

# Draft Environmental and Social Impact Assessment Report (ESIA) – Part 3

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## INO: Jawa-1 LNG to Power Project

Prepared by ERM for PT Jawa Satu Power (JSP)

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## *LIST OF ANNEXES*

- ANNEX A Comparison of Numerical Standards*
- ANNEX B Baseline Survey Results*
- ANNEX C Stakeholder Engagement Plan*
- ANNEX D Air Quality Assessment*
- ANNEX E Acoustics Assessment*
- ANNEX F Waste Regulations*
- ANNEX G Visual Impact Assessment*
- ANNEX H Quantitative Risk Assessment*
- ANNEX I Resettlement Plan*
- ANNEX J Biodiversity Criteria*
- ANNEX K Electromagnetic Field Study*
- ANNEX L Flood Risk Study*
- ANNEX M Greenhouse Gas Assessment*
- ANNEX N Salinity and Thermal Dispersion Model*



## **PLTGU Jawa 1 Independent Power Project**

### **ANNEX A NUMERICAL STANDARDS**

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## CONTENTS

<b>A</b>	<b>COMPARISON OF NUMERICAL STANDARDS BETWEEN INDONESIAN REGULATIONS AND WORLD BANK EHS GUIDELINES</b>	<b>A-1</b>
<b>A.1</b>	<b>ENVIRONMENTAL ASSESSMENT LEVELS</b>	<b>A-10</b>
<b>A.2</b>	<b>ENVIRONMENTAL PERFORMANCE LEVELS</b>	<b>A-30</b>

## LIST OF TABLES

Table A.1	Applicable Indonesia Laws and Legislations	A-2
Table A.2	Groundwater Quality	A-11
Table A.3	Water Quality	A-13
Table A.4	Ambient Air Quality Standards and Guidelines	A-15
Table A.5	Noise Standards (dBA)	A-21
Table A.6	Marine Water Quality	A-23
Table A.7	Combustion Process - Internal Combustion Engine	A-30
Table A.8	Combustion Process - Turbine Gas	A-31
Table A.9	Combustion Process - Boiler, Steam Generator, Process Heater, Heater Transfer	A-32
Table A.10	Combustion Process - Flaring Unit	A-32
Table A.11	Production Process - Sulphur Recovery Unit	A-32
Table A.12	Production Process - Thermal Oxidant Sulphur Limit	A-32
Table A.13	Production Process - Dehydration Glycol Release	A-33
Table A.14	Production Process - Regenerator Catalyst Unit	A-33
Table A.15	Production Process - Sulphur Recovery Unit Claus System without Gas Incinerator	A-33
Table A.16	Production Process - Sulphur Recovery Unit Claus System with Gas Incinerator	A-33
Table A.17	Effluent and Discharge	A-34
Table A.18	Domestic Wastewater	A-35
Table A.19	Air Emissions for Thermal Power Plant	A-36
Table A.20	Main Process Activity - Main Process Source	A-37
Table A.21	Main Process Activity - Blowdown Boiler	A-37
Table A.22	Main Process Activity - Blowdown Cooling Water	A-38
Table A.23	Main Process Activity - WTP Demineralisation	A-38
Table A.24	Supporting Activity - Cooling Water Source (Heat Water)	A-38
Table A.25	Supporting Activity - Desalination Source	A-39

## COMPARISON OF NUMERICAL STANDARDS BETWEEN INDONESIAN REGULATIONS AND WORLD BANK EHS GUIDELINES

This Annex presents the comparison of Indonesian and IFC's environmental assessment and performances levels and measures which are relevant to the Project.

The IFC EHS Guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs. The IFC Performance Standard 3 for 'Resource Efficiency and Pollution Prevention' states that:

*"when host country regulations differ from the levels and measures presented in the World Bank Group EHS Guidelines, projects are required to achieve whichever is the more stringent. If less stringent levels or measures than those provided in the EHS Guidelines are appropriate in view of specific project circumstances, a full and detailed justification must be provided for any proposed alternatives through the environmental and social risks and impacts identification and assessment process. This justification must demonstrate that the choice for any alternate performance levels is consistent with the objectives of this performance standard".*

As such it is important early in the regulatory ESIA process to discuss the required resource efficiency and pollution prevention and control techniques for the project so as to avoid potential delays or cost implications, particularly those that may affect engineering design decisions. ERM are able to apply the most stringent performance levels and measures to the ESIA process.

Table A.1 summarises the Indonesian regulatory standards which are applicable to the Project.

**Table A.1 Applicable Indonesia Laws and Legislations**

Aspect/Feature	Laws and Regulations	Key Requirements for the Project	Key Authorities
<b>Environmental Approval</b>	<ul style="list-style-type: none"> <li>Act No. 32 of 2009 on Environmental Protection and Management; and</li> <li>Regulation of the Minister of Environment (Permen LH) No. 5 of 2012 on Types of Business Plans and / or Activities Required to Have Environmental Impact Analysis.</li> </ul>	<ul style="list-style-type: none"> <li>Given the Project having substantial impact on the environment, it have to be subjected to an environmental impact analysis (AMDAL).</li> </ul>	The Ministry of Environment (Central Government, Jakarta)
	<ul style="list-style-type: none"> <li>Regulation of the Minister of Environment (Permen LH) No. 8 of 2006 Guidance in the Preparation for Environmental Impact Assessment.</li> </ul>	<ul style="list-style-type: none"> <li>Guideline and procedures for writing environmental impact analysis (AMDAL) documents.</li> </ul>	
	<ul style="list-style-type: none"> <li>Regulation of the Minister of Environment (Permen LH) No. 05 of 2008 on Working Procedure of EIA Appraisal Committee.</li> </ul>	<ul style="list-style-type: none"> <li>Guidelines for the Authority who assesses the AMDAL documents.</li> </ul>	
	<ul style="list-style-type: none"> <li>Decree of Head of Environmental Impact Management Agency No. 56/BAPEDAL/03/1994 concerning Guidelines to Significant Impacts.</li> </ul>	<ul style="list-style-type: none"> <li>Regulation for determination of significant impacts.</li> </ul>	The Head of Environmental Impact Management Agency ( <i>Bapedal</i> )
	<ul style="list-style-type: none"> <li>Decree of the Head of Environmental Impact Management Agency No. 299/BAPEDAL/11/1996 on Technical Guidelines for Technical Guidelines for Social Aspects Study in the Preparation of Environmental Impact Assessments; and</li> <li>Decree of Environmental Impact Management Agency No.8 of 2000 concerning Community Involvement and Information Disclosure in the Process of Environmental Impact Assessment.</li> </ul>	<ul style="list-style-type: none"> <li>Guidance for the assessments of social aspects in the drafting of AMDAL documents; and</li> <li>Regulation of the announcements in the press and the public consultation in relation to the AMDAL process.</li> </ul>	

Aspect/Feature	Laws and Regulations	Key Requirements for the Project	Key Authorities
	<ul style="list-style-type: none"> <li>Decree of Head of Impact Control Agency No. 124 of 1997 on Guidelines in the Aspects of Public Health Study in the Preparation of the Environmental Impact Assessment.</li> <li>Decree of the Minister (Kepmenkes) No. 876 of 2011 concerning Technical Guidelines for Environmental Health Impact Assessment.</li> </ul>	<ul style="list-style-type: none"> <li>Guidelines for the assessments of health elements in an AMDAL documents.</li> </ul>	The Ministry of Health (Central Government, Jakarta)
<b>Environmental License</b>	<ul style="list-style-type: none"> <li>Government Regulation No. 27 of 2012 on Environmental Permits</li> </ul>	<ul style="list-style-type: none"> <li>The requirement for obtaining the business permit is the Environmental Permit that shall report the requirements and obligations which have been stated in the approval of the AMDAL. The Environmental Permit shall also include the other required environmental protection and management permits, such as waste, gas emission, water discharge permits.</li> </ul>	Central Government
<b>Public Disclosure</b>	<ul style="list-style-type: none"> <li>Act No. 14 of 2008 on Public Information Disclosure.</li> </ul>	<ul style="list-style-type: none"> <li>The Act guarantees the right of every citizen to obtain information from public information quickly, efficiently and at a reasonable cost.</li> </ul>	Central Government
<b>Waste Management: Hazardous Waste</b>	<ul style="list-style-type: none"> <li>Government Regulation No. 101 of 2014 on Management of Hazardous and Toxic Waste.</li> </ul>	<ul style="list-style-type: none"> <li>Permit for managing hazardous and toxic waste.</li> </ul>	The Ministry of Environment (Central Government, Jakarta)
	<ul style="list-style-type: none"> <li>Regulation of the Minister of Environment (Permen LH) No. 18 of 2009 on Procedures for Management of Hazardous and Toxic Waste.</li> </ul>	<ul style="list-style-type: none"> <li>Technical guidelines for obtaining permit of temporary storage of hazard and toxic waste, transporting, and processing, including final dumping.</li> </ul>	The Ministry of Environment (Central Government, Jakarta)
	<ul style="list-style-type: none"> <li>Decree of Head of Environmental Impact Management Agency No. KEP-01/BAPEDAL/09/1995 on Procedures and</li> </ul>	<ul style="list-style-type: none"> <li>Technical requirements for storage and collection of hazardous and toxic material</li> </ul>	The Head of Environmental Impact

Aspect/Feature	Laws and Regulations	Key Requirements for the Project	Key Authorities
	<p><i>Requirements for Storage and Collection of Hazardous and Toxic Material;</i></p> <ul style="list-style-type: none"> <li><i>Decree of Head of Environmental Impact Management Agency No. KEP-02/BAPEDAL/09/1995 on Documents of hazardous and Toxic Waste; and</i></li> <li><i>Decree of Head of Environmental Impact Management Agency No. KEP-03/BAPEDAL/09/1995 on Hazardous and Toxic Waste Treatment.</i></li> </ul>	<ul style="list-style-type: none"> <li>Reference for management of hazardous and toxic waste; and</li> <li>Technical requirements for hazardous and toxic waste treatment including incineration.</li> </ul>	Management Agency ( <i>Bapedal</i> )
	<ul style="list-style-type: none"> <li><i>Minister of Environment of the Republic of Indonesia Regulation No 14 of 2013 regarding Symbol and Label for Hazardous and Toxic Waste.</i></li> </ul>	<ul style="list-style-type: none"> <li>Symbolling and labelling requirements for hazardous and toxic wastes.</li> </ul>	The Ministry of Environment (Central Government, Jakarta)
	<ul style="list-style-type: none"> <li><i>Minister of Environment Regulation No. 05 of 2009 regarding Waste Management at Port.</i></li> </ul>	<ul style="list-style-type: none"> <li>Requirements for transferring waste generated from vessel's routine and tank cleaning activities to the operator of waste management facilities on-shore.</li> </ul>	The Ministry of Environment (Central Government, Jakarta)
<b>Waste Management: Non-Hazardous Waste/General Waste</b>	<ul style="list-style-type: none"> <li><i>Act No. 18 of 2008 on Waste Management.</i></li> </ul>	<ul style="list-style-type: none"> <li>Provision for every individual to manage their waste in an environmentally sound manner.</li> </ul>	Central Government
<b>Hazardous Materials</b>	<ul style="list-style-type: none"> <li><i>Government Regulation No. 74 of 2001 on Management of Hazardous and Toxic Materials.</i></li> </ul>	<ul style="list-style-type: none"> <li>List of the toxic chemicals and guideline for managing hazardous and toxic materials.</li> </ul>	The Ministry of Environment (Central Government, Jakarta)
	<ul style="list-style-type: none"> <li><i>Regulation of the Minister of Environment (Permen LH) No. 3 of 2008 on Procedures for Issuing Symbols and Labels for Hazardous and Toxic Materials.</i></li> </ul>	<ul style="list-style-type: none"> <li>Symbolling and labelling requirements for hazardous and toxic wastes.</li> </ul>	The Ministry of Environment (Central Government, Jakarta)

Aspect/Feature	Laws and Regulations	Key Requirements for the Project	Key Authorities
	<ul style="list-style-type: none"> <li>Decree of Minister for Transportation No. KM 17 of 2000 on Guidelines for Handling of Dangerous Goods / Materials in Shipping Activities in Indonesia.</li> </ul>	<ul style="list-style-type: none"> <li>Obligation to comply with the IMDG (International Maritime Dangerous Goods Code) guidelines in conducting hazardous materials handling in shipping activities.</li> </ul>	The Ministry of Transportation (The Port Administration of Handil)
<b>Wastewater Management: Effluent and Sewage</b>	<ul style="list-style-type: none"> <li>Regional Regulation of Bekasi Regency Number 11 Year 2002 regarding Wastewater Disposal Permit</li> </ul>	<ul style="list-style-type: none"> <li>Provision on obtaining wastewater disposal permit regulation on Bekasi Regency</li> </ul>	Regent of Bekasi Regency
	<ul style="list-style-type: none"> <li>West Java Provincial Regulation No. 3 of 2004 on Water Quality Management and Water Pollution Control</li> </ul>	<ul style="list-style-type: none"> <li>Reference on water quality management in West Java area, including waste water treatment plant</li> </ul>	Governor of West Java
	<ul style="list-style-type: none"> <li>Regulation of the Ministry of Environment and Forestry No. P.68/Menlhk/Setjen/Kum.1/8/2016 on Quality Standard of Domestic Wastewater</li> </ul>	<ul style="list-style-type: none"> <li>Provision on quality standard of domestic wastewater including permit of disposal wastewater</li> </ul>	The Ministry of Environment (Central Government, Jakarta)
	<ul style="list-style-type: none"> <li>Ministry of Environment Regulation No. 8 Year 2009 regarding Wastewater Quality Standard for Business and/or Thermal Power Plant Activity</li> </ul>	<ul style="list-style-type: none"> <li>Provision of wastewater quality standard on thermal power plant activity</li> </ul>	The Ministry of Environment (Central Government, Jakarta)
<b>Water Quality and Hydrology: Seawater Pollution</b>	<ul style="list-style-type: none"> <li>Regulation of the Minister of Environment (Permen LH) No. 12 of 2006 on Requirements and Procedures for Permitting Wastewater Disposal into Sea.</li> </ul>	<ul style="list-style-type: none"> <li>Guidelines on permitting for wastewater disposal into the sea</li> </ul>	The Ministry of Environment (Central Government, Jakarta)
	<ul style="list-style-type: none"> <li>Decree of the Minister of Environment No. 51 of 2004 on Sea Water Quality Standard</li> </ul>	<ul style="list-style-type: none"> <li>No specific permitting requirements. Stipulated sea water quality standards for marine biota</li> </ul>	The Ministry of Environment (Central Government, Jakarta)

Aspect/Feature	Laws and Regulations	Key Requirements for the Project	Key Authorities
	<ul style="list-style-type: none"> <li>Government Regulation No. 21 of 2010 on Environmental Protection of Maritime</li> </ul>	<ul style="list-style-type: none"> <li>Prohibition for any ship to discharge water waste, hazardous, toxic chemicals and materials containing ozone-depleting substances into seawater.</li> </ul>	Central Government
<b>Water Resources</b>	<ul style="list-style-type: none"> <li>Act No. 7 of 2004 on Water Resources.</li> </ul>	<ul style="list-style-type: none"> <li>Law contains the principles of water resources management policies which consist in 6 main pillars: conservation, utilization, control of destructive force, community participation, steady institutional and good information systems and data</li> </ul>	Central Government
<b>Freshwater Quality</b>	<ul style="list-style-type: none"> <li>Regulation of the Minister of Health (Permenkes) No. 416 of 1990 Standard on Clean Water</li> </ul>	<ul style="list-style-type: none"> <li>Clean water standards and water quality parameters.</li> </ul>	The Ministry of Health (Central Government, Jakarta)
	<ul style="list-style-type: none"> <li>Government Regulation No. 82 of 2001 concerning Water Quality Management and Air Pollution Control</li> </ul>	<ul style="list-style-type: none"> <li>Classification of onshore water usage, the quality standards, the parameter requirement for water quality monitoring and the method for evaluating the water quality status. Based on the purpose of Kalen Atas and Cilamaya River as an irrigation and fishpond, both can be classified as Class II.</li> </ul>	Central Government
<b>Air Quality: Ambient Air</b>	<ul style="list-style-type: none"> <li>Government Regulation No. 41 of 1999 on Air Pollution Control</li> </ul>	<ul style="list-style-type: none"> <li>Standards of ambient air quality</li> </ul>	The Ministry of Environment (Central Government, Jakarta)
<b>Air Quality: Air Emission</b>	<ul style="list-style-type: none"> <li>Ministry of Environment Regulation No. 21 of 2008 on Quality Standard of Immobile Source Emission for Business and/or Thermal Power Plant Activity</li> </ul>	<ul style="list-style-type: none"> <li>Quality standards of emission in atmosphere from thermal industry</li> </ul>	The Ministry of Environment (Central Government, Jakarta)

Aspect/Feature	Laws and Regulations	Key Requirements for the Project	Key Authorities
<b>Noise</b>	<ul style="list-style-type: none"> <li>Decree of the Minister of Environment No. KEP48/MENLH/11/1996 on Noise Standard</li> </ul>	<ul style="list-style-type: none"> <li>Quality standard for noise levels in residential and industrial areas</li> </ul>	The Ministry of Environment (Central Government, Jakarta)
<b>Odour</b>	<ul style="list-style-type: none"> <li>Decree of the Minister of Environment No. 50 of 1996 on Standard of Odour</li> </ul>	<ul style="list-style-type: none"> <li>Quality standard for odour levels</li> </ul>	The Ministry of Environment (Central Government, Jakarta)
<b>Vibration</b>	<ul style="list-style-type: none"> <li>Decree of the Minister of Environment No. 49 of 1996 on Vibration Standards</li> </ul>	<ul style="list-style-type: none"> <li>Quality standard for vibration levels</li> </ul>	The Ministry of Environment (Central Government, Jakarta)

The Project will be undertaken in accordance with the applicable provisions of the IFC Performance Standards (2012), the World Bank Group Environmental, Health and Safety Guidelines and other good international industry practices.

Applicable IFC guidelines which the Project Proponent will consider in preparing its approach include:

- *Environmental, Health, and Safety (EHS) Guidelines - General EHS Guidelines, April 30, 2007;*
- *Environmental, Health, and Safety (EHS) Guidelines for Construction and Decommissioning, April 30, 2007;*
- *Environmental, Health, and Safety (EHS) Guidelines for Liquefied Natural Gas (LNG) Facilities, April 11, 2017;*
- *Environmental, Health, and Safety Guidelines for Thermal Power Plants, December 19, 2008; and*
- *Environmental, Health, And Safety Guidelines Offshore Oil and Gas Development, June 5, 2015.*

Other international treaties and conventions that are applicable to the Projects include:

- *International Convention for the Prevention of Pollution from Ships (MARPOL) 1978;*
- *IFC PS3 Resource Efficiency and Pollution Prevention;*
- *Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), 1975;*
- *ASEAN Agreement on the Conservation of Nature and Natural Resources, 1985;*
- *Convention on Biological Diversity, 1992;*
- *IFC PS6 Biodiversity Conservation and Sustainable Management of Living Natural Resources;*
- *ASEAN Peatland Management Initiative (APMI), 2003;*
- *Convention on Wetlands of International Importance (Ramsar Convention, 1971);*
- *Convention on the Protection of the World Cultural and Natural Heritage, 1972;*

- *Memorandum of Understanding on the Conservation and Management of Marine Turtles and their Habitats of the Indian Ocean and South-East Asia, 2001;*
- *Agreement for the establishment of the Asia-Pacific Fishery Commission, 1948;*
- *Convention on Fishing and Conservation of the Living Resources of the High Seas, 1958;*
- *United Nations Convention on the Law of the Sea (UNCLOS III), 1973;*
- *Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, 1995;*
- *International Convention for the Safety of Life at Sea (SOLAS), 1974;*
- *International Maritime Dangerous Goods (IMDG) Code Volume 1 (2006) and Volume 2 (2012);*
- *Montreal Protocol on Substances that Deplete the Ozone Layer, 1989;*
- *United Nations Framework Convention on Climate Change – UNFCCC – as Non-Annex Party, 1992;*
- *Stockholm Convention on Persistent Organic Pollutants, 2004; and*
- *Vienna Convention on the Protection of the Ozone Layer (1985) and related Montreal Protocol on Substances that Deplete the Ozone Layer, 1995.*

## A.1 ENVIRONMENTAL ASSESSMENT LEVELS

### A.1.1 *Soil Quality Standards*

The IFC does not establish standards for soil quality standards nor the local Indonesian standards. However, *Section 4.1 – Contaminated Land, IFC General Environmental, Health, and Safety Guidelines* provides the following:

Land contamination may be encountered in sites under construction or decommissioning due to known or unknown historical releases of hazardous materials or oil, or due to the presence of abandoned infrastructure formerly used to store or handle these materials, including underground storage tanks. Actions necessary to manage the risk from contaminated land will depend on factors such as the level and location of contamination, the type and risks of the contaminated media, and the intended land use. However, a basic management strategy should include:

- Managing contaminated media with the objective of protecting the safety and health of occupants of the site, the surrounding community, and the environment post-decommissioning;
- Understanding the historical use of the land with regard to the potential presence of hazardous materials or oil prior to initiation of decommissioning activities;
- Preparing plans and procedures to respond to the discovery of contaminated media to minimise or reduce the risk to health, safety, and the environment consistent with the approach for Contaminated Land;
- Preparation of a management plan to manage obsolete, abandoned, hazardous materials or oil consistent with the approach to hazardous waste management.

## A.1.2 Groundwater Quality Standards

The IFC does not establish standards for groundwater quality. The Indonesian standards are established by the *Regulation of Health Ministry No. 416/1990* in Appendix II.

**Table A.2 Groundwater Quality**

Parameters	Units	Regulation of Health Ministry 416/1990 Appendix II
<i>Physical Test</i>		
Colour	TCU	50
Odour	-	No odour
Temperature	°C	± 3
Taste	-	No taste
Total Hardness as CaCO <sub>3</sub>	mg/L	500
Total Dissolved Solids, TDS	mg/L	1500
pH	-	6.5 - 9
Turbidity	NTU	25
<i>Anions &amp; Nutrients</i>		
Chloride, Cl	mg/L	600
Fluoride, F	mg/L	1.5
Nitrate Nitrogen, NO <sub>3</sub> -N	mg/L	10
Nitrite Nitrogen, NO <sub>2</sub> -N	mg/L	1
Sulphate, SO <sub>4</sub>	mg/L	400
Cyanide, CN-	mg/L	0.1
Sulphide, H <sub>2</sub> S	mg/L	-
<i>Microbiology Tests</i>		
Total Coli form	MPN/100ml	50
Fecal Coliform	MPN/100ml	10
<i>Dissolved Metals</i>		
Arsenic, As	mg/L	0.05
Cadmium, Cd	mg/L	0.005
Chromium Hexavalent, (Cr <sup>6+</sup> )	mg/L	0.05
Copper, Cu	mg/L	-
Iron, Fe	mg/L	1
Lead, Pb	mg/L	0.05
Manganese, Mn	mg/L	0.5
Mercury, Hg	mg/L	0.001
Selenium, Se	mg/L	0.01
Sodium, Na	mg/L	-
Zinc, Zn	mg/L	15
<i>Organic Chemistry</i>		
Aldrin and Dieldrin	mg/L	0.0007
Benzene	mg/L	0.01
Benzo (a) pyrene	mg/L	0.00001
Chlordane (total isomer)	mg/L	0.007
Chloroform	mg/L	0.03
2,4 D	mg/L	0.1
DDT	mg/L	0.03
Detergent	mg/L	0.5
1,2 Dischloroethane	mg/L	0.01
1,1 Dischloroethene	mg/L	0.0003
Heptaclor dan heptaclor epoxide	mg/L	0.003
Hexachlorobenzene	mg/L	0.00001
Gamma-HCH (Lindane)	mg/L	0.004

Parameters	Units	Regulation of Health Ministry 416/1990 Appendix II
Methoxychlor	mg/L	0.03
Pentachlorophanol	mg/L	0.01
Total Pesticide	mg/L	0.1
2,4,6 urichlorophenol	mg/L	0.01
Potassium Permanganate, KMnO <sub>4</sub>	mg/L	10
<i>Radioactivity</i>		
Gross Alpha Activity	Bq/L	0.1
Gross Beta Activity	Bq/L	1

### A.1.3

### Water Quality Standards

The IFC does not establish standards for surface water quality. Indonesian standards are established by *Government Regulation (PP) Number 82/2001 on Water Quality Management and Water Pollution Control*, which includes different classes according to use.

Class I is applicable for drinking water (Class I) and Classes II-IV as water suitable for use for recreational, fresh water fish cultivation, livestock and irrigation.

**Table A.3** Water Quality

Parameters	Units	PP 82/2001 Class I <sup>(1)</sup>	PP 82/2001 Class II <sup>(2)</sup>	PP 82/2001 Class III <sup>(3)</sup>	PP 82/2001 Class IV <sup>(4)</sup>	IFC
<i>Physical Tests</i>						
Temperature	°C	Three (3) deviation	Three (3) deviation	Three (3) deviation	Three (3) deviation	-
pH	-	6 - 9	6 - 9	6 - 9	5 - 9	-
Hardness	-	-	-	-	-	-
Total Dissolved Solids, TDS	mg/L	1,000	1,000	1,000	2,000	-
Total Suspended Solids, TSS	mg/L	50	50	400	400	-
<i>Anions &amp; Nutrients</i>						
Fluoride, F	mg/L	0.5	1.5	1.5	-	-
Chloride, Cl	mg/L	600	-	-	-	-
Sulphate, SO <sub>4</sub>	mg/L	400	-	-	-	-
Nitrate Nitrogen, NO <sub>3</sub> -N	mg/L	10	10	20	20	-
Nitrite Nitrogen, as N	mg/L	0.06	0.06	0.06	-	-
Total Phosphate, T-PO <sub>4</sub> as P	mg/L	0.2	0.2	1	5	-
Sulphide, H <sub>2</sub> S	mg/L	0.002	0.002	0.002	-	-
Free Ammonia Nitrogen, NH <sub>3</sub> -N	mg/L	0.5	-	-	-	-
Cyanide, CN	mg/L	0.02	0.02	0.02	-	-
<i>Dissolved Metals</i>						
Arsenic, As	mg/L	0.05	1	1	1	-
Barium, Ba	mg/L	1	-	-	-	-
Boron, B	mg/L	1	1	1	1	-
Cadmium, Cd	mg/L	0.01	0.01	0.01	0.01	-
Chromium Hexavalent, (Cr <sup>6+</sup> )	mg/L	0.05	0.05	0.05	0.01	-
Cobalt, Co	mg/L	0.2	0.2	0.2	0.2	-
Copper, Cu	mg/L	0.02	0.02	0.02	0.2	-
Iron, Fe	mg/L	0.3	-	-	-	-

Parameters	Units	PP 82/2001 Class I <sup>(1)</sup>	PP 82/2001 Class II <sup>(2)</sup>	PP 82/2001 Class III <sup>(3)</sup>	PP 82/2001 Class IV <sup>(4)</sup>	IFC
Lead, Pb	mg/L	0.03	0.03	0.03	1	-
Manganese, Mn	mg/L	0.1	-	-	-	-
Mercury, Hg	mg/L	0.001	0.002	0.002	0.005	-
Selenium, Se	mg/L	0.01	0.05	0.05	0.05	-
Zinc, Zn	mg/L	0.05	0.05	0.05	2	-
<i>Microbiology</i>						
Fecal Coliform	MPN/ 100ml	100	1000	2000	2000	-
Total Coliform	MPN/ 100ml	1,000	5000	10000	10000	-
<i>Others</i>						
Biochemical						
Oxygen Demand, BOD	mg/L	2	3	6	12	-
Dissolve Oxygen, DO	mg/L	6	4	3	0	-
Chlorine, Cl <sub>2</sub>	mg/L	0.03	0.03	0.03	-	-
Chemical						
Oxygen Demand, COD	mg/L	10	25	50	100	-
Surfactant, MBAS	µg/L	200	200	200	-	-
Oil & Grease	mg/L	1	1	1	1	-
Phenol	µg/L	1	1	1	-	-
BHC	µg/L	210	210	210	-	-
Aldrin and Dieldrin	µg/L	17	-	-	-	-
Chlordane	µg/L	3	-	-	-	-
DDT	µg/L	2	2	2	2	-
Heptachlor and Heptachlor epoxide	µg/L	18	-	-	-	-
Lindane	µg/L	56	-	-	-	-
Methoxychlor	µg/L	35	-	-	-	-
Endrin	µg/L	1	4	4	-	-
Toxaphane	µg/L	5	-	-	-	-
<i>Radioactivity</i>						
Gross-A	Bq/L	0.1	0.1	0.1	0.1	-
Gross- B	Bq/L	1	1	1	1	-
<ol style="list-style-type: none"> <li>Class I: Water used as raw water for drinking water, or other uses that require water quality similar as aforementioned.</li> <li>Class II: Water used for infrastructure / water recreation facilities, freshwater fish farming, livestock, water for irrigating crops or other uses that require water quality similar as aforementioned.</li> <li>Class III: Water used for freshwater fish farming, livestock, water for irrigating crops or other uses that require water quality similar as aforementioned.</li> <li>Class IV: Water used to irrigate crops and or other uses that require water quality similar as aforementioned.</li> </ol>						

#### A.1.4

#### *Ambient Air Quality Standards and Guidelines*

The IFC EHS Guidelines for Air Emissions and Ambient Air Quality state that:

*“Emissions do not result in pollutant concentrations that reach or exceed relevant ambient quality guidelines and standards <sup>(1)</sup> by applying national legislated standards, or in their absence, the current WHO Air Quality Guidelines, or other internationally recognised sources”*

Air quality in Indonesia is regulated by *Government Regulation No. 41/1999* regarding Air Pollution Control (PP41/1999). In accordance with the IFC’s EHS Guidelines for Air Emissions and Ambient Air Quality, the air quality standards presented in PP41/1999 should be considered the appropriate standard and should be used for comparison of baseline data and predicted impacts to air quality from the Project.

The air quality standards in PP41/1999 are presented below in **Table A.4**. The IFC EHS guidelines and interim targets are also presented for comparison.

**Table A.4** *Ambient Air Quality Standards and Guidelines*

Parameter	Period of Measurement	PP41/1999 <sup>(1)</sup> (µg/m <sup>3</sup> )	IFC EHS Guidelines <sup>(2)</sup> (µg/m <sup>3</sup> )
Carbon monoxide, CO	1 hour	30,000	-
	24 hour	10,000	-
Hydrocarbons, HC	3 hour	160	-
Nitrogen dioxide, NO <sub>2</sub>	1 hour	400	200 (Guideline) <sup>(3)</sup>
	24 hour	150	-
	1 year	100	40 (Guideline)
Sulphur dioxide, SO <sub>2</sub>	10 minute	-	500 (Guideline)
	1 hour	900	-
	24 hour	365	125 (Interim target-1) <sup>(4)</sup>
			50 (Interim target-2)
	20 (Guideline)		
1 year	60	-	
Dust/ Total Suspended Solids (TSP)	24 hour	230	-
Lead (Pb)	1 year	90	-
	24 hour	2	-
Oxidant (O <sub>3</sub> )	1 year	1	-
	1 hour	50	-
	8 hour	-	160 (Interim Target-1)
			100 (Guideline)
	1 year	235	-

(1) Ambient air quality standards are ambient air quality levels established and published through national legislative and regulatory processes, and ambient quality guidelines refer to ambient quality levels primarily developed through clinical, toxicological and epidemiological evidence (such as those published by the World Health Organisation).

Parameter	Period of Measurement	PP41/1999 <sup>(1)</sup> (µg/m <sup>3</sup> )	IFC EHS Guidelines <sup>(2)</sup> (µg/m <sup>3</sup> )
PM <sub>10</sub>	24 hour	150	150 (Interim target 1)
			100 (Interim target 2)
	75 (Interim target 3)		
	50 (Guideline)		
PM <sub>2.5</sub>	24 hour	65	70 (Interim target 1)
			50 (Interim target 2)
	37.5 (Interim target 3)		
	25 (Guideline)		
PM <sub>10</sub>	1 year	-	50 (Interim target 1)
			50 (Interim target 2)
	30 (Interim target 3)		
	20 (Guideline)		
PM <sub>2.5</sub>	1 year	15	75 (Interim target 1)
			50 (Interim target 2)
	37.5 (Interim target 3)		
	25 (Guideline)		
PM <sub>2.5</sub>	1 year	15	35 (Interim target 1)
			25 (Interim target 2)
	15 (Interim target 3)		
	10 (Guideline)		

1. Indonesian Government Regulation No. 41 Year 1999 regarding Air Pollution Control (PP41/1999).
2. World Health Organisation (WHO) Air Quality Guidelines for Europe, 2<sup>nd</sup> Edition (2000).
3. The guidelines are intended to provide background information and guidance to (inter)national and local authorities in making risk assessment and risk management decisions. In establishing pollutant levels below which exposure - for life or for a given period of time - does not constitute a significant public health risk, the guidelines provide a basis for setting standards or limit values for air pollutants.
4. Interim targets are proposed as incremental steps in a progressive reduction of air pollution and are intended for use in areas where pollution is high. These targets aim to promote a shift from high air pollutant concentrations, which have acute and serious health consequences, to lower air pollutant concentrations. If these targets were to be achieved, one could expect significant reductions in risks for acute and chronic health effects from air pollution. Progress towards the guideline values should, however, be the ultimate objective of air quality management and health risk reduction in all areas.

The IFC Performance Standard 3 (PS3): Resource Efficiency and Pollution Prevention serves to avoid or minimise adverse impacts on human health and the environment by avoiding or minimising pollution from project activities. It also seeks to promote more sustainable use of resources, including energy and water. Besides, it anticipates to reduce project-related Greenhouse Gas (GHG) emissions.

#### A.1.4.1

#### MARPOL 73/78

Additionally, Annex VI of the MARPOL is the Prevention of Air Pollution from Ships which entered into force on 19 May 2005. It sets limits on sulphur oxide and nitrogen oxide emissions from ship exhausts and prohibits deliberate emissions of ODS.

#### Chapter III: Requirements for Control of Emissions from Ships

#### Regulation 12: ODS

Section 2 states that any deliberate emissions of ODS shall be prohibited which includes emissions occurring in the course of maintaining, servicing, repairing or disposing of systems or equipment, except that deliberate emissions do not include minimal releases associated with the recapture or recycling of an ODS. Emissions arising from leaks of an ODS, whether or not the leaks are deliberate, may be regulated by Parties.

*Section 5* requires each ship to maintain a list of equipment containing ODS.

*Section 6* requires each ship shall maintain an ODS Record Book. This Record Book may form part of an existing log-book or electronic recording system as approved by the Administration.

*Section 7* states that entries in the ODS Record Book shall be recorded in terms of mass (kg) of substance and shall be completed without delay on each occasion, in respect of the following:

- (1) recharge, full or partial, of equipment containing ODS
- (2) repair or maintenance of equipment containing ODS
- (3) discharge of ODS to the atmosphere:
  - i. deliberate; and
  - ii. non-deliberate;
- (4) discharge of ODS to the atmosphere;
- (5) discharge of ODS to land-based reception facilities; and
- (6) supply of ODS to the ship.

*Regulation 13: Nitrogen oxides (NO<sub>x</sub>)*

*Section 3* states that the operation of a marine diesel engine which is installed on a ship constructed on or after 1 January 2000 and prior to 1 January 2011 is prohibited, except when the emission of nitrogen oxides (calculated as the total weighted emission of NO<sub>2</sub>) from the engine is within the following limits, where n = rated engine speed (crankshaft revolutions per minute):

- (1) 17.0 g/kWh when n is less than 130 rpm;
- (2)  $45 \cdot n^{(-0.2)}$  g/kWh when n is 130 or more but less than 2,000 rpm;
- (3) 9.8 g/kWh when n is 2,000 rpm or more.

*Section 4* states that the operation of a marine diesel engine which is installed on a ship constructed on or after 1 January 2011 is prohibited, except when the emission of nitrogen oxides (calculated as the total weighted emission of NO<sub>2</sub>) from the engine is within the following limits, where n = rated engine speed (crankshaft revolutions per minute):

- (1) 14.4 g/kWh when n is less than 130 rpm;
- (2)  $44 \cdot n^{(-0.23)}$  g/kWh when n is 130 or more but less than 2,000 rpm;
- (3) 7.7 g/kWh when n is 2,000 rpm or more.

*Section 5(1)* states that the operation of a marine diesel engine which is installed on a ship constructed on or after 1 January 2016:

- (1) is prohibited except when the emission of nitrogen oxides (calculated as the total weighted emission of NO<sub>2</sub>) from the engine is within the following limits, where n = rated engine speed (crankshaft revolutions per minute):
  - i. 3.4 g/kWh when n is less than 130 rpm;
  - ii.  $9 \cdot n^{(-0.2)}$  g/kWh when n is 130 or more but less than 2,000 rpm;and
  - iii. 2.0 g/kWh when n is 2,000 rpm or more;

- (2) is subject to the standards set forth in subparagraph 5.1.1 of this paragraph when the ship is operating in an Emission Control Area (ECA) designated under paragraph 6 of this regulation; and
- (3) is subject to the standards set forth in paragraph 4 of this regulation when the ship is operating outside of an ECA designated under paragraph 6 of this regulation.

*Section 6* states that for the purpose of this regulation, an ECA shall be any sea area, including any port area, designated by the Organisation in accordance with the criteria and procedures set forth in Appendix III of MARPOL Annex VI.

*Regulation 14: Sulphur oxides (SO<sub>x</sub>) and Particulate Matter*

Section 1 states that the sulphur content of any fuel oil used on board ships shall not exceed the following limits:

- (1) 4.50% m/m prior to 1 January 2012;
- (2) 3.50% m/m on and after 1 January 2012; and
- (3) 0.50% m/m on and after 1 January 2020.

*Section 3(2)* states that Emission Control Areas shall include sea area, including port areas, designated by the Organisation in accordance with the criteria and procedures set forth in Appendix III of MARPOL Annex VI.

*Section 4* states that while ships are operating within an Emission Control Area, the sulphur content of fuel oil used on board ships shall not exceed the following limits:

- (1) 1.50% m/m prior to 1 July 2010;
- (2) 1.00% m/m on and after 1 July 2010; and
- (3) 0.10% m/m on and after 1 January 2015.

*Regulation 15: Volatile Organic Compounds (VOCs)*

1. If the emissions of VOCs from a tanker are to be regulated in a port or ports or a terminal or terminals under the jurisdiction of a Party, they shall be regulated in accordance with the provisions of this regulation.
2. A Party regulating tankers for VOC emissions shall submit a notification to the Organisation. This notification shall include information on the size of tankers to be controlled, the cargoes requiring vapour emission control systems, and the effective date of such control. The notification shall be submitted at least six months before the effective date.
3. A Party which designates ports or terminals at which VOCs emissions from tankers are to be regulated shall ensure that vapour emission control systems, approved by that Party taking into account the safety standards for such systems developed by the Organisation, are provided in any designated port and terminal and are operated safely and in a manner so as to avoid undue delay to a ship.

4. The Organisation shall circulate a list of the ports and terminals designated by Parties to other Parties and Member States of the Organisation for their information.
5. A tanker to which paragraph 1 of this regulation applies shall be provided with a vapour emission collection system approved by the Administration taking into account the safety standards for such systems developed by the Organisation, and shall use this system during the loading of relevant cargoes. A port or terminal which has installed vapour emission control systems in accordance with this regulation may accept tankers which are not fitted with vapour collection systems for a period of three years after the effective date identified in paragraph 2 of this regulation.
6. A tanker carrying crude oil shall have on board and implement a VOC Management Plan approved by the Administration. Such a plan shall be prepared taking into account the guidelines developed by the Organisation. The plan shall be specific to each ship and shall at least:
  - (1) provide written procedures for minimizing VOC emissions during the loading, sea passage and discharge of cargo;
  - (2) give consideration to the additional VOC generated by crude oil washing;
  - (3) identify a person responsible for implementing the plan; and
  - (4) for ships on international voyages, be written in the working language of the master and officers and, if the working language of the master and officers is not English, French, or Spanish, include a translation into one of these languages.
7. This regulation shall also apply to gas carriers only if the type of loading and containment systems allows safe retention of non-methane VOCs on board or their safe return ashore.

*Appendix III: Criteria and Procedures for Designation of Emission Control Areas*

*Section 1* states that this Appendix serves to provide the criteria and procedures to Parties for formulating and submitting proposals for the designation of Emission Control Areas and to set forth the factors to be considered in the assessment of such proposals by the Organisation. An ECA should be considered for adoption by the Organisation if supported by a demonstrated need to prevent, reduce, and control emissions of NO<sub>x</sub> or SO<sub>x</sub> and particulate matter or all three types of emissions (hereinafter emissions) from ships.

*Section 3* (Criteria for Designation of an Emission Control Area) states that:

1. The proposal shall include:
  - (i) a clear delineation of the proposed area of application, along with a reference chart on which the area is marked;
  - (ii) the type or types of emission(s) that is or are being proposed for control (i.e. NO<sub>x</sub> or SO<sub>x</sub> and particulate matter or all three types of emissions);

- (iii) a description of the human populations and environmental areas at risk from the impacts of ship emissions;
  - (iv) an assessment that emissions from ships operating in the proposed area of application are contributing to ambient concentrations of air pollution or to adverse environmental impacts. Such assessment shall include a description of the impacts of the relevant emissions on human health and the environment, such as adverse impacts to terrestrial and aquatic ecosystems, areas of natural productivity, critical habitats, water quality, human health, and areas of cultural and scientific significance, if applicable. The sources of relevant data including methodologies used shall be identified;
  - (v) relevant information pertaining to the meteorological conditions in the proposed area of application to the human populations and environmental areas at risk, in particular prevailing wind patterns, or to topographical, geological, oceanographic, morphological, or other conditions that contribute to ambient concentrations of air pollution or adverse environmental impacts;
  - (vi) the nature of the ship traffic in the proposed Emission Control Area, including the patterns and density of such traffic;
  - (vii) a description of the control measures taken by the proposing Party or Parties addressing land-based sources of NO<sub>x</sub>, SO<sub>x</sub> and particulate matter emissions affecting the human populations and environmental areas at risk that are in place and operating concurrent with the consideration of measures to be adopted in relation to provisions of regulations 13 and 14 of Annex VI; and
  - (viii) the relative costs of reducing emissions from ships when compared with land-based controls and the economic impacts on shipping engaged in international trade.
2. The geographical limits of an ECA will be based on the relevant criteria outlined above, including emissions and deposition from ships navigating in the proposed area, traffic patterns and density, and wind conditions.

### A.1.5

### Noise Standards

Under Indonesian standards, the *Decree of Environmental Ministry No. 48/1996* on Noise level Quality Standard and IFP regulates ambient noise. Noise health and safety limits are established under the Ministry of Manpower Decree No 51 of 1999.

The IFC Performance Standards applicable for industrial noise applies to fixed noise sources only. Noise impacts should not exceed the levels presented in **Table A.5**, or result in a maximum increase in background levels greater than three (3) dB at the nearest receptor location off-site.

**Table A.5** Noise Standards (dBA)

Site	MoE Dec. #48/1996 <sup>(1)</sup>	National Standard 51/1999 <sup>(2)</sup>	IFC EHS Guidelines (LAeq (dBA)) <sup>(3)(4)</sup>	
			Daytime (07:00 - 22:00)	Night-time (22:00 - 07:00)
Residential; Institutional; educational	55	-	55	45
Trade and service	70	-	-	-
Office and trade	65	-	-	-
Green space	50	-	-	-
Industrial; commercial	70	-	70	70
Officials and public facility	60	-	-	-
Recreational	70	-	-	-
Airport	-	-	-	-
Train station	60	-	-	-
Sea port	70	-	-	-
Cultural heritage	-	-	-	-
Hospitals	55	-	-	-
Schools	55	-	-	-
Worship place	55	-	-	-
Industrial Area	70	-	-	-
Occupational Health & Safety (exposure limits)		<b>Exposure Limit/Day</b>	<b>LAeq, 8h</b>	<b>Max LAmax, fast</b>
		-	40-45 (closed offices)	-
		-	45-50 (Open offices)	-
		85 (8 hours)	85 (heavy industry)	110 (heavy industry)
		88 (8 hours)	-	-
		91 (8 hours)	-	-
		94 (1 hours)	-	-
		97 (30 minutes)	-	-

1. Ministry of Environment Decree #48, 1996.
2. Ministry of Manpower Decree 51, 1999.
3. Environmental, Health, and Safety (EHS) Guidelines for Noise Management (2007).
4. Acceptable indoor noise levels for residential, institutional, and educational settings (WHO 1999).

Similar to the air quality, the national standards should be considered and used for comparison of baseline data and predicted impacts to noise generated from the Project.

## A.1.6 Marine Water Quality Standards

The IFC does not establish standards for seawater quality. Indonesian standards are established by the *Decree of Environmental Ministry No. 51/2004* in Appendix III.

**Table A.6 Marine Water Quality**

Parameters	Units	Regulation of Health Ministry 416/1990 Appendix II
<i>Physical Test</i>		
Odour	-	natural
pH	-	7 -8.5
Temperature	°C	natural
Transparency	m	natural
Salinity	‰	natural
Total Suspended Solids, TSS	mg/L	natural
Turbidity	NTU	< 5
Floating debris		none
Oil slick		none
<i>Anions &amp; Nutrients</i>		
Sulphide as H <sub>2</sub> S	mg/L	0.01
Cyanide, CN-	mg/L	0.5
Ammonia Nitrogen, NH <sub>3</sub> -N	mg/L	0.3
Nitrate Nitrogen, NO <sub>3</sub> -N	mg/L	0.008
Phosphate, PO <sub>4</sub> -P	mg/L	0.015
<i>Microbiology Tests</i>		
Total Coliform	MPN/100ml	1000
Pathogen	cell/100 ml	-
Plankton	cell/100 ml	not blooming
<i>Dissolved Metals</i>		
Arsenic, As	mg/L	0.05
Cadmium, Cd	mg/L	0.005
Chromium Hexavalent, (Cr <sub>6</sub> <sup>+</sup> )	mg/L	0.05
Copper, Cu	mg/L	-
Iron, Fe	mg/L	1
Lead, Pb	mg/L	0.05
Manganese, Mn	mg/L	0.5
Mercury, Hg	mg/L	0.001
Selenium, Se	mg/L	0.01
Sodium, Na	mg/L	-
Zinc, Zn	mg/L	15
<i>Organic Chemistry</i>		
Arsenic, As	mg/L	0.012
Cadmium, Cd	mg/L	0.001
Chromium Hexavalent, (Cr <sub>6</sub> <sup>+</sup> )	mg/L	0.005
Copper, Cu	mg/L	0.008
Lead, Pb	mg/L	0.008
Mercury, Hg	mg/L	0.001
Nickel, Ni	mg/L	0.05
Zinc, Zn	mg/L	0.05
Selenium, Se	mg/L	-
Silver, Ag	mg/L	-

Parameters	Units	Regulation of Health Ministry 416/1990 Appendix II
<i>Others</i>		
Dissolve Oxygen, DO	mg/L	>5
Biochemical Oxygen Demand, BOD	mg/L	20
Surfactants, MBAS	mg/L	1
PAH	mg/L	0.003
Oil & Grease	mg/L	1
Total Phenol	mg/L	0.002
Total PCB	mg/L	0.01
Pesticide	µg/L	0.01
TBT (Tributyltin)	µg/L	0.01
<i>Radioactivity</i>		
Radionuclides	Bq/L	4

## A.1.7 *Biodiversity*

### A.1.7.1 *ASEAN Agreement on the Conservation on Nature and Natural Resources, 1985*

As a signatory to the *ASEAN Agreement on the Conservation on Nature and Natural Resources, 1985* shall agree to take all necessary measures, within the framework of its national laws to ensure that conservation and management of natural resources, including marine habitats, are treated as an integral part of development at all stages and at all levels.

Under *Article 5* of this Agreement:

- *Appendix I* to this Agreement shall list endangered species recognised by the Contracting Parties as of prime importance to the Region and deserving special attention. The Appendix shall be adopted by a meeting of the Contracting Parties; Accordingly, Contracting Parties shall, wherever possible:
  - a) prohibit the taking of these species, except for exceptional circumstances by special allowance from the designated authorities of the Contracting Parties;
  - b) regulate the trade in and possession of specimens and products of those species accordingly; and
  - c) especially protect habitat of those species by ensuring that sufficient portions are included in protected areas; (d) take all other necessary measures to improve their, conservation status, and restore their populations to the highest possible level.
- Each Contracting Party shall, whenever Possible, apply the above measures to species endangered at national level.
- The Contracting Parties recognise their special responsibility in respect of species that are endemic to areas under their jurisdiction and shall undertake accordingly to take, wherever possible, all the necessary measures to maintain the population of such species at the highest possible level.

Under *Article 11* of the Agreement, the Contracting Parties, recognizing the adverse effect that polluting discharges or Missions may have on natural processes and the functioning of natural ecosystems as well as on each of the individual ecosystem components especially animal and plants species, shall endeavour to prevent, reduce and control such discharges, emissions or applications in particular by:

- a) submitting activities likely to cause pollution of the air, soil, freshwater, or the marine environment, to control which shall take into consideration

both the- cumulative effects of the pollutants concerned and the self-purification aptitude of the recipient natural environment;

- b) making such controls conditional on, inter alia, appropriate treatment of polluting emissions; and
- c) establishing national environmental quality monitoring programmes, particular attention being paid to the effects of pollution on natural ecosystems, and co-operation in such programmes for the Region as a whole.

*A.1.7.2 IFC Performance Standard 6 (PS6): Biodiversity Conservation and Sustainable Management of Living Natural Resources*

The PS6 serves to protect and conserve biodiversity. It helps maintain the benefits from ecosystem services and promotes the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities.

*A.1.7.3 Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), 1975*

CITES is an international agreement between governments, drafted as a result of a resolution adopted in 1963 at a meeting of members of the International Union for the Conservation of Nature (IUCN). The aim of CITES is to ensure that international trade in specimens of wild animals and plants does not threaten their survival and accords varying degrees of protection to more than 33,000 species of animals and plants.

*Article II* of the Convention states that parties shall not allow trade in specimens of species included in *Appendices I, II and III* except in accordance with the provisions of the present Convention:

- *Appendix I* shall include all species threatened with extinction which are or may be affected by trade. Trade in specimens of these species must be subject to particularly strict regulation in order not to endanger further their survival and must only be authorised in exceptional circumstances.
- *Appendix II* shall include:
  - a) all species which although not necessarily now threatened with extinction may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with their survival; and
  - b) other species which must be subject to regulation in order that trade in specimens of certain species referred to in sub-paragraph (a) of this paragraph may be brought under effective control.

- *Appendix III* shall include all species which any Party identifies as being subject to regulation within its jurisdiction for the purpose of preventing or restricting exploitation, and as needing the co-operation of other Parties in the control of trade.

*Articles III, IV and V* of the Convention gives provisions for the regulation of trade in specimens of species included in *Appendices I, II and III* respectively but shall not apply to the transit or transshipment of specimens through or in the territory of a Party while the specimens remain in Customs control as stated under *Article VII* of the Convention.

Permits and certificates granted under the provisions of *Articles III, IV, and V* shall be in accordance with the provisions of *Article VI* whereby each permit or certificate shall contain the title of the present Convention, the name and any identifying stamp of the Management Authority granting it and a control number assigned by the Management Authority. Furthermore, separate permit or certificate shall be required for each consignment of specimens. A Management Authority of the State of import of any specimen shall cancel and retain the export permit or re-export certificate and any corresponding import permit presented in respect of the import of that specimen.

#### A.1.7.4 *Convention on Biological Diversity (CBD), 1992*

The *Convention on Biological Diversity, 1992*, provides a global legal framework for action on biodiversity. The objectives of the Convention are the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising from the utilisation of genetic resources.

Under *Article 6* of the Convention each Contracting Party shall, in accordance with its particular conditions and capabilities:

- a) Develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity or adapt for this purpose existing strategies, plans or programmes which shall reflect, *inter alia*, the measures set out in this Convention relevant to the Contracting Party concerned; and
- b) Integrate, as far as possible and as appropriate, the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes and policies.

Under *Article 7* of the Convention, each Contracting Party shall, as far as possible and as appropriate, in particular for the purposes of *Articles 8 to 10*:

- a) Identify components of biological diversity important for its conservation and sustainable use having regard to the indicative list of categories set down in *Annex I*;

- b) Monitor, through sampling and other techniques, the components of biological diversity identified pursuant to subparagraph (a) above, paying particular attention to those requiring urgent conservation measures and those which offer the greatest potential for sustainable use;
- c) Identify processes and categories of activities which have or are likely to have significant adverse impacts on the conservation and sustainable use of biological diversity, and monitor their effects through sampling and other techniques; and
- d) Maintain and organise, by any mechanism data, derived from identification and monitoring activities pursuant to subparagraphs (a), (b) and (c) above

*Annex I* of the Convention states that:

1. Ecosystems and habitats: containing high diversity, large numbers of endemic or threatened species, or wilderness; required by migratory species; of social, economic, cultural or scientific importance: or, which are representative, unique or associated with key evolutionary or other biological processes;
2. Species and communities which are: threatened: wild relatives of domesticated or cultivated species; of medicinal, agricultural or other economic value; or social, scientific or cultural importance: or importance for research into the conservation and sustainable use of biological diversity, such as indicator species; and
3. Described genomes and genes of social, scientific or economic importance.

#### A.1.7.5

#### *ASEAN Peatland Management Initiative (APMI), 2003*

The APMI is a mechanism whereby ASEAN Member Countries through the principles of ASEAN cooperation will collectively collaborate amongst themselves or with other international institutions for mutual benefit to address the issues of peatland management on a sustainable basis to reduce transboundary haze pollution as well as climate change impact.

The goal is to promote sustainable management of peatlands in the ASEAN region through collective actions and enhanced cooperation as well as to reduce risk of fire and associated regional haze and contribute to global environmental management.

The ASEAN Peatland Management Strategy (APMS) has been developed by ASEAN Member States to guide actions to support management of peatlands in the region in the period of 2006-2020. The APMS was adopted in Manila in February 2003, and was last updated in September 2013.

The APMS has been prepared due to the pressing need recognised by both local and international communities for wise use and sustainable management

of peatlands as well as the emerging threat of peatland fire and its associated haze to the economy and health of the region, and its possibility of contributing to global climate change.

## A.2 ENVIRONMENTAL PERFORMANCE LEVELS

### A.2.1 Air Emission Limits for FSRU Activities

The Ministry of Environmental and Forestry Regulation No. 13 Year 2009 regarding Emission Standard of Stationary Emission Source for Oil and Gas Activity provides air emissions limits which are applicable to the Project.

The IFC PS3 states that when host country regulations differ from the levels and measures presented in the World Bank Group EHS Guidelines, projects are required to achieve whichever is the more stringent. On this basis, the equivalent IFC emission limit guidelines are presented where considered applicable and the more stringent of the two (2) has been highlighted. These values are what the Project should achieve.

**Table A.7 Combustion Process - Internal Combustion Engine**

Capacity	Fuel	Parameter	Environmental Ministry Regulation No. 13 Year 2009 (mg/Nm <sup>3</sup> ) <sup>(1)</sup>	IFC (in mg/Nm <sup>3</sup> or as indicated) <sup>(2)(3)</sup>
≤ 570 kWth	Oil	NO <sub>x</sub> as NO <sub>2</sub>	1000	NA
		CO	600	NA
	Gas	NO <sub>x</sub> as NO <sub>2</sub>	400	NA
		CO	500	NA
> 570 kWth	Oil	TSP	150	50 - 100 <sup>(4)</sup>
		SO <sub>2</sub>	800	1.5% - 3% sulfur <sup>(5)</sup>
		NO <sub>x</sub> as NO <sub>2</sub>	1000	1460 <sup>(6)</sup> or 1850 <sup>(7)</sup>
		CO	600	NA
	Gas	NO <sub>x</sub> as NO <sub>2</sub>	400	200 (Spark ignition)
				400 (Dual Fuel)
		CO	500	1600 (Compression Ignition)
				NA

1. Concentrations are specified at reference condition (Nm<sup>3</sup> is at 25°C, 1 atmosphere pressure, dry and 13% O<sub>2</sub>)
2. Environmental, Health, and Safety (EHS) Guidelines - General EHS Guidelines on Air Emissions and Ambient Air Quality (2007) Table 1.1.2 - Small Combustion Facilities Emission Guidelines (3MWth - 50MWth)
3. Concentrations are specified at reference condition (Nm<sup>3</sup> is at 0°C, 1 atmosphere pressure, dry and 15% O<sub>2</sub>)
4. Up to 100 if justified by project specific considerations (e.g. Economic feasibility of using lower ash content fuel, or adding secondary treatment to meet 50, and available environmental capacity of the site)
5. Up to 3% sulfur if justified by project specific considerations (e.g. Economic feasibility of using lower S content fuel, or adding secondary treatment to meet levels of using 1.5 percent Sulphur, and available environmental capacity of the site)
6. If bore size diameter [mm] < 400: 1460 (or up to 1,600 if justified to maintain high energy efficiency.)
7. If bore size diameter [mm] > or = 400

**Table A.8 Combustion Process - Turbine Gas**

Fuel	Parameter	Environmental Ministry Regulation No. 13 Year 2009 (in mg/Nm <sup>3</sup> or as indicated) <sup>(1)</sup>	IFC (in mg/Nm <sup>3</sup> or as indicated) <sup>(2)(3)</sup>
Oil	TSP	100	N/A
	SO <sub>2</sub>	650	N/A
	NO <sub>x</sub> as NO <sub>2</sub>	450	N/A
	Opacity	20%	N/A
Gas	TSP	50	N/A
	SO <sub>2</sub>	150	N/A
	NO <sub>x</sub> as NO <sub>2</sub>	150	N/A
	Opacity	320%	N/A
Natural Gas = 3MWth to < 15MWth	TSP	N/A	N/A
	SO <sub>2</sub>	N/A	N/A
	NO <sub>x</sub> as NO <sub>2</sub>	N/A	42 ppm <sup>(4)</sup> ; 100 ppm <sup>(5)</sup>
Natural Gas = 15MWth to < 50MWth	TSP	N/A	N/A
	SO <sub>2</sub>	N/A	N/A
	NO <sub>x</sub> as NO <sub>2</sub>	N/A	25ppm
Fuels other than Natural Gas = 3MWth to < 15MWth	TSP	N/A	N/A
	SO <sub>2</sub>	N/A	0.5% Sulfur <sup>(6)</sup>
	NO <sub>x</sub> as NO <sub>2</sub>	N/A	96ppm <sup>(4)</sup> ; 150ppm <sup>(5)</sup>
Fuels other than Natural Gas = 15MWth to < 50MWth	TSP	N/A	N/A
	SO <sub>2</sub>	N/A	0.5% Sulfur <sup>(6)</sup>
	NO <sub>x</sub> as NO <sub>2</sub>	N/A	74ppm

1. Concentrations are specified at reference condition (Nm<sup>3</sup> is at 25°C, 1 atmosphere pressure, dry and 13% O<sub>2</sub>).
2. Environmental, Health, and Safety (EHS) Guidelines - General EHS Guidelines on Air Emissions and Ambient Air Quality (2007) Table 1.1.2 - Small Combustion Facilities Emission Guidelines (3MWth - 50MWth)
3. Concentrations are specified at reference condition (Nm<sup>3</sup> is at 0°C, 1 atmosphere pressure, dry and 15% O<sub>2</sub>)
4. Electric generation
5. Mechanical drive
6. 0.5% or lower percent Sulphur (e.g. 0.2 percent Sulphur) if commercially available without significant excess fuel cost

**Table A.9 Combustion Process - Boiler, Steam Generator, Process Heater, Heater Transfer**

Fuel	Parameter	Environmental Ministry Regulation No. 13 Year 2009 (in mg/Nm <sup>3</sup> or as indicated) <sup>(1) (2)</sup>	IFC (in mg/Nm <sup>3</sup> or as indicated) <sup>(3)(4)(5)</sup>
Oil	TSP	150	50 <sup>(4)</sup>
	SO <sub>2</sub>	1200	2000
	NO <sub>x</sub> as NO <sub>2</sub>	800	460
	Opacity	20	N/A
Gas	TSP	50	N/A
	SO <sub>2</sub>	150	N/A
	NO <sub>x</sub> as NO <sub>2</sub>	400	320
	Opacity	20	N/A
Solid	TSP	N/A	50 <sup>(3)</sup>
	SO <sub>2</sub>	N/A	2000
	NO <sub>x</sub> as NO <sub>2</sub>	N/A	650
	Opacity	N/A	N/A

- Concentrations for oil are specified at reference condition (Nm<sup>3</sup> is at 25°C, 1 atmosphere pressure, dry and 5% O<sub>2</sub>).
- Concentrations for gas are specified at reference condition (Nm<sup>3</sup> is at 25°C, 1 atmosphere pressure, dry and 5% O<sub>2</sub>).
- Environmental, Health, and Safety (EHS) Guidelines - General EHS Guidelines on Air Emissions and Ambient Air Quality (2007) Table 1.1.2 - Small Combustion Facilities Emission Guidelines (3MWth - 50MWth)
- Concentrations for gas and oil are specified at reference condition (Nm<sup>3</sup> is at 0°C, 1 atmosphere pressure, dry and 3% O<sub>2</sub>).
- Concentrations for solid are specified at reference condition (Nm<sup>3</sup> is at 0°C, 1 atmosphere pressure, dry and 3% O<sub>2</sub>).
- 50 or up to 150 if justified by environmental assessment

**Table A.10 Combustion Process - Flaring Unit**

Parameter	Maximum Levels	Method
Opacity	40%	SNI 19.7117.11- 2005

**Table A.11 Production Process - Sulphur Recovery Unit**

Sulfur Feed Rate (ton/hr)	Minimum Sulfur Recovery (%)	Standard Method
<2	70 %	Measurement Method and Efficiency Rate Feed Sulfur Recovery using USEPA method 40 CFR Part 60 subpart 60 644 or equivalent method approved by the Ministry of Environment
2-10	85 %	
10-50	95 %	
> 50	97 %	

**Table A.12 Production Process - Thermal Oxidant Sulphur Limit**

Parameter	Emission Standard (mg/Nm <sup>3</sup> )	Method
Sulfur Dioxide (SO <sub>2</sub> )	2600	SNI 19-7117.3.1-2005

Volume of gas measured under standard conditions (25 °C and pressure 1 atmosphere), and dry conditions with correction of O<sub>2</sub> at 0%

**Table A.13 Production Process – Dehydration Glycol Release**

Parameter	Emission Standard	Method
VOC as total petroleum hydrocarbon	Efficiency of emission process hydrocarbon content at least 95% or 0,8 VOC as TPH/MSCF dehydrated gas averaged in 24 hours	Mass balance calculation EPA Method 8260
Volume of gas measured under standard conditions (25 °C and pressure 1 atmosphere), and dry conditions as well as the correction of O <sub>2</sub> at 0%		

**Table A.14 Production Process – Regenerator Catalyst Unit**

Parameter	Emission Standard (mg/Nm <sup>3</sup> )	Method
Particulate	400	SNI 19-7117.12-2005
SO <sub>2</sub>	1500	SNI 19-7117.3.1-2005 Or Method 6, 6C USEPA
NO <sub>2</sub>	1000	SNI 19-7117.5-2005 or Method 7, 7E USEPA
HC	200	-
Volume of gas measured under standard conditions (25 °C and pressure 1 atmosphere), and dry conditions with the correction of O <sub>2</sub> at 0%.		

**Table A.15 Production Process – Sulphur Recovery Unit Claus System without Gas Incinerator**

Parameter	Emission Standard (mg/Nm <sup>3</sup> )	Method
Particulate	400	SNI 19-7117.12-2005
Reduced Sulphur	450	SNI 19-7117.7-2005
NO <sub>2</sub>	1000	SNI 19-7117.5-2005 or Method 7, 7E USEPA
HC	200	-
Volume of gas measured under standard conditions (25 °C and pressure 1 atmosphere), and dry conditions as well as the correction of O <sub>2</sub> at 0%. Reduced Sulphur are hydrogen sulfide (H <sub>2</sub> S), carbonyl sulfide (COS) and carbon disulfide (CS <sub>2</sub> )		

**Table A.16 Production Process – Sulphur Recovery Unit Claus System with Gas Incinerator**

Parameter	Emission Standard (mg/Nm <sup>3</sup> )	Method
Particulate	400	SNI 19-7117.12-2005
Sulfur Dioxide (SO <sub>2</sub> )	1500	SNI 19-7117.3.1-2005 Or Method 6, 6C USEPA
NO <sub>2</sub>	1000	SNI 19-7117.5-2005 or Method 7, 7E USEPA
HC	200	-
Volume of gas measured under standard conditions (25 °C and pressure 1 atmosphere), and dry conditions with the correction of O <sub>2</sub> at 0%		

A.2.2 Effluent Discharge Standards for FSRU Activities

Table A.17 Effluent and Discharge

Types	Parameter	Unit	MoE Decree KEP-19/MENLH/2010 Attachment IV	IFC <sup>(1)</sup>
Waste water process	Oil and grease	mg/L	25	-
	Residual chlorine	mg/L	2	-
	Temperature	°C	45	-
	pH		6 – 9	-
Drainage Wastewater	Oil and grease	mg/L	15	-
	Total Organic Carbon (TOC)	mg/L	110	-
Cooling water	Temperature	°C	-	Temperature increase of no more than 3°C
Storm water drainage <sup>2</sup>	Oil and grease	mg/L	-	10
Hydro test Water	COD	mg/L	-	125
	BOD	mg/L	-	25
	Sulfides	mg/L	-	1
	Total Phenols	mg/L	-	0.5
	pH	mg/L	-	6 - 9
	TSS	mg/L	-	35
	Heavy metal (total) <sup>3</sup>	mg/L	-	5
	Chlorides	mg/L	-	600 (average); 1200 (maximum)
	Total Hydrocarbon	mg/L	-	10

1. IFC EHS Guidelines for Liquefied Natural Gas (LNG) Facilities (2017)

Additional notes:

- If the drainage of waste water is mixed with the processing waste water, the quality standards meet the process waste
- The cooling water effluent should result in a temperature increase of no more than 3°C at edge of the zone where initial mixing and dilution take place. Where the zone is not defined, use 100 m from point of discharge. Free chlorine (total residual oxidant in estuarine / marine water) concentration in cooling / cold water discharges (to be sampled at point of discharge) should be maintained at 0.2 parts per million (ppm)

**Table A.18 Domestic Wastewater**

Parameter	Unit	MoE Regulation No. 68/2016 <sup>(1)</sup>	IFC <sup>(2)(3)</sup>
pH	-	6 – 9	6 – 9
BOD	mg/L	30	30
COD	mg/L	100	125
TSS	mg/L	30	50
Oil and grease	mg/L	5	10
Ammoniac	mg/L	10	10
Total coliform bacteria	MPN <sup>(4)</sup> / 100 ml	3000	400 <sup>(3)</sup>
Debit	l/man/day	100	-

1. Ministry of Environment Regulation No. 68 Year 2016 regarding Domestic Wastewater Standard.
2. Environmental, Health, and Safety (EHS) Guidelines - General EHS Guidelines for Wastewater and Ambient Water Quality (2007).
3. Not applicable to centralised, municipal, wastewater treatment systems which are included in EHS guidelines for water and sanitation.
4. MPN = Most Probable Number.

Additional notes:

- The effluent should result in a temperature increase of no more than 3° C at the edge of the zone where initial mixing and dilution take place. Where the zone is not defined, use 100 m from the point of discharge when there are no sensitive aquatic ecosystems within this distance.
- Site specific requirement to be established by the EA.
- Elevated temperature areas due to discharge of once-through cooling water (e.g., 1 Celsius above, 2 Celsius above, 3 Celsius above ambient water temperature) should be minimised by adjusting intake and outfall design through the project specific EA depending on the sensitive aquatic ecosystems around the discharge point.

### A.2.3 *Air Emissions for Thermal Power Plant Activities*

The following air emissions standards are applicable, according to *Ministry of Environmental and Forestry Regulation No. 21 Year 2008* regarding Emission Standard of Combined Cycle Power Plant.

**Table A.19** *Air Emissions for Thermal Power Plant*

Parameter	Environmental Ministry Regulation No. 21 Year 2008 <sup>(1)</sup>	IFC <sup>(2)(3)</sup>
	Gas (mg/Nm <sup>3</sup> or as indicated) <sup>(4)</sup>	Gas (mg/Nm <sup>3</sup> or as indicated) <sup>(5)</sup>
SO <sub>2</sub>	150	-
NO <sub>x</sub> as NO <sub>2</sub>	320	51 (25 ppm)
Total of Particulate	30	-
Opacity <sup>(6)</sup>	-	-

1. Ministry of Environmental and Forestry Regulation No. 21 Year 2008 regarding Emission Standard of Combined Cycle Power Plant
2. Environmental, Health, and Safety (EHS) Guidelines for Thermal Power Plants (2008)
3. Natural Gas all turbine types of unit >50MWth
4. Concentrations are specified at reference condition (Nm<sup>3</sup> is at 25°C, 1 atmosphere pressure, dry and 15% O<sub>2</sub>)
5. Concentrations are specified at reference condition (Nm<sup>3</sup> is at 0°C, 1 atmosphere pressure, dry and 15% O<sub>2</sub>)
6. Opacity is used as an indicator for practical monitoring

#### A.2.4 Effluent Discharge Standards for Thermal Power Plant Activities

The following effluent and discharge standards are applicable, according to Ministry of Environmental and Forestry Regulation No. 8 Year 2009 regarding Wastewater Standard for Thermal Power Plant Activities.

**Table A.20 Main Process Activity - Main Process Source**

Parameter	Environmental Ministry Regulation No. 8 Year 2009 (mg/l) <sup>(1)</sup>	IFC (mg/l, except pH and temp) <sup>(2)</sup>
pH	6 - 9	6 - 9
TSS	100	50
Oil and Grease	10	10
Total residual chlorine	-	0.2
Free Chlorine (Cl <sub>2</sub> ) <sup>(3)</sup>	0.5	-
Total Chromium (Cr)	0.5	0.5
Copper (Cu)	1	0.5
Iron (Fe)	3	1.0
Zinc (Zn)	1	1.0
(PO <sub>4</sub> ) <sup>(4)</sup>	10	-
Lead (Pb)	-	0.5
Cadmium (Cd)	-	0.1
Mercury (Hg)	-	0.005
Arsenic (As)	-	0.5
Temperature Increase by thermal discharge from cooling system	-	Site specific requirement to be established by the EA. Elevated temperature areas due to discharge of once-through cooling water should be minimised by adjusting intake and outfall design through the project specific EA depending on the sensitive aquatic ecosystems around the discharge point.

1. Ministry of Environmental and Forestry Regulation No. 8 Year 2009 regarding Wastewater Standard for Thermal Power Plant Activities
2. Environmental, Health, and Safety (EHS) Guidelines for Thermal Power Plants (2008)
3. If the cooling tower blowdown is channeled to the STP
4. If the Phosphate Injection occurred

**Table A.21 Main Process Activity - Blowdown Boiler**

Parameter	Unit	Maximum Concentration	IFC <sup>a</sup>
pH	mg/L	6 - 9	6 - 9
Cu	mg/L	1	0.5
Fe	mg/L	3	1.0

*If the wastewater of Blowdown boiler is not channeled to the STP*

Notes:

IFC<sup>a</sup>: IFC EHS Guidelines for Thermal Power Plants, 2008

**Table A.22 Main Process Activity - Blowdown Cooling Water**

Parameter	Unit	Maximum Concentration	IFC <sup>a</sup>
pH	mg/L	6 – 9	6 – 9
Free Chlorine (Cl <sub>2</sub> )	mg/L	1	-
Zn	mg/L	1	1.0
PO <sub>4</sub> <sup>-</sup>	mg/L	10	-

*If the wastewater of Colling Tower is not channelled to the STP*

**Notes:**

IFC<sup>a</sup>: IFC EHS Guidelines for Thermal Power Plants, 2008

**Table A.23 Main Process Activity - WTP Demineralisation**

Parameter	Unit	Maximum Concentration	IFC <sup>a</sup>
pH	-	6 – 9	6 – 9
TSS	mg/L	100	50

*If the wastewater of WTP Demineralisation is not channelled to the STP*

**Notes:**

IFC<sup>a</sup>: IFC EHS Guidelines for Thermal Power Plants, 2008

**Table A.24 Supporting Activity - Cooling Water Source (Heat Water)**

Parameter	Unit	Maximum Concentration	IFC <sup>a</sup>
Temperature	°C	40*	Site specific requirement to be established by the EA.  Elevated temperature areas due to discharge of once-through cooling water (e.g., 1 Celsius above, 2 Celsius above, 3 Celsius above ambient water temperature) should be minimised by adjusting intake and outfall design through the project specific EA depending on the sensitive aquatic ecosystems around the discharge point.
Free Chlorine (Cl <sub>2</sub> )	mg/l	0.5	-

*If the heat water is not channelled to the STP*

**Notes:**

\*) Monthly Average measurement in condenser outlet

IFC<sup>a</sup>: IFC EHS Guidelines for Thermal Power Plants, 2008

**Table A.25 Supporting Activity - Desalination Source**

Parameter	Unit	Maximum Concentration	IFC
pH	-	6-9	6 - 9
Salinity	‰	In Radius 30 Km from seawater discharge location, the wastewater salinity should be equal to the natural salinity	-

Notes:

IFC<sup>a</sup>: IFC EHS Guidelines for Thermal Power Plants, 2008



## **PLTGU Jawa 1 Independent Power Project**

### **ANNEX B BASELINE SURVEY RESULTS**

Prepared for:

PT Jawa Satu Power (JSP)

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## CONTENTS

<b>B</b>	<b>BASELINE SURVEYS RESULTS</b>	<b>B-1</b>
<b>B.1</b>	<b>SOIL</b>	<b>B-2</b>
<b>B.1.1</b>	<i>List of Reports</i>	<b>B-2</b>
<b>B.2</b>	<b>GROUNDWATER</b>	<b>B-4</b>
<b>B.2.1</b>	<i>List of Reports</i>	<b>B-4</b>
<b>B.3</b>	<b>SURFACE WATER AND RIVER WATER</b>	<b>B-7</b>
<b>B.3.1</b>	<i>List of Reports</i>	<b>B-7</b>
<b>B.4</b>	<b>AIR QUALITY</b>	<b>B-14</b>
<b>B.4.1</b>	<i>List of Reports</i>	<b>B-14</b>
<b>B.5</b>	<b>NOISE AND VIBRATION</b>	<b>B-18</b>
<b>B.5.1</b>	<i>List of Reports</i>	<b>B-18</b>
<b>B.6</b>	<b>ELECTROMAGNETIC FIELDS (EMF)</b>	<b>B-23</b>
<b>B.6.1</b>	<i>List of Reports</i>	<b>B-23</b>
<b>B.7</b>	<b>MARINE WATER QUALITY</b>	<b>B-24</b>
<b>B.7.1</b>	<i>List of Reports</i>	<b>B-24</b>
<b>B.8</b>	<b>MARINE SEDIMENT</b>	<b>B-31</b>
<b>B.8.1</b>	<i>List of Reports</i>	<b>B-31</b>
<b>B.9</b>	<b>MARINE PLANKTON AND MACROBENTHOS</b>	<b>B-34</b>
<b>B.9.1</b>	<i>List of Reports</i>	<b>B-34</b>

## LIST OF TABLES

<b>Table B.1</b>	<b>Soil Monitoring (2015)</b>	<b>B-2</b>
<b>Table B.2</b>	<b>Soil Monitoring (2016)</b>	<b>B-2</b>
<b>Table B.3</b>	<b>Soil Monitoring (2017)</b>	<b>B-3</b>
<b>Table B.4</b>	<b>Groundwater Monitoring (2015)</b>	<b>B-4</b>
<b>Table B.5</b>	<b>Groundwater Monitoring (2016)</b>	<b>B-4</b>
<b>Table B.6</b>	<b>Groundwater Monitoring (August 2016, November 2016, December 2016 &amp; January 2017)</b>	<b>B-5</b>
<b>Table B.7</b>	<b>Groundwater Monitoring (2017)</b>	<b>B-5</b>
<b>Table B.8</b>	<b>Surface Water Monitoring (2016)</b>	<b>B-7</b>
<b>Table B.9</b>	<b>Surface Water Monitoring - Plankton Type Diversity (2016)</b>	<b>B-8</b>
<b>Table B.10</b>	<b>Surface Water Monitoring (August &amp; November 2016 and February &amp; May 2017)</b>	<b>B-9</b>
<b>Table B.11</b>	<b>Surface Water Monitoring (2017)</b>	<b>B-11</b>
<b>Table B.12</b>	<b>Surface Water Monitoring – Sediment (2017)</b>	<b>B-12</b>
<b>Table B.13</b>	<b>Air Quality Monitoring (November 2015 –July 2016)</b>	<b>B-14</b>
<b>Table B.14</b>	<b>Air Quality Monitoring (September 2016 &amp; March 2017)</b>	<b>B-15</b>

<i>Table B.15</i>	<i>Air Quality Monitoring (2017)</i>	<i>B-15</i>
<i>Table B.16</i>	<i>Air Quality Monitoring – Turbines (September 2016 &amp; March 2017)</i>	<i>B-16</i>
<i>Table B.17</i>	<i>Air Quality Monitoring – Generator Sets (September 2016 &amp; March 2017)</i>	<i>B-16</i>
<i>Table B.18</i>	<i>Flare Emission (September 2016 &amp; March 2017)</i>	<i>B-16</i>
<i>Table B.19</i>	<i>Offshore Air Quality Monitoring (2014)</i>	<i>B-17</i>
<i>Table B.20</i>	<i>Noise Monitoring (2016)</i>	<i>B-18</i>
<i>Table B.21</i>	<i>Noise Monitoring Results at Compressor in CCGT Power Plant (November 2015-July 2017)</i>	<i>B-20</i>
<i>Table B.22</i>	<i>Noise Monitoring (2017)</i>	<i>B-20</i>
<i>Table B.23</i>	<i>Vibration Monitoring (2017)</i>	<i>B-21</i>
<i>Table B.24</i>	<i>Noise Monitoring (2018)</i>	<i>B-21</i>
<i>Table B.25</i>	<i>Electromagnetic Field Monitoring (2017)</i>	<i>B-23</i>
<i>Table B.26</i>	<i>Electromagnetic Field Monitoring (2018)</i>	<i>B-23</i>
<i>Table B.27</i>	<i>Electromagnetic Field Monitoring along the Transmission Line (2018)</i>	<i>B-23</i>
<i>Table B.28</i>	<i>Marine Water Monitoring – Upper of Seawater Level (2016)</i>	<i>B-24</i>
<i>Table B.29</i>	<i>Marine Water Monitoring – Bottom of Seawater Level (2016)</i>	<i>B-26</i>
<i>Table B.30</i>	<i>Marine Water Monitoring (2017)</i>	<i>B-28</i>
<i>Table B.31</i>	<i>Marine Water Monitoring (2018)</i>	<i>B-30</i>
<i>Table B.32</i>	<i>Marine Sediment Monitoring (2017)</i>	<i>B-32</i>
<i>Table B.33</i>	<i>Marine Sediment Monitoring (2018)</i>	<i>B-33</i>
<i>Table B.34</i>	<i>Marine Plankton Type Diversity Monitoring (2016)</i>	<i>B-34</i>
<i>Table B.35</i>	<i>Marine Phytoplankton Monitoring (2017)</i>	<i>B-36</i>
<i>Table B.36</i>	<i>Marine Zooplankton Monitoring (2017)</i>	<i>B-36</i>
<i>Table B.40</i>	<i>Marine Macrobenthos Monitoring (2017)</i>	<i>B-37</i>

The sections of **Annex B** are structured as follows:

- *Section B.1 Soil;*
- *Section B.2 Groundwater;*
- *Section B.3 Surface Water and River Water;*
- *Section B.4 Air Quality;*
- *Section B.5 Noise and Vibration;*
- *Section B.6 Electromagnetic Field;*
- *Section B.7 Marine Water Quality;*
- *Section B.8 Marine Sediment; and*
- *Section B.9 Marine Plankton and Macrobenthos;*

## B.1 SOIL

### B.1.1 List of Reports

The following data is based on primary and secondary data available from the Project area and studies commissioned. This includes the following:

- *Soil Investigation at the proposed Power Plant area for 800 to 100 MW CCGT power Plant at Cilamaya, West Java, 2015 (Soilens, 2015);*
- *Geotechnical Investigation of the Jawa 1 CCGT Power Plant IPP Project, Cilamaya, West Java, 2016 (Tigenco, 2016); and*
- *Analisis Mengenai Dampak Lingkungan (AMDAL) Report (ERM, 2018b).2018c).*

**Table B.1 Soil Monitoring (2015)**

Parameters	S1	S2	S3
Sample depth (m)	1.0 - 1.7	1.0 - 1.7	1.0 - 1.7
pH	7.03	6.95	6.93
Chloride			
• ppm	78.0	167.0	169.7
• % by weight	0.01	0.02	0.02
Sulfate			
• ppm	91.8	255.0	98.2
• % by weight	0.01	0.03	0.01
Organic content in % by weight	4.37	2.43	2.31

Source: Soilens, 2015

Note:

- The undisturbed soil samples were obtained from the boreholes and were obtained using thin walled (Shelby) tube sampler of 73 mm inner diameter.
- All field tests were carried out in accordance to the ASTM standards.
- Neither local Indonesian regulations nor the IFC does not establish standards for soil quality standards.

**Table B.2 Soil Monitoring (2016)**

Parameters	S4	S5	S6	S7			
Sample depth (m)	1.0-1.5	1.0-1.5	2.5 - 3.0	0.5 - 1.5	2.0 -3.0	2.0-3.0	3.8-4.0
pH	6.78	5.9	6.62	7.73	8.23	7.0	8.0
Chloride (ppm)	52	94	103	12314	9459	5019	14057
Sulfate (ppm)	158	225	219	478	187	253	9

Source: Tigenco, 2016

Note:

- Access borehole was sunk for the exploratory purpose with *in-situ* tests and undisturbed soil sampling. The borehole diameter was sufficiently large to allow the insertion of *in-situ* test apparatus and undisturbed soil sampler with minimum diameter of 75 mm (NX Size).
- The tests methods:
  - Acidity/alkalinity (pH) test : ASTM G 51
  - Sulfur trioxide content test : BS 1377 Test 9
  - Chloride content test : BS 1377 Test 9 (for soil)
  - Carbonate content test : ASTM D 513 (for soil)

- Neither local Indonesian regulations nor the IFC does not establish standards for soil quality standards.

**Table B.3** *Soil Monitoring (2017)*

Parameters	S8	S9	S10	S11	S12	S13
Texture	Silt	Silt Loam	Silt	Silt	Silt Loam	Silt Loam
C-Organic (%)	3.2	3.46	3.92	2.84	3.80	2.52
N-Total	0.33	0.36	0.40	0.30	0.39	0.27
Phosphorus (P)	12.85	45.78	51.71	38.20	15.25	10.16
Potassium (K)	174.74	200.46	110.87	171.45	164.8	113.97
H <sub>2</sub> O	6.03	4.68	3.95	4.85	6.02	6.10
KCl	5.88	4.62	3.88	4.78	5.95	6.02
Mercury (Hg)	0.333	0.032	0.055	<0.004	0.094	0.104
Chromium (Cr)	18.30	11.47	17.09	13.84	15.57	15.57
Arsenic (Ar)	0.865	0.999	0.273	0.916	0.788	0.554
Selenium (Se)	0.42	0.43	0.49	0.32	0.29	0.35
Copper (Cu)	14.45	15.13	28.84	18.48	33.00	23.65
Lead (Pb)	41.01	45.48	35.37	39.07	59.73	74.38
Zinc (Zn)	92.84	54.56	72.62	87.26	135.56	128.31
Nickel (Ni)	14.22	9.11	19.50	13.79	25.43	18.41

Source: ERM, 2018b

Note:

- Neither local Indonesian regulations nor the IFC does not establish standards for soil quality standards.

## B.2 GROUNDWATER

### B.2.1 List of Reports

The following data is based on the primary and secondary data available from the Project area and studies commissioned. This includes the following:

- *Soil Investigation at the proposed Power Plant area for 800 to 100 MW CCGT power Plant at Cilamaya, West Java, 2015 (Soilens, 2015);*
- *Geotechnical Investigation of the Jawa 1 CCGT Power Plant IPP Project, Cilamaya, West Java, 2016 (Tigenco, 2016);*
- *Environmental Monitoring (RKL and RPL) Semester 2, 2016 completed for SKG Cilamaya (SKG Cilamaya, 2016);*
- *Regulatory Environmental Monitoring (RKL and RPL) Semester 1, 2017 completed for SKG Cilamaya (SKG Cilamaya, 2017); and*
- *Analisis Mengenai Dampak Lingkungan (ANDAL) Report (ERM, 2018b).*

**Table B.4 Groundwater Monitoring (2015)**

Parameters	GW1	GW2	GW3	Applicable Standards	
				I	II
Sample depth (m)	1.0 – 1.7	1.0 – 1.7	1.0 – 1.7	-	-
pH	6.73	6.86	6.88	6.5-9	-
Chloride (ppm)	28.3	50.9	42.7	600 mg/L	-
Sulfate (ppm)	26.2	14.7	20.6	400 mg/L	-
Organic content (ppm)	84.55	79.43	89.68	-	-

Source: Soilens, 2015

Note:

- All field tests were carried out in accordance to the ASTM standards.
- I: Regulation of Health Ministry 416/1990 Appendix II
- II: The IFC does not establish standards for groundwater quality standards.

**Table B.5 Groundwater Monitoring (2016)**

Parameters	GW4	GW5	GW6	GW7	Applicable Standards	
					I	II
pH	7.0	7.0	8.0	7.0	6.5-9	-
Chloride (ppm)	232	4303	2659	4253	600 mg/L	-
Sulfate (ppm)	<0.3	92	1.22	1364	400 mg/L	-

Source: Tigenco, 2016

Note:

- The tests methods:
  - Acidity/alkalinity (pH) test: ASTM D 1293
  - Sulfur trioxide content test : ASTM D 516
  - Chloride content test: ASTM D 516
  - Carbonate content test : ASTM D 1888
- I: Regulation of Health Ministry 416/1990 Appendix II
- II: The IFC does not establish standards for groundwater quality standards.

**Table B.6 Groundwater Monitoring (August 2016, November 2016, December 2016 & January 2017)**

Parameters	Unit	Results at GW8				Applicable Standards	
		August 2016	November 2016	February 2017	May 2017	I	II
<b>Physical-chemical characteristics</b>							
<i>in-situ</i> pH	-	7.4	6.5	6.5	7.0	6.5-9	-
<i>in-situ</i> Temperature	°C	27.0	28.0	27.0	30.0	± 3	-
Turbidity	NTU	0.5	13.0	2.0	6.0	25	-
Colour	TCU	12.0	38.0	6.0	3.0	50	-
Total Dissolved Solids (TDS)	mg/L	2,670.0	982.0	88.0	74.0	1500	-
Arsenic (As)	mg/L	<0.005	<0.005	<0.005	<0.005	0.05	-
Mercury (Hg)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	0.001	-
Selenium (Se)	mg/L	<0.002	<0.002	<0.002	<0.002	0.01	-
Iron (Fe)	mg/L	<0.047	<0.047	0.07	0.111	1	-
Manganese (Mn)	mg/L	0.119	<0.047	<0.047	<0.047	0.5	-
Zinc (Zn)	mg/L	<0.305	<0.305	<0.305	<0.305	15	-
Cyanide (CN)	mg/L	<0.002	<0.002	<0.002	<0.002	0.1	-
Lead (Pb)	mg/L	<0.045	<0.045	<0.045	<0.045	0.05	-
Cadmium (Cd)	mg/L	<0.001	<0.001	<0.001	<0.001	0.005	-
Carbon Carbonate	mg/L	837.0	552.0	26.0	26.0	500	-
Chloride (Cl)	mg/L	1,275.0	378.0	12.0	15.0	600	-
Fluoride (F)	mg/L	0.325	0.559	<0.112	<0.112	1.5	-
Nitrate	mg/L	1.161	0.301	0.174	<0.066	10	-
Nitrite	mg/L	<0.005	0.132	<0.005	<0.005	1	-
Chromium Hexavalent	mg/L	<0.010	<0.010	<0.010	<0.010	0.05	-
Sulphate	mg/L	59	160	<5.0	62.0	400	-
Surfactant (anion)	mg/L	<0.01	<0.01	<0.010	<0.010	-	-
Potassium Permanganate	mg/L	4.588	17.519	7.508	6.004	10	-
<b>Microbiological characteristic</b>							
Total Coliform.	MPN/100ml	< 2	58	15.0	8.0	50	-

Source: SGK Cilamaya, 2016; SGK Cilamaya, 2017

Note:

- I: Regulation of Health Ministry 416/1990 Appendix II
- II: The IFC does not establish standards for groundwater quality standards.

**Table B.7 Groundwater Monitoring (2017)**

Parameters	Unit	Results		Applicable Standards	
		GW9	GW10	I	II
<b>Physical-chemical characteristics</b>					
pH	-	6.4	6.5	6.5-9	-
Temperature	°C	31.9	30.3	± 3	-
Turbidity	NTU	0.52	0.31	25	-
Colour	TCU	3	9	50	-
Total Dissolved Solids (TDS)	mg/L	298	458	1500	-
Arsenic (As)	mg/L	<0.0001	<0.0001	0.05	-
Mercury (Hg)	mg/L	0.0003	0.0006	0.001	-

Parameters	Unit	Results		Applicable Standards	
		GW9	GW10	I	II
Selenium (Se)	mg/L	0.0084	0.009	0.01	-
Iron (Fe)	mg/L	0.058	<0.050	1	-
Manganese (Mn)	mg/L	0.046	0.046	0.5	-
Zinc (Zn)	mg/L	<0.005	<0.005	15	-
Cyanide (CN)	mg/L	0.007	0.007	0.1	-
Lead (Pb)	mg/L	8.85	6.45	0.05	-
Cadmium (Cd)	mg/L	0.002	<0.002	0.005	-
Carbon Carbonate	mg/L	125.73	154.55	500	-
Chloride (Cl)	mg/L	62.98	68.98	600	-
Fluoride (F)	mg/L	0.033	0.055	1.5	-
Nitrate	mg/L	0.106	0.125	10	-
Nitrite	mg/L	<0.005	0.005	1	-
Chromium Hexavalent	mg/L	<0.001	<0.001	0.05	-
Sulphate	mg/L	8.85	6.45	400	-
Surfactant (anion)	mg/L	0.074	0.062	-	-
Potassium Permanganate	mg/L	15.80	13.90	10	-
<b>Microbiological characteristics</b>					
Faecal Coliform.	MPN/ 100ml	920	>1600000	10	-
Total Coliform	MPN/ 100ml	920	>1600000	50	-

Source: ERM. 2018b

Note:

- I: Regulation of Health Ministry 416/1990 Appendix II
- II: The IFC does not establish standards for groundwater quality standards.

## B.3 SURFACE WATER AND RIVER WATER

### B.3.1 List of Reports

The following data is based on primary and secondary data available from the Project area and studies commissioned. This includes the following:

- *Bathymetric Survey and Seawater Data Collection Report. 2016 (Pöyry. 2016b);*
- *Environmental Monitoring (RKL and RPL) Semester 2. 2016 completed for SKG Cilamaya (SKG Cilamaya. 2016);*
- *Regulatory Environmental Monitoring (RKL and RPL) Semester 1. 2017 completed for SKG Cilamaya (SKG Cilamaya. 2017); and*
- *Analisis Mengenai Dampak Lingkungan (ANDAL) Report (ERM. 2018b).*

**Table B.8 Surface Water Monitoring (2016)**

Parameters	Unit	RW1	RW2	Applicable Standards	
				I	II
pH	-	7.2	7.0	6 - 9	-
<i>in-situ</i> Temperature	°C	28.5	28.7	Three (3) deviation	-
Total Dissolved Solids (TDS)	mg/L	192	178	1,000	-
Total Suspended Solids (TSS)	mg/L	500	450	400	-
BOD5	mg/L	13	16	6	-
COD	mg/L	29.4	34.3	50	-
Dissolved Oxygen(DO)	mg/L	4.5	4.3	3	-
Nitrate	mg/L	1.19	1.79	20	-
Nitrite	mg/L	0.005	0.004	0.06	-
Ammonia	mg/L	0.853	0.568	-	-
Mercury (Hg)	mg/L	0.36	0.09	0.002	-
Arsenic	mg/L	0.0019	0.1793	1	-
Barium	mg/L	<0.001	<0.001	-	-
Cadmium(Cd)	mg/L	<0.001	<0.001	0.01	-
Cobalt	mg/L	<0.001	<0.001	0.2	-
Total Chromium (Cr)	mg/L	0.011	0.008	0.05	-
Copper(Cu)	mg/L	0.075	0.155	0.02	-
Zinc(Zn)*	mg/L	0.114	0.107	0.05	-
Iron (Fe)*	mg/L	0.063	0.193	-	-
Boron	mg/L	<0.003	0.043	1	-
Lead(Pb)	mg/L	<0.001	0.001	1	-
Chloride	mg/L	17.4	14.5	-	-
Manganese(Mn)*	mg/L	0.220	0.157	-	-
Fluoride(F)	mg/L	0.859	0.488	-	-
Sulfate(SO4)	mg/L	53.8	53.9	-	-
Sulfide(H2S)	mg/L	0.019	0.023	0.002	-
Cyanide	mg/L	<0.001	0.001	-	-
Selenium	mg/L	<0.001	<0.001	0.05	-

Parameters	Unit	RW1	RW2	Applicable Standards	
				I	II
Oil & Grease	mg/L	2.40	2.0	1	-
MBAS	mg/L	<0.001	0.302	200	-
Phenol	mg/L	<0.005	<0.005	1	-
Total Phosphate	mg/L	0.022	0.050	1	-

Source: Pöyry, 2016b

Note:

- Sampling method aligned with the *Standard Nasional Indonesia SNI 6.989, 57: 2008* regarding Method for Surface Water Sampling. Before samples are taken, information such as sample code, date, and time of sampling will be noted in CoC (Chain of Custody) paper, including parameters that will be analysed.
- I: Government Regulation (PP) Number 82/2001 on Water Quality Management and Water Pollution Control
- II: The IFC does not establish standards for surface water quality.

**Table B.9 Surface Water Monitoring - Plankton Type Diversity (2016)**

Species	RW1	RW2
<b>Phytoplankton</b>		
<i>Aqmenellum</i> sp.	0	33
<i>Closterium</i> sp.	66	0
<i>Diatoma</i> sp.	33	0
<i>Eremosphaera</i> sp.	0	33
<i>Eudorina</i> sp.	33	0
<i>Fragilaria capucina</i> .	231	66
<i>Gyrosigma</i> sp.	0	33
<i>Lemanea</i> sp.	99	66
<i>Lyngbya</i> sp.	33	0
<i>Navicula</i> sp.	33	0
<i>Nitzschia</i> sp.	33	0
<i>Oscillatoria</i> sp.	66	33
<i>Phormidium</i> sp.	2046	528
<i>Spirogyra</i> sp.	66	0
<i>Stanieria</i> sp.	825	858
<i>Synedra</i> sp.	198	33
<i>Tribonema</i> sp.	264	198
<b>Total Phytoplankton</b>	<b>52668</b>	<b>39498</b>
<b>ID Simpson</b>	<b>0.779</b>	<b>0.798</b>
<b>Zooplankton</b>		
<i>Alona</i> sp.	33	0
<i>Arcella</i> sp.	98	33
<i>Asplanchna</i> sp.	33	0
<i>Brachionus calyciflorus</i> .	33	0
<i>Brachionus facaltis</i>	0	33
<i>Centropyxis</i> sp.	33	33
<i>Cyclops</i> sp.	66	231
<i>Diaptomus</i> sp.	66	33
<i>Epistylis</i> sp.	99	363
<i>Filinia</i> sp.	33	33
<i>Macrothrix</i> sp.	0	33
<i>Moina</i> sp.	99	132
<i>Notholca</i> sp.	33	0
<i>Phylodina</i> sp.	33	33
<i>Plumatella</i> sp.	33	0
<i>Rhabdolaimus</i> sp.	66	99
<i>Rotaria</i> sp.	33	0

Species	RW1	RW2
<b>Total Zooplankton</b>	<b>791</b>	<b>1056</b>
<b>ID Simpson</b>	<b>0.917</b>	<b>0.803</b>
<b>Total Plankton</b>	<b>4817</b>	<b>2937</b>
<b>ID Simpson</b>	<b>0.780</b>	<b>0.851</b>
<b>Benthos</b>		
<i>Belostoma</i> sp.	3	3
<i>Enallagma</i> sp.	3	0
<i>Paratelphusa</i> sp.	3	6
<i>Pomacea</i> sp.	6	6
<i>Syncaris</i> sp.	21	24
<b>Total</b>	<b>36</b>	<b>39</b>
<b>I.D Shannon &amp; Wiener</b>	<b>1.234</b>	<b>1.072</b>

Source: Pöyry, 2016b

Note:

- Sampling method aligned with the *Standar Nasional Indonesia SNI 6.989, 57: 2008* regarding Method for Surface Water Sampling. Before samples are taken, information such as sample code, date, and time of sampling will be noted in CoC (Chain of Custody) paper, including parameters that will be analysed.

**Table B.10** *Surface Water Monitoring (August & November 2016 and February & May 2017)*

Parameters	Unit	Results (RW3)				Applicable Standards	
		April 2016	November 2016	February 2017	May 2017	I	II
pH	-	7.4	7.2	7.6	7.4	5-9	-
<i>in-situ</i> Temperature	°C	28.0	27.0	27.0	30.0	Three (3) deviation	-
Total Suspended Solids (TSS)	mg/L	70	53	7	8	400	-
Total Dissolved Solids (TDS)	mg/L	298	131	170	162	1,000	-
Arsenic (As)	mg/L	<0.005	<0.005	<0.005	<0.005	1	-
Mercury (Hg)	mg/L	<0.0005	0.001	<0.005	<0.005	0.002	-
Selenium (Se)	mg/L	<0.002	<0.002	<0.002	<0.002	0.05	-
Barium (Ba)	mg/L	0.302	0.010	0.110	0.029	-	-
Boron (B)	mg/L	0.038	0.010	0.120	0.114	1	-
Cobalt (Co)	mg/L	<0.006	<0.006	<0.006	<0.024	0.2	-
Sulphide (H <sub>2</sub> S)	mg/L	<0.002	<0.002	<0.002	<0.002	0.002	-
Cyanide (CN)	mg/L	<0.002	<0.002	<0.002	<0.002	-	-
Phenol	mg/L	<0.001	<0.001	<0.001	<0.001	1	-
Iron (Fe)	mg/L	<0.001	0.574	0.060	<0.026	-	-
Manganese (Mn)	mg/L	<0.001	0.023	0.060	<0.026	-	-
Zinc (Zn)	mg/L	<0.001	0.254	0.030	0.006	0.05	-
Copper (Cu)	mg/L	<0.001	0.002	<0.001	<0.001	0.02	-
Cadmium (Cd)	mg/L	<0.001	<0.001	<0.001	<0.001	0.01	-
Lead (Pb)	mg/L	<0.001	<0.001	<0.001	<0.001	0.03	-
Fluoride (F)	mg/L	0.472	0.436	<0.112	0.154	1.5	-
Chloride (Cl)	mg/L	34.0	10.0	7.0	9.0	-	-
Free Ammonium	mg/L	1.268	<0.026	0.321	0.149	-	-
Nitrate	mg/L	5.662	2.46	0.080	<0.066	20	-
Nitrite	mg/L	<0.015	0.005	0.034	0.025	0.06	-
Surfactant (anion)	mg/L	0.01	<0.001	<0.01	17.0	-	-
Sulphate	mg/L	66.0	56.0	10.0	12.0	-	-

Parameters	Unit	Results (RW3)				Applicable Standards	
		April 2016	November 2016	February 2017	May 2017	I	II
Chromium Hexavalent	mg/L	0.018	<0.01	<0.010	<0.010	0.05	-
BOD5	mg/L	11.0	12.0	14.0	3.0	6	-
COD	mg/L	21.0	87.0	37.0	7.0	50	-
<i>in-situ</i> Dissolved Oxygen	mg/L	2.18	4.05	3.93	3.87	3	-
Free Chlorine	mg/L	0.04	0.02	0.02	0.05	-	-
Total Phosphate	mg/L	0.41	0.13	0.12	0.13	1	-
Oil & Grease	mg/L	<0.20	<0.20	<0.20	<0.20	1	-
Faecal Coliform	MPN/100ml	1,700	28,000	22,000	28,000	2,000	-
Total Coliform	MPN/100ml	2,100	35,000	2,800	3,500	10,000	-

Source: SGK Cilamaya. 2016; SGK Cilamaya. 2017

Note:

- Sampling method aligned with the *Standar Nasional Indonesia SNI 6.989,57: 2008* regarding Method for Surface Water Sampling. Before samples are taken, information such as sample code, date, and time of sampling will be noted in CoC (Chain of Custody) paper, including parameters that will be analysed.
- I: Government Regulation (PP) Number 82/2001 on Water Quality Management and Water Pollution Control
- II: The IFC does not establish standards for surface water quality.

**Table B.11 Surface Water Monitoring (2017)**

Parameters	Unit	RW4	RW5	RW6	RW7	RW8	RW9	RW10	Applicable Standards	
									I	II
Temperature	°C	28.0	27.6	29.8	29.5	28.3	30.6	31	Three (3) deviation	-
Total Suspended Solid (TSS)	mg/L	23	18	30	20	34	60	55	400	-
Total Dissolved Solids (TDS)	mg/L	264	220	264	240	248	1438	2160	1,000	-
pH	-	7.25	6.93	7.38	7.43	6.98	6.5	7.5	5-9	-
Dissolved Oxygen	mg/L	1.4	3.5	6.7	2.2	1.5	4.6	5.9	3	-
Biological Oxygen Demand (BOD <sub>5</sub> )	mg/L	6.4	5.80	6	6.40	6.2	6.60	6.4	6	-
Chemical Oxygen Demand (COD)	mg/L	74.20	72.05	45.43	63.47	54.02	49.73	81.07	50	-
Total Phosphate	mg/L	0.332	0.201	0.249	0.256	0.388	0.378	0.374	1	-
Ammonia (NH <sub>3</sub> -N)	mg/L	5.913	2.370	4.240	3.078	0.489	5.691	0.443	-	-
Nitrate (NO <sub>3</sub> -N)	mg/L	2.133	0.104	1.750	0.093	0.104	1.130	0.162	20	-
Nitrite (NO <sub>2</sub> -N)	mg/L	1.112	0.030	1.738	0.020	0.008	0.995	0.012	0.06	-
Sulphate (SO <sub>4</sub> )	mg/L	37.71	29.50	39.67	31.26	25.79	40.84	47.09	-	-
Chloride (Cl)	mg/L	16.99	23.99	28.99	36.99	31.99	34.99	33.59	-	-
Arsenic (As)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0016	0.0009	1	-
Cobalt (Co)	mg/L	<0.005	0.033	<0.005	<0.005	<0.005	0.012	0.039	0.2	-
Barium (Ba)	mg/L	0.684	0.324	0.385	0.239	0.22	0.094	0.165	-	-
Boron (B)	mg/L	0.426	0.412	0.399	0.511	0.456	0.432	0.622	1	-
Selenium (Se)	mg/L	0.0038	0.0036	0.0049	0.0070	0.0046	0.0070	0.0096	0.05	-
Cadmium (Cd)	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.01	-
Chromium Hexavalent (Cr <sup>6+</sup> )	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.05	-
Copper (Cu)	mg/L	0.025	0.042	0.036	0.036	0.034	0.034	0.04	0.02	-
Iron (Fe)	mg/L	0.272	0.379	0.198	0.179	0.300	0.397	0.458	-	-

Parameters	Unit	RW4	RW5	RW6	RW7	RW8	RW9	RW10	Applicable Standards	
									I	II
Lead (Pb)	mg/L	0.141	0.228	0.272	0.234	0.201	0.302	0.265	0.03	-
Manganese (Mn)	mg/L	0.040	<0.005	0.073	0.035	0.102	0.057	0.993	-	-
Mercury (Hg)	mg/L	0.0005	0.0003	0.0006	0.0004	0.0004	0.0003	0.0028	0.002	-
Zinc (Zn)	mg/L	0.034	0.020	0.033	0.021	0.010	0.016	0.009	0.05	-
Cyanide (CN)	mg/L	0.006	0.007	0.005	0.005	0.007	0.008	0.008	-	-
Fluoride (F)	mg/L	0.049	0.011	0.022	0.302	0.082	0.011	0.176	1.5	-
Free Chlorine (Cl <sub>2</sub> )	mg/L	0.070	0.050	0.050	0.050	0.180	0.080	0.100	-	-
Sulfide (H <sub>2</sub> S)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	-
Oil & Grease	mg/L	<1	<1	<1	<1	<1	<1	<1	1	-
Surfactant	mg/L	0.096	0.092	0.086	0.084	0.096	0.082	0.096	-	-
Phenol	mg/L	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	1	-
Total Coliform	MPN/100mL	>1600000	16000	4300	16000	1500	>1600000	16000	2,000	-
Fecal Coliform	MPN/100mL	>1600000	16000	4300	3500	1500	>1600000	16000	10,000	-

Source: ERM. 2018b

Note:

- Sampling method aligned with the *Standar Nasional Indonesia SNI 6.989, 57: 2008* regarding Method for Surface Water Sampling. Before samples are taken, information such as sample code, date, and time of sampling will be noted in CoC (Chain of Custody) paper, including parameters that will be analysed.
- I: Government Regulation (PP) Number 82/2001 on Water Quality Management and Water Pollution Control
- II: The IFC does not establish standards for surface water quality.

Table B.12 Surface Water Monitoring – Sediment (2017)

Parameter	Unit	RW4	RW5	RW6	RW7	RW8	RW9	RW10	Applicable Standards	
									I	II
Mercury (Hg)	mg/kg	0.257	0.061	0.163	0.091	0.080	0.065	0.038	-	0.17
Chromium (Cr)	mg/kg	7.23	9.07	9.16	11.48	11.33	14.32	9.14	-	37.3
Arsenic (As)	mg/kg	1.678	0.749	0.911	0.488	0.649	0.709	0.676	-	5.9
Cadmium (Cd)	mg/kg	3.67	2.49	0.77	1.26	2.72	1.95	1.46	-	0.6
Copper (Cu)	mg/kg	12.28	32.33	23.21	23.11	21.78	30.84	22.88	-	35.7
Lead (Pb)	mg/kg	59.08	66.98	66.42	55.65	71.80	58.58	69.96	-	35

Parameter	Unit	RW4	RW5	RW6	RW7	RW8	RW9	RW10	Applicable Standards	
									I	II
Zinc (Zn)	mg/kg	78.38	151.66	90.75	104.67	97.69	129.82	83.89	-	123
Nickel (Ni)	mg/kg	44.15	31.91	20.72	27.49	32.46	36.21	20.93	-	-

Source: ERM, 2018b

Note:

- Sampling method aligned with the *Standar Nasional Indonesia SNI 6.989,57: 2008* regarding Method for Surface Water Sampling. Before samples are taken, information such as sample code, date, and time of sampling will be noted in CoC (Chain of Custody) paper, including parameters that will be analysed. Neither local Indonesian regulations nor the IFC establish limits/standards for surface water quality.
- I: Not local Indonesian regulations nor IFC establish standards for surface water quality.
- II: Canadian Sediment Quality Guidelines for the Protection of Aquatic Life, 2001

**B.4 AIR QUALITY**

**B.4.1 List of Reports**

The following data is based on primary and secondary data available from the Project area and studies commissioned. This includes the following:

- *Initial Environmental Examination Report. 2016 (IEE, 2016);*
- *Environmental Monitoring (RKL and RPL) Semester 2. 2016 completed for SKG Cilamaya (SKG Cilamaya. 2016);*
- *Regulatory Environmental Monitoring (RKL and RPL) Semester 1. 2017 completed for SKG Cilamaya (SKG Cilamaya. 2017); and*
- *Analisis Mengenai Dampak Lingkungan (ANDAL ) Report (ERM. 2018b); and*
- *Laporan pelaksanaan RKL RPL Lapangan Migas di Blok PHE-ONWJ Semester I Tahun 2014 (RKL RPL, 2014) for the Offshore Air Monitoring.*

**Table B.13 Air Quality Monitoring (November 2015 –July 2016)**

Parameters	AQ1	AQ2	AQ3	AQ4	AQ5	Applicable Standards	
						I	II
NO <sub>2</sub>	22.53	26.31	24.21	23.79	27.59	1-hr:400 24-hr:150	1-hr: 200
SO <sub>2</sub>	13.31	18.05	16.94	13.88	14.12	1-hr:900 24-hr:365	24-hr: • 125 (Interim target-1) • 50 (Interim target-2) • 20 (Guideline)
CO	352.81	416.71	325.67	333.97	358.13	1-hr:30,000 24-hr:10,000	-
PM <sub>10</sub>	76.22	63.06	73.55	83.90	62.23	24-hr: 150	24-hr: • 150 (Interim target 1) • 100 (Interim target 2) • 75 (Interim target 3) • 50 (Guideline)
PM <sub>2.5</sub>	26.97	27.77	27.94	33.69	24.26	24-hr: 65	24-hr: • 75 (Interim target 1) • 50 (Interim target 2) • 37.5 (Interim target 3) • 25 (Guideline)
TSP	96.50	97.57	96.79	96.60	91.97	24-hr:230	-

Source: IEE. 2016

Note:

- Unit in µg/Nm<sup>3</sup>

- I: Government Regulation No. 41/1999 regarding Air Pollution Control (PP41/1999)
- II: IFC EHS General Guidelines

**Table B.14 Air Quality Monitoring (September 2016 & March 2017)**

Parameters	AQ6		AQ7		AQ8		Applicable Standards	
	Sep 2016	March 2017	Sep 2016	March 2017	Sep 2016	March 2017	I	II
NO <sub>2</sub>	<31	<31	<31	38	<31	<31	1-hr:400 24-hr:150	1-hr: 200
SO <sub>2</sub>	<58	98	<58	<58	<58	<58	1-hr:900 24-hr:365	24-hr: • 125 (Interim target-1) • 50 (Interim target-2) • 20 (Guideline)
CO	<1145	<1145	<1145	<1145	<1145	<1145	1-hr:30,000 24-hr:10,000	-
Ozone	26	<7	121	<7	39	<7	1-hr: 50	
Hydrocarbon	<92	<92	<92	<92	<92	<92	3-hr: 160	
Pb	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	24-hr: 2	
TSP	7	7	8	11	14	9	24-hr:230	-

Source: CGK Cilamaya. 2016. SKG Cilamaya. 2017

Note:

- Unit in µg/Nm<sup>3</sup>
- I: Government Regulation No. 41/1999 regarding Air Pollution Control (PP41/1999)
- II: IFC EHS General Guidelines

**Table B.15 Air Quality Monitoring (2017)**

Parameters	AQ9	AQ10	AQ11	AQ12	AQ13	AQ14	AQ15	Applicable Standards	
								I	II
NO <sub>2</sub>	<5	<5	<5	<5	<5	<5	<5	1-hr:400 24-hr:150	1-hr: 200
SO <sub>2</sub>	68	61	<20	57	42	<20	<20	1-hr:900 24-hr:365	24-hr: • 125 (Interim target-1) • 50 (Interim target-2) • 20 (Guideline)
CO	<100	<100	<100	<100	<100	<100	<100	1-hr:30,000 24-hr:10,000	-
Ozone	<20	<20	<20	<20	<20	<20	<20	1-hr: 50	1-hr: 50
Hydrocarbon	<5	<5	<5	<5	<5	<5	<5	3-hr: 160 24-hr: 150	3-hr: 160 24-hr: • 150 (Interim target 1) • 100 (Interim target 2) • 75 (Interim target 3) • 50 (Guideline)
PM <sub>10</sub>	123	111	143	67.5	166	85.5	5		

Parameters	AQ9	AQ10	AQ11	AQ12	AQ13	AQ14	AQ15	Applicable Standards	
								I	II
								24-hr: 65	24-hr: <ul style="list-style-type: none"> <li>• 75 (Interim target 1)</li> <li>• 50 (Interim target 2)</li> <li>• 37.5 (Interim target 3)</li> <li>• 25 (Guideline)</li> </ul>
PM <sub>2.5</sub>	80.4	78.8	73.3	53.0	122.0	55.1	2.0		
TSP	227	218	314	89	289	131	8.5	24-hr:230	-

Source: ERM. 2018b

Note:

- Unit in  $\mu\text{g}/\text{Nm}^3$
- I: Government Regulation No. 41/1999 regarding Air Pollution Control (PP41/1999)
- II: IFC EHS General Guidelines

**Table B.16 Air Quality Monitoring – Turbines (September 2016 & March 2017)**

Parameters	TAQ1		TAQ2		TAQ3		TAQ4		TAQ5		TAQ6		TAQ7	
	1	2	1	2	1	2	1	2	1	2	1	2	1	2
NO <sub>2</sub>	111	199	103	152	153	99	164	180	131	152	114	143	-	143
SO <sub>2</sub>	9	19	11	<3	40	13	60	8	17	10	<3	13	-	<3
Total Particulate	8	<0.2	2	<0.2	25	<0.2	15	10	3	<0.2	2	<0.2	-	<0.2

Source: CGK Cilamaya. 2016. SKG Cilamaya. 2017

Note:

- Unit in  $\text{mg}/\text{Nm}^3$
- 1: Monitoring in September 2016
- 2: Monitoring in March 2017

**Table B.17 Air Quality Monitoring – Generator Sets (September 2016 & March 2017)**

Parameters	GSAQ1		GSAQ2		GSAQ3	
	1	2	1	2	1	2
NO <sub>2</sub>	13	167	24	90	26	-
SO <sub>2</sub>	3	15	<3	<3	<3	-
Total Particulate	20	<0.2	<0.2	<0.2	<0.2	-
CO	86	-	<1	-	77	-
Flowrate	-	7.11	-	30.99	-	-
Opacity	<20	<20	<20	<20	<20	-

Source: CGK Cilamaya. 2016. SKG Cilamaya. 2017

Note:

- Unit in  $\text{mg}/\text{Nm}^3$ . except Opacity (%) & Flowrate ( $\text{ms}^{-1}$ )
- 1: Monitoring in September 2016
- 2: Monitoring in March 2017

**Table B.18 Flare Emission (September 2016 & March 2017)**

Parameters	FAQ1	
	September 2016	March 2017
Opacity	<20	<21

Source: CGK Cilamaya. 2016. SKG Cilamaya. 2017

Note: Unit in  $\text{mg}/\text{Nm}^3$

**Table B.19** *Offshore Air Quality Monitoring (2014)*

<b>Parameters</b>	<b>MAQ1</b>	<b>MAQ2</b>	<b>MAQ3</b>
NO <sub>2</sub>	1.07	1.07	1.07
SO <sub>2</sub>	7.47	7.47	7.47
CO	1145	1150	1150
PM <sub>10</sub>	6.1	4	6.9
PM <sub>2.5</sub>	1.9	0.9	1
TSP	37	48.3	37.3
Ozone	25.7	25.7	25.7
CH <sub>4</sub>	5.7	5.7	5.7

*Source: RKL RPL. 2014*

## B.5

### NOISE AND VIBRATION

Noise was sampled and monitored using a Sound Level Meter (SLM) equipped with features to measure the LAeq (A-weighted equivalent energy level). The analysis were conducted based on the:

- *Standard Nasional Indonesia, SNI 7231:2009, Measurement method for noise intensity in workplace;*
- *ISO 1996:1982, Acoustics, Description and measurement of environmental noise part-1 basic quantity and procedures, vol. 1 page 144-120;*
- *ISO 1996:1990, Acoustics, Determination of occupational noise exposure and estimation of noise induced hearing impairment, vol. 1 page 486-504; and*
- *ISO Standard Handbook ISBN 92-67-10221-4, General aspects of acoustics, methods of noise measurement in general, noise with respect to human being, second edition.*

#### B.5.1

#### List of Reports

The following data is based on primary and secondary data available from the Project area and studies commissioned. This includes the following:

- *Initial Environmental Examination Report, 2016 (IEE. 2016);*
- *Environmental Monitoring (RKL and RPL) Semester 2. 2016 completed for SKG Cilamaya (SKG Cilamaya. 2016);*
- *Regulatory Environmental Monitoring (RKL and RPL) Semester 1. 2017 completed for SKG Cilamaya (SKG Cilamaya. 2017);*
- *Analisis Mengenai Dampak Lingkungan (ANDAL ) Report (ERM. 2018b); and*
- *PLTGU Jawa 1 Independent Power Project - Integrated Environmental and Social Impact Assessment (ESIA) - Additional Baseline Surveys for ESIA (ERM, 2018c).*

**Table B.20 Noise Monitoring (2016)**

Location	Parameter	dB(A)	Applicable Standards	
			I	II
N1: In the PT Pertamina adjacent to school boundary	Ls1 (06.00 - 09.00)	52.6	55	Leq, 1-hr in dBA • Day : 55 dBA • Night: 45 dBA
	Ls2 (09.00 - 14.00)	55.0		
	Ls3 (14.00 - 17.00)	54.9		
	Ls4 (17.00 - 22.00)	56.2		
	Lm5 (22.00 -00.00)	51.2		
	Lm6 (00.00 -03.00)	44.8		

Location	Parameter	dB(A)	Applicable Standards	
			I	II
N2: Cilamaya IV State Primary School	Lm7 (03.00 - 06.00)	48.6	55	Leq, 1-hr in dBA • Day : 55 dBA • Night: 45 dBA
	Ls (Leq Daytime)	55.0		
	Lm (Leq Night-time)	48.5		
	Lsm (Leq Day Night)	54.6		
	Ls1 (06.00 - 09.00)	57.4		
	Ls2 (09.00 - 14.00)	65.7		
	Ls3 (14.00 - 17.00)	63.2		
	Ls4 (17.00 - 22.00)	59.0		
	Lm5 (22.00 - 00.00)	55.1		
	Lm6 (00.00 - 03.00)	50.8		
	Lm7 (03.00 - 06.00)	46.5		
	Ls (Leq Daytime)	62.0		
	Lm (Leq Night-time)	51.5		
Lsm (Leq Day Night)	60.9			
N3: Bunut Ageung Hamlet. Cilamaya Village. Cilamaya Wetan District	Ls1 (06.00 - 09.00)	52.5	55	Leq, 1-hr in dBA • Day : 55 dBA • Night: 45 dBA
	Ls2 (09.00 - 14.00)	54.9		
	Ls3 (14.00 - 17.00)	60.0		
	Ls4 (17.00 - 22.00)	61.2		
	Lm5 (22.00 - 00.00)	46.8		
	Lm6 (00.00 - 03.00)	44.4		
	Lm7 (03.00 - 06.00)	45.3		
	Ls (Leq Daytime)	59.3		
	Lm (Leq Night-time)	45.4		
	Lsm (Leq Day Night)	57.8		
N4: In the Pertamina (adjacent to wall (irrigation area)	Ls1 (06.00 - 09.00)	44.9	55	Leq, 1-hr in dBA • Day : 55 dBA • Night: 45 dBA
	Ls2 (09.00 - 14.00)	59.9		
	Ls3 (14.00 - 17.00)	53.6		
	Ls4 (17.00 - 22.00)	60.9		
	Lm5 (22.00 - 00.00)	53.9		
	Lm6 (00.00 - 03.00)	46.0		
	Lm7 (03.00 - 06.00)	52.9		
	Ls (Leq Daytime)	57.8		
Lm (Leq Night-time)	51.7			
Lsm (Leq Day Night)	57.5			
N5: Paddy field in Cilamaya Village. Cilamaya Wetan District	Ls1 (06.00 - 09.00)	53.9	55	Leq, 1-hr in dBA • Day : 55 dBA • Night: 45 dBA
	Ls2 (09.00 - 14.00)	56.1		
	Ls3 (14.00 - 17.00)	55.1		
	Ls4 (17.00 - 22.00)	53.8		
	Lm5 (22.00 - 00.00)	51.9		

Location	Parameter	dB(A)	Applicable Standards	
			I	II
	Lm6 (00.00 - 03.00)	51.2		
	Lm7 (03.00 - 06.00)	51.5		
	Ls (Leq Daytime)	54.7		
	Lm (Leq Night-time)	51.5		
	Lsm (Leq Day Night)	55.4		

Source: IEE. 2016

Note:

- I: Decree of Environmental Ministry No. 48/1996 on Noise Level Quality Standard
- II: IFC - Environmental, Health and Safety (EHS) Guidelines - General EHS Guidelines: Environmental Noise Management, Section 1.7 Noise (IFC 1.7 Noise), dated 30 April 2007.

**Table B.21 Noise Monitoring Results at Compressor in CCGT Power Plant (November 2015-July 2017)**

Location N6 (distance from the compressor in meter)	September 2016	December 2016	March 2017	June 2017	Applicable Standards	
	dB(A)				I	II
0	104	104	105	100	-	-
100	86	87	82	80	-	-
200	74	75	72	68	-	-
300	66	66	67	59	-	-
400	52	52	67	57	-	-

Source: SGK Cilamaya. 2016; SGK Cilamaya. 2017

Note:

- Local Indonesian legislation nor IFC does not establish standards for noise standards of operational compressor.

**Table B.22 Noise Monitoring (2017)**

Location	Parameter	dB(A)	Applicable Standards	
			I	II
N7 Pertamina Cilamaya	L90	46.9		
	Lm (Leq Night-time)	55.7	55	Leq, 1-hr in dBA • Day : 55 dBA • Night: 45 dBA
	Ls (Leq Daytime)	56.5		
	Lsm (Leq Day Night)	58.9		
N8 Masjid Al- Hidayah	L90	38.3		
	Lm (Leq Night-time)	73.0	55	Leq, 1-hr in dBA • Day : 55 dBA • Night: 45 dBA
	Ls (Leq Daytime)	70.8		
	Lsm (Leq Day Night)	74.6		
N9 Pertamina Residential Area	L90	44.8		
	Lm (Leq Night-time)	56.0	55	Leq, 1-hr in dBA • Day : 55 dBA • Night: 45 dBA
	Ls (Leq Daytime)	57.5		
	Lsm (Leq Day Night)	56.9		
N10 GCC Residential Area	L90	36.1		
	Lm (Leq Night-time)	51.0	55	Leq, 1-hr in dBA • Day : 55 dBA • Night: 45 dBA
	Ls (Leq Daytime)	50.4		

Location	Parameter	dB(A)	Applicable Standards	
			I	II
N11 MTsN 2 Bekasi	Lsm (Leq Day Night)	53.1	55	Leq, 1-hr in dBA • Day : 55 dBA • Night: 45 dBA
	L90	41.9		
	Lm (Leq Night-time)	56.3		
	Ls (Leq Daytime)	41.9		
N12 Access road to GITET Development area	Lsm (Leq Day Night)	56.6	55	Leq, 1-hr in dBA • Day : 55 dBA • Night: 45 dBA
	L90	-		
	Lm (Leq Night-time)	-		
	Ls (Leq Daytime)	-		
	Lsm (Leq Day Night)	53.2		

Source: ERM, 2018b

Note:

- I: Decree of Environmental Ministry No. 48/1996 on Noise Level Quality Standard
- II: IFC - Environmental, Health and Safety (EHS) Guidelines - General EHS Guidelines: Environmental Noise Management, Section 1.7 Noise (IFC 1.7 Noise), dated 30 April 2007.

**Table B.23** *Vibration Monitoring (2017)*

Sampling Code	V1	V2	Applicable Standards	
			I	II
<b>Vibration (mm/s)</b>				
4 Hz	0.008	0.008	<2	Structural Damage
5 Hz	0.006	0.006	<7.5	Triger Action
6.3 Hz	0.005	0.005	<7	Level: 3mm/s
8 Hz	0.004	0.004	<6	
10 Hz	0.004	0.003	<5.2	Human
12.5 Hz	0.003	0.003	<4.8	Disturbance
16 Hz	0.002	0.002	<4	Trigger Action
20 Hz	0.002	0.002	<3.8	level:
25 Hz	0.002	0.002	<3.2	• Daytime: 3mm/s
31.5 Hz	0.001	0.002	<3	• Night-time: 1 mm/s
40 Hz	0.001	0.003	<2	
50 Hz	0.001	0.001	<1	

Source: ERM, 2018b

Note:

- Vibration measurement was conducted based on the method as per *Minister of Environment Decree KEP-49/MENLH/II/1996, regarding Standard Vibration Level, Annex 5.*
- I: Decree of the Minister of Environment No. 49 of 1996 on Vibration Standards.
- II: DIN 4150-3 and DECC Guidelines, 2006.

**Table B.24** *Noise Monitoring (2018)*

Location	Parameter	dB(A)	Applicable Standards	
			I	II
N15	L90	41.1	55	Leq, 1-hr in dBA • Day : 55 dBA • Night: 45 dBA
	Ls (Leq Daytime)	79.6		
	Lm (Leq Night-time)	52.7		
N16	L90	39.3	55	Leq, 1-hr in dBA • Day : 55 dBA • Night: 45 dBA
	Ls (Leq Daytime)	52.6		
	Lm (Leq Night-time)	45.1		

Location	Parameter	dB(A)	Applicable Standards	
			I	II
N17	L90	54.2	55	Leq, 1-hr in dBA
	Ls (Leq Daytime)	60.2		• Day : 55 dBA
	Lm (Leq Night-time)	57.9		• Night: 45 dBA
N18	L90	43.2	55	Leq, 1-hr in dBA
	Ls (Leq Daytime)	52.5		• Day : 55 dBA
	Lm (Leq Night-time)	51.4		• Night: 45 dBA
N19	L90	43.3	55	Leq, 1-hr in dBA
	Ls (Leq Daytime)	62.6		• Day : 55 dBA
	Lm (Leq Night-time)	55.1		• Night: 45 dBA
N20	L90	45.7	55	Leq, 1-hr in dBA
	Ls (Leq Daytime)	61.8		• Day : 55 dBA
	Lm (Leq Night-time)	65.2		• Night: 45 dBA
N21	L90	46.1	55	Leq, 1-hr in dBA
	Ls (Leq Daytime)	61.6		• Day : 55 dBA
	Lm (Leq Night-time)	54.4		• Night: 45 dBA
N22	L90	45.2	55	Leq, 1-hr in dBA
	Ls (Leq Daytime)	54.4		• Day : 55 dBA
	Lm (Leq Night-time)	57.6		• Night: 45 dBA
N23	L90	45.2	55	Leq, 1-hr in dBA
	Ls (Leq Daytime)	54.4		• Day : 55 dBA
	Lm (Leq Night-time)	57.6		• Night: 45 dBA
N24	L90	46.4	55	Leq, 1-hr in dBA
	Ls (Leq Daytime)	62.1		• Day : 55 dBA
	Lm (Leq Night-time)	65.6		• Night: 45 dBA
N25	L90	50.7	55	Leq, 1-hr in dBA
	Ls (Leq Daytime)	69.2		• Day : 55 dBA
	Lm (Leq Night-time)	66.5		• Night: 45 dBA
N26	L90	45.3	55	Leq, 1-hr in dBA
	Ls (Leq Daytime)	71.7		• Day : 55 dBA
	Lm (Leq Night-time)	74.0		• Night: 45 dBA

Source: ERM, 2018c

- I: Decree of Environmental Ministry No. 48/1996 on Noise Level Quality Standard
- II: IFC - Environmental, Health and Safety (EHS) Guidelines - General EHS Guidelines: Environmental Noise Management, Section 1.7 Noise (IFC 1.7 Noise), dated 30 April 2007.

## B.6 ELECTROMAGNETIC FIELDS (EMF)

### B.6.1 List of Reports

The following data is based on primary and secondary data available from the Project area and studies commissioned. This includes the following:

- *Analisis Mengenai Dampak Lingkungan (ANDAL ) Report (ERM, 2018b); and*
- *PLTGU Jawa 1 Independent Power Project - Integrated Environmental and Social Impact Assessment (ESIA) - Additional Baseline Surveys for ESIA (ERM, 2018c).*

**Table B.25 Electromagnetic Field Monitoring (2017)**

Unit	EMF1	EMF2	Applicable Standards	
			I	I
T	$4.0 \times 10^{-7}$	$4.0 \times 10^{-7}$	0.0001	0.0001

Source: ERM, 2018b

Note:

- The EMF survey was conducted using an EMF Meter based on the NIOSH Manual for Measuring Occupational Electric and Magnetic Field Exposures, 1998.
- I: Standard Nasional Indonesia (SNI) 04-6950-2003 regarding the High Voltage Transmission (SUTT) and Extra High Voltage Transmission (SUTET) - Electromagnetic Fields Standards
- II: International Commission on Non-Ionising Radiation Protection (ICNIRP)

**Table B.26 Electromagnetic Field Monitoring (2018)**

Unit	EMF3	EMF4	Applicable Standards	
			I	I
T	0.0001	0.0001	0.0001	0.0001

Source: ERM, 2018b

Note:

- The EMF survey was conducted using an EMF Meter based on the NIOSH Manual for Measuring Occupational Electric and Magnetic Field Exposures, 1998.
- I: Standard Nasional Indonesia (SNI) 04-6950-2003 regarding the High Voltage Transmission (SUTT) and Extra High Voltage Transmission (SUTET) - Electromagnetic Fields Standards
- II: International Commission on Non-Ionising Radiation Protection (ICNIRP)

**Table B.27 Electromagnetic Field Monitoring along the Transmission Line (2018)**

Unit	EMF5	EMF6	EMF7	EMF8	EMF9	EMF10	EMF11	EMF12	EMF13	EMF14
T	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

Source: ERM, 2018c

Note:

- The EMF survey was conducted using an EMF Meter based on the NIOSH Manual for Measuring Occupational Electric and Magnetic Field Exposures, 1998.
- Refer Table B.25 and Table B.26 for the National and International Limits.

## B.7 MARINE WATER QUALITY

### B.7.1 List of Reports

The following data is based on primary and secondary data available from the Project area and studies commissioned. This includes the following:

- *Bathymetric Survey and Seawater Data Collection Report, 2016 (Pöyry, 2016b);*
- *Analisis Mengenai Dampak Lingkungan (ANDAL) Report (ERM, 2018b); and*
- *PLTGU Jawa 1 Independent Power Project - Integrated Environmental and Social Impact Assessment (ESIA) - Additional Baseline Surveys for ESIA (ERM, 2018c).*

**Table B.28 Marine Water Monitoring - Upper of Seawater Level (2016)**

Parameter	Unit	MW1	MW2	MW3	MW4	MW5	MW6	Applicable Standards	
								I	II
Brightness	M	2.20	2	2.20	5	5	4.7	-	-
Temperature	°C	30.5	30.5	30.2	30.2	30.2	29.9	Natural	-
Turbidity	NTU	2.83	2.94	1.81	0.89	1.14	1.92	<5	-
Odour	-	No Odour	Natural	-					
Color	Pt Co	5	12.5	10	5	5	5	-	-
Total Dissolved Solids	mg/L	31,080	30,730	31,080	31,150	31,150	31,150	-	-
Total Suspended Solids	mg/L	<1	3	<1	<1	<1	<1	Natural	-
Total Phosphorus	mg/L	0.60	0.058	0.010	0.035	0.015	0.043	-	-
BOD	mg/L	86	60	96	85	140	73	20	-
Mercury (Hg)	mg/L	0.09	0.18	0.09	< 0.09	< 0.09	0.09	0.001	-
Arsenic (As)	mg/L	< 0.0001	0.0001	< 0.0001	0.0001	< 0.0001	< 0.0001	0.012	-
Barium	mg/L	0.009	0.015	< 0.001	< 0.001	0.019	< 0.001	-	-
Chromium (Cr)	mg/L	0.009	< 0.001	< 0.001	< 0.001	0.022	< 0.001	Chromium Hexavalent: 0.05	-
Boron	mg/L	1.51	0.751	3.05	2.51	1.79	0.624	-	-
Fluoride	mg/L	1.52	1.47	1.36	1.70	1.05	1.39	-	-
Calcium	mg/L	321	400	400	480	400	480	-	-
Magnesium	mg/L	1736	1904	701	1379	1475	1284	-	-
Sodium	mg/L	6542	6417	6458	6542	6417	6583	-	-
Potassium	mg/L	382	364	375	386	375	368	-	-
Selenium	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001	-
Lead (Pb)	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.008	-
Aluminium	mg/L	0.196	0.351	0.222	0.343	0.291	0.102	-	-
Strontium	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	-	-
Cyanide	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	0.008	< 0.001	-	-
Phenol	mg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	-	-
Cadmium	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.005	-
Cobalt	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	-	-

Parameter	Unit	MW1	MW2	MW3	MW4	MW5	MW6	Applicable Standards	
								I	II
Electrical Conductivity	µS/cm	44400	43900	44400	44500	44500	44500	-	-
pH	-	7.31	7.42	7.47	6.82	7.54	7.59	7-8.5	-
Dissolved Oxygen (DO)	mg/L	5.3	5.4	5.0	5.3	5.1	5.2	>5	-
Nitrate (NO <sub>3</sub> -N)	mg/L	0.096	0.092	0.100	0.136	0.068	0.078	0.008	-
Nitrite (NO <sub>2</sub> -N)	mg/L	0.006	0.013	0.005	0.011	< 0.004	0.013	-	-
Ammonia (NH <sub>3</sub> -N)	mg/L	0.150	0.212	0.314	0.395	0.080	0.163	0.3	-
Orthophosphate (PO <sub>4</sub> )	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	Phosphate: 0.015	-
COD	mg/L	154	115	173	154	230	134	-	-
Iron	mg/L	0.026	< 0.01	0.137	0.025	< 0.01	0.046	1	-
Hardness	mg/L	7950	8933	8000	6948	7147	6551	-	-
Chloride	mg/L	15208	16270	15940	15884	13593	15836	-	-
Free Chlorine	mg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	-
Manganese	mg/L	0.167	0.270	0.241	0.152	0.100	0.032	0.5	-
Sulphate	mg/L	3113	2879	3515	2847	2566	2522	-	-
CO <sub>2</sub> Total	mg/L	9.46	12.3	8.51	6.62	5.68	4.73	-	-
Bicarbonate	mg/L	104	106	111	121	130	139	-	-
Carbonate	mg/L	0.0	0.0	0.0	0.0	0.0	0.0	-	-
Copper (Cu)	mg/L	0.097	0.217	0.164	0.062	0.106	0.071	0.008	-
Zinc(Zn)	mg/L	0.588	0.712	0.669	0.742	0.508	0.559	15	-
Oil and Grease	mg/L	3.0	4.80	3.60	4.20	4.40	4.60	1	-

Source: Pöyry, 2016b

Note:

- The marine water was sampled using Van Dorn Sampler/ Niskin Bottle.
- I: Decree of Environmental Ministry No. 51/2004 in Appendix III.
- II: The IFC does not establish standards for seawater quality.

**Table B.29 Marine Water Monitoring – Bottom of Seawater Level (2016)**

Parameter	Unit	MW1	MW2	MW3	MW4	MW5	MW6	I	II
Brightness	M	2.20	2	2.20	5	5	4.7	-	-
Temperature	°C	30.5	30.5	30.2	30.1	30.1	30.0	Natural	-
Turbidity	NTU	2.92	7.67	3.42	1.70	1.30	2.22	<5	-
Odour	-	No Odour	Natural	-					
Color	Pt Co	5	20	5	5	5	5	-	-
Total Dissolved Solids	mg/L	31360	31290	31220	31220	31220	31290	-	-
Total Suspended Solids	mg/L	24	22	87	<1	<1	<1	Natural	-
Total Phosphorus	mg/L	22	87	<1	<1	<1	0.023	-	-
BOD	mg/L	-	-	-	-	-	95	20	-
Mercury (Hg)	mg/L	-	-	-	-	-	<0.09	0.001	-
Arsenic (As)	mg/L	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	0.012	-
Barium	mg/L	<0.001	<0.001	0.014	0.016	0.010	<0.001	-	-
Chromium (Cr)	mg/L	<0.001	<0.001	<0.001	0.024	0.026	0.013	Chromium Hexavalent: 0.05	-
Boron	mg/L	2.36	<0.003	2.71	<0.003	0.855	1.42	-	-
Fluoride	mg/L	1.39	1.59	0.919	1.31	1.39	1.57	-	-
Calcium	mg/L	480	640	640	400	400	320	-	-
Magnesium	mg/L	1379	1284	1093	1189	1285	1428	-	-
Sodium	mg/L	6500	6583	6583	6625	6542	6458	-	-
Potassium	mg/L	357	368	378	364	361	361	-	-
Selenium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	-
Lead (Pb)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.008	-
Aluminium	mg/L	0.179	0.179	0.162	0.196	0.110	0.102	-	-
Strontium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-
Cyanide	mg/L	0.008	<0.001	<0.001	0.011	<0.001	0.009	-	-
Phenol	mg/L	0.263	<0.005	<0.005	<0.005	0.025	0.025	-	-
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.005	-
Cobalt	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-
Electrical Conductivity	µS/Cm	44800	44700	44600	44600	44600	44700	-	-
pH	-	7.53	7.64	7.69	7.68	7.69	7.71	7-8.5	-
Dissolved Oxygen (DO)	mg/L	5.2	5.4	5.1	5.1	5.4	5.2	>5	-
Nitrate (NO <sub>3</sub> -N)	mg/L	0.108	0.120	0.544	0.048	0.090	0.049	0.008	-
Nitrite (NO <sub>2</sub> -N)	mg/L	0.008	<0.004	<0.004	<0.004	<0.004	<0.004	-	-
Ammonia (NH <sub>3</sub> -N)	mg/L	0.219	0.309	0.292	0.197	0.223	0.111	0.3	-
Orthophosphate (PO <sub>4</sub> )	mg/L	<0.01	0.037	<0.01	<0.01	<0.01	<0.01	Phosphate: 0.015	-
COD	mg/L	211	154	288	173	154	154	-	-
Iron	mg/L	0.029	0.048	0.044	0.168	0.170	1.42	1	-
Hardness	mg/L	6948	6948	6154	5956	6353	6750	-	-
Chloride	mg/L	14387	15353	14387	14387	13905	13905	-	-
Free Chlorine	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-
Manganese	mg/L	0.093	0.078	0.063	0.022	0.122	0.307	0.5	-
Sulphate	mg/L	2423	2840	2409	2150	2219	2241	-	-

Parameter	Unit	MW1	MW2	MW3	MW4	MW5	MW6	I	II
CO <sub>2</sub> Total	mg/L	5.68	3.78	6.62	9.46	4.73	6.62	-	-
Bicarbonate	mg/L	146	144	134	136	144	141	-	-
Carbonate	mg/L	0.0	0.0	0.0	0.0	0.0	0.0	-	-
Copper (Cu)	mg/L	0.062	0.004	0.062	0.066	0.071	0.079	0.008	-
Zinc(Zn)	mg/L	0.406	0.479	0.559	1.406	1.420	1.245	0.05	-
Oil and Grease	mg/L	2.20	2.0	4.40	1.60	2.40	2.40	1	-

Source: *Pöyry, 2016b*

Note:

- The marine water was sampled using Van Dorn Sampler/ Niskin Bottle.
- I: Decree of Environmental Ministry No. 51/2004 in Appendix III.
- II: The IFC does not establish standards for seawater quality.

Table B.30 Marine Water Monitoring (2017)

Parameter	Unit	MW7	MW8	MW9	MW10	MW11	MW12	MW13	MW14	MW15	MW16	MW17	Applicable Standards	
													I	II
Brightness	M	4.2	2.5	0.1	0.1	1.25	2.5	2.5	5	4	3	1.25	-	-
Seawater Depth	m	12	20	1	1.3	4.5	9	9	12	14	15	7	-	-
Temperature	°C	29.4	28.6	29.6	30.3	29.3	29.1	28.9	29.0	28.7	28.5	28.9	Natural	-
pH	-	8.39	8.31	8.24	8.34	8.43	8.37	8.36	8.38	8.33	8.33	8.35	7-8.5	-
Turbidity	NTU	3.08	2.53	5.77	109	8.29	7.95	15.6	3.29	2.34	4.66	6.22	<5	-
Odour	-	Odour detected											Natural	
Total Suspended Solids	mg/L	<8	<8	647	142	11	12	50	<8	<8	10	11	Natural	-
Total Phosphorus	mg/L	0.60	0.058	0.010	0.035	0.015	0.043	0.60	0.058	0.010	0.035	0.015	-	-
BOD5	mg/L	2.50	2.60	2.40	2.40	2.50	2.30	2.60	2.60	2.40	2.50	2.60	20	-
Mercury (Hg)	mg/L	0.0085	0.0022	0.0014	0.0008	0.0004	0.0003	0.0010	0.0013	0.0010	0.0008	0.0006	0.001	-
Arsenic (As)	mg/L	< 0.0001	0.0004	< 0.0001	0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001	< 0.0001	<0.0001	< 0.0001	0.012	-
Chromium Hexavalent	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	Chromium Hexavalent: 0.05	-
Cadmium (Cd)	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001	0.001	0.005	-
Copper (Cu)	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	-	-
Lead (Pb)	mg/L	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	0.05	-
Zinc (Zn)	mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	15	-
Nickel (Ni)	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.05	-
Ammonia (NH3-N)	mg/L	0.012	0.010	0.010	0.010	0.011	0.013	0.010	0.012	0.012	0.010	0.012	0.3	-
Nitrate (NO3-N)	mg/L	0.082	0.096	0.139	0.090	0.106	0.087	0.090	0.088	0.090	0.088	0.102	0.008	-
Orthophosphate (PO4)	mg/L	0.004	0.008	0.004	0.004	0.004	0.004	0.004	0.005	0.003	0.002	0.004	Phosphate: 0.015	-
Cyanide	mg/L	0.005	0.006	0.007	0.005	0.007	0.008	0.006	0.007	0.007	0.007	0.005	0.01	-
Hydrogen Sulphide	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.5	-
Oil & Grease	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	-
Phenol	mg/L	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	<0.0005	<0.0005	0.002	-
Surfactant	mg/L	0.080	0.096	0.085	0.086	0.088	0.097	0.086	0.092	0.090	0.075	0.084	1	-
PAH	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.003	-

Parameter	Unit	MW7	MW8	MW9	MW10	MW11	MW12	MW13	MW14	MW15	MW16	MW17	Applicable Standards	
													I	II
PCB	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.01	-
TBT	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.01	-
Total Coliform	MPN/ 100mL	2	2400	33	27	2	0	49	2	5	2	0	1000	-
Fecal Coliform	MPN/ 100mL	2	2400	17	27	2	0	49	2	5	2	0	1000	-
Salmonella	Colony/ mL	0	3.5x10 <sup>1</sup>	0	0	0	0	0	0	0	0	0	-	-

Source: ERM, 2018b

Note:

- I: Decree of Environmental Ministry No. 51/2004 in Appendix III.
- II: The IFC does not establish standards for seawater quality.

**Table B.31 Marine Water Monitoring (2018)**

Parameter	Unit	MW18	MW19	MW20	MW21	MW22	MW23	I	II
Colour	Pt. Co	<1	<1	<1	<1	<1	<1	-	-
Odour		Odour Detected						Natural	-
Brightness	m	0.8	2	2	4	10	15	-	-
Turbidity	ntu	14.20	5.96	3.65	2.72	1.22	1.07	<5	-
TSS	mg/l	19	8	<8	<8	<8	<8	Natural	-
Temperature	°C	32.8	31.2	31.2	32.4	31	31.1	Natural	-
Garbage	-	-	-	-	-	-	-	-	-
Oil layer	-	-	-	-	-	-	-	-	-
pH	-	8.13	8.17	8.06	8.04	8.16	8.16	7-8.5	-
Salinity	‰	30	31	30	31	31	32	-	-
Dissolved Oxygen	mg/l	5.4	5.7	6.1	5.9	5.7	5.6	>5	-
BOD5	mg/l	1.40	1.20	1.20	1.40	1.30	1.20	20	-
Free Ammoniac	mg/l	0.158	0.077	0.070	0.100	0.109	0.155	-	-
Phosphate (PO <sub>4</sub> -P)	mg/l	0.312	0.311	0.311	0.311	0.311	0.312	Phosphate: 0.015	-
Nitrate (NO <sub>3</sub> -N)	mg/l	0.127	0.11	0.53	0.143	0.11	0.18	0.008	-
Sulphide (H <sub>2</sub> S)	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.01	-
Phenol	mg/l	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.002	-
Polyaromatic Hydrocarbon	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.003	-
Polychlorobiphenyl	µg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.01	-
Surfactant	mg/l	0.148	0.125	0.107	0.090	0.085	0.080	1	-
Oil and Grease	mg/l	<1	<1	<1	<1	<1	<1	1	-
Pesticide	µg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.01	-
COD	mg/l	55.74	53.59	50.16	54.02	54.02	59.17	-	-
Chlorides	mg/l	19873.84	18834.16	18514.26	18274.33	22433.04	25472.10	-	-
Total Hydrocarbon	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	-
Mercury (Hg)	mg/l	0.0001	0.0008	0.0004	0.0003	0.0003	0.0001	0.001	-
Hexavalent	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.05	-
Arsenic (As)	mg/l	0.0091	0.0050	0.0043	0.0085	0.0096	0.0109	0.05	-
Cadmium (Cd)	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.005	-
Copper (Cu)	mg/l	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	-	-
Lead (Pb)	mg/l	<0.006	<0.006	<0.006	<0.006	<0.006	0.008	0.05	-
Zinc (Zn)	mg/l	0.028	0.025	0.024	0.029	0.025	0.024	15	-
Silver (Ag)	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	-
Beryllium (Be)	mg/l	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	-	-
Selenium (Se)	mg/l	0.0010	0.0013	0.0009	0.0010	0.0013	0.0011	0.01	-

Source: ERM. 2018b

Note:

- The marine water was sampled using Van Dorn Sampler/ Niskin Bottle.
- I: Decree of Environmental Ministry No. 51/2004 in Appendix III.
- The IFC does not establish standards for seawater quality.

## **B.8**            *MARINE SEDIMENT*

### **B.8.1**        *List of Reports*

The following data is based on primary and secondary data available from the Project area and studies commissioned. This includes the following:

- *Bathymetric Survey and Seawater Data Collection Report, 2016 (Pöyry, 2016b);*
- *Analisis Mengenai Dampak Lingkungan (ANDAL) Report (ERM, 2018b); and*
- *PLTGU Jawa 1 Independent Power Project - Integrated Environmental and Social Impact Assessment (ESIA) - Additional Baseline Surveys for ESIA (ERM, 2018c).*

**Table B.32 Marine Sediment Monitoring (2017)**

Parameter	Unit	MS1	MS2	MS3	MS4	MS5	MS6	MS7	MS8	MS9	MS10	MS11	MS12	MS13	ANZECC/ ARMANZ 2000	
															ISQG - Low (Trigger Value)	ISQG - High
Mercury (Hg)	mg/kg	0.007	0.011	<0.004	0.030	0.023	<0.004	0.091	0.187	0.017	0.101	0.215	0.373	0.036	0.15	1
Chromium (Cr)	mg/kg	9.71	4.84	<0.09	12.66	13.74	5.84	9.04	13.65	8.52	1.91	13.78	7.41	7.90	80	370
Arsenic (As)	mg/kg	0.659	0.569	1.187	0.386	0.011	1.001	1.148	0.847	0.581	0.553	0.909	0.926	0.816	20	70
Cadmium (Cd)	mg/kg	2.54	0.61	0.33	1.30	1.20	2.90	2.60	4.05	3.85	4.59	1.75	4.40	1.82	1.5	10
Copper (Cu)	mg/kg	13.94	2.22	6.51	16.76	22.01	19.72	20.53	15.24	10.07	6.92	17.40	11.97	18.94	65	270
Lead (Pb)	mg/kg	39.76	18.35	12.40	40.36	42.47	55.25	54.07	51.66	53.11	68.26	50.44	66.23	72.56	50	220
Zinc (Zn)	mg/kg	86.86	40.68	61.74	95.2	101.59	93.29	96.03	79.12	83.29	76.76	85.04	77.98	113.58	200	410
Nickel (Ni)	mg/kg	40.32	16.90	22.33	25.49	31.24	50.54	34.58	45.50	39.59	51.32	26.90	42.33	31.51	21	52

Source: ERM, 2018b

Note:

- Parameters were analysed based on the specification of the Australian and New Zealand interim sediment quality guidelines i.e. ANZECC/ ARMANZ 2000.
- The local Indonesian standards nor IFC does not establish standards for marine sediment quality.

**Table B.33 Marine Sediment Monitoring (2018)**

Parameter	Unit	MS14	MS15	MS16	MS17	MS18	MS19	ANZECC/ ARMANZ 2000	
								ISQG - Low (Trigger Value)	ISQG - High
Arsenic (As)	mg/ kg	3.414	3.581	3.277	3.477	3.645	5.414	20	70
Cadmium (Cd)	mg/ kg	3.68	3.22	0.64	3.85	3.72	6.80	1.5	10
Chromium (Cr)	mg/ kg	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	80	370
Copper (Cu)	mg/ kg	22.27	26.76	31.94	14.88	15.92	12.10	65	270
Lead (Pb)	mg/ kg	96.15	68.05	110.36	98.59	123.67	119.00	50	220
Mercury (Hg)	mg/ kg	0.028	0.005	0.094	<0.004	0.022	0.077	0.15	1
Zinc (Zn)	mg/ kg	149.69	102.34	112.26	91.43	77.63	72.35	200	410
Nickel (Ni)	mg/ kg	29.95	39.53	5.87	36.82	35.95	51.79	21	52
Silver (Ag)	mg/ kg	3.49	<0.20	1.91	<0.20	4.19	1.20	1	3.7
TBT	µg/ kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	5	70
Total PAHs	µg/ kg	2	2	2	2	2	2	4000	45000
Total PCBs	µg/ kg	<20	<20	<20	<20	<20	<20	23	-

Source: ERM, 2018c

Note:

- Parameters were analysed based on the specification of the Australian and New Zealand interim sediment quality guidelines i.e. ANZECC/ ARMANZ 2000.
- No local Indonesian standards nor IFC does not establish standards for marine sediment quality.

## B.9.1

*List of Reports*

The following data is based on primary and secondary data available from the Project area and studies commissioned. This includes the following:

- *Bathymetric Survey and Seawater Data Collection Report, 2016 (Pöyry, 2016b);*
- *Analisis Mengenai Dampak Lingkungan (ANDAL) Report (ERM, 2018b); and*
- *PLTGU Jawa 1 Independent Power Project - Integrated Environmental and Social Impact Assessment (ESIA) - Additional Baseline Surveys for ESIA (ERM, 2018c).*

Plankton was observed by filtering the water samples using the plankton net number 25. The filtered water was placed in sampling bottles and were added with the preservative 4% MAF (methyl alcohol, acetic acid glacial and formalin). Analysis of plankton includes the abundance, diversity, homogeneity, and dominance. Individual number of plankton was calculated by using the Sedgwick Rafter Counting Cell, which determines plankton abundance and homogeneity using a standard equation.

Benthos in the waters bed were sampled using Petersen Grab, sieved to separate benthos from the sediment and be preserved by adding 4% MAF.

**Table B.34** *Marine Plankton Type Diversity Monitoring (2016)*

Species	MP1	MP2	MP3	MP4	MP5	MP6
<b>Phytoplankton</b>						
<i>Amphora sp.</i>	0	33	33	0	33	0
<i>Bacillariaparodoxa.</i>	1980	33	627	66	0	66
<i>Bacteriastrium sp.</i>	0	33	0	0	33	0
<i>Biddulphia.</i>	3630	1419	1089	792	1254	4950
<i>Biddulphia mobiliensis.</i>	0	0	0	33	0	0
<i>Ceratium furca.</i>	891	3630	560	924	33	429
<i>Ceratium fusus.</i>	0	1416	297	0	0	33
<i>Ceratium sp.</i>	198	297	132	4620	33	462
<i>Chaetoceros curvicutus.</i>	99	165	198	33	33	198
<i>Chaetoceros sp.</i>	17490	13530	6600	1056	164	4290
<i>Climacodium sp.</i>	0	0	66	0	0	0
<i>Amphora sp.</i>	0	33	33	0	33	0
<i>Bacillariaparodoxa.</i>	1980	33	627	66	0	66
<i>Bacteriastrium sp.</i>	0	33	0	0	33	0
<i>Biddulphia.</i>	3630	1419	1089	792	1254	4950
<i>Biddulphia mobiliensis.</i>	0	0	0	33	0	0
<i>Ceratium furca.</i>	891	3630	560	924	33	429
<i>Coscinodiscus sp.</i>	2640	1650	693	594	1650	4290
<i>Dinophysis sp.</i>	0	66	33	0	0	0
<i>Diploneis sp.</i>	0	0	33	0	0	0
<i>Ditylum sp.</i>	165	66	66	165	132	198
<i>Ethmodiscus sp.</i>	198	198	99	0	99	132
<i>Fragilaria cylindrus.</i>	66	0	33	0	66	0

Species	MP1	MP2	MP3	MP4	MP5	MP6
<i>Guinardia sp.</i>	495	561	1254	495	594	3201
<i>Hemiaulus sp.</i>	132	264	165	66	33	198
<i>Hemidiscus sp.</i>	0	0	99	33	33	198
<i>Hyalodiscus sp.</i>	33	0	66	0	0	33
<i>Lauderia sp.</i>	33	33	66	33	33	66
<i>Leprocylindrus sp.</i>	0	0	0	0	0	33
<i>Nitzschia longisima.</i>	33	0	132	0	33	0
<i>Nitzschia sigma.</i>	99	33	0	0	0	0
<i>Nitzschia sp.</i>	132	165	429	66	33	66
<i>Oscillatoria sp.</i>	33	33	0	0	0	0
<i>Peridinium sp.</i>	297	594	264	264	66	99
<i>Phrophacus sp.</i>	0	99	0	132	66	66
<i>Pleurosigma sp.</i>	33	165	528	0	33	132
<i>Rhabdonema sp.</i>	0	0	33	0	33	0
<i>Rhizosolenia alata.</i>	0	0	0	33	0	66
<i>Rhizosolenia delicatula.</i>	33	0	0	66	0	33
<i>Rhizosolenia fragilissima.</i>	0	0	0	33	0	66
<i>Rhizosolenia robusta.</i>	198	33	132	66	165	297
<i>Rhizosolenia shrubsolei.</i>	297	132	231	33	132	198
<i>Rhizosolenia stolterfothii.</i>	0	66	132	33	0	66
<i>Rhizosolenia sp.</i>	8910	5610	24750	9240	10560	39204
<i>Spirulina sp.</i>	0	0	33	33	0	0
<i>Stanieria sp.</i>	14190	8910	15510	7260	6930	11220
<i>Thalassionema sp.</i>	66	66	0	33	0	66
<i>Thalassiosira sp.</i>	0	0	99	0	0	0
<i>Thalassiothrix sp.</i>	231	0	0	33	0	198
<i>Tribonema sp.</i>	0	33	0	0	0	0
<i>Triceratium sp.</i>	0	0	33	0	0	0
<i>Trichodesmium sp.</i>	66	165	330	1287	33	1188
<b>Total Phytoplankton</b>	<b>52668</b>	<b>39498</b>	<b>54845</b>	<b>27522</b>	<b>22307</b>	<b>71742</b>
<b>ID Simpson</b>	<b>0.779</b>	<b>0.798</b>	<b>0.700</b>	<b>0.783</b>	<b>0.670</b>	<b>0.663</b>
<b>Zooplankton</b>						
<i>Acartia sp.</i>	6600	4950	6600	9900	4950	5610
<i>Balanus sp.</i>	66	33	66	0	66	66
<i>Brachionus facaltis.</i>	33	0	0	0	0	0
<i>Brachionus sp.</i>	0	0	33	0	0	0
<i>Centropages sp.</i>	3300	132	231	330	33	429
<i>Centropyxis aculeata.</i>	33	0	0	0	0	0
<i>Ciliata.</i>	0	33	0	0	0	0
<i>Cladocera.</i>	33	0	0	33	33	33
<i>Euterpina sp.</i>	1188	1980	396	297	627	231
<i>Favella sp.</i>	165	99	99	0	33	0
<i>Gryphaea sp.</i>	792	165	165	66	66	66
<i>Keratella sp.</i>	33	33	0	0	33	0
<i>Limacina sp.</i>	0	0	0	0	0	33
<i>Nauplii.</i>	2046	1815	6270	297	231	363
<i>Oikopleura sp.</i>	0	0	0	99	0	33
<i>Oithona sp.</i>	4950	198	891	264	33	132
<i>Paracalanus sp.</i>	0	33	0	165	33	165
<i>Polychaeta.</i>	0	33	0	0	0	0
<i>Tintinnopsis sp.</i>	99	99	33	0	33	33
<b>Total Zooplankton</b>	<b>19338</b>	<b>9603</b>	<b>14784</b>	<b>11451</b>	<b>6171</b>	<b>7194</b>
<b>ID Simpson</b>	<b>0.772</b>	<b>0.655</b>	<b>0.616</b>	<b>0.250</b>	<b>0.344</b>	<b>0.384</b>
<b>Total Plankton</b>	<b>72006</b>	<b>49101</b>	<b>69629</b>	<b>38973</b>	<b>28478</b>	<b>78936</b>
<b>ID Simpson</b>	<b>0.865</b>	<b>0.856</b>	<b>0.797</b>	<b>0.827</b>	<b>0.767</b>	<b>0.716</b>

Source: Pöyry, 2016b

**Table B.35 Marine Phytoplankton Monitoring (2017)**

Parameter	MP7	MP8	MP9	MP10	MP11	MP12	MP13	MP14	MP15	MP16	MP17
Total taxonomy	15	15	15	11	19	19	17	11	19	15	13
Total cell/ $m^3$	1.159.665	82.207	1.075.666	1.211.001	170.426	506.668	4.927.999	413.033	1.185.002	148.374	294.736
ID Simpson	0.54	0.26	0.61	0.64	0.34	0.20	0.22	0.76	0.23	0.20	0.37
Dominant species (Cell/ $m^3$ )	<i>Trichodesmium</i> sp. (840.000)	<i>Skeletonema</i> sp. (40.100)	<i>Skeletonema</i> sp. (835.333)	<i>Skeletonema</i> sp. (956.667)	<i>Skeletonema</i> sp. (87.218)	<i>Trichodesmium</i> sp. (188.333)	<i>Bacteriastrium</i> sp. (1.558.667)	<i>Trichodesmium</i> sp. (360.401)	<i>Chaetoceros</i> sp. (496.667)	<i>Chaetoceros</i> sp. (48.622)	<i>Trichodesmium</i> sp. (173.434)
	<i>Chaetoceros</i> sp. (142.333)	<i>Nitzschia</i> sp. (7.519)	<i>Nitzschia</i> sp. (100.333)	<i>Nitzschia</i> sp. (95.667)	<i>Trichodesmium</i> sp. (41.604)	<i>Thalassiothrix</i> sp. (75.000)	<i>Trichodesmium</i> sp. (1.381.333)	<i>Chaetoceros</i> sp. (19.048)	<i>Thalassiothrix</i> sp. (166.667)	<i>Thalassiothrix</i> sp. (33.083)	<i>Skeletonema</i> sp. (28.571)
	<i>Thalassiothrix</i> sp. (46.667)	<i>Bacillaria</i> sp. (5.013)	<i>Pleurosigma</i> sp. (39.667)	<i>Trichodesmium</i> sp. (88.667)	<i>Nitzschia</i> sp. (20.050)	<i>Chaetoceros</i> sp. (66.667)	<i>Chaetoceros</i> sp. (672.000)	<i>Thalassiothrix</i> sp. (11.028)	<i>Nitzschia</i> sp. (145.000)	<i>Bacteriastrium</i> sp. (22.055)	<i>Chaetoceros</i> sp. (23.058)

Source: ERM, 2018b

**Table B.36 Marine Zooplankton Monitoring (2017)**

Parameter	MP7	MP8	MP9	MP10	MP11	MP12	MP13	MP14	MP15	MP16	MP17
Total taxonomy	5	7	9	8	4	13	10	7	6	6	11
Total idn/ $m^3$	3.159	2.759	14.738	12.633	2.257	26.819	25.966	3.258	2.256	2.758	7.521
ID Simpson	0.28	0.21	0.22	0.30	0.33	0.21	0.19	0.16	0.19	0.21	0.11
Dominant species (idn/ $m^3$ )	<i>Nauplius</i> (1.404)	<i>Nauplius</i> (1.003)	<i>Nauplius</i> (4.561)	<i>Nauplius</i> (5.965)	<i>Nauplius</i> (1.003)	<i>Nauplius</i> (9.273)	<i>Oithona</i> sp. (7.368)	<i>Nauplius</i> (752)	<i>Nauplius</i> (501)	<i>Paracalanus</i> sp. (752)	<i>Nauplius</i> (1.253)
	<i>Paracalanus</i> sp. (702)	<i>Paracalanus</i> sp. (501)	<i>Oithona</i> sp. (4.211)	<i>Paracalanus</i> sp. (3.158)	<i>Larva</i> <i>Gastropoda</i> (sp1) (752)	<i>Paracalanus</i> sp. (7.018)	<i>Paracalanus</i> sp. (6316)	<i>Acartia</i> sp. (501)	<i>Paracalanus</i> sp. (501)	<i>Larva</i> <i>Gastropoda</i> (sp1) (752)	<i>Acrocalanus</i> sp. (1.003)
	<i>Achantometron</i> sp. (351)	<i>Achantometron</i> sp. (251)	<i>Tintinnopsis</i> sp. (2456)	<i>Tintinnopsis</i> sp. (1.053)	<i>Acartia</i> sp. (251)	<i>Oithona</i> sp. (3.509)	<i>Nauplius</i> (4912)	<i>Acrocalanus</i> sp. (501)	<i>Larva</i> <i>Pelecypoda</i> (501)	<i>Larva</i> <i>Pelecypoda</i> (501)	<i>Corycaeus</i> sp. (1.003)

Source: ERM, 2018b

Table B.37 Marine Macrobenthos Monitoring (2017)

Parameter	Unit	MB1	MB2	MB3	MB4	MB5	MB6	MB7	MB8	MB9	MB10	MB11	MB12	MB13
<b>Polychaeta</b>														
<i>Aglaophamus sp.</i>	Ind/m <sup>3</sup>	0	0	0	0	0	0	0	0	0	30	0	0	0
<i>Ampharete sp.</i>	Ind/m <sup>3</sup>	0	0	0	0	0	0	0	30	0	0	0	0	0
<i>Cirratulus sp.</i>	Ind/m <sup>3</sup>	0	0	0	0	0	0	0	30	0	0	0	0	0
<i>Diopatra sp.</i>	Ind/m <sup>3</sup>	0	0	0	0	0	0	0	30	0	0	0	0	0
<i>Eunice sp.</i>	Ind/m <sup>3</sup>	0	0	0	0	0	0	0	0	59	0	0	0	0
<i>Glycera sp.</i>	Ind/m <sup>3</sup>	0	0	0	0	0	0	0	0	0	0	0	30	0
<i>Goniada sp.</i>	Ind/m <sup>3</sup>	0	30	0	0	0	0	0	0	0	0	0	0	0
<i>Heteromastus sp.</i>	Ind/m <sup>3</sup>	0	0	0	0	30	0	0	0	0	0	0	0	0
<i>Lumbrineris sp.</i>	Ind/m <sup>3</sup>	0	0	0	0	0	0	0	0	30	30	0	0	0
<i>Mageelona sp.</i>	Ind/m <sup>3</sup>	0	0	0	89	30	0	0	0	0	0	0	0	0
<i>Nereis sp.</i>	Ind/m <sup>3</sup>	0	0	30	59	0	0	0	0	0	0	0	0	30
<i>Notomastus sp.</i>	Ind/m <sup>3</sup>	30	0	0	0	0	0	0	0	0	0	0	0	0
<i>Terebellides sp.</i>	Ind/m <sup>3</sup>	30	0	0	0	0	0	0	0	0	0	0	0	0
<i>Paraonis sp.</i>	Ind/m <sup>3</sup>	0	0	0	0	0	0	0	0	30	0	0	0	0
<i>Prionospio sp.</i>	Ind/m <sup>3</sup>	0	0	0	118	0	0	0	0	0	0	0	0	0
<i>Potamila sp.</i>	Ind/m <sup>3</sup>	0	0	0	30	0	0	0	0	0	0	0	0	0
<i>Sternaspis sp.</i>	Ind/m <sup>3</sup>	0	0	0	0	59	0	0	0	0	0	0	0	0
<i>Terebellides sp.</i>	Ind/m <sup>3</sup>	0	0	0	0	0	0	0	89	89	148	0	0	0
<i>Trichobranchus sp.</i>	Ind/m <sup>3</sup>	0	0	0	0	0	0	0	0	0	0	0	0	30
<b>Oligochaeta</b>														
<i>F. Lumbriculidae sp.</i>	Ind/m <sup>3</sup>	0	0	0	0	0	0	0	30	0	0	0	0	0
<b>Sipincola</b>														
<i>Apionsoma sp.</i>	Ind/m <sup>3</sup>	0	59	0	0	30	0	0	30	0	0	0	0	59
<b>Crustaceae</b>														
<i>Ampelisca sp.</i>	Ind/m <sup>3</sup>	0	0	0	0	0	0	0	30	0	0	0	0	0
<i>Callianassa sp.</i>	Ind/m <sup>3</sup>	0	0	0	0	0	0	0	0	0	30	0	30	0
<i>Cirolana sp.</i>	Ind/m <sup>3</sup>	0	0	0	0	0	0	0	0	89	0	0	0	0
<i>Leptopocchelia sp.</i>	Ind/m <sup>3</sup>	0	0	0	0	0	0	0	30	0	30	0	0	0
<i>Oratosquilla sp.</i>	Ind/m <sup>3</sup>	30	0	0	0	0	0	0	0	0	0	0	0	0
<i>Paradorippe sp.</i>	Ind/m <sup>3</sup>	0	0	0	0	0	0	0	0	0	0	30	0	0
<i>Photis sp.</i>	Ind/m <sup>3</sup>	0	0	59	0	0	0	0	0	0	0	0	0	0
<i>Pinnotheres sp.</i>	Ind/m <sup>3</sup>	0	0	0	0	0	0	0	0	0	30	0	0	0
<i>Ptilanthura sp.</i>	Ind/m <sup>3</sup>	30	0	0	0	0	0	30	0	0	0	0	0	0

Parameter	Unit	MB1	MB2	MB3	MB4	MB5	MB6	MB7	MB8	MB9	MB10	MB11	MB12	MB13
<i>Tanais sp.</i>	Ind/m <sup>3</sup>	30	0	0	0	0	0	0	0	0	0	0	0	0
<b>Pelecypoda</b>														
<i>Nuculuna sp.</i>	Ind/m <sup>3</sup>	0	0	0	0	30	30	0	0	0	0	0	0	0
<i>Siliqula sp.</i>	Ind/m <sup>3</sup>	0	0	0	59	0	0	0	0	0	0	0	0	0
<i>Tellina sp.</i>	Ind/m <sup>3</sup>	0	0	0	30	0	0	0	0	0	0	0	0	0
<b>Ecinodermata</b>														
<i>Ophiuroidea sp.</i>	Ind/m <sup>3</sup>	30	0	0	0	0	0	0	0	0	0	30	30	30
<b>Anthozoa</b>														
<i>Hormathia sp.</i>	Ind/m <sup>3</sup>	0	0	0	0	0	0	0	0	0	30	0	0	0
<b>Nemertina</b>														
<i>Cerebratulus sp.</i>	Ind/m <sup>3</sup>	0	0	0	0	0	0	0	0	0	0	0	30	0
<i>Tubulanus sp.</i>	Ind/m <sup>3</sup>	0	0	0	0	0	0	0	0	0	0	30	0	0

Source: ERM, 2018b

Note: Only detected species is recorded.



## **PLTGU Jawa 1 Independent Power Project**

### **ANNEX C STAKEHOLDER ENGAGEMENT PLAN (SEP)**

Prepared for:

PT Jawa Satu Power (JSP)

[www.erm.com](http://www.erm.com)

## TABLE OF CONTENTS

<b>1</b>	<b>INTRODUCTION</b> .....	<b>1-1</b>
1.1	PROJECT OVERVIEW .....	1-1
1.2	PROJECT LOCATION .....	1-3
1.3	PROJECT PROPONENTS .....	1-3
1.4	OVERVIEW OF THIS STAKEHOLDER ENGAGEMENT PLAN (SEP) .....	1-4
1.5	STAKEHOLDER ENGAGEMENT PLAN STRUCTURE .....	1-6
1.6	LIMITATIONS.....	1-6
<b>2</b>	<b>PROJECT DESCRIPTION</b> .....	<b>2-1</b>
2.1	PROJECT LOCATION.....	2-1
2.2	PROJECT COMPONENTS.....	2-1
2.2.1	Floating Storage and LNG Regasification Unit (FSRU) .....	2-1
2.2.2	CCGT Power Plant.....	2-2
2.3	SOCIAL SETTING OF PROJECT AREA .....	2-6
<b>3</b>	<b>REGULATIONS AND REQUIREMENTS</b> .....	<b>3-1</b>
3.1	PUBLIC CONSULTATION REQUIREMENT UNDER INDONESIAN REGULATION .....	3-1
3.2	INTERNATIONAL STANDARDS AND BEST PRACTICES .....	3-3
	Equator Principles .....	3-3
	Asian Development Bank (ADB) Safeguard Policies .....	3-5
	Japan Bank for International Cooperation (JBIC).....	3-8
	Nippon Export and Investment Insurance (NEXI).....	3-9
<b>4</b>	<b>PROJECT STAKEHOLDERS</b> .....	<b>4-1</b>
4.1	STAKEHOLDERS IDENTIFIED DURING AMDAL AND ESIA CONSULTATIONS PROCESS.....	4-1
4.2	VULNERABLE GROUPS.....	4-4
4.3	STAKEHOLDER ANALYSIS .....	4-5
<b>5</b>	<b>PREVIOUS STAKEHOLDER ENGAGEMENT ACTIVITIES</b> .....	<b>5-1</b>
5.1	PUBLIC CONSULTATION AS PART OF REGULATORY ENVIRONMENTAL IMPACT ASSESSMENT (AMDAL) PROCESS.....	5-1
5.2	CONSULTATIONS FOR THE ESIA PROCESS .....	5-1
5.3	CONSULTATIONS DURING THE LAND ACQUISITION PROCESS .....	5-1
5.4	SUMMARY OF CONSULTATION TO DATE .....	5-3
<b>6</b>	<b>STAKEHOLDER ENGAGEMENT PLAN</b> .....	<b>6-1</b>
6.1	STAKEHOLDER ENGAGEMENT METHODOLOGY .....	6-1
6.1.1	Stakeholder Engagement Materials .....	6-1
6.1.2	Communication Channels.....	6-2
6.2	PLANNED FUTURE STAKEHOLDER ENGAGEMENT .....	6-3
<b>7</b>	<b>COMMUNITY GRIEVANCE MECHANISM</b> .....	<b>7-1</b>

7.1	<i>PROPOSED GRIEVANCE MECHANISM FOR PROJECT-AFFECTED COMMUNITIES.....</i>	<i>7-1</i>
7.2	<i>MONITORING AND REPORTING OF GRIEVANCE MECHANISM.....</i>	<i>7-4</i>
7.3	<i>DISCLOSURE OF GRIEVANCE MECHANISM.....</i>	<i>7-4</i>
7.4	<i>WORKER GRIEVANCE MECHANISM .....</i>	<i>7-5</i>
8	<i>MANAGEMENT FOR IMPLEMENTATION OF STAKEHOLDER ENGAGEMENT.....</i>	<i>8-1</i>
8.1	<i>DEDICATED RESOURCES FOR MANAGING THE SEP.....</i>	<i>8-1</i>
8.2	<i>MONITORING AND TRACKING OF STAKEHOLDER ENGAGEMENT ACTIVITIES.....</i>	<i>8-2</i>
8.3	<i>DATA GATHERING AND REPORTING .....</i>	<i>8-3</i>
8.3.1	<i>Data Gathering and Tracking.....</i>	<i>8-3</i>
8.3.2	<i>Reporting.....</i>	<i>8-3</i>

### **LIST OF TABLES**

Table 2-1	<i>Project Social Boundaries.....</i>	<i>2-6</i>
Table 4-1	<i>Stakeholder Analysis .....</i>	<i>4-6</i>
Table 5-1	<i>Consultation Requirements and Gaps between AMDAL and ESIA .....</i>	<i>5-2</i>
Table 5-2	<i>Summary of Consultation to Date.....</i>	<i>5-4</i>
Table 5-3	<i>Public Consultation as part of Regulatory EIA (AMDAL) Process .....</i>	<i>5-10</i>
Table 5-4	<i>Stakeholder Consultations during the ESIA Development Phase .....</i>	<i>5-16</i>
Table 5-5	<i>Stakeholder Consultation by the Land Acquisition Consultant.....</i>	<i>5-21</i>
Table 6-1	<i>Stakeholder Engagement Tools .....</i>	<i>6-1</i>
Table 6-2	<i>Communication Channels.....</i>	<i>6-2</i>
Table 6-3	<i>PT Jawa Satu Power Stakeholder Engagement Plan.....</i>	<i>6-5</i>
Table 7-1	<i>Summary of Stages of Grievance Handling.....</i>	<i>7-2</i>
Table 8-1	<i>Key Roles and Responsibilities.....</i>	<i>8-1</i>

### **LIST OF FIGURES**

Figure 1-1	<i>Project Overview.....</i>	<i>1-2</i>
Figure 1-2	<i>Project Layout with EPC Responsibilities .....</i>	<i>1-4</i>
Figure 2-1	<i>CCGT Power Plant Site .....</i>	<i>2-3</i>
Figure 2-2	<i>Social Boundaries of Project.....</i>	<i>2-10</i>
Figure 3-1	<i>International Finance Corporation (IFC) Performance Standards .....</i>	<i>3-7</i>

*Figure 6-1 Stakeholder Engagement Based on Power / Influence verses Interest..... 6-4*

*Figure 7-1 Grievance Tracking Redress Mechanism ..... 7-2*

### ***LIST OF ANNEXES***

*Annex 1 Community Grievance Form*

*Annex 2 Grievance Log Book and Database Form*

*Annex 3 Stakeholder Engagement Database*

*Annex 4 List of Stakeholders Consulted during ESIA development Phase*

*Annex 5 Stakeholder Feedback Database*

*Annex 6 Stakeholder Feedback Form*

*Annex 7 Minutes of Meeting of Community Consultation Undertaken by the  
Project related to Compensation Scheme of Transmission Line Open Area /  
Space.*

# 1 INTRODUCTION

## 1.1 PROJECT OVERVIEW

The PLTGU Jawa-1 Project (the Project) involves the development of a Combined Cycle Gas Turbine (CCGT) Power Plant, a Liquefied Natural Gas (LNG) Floating Storage and Regasification Unit (FSRU) and a 500kV power transmission lines and a Substation. These project elements will be developed within the Karawang and Bekasi Regencies of West Java, Indonesia. The Project location and main elements are depicted in **Figure 1-1**.

PT Pertamina (Persero), Sojitz Corporation and Marubeni Corporation (together, the “Sponsors”) have concluded an agreement to develop the Project via a project company named PT. Jawa Satu Power (JSP).

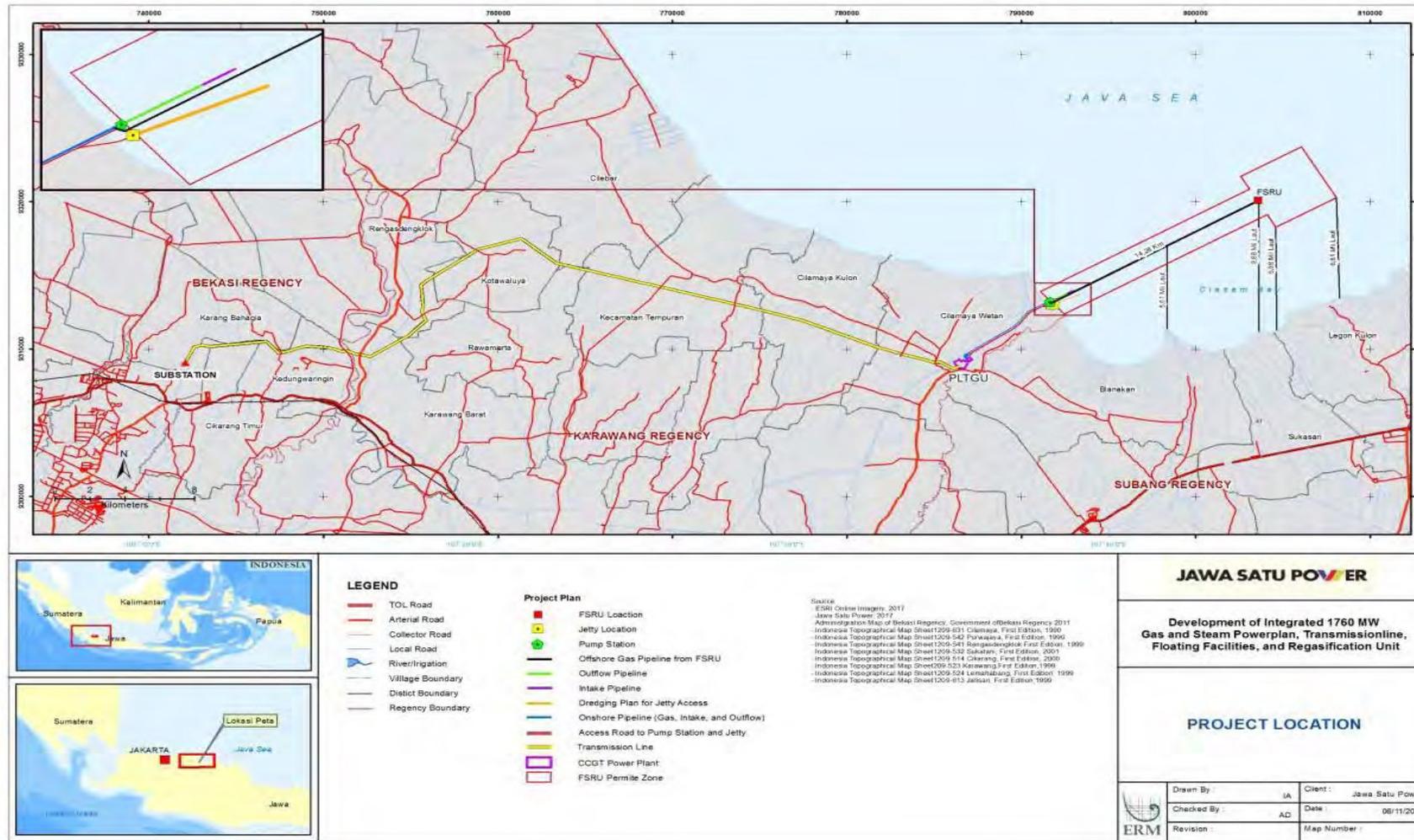
The construction of this Project is expected to commence in late 2018 with operation of the 1,760 MW CCGT Power Plant expected to commence in 2021.

The Project includes the following main components:

- Installation and operation of an FSRU;
- Construction and operation of seawater intake and seawater discharge pipelines;
- Construction and operation of an onshore gas receiving facility;
- Construction and operation of an emergency jetty;
- Gas supply pipelines, both subsea and terrestrial;
- 1,760 MW CCGT power plant;
- A 52 km 500 kV transmission line; and
- An electricity substation in Sukatani, Bekasi.

The LNG will be delivered to the FSRU via tankers; it is expected that the LNG will be supplied mainly from the BP Tangguh project, both of which are located within Indonesia. The FSRU will store and regassify the LNG, prior to delivery to an Onshore Receiving Facility (ORF) located adjacent to the CCGT Power Plant. Following gas treatment within the ORF, the gas will be supplied to the CCGT Power Plant and electricity dispatched to the transmission line and substation. The Scoping Report sets out the Project Description; components and associated facilities in more detail.

Figure 1-1 Project Overview



A consortium of lenders (Japan Bank for International Corporation (JBIC), Nippon Export and Investment Insurance (NEXI) and Asian Development Bank (ADB) leading) are considering financing the Project and an Environment, Social and Health Impact Assessment (ESIA) will be required to demonstrate how the Project aligns with the expectations of the following international Lender Environmental and Social standards and expectations:

- The Asian Development Bank (ADB) Safeguard Policy Statements (SPS);
- Equator Principles III (EPIII) 2013;
- 2012 IFC Performance Standards 1-8 (IFC PS);
- The World Bank Group EHS Guidelines; and
- Japan Bank for International Cooperation (JBIC) Guidelines for Confirmation of Environmental and Social Considerations (The Guidelines).

The Project is currently going through the regulatory Environmental Impact Assessment (EIA) process, locally referred to as AMDAL (*Analisis Mengenai Dampak Lingkungan*). This process is expected to be concluded in Q1 2018.

## 1.2 PROJECT LOCATION

The Project is located in the West Java Province, approximately 108 km east of Jakarta, the capital of Indonesia.

Administratively, the Project is located within Subang, Bekasi and Karawang Regencies (**Figure 1-1**).

The FSRU will be located offshore of Pamanukan Bay, in Subang Regency at a distance of approximately 8.8 km from the Regency coastline.

The Power Plant is located in the administrative area of Cilamaya Village, Cilamaya Wetan District, Karawang Regency.

The 500 kV transmission line then traverses Karawang Regency for a distance of 52 km before joining the Cibatu Baru II /Sukatani EHV Substation in Sukatani, Bekasi Regency.

## 1.3 PROJECT PROPONENTS

As stated previously the Project is a joint venture between PT Pertamina (Persero), Sojitz Corporation and Marubeni Corporation., referred to previously as the Sponsor Group.

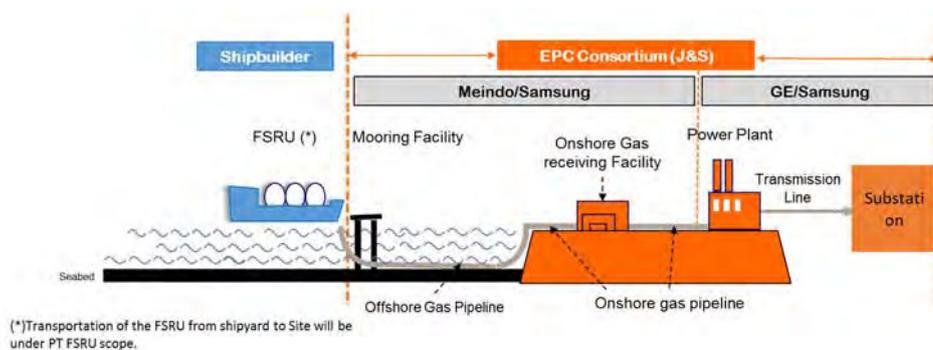
PT Pertamina (Persero) is a state-owned oil and gas company, which also has interests in the Power sector. Pertamina operates the Arun LNG Plant Unit (Aceh) and Bontang LNG Plant Unit (East Kalimantan) and geothermal power assets in Indonesia. Pertamina is also a major downstream supplier of fuel in Indonesia.

Sojitz Corporation is a general trading company that is active in a broad range of industries throughout Asia and globally. In Indonesia, Sojitz has a stake in the BP Tangguh Project via its LNG Japan Corporation consortium with Sumitomo. It also has interests in methanol export and real estate within Indonesia.

Marubeni Corporation is a Japanese headquartered trading house which operates in food and consumer goods, energy, transportation, chemicals and power businesses within Asia and globally. In Indonesia, Marubeni currently has investments in a number of thermal power assets.

In order to design and construct the Project the Sponsors have commissioned a number of contractors, namely the Engineering Procurement and Construction Consortium composed of Meindo, GE and Samsung (see **Figure 1-2**).

**Figure 1-2 Project Layout with EPC Responsibilities**



PT Perusahaan Listrik Negara (PLN), the Indonesian state electricity company, has entered into the LNG sale and purchase agreement with the LNG supplier for the purpose of fulfilling the LNG supply requirement to the FSRU. The Sponsors will only be responsible for the provision of the necessary gas supply infrastructure to the CCGT power plant and FSRU and the associated onshore and offshore infrastructure to support the transportation of gas. This integrated project will be transferred to PLN at the end of the Power Purchasing Agreement (PPA).

#### 1.4 OVERVIEW OF THIS STAKEHOLDER ENGAGEMENT PLAN (SEP)

This Stakeholder Engagement Plan (SEP) has been prepared to document the methods and process by which its stakeholders and other interested parties are consulted in relation to the proposed power plant project. The SEP is designed with the aim of providing a platform for consultation and information disclosure with Project stakeholders throughout all phases of the development. This SEP considers all impacted communities; the Project Resettlement Plan (RP) details the landowner and user data and consultation activities undertaken as part of this process (that aligns with the process set out in this SEP).

Good relations between the Project and its surrounding communities and other relevant stakeholders such as local fishermen, land owners and users and local government authorities will be essential for the Project to acquire its social license to operate i.e. to gain stakeholder trust in order to implement the Project in a timely and profitable manner. It is also an important means for receiving community feedback on Project related concerns, perceptions and expectations as well as providing a channel for the Project to disseminate relevant updates and other necessary information to the community.

This document also outlines the Grievance Mechanism (GM) that should be adopted and implemented by JSP, its EPC and other subcontractors. The GM provides a process by which stakeholders and / or interested parties can raise their complaints, concerns and observations and for the Project to address genuine items in a timely and agreeable manner.

The SEP for this Project has been prepared in accordance with the Applicable Standards including relevant national regulations and international standards and guidelines which are further discussed in later in this report.

In terms of stakeholder engagement and disclosure the below guidelines will be adhered to:

- IFC - Stakeholder Engagement; A Good Practice Handbook for Companies Doing Business in Emerging Markets;
- ADB (Asian Development Bank). 2006. *Strengthening Participation for Development Results: A Staff Guide to Participation and Development*; and
- World Bank EHS Guidelines for Electric Power Transmission and Distribution, 2007.

In order to meet the above requirements JSP has commissioned PT ERM Indonesia (ERM) to develop its stakeholder engagement process that will be implemented as part of its ESIA and management plans implementation throughout the pre-construction, construction and operation phases of the Project. This document has been developed to set out consultation required as part of the regulatory AMDAL process (i.e. the public consultation) and the ESIA process. Where data is available consultation undertaken as part of the land acquisition process has been discussed. However given the process is still ongoing this document will be updated following completion of the Resettlement Plan that will summarize all consultation conducted as part of the land acquisition process.

## 1.5 *STAKEHOLDER ENGAGEMENT PLAN STRUCTURE*

The SEP contains the following sections:

- Section 1 Introduction – describes an overview of the SEP document, its purpose and objectives and description of the social-economic setting of the Project area.
- Section 2 Project Description – describes the Project background and details of the facilities to be built.
- Section 3 Regulations and Requirements – outlines the key Indonesian legislation and international guidelines concerning stakeholder engagement that apply to the Project.
- Section 4 Previous Stakeholder engagement activities - explains consultation activities undertaken as part of the Project permitting, *Analisis Mengenai Dampak Lingkungan* (AMDAL or regulatory EIA) and Environmental and Social Impact Assessment (ESIA) process.
- Section 5 Project Stakeholders –identifies the Project stakeholders and issues along with the power and influence analysis.
- Section 6 Stakeholder Engagement Planning - provides a detailed description of proposed future stakeholder engagement activities and includes a timetable showing when these activities should occur.
- Section 7 Community Grievance Mechanism - a detailed Project based Grievance Mechanism is discussed.
- Section 8 Management for implementation of SEP - details resources for implementation of this SEP and describes monitoring, reporting and evaluation measures to be undertaken to ensure the success of this SEP.

## 1.6 *LIMITATIONS*

The findings reported in this SEP are based on the information provided to ERM by JSP and data gathered during the public consultations/socialization activities during the AMDAL and stakeholder consultation conducted as part of the ESIA development conducted by ERM. However there were a number of limitations during the development of this SEP namely limited data and information on affected landowners due to the land acquisition requirement of the Project. The land acquisition process is being overseen by a local land acquisition consultant, acting as a contractor of the Project. Their activities are estimated to be completed by mid-2018 when this SEP will require updating.

## 2 *PROJECT DESCRIPTION*

### 2.1 *PROJECT LOCATION*

The Project is located in the West Java Province, approximately 108 km east of Jakarta, the capital of Indonesia. Administratively, the Project is located within the Subang, Bekasi and Karawang Regencies (see **Figure 1-1**).

The FSRU and offshore pipeline will be located offshore of Pamanukan Bay, in Subang Regency at a distance of approximately 15 km from the Regency coastline. The CCGT Power Plant will be located in the administrative area of Cilamaya Village, Cilamaya Wetan District, Karawang Regency next to the existing Gas Compression Station (SKG) operated by Pertamina Gas; the transmission line will traverse through the Karawang Regency for a distance of 52 km before joining the Cibatu Baru II /Sukatani EHV Substation in Sukatani, Bekasi Regency.

### 2.2 *PROJECT COMPONENTS*

#### 2.2.1 *Floating Storage and LNG Regasification Unit (FSRU)*

The FSRU will be located and moored offshore of Ciasem Bay within Subang Regency at a distance of approximately of eight (8) km off the north Ciasem Bay coast and at depth of 16 m of sea level.

The FSRU will be permanently moored and during installation of the vessel a prohibited zone (a 500 m radius area starting from the outmost side of the installation) and a restricted zone (a 1,250 m radius area starting from the prohibited zone) will be established around the FSRU. Based on *Ministry of Transportation Regulation No. 129 2016*, a secure and safety zone must be established around offshore facilities, including the FSRU and its mooring facilities. Such zone covers both prohibited zone and restricted zone. The prohibited zone is an area with a radius of 500 m starting from the outmost side of the installation; the restricted zone is the area with radius of 1,250 m starting from the prohibited zone.

The FSRU will be 292.5 m in length, 43.4 m in width, and a depth of 26.6 m. Four LNG storage tanks with a total capacity of 170,000 m<sup>3</sup> will be retained on the vessel. The vessel will be equipped with four (4) regasification trains; each train having a capacity of 100 mmscfd. The nominal capacity will be 300 mmscfd with a peak capacity of 400 mmscfd.

The FSRU is planned for 25 years and will be taken away for dry dock inspection and maintenance to a suitable port e.g. in Singapore at least once during the operational life-time. Furthermore, maintenance activities i.e. painting will be conducted periodically to prevent rust on vessel body, deck and on-board

equipment. In addition, to ensure the stability of vessel hull, underwater survey will be carried out periodically.

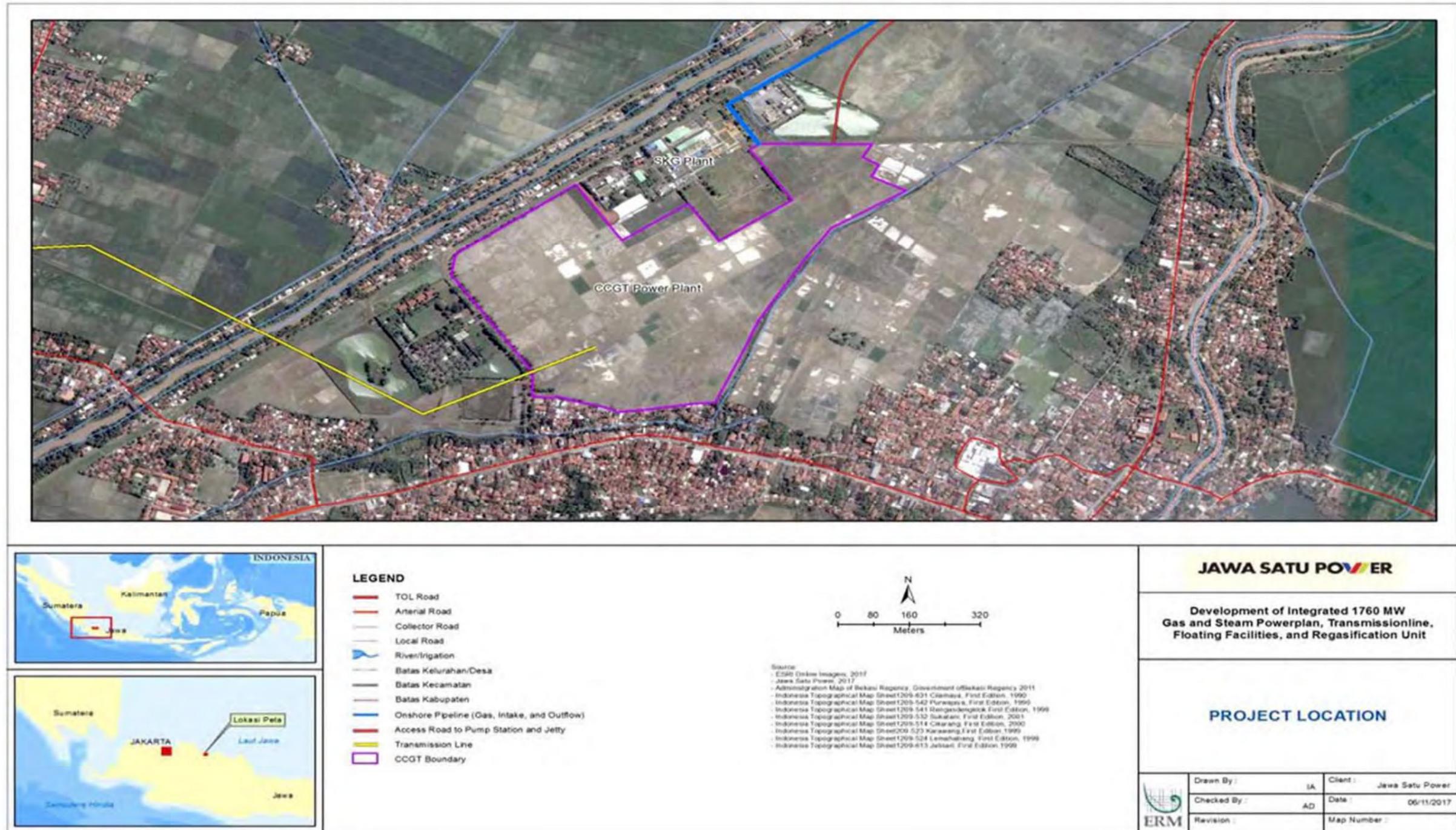
### 2.2.2 *CCGT Power Plant*

The 1,760 MW CCGT Power Plant will be developed on a 36.7 ha parcel of land located in Cilamaya Village, Cilamaya Wetan District, Karawang Regency. The land was originally owned by Pertamina (Persero) and such land title transfer to PT JSP is still on-going and will complete before the financial close.

The site consists predominately of vacant agricultural land where clearing has already occurred. The CCGT Power Plant site in relation to surrounding communities is shown in **Figure 2-1**. Cilamaya Village is located next to the site with some residences sharing a boundary with the site. It is also reported that some households and small kiosks reside within the border of the site illegally.

The power plant complex will consist of five main buildings supported by other infrastructure. The main buildings include two turbine buildings, control and electrical building, administration building and a workshop/warehouse building.

Figure 2-1 CCGT Power Plant Site



#### **4.1.1**      *Transmission Lines*

A 52 km 500kV Transmission Line will be established from the CCGT Power Plant in Cilamaya to Cibatu Baru II/Sukatani EHV Substation in Bekasi Regency.

The line will comprise 118 transmission towers with a transmission corridor of approximately 17 m each side of the transmission lines established, as required by local regulation.

The line will run through two regencies; Karawang and Bekasi and will affect 36 villages. The proposed transmission line route crosses mainly areas of land used for agricultural purposes (rice paddy fields).

It is estimated that a total acquisition of 116,000 m<sup>2</sup> (11.6 ha) of land is required for the tower footings. This is based on 116 towers and typical footing area of 1000 m<sup>2</sup> per tower (two towers are currently owned by Pertamina and therefore the land deeds will only require transfer from its subsidiary to the Project Sponsors). The actual land area required will depend on the nature of the tower (the area required for suspension tower, dead end tower and tension tower are different and range from 784 m<sup>2</sup> to 1,764 m<sup>2</sup>).

#### **4.1.2**      *Substation*

The 500kV Cibatu Baru II/Sukatani Substation will be an outdoor gas insulated design comprising the following number of circuits:

- 1) Two outgoing lines to the 500kv Muara Tawar substation;
- 2) Two outgoing lines to the 500kv Cibatu substation; and
- 3) Two incoming lines from PLTGU Java-1 Power Plant.

In addition the substation site shall include land (space only) for two additional 500kV diameter and one 150 kV Substation (8 bays).

A substation control building shall be provided which will consist of an office room, communications room, control room, and protection room.

#### **4.1.3**      *Equipment Jetty - Construction and Operation*

A jetty to support project construction and emergency operations will be established. A volume of approximately 80,000 m<sup>3</sup> of material is likely to require dredging to allow access of barges and other supply vessels. The dredging is expected to be approximately 1,500 m in length; the method of dredging is yet to be confirmed.

The jetty construction is expected to require nine months with the foundations piled into the seabed. The jetty will be used to supply large equipment which cannot be readily transported by road during construction, and maintenance and emergencies conditions during operations.

Once the jetty is built roughly one barge every four days will dock there depending on the weather; this will decrease to one barge every two weeks during the last 10 months of construction.

## **4.2** *TRANSPORT, EQUIPMENT AND MACHINERY REQUIREMENTS*

During construction deliveries of equipment and supplies will occur via local roads and the proposed construction Jetty. **Figure 4-8** depicts the main transport routes to be used during construction.

A significant volume of additional vehicle movements will occur and traffic congestion and disruption is expected along the main transport routes from the Cikampek Toll gate through Kotabaru District, Jatisari District, and Banyusari District a distance of 27 km.

Transport requirements for the Project are estimated as:

- Truck movements associated with the transport of fill material to the site;
- Movements of heavy and wide loads requiring temporary road closures and traffic disruption; and
- Significant truck movements associated with the movements of construction materials to the construction locations.

Vessels will be temporarily present within the nearshore area during pipe laying, dredging and the FSRU installation and mooring.

## **4.3** *WORKFORCE AND HOUSING*

It is estimated that during construction the total peak workforce will be between 3,400 and 4,000 workers. Where feasible, based on skillsets, the Project will maximize local employment. A basecamp will be provided for non-local workers within the proposed CCGT Power Plant location. Its capacity is yet to be confirmed however is expected to be a significant facility in order to meet the Project's workforce demands. Water, electricity supply and also waste collection and disposal options are currently being confirmed. During the towers and substation construction a smaller workforce will be required; whereby the construction teams are likely to rent temporary accommodation in the local villages depending on the tower location.

- 1 Regulation of Environmental Ministry No. 21/2008 concerning Air Emission Stationary Sources Standard for Combine Cycle Power Plant
- 2 Environmental, Health, and Safety Guidelines Thermal Power Plants (2008)

#### 4.4 *LAND ACQUISITION*

Kwarsa Hexagon has been contracted by the Sponsor's Group to oversee the Project's land acquisition activities. Land acquisition will be undertaken for the 500 KV Transmission Line and Cibatu Baru II/Sukatani Substation construction purposes impacting approximately 116 land owners for the tower footing and 7 land owners for the substation. Land title transfer for the CCGT Power Plant and two of the tower footings from original landowner to PT JSP will be conducted. The current pipeline ROW land is owned by Pertagas however some additional land will also need to be acquired; this will involve some private land owners (to be confirmed by Kwarsa Hexagon) and the Ministry of Environment and Forestry. An access road will also be constructed between the Power Plant and the jetty area that will also involve private landowners.

The land acquisition activities of PT. Jawa Satu Power will be conducted in accordance with Indonesian President Regulation No. 149 Year 2015 about Land Procurement for Development Implementation for the Public Interest. Furthermore to meet the ADB's expectations, a Resettlement Plan is being developed to ensure any gaps between the regulations and the ADB's expectations are addressed.

No physical displacement is anticipated however economic displacement will occur due to the land acquisition. In general land along the transmission line is largely paddy, whilst land along the coast consists of fish ponds.

The land acquisition process has commenced with identification of landowners and land measurements, negotiation and payment for compensation/land purchase. The process will continue for an estimated six months (as of January 2018).

#### 2.3 *SOCIAL SETTING OF PROJECT AREA*

The construction and operation of the Project is likely to impact 39 villages within 14 Sub-Districts and 3 Regencies in West Java. **Table 2-1** presents the Project's social boundaries.

The impacted villages were determined based on their proximity to the project facilities i.e. the transmission line, substation and power plant location. The SEP also covers the coastal villages where fishing activities are undertaken along the Cilamaya River and surrounding coastal areas nearshore of the jetty and the FSRU.

**Table 2-1 Project Social Boundaries**

Regency	Sub-District	Village		
1. Karawang	1. Cilamaya Wetan	1.	Muara	
		2.	Cilamaya	
		3.	Sukatani	
	2. Cilamaya Kulon	4. Sukamulya	4.	Sukamulya
			5.	Pasirukem
			6.	Muktijaya
			7.	Tegalurung
			8.	Manggungjaya
			9.	Sumurgede
	3. Tempuran	10. Jayanegara	10.	Jayanegara
			11.	Purwajaya
			12.	Pegadungan
			13.	Pancakarya
			14.	Lemahduhur
			15.	Lemahkarya
			16.	Dayeuhluhur
	4. Rawamerta	18. Sukaraja	18.	Sukaraja
19.			Sukaratu	
5. Cilebar	19. Sukaratu	19.	Sukaratu	
6. Kotawaluya	20. Sindangsari	20.	Sindangsari	
		21.	Sampalan	
		22.	Waluya	
		23.	Mulyajaya	
7. Rengasdengklok	24. Karyasari	24.	Karyasari	
		25.	Kalangsuria	
		26.	Kalangsari	
8. Karawang Barat	27. Mekarjati	27.	Mekarjati	
		28.	Tunggakjati	
2. Bekasi	9. Pebayuran	29.	Bantarjaya	
	10. Kedungwaringin	30. Karangmekar	30.	Karangmekar
			31.	Mekarjaya
			32.	Karangharum
	11. Cikarang Timur	33. Karangsari	33.	Karangsari
	12. Karang Bahagia	34. Karangmukti	34.	Karangmukti
			35.	Karangsatu
			36.	Karangrahayu
13. Cikarang Utara	37. Karangraharja	37.	Karangraharja	
		38.	Waluya	
3. Subang	14. Blanakan	39.	Blanakan	

Source: PT JSP, 2017

### *Karawang Regency*

The total population of the Karawang Regency in 2016 was 2,295,778 people<sup>[1]</sup> with a sex ratio of 105.26 and total area of 1,753.27 km<sup>2</sup>; the density of the Regency was 1,039 persons per km<sup>2</sup>.

Karawang Regency is one of the national food sheds due to its high production of rice and other food crops such as corn, soybean, cassava, and vegetables. In the livestock sector, the regency contributes up to 799,128 tons/year of rice to fulfill the national rice consumption<sup>[2]</sup>. Meanwhile, the total fish production (including capture fisheries and aquaculture) was 51,794.21 tons or IDR 1,223,238,249,000. It is understood that the FSRU location and its surrounding area are known as fishing grounds for the nearest fishing communities. Based on focus group discussions conducted with fishermen in the village of Blanakan the concentration of fishing activities are in the range of 5 to 12 km from of the coastal area / line of Blanakan. However, it is important to note that existing exclusion zones already exist in the area due to existing oil platforms and subsea pipelines. The existing exclusion zones exist around the offshore platforms operated by PHE. These are not located near the FSRU (further offshore). Considering these activities, it is likely that the Karawang coastal area may be impacted by the Project and as such these stakeholders need to be consulted with as part of the AMDAL and ESIA process. They are also being considered in the broader ESIA and ESMP.

### *Bekasi Regency*

The total population of the Bekasi Regency as of 2015 was 3,246,013<sup>[3]</sup>. Districts in the industrial areas of Bekasi neighboring Jakarta are much denser compared to those in the rural areas. The industrial sector especially metal and electronics are the highest contributors to the Gross Regional Domestic Product (GRDP) of Bekasi employing approximately 38% of total employment in the regency. Between 2010 and 2014 the size of agricultural land decreased resulting in the decreased production of the food crops and vegetables. This is due to the growing of industrial sector where agricultural area / land are being converted into industrial complexes.

The Bekasi Regency will be impacted by the installation of the substation, tower footings and transmission line. It is understood that most of the land to be acquired is currently used for agricultural activities hence no physical relocation will be required. As such land owners and users will need to be consulted with in relation to the Project (activities, land acquisition project and schedule).

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[1] Kabupaten Karawang dalam Angka, 2017

[2] Department of Agriculture, Forestry, Plantation and Livestock of Karawang, 2016

[3] Kabupaten Bekasi dalam Angka 2016

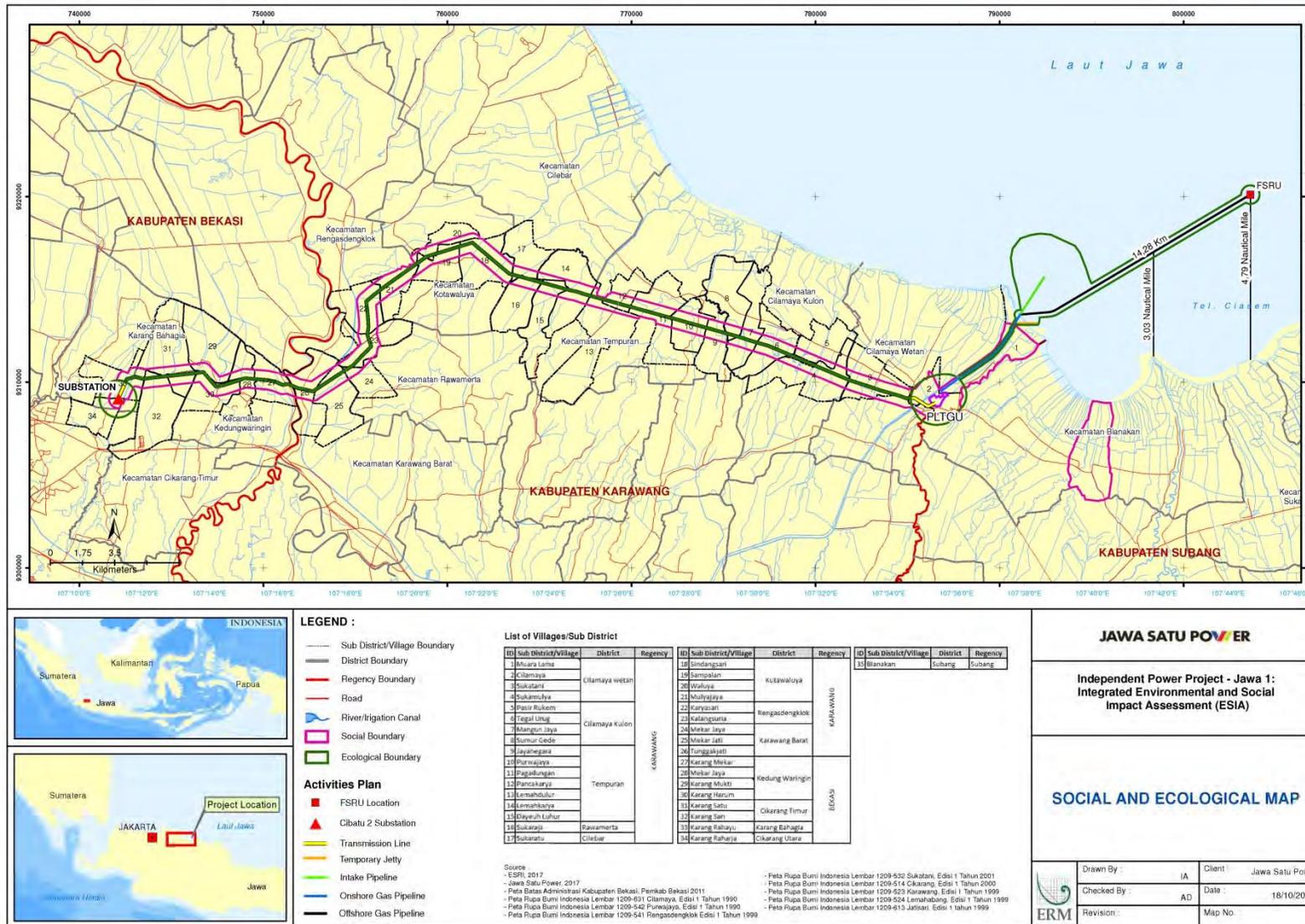
### *Subang Regency*

Based on available statistical data, the total population of Subang Regency as of 2015 was 1,529,388 people with an average population growth rate of 1.05% per year. The number of people employed in Subang Regency was approximately 633,116; of that amount 211,972 people or around 33.48% were employed in agriculture and fisheries. The field of services business (which includes shops and stall owners) employs approximately 318,113 people or about 50.25%. While the field of industry employs approximately 103,031 people or about 16.27% of the working population.

Blanakan village within the Subang Regency is the only identified village potentially impacted by the Project. This is due to the development of FSRU and offshore pipeline as their fishing grounds / fishing catchment areas are within the Project area. As such this community requires consultation and engagement by the Project.

An additional Public Consultation was conducted on the 9<sup>th</sup> of November 2017 in Blanakan Sub-District, Subang Regency attended by 33 participants consisting of the Head of Sub-District, Heads of Muara and Blanakan villages, Marine and Air Police of Blanakan Sub-District, Police Resort of Blanakan Sub-District, community leaders of Blanakan and Muara villages, fishermen and fishpond representatives of Muara village and Blanakan Sub-District. The Public Consultation was held to provide updated information regarding the Project development, impacts and to capture concerns for incorporation in the AMDAL and ESIA.

Figure 2-2 Social Boundaries of Project



### 3 REGULATIONS AND REQUIREMENTS

There are two levels of regulatory provisions applicable to the Project. The first is the Indonesian assessment and approvals process. Secondly, as the Sponsor Group have committed to also meeting international standards, the following will be adhered to:

- The Asian Development Bank (ADB) Safeguard Policy Statements (SPS); and
- 2012 IFC Performance Standards 1-8 (IFC PS) and also the World Bank Group EHS Guidelines for the life of the Project.

The Project is currently seeking Regulatory Environmental Approval via the Indonesian AMDAL process however in applying international standards to the Project these additional standards and expectations will be met throughout the construction and operational scope covered by the Environmental Social and Health Impact Assessment (ESIA).

ERM has reviewed of the historical consultation completed to date by the Project; it is considered to meet all the Indonesian requirements specifically consultations as part of the AMDAL process. This has been verified by consultations with the MoEF and AMDAL Technical Committee.

Consultation activities to meet the Lenders Applicable Standards are ongoing.

#### 3.1 PUBLIC CONSULTATION REQUIREMENT UNDER INDONESIAN REGULATION

The Project is committed to upholding all applicable laws and regulations of the Government of the Republic of Indonesia. Laws and regulations most applicable to stakeholder consultation and disclosure activities are summarized in **Table 3-1**.

**Table 3-1 National Regulation Framework for Stakeholder Consultation and Information Disclosure**

Regulation	Content	Citation
<i>Law No 32 of 2009 about "Environmental Protection and Management."</i>	Chapter XI details expectations associated with community participation. The community has equal rights and opportunities to actively participate in and protect the environment as well as part of the planning and implementation of environmental protection and management.	Articles No. 70 Paragraph 1
<i>Government Regulation (PP) No. 27 of 2012 on Environmental Permit</i>	<ul style="list-style-type: none"> <li>• In preparing the Regulatory EIA / AMDAL, the Project Initiator should include the following parties in the process:               <ul style="list-style-type: none"> <li>• Affected communities;</li> <li>• Environmental experts; and</li> <li>• any party who are affected by any form of decision in the AMDAL process</li> </ul> </li> </ul>	Article No. 9 Paragraph 1 - 4

Regulation	Content	Citation
	<ul style="list-style-type: none"> <li>• Community / public participation as intended in above paragraph are done through announcement of Business and / or activity plan and public consultation.</li> <li>• Community / public participation shall be made before the preparation of EIA / AMDAL Term of Reference;</li> <li>• The community shall be entitled to submit suggestions, opinions, and responses to the business and / or activity plan within 10 working days since the announcement as referred to point no 2 above.</li> </ul>	
<p><i>Regulation of the State Minister for Environment No. 17/2012 regarding Guidelines for Community Involvement in the Process of Environmental Impact Assessment and Environmental Permit</i></p>	<p>This regulation as guarantee and guidelines the implementations of community involvement in the process of environmental impact assessment and environmental permit.</p> <p>Stated that the mandatory notification should be using 2 mandatory media i.e.</p> <ol style="list-style-type: none"> <li>1) printed media such as local newspaper and/ or national newspaper (if required by EIA assessment authority</li> <li>2) bulletin board which is easily accessible to the affected communities</li> </ol> <p>In addition to mandatory media as mentioned above, the Project could use other supporting media to undertake notification such as:</p> <ol style="list-style-type: none"> <li>1) printed media such as brochures, pamphlet, or banner;</li> <li>2) electronic media such as television, website, social network, short message service (SMS), and/ or radio;</li> <li>3) bulletin board in environmental agencies and relevant government agencies in national, province and regency level; and</li> <li>4) other media which can be used</li> </ol> <p>In addition, this regulation also mention that the notification should be conveyed through multimedia which is effectively accessible to the community such as website and bulletin board in the Project plan location which easily to reach by the affected community.</p>	<p>Chapter II: Part B, point b</p> <p>Chapter III: Part B, point 1.b</p>

Regulation	Content	Citation
Regulation of the Minister of Environment No 17 of 2012.	<ul style="list-style-type: none"> <li>• Guidance of community involvement in the process of environmental impact and environmental permit analysis is intended as a reference: <ul style="list-style-type: none"> <li>• The implementation of community involvement in the environmental impact analysis process; and</li> <li>• Implementation of community involvement in the environmental permit process.</li> </ul> </li> <li>• Implementation of community involvement in the EIA and Environmental Permit Process shall be based on the following basic principles: <ul style="list-style-type: none"> <li>▪ Providing transparent and complete information;</li> <li>▪ Equality of positions among the parties involved;</li> <li>▪ Fair and wise problem solving; and</li> <li>▪ Coordination, communication and cooperation among the parties concerned / involved.</li> </ul> </li> </ul>	Article No 1 and 2

### 3.2 *INTERNATIONAL STANDARDS AND BEST PRACTICES*

The international standards to be applied to the Project are summarized below.

#### *Equator Principles*

The Equator Principles (EPs) are the environmental and social risk management framework voluntarily adopted by 83 member financial institutions (Equator Principle Financial Institutions, EPFIs). They are primarily intended to provide a minimum standard for due diligence to support responsible risk decision-making. The Equator Principles were developed by private-sector banks and launched in June 2003. They were first revised in July 2006 and new revisions, known as EP III, took effect on June 4, 2013.

The EPs established voluntary principles for addressing environmental and social risks and issues in global project finance transactions, including adherence to IFC Performance Standards. They are designed to serve as a benchmark for the financial industry to manage social and environmental risks in project financing. They apply to all new project financings with total project capital costs of USD \$10 million or more, and across all industry sectors. The Principles (EPs 1 to 10) are:

- Principle 1: Review and Categorisation;
- Principle 2: Environmental and Social Assessment;
- Principle 3: Applicable Environmental and Social Standards;
- Principle 4: Environmental and Social Management System and Equator Principles Action Plan;

- Principle 5: Stakeholder Engagement;
- Principle 6: Grievance Mechanism;
- Principle 7: Independent Review;
- Principle 8: Covenants;
- Principle 9: Independent Monitoring and Reporting; and
- Principle 10: Reporting and Transparency.

The current version of the EPs is the EP III, which apply globally, to all industry sectors.

Given the fact the Project is seeking finance from a consortium of lenders all adopting the EPs framework hence the Project will need to comply with the EP principles to address environmental and social risks and issues.

Under Principle 1: Review and Categorization, the Project is categorized to ensure that the required level of environmental and social due diligence is commensurate with the nature, scale and stage of the Project, and with the level of environmental and social risks and impacts. The categories are:

- Category A – Projects with potential significant adverse environmental and social risks and/or impacts that are diverse, irreversible or unprecedented;
- Category B – Projects with potential limited adverse environmental and social risks and/or impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures; and
- Category C – Projects with minimal or no adverse environmental and social risks and/or impacts.

Under Principle 2: Environmental and Social Assessment, all Category A and Category B Projects are required to conduct an Assessment process to address the relevant environmental and social risks and impacts of the proposed Project.

Principle 3: Applicable Environmental and Social Standards requires that the Project complies with relevant host country laws, regulations and permits that pertain to environmental and social issues. The principle also brings into consideration compliance with the IFC Performance Standards on Environmental and Social Sustainability (IFC PS) and the World Bank Group Environmental, Health and Safety Guidelines (EHS Guidelines).

- Principles 4 through 7 and Principles 9 and 10 apply to all Category A and, as appropriate, Category B Projects; and
- Principle 8 applies to all Category A and Category B Projects.

### *Asian Development Bank (ADB) Safeguard Policies*

ADB's Safeguard Policy Statement (SPS) 2009<sup>1</sup> also governs the social safeguards of ADB's operations and articulates the safeguard policy principles for three key safeguard areas:

- Environment safeguards (SPS, Appendix 1);
- Involuntary resettlement safeguards (SPS, Appendix 2); and
- Indigenous Peoples safeguards (SPS, Appendix 3).

The SPS 2009 applies to all ADB-supported projects reviewed by ADB's management after 20 January 2010. The objective of the SPS is to ensure the social soundness and sustainability of projects and to support the integration of those considerations into the project decision-making process.

The ADB adopts a set of specific safeguard requirements whereby participation in consultation activities is required to understand the concerns of affected people; borrowers/clients are required to meet in addressing social impacts and risks. The ADB has participated in consultation activities during the AMDAL and ESIA data collection activities in July 2017 and intends to conduct a second visit in January 2017 where additional stakeholder consultation activities will be conducted with a range of community stakeholders.

The Safeguard Requirements (SR) are described in the following:

- Safeguard Requirements 1 (SR1): Environment Safeguards. A Good Practice Sourcebook (Draft Working Document November 2012);
- Safeguard Requirements 2 (SR2): Involuntary Resettlement Safeguards. A Planning and Implementation Good Practice Sourcebook (Draft Working Document November 2012);
- Safeguard Requirements 3 (SR3): Indigenous Peoples Safeguards. A Planning and Implementation Good Practice Sourcebook (Draft Working Document Revised June 2013).

In addition to the ADB Safeguard Policy Statement (2009) discussed above, the following ADB policies and strategies have been considered as part of this assessment:

- Social Protection Strategy (2001) – which stipulates ADB expectations for compliance with applicable labour laws (e.g. the relevant conventions of the International Labour Organisation [ILO]) in relation to a Project, The strategy

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<sup>1</sup> <https://www.adb.org/documents/safeguard-policy-statement>

specifically discusses expectations with respect to forced or compulsory labour, child labour, discrimination in respect of employment and occupation, and freedom of association and the effective recognition of, the right to collective bargaining.

- Policy on Gender and Development (1998) - supports mainstreaming as a key strategy in promoting gender equity in ADBs projects. The key elements of this policy include gender sensitivity, analysis and planning as well as mainstreaming and agenda setting.
- Public Communications Policy (2011) - which aims to enhance stakeholders' trust in and ability to engage with ADB. It recognizes the right of people to seek, receive, and impart information about ADB operations and supports knowledge sharing and enables participatory development with affected people. The policy is based on a presumption in favour of disclosure unless there is a compelling reason for non-disclosure.
- ADB Accountability Mechanism (2012) - ADB's Accountability Mechanism provides a forum where people adversely affected by ADB-assisted projects can voice and seek solutions to their problems and report alleged noncompliance with ADB's operational policies and procedures. It consists of two separate but complementary functions: the problem solving function and the compliance review function. The objective of the Accountability Mechanism Policy (2012) is to be accountable to people for ADB-assisted projects as a last resort mechanism.

### **IFC Performance Standards 2012**

In April 2006 the International Finance Corporation, a member of the World Bank Group, released a set of PSs based upon the original World Bank Group Safeguard Policies, which recognized further the specific issues associated with private sector projects. The IFC PSs have been broadened now to include issues such as greenhouse gases, human rights, community health, and safety and security. A revised set of Performance Standards came into force on January 1, 2012. The complete list of PS's is provided in **Figure 3-1**.

Figure 3-1 International Finance Corporation (IFC) Performance Standards

## PERFORMANCE STANDARDS



Source: [www.ifc.org/wps/wcm/connect/topics\\_ext\\_content/ifc\\_external\\_corporate\\_site/sustainability-at-ifc/policies-standards/performance-standards](http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/performance-standards)

PS1: Assessment and Management of Environmental and Social Risks and Impacts) sets out the following expectations with regards to stakeholder engagement:

- *“An effective Environmental and Social Management System...involves engagement between the client, its workers and the local communities directly affected by the project”.*
- *“To promote and provide means for adequate engagement with Affected Communities throughout the project cycle on issues that could potentially affect them...”.*
- *“...the client will identify individuals and groups that may be differentially or disproportionately affected by the project because of their disadvantaged or vulnerable status....”.*
- *“Stakeholder engagement is the basis for building strong, constructive, and responsive relationships that are essential for the successful management of a project's environmental and social impacts “.*
- *“Stakeholder engagement is an ongoing process that may involve, in varying degrees, the following elements: stakeholder analysis and planning, disclosure and dissemination of information, consultation and participation, grievance mechanism, and ongoing reporting to Affected Communities...”.*
- *“...The nature, frequency, and level of effort of stakeholder engagement may vary considerably and will be commensurate with the project's risks and adverse impacts, and the project's phase of development. ...”.*
- *“When Affected Communities are subject to identified risks and adverse impacts from a project, the client will undertake a process of consultation...”.*
- *“Effective consultation is a two-way process that should...(iv) be free of external manipulation, interference, coercion, or intimidation”.*

The IFC has also issued a number of other guidance documents related to stakeholder engagement such as:

- IFC (International Finance Corporation), 2009. *Addressing Grievances from Project-Affected Communities: Guidance for Projects and Companies on Designing Grievance Mechanism*; and
- International Finance Corporation (IFC), 2003. *Good Practice Note: Addressing the Social Dimensions of Private Sector Projects*. 200;

### **Japan Bank for International Cooperation (JBIC)**

JBIC adopted the Guidelines for Confirmation of Environmental Considerations on 1st October 2009 through the Japan Finance Corporation (referred to as the JFC Guidelines). In 2002, they were revised as the JBIC Guidelines for Confirmation of Environmental and Social Considerations (the Guidelines), to include detailed provisions. The Guidelines were revised in 2007, 2012 and 2015 to take account of global developments and trends on environmental matters and broad opinions from stakeholders. The current version of the Guidelines is available on JBIC's website<sup>2</sup>. The Guidelines state that Project proponents are responsible for undertaking "appropriate environmental and social considerations so as to prevent or minimize the impact on the environment and local communities, and not bring about unacceptable impacts which may be caused by the projects for which JBIC provides funding."

Environmental and social considerations refer not only to the natural environment, but also to social issues such as involuntary resettlement and respect for the human rights of indigenous peoples. It is important to confirm that adequate measures have been taken to mitigate adverse environmental impacts proactively and that understanding has been obtained from all the stakeholders regarding environmental effects, especially when significant environmental impact is foreseen from the proposed project. These are crucial points for proceeding with the proposed project or approving a loan for the project.

Regarding World Bank Safeguard Policy and IFC PSs, the Environmental Guidelines stipulates "JBIC also ascertains whether a project meets the relevant aspects of World Bank Safeguard Policy regarding environmental and social considerations. On the other hand, for private sector limited or non-recourse project finance cases, or for where appropriate, JBIC ascertains whether the project meets the relevant aspects of IFC PSs". Therefore further reference to IFC PSs in this SEP also represent meeting JBIC standards.

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<sup>2</sup> <http://www.jbic.go.jp/en/efforts/environment/confirm>

### *Nippon Export and Investment Insurance (NEXI)*

NEXI encourages the project sponsors in the projects that are subject to NEXI's insurance services, via the applicants for insurance services such as exporters and others (hereinafter referred to as the "Applicants"), to undertake appropriate environmental and social considerations in accordance with the nature of the project, based on the principles adopted by NEXI.

NEXI confirms whether the project sponsors implement appropriate environmental and social considerations, so as to prevent or mitigate potential impacts on environment (i.e. not only on the natural environment, but also on social issues such as involuntary resettlement and respect for the human rights of indigenous peoples: hereinafter referred to as the "environment") which may be caused by the projects relating to insurance (two years or more) services from NEXI.

NEXI's confirmation of environmental and social considerations is one of the most important components in its risk assessment. NEXI incorporates the outcomes of its confirmation of environmental and social considerations in its decisions on issuance of commitment (or on conclusion of an insurance contract if application for commitment is not made. The same applies hereafter.). If, as a result of its confirmation of environmental and social considerations, NEXI judges that the relevant project will cause adverse impacts on the environment, it encourages the project sponsors, through the Applicants, to undertake appropriate environmental and social considerations, and there may be cases where a commitment letter is not issued.

NEXI prescribes its procedures for confirmation of environmental and social considerations such as to classify the projects into 3 categories through screening and to implement Environmental Review for each category and engages to disclose information. In so doing, NEXI endeavors to ensure transparency, predictability and accountability in its decision on issuance of commitment from the viewpoint of environmental and social considerations, taking into account the constraints of the Applicants' business confidentiality and competitive concerns.

Even after making a decision on issuance of commitment, NEXI will take appropriate actions to confirm the status of monitoring by the project sponsor via the Applicants when necessary.

## 4 PROJECT STAKEHOLDERS

The stakeholder identification and analysis process will form the foundation for planning and designing of subsequent stakeholder engagement activities. The Project's stakeholders and analysis will be reviewed and refined regularly as the Project become more detailed and definite.

A stakeholder is defined as individuals, communities, groups and institutions who:

- Are most likely to experience, at significant levels, any potential negative and / or positive impacts of the proposed Project;
- Have the mandate over the various elements of the project's activities (such as Government institutions); and
- Are considered vulnerable members of the community within the proposed project area.

Qualitative research approaches (one-on-one interviews with key informants and questionnaire) were used to collect data on relevant stakeholder / stakeholder groups and their associated issues and perceptions on the Project. Based on the results of the interviews other key respondents were identified through a snowball technique<sup>3</sup>.

### 4.1 *STAKEHOLDERS IDENTIFIED DURING AMDAL AND ESIA CONSULTATIONS PROCESS*

An overview of the key Project stakeholders below is identified based on several categories. The first level is government who has an important role in the AMDAL approval process; the second are those that are potentially directly impacted by the Project; the third category involves any interest parties namely Non-Governmental Organizations / Community Based Organization who can create a potential delay or raise reputation concerns related to the Project.

The two principal categories of stakeholders for this Project include:

1. **Affected parties;** people / entities directly affected by the Project and / or have been identified as most vulnerable to change and who need to be engaged in identifying impacts and their significance, as well as in decision-making on mitigation and management measures, namely:
  - *Sub-District / Local Government* - This stakeholder group consists of the village head or representatives of the village government who live in the villages within the Project footprint. area total of 37 villages are considered as potentially impacted by the Project;

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<sup>3</sup> A non-probability sampling technique where existing study subjects recruit future subjects from among their acquaintances. Thus the sample group appears to grow like a rolling snowball. As the sample builds up, enough data are gathered to be useful for research.

- *Host Community* – This stakeholder group includes all local residents potentially exposed to significant impacts due to Project construction and operation. Mainly related to the potential construction and operational impacts onshore and offshore and the Project’s need for land. A particular focus is on the community of Cilamaya considering the main Project activities and Power Plant will be located nearby which potentially can have diverse and significant impacts on the local community;
- *Traditional Institution* – This stakeholder group consists of individuals who live in villages within the Project footprint that have a social and cultural legitimacy and are considered influential within the community;
- *Landowners* – This stakeholder group includes people affected by land acquisition process (transmission line route, pipeline right of way, access roads, water intake and jetty) for the Project. This will be applied for landowners impacted by the development of the substation and the 500 kV Transmission Line (52 km) in 35 villages in the Regency of Karawang and Bekasi, landowners along the onshore pipeline ROW, area to be acquired for access road and area to build the Jetty;
- *Former Cultivators of Pertamina’s land (Land users)* – This stakeholder group consists of farmers or local residents who formerly conducted farming activities on the land that will be used for the Power Plant development. Pertamina has engaged with these stakeholders and requested them to stop activities on the land. As of mid-2017 no further activities have occurred. Pertamina provided the opportunity for these land users to participate in a separate CSR activity (raising sheep) and reportedly some are now participating whilst others declined due to other priorities.
- *Vulnerable Group* – This stakeholder group consists of the Skewer maker Woman, owners of kiosk residing next to the Project’s location in Cilamaya village and groups of community residing in the protected forest. Details of this stakeholder group are discussed in separate section of this report;
- *Fisherman Group* - This stakeholder group includes all fishermen living in the area or village of Muara and Blanakan. These fishermen will likely be impacted by the installation of the offshore facilities and operation of the FSRU, construction and operation of the seawater intake and seawater discharge pipeline and construction and operation of the jetty. These fishermen conduct their fishing activities in the waters around the Project site; fishing is their main livelihood and source of income; and/or
- *Squatters* – This stakeholder group includes people who have settled within the Project area illegally and have constructed housing, local businesses or conduct agricultural activities on land that will be acquired by the Project.

- *Private and Public Users of the Marine Environment* - The Project will construct some equipment and facilities along the coastal and sea (FSRU). During construction there will be a possibility that some Project activities may impact other marine users or those using existing transportation routes, such as oil and gas companies, shipping companies, port authorities and commercial fishing operators.
2. **Other interested parties;** people / entities that are interested in the Project and / or could affect the Project in some way, namely:
- *Central Government* - This stakeholder consists of the Ministry of Environmental and Forestry who is considered as having the most crucial role in the AMDAL approval process.
  - *Provincial/Regional Government* - This stakeholder group consists of agencies under the administration of West Java Province Government and Karawang, Bekasi and Subang Regency Government. These government agencies have an important role in the AMDAL approval process.
  - *Law Enforcement Agency* - This stakeholder group includes the District Sector Police and District Military Command of Cilamaya Wetan, Cilamaya Kulon, Tempuran, Pedes, Rawamerta, Kedungwaringin, Cikarang Timur and Karang Bahagia.
  - *National Level Non-Governmental Organizations* - This stakeholder group consists of national or local based level NGOs namely Wahana Lingkungan Hidup Foundation (WALHI). Through various media coverage this NGO has actively observed the development of infrastructure projects in Indonesia including the development of various power plants to ensure its development in accordance with environmental and social norms.
  - *Local Level Non-Governmental Organization* - This stakeholder group consists of local-based community organizations namely Karang Taruna (Local Youth Organization), Gerakan Masyarakat Bawah Indonesia (GMBI), Badan Pembinaan Potensi Keluarga Besar Banten (BPKB); Ikatan Putra Daerah (IKAPUD); and Pemuda Pancasila (PP). These stakeholders were assessed through information provided by a number of head villages interviewed during the baseline data collection phase.
  - *Private Companies* - This stakeholder group although not directly impacted may have a vested interested in the Projects planned activities. This may include local contractors interested in procuring services to the Project and those potentially neighboring the site (e.g. SKG Cilamaya).

- *General Public* – This stakeholder group is wide encompassing a broad range of people largely those residing outside the Project area. Interests may be related to employment, environmental protection etc.

## 4.2 *VULNERABLE GROUPS*

Stakeholder identification and engagement also seeks to identify any potentially vulnerable or disadvantaged individuals and groups in local communities. Vulnerable groups are those who may be differently or disproportionately affected by the Project, or whose situation may mean that special care is needed to engage them in consultation and disclosure activities. They may include female headed houses, the elderly, disabled people or those residing below the poverty line.

The vulnerable groups' within this context were identified by ERM during fieldwork for stakeholder consultation as part of ESIA baseline data collection. Such vulnerable groups include:

### 1. *Skewer Maker Female Group*

During the field assessment, ERM identified female groups in Cilamaya village working as skewer makers earning around IDR 25,000 per day thus living below the poverty line (if only counting this activity as the single source of income in the household). However, most skewer makers have other members of their household who are working and generating income for the family. This group is also under represented in public activities/ consultation as their time is fully occupied with the skewer making activity and domestic chores, in addition to the fact that generally men adopt the role of representing family in public activities in this region.

### 2. *Owners of Kiosks Next to the CCGT Plant*

The Project is located next to the land owned by *State Water Department* (Badan Pengairan), where a group of community members reside without legal land deeds. Many of the families living in the location generate income by selling food or other daily necessities in a small kiosk in their house. Their location is easily accessed through the existing road built by and dedicated for the Gas Compression Station. These groups will be negatively affected if their customers decrease significantly due to impact of project activities such as limited or restricted access to the area.

### 3. *Communities Residing within the Protected Forest*

This group consists of people from Muara village who live / reside within the protected forest area. The main source of livelihood of this community is farming and fish ponds. This community will likely be impacted due to the development of Jetty and construction of the access road from the Power Plant to the jetty etc. Further details on the vulnerable groups will be presented in the ESIA document. However it is planned that in future Project consultation the process is inclusive of these groups; providing a channel for them to voice their concerns and perceptions as well as receives information on the Project.

### 4.3 *STAKEHOLDER ANALYSIS*

Based on the results of the consultations, stakeholders were analyzed considering their interest, influence or power and perception in relation to the Project and whether they are a party who will be affected or who will be affecting the Project. **Table 4-1** outlines this Stakeholder Analysis.

The matrix is a dynamic tool that should be periodically updated as and when interest and / or influences of each stakeholder change over the Project implementation period.

Stakeholder concerns have been gathered during the AMDAL and ESIA processes and recorded (as presented in this SEP). Follow up activities, to address these concerns will be undertaken in Q1 2018 and will continue throughout the pre-construction, construction and operation phases. Concerns and issues will be managed by the Sponsors' community relations, and where necessary, the Project management personnel through transparent consultation and disclosure of relevant project information. Where necessary issues will be recorded in the grievance mechanism and addressed through the due processes set out in **Chapter 7**.

**Table 4-1 Stakeholder Analysis**

No.	Stakeholder Group	Stakeholder	Interest	Power or Influence	Perception
1.	Central Government	Ministry of Environmental and Forestry	<ul style="list-style-type: none"> <li>To become an ad-hoc partner for the Project to fulfill government requirements on administration and business permit / license; and</li> <li>Project to contribute in the development of local economy whilst managing its environmental and social issues properly.</li> </ul>	Legal and formal position in the Central Government level. Through the Environmental Agency have the authority to monitor Project environmental and social performance based on AMDAL. Should any non-compliance occur the Government has the authority to stop all activities related to the Project.	<i>Positive</i> Supportive, the Project is part of a regional development program. As long as it meets the regulations it will bring economic development for the local area.
1.	Provincial / Regencies Government	<ul style="list-style-type: none"> <li>Environmental Agency (DLHK) of Karawang Regency;</li> <li>Bekasi dan Karawang Energy and Mineral Resources Agency;</li> <li>Kanwil BPN (National land Agency in Jawa Barat Province);</li> <li>Development Planning Agency at Sub-National Level (BAPPEDA);</li> <li>Department of Industry and Commerce;</li> <li>Department of Spatial Planning;</li> <li>Directorate of Sea Spatial Planning; and</li> <li>Directorate General of Sea Spatial Management.</li> </ul>	<ul style="list-style-type: none"> <li>To become an ad-hoc partner for the Project to fulfill government requirements on administration and business permit / license; and</li> <li>Project to contribute in the development of local economy whilst managing its environmental and social issues properly.</li> </ul>	Legal and formal position in the Provincial and Regencies Government level. Through the Environmental Agency have the authority to monitor Project environmental and social performance based on AMDAL. Should any non-compliance occur the Government has the authority to stop all activities related to the Project.	<i>Positive</i> Supportive, the Project is part of a regional development program. As long as it meets the regulations it will bring economic development for the local area.

No.	Stakeholder Group	Stakeholder	Interest	Power or Influence	Perception
2.	Sub-District / Local Government	Head of Districts of: <ul style="list-style-type: none"> <li>• Cilamaya Wetan;</li> <li>• Tempuran;</li> <li>• Cilamaya Kulon;</li> <li>• Cilebar;</li> <li>• Kutawaluya;</li> <li>• Rawamerta;</li> <li>• Rengasdengklok;</li> <li>• Karawang Barat;</li> <li>• Kedung Waringin;</li> <li>• Cikarang Timur; and</li> <li>• Karang Bahagia</li> </ul>	Project to contribute to the local / village social and economic development through providing opportunity for local workforce and social investment Programs.	Formal position as the head of sub-district and usually engaged by the Project in relation to social investment, labor issues and general community engagement.	<i>Positive</i> Supportive; The Project is part of a regional development program. As long as it meets the regulations it will bring economic development for the local area.
3.	Law Enforcement Agency	District Sector Police and District Military Command of: <ul style="list-style-type: none"> <li>▪ Cilamaya Wetan;</li> <li>▪ Cilamaya Kulon;</li> <li>▪ Tempuran;</li> <li>▪ Pedes;</li> <li>▪ Rawamerta</li> <li>▪ Kedungwaringin;</li> <li>▪ Cikarang Timur; and</li> <li>▪ Karang Bahagia</li> </ul>	To become strategic partner in terms of providing security to Project's assets and work with the Project to contribute maintaining community safety and security.	Formal position as the Sub-District level authorities and these agencies enforce the country's national and local laws.	<i>Positive</i> Supportive as long as it meets the regulations and bring economic and community development for the local area.
4.	Host Communities	<ul style="list-style-type: none"> <li>• Community of Cilamaya village;</li> <li>• Head of the 33 project affected villages and as the representative of the village residents.</li> </ul>	Optimizing the beneficial impacts of the Project such as providing community development program for the affected communities, support improvement and maintenance of village infrastructure, optimizing and	Formal position as the village authorities and considered to be the representative of the community which can easily influence the perception of community toward the Project.	<i>Positive</i> Supportive to the Project as long as the Project supports the local economy and manages it adverse impacts.

No.	Stakeholder Group	Stakeholder	Interest	Power or Influence	Perception
			prioritizing villagers as project workers especially during the construction and Project to minimize all the potential adverse impacts.		
5.	Traditional Institutions	Community Leaders of Sub-Districts of: <ul style="list-style-type: none"> <li>▪ Cilamaya Wetan;</li> <li>▪ Cilamaya Kulon;</li> <li>▪ Tempuran;</li> <li>▪ Pedes;</li> <li>▪ Rawamerta</li> <li>▪ Kedungwaringin;</li> <li>▪ Cikarang Timur; and</li> <li>▪ Karang Bahagia</li> </ul>	Project to contribute to the local / village social and economic development in terms of providing opportunities for local employment, improving the quality of life of the community, contributing in maintaining security in the impacted villages and to support local infrastructure development and maintenance.	These are key figures that have a strong legitimacy from the people as representatives of the community	<i>Positive</i> Supportive to the Project as long it provides benefits for the community interest.
6.	Landowners	Landowners impacted by the development of the following project's component: <ul style="list-style-type: none"> <li>▪ 500 KV High Voltage Transmission Line;</li> <li>▪ Access road;</li> <li>▪ Project's Jetty; and</li> <li>▪ Onshore pipeline</li> </ul>	<ul style="list-style-type: none"> <li>• Striving for a fair price for land acquisition and getting support from Project to improve village development;</li> <li>• Land compensation paid timely manner; and</li> <li>• Project to provide an opportunity for work for the land owners impacted by the Project or their families.</li> </ul>	If land compensation issues are not resolved they could lead to social unrest and may delay the Project's construction.	<i>Positive</i> Supportive to the Project as long as the Project provides fair compensation for the displaced community, and supports the local economy and manages its adverse impacts.
7.	National Level Non-Governmental Organizations	Yayasan Wahana Lingkungan Hidup (WALHI)	Supportive as long as it meets the regulations and bring economic and community development for the local area.	Has an extensive network nationwide with other NGOs, academia and the media so it is very easy to spread news or	<i>Positive</i> As long as the Project supports the local economy and

No.	Stakeholder Group	Stakeholder	Interest	Power or Influence	Perception
				information related to Project's activities.	manages its environmental adverse impacts.
8.	Local Level Non-Governmental Organization	<ul style="list-style-type: none"> <li>• Karang Taruna (Local Youth Organization);</li> <li>• Gerakan Masyarakat Bawah Indonesia (GMBI);</li> <li>• Badan Pembinaan Potensi Keluarga Besar Banten (BPKB);</li> <li>• Ikatan Putra Daerah (IKAPUD); and</li> <li>• Pemuda Pancasila (PP).</li> </ul>	To gain economic benefit from the existence of various companies within the sub-district and regency area.	Local youth organizations are quite active in the village organizing social activities involving youth such as sport and religious events. These organizations have a large potential to influence youth attitude towards the project.	<i>Positive</i> Supportive to the Project as long as the organization received benefits from the Project otherwise will tend to oppose the Project.
9.	Former cultivators of Pertagas land (Land User)	Farmers and local residents who conducted farming activities on Pertagas land that will be used for power plant development	Project to provide employment opportunity to the impacted farmers or their family.	These are communities of land user at the local level in Cilamaya village cultivating the Pertagas land as their main source of income / livelihood.	<i>Positive</i> Supportive to the Project as long as the particular community received benefits from the Project.
10.	Vulnerable Group	<ul style="list-style-type: none"> <li>• Female Craftsmen</li> <li>• Owners of Stalls Located around the Project area in Cilamaya village.</li> </ul>	Project to provide employment opportunity to the impacted community or their family and to be involved in the Project CSR / Social Investment Program	These are normally communities at the local level who sell products or open up small scale businesses as the only source of income. Although no request for compensation has been made it may result in livelihood impacts.	<i>Positive</i> Supportive to the Project as long as the particular community received benefits from the Project.
11.	Local Small Medium Enterprises Group	Local Entrepreneur from Cilamaya Wetan and Manggung Jaya Village	Expectation benefits from the Project through assistance in the form of providing capital and	These are normally communities at the local level who open up small scale business as source of income.	<i>Positive</i> Supportive and very positive towards the Project.

No.	Stakeholder Group	Stakeholder	Interest	Power or Influence	Perception
			technical assistance for business and economic development.		Sees the project as a big opportunity to develop his businesses in the area.
12.	Squatters	Owners of Kiosks next to the CCGT Plant	Expectation of benefits from the Project through assistance in the form of providing capital and technical assistance for business and economic development.	These communities who own their kiosks however do not have legal rights over the land.	<i>Positive</i> Supportive and very positive towards the Project. Sees the project as a big opportunity to develop his businesses in the area. However this may change if compensation is not provided.
13.	Private and Public Users of the Marine Environment	<ul style="list-style-type: none"> <li>• Oil and gas companies</li> <li>• Shipping companies</li> <li>• Port authorities</li> <li>• Tourism operators</li> <li>• Commercial fishing operators</li> </ul>	To be regularly informed of activities that may affect their activities, to collaborate with the Project to provide employment opportunity to the impacted community, to be in the Project CSR / Social Investment and to support local and regional economic development in general.	Public and private companies operating strictly under the Indonesian law and regulation.	<i>Positive</i> Supportive, the Project is part of a regional development program.

## 5 PREVIOUS STAKEHOLDER ENGAGEMENT ACTIVITIES

### 5.1 *PUBLIC CONSULTATION AS PART OF REGULATORY ENVIRONMENTAL IMPACT ASSESSMENT (AMDAL) PROCESS*

One of the main focuses of the Project's historical consultation was through its public consultation which is required as part of the Indonesian regulatory EIA (AMDAL) process. This has included discussions and consultation meetings with the local, provincial and national level authorities, selected impacted community representatives and other relevant Project stakeholders. The consultation meeting covered aspects of the design and timeline, permitting, project area / boundaries, negative impacts of the Project and local economic development / workforce opportunities.

JSP has also undertaken a number of consultation activities in the project planning phase, largely with various government agencies. This consultation will continue throughout the project preparation phase. The key activities undertaken to date are presented in **Table 5-2**.

**Table 5-3** outlines the public consultation conducted to date as part of the AMDAL process.

### 5.2 *CONSULTATIONS FOR THE ESIA PROCESS*

This section outlines one of the main phases of community consultation during the social-economic baseline data collection for the ESIA. The socio-economic baseline data and information collected will be the basis for conducting the Project impact assessment (AMDAL and ESIA).

Consultations were conducted by teams of ERM and sub-consultants on behalf of the Project. Face to face interviews, one-on-one surveys samples of affected peoples and focus group discussions were the main approach undertaken during the fieldwork.

**Table 5-4** provides a summary of the consultation activities undertaken during the ESIA development. The list of respondents consulted is presented in **Annex 4**; this will be updated following the development of the ESIA.

### 5.3 *CONSULTATIONS DURING THE LAND ACQUISITION PROCESS*

JSP has engaged a local land surveying consultant to manage all its land acquisition activities; including identification of land owners, eligibility and assets, consultation of Project activities, the compensation and disbursement process. The land owners along the transmission line have been engaged with and provided information on the Project activities (specifically the land requirements), and compensation discussions have taken place.

It is understood that currently the consultant (on behalf of JSP) is in the process of undertaking consultation to identify and profile the remaining landowners

impacted by the access road, jetty and right of way; gathering their concerns and perceptions of the Project. **Table 5-5** provides a summary of the consultation activities undertaken related to the land acquisition process as per December 2017.

In addition to the above consultation undertaken as part of the land acquisition process of the Transmission Line Tower Footings, socialization and consultation related to compensation scheme of the area / space traversed by the Project's 500 kV Transmission Line were also conducted by JSP through its land acquisition consultant during the period of January and February 2018. This has included discussions with the landowners, district and village authorities, local police and military and community leaders.

A summary of the socialization and consultation activities undertaken related to the compensation scheme is also provided in **Table 5-5**. ERM was also provided with the Minutes of Meetings of the consultations which are presented in **Annex 7** of this SEP.

Further details on landowners (and land users) such landownership, degree of impact (potential displacement) and their concerns related to the land acquisition process will be gathered during December through to March as part of the development of the Resettlement Plan. Following this the SEP will be updated.

There are a number of key differences between the consultation required for the AMDAL and the activities required for the ESIA; in general the ESIA consultation and disclosure activities are more in-depth and broad. **Table 5-1** presents the key gaps between the two processes and requirements.

**Table 5-1** Consultation Requirements and Gaps between the AMDAL and ESIA

AMDAL Consultation/Disclosure Requirements	ESIA Consultation/Disclosure Requirements
<ul style="list-style-type: none"> <li>The formal AMDAL public consultation is conducted via a public newspaper announcement followed by public consultation sessions (4) in the key communities.</li> </ul>	<ul style="list-style-type: none"> <li>Stakeholder consultation commences during the ESIA baseline study phase, followed by disclosure of the ESIA.</li> </ul>
<ul style="list-style-type: none"> <li>The Public consultation session are recorded, with minutes, photographs and list of attendees presented in the KA ANDAL and ANDAL</li> </ul>	<ul style="list-style-type: none"> <li>All stakeholder consultation sessions are recorded in a stakeholder engagement log with meeting minutes throughout the project lifecycle. The ESIA consultation is presented in the SEP and the remaining activities are recorded and tracked in the stakeholder engagement database.</li> </ul>
<ul style="list-style-type: none"> <li>Consultation is required as part of the RKL RPL process on a needs basis</li> </ul>	<ul style="list-style-type: none"> <li>Stakeholder consultation is carried out proactively throughout all the project phases with all project affected people</li> </ul>
<ul style="list-style-type: none"> <li>No consultation plan is required</li> </ul>	<ul style="list-style-type: none"> <li>The ESIA requires a formal Stakeholder Engagement Plan is developed and implemented by the Project. The SEP is a live document</li> </ul>

AMDAL Consultation/Disclosure Requirements	ESIA Consultation/Disclosure Requirements
	that is regularly updated by the Project.
<ul style="list-style-type: none"> <li>The public consultations are by invite only with selected government, community, NGO representatives.</li> </ul>	<ul style="list-style-type: none"> <li>The ESIA requires consultation and disclosure activities for all project stakeholders.</li> </ul>
<ul style="list-style-type: none"> <li>No specific request or guidance for consultation materials</li> </ul>	<ul style="list-style-type: none"> <li>The ESIA consultation materials should be culturally appropriate, developed in a clear manner and in the local language.</li> </ul>
<ul style="list-style-type: none"> <li>No specification to consult with vulnerable groups</li> </ul>	<ul style="list-style-type: none"> <li>The ESIA requires consultation with vulnerable groups (eg ethnic minorities), and to consider gender in all project consultation activities</li> </ul>
<ul style="list-style-type: none"> <li>No specific requirement for community relations personnel</li> </ul>	<ul style="list-style-type: none"> <li>The Project is expected to recruit qualified community relations personnel to manage the grievances and conduct formal and informal community consultation activities through all phases of the project</li> </ul>
<ul style="list-style-type: none"> <li>No requirement for a grievance mechanism</li> </ul>	<ul style="list-style-type: none"> <li>The Project is required to develop and implement a grievance mechanism and disclose this widely to the project affected people</li> </ul>

#### 5.4 *SUMMARY OF CONSULTATION TO DATE*

Stakeholder identification and issues analysis is an important part of stakeholder engagement planning; it is a key step in informing the strategies that will be applied during the consultation. This stakeholder identification aims to build understanding of the Project's stakeholders to support the follow up on activities required.

The following provides a summary of the stakeholder issues identified during public consultation as part of the AMDAL and ESIA:

- Limited project information disclosure;
- Opportunity for local workers to be employed by the Project;
- Project to support local / village infrastructure development and community empowerment through education and training;
- Project to contribute to local economic development particularly to support the development of local small medium enterprises and to provide Corporate Social Responsibility program in general;
- Project to contribute in maintaining security within the community; to involve them in project security;
- Land acquisition and compensation;
- Project to contribute in improving the local community health;

- Project to manage environmental adverse impact adequately (i.e. waste management, dust, noise and smoke disturbance);
- Develop an Emergency Response Plan related to accident, gas leaking and explosion;
- Compensation for disruption to fishing ground areas caused by Project activities at sea;
- Sea restriction zone affecting traditional fishing lane and sea traffic signage;
- Project to ensure marine traffic safety and security for the fisherman communities;
- Project socialization particularly for activities impacted fisherman communities in Muara Baru and Pasir Putih area; and
- Project to provide access to land above where the new pipeline is going to be planted to be used for livelihood purposes.

One of the key mitigation actions will be effective engagement with key stakeholders to address the issues and concerns set out in this Report. This will not only support the Project in addressing potential stakeholder issues but assist in the dissemination of accurate project information whilst providing a two way dialogue between the Project and its stakeholders. Further, it will support in building stronger stakeholder relations. The Project is proposing to conduct regular and informed consultation activities during the Project lifecycle to discuss the proposed Project activities, employment and procurement opportunities, the land acquisition process, entitlements and compensation measures, Project impacts and proposed mitigation measures and broader Project benefits. These discussions have commenced as of January 2018 in the coastal village areas and along the transmission line<sup>4</sup>; led by the Sponsors and its subcontractors.

**Table 5-2** provides the overall summary of consultation conducted by the Project to date. This has largely been around introducing the Project to various government agencies as well as the communities in the vicinity of the Project facilities.

The subsequent tables summarize consultations associated with the AMDAL, ESIA (requires updating in early 2018) and the land acquisition (requires updating in mid-2018).

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<sup>4</sup> Two of these consultations were attended by ADB who led landowner and user discussions in the villages of Mulyjaya and Karangsatu.

*Table 5-2 Summary of Consultation to Date*

Stakeholder Group	Location	Stakeholder	Key Message	Issues Raised
Provincial / Regencies Government	Karawang Regency, Cilamaya Wetan and Tempuran District	<ol style="list-style-type: none"> <li>1. Environmental Agency (DLHK) of Karawang Regency;</li> <li>2. Bekasi and Karawang Energy and Mineral Resources Agency;</li> <li>3. Kanwil BPN (National land Agency in Jawa Barat Province;</li> <li>4. Development Planning Agency at Sub-National Level (BAPPEDA);</li> <li>5. Department of Industry and Commerce;</li> <li>6. Department of Spatial Planning;</li> <li>7. Directorate of Sea Spatial Planning; and</li> <li>8. Directorate General of Sea Spatial Management.</li> </ol>	<ul style="list-style-type: none"> <li>• Project description;</li> <li>• Regulations related to construction of power plant;</li> <li>• Concept of Partnership offered to community and government by the project. This concept to optimize the beneficial impact such as community development as well as prioritizing local workers and minimizing adverse impacts to both the environment and community.</li> </ul>	<ul style="list-style-type: none"> <li>• Potential hazards caused by the project such as radiation due to electromagnetic fields from the Transmission Line;</li> <li>• Community accessibility to the Project site / location;</li> <li>• Clarification on land acquisition process and compensation for impacted landowners;</li> <li>• Impact on health and sanitation; and</li> <li>• Impact on water supply / availability.</li> </ul>
	Bekasi Regency, Cikarang Timur District	Environment Agency of Bekasi Regency	<ul style="list-style-type: none"> <li>• ANDALALIN (Traffic Impact Assessment) will be separated from the AMDAL, this is based on the government regulation;</li> <li>• Disclosure of project information including timeline; and</li> <li>• Disclosure of land acquisition process.</li> </ul>	<ul style="list-style-type: none"> <li>• Compensation for land acquisition will be provided for loss of land, loss of assets including house / building and crops;</li> <li>• Clarification on potential hazards caused by the project such as radiation due to electromagnetic fields from the Transmission Line;</li> <li>• Opportunity for local workforce to be involved in the Project;</li> <li>• Community accessibility to the Project site / location; and</li> <li>• Impact to community health particularly related to the Transmission Line.</li> </ul>

Stakeholder Group	Location	Stakeholder	Key Message	Issues Raised
District / Local Government	Karawang Regency	Head of Districts of: 1. Cilamaya Wetan; 2. Cilamaya Kulon; 3. Tempuran; 4. Cilebar; 5. Rawamerta;	<ul style="list-style-type: none"> <li>• Project design and development, impacts and opportunities;</li> <li>• Project local labor requirements and procurement mechanism;</li> <li>• Opportunities for Project involvement in community development.</li> </ul>	<ul style="list-style-type: none"> <li>• Project local labor requirements and procurement mechanism;</li> <li>• Dissemination of AMDAL and RKL RPL documents;</li> <li>• Project community Grievance Mechanism; and</li> <li>• Coordination with local security forces.</li> </ul>
	Bekasi Regency	Head of Districts of: 1. Cikarang Timur; and 2. Karang Bahagia	<ul style="list-style-type: none"> <li>• ANDALALIN (Traffic Impact Assessment) will be separated from the AMDAL, this is based on the government regulation;</li> <li>• Disclosure of project information including timeline; and</li> <li>• Disclosure of land acquisition process.</li> </ul>	<ul style="list-style-type: none"> <li>• Clarification on potential hazards caused by the project such as radiation due to electromagnetic fields from the Transmission Line;</li> <li>• Community accessibility to the Project site / location;</li> <li>• Impact to community health particularly related to the Transmission Line;</li> <li>• Opportunity for local workforce to be involved in the Project; and</li> <li>• Compensation for land acquisition will be provided for loss of land, loss of assets including house / building and crops.</li> </ul>
Law Enforcement Agency	Karawang Regency	District Sector Police and District Military Command of: 1. Cilamaya Wetan; 2. Cilamaya Kulon; 3. Tempuran; 4. Pedes; 5. Rawamerta 6. Kedungwaringin; 7. Cikarang Timur; and 8. Karang Bahagia	Project design and development, impacts and opportunities	<ul style="list-style-type: none"> <li>• Dissemination of AMDAL and RKL RPL documents;</li> <li>• Disclosure of Project Land Acquisition Lack of engagement and coordination with local security forces;</li> <li>• Project local labor requirements and procurement mechanism; and</li> <li>• Opportunity for partnership related to security aspect of the project assets and safety throughout the construction and operation of the Project.</li> </ul>

Stakeholder Group	Location	Stakeholder	Key Message	Issues Raised
	Bekasi Regency	District Sector Police and District Military Command of: 1. Kedungwaringin 2. Cikarang Timur 3. Karang Bahagia	<ul style="list-style-type: none"> <li>• ANDALALIN (Traffic Impact Assessment) will be separated from the AMDAL, this is based on the government regulation;</li> <li>• Disclosure of project information including timeline;</li> <li>• Opportunity for local workforce to be involve in the Project.</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of socialization on Project information.</li> <li>• Disclosure of land acquisition process; Compensation for land acquisition will be provided for loss of land, loss of assets including house / building and crops;</li> <li>• Clarification on potential hazard caused by the project such as radiation due to electromagnetic fields from the Transmission Line;</li> <li>• Community accessibility to the Project site / location; and</li> <li>• Impact to community health particularly related to Transmission Line.</li> </ul>
Host Community	Karawang Regency, Cilamaya Wetan District, Cilamaya Village	1. Host Communities of Cilamaya village; 2. Head of project affected villages and representative of the village residents	<ul style="list-style-type: none"> <li>• Disclosure of project information including timeline;</li> <li>• Opportunity for local workforce to be involve in the Project.</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of socialization on project information;</li> <li>• Environmental, Health, Safety, and Security issue;</li> <li>• Economic development;</li> <li>• Disclosure of land acquisition process;</li> <li>• Infrastructure development;</li> <li>• Local employment; and</li> <li>• CSR program.</li> </ul>
Traditional Institutions	Karawang Regency	Community Leaders of Sub-Districts of: 1. Cilamaya Wetan; 2. Cilamaya Kulon; 3. Tempuran; 4. Pedes; 5. Rawamerta	<ul style="list-style-type: none"> <li>• Disclosure of Project Grievance Mechanism; and</li> <li>• Opportunities for Project involvement in local economy and community development.</li> </ul>	<ul style="list-style-type: none"> <li>• Opportunity for Project to support social or community events such as Independence Day celebration and cultural events.</li> </ul>

Stakeholder Group	Location	Stakeholder	Key Message	Issues Raised
	Bekasi Regency	Community Leaders of Sub-Districts of: 1. Kedungwaringin; 2. Cikarang Timur; and 3. Karang Bahagia	<ul style="list-style-type: none"> <li>• ANDALALIN (Traffic Impact Assessment) will be separated from the AMDAL, this is based on the government regulation;</li> <li>• Disclosure of land acquisition process; and</li> <li>• Disclosure of project information including timeline.</li> </ul>	<ul style="list-style-type: none"> <li>• Compensation for land acquisition will be provided for loss of land, loss of assets including house / building and crops;</li> <li>• Clarification on potential hazard caused by the Project such as radiation due to electromagnetic fields from the Transmission Line;</li> <li>• Community accessibility to the Project site / location;</li> <li>• Opportunity for local workforce to be involve in the Project; and</li> <li>• Impact to community health particularly related to Transmission Line.</li> </ul>
Former cultivators of Pertagas land	Karawang Regency, Cilamaya Wetan District, Mekar Maya Village	7 farmers and local residents who conducted farming activities on Pertagas land that will be used for power plant development	<ul style="list-style-type: none"> <li>• Project design and development, impacts and opportunities;</li> <li>• Opportunities for Project involvement in community development. And</li> <li>• Land replacement for farming activities.</li> </ul>	<ul style="list-style-type: none"> <li>• Dissemination of AMDAL and RKL RPL documents;</li> <li>• Project local labor requirements and procurement mechanism;</li> <li>• Project community Grievance Mechanism; and</li> <li>• Economic development of the farmer through initiation livestock cooperative; and</li> <li>• Social or community events such as Independence day celebration and cultural events</li> </ul>
Vulnerable Group	Cilamaya Village	Female Craftsmen and Owners of Stalls Located around the Project area in Cilamaya village.	<ul style="list-style-type: none"> <li>• Project design and development, impacts and opportunities; and</li> </ul>	<ul style="list-style-type: none"> <li>• Opportunities for Project involvement in local economy and community development particularly involving the identified vulnerable group;</li> </ul>

Stakeholder Group	Location	Stakeholder	Key Message	Issues Raised
				<ul style="list-style-type: none"> <li>• Disclosure of Project Grievance Mechanism.</li> <li>• Project local labor requirements and procurement mechanism and opportunity for local workforce to be involved in the Project.</li> </ul>
Local Small Medium Enterprises Group	Karawang Regency, Cilamaya Wetan District, Cilamaya Village	23 Local Entrepreneurs	<ul style="list-style-type: none"> <li>• Project design and development, impacts and opportunities;</li> <li>• Project local labor requirements and procurement mechanism;</li> <li>• Project community Grievance Mechanism; and</li> <li>• Opportunities for Project involvement in community development.</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of socialization on project information;</li> <li>• Infrastructure development;</li> <li>• Capital for small-medium enterprises; and</li> <li>• CSR program; and local employment</li> </ul>
	Karawang Regency, Cilamaya Kulon District, Manggung Jaya Village	1 Local Entrepreneur	<ul style="list-style-type: none"> <li>• Project design and development, impacts and opportunities;</li> <li>• Project local labor requirements and procurement mechanism;</li> <li>• Project community Grievance Mechanism; and</li> <li>• Opportunities for Project involvement in community development.</li> </ul>	<ul style="list-style-type: none"> <li>• Funding assistance on small-medium enterprise and infrastructure development; and</li> <li>• Local employment training.</li> </ul>
Fishermen Group	Karawang Regency, Cilamaya	16 Sea fishermen	<ul style="list-style-type: none"> <li>• Project design and development, impacts and opportunities;</li> </ul>	<ul style="list-style-type: none"> <li>• Limited information / socialization on Project development.</li> </ul>

Stakeholder Group	Location	Stakeholder	Key Message	Issues Raised
	Wetan District, Muara Village		<ul style="list-style-type: none"> <li>• Project local labor requirements and procurement mechanism;</li> <li>• Project community Grievance Mechanism; and</li> <li>• Opportunities for Project involvement in community development.</li> </ul>	<ul style="list-style-type: none"> <li>• Sea restriction zone; and Marine traffic safety and security particularly for the local fishermen.</li> <li>• A clear socialization as well as a warning indicator which should or should not be passed, for example by installing buoys and lights.</li> </ul>
		5 Fishpond fishermen	<ul style="list-style-type: none"> <li>• A clear and detailed calculation of the compensation mechanisms.</li> </ul>	<ul style="list-style-type: none"> <li>• Access for farmer to utilize land above the pipeline RoW for farming activities.</li> <li>• Limited information / socialization on Project development.</li> </ul>
	Subang Regency, Blanakan District, Blanakan Village	10 Fishermen	<ul style="list-style-type: none"> <li>• Community development program for the affected fishermen communities / group.</li> </ul>	<ul style="list-style-type: none"> <li>• Limited information / socialization on Project development;</li> <li>• Compensation for sea restriction zone affecting the fishermen fishing ground</li> <li>• Disruption on fishing activities</li> <li>• Sea restriction zone</li> <li>• Marine traffic safety.</li> </ul>

**Table 5-3 Public Consultation as part of Regulatory EIA (AMDAL) Process**

Date and Location	Activities	Stakeholder	Key Message	Issues Raised
Karawang Regency	Government Consultation	1. Department of Investment and One Stop Integrated Service	<ul style="list-style-type: none"> <li>• Consultation related to all permits required under the Karawang Regency administration.</li> </ul>	-
22 February 2017; Karawang Regency	Government Consultation	1. National Land Agency	<ul style="list-style-type: none"> <li>• Application of Technical Recommendation to Land Authority</li> </ul>	-
17 March 2017; Cilamaya Wetan District, Karawang Regency	Public Consultation	<ol style="list-style-type: none"> <li>1. Environment Agency of Karawang</li> <li>2. Police Sector of Cilamaya Wetan and Cilamaya Kulon District</li> <li>3. District Command of Cilamaya Wetan and Cilamaya Kulon District</li> <li>4. District Head of Cilamaya Wetan, and Cilamaya Kulon District</li> <li>5. Village Head of Cilamaya, Sukatani, Tegal Urug, Sukamulya, and Manggung Jaya Village</li> <li>6. Village Representatives of Cilamaya, Sukatani, Tegal Urug, Sukamulya, and Manggung Jaya Village</li> <li>7. Representatives of Fisherman Forum</li> <li>8. Representatives of NGO</li> <li>9. UPTD Representatives of Cilamaya Wetan and Cilamaya Kulon District.</li> </ol>	<ul style="list-style-type: none"> <li>• Project description.</li> <li>• Regulations related to construction of power plant.</li> <li>• Concept of Partnership offered to community and government by the project. This concept to optimize the beneficial impact such as community development as well as prioritizing local worker and minimizing adverse impact to both environmental and social.</li> </ul>	<ul style="list-style-type: none"> <li>• Clarification on potential hazards caused by the project such as radiation due to electromagnetic fields from the Transmission Line; and</li> <li>• Community accessibility to the Project site / location.</li> </ul>
23 March 2017;	Public Consultation	10. Environmental Agency (DLHK) of Karawang Regency	<ul style="list-style-type: none"> <li>• Project description;</li> </ul>	<ul style="list-style-type: none"> <li>• Clarification related to potential hazards caused by the project such as</li> </ul>

Date and Location	Activities	Stakeholder	Key Message	Issues Raised
Tempuran Sub-District Office Hall, Karawang Regency		<ol style="list-style-type: none"> <li>11. Police Office (Kepolisian Sektor) of Tempuran, Pedes and Rawamerta</li> <li>12. District Military Command (Komando Rayon Militer) of Tempuran, Pedes and Rawamerta</li> <li>13. Head of Tempuran, Cilebar and Rawamerta District</li> <li>14. Head of Jayanegara, Pagadungan, Lemah Makmur, Mekar Pohaci, Tanjung Sari, Dayeuh Luhur, Sukaratu and Sukaraja Village</li> <li>15. Representatives of Jayanegara, Pagadungan, Lemah Makmur, Mekar Pohaci, Tanjung Sari, Dayeuh Luhur, Sukaratu and Sukaraja Village</li> <li>16. Representatives of Local Implementation Unit of Agriculture (UPTD Pertanian) of Tempuran, Cilebar and Rawamerta Village.</li> </ol>	<ul style="list-style-type: none"> <li>• Regulations related to construction of power plant;</li> <li>• Concept of Partnership offered to community and government by the project. This concept to optimize the beneficial impact such as community development as well as prioritizing local worker and minimizing adverse impact to both environmental and social; and</li> <li>• Land acquisition process and compensation for impacted landowners.</li> </ul>	<p>radiation due to electromagnetic fields from the Transmission Line;</p> <ul style="list-style-type: none"> <li>• Community accessibility to the Project site / location;</li> <li>• Project impact on health and sanitation; and</li> <li>• Project impact on water supply / availability.</li> </ul>
27 March 2017; Karawang Regency	Government Consultation	<ol style="list-style-type: none"> <li>1. Department of Investment and One Stop Integrated Service;</li> <li>2. Regent Karawang.</li> </ol>	<ul style="list-style-type: none"> <li>• Application of Location Permit</li> </ul>	-

Date and Location	Activities	Stakeholder	Key Message	Issues Raised
20 April 2017; Cikarang Timur Sub-District, Bekasi Regency.	Public Consultation	<ol style="list-style-type: none"> <li>1. Environment Agency of Bekasi Regency</li> <li>2. Police Sector of Kedungwaringin, Cikarang Timur, and Karang Bahagia Sub District</li> <li>3. Military Rayon Command of Kedungwaringin, Cikarang Timur, and Karang Bahagia Sub District</li> <li>4. Sub District Head of Cikarang Timur, and Karang Bahagia</li> <li>5. Village Representatives of Karang Mekar, Mekarjaya, Karang Harum, Karangsari, Karang Rahayu, and Karang Setia Village</li> <li>6. UPTD Representatives of Kedungwaringin, Cikarang Timur, and Karang Bahagia Sub District</li> <li>7. Environmental activist around project (NGO)</li> </ol>	<ul style="list-style-type: none"> <li>• ANDALALIN (Traffic Impact Assessment) will be separated from the AMDAL, this is based on the government regulation;</li> <li>• Disclosure of project information including timeline; and</li> <li>• Disclosure of land acquisition process.</li> </ul>	<ul style="list-style-type: none"> <li>• Compensation for land acquisition will be provided for loss of land, loss of assets including house / building and crops;</li> <li>• Clarification on potential hazards caused by the project such as radiation due to electromagnetic fields from the Transmission Line;</li> <li>• Community accessibility to the Project site / location;</li> <li>• Opportunity for local workforce to be involved in the Project; and</li> <li>• Project impact to community health particularly related to Transmission Line.</li> </ul>
19 May 2017	Government Consultation	<ol style="list-style-type: none"> <li>1. Regent of Karawang</li> </ol>		<ul style="list-style-type: none"> <li>• Barriers in spatial related issues need to be further discussed with the Coordinating Minister of Economy</li> </ul>

<p>19 October 2017, South Jakarta</p>	<p>MoEF Meeting to Discuss KA-ANDAL (EIA Terms of Reference)</p>	<ol style="list-style-type: none"> <li>1. PT Pertamina;</li> <li>2. PHE ONWJ;</li> <li>3. Fisheries Department of Subang Regency;</li> <li>4. Department of Manpower and Transmigration, Energy and Mineral Resources Agency (Mining and Mineral Agency) of Subang Regency;</li> <li>5. Fisheries Department of Karawang Regency;</li> <li>6. Department of Industry and Commerce of Karawang Regency;</li> <li>7. Directorate of Sea Planning - Marine and Fisheries Ministry;</li> <li>8. Energy and Mineral Resources Agency of West Java Province;</li> <li>9. IPB (Bogor Agricultural University);</li> <li>10. Environmental Health Directorate -Ministry of Health</li> <li>11. Environmental Agency of West Java Province</li> <li>12. Environmental Agency of Karawang Regency</li> <li>13. Ministry of Energy and Mineral Resources</li> <li>14. UGM (University of Gadjah Mada);</li> <li>15. UI (University of Indonesia);</li> <li>16. Environmental Agency of Subang Regency;</li> </ol>	<ul style="list-style-type: none"> <li>• Land acquisition;</li> <li>• Socio-economic and Corporate Social Responsibility program; and</li> </ul>	<ul style="list-style-type: none"> <li>• Opportunity for local workforce to be involved in the Project;</li> <li>• Project potential impact on health and safety aspect such as magnetic field, noise, vibration, traffic, and road disturbance;</li> <li>• Project potential impact on environment such as flooding, dust, and decreasing availability of clean water;</li> <li>• Sampling should be done in ANDAL document (aquatic biology) and provide the map of sampling point;</li> <li>• Mangrove survey should be based on reference Kep. Men LH No. 201/2004;</li> <li>• Location of development plant; Subang Regency (Blanakan, Sukasari, and Legonkulon District) should be added;</li> <li>• Jetty development should be coordinated with KKP and DKP Jawa Barat; including LNG-FSRU;</li> <li>• Should be equipped with map of existing sea utilization;</li> <li>• Bathymetry should be checked with BIG (LIPI map) and Pushidros (Sea map) as secondary data; and</li> <li>• Impacts on fishermen communities.</li> </ul>
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Date and Location	Activities	Stakeholder	Key Message	Issues Raised
		<ul style="list-style-type: none"> <li>17. Directorate General of Human Settlements - Ministry of Public Work ;</li> <li>18. Regional Planning and Development Agency of Bekasi Regency; and</li> <li>19. Regional Planning and Development Agency of West Java Province.</li> </ul>		

Date and Location	Activities	Stakeholder	Key Message	Issues Raised
9th November 2017; Sub-District of Blanakan, Subang Regency	Public Consultation	<ol style="list-style-type: none"> <li>1. Head of Muara Village;</li> <li>2. Community Leaders of Muara Village;</li> <li>3. Fishermen Group from TPI (Fish Auction) Samudera Mina, Muara Village;</li> <li>4. Fishermen Ponds Group of Tanah Timbul Jaya, Muara Village;</li> <li>5. Head of Blanakan Sub-District;</li> <li>6. Head of Blanakan Village;</li> <li>7. Blanakan Sub-District Police;</li> <li>8. Marine and Air Police of Cilamaya Wetan and Blanakan Sub-Districts;</li> <li>9. Fishermen Group of KUD Mandiri Mina Fajar Sidik, Blanakan Village;</li> <li>10. Fishermen Group of Mina Bahari, Muara Ciasem Village;</li> <li>11. Fishermen Group of Karya Baru, Cilamaya Girang Village;</li> <li>12. Fishermen Group of Grinting, Jayamukti Village;</li> <li>13. HNSI of Subang Regency; and</li> <li>14. Community Leaders of Blanakan Sub-District.</li> </ol>	<ul style="list-style-type: none"> <li>• Project to involve NGOs in Subang such as PNTI (Indonesian Association of Traditional Fishermen) to discuss issues or concerns related to fishermen.</li> </ul>	<ul style="list-style-type: none"> <li>• Project to provide compensation to fishermen should there be damage to fishing gear due to the impact of project activities;</li> <li>• Project to establish regular communication with the affected communities particularly to the fishermen prior and during project implementation;</li> <li>• Construction of offshore pipelines does not interfere with the fishing activities;</li> <li>• Project to prioritize non-skilled local workforce to be employed in the project; and</li> <li>• Concerns related to impacts to the economy and livelihood of fishermen considering fishing is the key skill possessed to sustain livelihood.</li> </ul>

**Table 5-4 Stakeholder Consultations during the ESIA Development Phase**

Date & Location	Activity	Stakeholder Involved	Key Message	Issues Raised
08 – 09 August 2017, Cilamaya Kulon and Cilamaya Wetan District, Karawang Regency	Interview	Teacher from Muara and Pasirrukem Village	Project Description	<ul style="list-style-type: none"> <li>• Project support to local infrastructure development.</li> <li>• Project support to local economic development such as providing assistance on capital for small-medium enterprises and CSR program.</li> </ul>
09 – 11 August 2017, Cilamaya Kulon and Cilamaya Wetan District, Karawang Regency	Interview	Small Medium Enterprises / Local Entrepreneur from Cilamaya Wetan and Manggung Jaya Village	Project Description	<ul style="list-style-type: none"> <li>• Lack of socialization on project information;</li> <li>• Project support to local infrastructure development;</li> <li>• Project support to local economic development such as providing assistance on capital for small-medium enterprises and CSR program; and</li> <li>• Opportunity for local workforce to be involve in the Project.</li> </ul>
10 – 16 August 2017, Cilamaya Kulon, Blanakan, and Cikarang Timur District, Karawang Regency	Interview	Village Officer from: <ol style="list-style-type: none"> <li>1. Cilamaya Village</li> <li>2. Pasirrukem Village</li> <li>3. Muktijaya Village</li> <li>4. Karang Sari Village</li> <li>5. Blanakan Village</li> </ol>	Project Description	<ul style="list-style-type: none"> <li>• Lack of socialization on project information;</li> <li>• Project support to local infrastructure development;</li> <li>• Project to support local economic development such as providing assistance on capital for small-medium enterprises and CSR program;</li> <li>• Opportunity for local workforce to be involve in the Project.</li> </ul>

Date & Location	Activity	Stakeholder Involved	Key Message	Issues Raised
15 August 2017, Cilamaya Wetan District, Karawang Regency	Interview	Police and Army from Cilamaya Village	Project Description	<ul style="list-style-type: none"> <li>• Lack of socialization on project information; and</li> <li>• Lack of engagement and coordination with local security forces.</li> </ul>
09 - 18 August 2017; Cilamaya Wetan, Cilamaya Kulon, Tempuran, Cikarang Timur, Karang Bahagia District, Karawang Regency	Consultation	Village Head of: 1. Cilamaya, 2. Sukatani, 3. Tegalurung, 4. Sumurgede, 5. Jayanegara, 6. Purwajaya, 7. Pegadungan, 8. Pancakarya, 9. Lemahduhur, 10. Dayeuhluhur, 11. Muktijaya, 12. Karang Sari, 13. Muara Karang Satu	Project Description	<ul style="list-style-type: none"> <li>• Lack of socialization on project information;</li> <li>• Project support to local infrastructure development;</li> <li>• Project support to local economic development such as providing assistance on capital for small-medium enterprises and CSR program; and</li> <li>• Disclosure of land acquisition process</li> <li>• Opportunity for local workforce to be involve in the Project.</li> </ul>
08 - 15 August 2017; Cilamaya Wetan District	Interview	Community Household from Cilamaya Village; Local People	Project Description	<ul style="list-style-type: none"> <li>• Lack of socialization on project information</li> <li>• Project support to local infrastructure development; and</li> <li>• Project to support local economic development such as providing assistance on capital for small-medium enterprises and CSR program.</li> <li>• Opportunity for local workforce to be involve in the Project; and</li> <li>• Project environmental and health adverse impacts particularly on waste management, noise, dust, fire and</li> </ul>

Date & Location	Activity	Stakeholder Involved	Key Message	Issues Raised
				accident caused by project activities such as gas leakage and explosion.
08, 13-14 August 2017; Cilamaya Wetan District	Interview	Community Leader from Cilamaya Village;	Project Description	<ul style="list-style-type: none"> <li>• Project support to local infrastructure development; and</li> <li>• Project support to local economic development such as providing assistance on capital for small-medium enterprises and CSR program.</li> <li>• Opportunity for local workforce to be involve in the Project.</li> </ul>
12 August 2017; Cilamaya Wetan District	Focus Group Discussion	Former cultivators of Pertagas land (7 people attended the FGD)	Project Description	<ul style="list-style-type: none"> <li>• Project to support economic development of the farmer through initiation livestock cooperative;</li> <li>• Project to support social or community events such as Independence day celebration and cultural events; and</li> <li>• Opportunity for local workforce to be involve in the Project.</li> <li>• Project to support farmer through providing land replacement for farming activities.</li> </ul>
15 August 2017; Cilamaya Wetan District	Focus Group Discussion	Women's group (10 people attended the FGD)	Project Description	<ul style="list-style-type: none"> <li>• Opportunity for local workforce to be involve in the Project.</li> <li>• Project support to local infrastructure development; and</li> <li>• Project support to local economic development such as providing assistance on capital for small-medium enterprises and CSR program.</li> </ul>

Date & Location	Activity	Stakeholder Involved	Key Message	Issues Raised
9 August 2017; Cilamaya Wetan District	Focus Group Discussion	Sea Fisherman Group from Muara Village (16 people attended the FGD)	Project Description	<ul style="list-style-type: none"> <li>• Limited information / socialization on Project development.</li> <li>• Sea restriction zone that could affect the fishermen fishing area hence it can decrease the catch which in turn also decrease fishermen income;</li> <li>• A clear socialization as well as a warning indicator which should or should not be passed, for example by installing buoys and lights; and</li> <li>• Project to ensure the sea traffic safety and security particularly for the local fishermen.</li> </ul>
16 August 2017; Cilamaya Wetan District	Focus Group Discussion	Fishpond Fisherman Group from Muara Village	Project Description	<ul style="list-style-type: none"> <li>• Limited information / socialization on Project development.</li> <li>• A clear and detailed calculation of the compensation mechanisms to the farmers to maintain their livelihoods (e.g., sufficient compensation value to be used for working on other land);</li> <li>• The compensation value is calculated clearly and transparently and agreed with the fishermen;</li> <li>• Access for farmer to utilize land above the pipeline RoW for farming activities;</li> <li>• Considering the historical compensation rate of the land in order</li> </ul>

Date & Location	Activity	Stakeholder Involved	Key Message	Issues Raised
13 August 2017; Blanakan Sub-District	Focus Group Discussion	Fisherman Group from Blanakan	Project Description	<p>to establish the propose compensation scheme.</p> <ul style="list-style-type: none"> <li>• Limited information / socialization on Project development;</li> <li>• Sea restriction zone that could affect the fishermen fishing area hence it can decrease the catch which in turn also decrease fishermen income;</li> <li>• Sea restriction zone should be clearly socialize and equipped with signage to avoid sea traffic accident;</li> <li>• Compensation should be provided for sea restriction zone affecting the fishermen fishing ground;</li> <li>• Project to implement community development program for the affected fishermen communities / group;</li> <li>• Installation of pipeline on the seabed can be anchored. Fishermen questioned how technical the piping was; and</li> <li>• Project to ensure the sea traffic safety and security particularly for the local fishermen.</li> </ul>

**Table 5-5 Stakeholder Consultation Conducted by the Land Acquisition Consultant**

Village	District	Regency	Date	Stakeholder Involved	Key Messages	Issues Raised
Cilamaya	Cilamaya Wetan	Karawang	24-09-2017	Landowners	<ul style="list-style-type: none"> <li>JSP conveys the intent and purpose of the project as a government program;</li> <li>There are 7 tower locations in Cilamaya village where 2 towers (T.001 and T.002) are on PERTAMINA's land (so there is no need for land acquisition) while 5 towers are located in the community's paddy field; and</li> <li>The area of land to be used is different, according to the needs of the tower.</li> </ul>	<ul style="list-style-type: none"> <li>The landowner hopes that all of his plots are purchased because they are in the middle of his property; and</li> <li>The landowner is willing to sell their land, as long as the payment for the land purchase with agreed price will be brought to them.</li> </ul>
Sukatani	Cilamaya Wetan	Karawang	23-09-2017.	Landowners	<ul style="list-style-type: none"> <li>JSP conveys the aims and objectives of the project to support the national electricity program;</li> <li>There are 5 Tower in Sukatani Village (T.008 - T.012), which lands are owned by the community;</li> <li>The landowner expressed concern about the impact of radiation (due to electromagnetic from the Transmission Line)</li> </ul>	<ul style="list-style-type: none"> <li>The landowner is willing to sell their land, as long as the payment for the land purchase with agreed price will be brought to them.</li> </ul>

Village	District	Regency	Date	Stakeholder Involved	Key Messages	Issues Raised
					<p>caused and the danger of electricity during the rain;</p> <ul style="list-style-type: none"> <li>JSP said that it will be carried out periodic and proper maintenance and monitoring to secure the safety of the community around the Transmission Line area.</li> </ul>	
Sukamulya	Cilamaya Kulon	Karawang	21-09-2017.	Landowners and village government	JSP delivered the intent and purpose of the project at the location of Sukamulya Village.	<ul style="list-style-type: none"> <li>Village government and land owners are ready to support the land acquisition of 500 kV Transmission Line tower.</li> <li>Landowners are concerned about the negative impact of the 500 kV Transmission Line.</li> <li>Based on experience from other local power projects, the land price usually drops after construction and the area utilized for Transmission Lines.</li> <li>Impact of damage during construction.</li> <li>The village government expects the transaction process to be simplified.</li> <li>The landowner is willing to sell their land, as long as the payment for the land purchase with agreed price will be brought to them.</li> </ul>
Muktijaya	Cilamaya Kulon	Karawang	05-10-2017.		JSP delivered the intent and purpose of the project at the location of Muktijaya Village.	<ul style="list-style-type: none"> <li>Landowners inquire about tower security, construction process &amp; possible damage to their fields &amp; other</li> </ul>

Village	District	Regency	Date	Stakeholder Involved	Key Messages	Issues Raised
						<p>rice fields around it because the location is in the middle of his land.</p> <ul style="list-style-type: none"> <li>• Mr. Ali Hidayat as the land owner asked JSP to be able to shift the location of the tower to the south end so that the fields are not cut off.</li> <li>• The landowner is willing to sell their land, as long as the payment for the land purchase with agreed price will be brought to them.</li> <li>• The completeness of the file will be handled by the land owner and the Muktijaya Village Government.</li> </ul>
Pasirukem	Cilamaya Kulon	Karawang	03-10-2017.	Landowners and village government	<ul style="list-style-type: none"> <li>• JSP delivered the project aims and objectives that are part of the 35,000 MW government program.</li> <li>• Cultivation of the land prior to construction will be discussed later with JSP, Landowners and Village Government.</li> </ul>	<ul style="list-style-type: none"> <li>• Landowners asked to recheck their land accompanied by the landowners to confirm the exact location of the required land.</li> <li>• The village government said that the community should understand the rights and obligations when and after the land acquisition.</li> <li>• H. Guntur (Land Owner) expressed concern about the diminishing value of land and danger from the Transmission Line.</li> <li>• Ade bin Tarli (Landowner) complained about the status of cultivation of land after sale and</li> </ul>

Village	District	Regency	Date	Stakeholder Involved	Key Messages	Issues Raised
						purchase because it will be worked on by the village.
Tegalurung	Cilamaya Kulon	Karawang	05-10-2017	Landowners	JSP conveys the intent and purpose of the project at the Tegalurung Village Site.	<ul style="list-style-type: none"> <li>Land owners support the construction of transmission lines and they're willing to sell their land in accordance with the agreed price; and</li> <li>The landowner "Anyih" expects his whole land to be purchased at once.</li> </ul>
Manggunjaya	Cilamaya Kulon	Karawang	22-09-2017	Landowners and village government	JSP conveys the purpose and objectives that is part of the activities of the government's 35,000 MW program.	<ul style="list-style-type: none"> <li>Village Governments and Owners of land (Represented by parents) understand and ready to assist and willing to release land for government programs.</li> <li>The landowner asked for site checking and to confirm the area required to build the 500 kV Transmission Line Tower.</li> <li>Cultivation of land before construction is expected to be permissible to the landowners.</li> </ul>
Sumurgede	Cilamaya Kulon	Karawang	18-09-2017	Landowners	JSP conveys the aims and objective of the project which is a government program.	<ul style="list-style-type: none"> <li>The landowner is willing to sell their land, as long as the payment for the land purchase with agreed price will be brought to them.</li> </ul>
Jayanegara	Tempuran	Karawang	14-09-2017	Landowners and village government	JSP conveys the purpose and objective of building the 500 kV SUTET line to support the	<ul style="list-style-type: none"> <li>The Village Government is ready to assist and support the work that is a government program;</li> </ul>

Village	District	Regency	Date	Stakeholder Involved	Key Messages	Issues Raised
					government's program to increase the 35,000 MW power;	<ul style="list-style-type: none"> <li>Land owner H. Abdullah asked for compensation or land acquisition good enough to obtain land of the same condition in other location.</li> <li>The landowner asked to check the location of the land to be used.</li> <li>The landowner asked for permission to make cultivation before the construction activity can be done by the land owner.</li> </ul>
Purwajaya	Tempuran	Karawang	13-09-2017	Landowners	JSP conveys the purpose and objectives of the Transmission Line project which is a government Program.	<ul style="list-style-type: none"> <li>The landowner is willing to sell their land, as long as the payment for the land purchase with agreed price will be brought to them.</li> </ul>
Pagadungan	Tempuran	Karawang	12-09-2017	Landowners and village government	JSP conveys the aims and objective of the project which is a government program.	<ul style="list-style-type: none"> <li>Landowners and Village Government support Transmission Line construction activities in Padagadungan Village area.</li> <li>The landowner is willing to sell their land, as long as the payment for the land purchase with agreed price will be brought to them.</li> <li>The landowner hopes the land under the tower and around the Transmission Line can still be cultivated.</li> </ul>

Village	District	Regency	Date	Stakeholder Involved	Key Messages	Issues Raised
						<ul style="list-style-type: none"> <li>The village government hopes the documentation process can be simplified.</li> </ul>
Pancakarya	Tempuran	Karawang	11-09-2017	Landowners and village government	JSP conveys the purpose and objectives of the Transmission Line project which is a government Program;	<ul style="list-style-type: none"> <li>Village Governments and Land Owners are ready to support the Transmission Line land acquisition process.</li> <li>The landowner is willing to sell their land, as long as the payment for the land purchase with agreed price will be brought to them and they hope the transaction process will be simplified.</li> <li>Tower T.40 is located in 2 land owners (Yudha &amp; Eneung Rusiti).</li> <li>The landowner is willing to sell their land, as long as the payment for the land purchase with agreed price will be brought to them.</li> </ul>
Lemahduhur	Tempuran	Karawang	04-10-2017	Landowners and village government	JSP conveys the purpose and objectives of the Transmission Line project which is a government Program.	<ul style="list-style-type: none"> <li>The village government supports the activities to be carried out after JSP conveys the purpose and objective of the project implementation which is a national program in the expansion of 35,000 MW energy.</li> <li>Epong (Land Owner) requested to double check his land to clarify that the required land is really owned by</li> </ul>

Village	District	Regency	Date	Stakeholder Involved	Key Messages	Issues Raised
						<p>him during land acquisition activities.</p> <ul style="list-style-type: none"> <li>The concerns of Racih's mother is related to the radiation (due to electromagnetic fields from the Transmission Line) disturbance caused by the 500 kV Transmission Line.</li> </ul>
Lemahkarya	Tempuran	Karawang	13-09-2017	Landowners and village government	JSP conveys the purpose and objectives of the Transmission Line project which is a government Program.	<ul style="list-style-type: none"> <li>Village government and land owners are ready to support the land acquisition of 500 kV Transmission Line with agreed price.</li> <li>Village Governments and landowners expect the land acquisition process to be simplified and as soon as possible.</li> <li>The Land ownership documents of T.45 will be taken out of the Bank by the landlord during the acquisition transaction. The Land deed is in the Bank for mortgage</li> </ul>
Dayeuhluhur	Tempuran	Karawang	08-09-2017	Landowners and village government	JSP conveys the intention and objectives of the Project which is one of the national strategic projects.	<ul style="list-style-type: none"> <li>Landowners and village governments are ready to support land acquisition activities in accordance with the agreed price with JS.</li> <li>The village government said that the land acquisition process needs</li> </ul>

Village	District	Regency	Date	Stakeholder Involved	Key Messages	Issues Raised
						<p>to be simplified.</p> <ul style="list-style-type: none"> <li>.Landowners are concerned about the safety of farmers around the Transmission Line location.</li> </ul>
Sukaraja	Rawamerta	Karawang	16-09-2017	Landowners and village government	<ul style="list-style-type: none"> <li>JSP conveys the intention and objectives of the Project which is one of the national strategic projects; and</li> <li>The establishment of good relationships between the JSP team and the village government.</li> </ul>	<ul style="list-style-type: none"> <li>The establishment of good relationships between the JSP team and the village government.</li> <li>Village Governments and Landowners understand the purpose and objectives of project implementation and are willing to assist in the identification of land owners of 500 kV transmission tower sites.</li> <li>Village Government understands JSP plan to verify land owner data for tower site in Sukaraja Village.</li> <li>Approved schedule for land owner identification is 17 - 19 September 2017.</li> <li>Verification of land owners' data tower will be implemented 22 - 23 September 2017.</li> <li>The village government and the community are ready to support the construction activities of the tower site and are ready to assist in the process of completing the data of the land owner.</li> </ul>

Village	District	Regency	Date	Stakeholder Involved	Key Messages	Issues Raised
Sukaratu	Cilebar	Karawang	27-09-2017	Landowners and village government	<ul style="list-style-type: none"> <li>The establishment of good relations and introduction of JSP team with village government;</li> <li>JSP conveys the purpose and objective of coordination and socialization;</li> <li>JSP conveyed the plan of tower construction of 500 kV transmission line;</li> <li>JSP submits the terms / requirements (necessary documents) for land acquisition of the RoW corridor path; and</li> <li>There is one tower in Sukaratu village so that the process of land acquisition will be easier and faster, but almost all land is in the process of national land certification (Prona) so that it awaits the results for land acquisition.</li> </ul>	<ul style="list-style-type: none"> <li>Village Governments and Land Owners understand the land ownership identification plan for transmission towers of 500 kV PLTGU Java 1;</li> <li>The village government understands the land ownership verification plan in Sukaratu Village, Cilebar District; and</li> <li>The Village Government understands about the construction plans of the 500 kV transmission line towers as well as the terms and conditions required for land acquisition activities.</li> </ul>
Sindangsari	Kutawaluya	Karawang	23-09-2017	Landowners and village government	<ul style="list-style-type: none"> <li>JSP conveys the purpose and objective of coordination and socialization of the government's plan for the development of Java PLTGU tower &amp; transmission line 1; and</li> <li>JSP explains the land acquisition of towers that must be</li> </ul>	<ul style="list-style-type: none"> <li>Village Head, Village Apparatus and Land Owner understand the plan of tower construction and requirements for land acquisition tower;</li> <li>The area of land acquisition is adjusted to the needs of tower needs;</li> <li>Implementation of payment can be done after the validity of the land is</li> </ul>

Village	District	Regency	Date	Stakeholder Involved	Key Messages	Issues Raised
					completed by the land owner.	complete and supported with complete administrative data; and <ul style="list-style-type: none"> <li>Landowners agree to follow agreed upon rules.</li> </ul>
Sampalan	Kutawaluya	Karawang	22-09-2017	Landowners and village government	<ul style="list-style-type: none"> <li>JSP conveyed the plan of tower building transmission line 500 kV PLTGU Java 1;</li> <li>JSP conveys the terms or conditions of land acquisition and Transmission Line;</li> <li>There are 4 points in Sampalan Village that need to be done land acquisition;</li> <li>After identification of land owners, then will be collected other supporting documents for land acquisition;</li> <li>Payment can be made if the file requirements are met, complete and accountable; and</li> <li>The area of land acquisition is adjusted to the needs of tower area.</li> </ul>	Village Governments and Land Owners understand the tower development plan as a government program.
Waluya	Kutawaluya	Karawang	23-09-2017	Landowners, village leaders, and village government	<ul style="list-style-type: none"> <li>JSP conveys the purpose and objectives of project implementation;</li> <li>JSP explains the identification of the owner of the tower site; and</li> <li>JSP describes the schedule of identification and verification of</li> </ul>	<ul style="list-style-type: none"> <li>Landowners understand the terms or conditions of land acquisition tower;</li> <li>the requirements file to be prepared by the land owner assisted by the village apparatus for administrative completeness;</li> <li>Owners of land domiciled outside the</li> </ul>

Village	District	Regency	Date	Stakeholder Involved	Key Messages	Issues Raised
					data completeness of land owner tower.	village will be immediately contacted by the village; and <ul style="list-style-type: none"> <li>Village and community leaders are expected to assist the government's program in order to run well.</li> </ul>
Mulyajaya	Kutawaluya	Karawang	14-09-2017	Landowners	<ul style="list-style-type: none"> <li>JSP conveys the purpose and objective of coordination and socialization which is about the government plan of tower construction &amp; transmission line of PLTGU Java 1;</li> <li>JSP conveys the terms or conditions for land acquisition of towers that must be completed by the land owner;</li> <li>The land associated with the national land certification program (PRONA) cannot be paid before the proof of land ownership is a Certificate issued or issued by BPN;</li> <li>Payment can be made after the requirements and provisions of administered files are completed; and</li> <li>Payment is made in front of a notary public.</li> </ul>	

Village	District	Regency	Date	Stakeholder Involved	Key Messages	Issues Raised
Karyasari	Rengasdengklok	Karawang	23-09-2017	Landowners and village government	<ul style="list-style-type: none"> <li>JSP conveyed the plan of building tower transmission line 500 kV PLTGU Java 1;</li> <li>There are 6 tower points to be released in Sampalan Village;</li> <li>Land acquisition can be done if the requirements / conditions are met.</li> </ul>	<ul style="list-style-type: none"> <li>Village government and land owners are ready to support the development and land acquisition program of 500 kV Transmission Line PLTGU Java 1 in Karyasari Village, Rengasdengklok District; and</li> <li>The hope of landowners and village government, land acquisition activities can be implemented immediately.</li> </ul>
Kalangsuria	Rengasdengklok	Karawang	29-09-2017	Landowners and village government	<ul style="list-style-type: none"> <li>JSP conveyed the plan of building of tower site of transmission line of 500 kV PLTGU Java 1; <ul style="list-style-type: none"> <li>The construction will be implemented from Cilamaya to Cikarang Utara</li> <li>There are 3 Tower in Kalangsuria Village for land acquisition</li> <li>Land requirements will be adjusted to the type of tower.</li> </ul> </li> <li>JSP explains the terms / Requests for land acquisition and RoW corridor path.</li> </ul>	<ul style="list-style-type: none"> <li>Village government and landowners understand the tower construction plans and land acquisition requirements; and</li> <li>Payment will be made in the presence of a notary.</li> </ul>
Kalangsari	Rengasdengklok	Karawang	20-09-2017	Landowners and village government	<ul style="list-style-type: none"> <li>JSP conveyed the plan of tower construction of transmission line of 500 kV PLTGU Java 1 -</li> </ul>	<ul style="list-style-type: none"> <li>Village Governments and Landowners understand the provisions / requirements for land</li> </ul>

Village	District	Regency	Date	Stakeholder Involved	Key Messages	Issues Raised
					<p>Cibatu Baru;</p> <ul style="list-style-type: none"> <li>The area of land used for the tower is adjusted to the needs of the tower;</li> <li>The payment will be made in front of the notary; and</li> <li>The process of completing documents that the owner is not placed then can be sent via email / post.</li> </ul>	<p>acquisition and compensation of the ROW corridor path; and</p> <ul style="list-style-type: none"> <li>Payment must be attended by the person whose name is listed in the land deed.</li> </ul>
Mekarjati	Karawang Barat	Karawang	10-10-2017	Landowners	<ul style="list-style-type: none"> <li>JSP explains the purpose and objective of coordination and socialization of the neighboring plan of the construction of 500 kV transmission line tower site; and</li> <li>JSP conveys the terms and conditions of land acquisition for tower land that must be completed by the land owner.</li> </ul>	<ul style="list-style-type: none"> <li>Land document in the form of Certificate of Property (SHM) needs to be checked by BPN;</li> <li>Loan of original certificate is made with document receipt; and</li> <li>Some towers need to be conducted by the state court because the heirs are still under age.</li> </ul>
Tunggak Jati	Karawang Barat	Karawang	24-09-2017	Landowners	<ul style="list-style-type: none"> <li>JSP explains the purpose and objective of coordination and socialization of the neighboring plan of the construction of 500 kV transmission line tower site;</li> <li>JSP conveys the terms and conditions of land acquisition for tower land that must be completed by the land owner;</li> </ul>	<ul style="list-style-type: none"> <li>Landowners understand about the construction plan of the transmission line tower site; and</li> <li>The results of the socialization to the LDII (Landowners) is willing to release land for the purpose of government programs and related to price negotiations are still waiting for the decision of LDII leaders.</li> </ul>

Village	District	Regency	Date	Stakeholder Involved	Key Messages	Issues Raised
					<ul style="list-style-type: none"> <li>The area of land acquisition is adjusted to the needs of the tower floor area;</li> <li>Prices are based on NJOP and land market prices in the region; and</li> <li>Implementation of payment can be done after the validity of the land is complete.</li> </ul>	
Cilamaya	Cilamaya Wetan	Karawang	30-01-2018	<ul style="list-style-type: none"> <li>Landowners;</li> <li>District and Village Authorities;</li> <li>Local Police and Military; and</li> </ul>	Compensation scheme for area / space traversed by the Project 500 kV Transmission Line.	<ul style="list-style-type: none"> <li>Project to have close coordination and to inform district and village authorities and community prior to conducting any construction activities;</li> <li>Project to provide local farmers to harvest their farming product prior conducting the construction activities;</li> <li>To optimize local content and prioritize local workforce where feasible;</li> <li>Decrease land price / value to area / land traversed by TL ROW; and</li> <li>Road damage due to Project traffic mobilization;</li> <li>Impacts of electric and magnetic radiation to community health.</li> </ul>

Village	District	Regency	Date	Stakeholder Involved	Key Messages	Issues Raised
Sukatani	Cilamaya Wetan	Karawang	01-02-2018	To be confirmed	Compensation scheme for area / space traversed by the Project 500 kV Transmission Line.	To be confirmed
Sukamulya	Cilamaya Kulon	Karawang	05-02-2018	<ul style="list-style-type: none"> <li>• Landowners; and</li> <li>• Village Authorities</li> </ul>	Compensation scheme for area / space traversed by the Project 500 kV Transmission Line.	<ul style="list-style-type: none"> <li>• Determination of compensation value;</li> <li>• Access to community land after being compensated;</li> <li>• Impacts of electric and magnetic radiation to community health and</li> <li>• Project community grievance handling / management</li> </ul>
Sindangsari	Kutawaluya	Karawang	05-02-2018	<ul style="list-style-type: none"> <li>• Landowners;</li> <li>• District and Village Authorities;</li> <li>• Local Police and Military; and</li> </ul>	Compensation scheme for area / space traversed by the Project 500 kV Transmission Line.	<ul style="list-style-type: none"> <li>• Determination of compensation value;</li> <li>• Project to have close coordination and to inform district and village authorities and community prior to conducting any construction activities;</li> <li>• Eligibility to receive compensation;</li> <li>• Compensation for damaged crops due to construction activities; and</li> <li>• Method of compensation payment.</li> </ul>
Sukaratu	Cilebar	Karawang	06-02-2018	<ul style="list-style-type: none"> <li>• Landowners; and</li> <li>• Village Authorities</li> </ul>	Compensation scheme for area / space traversed by the Project 500 kV Transmission Line.	<ul style="list-style-type: none"> <li>• Determination of compensation value;</li> <li>• Eligibility to receive compensation;</li> <li>• Method of compensation payment; and</li> </ul>

Village	District	Regency	Date	Stakeholder Involved	Key Messages	Issues Raised
						<ul style="list-style-type: none"> <li>Maintenance of Transmission Line;</li> </ul>
Sukaraja	Rawamerta	Karawang	07-02-2018	To be confirmed	Compensation scheme for area / space traversed by the Project 500 kV Transmission Line.	To be confirmed
Muktijaya	Cilamaya Kulon	Karawang	07-02-2018	To be confirmed	Compensation scheme for area / space traversed by the Project 500 kV Transmission Line.	To be confirmed
Karangharum	Kedungwaringin	Bekasi	07-02-2018	To be confirmed	Compensation scheme for area / space traversed by the Project 500 kV Transmission Line.	To be confirmed
Waluya	Kutawaluya	Karawang	08-02-2018	<ul style="list-style-type: none"> <li>Landowners;</li> <li>District and Village Authorities; and</li> <li>Local Police</li> </ul>	Compensation scheme for area / space traversed by the Project 500 kV Transmission Line.	<ul style="list-style-type: none"> <li>Determination of compensation value; and</li> <li>Insufficient amount of compensation if based on Ministerial Regulation No.38 Year 2013.</li> </ul>
Sumurgede	Cilamaya Kulon	Karawang	08-02-2018	<ul style="list-style-type: none"> <li>Landowners;</li> <li>District and Village Authorities;</li> </ul>	Compensation scheme for area / space traversed by the Project 500 kV Transmission Line.	<ul style="list-style-type: none"> <li>Eligibility and landownership documentation requirement to receive compensation; and</li> <li>Project community grievance handling / management.</li> </ul>

Village	District	Regency	Date	Stakeholder Involved	Key Messages	Issues Raised
Mekarjaya	Kedungwaringin	Bekasi	08-02-2018	To be confirmed	Compensation scheme for area / space traversed by the Project 500 kV Transmission Line.	To be confirmed
Sampalan	Kotawaluya	Karawang	09-02-2018	To be confirmed	Compensation scheme for area / space traversed by the Project 500 kV Transmission Line.	To be confirmed
Manggungjaya	Cilamaya Kulon	Karawang	09-02-2018	<ul style="list-style-type: none"> <li>• Landowners;</li> <li>• District and</li> <li>• Village Authorities;</li> </ul>	Compensation scheme for area / space traversed by the Project 500 kV Transmission Line.	<ul style="list-style-type: none"> <li>• Eligibility and landownership documentation requirement to receive compensation; and</li> <li>• Project to have close coordination and to inform district and village authorities and community prior to conducting any construction activities/</li> </ul>
Karangmekar	Kedungwaringin	Bekasi	09-02-2018	To be confirmed	Compensation scheme for area / space traversed by the Project 500 kV Transmission Line.	To be confirmed
Mulyajaya	Kotawaluya	Karawang	10-02-2018	To be confirmed	Compensation scheme for area / space traversed by the Project 500 kV Transmission Line.	To be confirmed

Village	District	Regency	Date	Stakeholder Involved	Key Messages	Issues Raised
Karyasari	Rengas-dengklok	Karawang	12-02-2018	To be confirmed	Compensation scheme for area / space traversed by the Project 500 kV Transmission Line.	To be confirmed
Karangsatu	Karangbahagia	Bekasi	12-02-2018	<ul style="list-style-type: none"> <li>• Landowners;</li> <li>• District and Village Authorities; and</li> <li>• Local Police and Military</li> </ul>	Compensation scheme for area / space traversed by the Project 500 kV Transmission Line.	<ul style="list-style-type: none"> <li>• Method and determination of compensation; and</li> <li>• Detail of construction of Transmission Line.</li> </ul>
Kalangsuria	Rengas-dengklok	Karawang	13-02-2018	<ul style="list-style-type: none"> <li>• Landowners;</li> <li>• District and Village Authorities;</li> </ul>	Compensation scheme for area / space traversed by the Project 500 kV Transmission Line.	<ul style="list-style-type: none"> <li>• Impact of Transmission Line to the underneath vegetation / crops; and</li> <li>• Access to community land after being compensated.</li> </ul>
Kalangsari	Rengas-dengklok	Karawang	14-02-2018	To be confirmed	Compensation scheme for area / space traversed by the Project 500 kV Transmission Line.	To be confirmed
Pasirukem	Cilamaya Kulon	Karawang	14-02-2018	<ul style="list-style-type: none"> <li>• Landowners;</li> <li>• District and Village Authorities; and</li> <li>• Local Police</li> </ul>	Compensation scheme for area / space traversed by the Project 500 kV Transmission Line.	<ul style="list-style-type: none"> <li>• Timeline of the Transmission Line construction;</li> <li>• Method and determination of compensation; and</li> <li>• Timeline for the payment of compensation of land acquisition for TL Tower footing.</li> </ul>

Village	District	Regency	Date	Stakeholder Involved	Key Messages	Issues Raised
Karang-mukti	Karang Bahagia	Bekasi	15-02-2018	To be confirmed	Compensation scheme for area / space traversed by the Project 500 kV Transmission Line.	To be confirmed
Mekarjati	Karawang Barat	Karawang	15-02-2018	<ul style="list-style-type: none"> <li>• Landowners; and</li> <li>• District and Village Authorities;</li> </ul>	Compensation scheme for area / space traversed by the Project 500 kV Transmission Line.	<ul style="list-style-type: none"> <li>• Legality of the Project;</li> <li>• Access to community land after being compensated;</li> <li>• Impacts of electric and magnetic radiation to community health; and</li> <li>• Eligibility and landownership documentation requirement to receive compensation.</li> </ul>
Tunggakjati	Karawang Barat	Karawang	15-02-2018	To be confirmed	Compensation scheme for area / space traversed by the Project 500 kV Transmission Line.	To be confirmed
Tegalurung	Cilamaya Kulon	Karawang	15-02-2018	<ul style="list-style-type: none"> <li>• Landowners;</li> <li>• District and Village Authorities; and</li> <li>• Local Police and Military</li> </ul>	Compensation scheme for area / space traversed by the Project 500 kV Transmission Line.	<ul style="list-style-type: none"> <li>• Timeline of the Transmission Line construction;</li> <li>• Access to community land after being compensated; and</li> <li>• Impacts of electric and magnetic radiation to community health.</li> </ul>

## 6 STAKEHOLDER ENGAGEMENT PLAN

### 6.1 STAKEHOLDER ENGAGEMENT METHODOLOGY

Stakeholder engagement is centered on building and maintaining constructive relationships over time with groups of people / stakeholders who are affected or interested in the Project's activities. It is an ongoing process between the Project and its stakeholders that extends throughout the life of the Project and encompasses a range of activities and approaches, from information sharing and consultation, to participation, negotiation, and information of partnerships.

Considering the social setting of the communities living around the Project area and category of stakeholders identified during the AMDAL and ESIA consultation, the following section sets out the strategy and approach for the Project to conduct stakeholder engagement activities in a culturally appropriate manner.

The goal is to ensure the timely provision of relevant and understandable information and to create a process that provides opportunities for all stakeholders to express their views and concerns, and allows the Project to consider and respond to them. The nature and frequency of this engagement should reflect the level of Project risks and impacts.

#### 6.1.1 Stakeholder Engagement Materials

Materials supporting stakeholder engagement can include printed information in the form of leaflets and posters as well as documents that form the focus of disclosure and consultation activities, including the AMDAL and ESIA Reports. Other materials are developed to support consultation meetings, including presentations, posters and banners illustrating aspects of the Project and the AMDAL and ESIA process.

Potential consultation / engagement methods that could be used by the Project include (but are not exclusive to) those detailed in **Table 6-1**.

*Table 6-1 Stakeholder Engagement Tools*

Method*	Use
Briefings and presentations	Provide information on a specific issue/initiative to those that may be affected.
Public displays	Increase accessibility of information to community. Include Fact Sheets/Newsletters and staff to answer questions.
Media coverage (both editorial and advertising)	Raise awareness amongst wide audience.
Open days	Informal event designed to raise awareness and provide vehicle for addressing community concerns. Include printed material and staff for further information.
Printed/website materials (external)	Provide updates to reach wide audience.

Method*	Use
Printed/intranet materials (internal)	Provide updates to reach wide internal audience.
Videos/DVDs	Visual depiction of development/activities. Can be used in briefings/presentations, open days, public displays and other methods of consultation/engagement.
Website	Provides regular updates and stores other useful information (such as fact sheets/newsletters etc.). Include feedback mechanism.
Community Consultative Committees	Made up of relevant interest group representatives in order to provide a vehicle for constructive discussion and good relationships.
Community profiling	Used to understand the community profile in a specific geographical area or community of interest. Can assist in better understanding consultation needs.
Focus groups	Often used to identify specific issues on which to base further research or consultation.
Negotiation/mediation	Aimed at dealing with conflict and resulting in an agreed outcome.
Public meetings	Used to raise awareness amongst wide audience and provides a vehicle for community to raise their concerns.
Stakeholder interviews	Used to gain in-depth understanding of a specific issue.
Surveys	Used to gain overview of community views or level of community understanding.
Community partnerships	Provide an opportunity for joint company-community decision making on community projects and initiatives.
Social investment	Strategic contributions to support areas of identified need in the community. Can lead to good relationships and will enhance corporate reputation.

### 6.1.2 *Communication Channels*

Feedback mechanisms are adapted to suit the needs and preferences of the different stakeholders, as well as their location. They range from comment boxes, which are used in local communities to gather feedback in written form, to web-based mechanisms that can gather feedback from more urban stakeholders who have more easy access to information technology.

The different consultation and disclosure methods, materials and communication channels that can be used to engage stakeholders are shown in **Table 6-2**.

**Table 6-2** *Communication Channels*

Stakeholder Category	Disclosure Methods	Communication Channels
Government Authorities	Notification, key documents and invitations to meet with Project addressed to specific stakeholders.	<ul style="list-style-type: none"> <li>Email, telephone, post and in person.</li> </ul> Meeting and correspondence with the Project representatives.

Stakeholder Category	Disclosure Methods	Communication Channels
Residents of local communities	Paper copies of documents made available in central community location (e.g. town halls, cultural centers, village head office, traditional market, etc.)	<ul style="list-style-type: none"> <li>• Email, telephone, post and in person.</li> <li>• Secure comment boxes</li> <li>• Community meetings and public hearings</li> </ul>
Landowners	Relevant information send directly to affected peoples	<ul style="list-style-type: none"> <li>• Email, telephone, post and in person.</li> <li>Meeting and correspondence with the Project representative.</li> </ul>
Land users and farmers	<ul style="list-style-type: none"> <li>• Paper copies of documents made available in central community location (e.g. town halls, cultural centers, village head office, traditional market, etc.)</li> <li>• Notification, key documents and invitations to meet with Project addressed to specific stakeholders.</li> </ul>	<ul style="list-style-type: none"> <li>• Email, telephone, post and in person.</li> <li>• Secure comment boxes</li> <li>• Community meetings and public hearings</li> <li>• Private and roundtable meetings with the Project</li> </ul>
Non-government organizations (NGOs)	Notifications, key documents and invitation to meet with the Project addressed to specific stakeholders.	<ul style="list-style-type: none"> <li>• Email, telephone, post and in person.</li> <li>• Meeting and correspondence with the Project representative</li> </ul>
Media	Press releases and media interviews regarding Project updates and disclosure periods	Media contacts

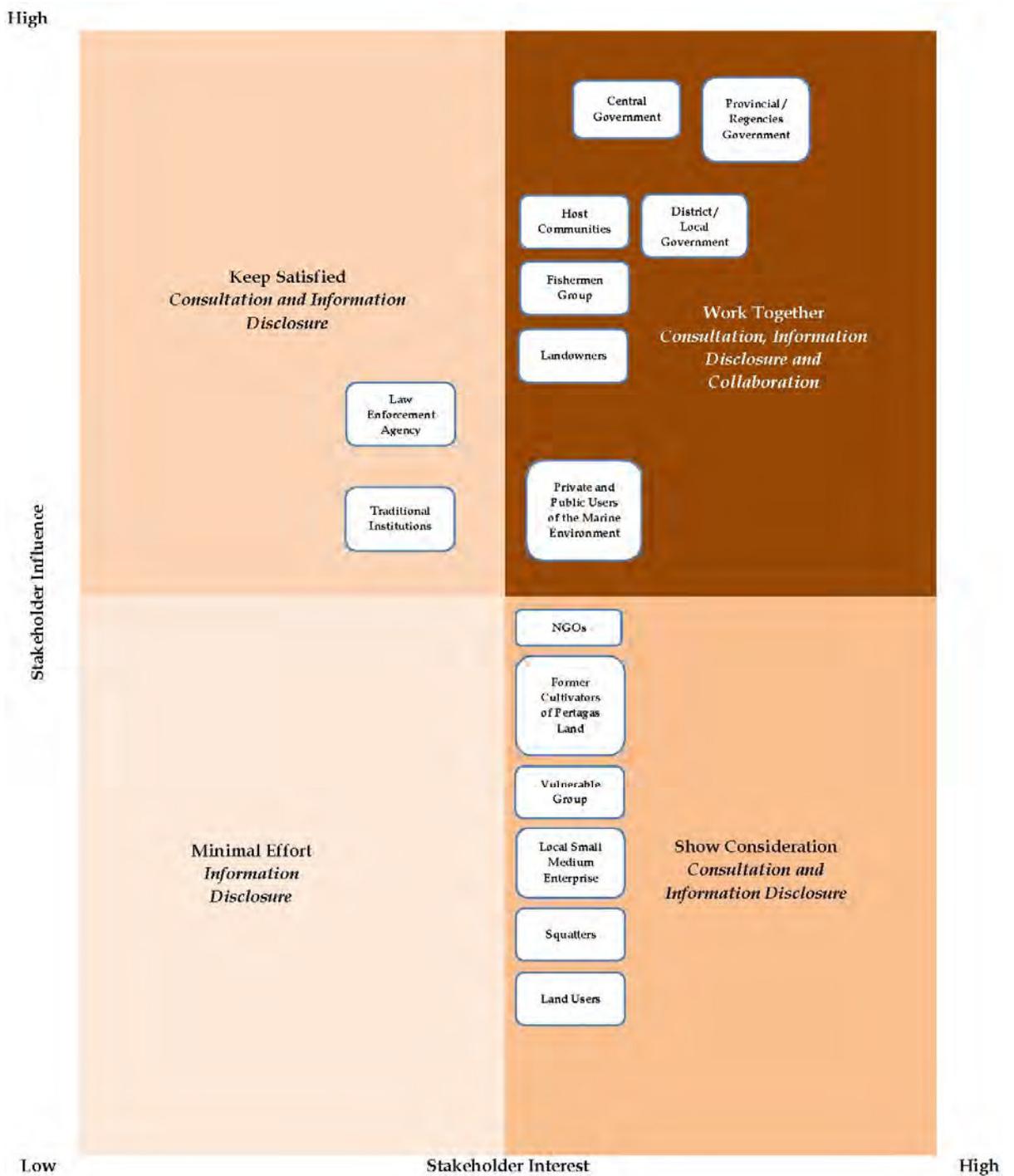
## 6.2 *PLANNED FUTURE STAKEHOLDER ENGAGEMENT*

This SEP identifies the relevant stakeholder groups, key messages to be delivered, approach and tools of engagement, timeline and responsible parties. The SEP is designed to include all relevant stakeholders and issues to cover the entire lifecycle of the Project. However, the plan is a dynamic tool to be periodically updated and adapted to the current social, economic and political situation of the area since the Project's stakeholders and issues / concerned raised may change over the life time of the Project.

Based on the analysis of stakeholder interests' verses power or influence presented in **Table 5-1** in the previous section, the type of engagement that will be implemented for each of the different stakeholder identified is shown in **Figure 6-1**.

The proposed future Project stakeholder engagement activities, based on ERM's understanding of potential project impacts and stakeholder consultation results are presented in **Table 6-3**.

Figure 6-1 Stakeholder Engagement Based on Power / Influence versus Interest



**Table 6-3 PT Jawa Satu Power Stakeholder Engagement Plan**

No.	Stakeholder Group	Stakeholder	Key Issue / Message	Approach	Responsibility	Phase of Project
1.	Central Government	<ul style="list-style-type: none"> <li>Ministry of Environmental and Forestry</li> </ul>	Obtaining all regulatory permits and licensing requirements for the development of the Project mainly the AMDAL permit.	<p><i>Approach:</i> Consultation, Collaboration and Information Disclosure</p> <p><i>Tools:</i></p> <ul style="list-style-type: none"> <li>Direct one-on-one meeting with relevant government agencies as required</li> <li>Focus Group Discussion at regencies level</li> <li>Workshop</li> <li>Briefing and presentation</li> </ul>	PT Jawa Satu Power	Pre-Construction and Construction
2.	Provincial / Regencies Government	<ul style="list-style-type: none"> <li>Environmental Agency (DLHK) of Karawang Regency;</li> <li>Bekasi dan Karawang Energy and Mineral Resources Agency;</li> <li>Kanwil BPN (National land Agency in Jawa Barat Province;</li> </ul>	Obtaining all regulatory permits and licensing requirements for the development of the PT Jawa Satu Power Plant Project mainly the Location Permit, Construction Permits and AMDAL permit.	<p><i>Approach:</i> Consultation, Collaboration and Information Disclosure</p> <p><i>Tools:</i></p> <ul style="list-style-type: none"> <li>Direct one-on-one meeting with relevant</li> </ul>	PT Jawa Satu Power	Pre-Construction, Construction and Operation

No.	Stakeholder Group	Stakeholder	Key Issue / Message	Approach	Responsibility	Phase of Project
		<ul style="list-style-type: none"> <li>• Development Planning Agency at Sub-National Level (BAPPEDA);</li> <li>• Department of Industry and Commerce;</li> <li>• Department of Spatial Planning;</li> <li>• Directorate of Sea Spatial Planning; and</li> <li>• Directorate General of Sea Spatial Management.</li> </ul>		<p>government agencies as required</p> <ul style="list-style-type: none"> <li>• Focus Group Discussion at regencies level</li> <li>• Workshop</li> </ul>		
3.	District / Local Government	<p>Sub-District Heads of:</p> <ul style="list-style-type: none"> <li>▪ Cilamaya Wetan;</li> <li>▪ Cilamaya Kulon;</li> <li>▪ Tempuran;</li> <li>▪ Pedes;</li> <li>▪ Rawamerta</li> <li>▪ Kedungwaringin;</li> <li>▪ Cikarang Timur; and</li> <li>▪ Karang Bahagia</li> </ul>	<ul style="list-style-type: none"> <li>▪ Project design and development</li> <li>▪ Dissemination of AMDAL and RKL RPL documents.</li> <li>▪ Disclosure of ESIA; the final project design, identified impacts and proposed mitigations;</li> <li>▪ Addressing other concerns not discussed in the above.</li> <li>▪ Providing an opportunity for feedback.</li> <li>▪ Project local labour requirements and procurement mechanism.</li> <li>▪ Project community Grievance Mechanism.</li> <li>▪ Opportunities for Project involvement in community development.</li> </ul>	<p><i>Approach:</i></p> <p>Consultation, Collaboration and Information Disclosure</p> <p><i>Tools:</i></p> <ul style="list-style-type: none"> <li>• Socialization forum in each village or sub-district involving village governments.</li> <li>• Briefing and presentations.</li> <li>• Printed project updates / Website Material</li> <li>• Videos / Film</li> </ul>	PT Jawa Satu Power	Pre-Construction, Construction and Operation

No.	Stakeholder Group	Stakeholder	Key Issue / Message	Approach	Responsibility	Phase of Project
4.	Law Enforcement Agency	District Sector Police and District Military Command of: <ul style="list-style-type: none"> <li>▪ Cilamaya Wetan;</li> <li>▪ Cilamaya Kulon;</li> <li>▪ Tempuran;</li> <li>▪ Pedes;</li> <li>▪ Rawamerta</li> <li>▪ Kedungwaringin;</li> <li>▪ Cikarang Timur; and</li> <li>▪ Karang Bahagia</li> </ul>	<ul style="list-style-type: none"> <li>▪ Project design and development, impacts and opportunities.</li> <li>▪ Dissemination of AMDAL and RKL RPL documents.</li> <li>▪ Project local labour requirements and procurement mechanism</li> <li>▪ Opportunity for partnership related to security aspect of the project assets and safety throughout the construction and operation of the project.</li> <li>▪ Project security requirements.</li> <li>▪ Disclosure of Project Grievance Mechanism.</li> </ul>	<p><i>Approach:</i> Consultation and Information Disclosure</p> <p><i>Tools:</i> Socialization forum in each village or sub-district involving village governments</p>	PT Jawa Satu Power	Pre-Construction and Construction
5.	Host Communities	<ul style="list-style-type: none"> <li>▪ Community of Cilamaya village;</li> <li>▪ Head of the 37 project affected villages as representatives of the village residents.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Project design and development Disclosure of ESIA; the final project design, identified impacts and proposed mitigations;</li> <li>▪ Providing an opportunity for feedback.</li> <li>▪ Addressing other concerns not discussed in the above.</li> <li>▪ Project local labour requirements and procurement mechanism.</li> <li>▪ Project community Grievance Mechanism.</li> <li>▪ Opportunities for Project involvement in community development.</li> </ul>	<p><i>Approach:</i> Consultation, Collaboration and Information Disclosure</p> <p><i>Tools:</i></p> <ul style="list-style-type: none"> <li>• Socialization forum in each village</li> <li>• Posters in location where it is easily accessible to the community.</li> <li>• Public Displays</li> <li>• Project briefing and presentations</li> </ul>	PT Jawa Satu Power	Pre-Construction, Construction and Operation

No.	Stakeholder Group	Stakeholder	Key Issue / Message	Approach	Responsibility	Phase of Project
				<ul style="list-style-type: none"> <li>• Media Coverage</li> <li>• Printed project updates/ Website Material</li> <li>• Videos / Film</li> </ul>		
6.	Traditional Institutions	Community Leaders of Sub-Districts of: <ul style="list-style-type: none"> <li>▪ Cilamaya Wetan;</li> <li>▪ Cilamaya Kulon;</li> <li>▪ Tempuran;</li> <li>▪ Pedes;</li> <li>▪ Rawamerta</li> <li>▪ Kedungwaringin;</li> <li>▪ Cikarang Timur; and</li> <li>▪ Karang Bahagia</li> </ul>	<ul style="list-style-type: none"> <li>• Disclosure of ESIA; the final project design, identified impacts and proposed mitigations;</li> <li>• Providing an opportunity for feedback.</li> <li>• Addressing other concerns not discussed in the above.</li> <li>• Opportunities for Project involvement in local economy and community development;</li> <li>• Opportunity for Project to support social or community events such as Independence day celebration and cultural events/CSR activities;</li> <li>• Disclosure of Project Grievance Mechanism.</li> </ul>	<i>Approach:</i> Consultation, collaboration, Information and Disclosure  <i>Tools:</i> <ul style="list-style-type: none"> <li>• Direct one-on-one meeting as required</li> <li>• Focus Group Discussion in the village level.</li> <li>• Public Displays</li> <li>• Briefing and Presentations</li> <li>• Media Coverage</li> <li>• Printed / Website Material</li> <li>• Videos / Film</li> </ul>	PT Jawa Satu Power	Pre-Construction, Construction and Operation
7.	Fishermen Groups	Fishermen communities originated from the village of Muara and Blanakan	<ul style="list-style-type: none"> <li>▪ Project design and development,</li> <li>▪ Disclosure of ESIA; the final project design, identified</li> </ul>	<i>Approach:</i> Consultation, Collaboration and Information Disclosure	PT Jawa Satu Power	Pre-Construction, Construction and Operation

No.	Stakeholder Group	Stakeholder	Key Issue / Message	Approach	Responsibility	Phase of Project
			<p>impacts and proposed mitigations;</p> <ul style="list-style-type: none"> <li>▪ Addressing other concerns not discussed in the above.</li> <li>▪ Providing an opportunity for feedback.</li> <li>▪ Marine / Sea restriction zone which will be applied by the Project during construction and operation;</li> <li>▪ Project Sea traffic safety and security plan;</li> <li>▪ Disclosure of Project Grievance Mechanism.</li> <li>▪ Opportunities for Project involvement in local economy and community development particularly for the fishermen group.</li> </ul>	<p><i>Tools:</i></p> <ul style="list-style-type: none"> <li>• Socialization and consultation forum in the village level</li> <li>• Posters in location where it is easily accessible to the fishermen community.</li> <li>• Public Displays</li> <li>• Briefing and Presentations</li> <li>• Media Coverage</li> <li>• Printed / Website Material</li> <li>• Videos / Film</li> </ul>		
8.	Landowners	<p>Landowners impacted by the development of the following project's component:</p> <ul style="list-style-type: none"> <li>▪ 500 KV High Voltage Transmission Line;</li> <li>▪ Access road;</li> <li>▪ Project's Jetty; and</li> <li>▪ Onshore pipeline</li> </ul>	<ul style="list-style-type: none"> <li>▪ Land acquisition process and compensation scheme;</li> <li>▪ Disclosure of ESIA; the final project design, identified impacts and proposed mitigations;</li> <li>▪ Providing an opportunity for feedback.</li> <li>▪ Addressing other concerns not discussed in the above.</li> <li>▪ Livelihood / Income Restoration program / scheme</li> </ul>	<p><i>Approach:</i></p> <p>Consultation, Collaboration and Information Disclosure</p> <p><i>Tools:</i></p> <ul style="list-style-type: none"> <li>• Direct one-on-one meeting</li> </ul>	Local land acquisition consultant on behalf of PT Jawa Satu Power	Pre-Construction, Construction and Operation

No.	Stakeholder Group	Stakeholder	Key Issue / Message	Approach	Responsibility	Phase of Project
			<p>for the project affected landowners;</p> <ul style="list-style-type: none"> <li>▪ Community health and safety due to impact of transmission line; onshore pipeline installment; and</li> <li>▪ Disclosure of Project Grievance Mechanism particularly during the land acquisition phase.</li> </ul>	<p>with landowner as required; and</p> <ul style="list-style-type: none"> <li>• Socialization forum in the village level.</li> <li>• Public Displays</li> <li>• Briefing and Presentations</li> <li>• Media Coverage</li> <li>• Printed / Website Material</li> <li>• Videos / Film</li> </ul>		

No.	Stakeholder Group	Stakeholder	Key Issue / Message	Approach	Responsibility	Phase of Project
9.	Former cultivators of Pertagas land	Farmers and local residents who conducted farming activities on Pertagas land that will be used for power plant development	<ul style="list-style-type: none"> <li>▪ Disclosure of ESIA; the final project design, identified impacts and proposed mitigations;</li> <li>▪ Providing an opportunity for feedback.</li> <li>▪ Addressing other concerns not discussed in the above.</li> <li>• Opportunities for Project involvement in local economy and community development particularly for the former cultivators of the Pertagas land.</li> <li>• Project local labour requirements and procurement mechanism and opportunity for local workforce to be involved in the Project; and</li> <li>• Disclosure of Project Grievance Mechanism.</li> </ul>	<p><i>Approach:</i></p> <p>Consultation and Information Disclosure</p> <p><i>Tools:</i></p> <ul style="list-style-type: none"> <li>• Socialization forum in the village level.</li> <li>• Focus Group Discussion in the village level.</li> <li>• Public Displays</li> <li>• Briefing and Presentations</li> <li>• Media Coverage</li> <li>• Printed / Website Material</li> <li>• Videos / Film</li> </ul>	PT Jawa Satu Power	Pre-Construction, Construction and Operation

No.	Stakeholder Group	Stakeholder	Key Issue / Message	Approach	Responsibility	Phase of Project
10.	Vulnerable Group	<ul style="list-style-type: none"> <li>Female Craftsmen</li> <li>Owners of stalls located around the Project area in Cilamaya village.</li> </ul>	<ul style="list-style-type: none"> <li>Disclosure of ESIA; the final project design, identified impacts and proposed mitigations;</li> <li>Providing an opportunity for feedback.</li> <li>Addressing other concerns not discussed in the above.</li> <li>Opportunities for Project involvement in local economy and community development particularly involving the identified vulnerable group;</li> <li>Project local labour requirements and procurement mechanism and opportunity for local workforce to be involved in the Project.</li> <li>Disclosure of Project Grievance Mechanism.</li> </ul>	<p><i>Approach:</i></p> <p>Consultation and Information Disclosure</p> <p><i>Tools:</i></p> <ul style="list-style-type: none"> <li>Direct one-on-one meeting as required</li> <li>Socialization forum in the village level.</li> <li>Focus Group Discussion in the village level.</li> <li>Public Displays</li> <li>Briefing and Presentations</li> <li>Media Coverage</li> <li>Printed / Website Material</li> <li>Videos / Film</li> </ul>	PT Jawa Satu Power	Pre-Construction, Construction and Operation
11.	National Level Non-Government Organizations	<ul style="list-style-type: none"> <li>Wahana Lingkungan Hidup Foundation (WALHI)</li> </ul>	<ul style="list-style-type: none"> <li>Project development, impacts and opportunities.</li> <li>Management of environmental and social adverse impacts.</li> <li>Dissemination of AMDAL and RKL RPL documents.</li> </ul>	<p><i>Approach:</i></p> <p>Consultation and Information Disclosure</p> <p><i>Tools:</i></p> <ul style="list-style-type: none"> <li>Direct one-on-one meeting as required</li> </ul>	PT Jawa Satu Power	Pre-Construction and Construction

No.	Stakeholder Group	Stakeholder	Key Issue / Message	Approach	Responsibility	Phase of Project
				<ul style="list-style-type: none"> <li>• Focus Group Discussion at regency level.</li> <li>• Briefing and Presentations</li> <li>• Printed / Website Material</li> <li>• Media Coverage</li> <li>• Videos / Film</li> </ul>		
12.	Local Level Non-Government Organizations	<ul style="list-style-type: none"> <li>• Karang Taruna (Local Youth Organization);</li> <li>• Gerakan Masyarakat Bawah Indonesia (GMBI);</li> <li>• Badan Pembinaan Potensi Keluarga Besar Banten (BPKB);</li> <li>• Ikatan Putra Daerah (IKAPUD); and</li> <li>• Pemuda Pancasila (PP);</li> </ul>	<ul style="list-style-type: none"> <li>▪ Project development, impacts and opportunities.</li> <li>▪ Project local labour requirements and procurement mechanism and opportunity for local workforce to be involved in the Project.</li> <li>▪ Project's social investment/community development programs</li> <li>▪ Management of environmental and social impacts.</li> </ul>	<p><i>Approach:</i></p> <p>Communication and Information Disclosure</p> <p><i>Tools:</i></p> <ul style="list-style-type: none"> <li>• Direct one-on-one meeting with relevant CBO as required</li> <li>• Focus Group Discussion at Sub-District level</li> <li>• Briefing and Presentations</li> <li>• Printed / Website Material</li> <li>• Media Coverage</li> </ul>	PT Jawa Satu Power	Pre-Construction, Construction and Operation

No.	Stakeholder Group	Stakeholder	Key Issue / Message	Approach	Responsibility	Phase of Project
13.	Local Small Medium Enterprises Group	Local Entrepreneur from Cilamaya Wetan and Manggung Jaya Village	<ul style="list-style-type: none"> <li>▪ Disclosure of ESIA; the final project design, identified impacts and proposed mitigations;</li> <li>▪ Addressing other concerns not discussed in the above.</li> <li>▪ Project design and development; and</li> <li>▪ Project's social investment/local economic and community development programs.</li> </ul>	<p><i>Approach:</i></p> <p>Consultation and Information Disclosure</p> <p><i>Tools:</i></p> <ul style="list-style-type: none"> <li>• Direct one-on-one meeting as required</li> <li>• Focus Group Discussion in the village.</li> <li>• Public Displays</li> <li>• Briefing and Presentations</li> <li>• Media Coverage</li> <li>• Printed / Website Material</li> <li>• Videos / Film</li> </ul>	PT Jawa Satu Power	Construction and Operation

No.	Stakeholder Group	Stakeholder	Key Issue / Message	Approach	Responsibility	Phase of Project
14	Squatters	Owners of Kiosks Next to the CCGT Plant	<ul style="list-style-type: none"> <li>▪ Disclosure of ESIA; the final project design, identified impacts and proposed mitigations;</li> <li>▪ Addressing other concerns not discussed in the above.</li> <li>▪ Providing an opportunity for feedback.</li> <li>▪ Opportunities for Project involvement in local economy and community development particularly involving the identified vulnerable group;</li> <li>▪ Project local labour requirements and procurement mechanism and opportunity for local workforce to be involved in the Project.</li> <li>▪ Disclosure of Project Grievance Mechanism.</li> </ul>	<p><i>Approach:</i> Consultation and Information Disclosure</p> <p><i>Tools:</i></p> <ul style="list-style-type: none"> <li>• Direct one-on-one meeting as required</li> <li>• Socialization forum in the village level.</li> <li>• Focus Group Discussion in the village level.</li> <li>• Public Displays</li> <li>• Briefing and Presentations</li> <li>• Media Coverage</li> <li>• Printed / Website Material</li> <li>• Videos / Film</li> </ul>	PT Jawa Satu Power	Pre-Construction, Construction and Operation
15	Private and Public Users of the Marine Environment	<ul style="list-style-type: none"> <li>• Oil and gas company;</li> <li>• Shipping companies;</li> <li>• Port authorities;</li> <li>• Tourism operator; and</li> <li>• Commercial fishing operators</li> </ul>	<ul style="list-style-type: none"> <li>▪ Disclosure of ESIA; the final project design, identified</li> </ul>	<p><i>Approach:</i> Consultation and Information Disclosure</p>	PT Jawa Satu Power	Construction and Operation

No.	Stakeholder Group	Stakeholder	Key Issue / Message	Approach	Responsibility	Phase of Project
			<p>impacts and proposed mitigations;</p> <ul style="list-style-type: none"> <li>▪ Addressing other concerns not discussed in the above.</li> <li>▪ Project design and development; and</li> <li>▪ Seeking opportunity to collaborate for supporting local economic and infrastructure development.</li> </ul>	<p><i>Tools:</i></p> <ul style="list-style-type: none"> <li>• Direct one-on-one meeting as required</li> <li>• Focus Group Discussion at regency level.</li> <li>• Briefing and Presentations</li> <li>• Media Coverage</li> <li>• Printed / Website Material</li> </ul>		

## 7 COMMUNITY GRIEVANCE MECHANISM

A grievance mechanism is a process for systematically receiving, investigating and responding to stakeholder complaints. When carefully designed, properly implemented and embedded in an effective engagement and disclosure program, they provide significant benefits to both companies and communities.

A well-functioning grievance mechanism:

- Demonstrates a company's willingness to take community concerns seriously, thereby contributing to better relationships with stakeholders;
- Promotes early identification and resolution of concerns, leading to better management of operational impacts and the avoidance of potential harm; and
- Reduces the potential for complaints to escalate into litigation, protests, security incidents, or regulatory challenges that could result in project delays.

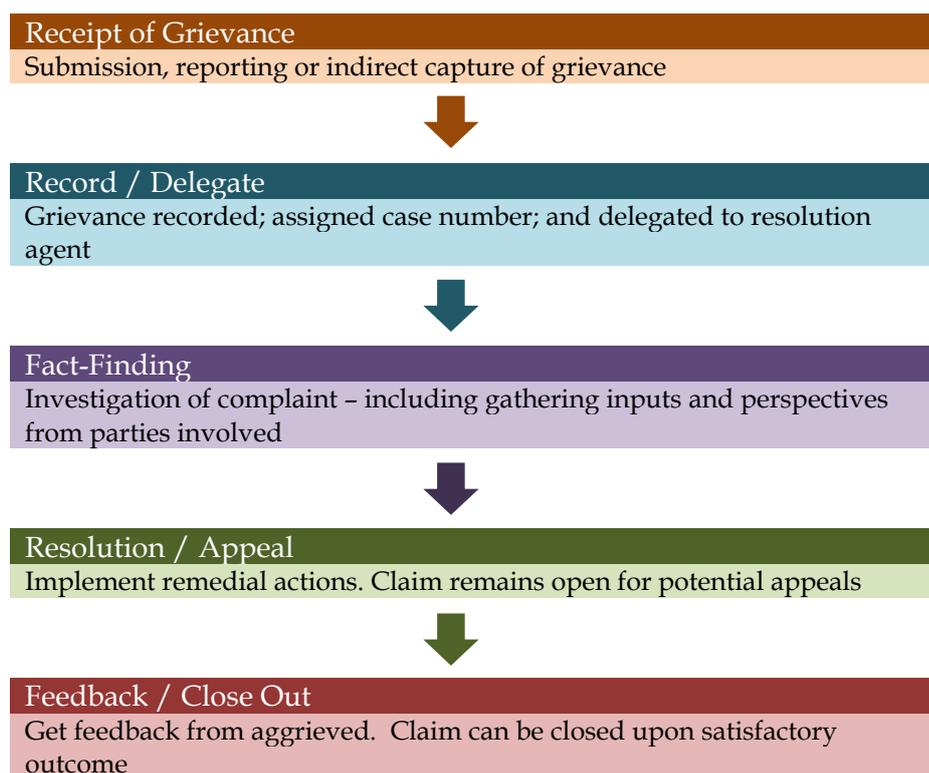
A Project-level grievance mechanism is a locally based, formalized way for a company or Project to accept, assess, and resolve stakeholder complaints related to Project activities. It offers a package of widely understood and effective procedures for solving problems in a culturally appropriate manner.

### 7.1 *PROPOSED GRIEVANCE MECHANISM FOR PROJECT-AFFECTED COMMUNITIES*

Throughout the life cycle of the Project queries and grievances from community may arise hence a Grievance Tracking Redress Mechanism (GTRM) is established to address such incidences. The GTRM will be triggered in all instances where a complaint is received by the Project or its contractors (such as the land acquisition consultant and the EPCs for the offshore and onshore activities).

Typically, an effective GTRM is characterized by five basic steps and activities which are easy to follow and understand as illustrated in **Figure 7-1**.

**Figure 7-1 Grievance Tracking Redress Mechanism**



A summary of the process of identifying, investigating, and resolving grievances is detailed in the **Table 7-1**.

**Table 7-1 Summary of Stages of Grievance Handling**

Stage	Description	Responsibility	Timeline
Stage 1: <b>Receipt of Grievance</b>	<ul style="list-style-type: none"> <li>▪ Comments and questions are received and analyzed as part of the standard feedback process. Feedback or complaints can be received through verbal and writing, follow by registering.</li> <li>▪ All communications are subject to the feedback process, which ensures that feedback is documented, incorporated, and responded to as needed.</li> <li>▪ When the grievance is identified, stage 2 of the grievance procedure is initiated.</li> </ul>	Community Liaison Officer	
Stage 2: <b>Record/ Delegate</b>	<ul style="list-style-type: none"> <li>▪ When a grievance is identified, it is officially registered in a grievance log (see <b>Annex 1</b> a template of grievance log) and given a unique identification number.</li> <li>▪ It is categorized based on the type of complaint and its severity. Grievances are categorized into two categories:               <ol style="list-style-type: none"> <li>1. Low significance grievance, with characteristics:                   <ul style="list-style-type: none"> <li>• The complaints involve individual affected people only;</li> </ul> </li> </ol> </li> </ul>	Community Liaison Officer	3 days after the receipt of Grievance

Stage	Description	Responsibility	Timeline
	<ul style="list-style-type: none"> <li>• One-off grievance, less probability it will attract media attention; and</li> <li>• Does not require immediate intervention from managerial level</li> </ul> <p>2. High significance grievance, indicated by the following conditions:</p> <ul style="list-style-type: none"> <li>• The complaints involve a large group of affected people;</li> <li>• Has not been resolved during the time specified in this mechanism</li> <li>• Recurring and potentially affecting the Project activities schedule;</li> <li>• Potentially attracting media attention; and</li> <li>• Requiring immediate intervention from managerial level.</li> </ul> <ul style="list-style-type: none"> <li>▪ An initial response is sent to the person(s) who raised the grievance within six (6) working days, acknowledging their feedback and describing the next steps in the grievance process, time estimates for these steps and a contact person.</li> <li>▪ The issue will be delegated to relevant unit/ department to be followed up.</li> </ul>		
<p>Stage 3: <b>Fact Finding</b></p>	<ul style="list-style-type: none"> <li>▪ The Project will investigate grievances and their surroundings in a timely manner. Investigations may include photographs and other evidence, witness statements, interviews with affected stakeholders and other parties, review of site register, and other information gathering activities.</li> <li>▪ The results of the investigation will be reviewed and a resolution will be proposed. The development of the resolution may involve consultation with the person(s) involved. The proposed resolution will then be formally communicated to all parties.</li> </ul>	<p>Community Liaison Officer and Grievance Redress Officer</p>	<p>6 days</p>
<p>Stage 4: <b>Resolution or Appeal</b></p>	<ul style="list-style-type: none"> <li>▪ If the resolution is accepted by all parties, it will be documented, implemented and the grievance is closed.</li> <li>▪ If the resolution is not accepted, it will be reconsidered and the following resolution may be proposed: <ul style="list-style-type: none"> <li>○ If complainant is not satisfied with the proposed resolution either party resorts to a mediator / arbitrator;</li> <li>○ Mediator / Arbitrator then reviews the grievance and seeks resolution;</li> <li>○ Mediator / Arbitrator then propose resolution;</li> <li>○ If both parties are satisfied with the proposed resolution it will be</li> </ul> </li> </ul>	<p>Stakeholder Relations Lead and EHS&amp;S Manager</p>	<p>6 days</p>

Stage	Description	Responsibility	Timeline
	<p>documented, implemented and the grievance is closed;</p> <ul style="list-style-type: none"> <li>○ If both parties are not satisfied with the proposed resolution, then the complainant or Project will resort to the courts.</li> </ul>		
Stage 5: <b>Feedback/ Close out</b>	<ul style="list-style-type: none"> <li>▪ After the accepted resolution has been implemented, it will be monitored and its effectiveness will be evaluated. All parties will be notified that the resolution has been implemented and will have the opportunity to provide feedback on the grievance process and its implementation.</li> </ul>	Stakeholder Relation Lead and EHS&S Manager	15 days

## 7.2 *MONITORING AND REPORTING OF GRIEVANCE MECHANISM*

The Project will establish an internal monitoring process to monitor the effectiveness of the Grievance Mechanism. Internal monitoring will be undertaken on a quarterly basis / four times annually. The monitoring process is designed to identify areas of high performance and areas for improvement to enhance the process. The reporting of the Project Grievance Mechanism will be aligned and consistent with the ESIA and ESMP reporting.

The scopes of the monitoring include:

- Assessing the effectiveness of the grievance tracking and handling procedure;
- Identifying the need for organizational improvement in implementing the procedure;
- Evaluating the progress of resolution implementation and identify intervention needs from senior management to manage overdue / outstanding cases or recurring grievances; and
- Identifying the need for improvement of the procedure, should any significant changes in external factors occur, e.g. economic and political conditions which potentially encourage additional social risk and impact.

## 7.3 *DISCLOSURE OF GRIEVANCE MECHANISM*

The disclosure and communication of the project grievance mechanism will begin early in the Project lifecycle and continue on an on-going basis as grievances arise. These disclosure activities are currently being undertaken (Q1 2018). The process will be conducted in a culturally appropriate manner in the local language (the majority of the community residing around the Project site are able to speak Bahasa Indonesia fluently but the local Sundanese language is also spoken widely) and format that is understandable to the entire project affected peoples

The Project is currently disclosing the Grievance Mechanism following the recruitment of one community relations personnel. Following this the Project will continue consultation and disclosure activities with all the relevant stakeholders to

promote awareness of the Project Grievance Mechanism during the construction and operation phases of the Project.

In regard to disclosing the mechanism, the Project will undertake communication in group discussions, community meetings and through the Project's community liaison officers as well as by using posters and bill boards.

The following information will be disclosed:

- Who can raise complaints – focusing on affected communities;
- Where, when, and how community members can log complaints;
- Who is responsible for receiving and responding to complaints, and if any external parties can receive complaints from communities;
- What type of responses complainants can expect from the Project including timing of responses; and

The benefits that complainants can receive from using the grievance mechanism.

It is essential that the local government (and all contractors) also fully understand the mechanism to enable them to communicate the step-by-step process to the project affected people, particularly in the case where the grievances are submitted to them for resolution.

#### **7.4 *WORKER GRIEVANCE MECHANISM***

The Project will provide a grievance mechanism for workers to raise reasonable workplace concerns. The mechanism will involve an appropriate level of management and address concerns promptly, using an understandable and transparent process that provides feedback to those concerned, without any retribution.

The workers (including sub-contractors) will be informed of the grievance mechanism at the time of recruitment and provided refreshers on the process thereafter during their employment. Similar to the affected people's mechanism appropriate resources and budget should be allocated to address these matters in a transparent and understandable process that provides feedback to the workers without any retribution. The process should be anonymous and fair. Some guiding principles set out by the IFC include:

- The company will establish a transparent process for workers to express concerns and file grievances;
- There will be no retaliation or discrimination against those that express grievances
- Management will treat the grievances seriously and take appropriate action;
- The company's grievance mechanism does not replace other channels as defined by law or collective bargaining agreements.

The worker grievance mechanism will be established as part of the Project worker management plan.

## 8 MANAGEMENT FOR IMPLEMENTATION OF STAKEHOLDER ENGAGEMENT

### 8.1 DEDICATED RESOURCES FOR MANAGING THE SEP

The SEP (and grievance mechanism) will be effective if adequate resources – people, systems and processes, and associated financial resources – are assigned to implementation, and if responsibilities are clearly defined. Stakeholder engagement management should be recognized as a business function with clearly defined objectives, assigned responsibilities, timelines, budget, senior management oversight, and regular reporting.

Currently the Project is in the process of establishing Environmental, Social or Health and Safety (EHS&S) resources management to undertake the EHS&S activities including stakeholder engagement activities. However, it is understood there are personnel from the Project who have been actively conducting consultation with the government in order to provide initial information regarding the Project and as part of acquiring formal data for the development of regulatory EIA (AMDAL). The Project contractors for the land acquisition have been undertaking extensive consultation with the Project’s land owners whilst the Sponsors E&S advisors have been conducting a series of consultations associated with the AMDAL and ESIA. The Project Sponsor has identified two experienced local staff to take on these roles specifically the Grievance Redress Officer; they will conduct formal and informal community consultation activities/awareness raising events associated with the project and oversee and manage Project grievances.

In order to execute the plan throughout the project lifecycle the key organizational structure / function outline in **Table 8-1** will be considered in JSP’s organization.

*Table 8-1 Summarizes the Key Roles and Responsibilities that will be required to Implement the Stakeholder Engagement Plan*

No	Roles and Responsibilities
<b>EHS&amp;S Manager</b>	
1	Develop and endorse Social and Community related Policies
2	Liaise with government stakeholders
3	Plans, directs, manages, and coordinates community development program, projects, services, functions and activities
4	Monitor and report the Project’s Social performance on a regular basis to the Project Manager, and take action to address performance issues, as needed.
5	Develops, justifies, and manages the budget
<b>Stakeholder Relations</b>	
1	Lead collaboration with Project EPC Construction HSE Team to establish and implement the Project Grievance Mechanism for construction phase.
2	Ensure the social-related commitments in the HSE&S Policy are applied.
3	Manage the grievance mechanism monitoring and audit as required.

No	Roles and Responsibilities
4	Report to the Top Management and Lenders on social issues and grievance resolution implementation progress.
<b>Stakeholder Consultation &amp; Grievance Redress</b>	
1	To manage the implementation of the grievance mechanism as required.
2	To collaborate with other related units or departments and external parties (e.g. Contractors) in resolving grievances.
3	To coordinate the grievance team in preparing proper documentation of grievances and their resolution.
4	Lead the grievance mechanism monitoring and report to the Stakeholder Relations Lead and other relevant parties as required.
<b>Community Liaison</b>	
1	To observe the steps required in tracking and handling grievances.
2	To receive, record and log grievances properly as required.
3	Support the Grievance Redress officer in communicating with stakeholders and complainants.
4	Support Grievance Redress officer in coordinating with contractors and other related parties as requested.
5	To ensure proper documentation and database update of grievance and its resolution.
6	To prepare periodical grievance reporting.

These key roles and responsibilities will be employed to manage stakeholder engagement activities; with some roles concurrently undertaken by one officer.

## 8.2 *MONITORING AND TRACKING OF STAKEHOLDER ENGAGEMENT ACTIVITIES*

Monitoring the stakeholder engagement activities is important to ensure that consultation and disclosure efforts are effective, and in particular that stakeholders have been meaningfully consulted throughout the process. Monitoring also allows the Project to improve its strategies by using rigorous information acquired from the monitoring activities.

The Project under the ESIA will establish an Environmental and Social Management Plan (ESMP) that will be used as a platform to monitor the stakeholder engagement activities, particularly the following items:

- The implementation of this SEP;
- Consultation activities conducted with all groups of stakeholders;
- The effectiveness of the engagement processes in managing impacts and expectations by tracking feedback received from engagement activities; and
- All grievances received.

Performance will be reviewed regularly against the SEP by tracking the following indicators:

- Materials disseminated: type, frequency, and location;
- Place and time of formal engagement events and level of participation by specific stakeholder categories and groups;

- Number of comments by issue / topic and type of stakeholder, and details of feedback provided;
- Number and types of grievances and the nature and timing of their resolution;
- Recording and tracking commitments made to stakeholders; and
- Community attitudes and perceptions towards the Project based on media reports and stakeholder feedback.

### 8.3 *DATA GATHERING AND REPORTING*

#### 8.3.1 *Data Gathering and Tracking*

Stakeholder consultation activities conducted throughout all the phases of the Project and grievance submitted by any relevant external parties will need to be properly recorded and documented. This will enable the Project to track the consultation activities and to determine whether any issue or concern expressed by the stakeholder needs to be addressed and acted upon immediately. Particular to grievance management it will also provide factual information whether the grievances has been partially or fully settled. A stakeholder and grievance database is proposed (see **Annex 2** and **Annex 3**) which will need to be populated continuously by Project Stakeholder Consultation and Grievance Redress Officer or its relevant function for every stakeholder engagement activity has been conducted or after receiving any grievances from external parties

#### 8.3.2 *Reporting*

The Project will develop regular reports (typically quarterly during the construction and twice a year in operations) which are typically required by the Lenders to present all activities for the period and summarize raised issues. The report will also detail the measures taken to address the issues, timeline of responses, as well as corrective and mitigation measures to address grievances, and analysis of trends. The report will particularly highlight the following aspects:

- Total number of stakeholders engaged according to stakeholder category;
- Numbers of comments and queries received according by topic and responses given;
- Issues raised and levels of support for and opposition to the Project;
- Numbers of grievances logged; and
- Time to resolution of grievances.

Upon receipt of these reports, the lender may request improvements or corrective actions to be implemented to the consultation process or grievance mechanism approach or monitoring. As such this SEP must be regularly updated to reflect Project and stakeholder changes and therefore should be considered as a live document. The reporting on consultation activities during the pre-construction phase is to be included in the ESIA. Reporting requirements for latter stages will be specified and consistent with the ESMP.

*ANNEXES*

## Annex 1 Community Grievance Form

Grievance Form		
Date		
Reference Number		
Full Name (optional and can be left blank)		
ID Number (optional and can be left blank)		
Contact Information (optional and can be left blank)	Address	
	Postal Code	
	Phone	
	Email	
Content of Grievance or complaint	Classification	
	Significance	
	Description	
	Location	
Consent to disclose the grievance information to third parties		
Signature of complainant		
Received by	Name	
	Signature	
Status of grievance	Investigation	
	Resolution	
	Complainant feedback	
	Close out reporting	
Date for response to be submitted to the complainant		



*Annex 3 Stakeholder Engagement Database*

No	Date	Location	Project Staff in Attendance	Stakeholders Involved	Contact Persons / Organization	Meeting Summary / Key Issues Raised	Follow-Up Actions

**Annex 4**      *List of Stakeholders Consulted during ESIA development Phase*

No	Date	Name of Stakeholders	Position	Category	Village	Sub-District	Issue Raised by Stakeholders
1	09 August 2017	Iyos Rosita	Head of Village	District / Local Government	Muara	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Lack of project information</li> <li>• Local employment</li> <li>• CSR funding</li> <li>• Funding assistance on infrastructure development</li> </ul>
2	09 August 2017	Koeswandi	Head of Village	District / Local Government	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Lack of project socialization</li> <li>• Land acquisition</li> <li>• Local employment</li> </ul>
3	09 August 2017	Yahya Suleman	Head of Village	District / Local Government	Sumurgede	Cilamaya Kulon	<ul style="list-style-type: none"> <li>• Lack of project socialization</li> <li>• Funding assistance on small-medium enterprise and infrastructure development</li> <li>• Local employment</li> <li>• Training</li> </ul>
4	09 August 2017	Suwanda	Head of Village	District / Local Government	Jayanegara	Tempuran	<ul style="list-style-type: none"> <li>• Funding assistance on small-medium enterprise and infrastructure development</li> <li>• Local employment</li> <li>• Training</li> </ul>
5	09 August 2017	Endang	Head of Village	District / Local Government	Mulyajaya	Kutawaluya	<ul style="list-style-type: none"> <li>• Land Acquisition</li> </ul>
6	09 August 2017	Lili Suherman	Head of Village	District / Local Government	Kalangsuria	Rengasdengklok	<ul style="list-style-type: none"> <li>• Land Acquisition</li> </ul>
7	10 August 2017	Karsim	Head of Village	District / Local Government	Tegalurung	Cilamaya Kulon	<ul style="list-style-type: none"> <li>• Lack of project socialization</li> <li>• Land acquisition</li> <li>• Funding assistance on small-medium enterprise and infrastructure development</li> <li>• Local employment</li> <li>• Training</li> </ul>
8	10 August 2017	Ata Sutisna	Head of Village	District / Local Government	Pancakarya	Tempuran	<ul style="list-style-type: none"> <li>• Lack of project information</li> <li>• Land Acquisition</li> <li>• Funding assistance on small-medium enterprise and infrastructure development</li> <li>• Local employment</li> <li>• Training</li> </ul>

No	Date	Name of Stakeholders	Position	Category	Village	Sub-District	Issue Raised by Stakeholders
7	10 August 2017	Tarno	Head of Village	District / Local Government	Purwajaya	Tempuran	<ul style="list-style-type: none"> <li>Funding assistance on small-medium enterprise and infrastructure development</li> <li>Local employment</li> <li>Training</li> </ul>
8	11 August 2017	Olim	Head of Village	District / Local Government	Pegadungan	Tempuran	<ul style="list-style-type: none"> <li>Lack of project information</li> <li>Funding assistance on small-medium enterprise and infrastructure development</li> <li>Local employment</li> <li>Training</li> </ul>
9	12 August 2017	Maman Sukarman	Head of Village	District / Local Government	Lemahdudur	Tempuran	<ul style="list-style-type: none"> <li>Funding assistance on small-medium enterprise and infrastructure development</li> <li>Local employment</li> <li>Training</li> </ul>
10	14 August 2017	Suryadi	Head of Village	District / Local Government	Karangsatu	Karangbahagia	<ul style="list-style-type: none"> <li>Land Acquisition</li> <li>Local employment</li> </ul>
	14 August 2017	Engki	Head of Village	District / Local Government	Sukaraja	Rawamerta	<ul style="list-style-type: none"> <li>Land Acquisition</li> </ul>
11	15 August 2017	Sawa Isyarot	Head of Village	District / Local Government	Muktijaya	Cilamaya Kulon	<ul style="list-style-type: none"> <li>Lack of project information</li> <li>Funding assistance on small-medium enterprise and infrastructure development</li> <li>Local employment</li> <li>Training</li> </ul>
12	16 August 2017	Saman Masruki	Head of Village	District / Local Government	Sukatani	Cilamaya Wetan	<ul style="list-style-type: none"> <li>Local employment</li> <li>Land acquisition</li> <li>Community security</li> </ul>
13	16 August 2017	Umbara	Head of Village	District / Local Government	Karangsari	Cikarang Timur	<ul style="list-style-type: none"> <li>CSR funding</li> <li>Funding assistance on small-medium enterprise and infrastructure development</li> <li>Local employment</li> <li>Training</li> </ul>
14	18 August 2017	Sapin Hidayat	Head of Village	District / Local Government	Dayeuhluhur	Tempuran	<ul style="list-style-type: none"> <li>Lack of project information</li> <li>Funding assistance on small-medium enterprise and infrastructure development</li> <li>Local employment</li> </ul>

No	Date	Name of Stakeholders	Position	Category	Village	Sub-District	Issue Raised by Stakeholders
							<ul style="list-style-type: none"> <li>• Training</li> </ul>
15	15 August 2017	Rasit	Army (Babinsa)	Law Enforcement Agency	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Appointed security does not coordinate with local security</li> <li>• Local security is not involved</li> <li>• Unfairness security funding</li> </ul>
16	15 August 2017	Nurdin	Police (Kamtimnas)	Law Enforcement Agency	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Project will only add more burden to interviewee</li> </ul>
17	08 August 2017	Hadis	Community Leader (Teacher, Fish Auction Manager)		Muara	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Provide community development / CSR</li> </ul>
18	09 August 2017	Sehu Supomo	Teacher		Pasirrukem	Cilamaya Kulon	<ul style="list-style-type: none"> <li>• Education development</li> <li>• Support and funding assistance on small-medium enterprise, infrastructure and facilities</li> <li>• Environmental issue; dust</li> </ul>
19	10 August 2017	Ali	Village Secretary	District / Local Government	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Local contractor</li> <li>• Local employment</li> <li>• Land Acquisition</li> </ul>
20	12 August 2017	Dasam	Village Cooperative Secretary	District / Local Government	Blanakan	Blanakan	<ul style="list-style-type: none"> <li>• Fisherman welfare</li> <li>• Disruption on fisherman activity</li> </ul>
21	15 August 2017	Warsid	Village Secretary	District / Local Government	Muktijaya	Cilamaya Kulon	<ul style="list-style-type: none"> <li>• Lack of project information</li> </ul>
22	16 August 2017	Jaya Marjaya	Village Secretary	District / Local Government	Karangsari	Cikarang Timur	<ul style="list-style-type: none"> <li>• Lack of project information</li> <li>• Funding assistance on small-medium enterprise and infrastructure development</li> <li>• Local employment</li> <li>• Training</li> </ul>
23	08 August 2017	Didi Sukardi	Entrepreneur and Farmer		Manggung Jaya	Cilamaya Kulon	<ul style="list-style-type: none"> <li>• Funding assistance on small-medium enterprise and infrastructure development</li> <li>• Local employment</li> <li>• Training</li> </ul>
24	09 August 2017	Asep	Community Leader (Entrepreneur and Leader of Youth Organization)		Muara	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Lack of project information</li> <li>• Local employment</li> </ul>

No	Date	Name of Stakeholders	Position	Category	Village	Sub-District	Issue Raised by Stakeholders
25	11 August 2017	Agus Mae	Entrepreneur (Ex Pertamina land's cultivator)		Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>Lack of project information</li> <li>Land acquisition</li> </ul>
26	8 August 2017	Iman	Entrepreneur	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>Job opportunities</li> <li>Local employment</li> <li>CSR program</li> </ul>
	8 August 2017	Indah	Unemployed	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>Project's flare</li> <li>CSR program</li> </ul>
	8 August 2017	Mulyati	Entrepreneur	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>Village development</li> <li>CSR program</li> </ul>
	8 August 2017	Nur	Labor	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>Job opportunities</li> <li>Local employment</li> <li>CSR program</li> <li>Noise</li> <li>Dust</li> </ul>
	8 August 2017	Suki	Labor	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>Village development</li> <li>Job opportunities</li> <li>Local employment</li> <li>CSR program</li> </ul>
	9 August 2017	Asiah	Labor	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>Job opportunities</li> <li>Local employment</li> <li>CSR program</li> <li>Electrical supply</li> <li>Noise</li> <li>Breathless</li> </ul>
	9 August 2017	Cicih	Trader	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>Job opportunities</li> <li>Local employment</li> <li>CSR program</li> <li>Electrical supply</li> <li>Hot gas waste</li> </ul>
	9 August 2017	Mimin	Labor	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>Job opportunities</li> <li>Local employment</li> <li>CSR program</li> <li>Noise</li> <li>Flare</li> </ul>
	9 August 2017	Ade	Entrepreneur	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>Local employment</li> <li>CSR program</li> <li>Loss of income</li> </ul>

No	Date	Name of Stakeholders	Position	Category	Village	Sub-District	Issue Raised by Stakeholders
	9 August 2017	Komariah	Labor	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Job opportunities</li> <li>• Local employment</li> <li>• CSR program</li> <li>• Health issue</li> </ul>
	9 August 2017	Edah	Labor	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Job opportunities</li> <li>• Local employment</li> <li>• CSR program</li> <li>• Conflict of interest</li> </ul>
	10 August 2017	Ani	Labor	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Job opportunities</li> <li>• Local employment</li> <li>• CSR program</li> <li>• Noise</li> <li>• Hot weather</li> <li>• Windbreak</li> </ul>
	10 August 2017	Rawi	Fisherman	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Job opportunities</li> <li>• Local employment</li> <li>• CSR program</li> <li>• Noise</li> <li>• Dust</li> <li>• Hot weather</li> </ul>
	10 August 2017	Wariah	Fisherman	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Job opportunities</li> <li>• Local employment</li> <li>• CSR program</li> <li>• Wildfire</li> </ul>
	10 August 2017	Maya	Entrepreneur	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Job opportunities</li> <li>• Local employment</li> <li>• CSR program</li> <li>• Land acquisition</li> </ul>
	10 August 2017	Nurhayati	Labor	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Smoke</li> <li>• Gas waste</li> <li>• CSR program</li> </ul>
	10 August 2017	Mulyadi	Trader	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Job opportunities</li> <li>• Local employment</li> <li>• CSR program</li> <li>• Hot weather</li> <li>• Electrical short-circuit</li> </ul>
	10 August 2017	Erlina	Trader	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Village improvement</li> <li>• Wildfire (Safety issue)</li> </ul>

No	Date	Name of Stakeholders	Position	Category	Village	Sub-District	Issue Raised by Stakeholders
	11 August 2017	Yeyen	Fisherman	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Job opportunities</li> <li>• Local employment</li> <li>• CSR program</li> <li>• Pollution</li> <li>• Hot weather</li> <li>• Waste</li> <li>• Noise</li> <li>• Land acquisition</li> </ul>
	11 August 2017	Iis	Fishermen	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Job opportunities</li> <li>• Local employment</li> <li>• CSR program</li> <li>• Hot weather</li> <li>• Gas Waste</li> <li>• Noise</li> <li>• Smell</li> </ul>
	11 August 2017	Dasri	Employee	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Land acquisition</li> <li>• Local employment</li> <li>• CSR program</li> <li>• Noise</li> <li>• Accident</li> <li>• Flare</li> </ul>
	11 August 2017	Agus Mae	Unemployed	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Job opportunities</li> <li>• Local employment</li> <li>• CSR program</li> <li>• Noise</li> <li>• Waste</li> <li>• Fire</li> </ul>
	11 August 2017	Badriah	Labor	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Job opportunities</li> <li>• Local employment</li> <li>• CSR program</li> <li>• Noise</li> <li>• Dust</li> <li>• Fire</li> </ul>
	11 August 2017	Royah	Unemployed	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Village improvement</li> <li>• Wildfire</li> <li>• Loss of income</li> <li>• CSR program</li> </ul>
	11 August 2017	Neneng	Labor	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Job opportunities</li> <li>• Local employment</li> <li>• CSR program</li> </ul>

No	Date	Name of Stakeholders	Position	Category	Village	Sub-District	Issue Raised by Stakeholders
	13 August 2017	Atikah	Entrepreneur	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Job opportunities</li> <li>• Local employment</li> <li>• CSR program</li> <li>• Smoke</li> </ul>
	13 August 2017	Atikah	Entrepreneur	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Village improvement</li> <li>• Smoke</li> <li>• Air pollution</li> <li>• CSR program</li> </ul>
	13 August 2017	Tutun	Entrepreneur	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Job opportunities</li> <li>• Local employment</li> <li>• CSR program</li> <li>• Fire</li> </ul>
	13 August 2017	Alex	Fisherman	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Job opportunities</li> <li>• Local employment</li> <li>• CSR program</li> <li>• Polluted gas</li> </ul>
	13 August 2017	Wahyudi	Entrepreneur	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Job opportunities</li> <li>• Local employment</li> <li>• CSR program</li> </ul>
	14 August 2017	Ipen	Entrepreneur	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Village improvement</li> <li>• CSR program</li> </ul>
	14 August 2017	Dacih	Entrepreneur	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• CSR program</li> </ul>
	14 August 2017	Nining	Unemployed	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Job opportunities</li> <li>• Local employment</li> <li>• CSR program</li> </ul>
	14 August 2017	Imas	Unemployed	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Job opportunities</li> <li>• Local employment</li> <li>• CSR program</li> </ul>
	14 August 2017	Anesah	Entrepreneur	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Job opportunities</li> <li>• Local employment</li> <li>• CSR program</li> <li>• Flare</li> <li>• Hot weather</li> </ul>
	14 August 2017	Carsih	Entrepreneur	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Job opportunities</li> <li>• Local employment</li> <li>• CSR program</li> <li>• Flare</li> <li>• Hot weather</li> </ul>

No	Date	Name of Stakeholders	Position	Category	Village	Sub-District	Issue Raised by Stakeholders
	14 August 2017	Rasti	Labor	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Job opportunities</li> <li>• Local employment</li> <li>• CSR program</li> <li>• Flooding</li> </ul>
	14 August 2017	Ida	Unemployed	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Job opportunities</li> <li>• Local employment</li> <li>• CSR program</li> </ul>
	14 August 2017	Miyati	Labor	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Lower electrical price</li> <li>• CSR program</li> </ul>
	14 August 2017	Nita	Unemployed	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Job opportunities</li> <li>• Local employment</li> <li>• CSR program</li> </ul>
	15 August 2017	Adik Maulana Yusuf	Unemployed	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Job opportunities</li> <li>• Local employment</li> <li>• CSR program</li> <li>• Human resource improvement; education, training, and health</li> <li>• Disturbance</li> <li>• Road blockade</li> </ul>
	15 August 2017	Isah	Unemployed	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Job opportunities</li> <li>• Local employment</li> <li>• CSR program</li> <li>• Land acquisition</li> <li>• Fire</li> <li>• Smell</li> <li>• Gas leaking</li> </ul>
	15 August 2017	Euis	Unemployed	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Job opportunities</li> <li>• Local employment</li> <li>• CSR program</li> <li>• Land acquisition</li> <li>• Fire</li> <li>• Dust</li> <li>• Noise</li> </ul>
	15 August 2017	Yeti	Entrepreneur	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Job opportunities</li> <li>• Local employment</li> <li>• CSR program</li> <li>• Land acquisition</li> </ul>
	15 August 2017	Maya	Unemployed	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Job opportunities</li> <li>• Local employment</li> </ul>

No	Date	Name of Stakeholders	Position	Category	Village	Sub-District	Issue Raised by Stakeholders
							<ul style="list-style-type: none"> <li>• CSR program</li> <li>• Land acquisition</li> </ul>
	15 August 2017	Nawang		Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Infrastructure development</li> <li>• Health facilities</li> <li>• Radiation</li> <li>• CSR program</li> </ul>
	15 August 2017	Tarini	Unemployed	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Job opportunities</li> <li>• Local employment</li> <li>• CSR program</li> <li>• Land acquisition</li> </ul>
	15 August 2017	Warsih	Unemployed	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Job opportunities</li> <li>• Local employment</li> <li>• CSR program</li> <li>• Noise</li> <li>• Dust</li> </ul>
	15 August 2017	Elin	Unemployed	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Job opportunities</li> <li>• Local employment</li> <li>• CSR program</li> <li>• Road blockade</li> </ul>
	15 August 2017	Iti	Unemployed	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Job opportunities</li> <li>• Local employment</li> <li>• CSR program</li> <li>• Land acquisition</li> </ul>
	15 August 2017	Kapsah	Unemployed	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Village improvement</li> <li>• CSR program</li> </ul>
	15 August 2017	Rahayu	Entrepreneur	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Job opportunities</li> <li>• Local employment</li> <li>• CSR program</li> <li>• Noise</li> </ul>
	15 August 2017	Kaban	Farmer	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Road disruption</li> </ul>
	15 August 2017	Wati	Employee	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Village improvement</li> <li>• Road blockade</li> <li>• CSR program</li> </ul>
	08 August 2017	Melinda Fransiska	Entrepreneur	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Village improvement</li> <li>• Infrastructure development</li> <li>• Health facilities</li> <li>• Job opportunities</li> <li>• CSR program</li> </ul>

No	Date	Name of Stakeholders	Position	Category	Village	Sub-District	Issue Raised by Stakeholders
	08 August 2017	Sri Rohayati	Labor	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>Village improvement</li> <li>Job opportunities</li> <li>Local employment</li> <li>Accident</li> </ul>
	08 August 2017	Puspa Rini	Labor	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>Village improvement</li> <li>Land acquisition</li> </ul>
	08 August 2017	Adkoni	Employee	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>Village improvement</li> <li>Job opportunities</li> <li>Local employment</li> <li>CSR program</li> </ul>
	08 August 2017	Imah	Labor	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>Village improvement</li> <li>Job opportunities</li> <li>Local employment</li> <li>CSR program</li> <li>Accident</li> <li>Fire</li> </ul>
	09 August 2017	Sri Lestari	Labor	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>Job opportunities</li> <li>Local employment</li> <li>CSR program</li> </ul>
	09 August 2017	Resem	Labor	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>Job opportunities</li> <li>Local employment</li> <li>CSR program</li> <li>Fire</li> </ul>
	09 August 2017	Rusminah	Labor	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>Job opportunities</li> <li>Local employment</li> <li>CSR program</li> <li>Accident</li> <li>Fire</li> </ul>
	09 August 2017	Eli	Unemployed	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>Safety issue</li> <li>Security</li> <li>Noise</li> </ul>
	09 August 2017	Desi	Labor	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>Land acquisition</li> <li>CSR program</li> </ul>
	09 August 2017	Ida	Labor	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>Explosion</li> <li>Waste</li> <li>Smoke</li> <li>Hot weather</li> </ul>
	10 August 2017	Agus Saleh	Labor	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>Hot weather</li> </ul>

No	Date	Name of Stakeholders	Position	Category	Village	Sub-District	Issue Raised by Stakeholders
							<ul style="list-style-type: none"> <li>• Land acquisition</li> <li>• CSR program</li> </ul>
	10 August 2017	Rohimah	Unemployed	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Land acquisition</li> <li>• CSR program</li> </ul>
	10 August 2017	Tuti	Unemployed	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Job opportunities</li> <li>• Local employment</li> <li>• CSR program</li> <li>• Hot weather</li> <li>• No wind</li> <li>• Land acquisition</li> </ul>
	10 August 2017	Yani	Labor	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Village improvement</li> <li>• Land acquisition</li> <li>• CSR program</li> </ul>
	10 August 2017	NA. Titin	Employee	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Job opportunities</li> <li>• Local employment</li> <li>• CSR program</li> <li>• Land acquisition</li> </ul>
	10 August 2017	Sutrisno	Entrepreneur	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Village improvement</li> <li>• CSR program</li> </ul>
	10 August 2017	Fia	Entrepreneur	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Hot weather</li> <li>• CSR program</li> </ul>
	11 August 2017	Agus Muharram	Labor	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Village improvement</li> <li>• Land acquisition</li> <li>• Electrical induction</li> <li>• Health issue</li> <li>• Noise</li> <li>• CSR program</li> </ul>
	11 August 2017	Udi Mashudi	Labor	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Land acquisition</li> <li>• Noise</li> <li>• Smell</li> <li>• CSR program</li> </ul>
	11 August 2017	Ulyana	Labor and Trader	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Job opportunities</li> <li>• Local employment</li> <li>• CSR program</li> </ul>
	11 August 2017	Juniah	Labor	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Job opportunities</li> <li>• Local employment</li> <li>• CSR program</li> <li>• Arid</li> </ul>

No	Date	Name of Stakeholders	Position	Category	Village	Sub-District	Issue Raised by Stakeholders
							<ul style="list-style-type: none"> <li>• Explosion</li> <li>• Smell</li> </ul>
	11 August 2017	Sukarsih	Labor	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Job opportunities</li> <li>• Local employment</li> <li>• CSR program</li> <li>• Gas issue</li> </ul>
x	11 August 2017	Nuraini	Trader	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>•</li> </ul>
	11 August 2017	Inah	Labor	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Village improvement</li> <li>• Wildfire</li> <li>• CSR program</li> </ul>
	11 August 2017	Inem	Labor	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Land acquisition</li> <li>• Job opportunities</li> <li>• Local employment</li> </ul>
	13 August 2017	Aa Syafrudin	Entrepreneur	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Radiation</li> <li>• Gas leaking</li> </ul>
	13 August 2017	Akip Juarya	Entrepreneur	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Village improvement</li> <li>• Explosion</li> <li>• CSR program</li> </ul>
	13 August 2017	Lukman	Entrepreneur	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Village improvement</li> <li>• Low electrical price</li> <li>• Waste</li> <li>• CSR program</li> </ul>
	13 August 2017	Siti Jamilah	Entrepreneur	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Village improvement</li> <li>• Job opportunities</li> <li>• Local employment</li> <li>• CSR program</li> </ul>
	14 August 2017	Yati	Unemployed	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Job opportunities</li> <li>• Local employment</li> <li>• CSR program</li> </ul>
	14 August 2017	Ropi	Labor	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Village improvement</li> <li>• Explosion</li> <li>• CSR program</li> </ul>
	14 August 2017	Sakur	Farmer	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Village improvement</li> <li>• CSR program</li> </ul>
	14 August 2017	Anan Burhanudin	Labor	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>• Job opportunities</li> <li>• Local employment</li> <li>• CSR program</li> </ul>

No	Date	Name of Stakeholders	Position	Category	Village	Sub-District	Issue Raised by Stakeholders
							<ul style="list-style-type: none"> <li>Gas leaking</li> <li>Project socialization</li> </ul>
	14 August 2017	Suhirin	Trader	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>Village improvement</li> <li>Job opportunities</li> <li>Local employment</li> <li>Wildfire</li> </ul>
	14 August 2017	Endik	Labor	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>Village improvement</li> <li>Job opportunities</li> <li>Local employment</li> <li>Wildfire</li> <li>CSR program</li> </ul>
x	14 August 2017	Warsih	Labor	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li></li> </ul>
	14 August 2017	Nanis	Unemployed	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li></li> </ul>
	14 August 2017	Rohimah	Unemployed	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li></li> </ul>
	14 August 2017	Patoni	Entrepreneur	Community Leader	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>Job opportunities</li> <li>Local employment</li> <li>CSR program</li> </ul>
	14 August 2017	Dani	Labor and Entrepreneur	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>CSR program</li> </ul>
	14 August 2017	M Toha Paroga	Unemployed	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>Job opportunities</li> <li>Local employment</li> <li>CSR program</li> </ul>
	14 August 2017	Acim	Labor	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>CSR program</li> </ul>
	14 August 2017	Tarwan	Labor	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>Job opportunities</li> <li>Local employment</li> <li>CSR program</li> </ul>
	14 August 2017	Maya	Labor	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>CSR program</li> </ul>
	14 August 2017	Aditya	Labor	Host Community	Cilamaya	Cilamaya Wetan	<ul style="list-style-type: none"> <li>CSR program</li> </ul>

*Annex 5 Stakeholder Feedback Database*

<b>Date and Location</b>	<b>Activities</b>	<b>Stakeholder Involved</b>	<b>Key Message Delivered</b>	<b>Issues Raised by Stakeholder</b>	<b>Project Response to Address Issue Raised by Stakeholder</b>	<b>Project PIC</b>

**Annex 6 Stakeholder Feedback Form**

Stakeholder Feedback Form		
Date		
Reference Number		
Full Name (optional and can be left blank)		
ID Number (optional and can be left blank)		
Contact Information (optional and can be left blank)	Address	
	Postal Code	
	Phone	
	Email	
Key Message Delivered by the Project		
Feedback / Issue Raised by Stakeholder		
Project Response to Address Feedback		
Received by Project Person in Charge	Name	
	Signature	

*Annex 7 Minutes of Meeting of Community Consultation Undertaken by the Project related to Compensation Scheme of Transmission Line Open Area / Space.*

**NOTULENSI**

Kegiatan : Sosialisasi Kompensasi Ruang Bebas  
Tanggal : Selasa 30 Januari 2018  
Lokasi : Desa Cilamaya Kec. Cilamaya Wetan Kab. Karawang  
Peserta : 1. Camat Kecamatan Cilamaya Wetan (Hamdani)  
2. Polsek Cilamaya Wetan (Dadang. G)  
3. Danramil Cilamaya Wetan (Sukirno)  
4. Kepala Desa Cilamaya (Kusnadi)  
5. Warga pemilik lahan di dalam ROW

**Materi sosialisasi**

Kegiatan sosialisasi kompensasi ruang kosong dihadiri oleh Camat Cilamaya Wetan (Hamdani), Kapolsek Cilamaya Wetan (Dadang.G), DANRAMIL Cilamaya Wetan (Sukirno) dan Kepala DEsa Cilamaya (Kusnadi).

Camat Kecamatan Cilamaya Wetan (Hamdani)

- Pada waktu kontruksi diharapkan tidak berbarengan saat disawah ada tanaman apalagi tanaman padi sudah mulai mengisi siap dipanen, walaupun harus dilakukan kegiatan kontruksi harus dilakukan musyawarah dengan pemilik lahan disekitar lahan yang sudah dibebaskan.
- Koordinasi dengan pihak desa dan kecamatan harus dilakukan sebelum dilakukan kontruksi
- Berdayakan tenaga kerja local sesuai dengan kemampuan dan keahliannya

Kapolsek Cilamaya Wetan (Dadang. G)

- Sangat mendukung kelancaran pembangunan PLTGU yang merupakan program pemerintah
- Siap berperan sebagai pengamanan saat mobilisasi alat-alat saai kontruksi bila diperlukan
- Bersama warga siap menjaga KAMTIBMAS

DANRAMIL Cilamaya Wetan (Sukurno)

- Semua harus mendukunga program pemerintah
- Siap bersama seluruh elemen masyarakat, kepolisian dan pihak pengembang untuk menjaga KAMTIBMAS

Tanya Jawab/Harapan/Kekhawatiran :

*Kosasih (tokoh masyarakat/petani)*

Harapan :

- Untuk perhitungan harga kompensasi seharusnya mengacu pada harga lahan yang sudah dibebaskan

Kekhawatiran:

- Nilai jual tanah yang terlintasi jalur/ROW/ruang kosong akan menurun.
- Dampak radiasi medan magnet dan medan listrik dari SUTET terhadap kesehatan manusia

Pertanyaan :

- Apa tindak lanjut dari sosialisasi dalam waktu dekat ini ?

*Sujana (IPTD Pertanian Cilamaya Wetan)*

Kekhawatiran :

- Rusaknya sarana jalan desa dan jalan kecamatan pada saat mobilisasi alat berat .
- Rusaknya lahan pertanian/sawah pada saat konstruksi.
- Masalah social yang akan timbul ketika banyak pendatang terutama pekerja proyek PLTGU baik orang luar negeri maupun dari dalam negeri.

Harapan :

- Harus ada sosialisasi atau pemberitahuan sebelum dilakukannya konstruksi.
- Berdayakan tenakankerja local karawang terutama Cilamaya sesuai dengan kemampuannya.
- Pengembang harus mengantisipasi masalah social yang ditimbulkan karena banyak pekerja dari luar daerah

**Kesimpulan**

- Isu yang diangkat/didiskusikan  
Kekhawatiran akan dampak social dan jalan rusak yang ditimbulkan saat pekerjaan konstruksi berlangsung
  - Responden dari sponsor  
Ketika pekerjaan konstruksi akan dilaksanakan, kontraktor akan melakukan sosialisasi ke desa dengan mengundang bapak ibu sekalian untuk meminta izin sekaligus membicarakan kesepakatan kompensasi atau ganti kerugian jika ada kerusakan terhadap tanaman warga dan berkoordinasi dengan instansi terkait dalam penggunaan akses jalan dan keamanan.
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## NOTULENSI

Kegiatan : Sosialisasi Kompensasi Ruang Bebas  
Tanggal : Selasa, 6 Februari 2018  
Lokasi : Desa Sukaratu Kec. Cilebar Kab. Karawang  
Peserta : 1. Camat Cilebar (A. Kartiwa)  
2. Kapolsek Pedes (Much Sutusna)  
3. Kepala desa Sukaratu (Sukanda)

### Materi sosialisasi

Camat Kecamatan Cilebar (A. Kartiwa)

Pada kesempatan hari ini kita dapat berkumpul di Aula desa Sukaratu merupakan anugrah karena bertepatan hari ini adalah hari pertama saya bertugas di kecamatan Cilebar. Dalam kegiatan ini juga menjadi kesempatan saya untuk memperkenalkan diri kepada bapak-ibu sekalian dan mohon bantuan serta dukungannya untuk dapat membangun kecamatan Cilebar, karena masih banyak pekerjaan yang harus kita lakukan bersama terutama pada musim hujan sekarang banyak sawah yang terkena banjir dan itu harus kita lihat bersama apa penyebabnya. Saya juga meminta kepada pihak PT. JSP untuk dapat menjelaskan runutan proyek dari awal kegiatan, apakah sudah ada pertemuan sebelumnya dan proses hingga saat ini sampai mana. Seperti yang saya belum ketahui bahwa di kecamatan Cilebar ini akan terlewati jalur SUTET, apakah hanya desa Sukaratu saja atau ada desa yang lainnya mohon dijelaskan dan diinformasikan kepada saya. Pada prinsipnya ;kami dari pihak pemerintahan Kecamatan mendukung program ini apalagi telah menjadi program pemerintah pusat.

Kapolsek Pedes (Much Sutusna)

Alhamdulillah saya bisa hadir dalam kegiatan sosialisasi ini, pada sekitaran bulan maret 2017 lalu saya juga pernah diundang untuk mengikuti kegiatan sosialisasi proyek PLTGU ini di kecamatan Tempuran mungkin waktu itu hanya semacam pemberitahuan awan bahwa akan ada kegiatan pembangunan PLTUG dan SUTET. Sebagai mana kita ketahui bahwa SUTET adalah aliran tegangan tinggi pada kesempatan ini mohon juga dijelaskan bagaimana dampak atau bahaya yang ditimbulkan terhadap kesehatan manusia.

Kepala desa Sukaratu (Sukanda)

Pada sosialisasi awal di kecamatan Tempuran, informasi yang kami dapat bahwa ada 3 perusahaan yang akan menangani kegiatan pembangunan PLTGU dan SUTET yaitu perusahaan yang membebaskan tanah, perusahaan untuk penyusunan AMDAL dan perusahaan untuk konstruksi. Mungkin prosesnya sampai saat ini baru perusahaan untuk penyusunan AMDAL dan untuk Pembebasan lahan yang sudah turun. Dalam kesempatan ini saya sengaja

mengundang bapak-ibu yang lahan sawahnya terlintasi jalur kabel SUTET, diharapkan selain penjelasan tentang kompensasi juga dijelaskan apasaja dampaknya terhadap kesehatan manusia.

Penyampaian materi sosialisasi oleh tim dari Kwarsa (materi terlampir)

### **Tanya jawab**

#### 1. Wasim BPD

Tanya : Bagaimana pemberian kompensasinya apabila tanah atau lahan sawah yang belum AJB ?

Jawab : ditambahkan dengan surat keterangan dari desa yang menyatakan calon penerima adalah pemilik yang sah

Tanya : Tadi bapak narasumber hanya menjelaskan yang 500 KV tetapi tidak menjelaskan yang tegangan 1.760 MW, bagaimana dampaknya terhadap petani yang bekerja di dawahnya ?

Jawab : perlu bapak-ibu ketahui bahwa 500 KV dengan 1.760 MW itu adalah hal yang berbeda. 1.760 MW itu adalah satuan daya listrik yang dihasilkan oleh pembangkit PLTGU yang di Cilamaya, sedangkan 500 KV adalah satuan tegangan yang dialirkan melalui kabel SUTET.

#### 2. Atim (pemilik lahan)

Tanya : Bagaimana jika lahannya adalah warisan yang belum ada surat pelimpahan hak, sedangkan pemberi warisnya sudah meninggal ?

Jawab : Dilampirkan surat keterangan dari desa saja, nanti ada runutan sejarah kepemilikan lahan yang dimiliki oleh desa dan disahkan oleh kepala desa.

#### 3. Wasim BPD

Tanya : Apakah perhitungan nilai kompensasi berdasarkan yang tertera di NJOP atau nilai jual pasaran saat ini ?

Jawab : merunut dari peraturan yang ada tentunya menggunakan harga pasaran saat ini.

#### 4. Kepala desa (Sukanda)

Tanya : Setelah SUTET dioperasikan, jika ada kejadian putus kabel atau gagal kontruksi siapa yang bertanggung jawab atas kerugian warga ?

Jawab : saat masa kontruksi berlangsung tentunya yang akan bertanggungjawab adalah pengembang dalam hal ini PT. JSP dan Kontraktor yang bekerja, sedang setelah beroperasi tentunya pemerintah melalui PLN yang akan bertanggungjawab.

Tanya : Kapan akan dibayarkan kompensasinya :

Jawab : saat ini kita baru memasuki tahap pengukuran dan verifikasi, kalau tidak ada halangan dan proses pengumpulan surat-surat lancar kami berharap di bulan April kompensasi sudah dapat dibayarkan

### **Kesimpulan**

- Isu yang diangkat/didiskusikan  
Pertanyaan dari warga lebih terfokus pada masalah kompensasi baik untuk ruang bebas maupun pada saat pelaksanaan pekerjaan kontruksi hingga operasionalnya nanti.
- Respon dari sponsor  
Narasumber menjelaskan berdasarkan materi sosialisasi

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## NOTULENSI

Kegiatan : Sosialisasi Kompensasi Ruang Bebas  
Tanggal : Senin, 5 Februari 2018  
Lokasi : Desa Sindangsari Kec. Kutawaluya Kab. Karawang  
Peserta : 1. Sekcam Kecamatan Kutawaluya (H. Agus Sanusi)  
2. Polsek Kutawaluya (Supanri)  
3. Danposramil Kutawaluya (Jagurdin)  
4. Kepala desa Sindangsari (H. Kaning)

### Materi sosialisasi

*Sosialisasi kompensasi ruang bebas di desa Sindangsari Kecamatan Kutawaluya – Karawang*

Sosialisasi di desa Sindangsari dihadiri oleh Sekcam kecamatan Kutawaluya, perwakilan dari Polsek Kutawaluya, Danposramil Kutawaluya, Kepala desa Sindangsari beserta jajarannya.

- Sekcam Kecamatan Kutawaluya ( H. Agus Sanusi )  
Kecamatan Kutawaluya hanya 4 desa yang terlintasi jalur SUTET, desa Sindangsari, Sampalan, Waluya dan Mulyajaya. Pembangunan PLTGU dan SUTET ini adalah salah satu program pemerintah yang harus kita dukung bersama demi kepentingan kita bersama juga tentunya, apalagi hasil dari listriknya untuk menyuplai kebutuhan listrik Jawa-Bali atrinya untuk kebutuhan listrik kita semua termasuk bapak dan ibu yang hadir disini. Dalam kesempatan sosialisasi ini saya harapkan bapak ibu sekalian dapat menyimak dan memahami apa saja yang akan disampaikan oleh nara sumber, dan nantinya pada sesi Tanya jawab diharapkan bapak ibi sekalian dapat bertanya sebanyak mungkin hingga jelas dan tidak ada lagi uneg-uneg sesampainya dirumah natinya.
- Perwakilan Polsek Kutawaluya (Supanri )  
Dengan adanya proyek PLTGU dan SUTET ini tentunya akan berdampak pada kamtibmas, kami dari pihak kepolisian mendukung program pemerintah dibidang pengamanan. Kegiatan ini sangat penting bagi kita semua untuk mendapatkan informasi seluas-luasnya baik tentang proyeknya ataupun tentang kompensasi yang akan diberikan sebagai hak bapak-ibu sekalian. Seperti yang telah disampaikan oleh pak seccam tadi mohon bapak-ibu memahami dan jika ada kekurangannya harap dimaklum. Bertanyalah jika tidak jelas jangan sampai nanti ada pembicaraan yang tidak baik dibelakang hari kemudian.
- Danposramil Kutawaluya (Jagurdin)  
Dengan adanya proyek SUTET ini kita tetap harus waspada, waspada dan waspada. Artinya waspada akan dampak yang akan ditimbulkan baik terhadap kesehatan maupun dampak social nantinya ketika perkerjaan dimulai. Namun demikian kita semua harus mendukung program pemerintah yang merupakan program strategis pembangunan.

Pada kegiatan sosialisasi ini bapak-ibu sekalian harus bertanya sejelas-jelasnya biar mengerti dan faham dengan kegiatan ini.

- Kepala desa Sindangsari ( H. Kaning )  
Terimakasih kepada bapak-ibu sekalian yang hadir memenuhi undangan dari kami selaku kepala desa, sengaja yang diundang pada kesempatan ini adalah para pemilikan lahan yang terkena jalur SUTET. Kami selaku kepala desa dan pemerintahan desa hanya sebagai fasilitator, memfasilitasi pertemuan antara pengembang PT. JSP dengan warga untuk kegiatan sosialisasi ini. Selanjutnya nanti selahkan bapak-ibu sekalian mengikutu kegiatan dan mendengarkan serta menahami apa yang akan disampaikan oleh narasumber nantinya.

Materi sosialisasi disampaikan oleh pak Apip tim sosialisasi kompensasi ruang bebas ( Kwarsa)

### **Tanya jawab:**

#### 1. Bapak Warna

Tanya : Bagaimana jika ada kerusakan terhadap tanaman saat nantinya pekerjaan kontruksi berlangsung dan siapa yang akan bertanggungjawab ?

Jawab : bapak-ibu sekalian, kami dari PT. JSP akan meminta kepada kontraktor bila nantinya akan memulai pekerjaan kontruksi harus melakukan sosialisasi dahulu dan membicarakan hal-hal yang mungkin akan terjadi dengan warga desa. Dan bilamana nanti terjadi kerusakan tentunya kontraktor akan mengganti kerusakan tersebut tentunya atas dasar musyawarah dan mufakat.

#### 2. Bapak H. Surdi

Tanya : Apakah ada perbedaan harga antara tanah yang sudah memiliki SHM dengan dengan yang belum SHM dalam hal pembayaran kompensasi ?

Jawab : Tidak ada, perbedaan harga bukan dilihat dari surat-surat tanahnya melainkan dilihat dari produktivitas dan kelas tanahnya.

#### 3. Bapak Ursid

Tanya : Apakah penggarap juga mendapatkan kompensasi ?

Jawab : Kompensasi hanya diberikan kepada pemilik tanah yang sah atau yang memiliki surat-suratnya, namun dapat dititipkan kepada penggarap apabila pemiliknya jauh berada diluar kota tentunya dengan surat kuasa yang diketahui oleh kepala desa.

#### 4. Ibu Nur

Tanya : Dimana kompensasi dibayarkan dan kapan ?

Jawab : nanti kita sepakati dengan pihak desa apakah akan dibayarkan di kantor desa atau di dusun masing-masing agar tidak terlalu jauh bila ke kantor desa. Masalah kapan waktunya semua tergantung dari bapak ibu sekalian, semakin cepat syarat-syarat atau data kepemilikan dikumpulkan tentunya dapat mempercepat proses. Jika semuanya lancar sekitar bulan April kompensasi dapat dibayarkan.

## Kesimpulan

- Isu yang diangkat/ didiskusikan  
Warga lebih antusias ketika menanyakan besaran kompensasi yang akan diberikan, besaran 15% dari harga pasar masih menjadi pokok pembahasan, karena warga menginginkan lebih.
  - Respon dari sponsor  
Narasumber menjelaskan kepada warga mengacu pada Permen ESDM no 38 tahun 2013, bahwa besaran kompensasi yang sudah diatur adalah 15%.
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## NOTULENSI

Kegiatan : Sosialisasi Kompensasi Ruang Bebas  
Tanggal : 8 Februari 2018  
Lokasi : Kantor Desa Waluya Kec. Kutawaluya Kab. Karawang  
Peserta : 1. Camat Kutawaluya (Saryadi)  
2. Danpospol Kutawaluya (Supandi)  
3. Kepala Desa Waluya (Hermansyah)  
4. Warga pemilik lahan dalam ROW

### Materi sosialisasi

Camat Kecamatan Kutawaluya (Saryadi)

Kami dari pemerintahan kecamatan mengucapkan terimakasih kepada bapak-bapak sekalian yang hadir di kantor desa Waluya ini, tidak hanya warga desa Waluya yang hadir tetapi juga dari desa tetangga dan dari karawang tetapi yang pasti bahwa yang diundang pada kesempatan ini adalah warga yang tanah atau lahannya terlintasi jalur SUTET.

Danpospol Kutawaluya (Supandi)

Permohonan maaf dari bapak Kapolsek karena tidak bisa hadir dalam kegiatan sosialisasi ini dikarenakan ada hal yang tidak bisa ditinggalkan dan diwakilkan. Pesan beliau semoga apa yang direncanakan dan dikerjakan oleh pemerintah melalui PT. JSP dapat berjalan dengan lancar. Kami dari pihak kepolisian tentunya sangat mendukung program pemerintah ini dan siap mendukung dalam bidang keamanan. Dalam hal ini saya juga meminta kepada warga sekalian untuk dapat bertanya seluas-luasnya nanti dalam sesi Tanya jawab agar jelas dan tidak ada uneg-uneg saat nanti dirumah.

Kepaladesa Waluya (Hermansyah)

Terimakasih kepada bapak-bapak sekalian yang telah hadir memenuhi undangan dari PT. JSP, kami dari pihak desa hanya sebatas memfasilitasi seadanya dan sekemampuan kami. Kami dari pemerintahan desa meminta kepada PT. JSP untuk dapat memberikan penjelasan yang lengkap kepada warga kami terkait kegiatan sosialisasi kompensasi ruang hampa hari ini, dan kami selaku pemerintahan desa tentunya juga seiring dengan dari pihak pemerintahan Kecamatan dan kepolisian akan mendukung program pemerintah.

## Tanya jawab

### 1. Agus

Tanya : Tolong jelaskan kembali perhitungan nilai kompensasi ?

Jawab : nilai kompensasi menurut Permen ESDM no. 38 tahun 2013 bahwa ketentuannya 15% dari harga pasar. Dalam perhitungan kompensasi yang akan dilaksanakan nanti ada 3 objek yang mendapatkan kompensasi dengan perhitungan ; untuk tanah  $15\% \times \text{Luas tanah} \times \text{Harga pasar}$ , untuk bangunan  $15\% \times \text{Luas bangunan} \times \text{Harga pasar}$  dan untuk tanaman  $\text{Jenis tanaman} \times \text{harga pasar}$ .

Tanya : Kenapa pemerintah menentukan besaran 15% ? dan siapa yang menentukan harga pasar ? karena dengan 15% artinya kompensasi yang kami terima kecil sekali.

Jawab : Kalau bapak tanya kepada kami tentunya kami tidak bisa menjawab kenapa pemerintah menentukan besaran 15%, tetapi jika dibandingkan dengan proyek pemerintah yang lalu itu hanya diberikan sesuai dengan NJOP kalau untuk kompensasi saat ini ditentukan senilai harga pasar yang sudah survey, dikaji, dianalisa dan ditetapkan berdasarkan wilayah masing-masing yang saat ini sudah tinggi

Usulan : Menurut kami nilai 15% dari harga pasar itu masih sangat kecil, kami akan musyawarah dan nantinya besarnya akan kami sampaikan kepada pihak pengembang.

### 2. H. Uun

### 3. Endang

## Kesimpulan

- Pertanyaan warga pemilik lahan dalam ROW lebih banyak masalah harga atau besaran nilai kompensasi yang akan diterima, karena warga belum bisa menerima jika perhitungan nilai kompensasi  $15\% \times L_t \times H_p$ . ekspektasi warga tentang harga kompensasi sangat tinggi lebih dari 15% dari harga pasar, warga juga mengusulkan nilai pasar setiap lahan disamakan besarnya.
- Tanggapan dari tim sosialisasi : Nilai 15% dari harga pasar tersebut bukan kami yang menentukan bukan juga KJPP, tetapi pemerintah melalui Permen ESDM no. 38 tahun 2013. Dalam penentuan harga pasar KJPP melakukan survey ke lapangan menanyakan langsung ke masyarakat di setiap wilayah yang terlintasi jalur SUTET, kami yakin KJPP bekerja dengan sangat profesional dan tidak akan merugikan masyarakat.

Namun demikian jika bapak-bapak masih belum bisa atau tidak menerima kompensasi ketika nantinya dilakukan pembayaran, menurut ketentuan peraturan pemerintah melalui permen ESDM no. 38 tahun 2013 uang tersebut kami titipkan di pengadilan negeri setempat, selanjutnya jika bapak-bapak sekalian suatu saat ingin mengambilnya silahkan datang ke pengadilan negeri setempat (PN Karawang). Dan setelah uang dititipkan di pengadilan, secara otomatis pengembang sudah bisa melakukan kegiatan konstruksi.

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## NOTULENSI

Kegiatan : Sosialisasi Kompoensasi Ruang Bebas  
Tanggal : Senin, 5 Februari 2018  
Lokasi : Desa Sukamulya Kec. Cilamaya Kulon Kab. Karawang  
Peserta : 1. Kepala desa Sukamulya  
2. Ketua BPD desa Sukamulya

### Materi sosialisasi

*Sosialisasi kompensasi ruang bebas di desa Sukamulya Kecamatan Cilamaya Kulon – Karawang*

Kegiatan sosialisasi dihadiri oleh Kepala Desa beserta jajarannya, perwakilan dari kecamatan Cilamaya Kulon, dari polsek Cilamaya Kulon dan Babinsa Cilamaya kulon.

- Kepala desa Sukamulya ( H. Ade Asep Amaludin )  
Terimakasih kepada bapak-ibu yang telah hadir meluangkan waktu memenuhi undangan dari kami selaku kepala desa Sukamulya untuk mengikuti kegiatan sosialisasi kompensasi proyek SUTET yang merupakan program pemerintah. Kita selayaknya ikut membantu dan mensukseskan program ini. Dalam kegoiatan ini semoga nantinya bapak-ibu sekalian dapat penjelasan bagai mana proses dan besaran harga kompensasi yang akan diberikan, selauin itu bapak-ibu sekalian dapat bertanya seluas-luasnya agar faham dan mengerti.
  
- Ketua tim lapangan Karawang 1 ( Hikmawan)  
Kami dari tim lapangan sangat berterimakasih karena sampai saat ini bapak-ibu sekalian berperan ikut menjaga patok yang ada dilahan bapak-ibu sekalian yang mana patok tersebut nantinya akan menjadi tapak berdirinya tower untuk SUTET. Selanjutnya kami mohon maaf juga apabila keberadaan kami dilapangan membuat bapak-ibu sekalian terganggu atau tidak nyaman bahkan banyak timbul pertanyaan untuk itu kami mohon maaf. Dalam kegiatan sosialisasi ini nantinya narasumber akan menjelaskan mengenai kompensasi ruang bebas, apa tu ruang bebas mari kita simak bersama dan apabila nantinya ada yang kurang dimengerti mohon jangan sungkan untuk bertanya.

### Tanya jawab

1. Bapak H. Abidin

Tanya : Kompensasi ini apakah warga bernegosiasi langsung dengan kontraktor atau ada musyawarah didesa ?

Jawab : Untuk kompensasi ruang bebas penentun harganya sudah dihitung oleh KJPP dengan perhitungan rumus tadi yang saya sampaikan

## 2. Bapak Wasim BPD

Tanya : Apakah kompensasi ruang bebas ini dibayarkan sekali atau tiap tahun ? karena kami seterusnya menggarap atau bekerja dibawah jalur SUTET.

Jawab : hanya dibayarkan sekali, karena bapak-ibu sekalian masih dapat menggarap tanah tersebut karena tidak dibebaskan

Tanya : Berapa nilai besaran kompensasinya ?

Jawab : Sampai saat ini masih dalam proses perhitungan oleh KJPP, kami belum tahu berapa besarnya. Mungkin dalam akhir bulan Februari ini bias selesai KJPP melakukan survey sehingga harga dapat diketahui.

## 3. Ibu Mayang

Tanya : Apakah warga yang terlintas jalur SUTET setelah mendapatkan kompensasi dapat menggarap lagi tanahnya ?

Jawab : Kompensasi untuk jalur bebas berbeda dengan jual beli untuk tapak tower, bapak-ibu yang mendapatkan kompensasi pada jalur bebas masih bias menggarap lahannya karena tidak dibebaskan dan masih milik bapak-ibu sekalian, sedangkan untuk pembebasan pada tapak tower lahan akan digunakan selamanya oleh PLN nantinya.

## 4. Bapak Rudi

Tanya : Apakah ada dampak kesehatan bagi manusia ? karena kami petani setiap hari bekerja disawah dibawah jalur SUTET.

Jawab : Berdasarkan kajian dan pengukuran medan magnet dan medan listrik yang ditimbulkan sangat kecil dan jauh dari bakumutu yang ditetapkan oleh standar nasional dan internasional, artinya masih sangat aman bagi kesehatan manusia.

Tanya : apakah ada pengaruh terhadap televisi ?

Jawab : Sejauh ini belum ada laporan ataupun kasus SUTET berpengaruh terhadap televisi, seperti jalur yang sudah ada melewati perumahan contohnya di daerah Bekasi perkotaan tidak ada pengaruh apapun.

## 5. Bapak Karyono BPD

Tanya : Apakah proyek PLTGU dan jalur SUTET ini sudah mempunyai dokumen AMDAL ?

Jawab : Sampai saat ini PT. JSP baru memiliki dokumen KA-ANDAL, sedangkan dokumen AMDALnya masih dalam tahap revisi.

Tanya : Untuk pembayaran kompensasi apakah dilakukan di desa atau langsung ke rumah masing-masing pemilik lahan ?

Jawab : Menurut kesepakatan saja, agar lebih memudahkan koordinasi kami menginginkan dilakukan di kantor desa, namun tidak menutup kemungkinan dapat dilakukan di dusun masing-masing. Untuk penerima kompensasinya langsung kepada pemilik tanah yang sah.

Tanya : Jika nanti disaat kontruksi ada keluhan atau keberatan dari warga, kemana warga harus mengadu atau menyampaikan keluhan atau keberatannya ?

Jawab : PT. JSP mempunyai mekanisme untuk menyampaikan keberatan atau keluhan warga melalui Grievance Mechanism, nanti di desa ada kotak dan format keluhan, di pasang poster alur penyampaian keluhan dan kontak person yang bias dihubungi. Nantinya ada personil PT. JSP yang akan menindaklanjuti keluhan dari warga yaitu bapak Maryono.

6. Bapak H. Ade Asep Amaludin Kepala desa Sukamulya

Terimakasih atas partisipasi dari bapak-ibu sekalian karena sudah mengikuti kegiatan sosialisasi ini, namun saya merasa sedikit kecewa dengan sosialisasi ini karena harga atau nilai kompensasinya belum bisa di keluarkan. Namun demikian tidak menjadi hambatan dalam kegiatan ini terimakasih juga kepada tim sosialisasi dari PT. JSP yang sudah memberikan pemaparan kepada warga kami.

### **Kesimpulan**

- Isu yang diangkat/ didiskusikan  
Isu yang muncul dalam sesi Tanya jawab adalah kekhawatiran dampak SUTET terhadap kesehatan
  
- Respon dari sponsor  
Narasumber menjelaskan berdasarkan hasil dari pengukuran yang sudah dilakukan kemudian dibandingkan dengan batas besaran medan magnet dan medan listrik yang diperbolehkan menurut WHO. IRPA, IDI dan SNI 8151-2015 bahwa batas bakumutu yang diperbolehkan adalah 5 Kv/m dan medan magnet 0,5 mt/m

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### **NOTULENSI**

Kegiatan : Sosialisasi Kompensasi Ruang Bebas  
Tanggal : 9 Februari 2018  
Lokasi : Desa Manggungjaya  
Peserta : 1. Perwakilan dari Kecamatan Cilamaya Kulon  
2. Perwakilan dari Koramil  
3. Sekdesa Manggungjaya  
4. Pemilik lahan di dalam ROW

#### **Materi sosialisasi**

Sambutan dari Camat Cilamaya Kulon / yang diwakili Bapak Sandi (kasi POLPP)  
Kami dari pemerintahan kecamatan khususnya kecamatan Cilamaya Kulon sangat apresiasi sekali dengan adanya kegiatan sosialisasi ini, tentunya sangat berguna sekali untuk kita semua untuk dapat mengetahui dengan gamblang proses rencana pembangunan PLTGU Jawa-1 Cilamaya dan jaringan SUTET yang melintasi kecamatan Cilamaya Kulon khususnya desa Manggungjaya. Pemerintah dalam hal ini PLN tidak sembarangan menunjuk PT. JSP untuk melakukan pembangunan PLTGU Jawa-1 ini, tentunya PT JSP mempunyai perangkat atau tenaga ahli yang mumpuni dibidangnya. Selain itu kita juga harus mendukung program pemerintah yang tentunya akan bermanfaat bagi masyarakat luas. Sudah barang tentu pembangunan yang akan dilaksanakan pemerintah tidak akan merugikan masyarakat. Dalam kesempatan ini marilah kita simak bersama apa yang akan disampaikan nanti oleh tim sosialisasi Jawa Satu Power dan di sesi tanya-jawab nanti saya mohon kepada bapak sekalian untuk banyak bertanya agar lebih jelas.

Sambutan dari Danramil / yang diwakili oleh Bapak Oday. S (Danposmil)

Dalam kesempatan ini saya mewakili komandan saya yang saat ini sedang rapat di Karawang bersama Kapolres, yang mana dalam waktu dekat ini Kabupaten Karawang akan kedatangan pasukan yang cukup besar dari luar daerah untuk melaksanakan program pemerintah Cutarum Bersih. Tentunya kita sebagai tuan rumah harus mempersiapkan segala sesuatunya.

Pada prinsipnya kami dari pihak keamanan mendukung penuh segala program pembangunan yang akan dan sedang dilaksanakan oleh pemerintah. Dalam hal ini tentunya kami akan berpartisipasi dalam bidang keamanan, dalam kegiatan sosialisasi ini saya berpesan kepada masyarakat untuk dapat bertanya langsung jika ada yang kurang jelas jangan sampai nati sampai dirumah ada uneg-uneg atau ganjalan. Dan jika ada masalah nantinya tolong jangan bertindak sendiri, kita punya pemerintahan desa yang akan mengakomodir segala keluhan warga, tentunya dari pihak perusahaan atau pengembang juga mempunyai mekanisme dalam menyelesaikan masalah.

Sekali lagi saya minta kepada seluruh masyarakat khususnya masyarakat desa Manggungjaya marilah kita berperan bersama-sama untuk mensukseskan pembangunan ini, karena dengan adanya dukungan dari kita semua pembanguna dapat berjalan dengan baik.

Sambutan Kepala Desa Manggungjaya / yang diwakili oleh Bapak H. Unung Nuruhidin (sekdes) Pertama-tama saya menyampaikan permohonan maaf dari bapak kepala desa yang mana dalam kesempatan ini beliau tidak bisa hadir ditengah-tengah kita dikarenakan sakit. Kami dari pihak pemerintahan desa sangat berterimakasih atas kedatangan bapak sekalian atas undangan dari PT. JSP, kami pemerintahan desa hanya sebatas memfasilitasi saja kegiatan sosialisasi ini dan jika ada sesuatu yang kurang pas dalam penyediaan tempat dan fasilitas kami mohon dimaklumi. Selanjutnya, sengaja yang diundang pada kesempatan ini adalah warga yang memiliki lahan yang terkena jalur kabel dan akan diberikan kompensasi. Bagaimana cara dan bentuk kompensasinya mari kita simak bersama penyampaian dari tim PT. JSP.

Tim Sosialisasi Kompensasi Ruang Bebas (Hikmawan) coordinator wilayah Karawang 1 Terimakasih kepada bapak sekalian yang sudah hadir disini memenuhi undangan kami, dan terimakasih juga karena sampai sekarang patok kami masih terjaga dengan baik. Memang benar apa yang disampaikan oleh bapak Sandi dari kecamatan tadi banwasanya pembangunan yang dilakukan oleh pemerintah itu tidaklah merugikan masyarakat, salah satunya kegiatan kita kali ini sosialisasi kompensasi ruang bebas. Artinya dalam proyek PLTGU Jawa-1 ini ruang bebas yang tidak ada apa-apanya pun diberi kompensasi.

Materi sosialisasi terlampir.

### **Tanya jawab**

#### 1. Danuri

Tanya : Bagaimana kalau pemilik lahan sudah meninggal tetapi lahannya belum diwariskan ?

Jawab : mohon dibuatkan surat keterangan kuasa waris yang diketahui oleh pihak desa dan kecamatan lalu dilaporkan persyaratan lainnya seperti foto copy KTP, KK, SPPT dan surat tanahnya.

#### 2. Adang

Tanya : Bagai mana jika tanah tersebut tidak mempunyai surat-surat atau belum AJB ataupun SHM ?

Jawab : bisa ditambah dengan surat keterangan dari desa tentang status dan asal-usul tanah

3. Kaswan

Tanya : Bagaimana jika surat-surat tanahnya tidak ada, tetapi hanya mempunyai SPPT ?

Jawab : Jika surat-surat tanah bapak tidak ada, sama dengan pertanyaan sebelumnya. Jika di SPPT masih atas nama orang tua dan sudah meninggal harus dilengkapi dengan surat keterangan kuasa waris. Tetapi kalau di SPPT sudah nama bapak cukup dilengkapi dengan surat status dan asal-usul tanah yang diketahui desa dan camat.

4. Roya

Tanya : Kompensasi dibayarkan Cuma sekali kepada pemilik lahan, bagaimana jika nantinya lahan dijual ke orang lain atau sudah pindah kepemilikannya ?

Jawab : Menurut Permen ESDM no. 38 tahun 2013, Kompensasi tanah, bangunan dan tanaman yang berada di bawah ruang bebas SUTT atau SUTET hanya dapat diberikan satu kali. Dalam hal telah berpindah tangan kepada pemilik yang baru, maka pemilik baru tersebut tidak berhak menuntut pembayaran Kompensasi. Dalam peraturan menteri ESDM sudah sangat jelas disebutkan.

Tanya : Bagai mana jika ada kerusakan disaat pembangunan atau pekerjaan nantinya ?

Jawab : Bapak-bapak sekalian sebelum dilakukan pekerjaan konstruksi, kontraktor akan melakukan sosialisasi seperti ini di kantor desa dengan mengundang warga. Dalam kesempatan itu akan disampaikan hal-hal yang menyangkut dengan penggunaan lahan dan lainnya, disana tentunya bapak sekalian bisa bermusyawarah untuk hal tersebut.

## **Kesimpulan**

- Isu yang diangkat/ didiskusikan  
Antusiasme warga dalam bertanya masih pada besaran nilai kompensasi yang akan diberikan, dan kompensasi saat kegiatan konstruksi berlangsung
  - Respon dari sponsor  
Penjelasan yang diberikan kepada warga sesuai dengan materi sosialisasi
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## **NOTULENSI**

Kegiatan : Sosialisasi kompensasi Ruang Bebas  
Tanggal : Selasa 13 Februari 2018  
Lokasi : Desa Kalangsuria Kec. Rengasdengklok Kab. Karawang  
Peserta : 1. Kepala desa Kalangsuria  
2. Sekcam Kecamatan Rengasdengklok  
3. warga pemilik lahan dalam ROW

## **Materi sosialisasi**

Dikarenakan hujan deras dalam perjalanan menuju desa Kalangsuria saya datang terlambat dan hanya mengikuti sesi tanya jawab.

### **Tanya jawab**

1. Edi Sukardi

Tanya : Bagaimana dampak radiasi SUTET terhadap tanaman dibawahnya ?

Jawab : Batasan medan magnet dan medan listrik yang direkomendasikan oleh WHO, IRPA, IDI dan SNI 8151-2015 adalah 5 Kv/m untuk medan listrik dan 0,5 MT/m untuk medan magnet. Dibandingkan dengan beberapa hasil pengukuran yang kami lakukan di beberapa transmisi SUTET Paito - Gersik dan dan Adipala menunjukkan hasil masih jauh dibawah baku mutu yang ditetapkan tersebut yakni 0,0042 Kv/m dan 0,0017 Mt/m artinya masih sangat aman baik untuk tumbuhan maupun manusia.

2. Lili Suherman

Tanya : di wilayah saya terdapat 2 rumah yang berada tepat dibawah jalur SUTET, mereka menempati tanah pengairan, apakah mereka juga dapat kompensasi ?

Jawab : Permen Energi dan Sumber Daya Mineral No. 38 Th. 2013 tentang Kompensasi Atas Tanah, Bangunan, dan Tanaman Yang Berada Di Bawah Ruang Bebas Saluran Udara Tegangan Tinggi dan Saluran Udara Tegangan Ekstra Tinggi. Dalam Permen ESDM diatas sudah jelas bahwa bangunan mendapatkan kompensasi tetapi tanahnya tidak karena bukan hak milik pribadi.

Tanya : Apakah lahan dibawah tower boleh digarap oleh warga ?

Jawab : Sampai saat ini kami belum tahu kebijakan PLN seperti apa, namun jika melihat dari tower yang sudah ada sebaiknya tidak untuk sawah atau ditanami padi kembali, karena dapat mengganggu pada saat pemeliharaannya nanti.

### **Kesimpulan**

- Isu yang diangkat/ didiskusikan  
Warga menanyakan dampak kesehatan terhadap manusia dan tumbuhan dibawah jalur SUTET dan penggunaan lahan tapak tower yang sudah dibebaskan.
- Respon dari sponsor

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### **NOTULENSI**

Kegiatan : Sosialisasi Kompensasi ruang Bebas  
Tanggal : 14 Februari 2018  
Lokasi : Desa Pasirukem Kec. Cilamaya Kulon Kab. Karawang  
Peserta : 1. Kepala desa Pasirukem  
2. Kasi Trantib Kec. Cilamaya Kulon  
3. Koramil Cilamaya  
4. Polsek Cilamaya

## 5. Warga pemilik lahan dalam ROW

### Materi sosialisasi

- Kepala Desa Pasirukem

Selamat datang dan terimakasih kepada bapak ibu sekalian yang telah meluangkan waktu untuk mengikuti kegiatan sosialisasi pada siang hari ini, perlu diketahui warga pemilik lahan yang diundang pada siang hari ini dari 27 undangan 8 diantaranya warga Pasiruken, sekebihnya dalah warga dari luar desa Pasirukem yang memiliki lahan di sisni. Jadi mohon maaf jika banyak diantara bapak-ibu sekalian yang tidak saya kenal. Selanjutnya saya selaku pemerintahan desa mohon maaf yang sebesar-besarnya kepada bapak-ibu undangan dan tim dari PT. JSP karena dalam penyambutan dan fasilitas serta pelayanan kami kurang memuaskan. Kami juga selaku pemerintahan desa mendukung apa yang telah menjadi program pemerintah dalam hal ini pembangunan PLTGU dan jalur SUTET.

- Kasi Trantib POLPP Kecamatan Cilamaya Kulon (Bapak Sandi Hudaya)

Dari pemerintahan kecamatan sangat apresiasi sekali dengan adanya kegiatan sosialisasi ini dimana masyarakat mendapatkan penjelasan seluas-luasnya tentang apa yang akan dan sedang dilakukan oleh PT. JSP selain itu juga akan terjalin komunikasi yang baik antara warga dengan pengembang yang berujung pada ketertiban dan keamanan baik di masyarakat maupun di dapan pembangunan PLTGU-Jawa1 dan di kecamatan Cilamaya Kulon khususnya.

Sebagaimana kita ketahui bahwa pembangunan PLTGU ini nantinya akan menambah pasokan listrik untuk masyarakat, tentunya ini juga akan menambah dan mempercepat proses pembangunan dan pertumbuhan ekonomi masyarakat. Program pemerintah yang baik ini sudah seharusnya kita dukung bersama melalui peran serta dari masyarakat. Pesan saya kepada masyarakat bilamana nantinya dekemudian hari ada hal-hal atau permasalahan tolong jangan bertindak sendiri-sendiri, kita punya kepala desa sebagai pimpinan kita, tentunya poihak desa akan mengakopmodir segala permasalahan dari warga dan menindaklanjutnya serta akan berkoordinasi dengan pihan kecamatan dan keamanan setempat. Dalam sesi tanya jawab nanti sebaiknya bapak-ibu sekalian dapat bertanya seluas-luasnya agar sepulangnya dari kegiatan ini tidak ada lagi uneg-uneg yang mengganjal.

- Danposramil Cilamaya (N. Warjuki)

Kami sebagai alat Negara dalam hal ini TNI harus mendukung semua program dari pemerintah. Dalam kegiatan sosialisasi ini kami minta kepada PT. JSP untuk dapat menjelaskan kepada masyarakat pa dampak baik dan buruknya dengan adanya pembangunan PLTGU-Jawa1 ini. Dan kepada bapak-ibu sekalian peserta sosialisasi terutama pemilik lahan silahkan bertanya dan menyampaikan usulan kepada PT. JSP karena ini adalah kesempatan kita bertemu dan berdiskusi dengan pihak pengembang.

- Babinkamtibmas Cilamaya Kulon

Kami dari pihak kepilosian tentunya mendukung sekali apa yang menjadi program pemerintah, peran kami tentunya dibidang keamanan dan ketertiban saat pembangunan

berlangsung. Pesan dari bapak kapolsek meri kita sukseskan pembangunan ini dengan berperan menjaga ketertiban dan keamanan.

### **Tanya jawab**

#### 1. Ono Darsono

Tanya : Yang ingin saya tanyakan, berapakah luasan tanah yang terkena kompensasi setiap warga pemilik lahan ?

Jawab : untuk mengetahui berapa besaran atau luasan tanah bapai ibu sekalian yang terkena kompensasi baru minggu depan semua desa kami rilis dan dapat dilihat di kantor desa Pasirukem.namun jika bapak-ibu penasaran nanti setelah acara ini selesai dapat saya perlihatkan dari peta bidang yang saya bawa dan itu belum final.

Tanya : Kapan kompensasi dibayarkan ?

Jawab : Tergantung pada kecepatan bapak-ibu sekalian mengumpulkan data kepemilikan atau persyaratannya, kami harap minggu depan sudah terkumpul dan akan difasilitasi oleh pihak desa. Jika semua berjalan lancar di akhir bulan Maret proses pembayaran sudah bisa dilakukan.

#### 2. Hasan

Tanya : Kapan pelaksanaan pembangunan SUTET dimulai ?

Jawab : Jika tidak ada halangan dan semuanya lancar mungkin sekitaran bulan Oktober atau November 2018 sudah dimulai pekerjaannya.

Tanggapan : Artinya masih ada waktu sampai panen berikutnya, jangan sampai pas lagi tanaman padi kami hamper panan pekerjaan dimulai tentunya akan dapat merusak tanaman padi kami.

#### 3. Ade

Tanya : Saya adalah salah satu yang lahannya dibebaskan untuk tapak tower, baru dibayar 80%. Yang saya tanyakan adalah kapan sisa 20% dibayarkan ?

Jawab : Pembayaran sisa yang 20% dapat dilakukan setelah proses pemecahan di BPN selesai pak, kami kemarn mendapat info dari BPN bahwa proses pembuatan surat-suratny aselesai sekitar 2 bulan. Kami juga masih menunggu kapan BPN selesai dan akan langsung melakukan pelunasan sisanya.

Tanya : Berapa besaran nilai pasar untuk tanah yang terkena kompensasi ?

Jawab : Besaran nilai pasar lahan bukan kami yang menentukan tetapi dilakukan oleh lembaga independen penilai harga pasar yaitu dari KJPP. Kami juga masih menunggu KJPP mengeluarkan nilai pasar setiap lahan dan nanti akan di umumpak di kantor desa.

### **Kesimpulan**

- Isu yang diangkat/didiskusikan

Pada umumnya peserta menanyakan berapa besaran nilai pasar untuk lahan yang terkena kompensasi dan kapan pelaksanaan pembayaran kompensasi dilaksanakan, kegiatan sosialisasi berjalan dengan baik dan lancar.

Peserta undangan dari warga yang terlintas ROW 27 undangan namun yang dating dalam daftar hadir sampai 68 orang

- Respon dari sponsor  
Tanggapan dari narasumber terkait pertanyaan warga masih dalam lingkup materi sosialisasi. Namun yang menjadi catatan adalah banyaknya peserta diluar undangan yang hadir dan tidak mengikuti kegiatan sosialisasi menjadi perhatian khusus untuk kegiatan berikutnya.
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## NOTULENSI

Kegiatan : Sosialisasi Kompensasi Ruang Bebas  
Tanggal : Kamis, 15 Februari 2018  
Lokasi : Desa Tegalurung Kec Cilamaya Kulon Kab. Karawang  
Peserta : 1. Kepala desa Tegalurung  
2. Kasi Trantib Kecamatan Cilamaya Kulon  
3. Polsek Cilamaya  
4. Danramil Cilamaya  
5. Warga pemilik lahan dalam ROW

### Materi sosialisasi

- Kepala Desa Tegalurung (Karsim)

Saya atasnama pemerintahan desa Tegalurung mengucapkan terimakasih atas segala dukungan dan kerjasamanya sehingga terlaksanakannya kegiatan sosialisasi kompensasi ini, sesuai dengan permintaan dari PT. JSP bahwa warga yang diundang adalah pemilik lahan yang berada di bawah jalur. Saya harap bapak-ibu sekalian yang hadir saat ini dapat menyimak dan memahami apa yang akan disampaikan oleh perwakilan dari TP. JSP dan nantinya tolong juga disampaikan kepada warga lainnya yang tidak dapat hadir.

Pada sesi Tanya jawab nanti kami harapkan kepada bapak-ibu sekalian untuk bertanya mengenai hal-hal yang kurang jelas.

Kepada PT. JSP selaku pengembang PLTGU-Jawa 1 saya mewakili warga memohon atau mengusulkan kalau bisa ketika nanti akan dilaksanakan pekerjaan tower ataupun penarikan kabel diusahakan jangan waktu di sawah warga ada tanaman padinya diusahakan setelah kalau bisa setelah panen, untuk menghindari kerusakan tanaman warga. Pada umumnya warga merasa tidak rela jika tanamannya tergusur walaupun ada penggantiang atau gantiruginya.

Terakhir permohonan atau usulan kami adalah usahakan ada keterlubatan warga kami dalam kegiatan pembangunan proyek PLTUG ini, minimal sebagai buruh kasarnya, supaya kami selaku tuan rumah tidak hanya jadi penonton saja.

- Kasi Trantib Cilamaya Kulon (Sandi Hudaya)

Saya mewakili pemerintahan kecamatan sangat mendukung dan berapresiasi sekali dengan adanya kegiatan sosialisasi ini karena akan terjadi komunikasi antara pengembang dan masyarakat yang akan berdampak positif dan menghasilkan ketertiban serta keamanan disaan pembangunan dan pembangunana diwilayah kecamatan Cilamaya Kulon khususnya.

Sudah menjadi tanggungjawab kita semua untuk mendukung program pembanguna pemerintah untuk ketersediaanya pasokan energy listrik yang saat ini masih kita sama-sama rasakan. Karena dengan dukungan kita semua, pemerintah dan masyarakat maka pembanguna dapat berjalan dengan baik.

Bapak-ibu sekalian pesan kami dari kasi TRANTIB adalah, jika nanti dikemudian hari ada permasalahan apapun itu diharapkan untuk jangan bertindak sendiri-sendiri. Kita punya kepala desa sebagai perwakilan warga, sampaikan kepada beliau pasti kepala desa akan mengakomodir dan menindaklanjuti baik ke pihak kecamatan maupun ke pihak keamanan.

- Kanit Intel Polsek Cilamaya (Suratman)

Dengan akan dilaksanakannya kegiatan pembangunan PLTGU cilamaya dalam waktu dekat ini, saya mohon jika asa sesuatu permasalahan segera laporkan ke desa atau pihak keamanan untuk menjaga konsidi tetap kondusif. Kami dari pihak kepolisian sangat mendukung program pemerintah, demikian juga hendaknya dengan bapak-ibu sekalian harus kita sukseskan bersama.

- Penyampaian materi sosialisasi oleh pak Yudi (Kwarsa)

## **Tanya jawab**

1. Jami'at

Tanya : Kapan pekerjaan kontruksi dimulai :

Jawab : menurut jadwal yang sekarang kita pegang kalau semuanya lancar pada awal September 2018 pekerjaan sudah dimulai. Atau sebulan sebelum pekerjaan dimulai nanti kami sarankan kepada kontraktor untuk sosialisasi dulu seperti ini ke desa-desa.

Tanya : Kapan kompensasi akan dibayarkan ?

Jawab : Tergantung pada kecepatan bpak-ibu sekalian mengumpulkan 4 persyaratan tersebut yakni copy KTP, KK, SPPT 1 tahun terakhir, bukti surat tanah dan keterangan desa. Tetapi kami punya target pada bulan April semoga sudah bisa dibayarkan.

2. Komarudin

Tanya : Tolong jelaskan pengaruh radiasi terhadap kesehatan manusia ?

Jawab : kami pernah melakukan pengukuran di beberapa tempat, memang ada medan magnet dan medan listrik yang ditimbulkan, selama kita masih berada diluar batas ruang bebas masih sangat aman dan tidak ada pengaruhnya terhadap kesehatan, kecuali kita berada dalam ruang bebas yang 9 meter dari bawah kabel terendah. Kami juga pernah melakukan perbandingan tingkat radiasi SUTET dengan microwave, hasilinya pada SUTET medan lisriknya 0,0042 kv/m dan medan magnetnya 0.0017 MT dibawah ketinggian 9 meter dari bawah kabel, sedangkan pada microwave medan listriknya 1.05 Kv/m dan medan magnetnya 0,03312 MT.

3. Kades Tegalurung

Usulan/saran : Kami selaku pemerintahan desa mewakili warga kami mengusulkan untuk pekerjaan kontruksi sebaiknya dilakukan setelah panen sehingga tidak merusak tanaman padi.

### **Kesimpulan**

- Isu yang diangkat/didiskusikan  
Masyarakat mengkhawatirkan kerusakan terhadap tanaman disaat pekerjaan kontruksi nantinya, dan mengusulkan pekerjaan dilakukan setelah panen.  
Kepala desa lebih menyoroti keterlibatan masyarakat nantinya sebagai tenaga kerja local.
  
  - Respon dari sponsor  
Satu bulan sebelum pekerjaan kontruksi dimulai kami meminta supaya kontrak melakukan sosialisasi ke desa-desa untuk menginformasikan kepada bapak-ibu sekalian sekaligus membicarakan kemungkinan penggantian kerusakan yang di akibatkan saat pekerjaan kontruksi.  
Untuk keterlibatan tenaga kerja lokal nanti kontraktor tentunya akan menghitung berapa kebutuhan tenaga kerja yang dibutuhkan dan berapa yang dari warga local, tentunya ini akan kami sampaikan juga kepada kontraktor yang nanti akan bekerja.
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### **NOTULENSI**

Kegiatan : Sosialisasi Kompensasi Ruang Bebas  
Tanggal : Senin 12 Februari 2018  
Lokasi : Desa Karangatsu Kec. Karangbahagia Kab. Bekasi  
Peserta : 1. Kepala desa Karangatsu  
2. Polsek Karangbahagia  
3. Koramil Karangbahagia  
4. Warga pemilik lahan dalam ROW

### **Materi sosialisasi**

- Kades (Suryadi)  
Kami ucapkan terimakasih kepada bapak-ibu sekalian pemilik lahan yang terlintasi jalur transmisi SUTET yang dalam waktu dekat ini akan dilaksanakan pembangunannya, telah dapat meluangkan waktu untuk hadir dalam acara sosialisasi kompensasi ruang bebas ari PT. JSP. Semoga dengan adanya kegiatan ini kita semua dapat memahami dan dapat mendukung program pembangunan dari pemerintah.  
Perlu juga kami sampaikan kepada bapak-ibu sekalian kami pemerintahan desa dalam kegiatan ini hanya memfasilitasi guna kelancaran kegiatan ini, kami mohon maaf apabila fasilitas yang ada di desa kami tidak memuaskan atau kurang baik.  
Permohonan kami kepada PT. JSP untuk dapat menjelaskan kepada warga kami mengenai materi kegiatan ini dan sebaliknya kepada warga yang kurang mengerti dan kurang fahan agar dapat menanyakan kepada tim dari PT. JSP pada sesi tanya jawab nanti.
  
- Polsek (Dwi. K)

Pada prinsipnya kami dari pihak kepolisian sangat mendukung program pembangunan dari pemerintah. Sebagai alat Negara kami wajib mendukung dalam segi keamanan dan ketertiban demi kelancaran program pemerintah ini. Kami juga memohon kepada bapak-ibu sekalian untuk dapat mendukung demi kesuksesan program pembangunan ini.

- Koramil (Cece. NS)

Tentunya kita semua harus mendukung serta dapat memahami dengan adanya pembanguna PLTGU-Jawa 1 ini karena untuk kepentingan kita bersama dan kemajuan pembangunan nasional. Kami juga mendukung dengan adanya sosialisasi ini tentunya warga akan mendapatkan penjelasan tentang kompensasi yang akan diberikan kepada warga yang terlintas jalur SUTET. Harapan kami semoga kegiatan ini dapat berjalan dengan lancar dan baik sampai selesai.

### **Tanya jawab**

- H. Maman

Tanya : Jarak 17 meter ke kiri-ke kanan yang mendapatkan pembayaran kompensasi itu diukur dari mana ?

Jawab : Di ukur dari tenggan-tengan tiang tower/sumbu as nya tower, bukan di ukur dari kabel tower.

- Ahmadi

Tanya : Saya pemilik lahan tower T 111 yang sudah dibebaskan, pertanyaan saya apakah semua lahan yang dibebaskan tersebut digunakan untuk tiang tower ?

Jawab : Lahan yang dibebaskan untuk tapak tower tidak lah seluruhnya untuk tiang, tetapi ada jarak dari batas yang dibebaskan sekitar 6 meter untuk area kerja pembanguna tower nantinya.

Tanya : Apakah lahan sisa tiang tower dan dibawah tower boleh di tanami nantinya ?

Jawab : Sampai saat ini kami belum tahu kebijakan PLN seperti apa, namun jika melihat dari tower yang sudah ada sebaiknya tidak untuk sawah atau ditanami padi kembali, karena dapat mengganggu pada saat pemeliharaannya nanti.

### **Kesimpulan**

Warga pemilik lahan dalam ROW di desa Karangsatu sudah sering sekali berinteraksi dengan tim dilapangan baik dengan pertemuan di kantor desa maupun di lokasi jalur tower. Pada umumnya mereka sudah sangat faham dan mengerti tentang pembangunan PLTGU-Jawa 1 dan jalur transmisi yang akan melewati desa/lahan mereka. Hal ini juga dikarenakan disekitaran wilayah kecamatan Karangbahagia sudah ada jalur transmisi yang sudah sering mereka lihat.

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### **NOTULENSI**

Kegiatan : Sosialisasi Kompensasi Ruang Bebas  
Tanggal : Kamis 8 Februari 2018

Lokasi : Desa Sumurgede Kec. Cilamaya Kulon Kab. Karawang  
Peserta : 1. Kepala desa Sumurgede  
2. Tim Sosialisasi  
3. Warga pemilik lahan dalam ROW

### **Materi sosialisasi**

- Kepala desa Sumurgede (Yahya)

Terimakasih kepada warga pemilik lahan yang berada dibawah jalur SUTUT yang telah menghadiri undangan dari PT. JSP melalui kami pemerintahan desa Sumurgede.

Terimakasih juga kepada tim dari PT. JSP yang sudah datang untuk bersosialisasi ke desa kami.

Perlu bapak-ibu sekalian ketahui bahwa di Sumurgede yang terlintasi jalur ada 18 idang sawah, 3 bidang diantaranya dimiliki oleh 1 orang, dan ada lahan yang dimiliki oleh orang luar desa dan berdomisili di Majalengka.

Adapun tujuan bapak-ibu sekalian diundang ke kantor desa tidak lain adalah untuk mendengarkan sosialisasi pembangunan PLTGU-Jawa1 yang merupakan program pembangunan dari pemerintah.

- Kasi Trantib Cilamaya Kulon (Sandi Hudaya)

Saya mewakili pemerintahan kecamatan sangat mendukung dan berapresiasi sekali dengan adanya kegiatan sosialisasi ini karena akan terjadi komunikasi antara pengembang dan masyarakat yang akan berdampak positif dan menghasilkan ketertiban serta keamanan disaan pembangunan dan pembangunana diwilayah kecamatan Cilamaya Kulon khususnya.

Sudah menjadi tanggungjawab kita semua untuk mendukung program pembanguna pemerintah untuk ketersediaan pasokan energy listrik yang saat ini masih kita sama-sama rasakan. Karena dengan dukungan kita semua, pemerintah dan masyarakat maka pembanguna dapat berjalan dengan baik.

Bapak-ibu sekalian pesan kami dari kasi TRANTIB adalah, jika nanti dikemudian hari ada permasalahan apapun itu diharapkan untuk jangan bertindak sendiri-sendiri. Kita punya kepala desa sebagai perwakilan warga, sampaikan kepada beliau pasti kepala desa akan mengakomodir dan menindaklanjuti baik ke pihak kecamatan maupun ke pihak keamanan.

### **Tanya jawab**

1. Endang

Tanya : Bagaimana kalau surat tanahnya lagi mesantran (sebagai borah di Bank) ?

Jawab : cukup dibuktikan dengan foto copynya saja dan surat keterangan dari bank yang bersangkutan.

Tanya : Bagaimana jika tanah sudah diwariskan kepada anak, namun anak tersebut masih dibawah umur ?

Jawab : Dari 4 persyaratan tersebut ditambah dengan surat keterangan dari desa itu sudah cukup. Kompensasi bukan lah proses jual beli, kalau untuk jual beli harus ada surat dari pengadilan negeri yang menyatakan kuasa untuk jual beli karena anak dibawah umur belum bisa melakukan tindakan hokum jual beli.

2. Udi

Tanya : Persyaratan SPPT apakah harus 5 tahun terakhir atau cukup dengan 1 tahun saja ?

Jawab : Pada awalnya persyaratan SPPT harus 5 tahun terakhir, tetapi setelah kami bernegosiasi dengan pihak notaris diperbolehkan SPPT 1 tahun terakhir. Kenapa harus 1 tahun terakhir ? itu adalah sebagai bukti kalau bapak-ibu sudah bayar pajaknya.

### 3. H. Salim

Tanya : Jika terjadi sesuatu yang tidak diinginkan atau yang merugikan warga saat pembanguna SUTET dan saat operasionalnya nanti kami harus mengadu kemana ?

Jawab : Pada saat pembangunan nati PT. JSP menempatkan personil untuk mengelola keluhan dari warga, nanti mekanisme pengaduannya akan di tempelkan di kantor desa sebagai pengumuman, bisa juga lewat desa nanti akan di tindaklanjuti oleh tim Pt. JSP. Sedangkan pada saat operasionalnya nati itu sudah menjadi tanggungjawab dari PLN, karena PT. JSP hanya bertugas membangunnya saja setelah menyala langsung diserahkan kepada PLN.

Tanya : Apakah boleh membangun di bawah kabel SUTET ?

Jawab : Pada prinsipnya boleh selama tidak melewati batas ruang bebas 9 meter dari bawah kabel, tetapi sebaiknya berkoordinasi atau pemberitahuan dahulu ke PLN agar PLN dapat melakukan pemantauan.

### Kesimpulan

- Isu yang diangkat/ didiskusikan  
Kelengkapan persyaratan untuk proses kompensasi masih menjadi kendala bagi warga karena ada yang digadaikan di Bank, ada yang tanahnya diwariskan ke anaknya yang masih dibawah umur, ada juga yang pemiliknya berada diluar kota .
- Respon dari sponsor  
Untuk mempermudah warga dalam proses kompensasi peran pemerintahan desa sangat diperlukan dengan mengeluarkan surat keterangan dari desa untuk permasalahan tersebut.

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### NOTULENSI

Kegiatan : Soaialisasi Kompensasi Ruang Bebas  
Tanggal : Kamis, 15 Februari 2018  
Lokasi : Kelurahan Mekarjati Kec. Karawang Barat Kab. Karawang  
Peserta : 1. Lurah Mekarjati  
2. Sekcam Kecamatan Karawang Barat  
3. Warga pemilik lahan dalam ROW

### Materi sosialisasi

- Sekcam (H. Ade Erman)

Adanya pembanguna PLTGU-Jawa 1 sangatlah berarti bagi pembangunan dan mudah-mudahan berguna bagi kita semua. Dengan adanya kegiatan sosialisasi ini saya deri pihak pemerintahan kecamatan sangat mendukung, diharapkan dengan kegiatan ini bapak-ibu

sekalian bisa memahami, mengerti dan mendukung program pemerintah ini karena sangat bermanfaat bagi kita semua.

Dengan sosialisasi juga kita dapat manfaat pengetahuan dan terjalin interaksi antara masyarakat dengan pengembang yang akan membangun PLTGU dan jalur SUTET untuk mengetahui kondisi dan situasi saat ini. Semoga kegiatan sosialisasi ini dapat berjalan dengan lancar dan apabila nanti ada sesi Tanya jawab saya harapkan bapak-ibu bertanya apabila ada yang kurang jelas ataupun yang tidak dimengerti.

- Lurah Mekarjati (Karta Wijaya)

Terimakasih kepada bapak-ibu yang sudah datang memenuhi undangan kami, warga pemilik lahan yang diundang ada 30 orang sesuai dengan daftar yang diberikan oleh PT. JSP namun sesungguhnya masih ada warga pemilik lahan yang tidak hadir karena belum terdaftar dan tidak menerima undangan. Kami mohon nanti setelah kegiatan ini dari pihak TP. JSP melakukan pendataan ulang bersama staf kami sehingga warga pemilik lahan yang belum terdaftar dapat terakomodir.

Selanjutnya mengenai kegiatan sosialisasi kompensasi ruang bebas, saya mohon dari pihak PT. JSP yang akan membawakan materi nantinya untuk dapat menjelaskan dengan sejelas-jelasnya karena saya juga kurang mengerti apa yang dimaksud dengan ruang bebas tersebut dan mengapa harus di beri kompensasi.

Nanti pada sesi tanya-jawab nantinya saya mohon juga kepada bapak-ibu untuk bertanya dan jangan sungkan-sungkan agar semuanya dapat diterima dan difahami dengan jelas.

- Hikmawan (Kwarsa)

Terimakasih pak lurah atas masukannya, nanti tim kami beserta staf dari kelurahan dan pak RT akan melakukan pendataan ulang terkait warga pemilik lahan terken jalur yang saat ini belum terdata.

## **Tanya jawab**

1. Sarwan

Tanya : Saya mau tanya, saya kurang faham mengenai UU, kenapa yang dipakai UU no. 30 tahun 2009 tentang ketenaga listrikan tetapi peraturan menteri keuangannya yang dipakai Permenkeu No. 125/PMK 01 Tahun 2008 tentang Jasa Penilai Publik ?

Jawab : tidak semua UU yang disahkan itu selalu diikuti oleh peraturan menteri, selagi masih relevan dan tidak berpotensi ada tindakan melawan hukum masih dapat di pergunakan. Dalam proyek pembangunan PLTGU-Jawa 1, UU yang dipakai adalah tahun 2009 tentang ketenaga listrikan. Karena proyek ini menggunakan uang Negara maka yang dipakai peraturan menteri keuangan yang masih berlaku tahun 2008.

Tanya : Pada lahan yang sudah dibebaskan masih boleh ditanami padi tidak kedepannya ?

Jawab : Sampai saat ini kami belum tau kebijakan PLN seperti apa, namun jika melihat tower yang sudah berdiri dan beroperasi maka sebaiknya tidak dijadikan sawah lagi karena akan mengganggu pada saat perawatan dari PLN.

Tanya : Apakah ada pengaruhnya terhadap petir ?

Jawab : sebenarnya sangat aman, karena dipaling atas tower akan dipasang kabel penangkal petir dan setiap 5 tower akan disalurkan ke dalam bumi, jika dibandingkan dengan berdiri ditengah lapang atau sawah yang tidak ada towernya maka ini sangat berbahaya jika ada petir karena petir akan memapar benda yang paling tinggi.

## 2. Komarudin

Saran/masukan : Saya sebagai ketua LPM kelurahan Mekarjati meminta kepada PT. JSP dalam pembayaran kompensasi nantinya harus transparan dan teliti kerana sekecil apapun kesalahan jika menyangkut uang bisa repot nantinya.

## 3. Carli

Tanya : Bagaimana pembayaran kompensasi bila pemiliknya tidak ada atau berada diluar daerah ?

Jawab : Seharusnya kompensasi diberikan kepada pemilik tanah, namun jika tidak ada bisa diwakili oleh penggarap dengan surat kuasa penganbilan kompensasi dari pemilik lahan atau surat keterangan dari desa.

Tanya : Kapan kompensasi dibayarkan ? hanya satu kali saja atau setiap tahun ?

Jawab : Kompensasi dibayarka hanya satu kali, bila mana tanah berpindah tangan atau di perjual belikan setelah mendapatkan kompensasi maka pemilik yang baru tidak mendapatkan kompensasi. Karena kompensasi diberikan kepada tanah, bangunan dan tanaman bukan kepada pemiliknya.

## 4. Ayim

Tanya : pada waktu pendataan dulu ternyata masih ada yang terlewat, ada juga yang salah penulisan nama, yang saya tanyakan apakah data yang kami terima tersebut adalah data baku sudah final atau masih bisa diperbaiki ?

Jawab : Seperti yang sudah kami sampaikan tadi dalam tahapan pemberian kompensasi, ada tahapan validasi data baik nama, luasan dan persyaratannya, jika masih ditemukan kekurangan atau kesalahan maka masih sangat memungkinkan untuk diperbaiki.

## 5. R. Nainggolan

Tanya : Siapa KJPP itu ? berkedudukan dimana ? dan apakah bapak-bapak dari JSP ini bagian dari KJPP ?

Jawab : KJPP atau Kantor Jasa Penilai Publik adalah lembaga independen yang ditunjuk oleh kementerian ESDM untuk menilai objek yang akan di kompensasikan secara wajar, berkedudukan di Jakarta, dan kami bukan bagian dari KJPP.

Tanya : Untuk transparansi pembayaran kompensasi, dimana pembayaran tersebut dilaksanakan ?

Jawab : Kami akan melakukan pembayaran tentunya dengan kesepakatan bersama warga, bisa di kantor desa, dirumah tokoh masyarakat. Dalam proses pembayaran tersebut kami kami buat berita acaranya yang disaksikan dan ditanda tangani oleh kepala desa dan pemilik lahan.

Tanya : Apabila terjadi sesuatu hal yang tidak diinginkan pada saat pembangunan dan setelah beroperasinya SUTET nanti masyarakat harus mengadu kemana ?

Jawab : Pada saat pembangunan nati PT. JSP menempatkan personil untuk mengelola keluhan dari warga, nanti mekanisme pengaduannya akan di tempelkan di kantor desa sebagai

pengumuman, bisa juga lewat desa nanti akan di tindaklanjuti oleh tim PT. JSP. Sedangkan pada saat operasionalnya nanti itu sudah menjadi tanggungjawab dari PLN, karena PT. JSP hanya bertugas membangunnya saja setelah menyala langsung diserahkan kepada PLN.

### **Kesimpulan**

- Isu yang diangkat/didiskusikan  
Isu yang diangkat adalah tentang data pemilik lahan yang belum terdata, warga masih khawatir jika yang lahannya terlintasi jalur SUTET namun tidak terdaftar sebagai penerima kompensasi akan timbul jejolak di masyarakat dan pada akhirnya menjadikan kondisi tidak kondusif.
  
- Respon dari sponsor  
Tim lapangan Kwarsa dibantu oleh staf kelurahan dan RW akan melakukan validasi data setelah kegiatan sosialisasi selesai.



## **PLTGU Jawa 1 Independent Power Project**

### **ANNEX D AIR QUALITY ASSESSMENT**

Prepared for:

PT Jawa Satu Power (JSP)

[www.erm.com](http://www.erm.com)

## CONTENTS

1	INTRODUCTION	1
1.1	OVERVIEW	1
2	LEGAL FRAMEWORK AND BEST PRACTICE	2
2.1.1	<i>Overview</i>	2
2.1.2	<i>Quality Standards and Guidelines</i>	3
2.1.3	<i>Guideline Air Emission Levels</i>	5
3	SCREENING ASSESSMENT	8
3.1	OVERVIEW	8
3.2	ON SITE CONSTRUCTION PLANT	8
3.3	GENERAL CONSTRUCTION ACTIVITIES	9
3.4	OFFSITE TRAFFIC	9
3.5	UNPAVED ACCESS ROADS	10
3.6	SHIPPING	11
3.7	FLOATING STORAGE AND REGASIFICATION UNIT (FSRU)	11
3.8	ONSHORE RECEIVING FACILITY (ORF)	12
3.9	COMBINED CYCLE GAS TURBINE (CCGT) POWER PLANT	13
3.10	DIESEL ENGINE-GENERATORS	14
3.11	COOLING TOWERS	14
3.12	DECOMMISSIONING	14
4	IMPACT ASSESSMENT CRITERIA FOR DETERMINING IMPACTS TO AIR QUALITY	15
4.1	OVERVIEW	15
4.2	AIR QUALITY ASSESSMENT SIGNIFICANCE CRITERIA	15
5	RECEIVING ENVIRONMENT	19
5.1	OVERVIEW	19
5.2	STUDY AREA AND IDENTIFICATION OF SENSITIVE RECEPTORS	19
5.3	AIR QUALITY BASELINE	24
5.3.1	<i>Overview</i>	24
5.3.2	<i>Baseline Monitoring Methods</i>	24
5.3.3	<i>Monitoring Locations and Duration</i>	25
5.3.4	<i>Baseline Results and Summary</i>	30
5.4	CLIMATOLOGY	35
6	IMPACT ASSESSMENT AND MITIGATION	37
6.1	OVERVIEW	37
6.2	IMPACTS TO AIR QUALITY FROM DUST EMISSIONS DURING CONSTRUCTION	37
6.2.1	<i>Overview</i>	37
6.2.2	<i>Qualitative Impact Assessment Methodology</i>	38
6.2.3	<i>Construction Phase Impacts (pre mitigation)</i>	41
6.2.4	<i>Recommended Mitigation, Management and/ or Monitoring Measures</i>	44

6.2.5	<i>Residual Impacts (post mitigation)</i>	47
6.3	<b>IMPACTS TO AIR QUALITY FROM OFFSITE TRAFFIC DURING CONSTRUCTION</b>	47
6.3.1	<i>Overview</i>	47
6.3.2	<i>Assessment Methodology</i>	47
6.3.3	<i>Traffic Related Impacts (pre-mitigation)</i>	48
6.3.4	<i>Recommended Mitigation, Management and/ or Monitoring Measures</i>	50
6.3.5	<i>Residual Impacts (post mitigation)</i>	50
6.4	<b>IMPACTS TO AIR QUALITY FROM CCGT POWER PLANT DURING OPERATION</b>	50
6.4.1	<i>Overview</i>	50
6.4.2	<i>Assessment Methodology</i>	50
6.4.3	<i>Impacts to Air Quality (pre-mitigation)</i>	56
6.4.4	<i>Recommended Mitigation, Management and/ or Monitoring Measures</i>	65
6.4.5	<i>Residual Impacts (post mitigation)</i>	65
6.5	<b>IMPACTS TO AIR QUALITY FROM BLACK START/EMERGENCY DIESEL ENGINE-GENERATORS</b>	66
6.5.1	<i>Overview</i>	66
6.5.2	<i>Assessment Methodology</i>	66
6.5.3	<i>Scenario 1: Impacts to Air Quality (pre-mitigation)</i>	71
6.5.4	<i>Scenario 1: Recommended Mitigation, Management and/ or Monitoring Measures</i>	75
6.5.5	<i>Scenario 1: Residual Impacts (post-mitigation)</i>	76
6.5.6	<i>Scenario 2: Impacts to Air Quality (pre-mitigation)</i>	76
6.5.7	<i>Scenario 2: Recommended Mitigation, Management and/ or Monitoring Measures</i>	79
6.5.8	<i>Scenario 2: Residual Impacts (post-mitigation)</i>	79
6.6	<b>IMPACTS FROM COOLING TOWERS</b>	79
6.6.1	<i>Overview</i>	79
6.6.2	<i>Assessment Methodology</i>	79
6.6.3	<i>Impacts to Agriculture (pre mitigation)</i>	81
6.6.4	<i>Recommended Mitigation, Management and/or Monitoring Measures</i>	83
6.6.5	<i>Residual Impacts (post mitigation)</i>	83
7	<b>CUMULATIVE IMPACTS AND MITIGATION</b>	84
7.1	<b>INTRODUCTION</b>	84
7.2	<b>IDENTIFIED CUMULATIVE IMPACTS</b>	84
8	<b>CONCLUSION AND RECOMMENDATIONS</b>	85
8.1	<b>CONSTRUCTION PHASE</b>	85
8.2	<b>OPERATION PHASE</b>	85

## LIST OF FIGURES

Figure 5.1	Construction Phase Study Area and Representative Human Receptors	21
Figure 5.2	Operation Phase Study Area and Representative Human Receptors	22
Figure 5.3	Ecology in the Study Area	23
Figure 5.4	Air Quality Monitoring Locations	27
Figure 5.5	Air Quality Monitoring Site (AQM) 1a-HOLD	28
Figure 5.6	Air Quality Monitoring Site (AQM) 1b	28
Figure 5.7	Air Quality Monitoring Site 2	28
Figure 5.8	Air Quality Monitoring Site 3	28
Figure 5.9	Air Quality Monitoring Site 4a	28
Figure 5.10	Air Quality Monitoring Site 4b	29
Figure 5.11	Air Quality Monitoring Site 5	29
Figure 5.12	Air Quality Monitoring Site 6	29
Figure 5.13	Wind Rose (2013 – 2017)	36
Figure 6.1	Building Representation in AERMOD	55
Figure 6.2	Nitrogen Dioxide (NO <sub>2</sub> ) 1-Hour Average – 99.9 Percentile (Human Health)	64
Figure 6.3	Nitrogen Dioxide (NO <sub>2</sub> ) 24-Hour Average – 100th Percentile (Human Health)	64
Figure 6.4	Nitrogen Dioxide (NO <sub>x</sub> ) Maximum Annual Average (Ecology)	65
Figure 6.5	Scenario 1: Nitrogen Dioxide (NO <sub>2</sub> ) 1-Hour Average – 99.9 Percentile (All Engine-Generators at 100% Load for 50 minutes)	75
Figure 6.6	Global Sea Salt Deposition	81
Figure 6.7	Predicted Salt Deposition Rates from Cooling Towers - Significance of Impact on Crops	82

## LIST OF TABLES

Table 2.1	Indonesia (PP41/1999) Ambient Air Quality Standards	3
Table 2.2	Air Quality Critical Levels used for the Assessment of Impacts on Sensitive Ecological and Agricultural Receptors	4
Table 2.3	Salt Deposition Threshold	5
Table 2.4	International Finance Corporation (IFC) Air Emissions Guidelines for Combustion Turbine (>50MWth)	6
Table 2.5	Environmental Ministry Regulation No. 21 Year (2008) Emission Limits for Gas Fired Power Plant	6
Table 3.1	FSRU Dual-Fuel Generator Information Operating on Gas	12
Table 3.2	Feed Gas Composition	13
Table 4.1	Receptor Sensitivity	15
Table 4.2	Magnitude Criteria for Assessment of Air Pollutants	17
Table 4.3	Determination of Significance	17
Table 5.1	Air Quality Monitoring Summary	26
Table 5.2	Indicative Annual Mean NO <sub>2</sub> Background Concentrations Estimated from Weekly Diffusion Tube Results	31
Table 5.3	Maximum Indicative 1-Hour NO <sub>2</sub> Background Concentrations Estimated from Weekly Diffusion Tube Results	31
Table 5.4	Maximum Indicative 24-Hour NO <sub>2</sub> Background Concentrations Estimated from Weekly Diffusion Tube Results	32
Table 5.5	AQS1 - NO <sub>2</sub> Monitoring Summary	34
Table 5.6	AQS1 - O <sub>3</sub> Monitoring Summary	35

Table 6.1	<i>Dust Emission Magnitude (IAQM)</i>	40
Table 6.2	<i>Summary of Impacts during Construction (pre-mitigation)</i>	44
Table 6.3	<i>Proposed Mitigation Measures</i>	45
Table 6.4	<i>Emission Function Coefficients for Total Oxides of Nitrogen and Particulate Matter</i>	49
Table 6.5	<i>Process Contribution from Construction Traffic Vehicle Exhausts (1000 AADT)</i>	49
Table 6.6	<i>Process Contribution from Construction Traffic Vehicle Exhausts (10,000 AADT)</i>	49
Table 6.7	<i>Detailed Modelling Methodology</i>	52
Table 6.8	<i>Emission Inventory for CCGT Power Plant</i>	56
Table 6.9	<i>Nitrogen Dioxide (NO<sub>2</sub>) 1-Hour Average - 99.9 Percentile (Human Health)</i>	58
Table 6.10	<i>Nitrogen Dioxide (NO<sub>2</sub>) 24-Hour Average - 100 Percentile (Human Health)</i>	59
Table 6.11	<i>Nitrogen Dioxide (NO<sub>2</sub>) Annual Average (Human Health)</i>	60
Table 6.12	<i>Carbon Monoxide (CO) 1-Hour Average - 99.9 Percentile (Human Health)</i>	61
Table 6.13	<i>Carbon Monoxide (CO) 24-Hour Average - 100 Percentile (Human Health)</i>	62
Table 6.14	<i>Oxides of Nitrogen (NO<sub>x</sub>) - Maximum Annual Average (Ecology)</i>	63
Table 6.15	<i>Detailed Modelling Methodology</i>	67
Table 6.16	<i>Generator Locations</i>	70
Table 6.17	<i>Emission Inventory for Black Start and Emergency Generators</i>	70
Table 6.18	<i>Scenario 1: Nitrogen Dioxide (NO<sub>2</sub>) 1-Hour Average - 99.9 Percentile (All Engine-Generators at 100% Load for 50-minutes)</i>	72
Table 6.19	<i>Scenario 1: Sulphur Dioxide (SO<sub>2</sub>) 1-Hour Average - 99.9 Percentile (All Engine-Generators at 100% Load for 50-minutes)</i>	73
Table 6.20	<i>Scenario 2: Nitrogen Dioxide (NO<sub>2</sub>) 1-Hour Average - 99.9 Percentile (Generators 1 Only at 100% Load)</i>	77
Table 6.21	<i>Scenario 2: Sulphur Dioxide (SO<sub>2</sub>) 1-Hour Average - 99.9 Percentile (Generators 1 Only at 100% Load)</i>	78
Table 6.22	<i>Cooling Tower Fan Locations</i>	80
Table 6.23	<i>Cooling Tower and Modelling Information</i>	80

# 1 INTRODUCTION

## 1.1 OVERVIEW

The PLTGU Jawa-1 Project (hereafter referred to as 'the Project') involves the development of a 1,760MW Combined Cycle Gas Turbine (CCGT) Power Plant, a Liquefied Natural Gas (LNG) Floating Storage and Regasification Unit (FSRU) and 500kV power transmission lines and a Substation.

Emissions to air from the Project have the potential for adverse effects on human health, agricultural and sensitive ecology. This air quality impact assessment assesses these potential impacts against relevant air quality standards, objectives and guidelines where relevant.

The assessment of potential air quality impacts associated with the Project considers:

- sources, nature and quantity of emissions to air;
- a qualitative assessment of construction and decommissioning phase impacts;
- a detailed quantitative assessment of process emissions;
- an assessment of potential impacts on relevant sensitive receptors; and
- mitigation measures to reduce the impacts where necessary.

## 2.1.1

*Overview*

The International Finance Corporation (IFC) Environmental, Health and Safety (EHS) guidelines are considered throughout the assessment and provide the overarching guidance and principles for undertaking the assessment. The key documents considered are:

- IFC General EHS Guidelines: Air Emissions and Ambient Air Quality <sup>(1)</sup>;
- IFC General EHS Guidelines: Construction and Decommissioning <sup>(2)</sup>;
- IFC EHS Guidelines for Thermal Power Plants <sup>(3)</sup>;
- IFC EHS Guidelines for Liquefied Natural Gas (LNG) Facilities <sup>(4)</sup>; and
- IFC EHS Guidelines for Shipping <sup>(5)</sup>.

Where necessary, other internationally recognised sources of information are referred to including guidelines from: the World Health Organisation (WHO); the European Union (EU); United States Environmental Protection Agency (USEPA); the Australian National Pollution Inventory (NPi); and/or various guidelines and methodologies from the Department of Environment and Rural Affairs (DEFRA) and reputable air quality institutes and working groups such as the Institute of Air Quality Management (IAQM). Air

(1) International Finance Corporation (IFC) (2007) Environmental, Health and Safety Guidelines, General EHS Guidelines: Environmental Air Emissions and Ambient Air Quality [Online] Available at:

[http://www.ifc.org/wps/wcm/connect/topics\\_ext\\_content/ifc\\_external\\_corporate\\_site/sustainability-at-ifc/policies-standards/ehs-guidelines](http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/ehs-guidelines) [Accessed 06 February 2018]

(2) International Finance Corporation (IFC) (2007) Environmental, Health and Safety Guidelines, General EHS Guidelines: Construction and Decommissioning [Online] Available at:

[http://www.ifc.org/wps/wcm/connect/topics\\_ext\\_content/ifc\\_external\\_corporate\\_site/sustainability-at-ifc/policies-standards/ehs-guidelines](http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/ehs-guidelines) [Accessed 06 February 2018]

(3) International Finance Corporation (IFC) (2007) Environmental, Health and Safety Guidelines for Thermal Power Plants [Online] Available at:

[http://www.ifc.org/wps/wcm/connect/topics\\_ext\\_content/ifc\\_external\\_corporate\\_site/sustainability-at-ifc/policies-standards/ehs-guidelines](http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/ehs-guidelines) [Accessed 06 February 2018]

(4) International Finance Corporation (IFC) (2017) Environmental, Health and Safety Guidelines for Liquefied Natural Gas (LNG) Facilities [Online] Available at:

[http://www.ifc.org/wps/wcm/connect/topics\\_ext\\_content/ifc\\_external\\_corporate\\_site/sustainability-at-ifc/policies-standards/ehs-guidelines](http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/ehs-guidelines) [Accessed 06 February 2018]

(5) International Finance Corporation (IFC) (2007) Environmental, Health and Safety Guidelines for Shipping [Online] Available at:

[http://www.ifc.org/wps/wcm/connect/topics\\_ext\\_content/ifc\\_external\\_corporate\\_site/sustainability-at-ifc/policies-standards/ehs-guidelines](http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/ehs-guidelines) [Accessed 06 February 2018]

## 2.1.2

### Quality Standards and Guidelines

#### Human Health

Indonesia has established ambient air quality standards which are published in the Government Regulation of the Republic of Indonesia Number 41 (1999) regarding Air Pollution Control (PP41/1999).

The IFC's General EHS guidelines for air emissions and ambient air quality specifies that:

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

In accordance with the IFC guidelines, the air quality standards presented in the Indonesian Regulation 'PP41/1999' should be considered the appropriate standard and are therefore used for comparison of baseline data and predicted impacts in this air quality impact assessment. A summary of the air quality standards are presented in **Table 2.1**.

**Table 2.1** *Indonesia (PP41/1999) Ambient Air Quality Standards*

Parameter	Averaging Period	Air Quality Standard (µg/m <sup>3</sup> )
Nitrogen Dioxide (NO <sub>2</sub> )	1-hour	400
	24-hour	150
	Annual	100
Sulphur dioxide (SO <sub>2</sub> )	1-hour	900
	24-hour	365
	Annual	60
Carbon Monoxide (CO)	1-hour	30,000
	24-hour	10,000
Total Suspended Particulate (TSP)	24-hour	230
	Annual	90
PM <sub>10</sub>	24-hour	150
PM <sub>2.5</sub>	24-hour	65
	Annual	15
Ozone (O <sub>3</sub> )	1-hour	50
	Annual	235
Lead (Pb)	24-hour	2
	Annual	1
Hydrocarbons (HC)	3-hours	160
Total Fluorides (F)	24-hour	3
	90 days	0.5
Chlorine and Chlorine dioxide	24-hour	150

## Ecology and Agriculture

The IFC's General EHS guidelines for air emissions and ambient air quality <sup>(1)</sup> states that:

*“Facilities or projects located within or next to areas established as ecologically sensitive (e.g. national parks), should ensure that any increase in pollution levels is as small as feasible, and amounts to a fraction of the applicable short term and annual average air quality guidelines or standards as established in the project specific environmental assessment.”*

In terms of potential impacts to ecology and agriculture, local assessment criteria do not exist and the IFC do not set standards or guidelines for protection of vegetation, however, guidelines and standards from the WHO and the EU exist and are therefore used to inform the assessment where necessary.

Air quality critical levels for the protection of sensitive ecological areas and agriculture adopted in this air quality impact assessment are presented below in **Table 2.2**. The critical level is the concentration in the atmosphere above which direct adverse effects on ecological receptors, such as plants or ecosystems may occur. These critical levels will be used for comparison against predicted impacts in this air quality impact assessment.

**Table 2.2** *Air Quality Critical Levels used for the Assessment of Impacts on Sensitive Ecological and Agricultural Receptors*

Substance	Averaging Period	Critical Levels ( $\mu\text{g}/\text{m}^3$ ) <sup>(1,2)</sup>
Nitrogen Oxides (NO <sub>x</sub> )	Annual mean	30
Sulphur dioxide (SO <sub>2</sub> )	Annual Mean	20

(1) World Health Organisation (WHO) Air Quality Guidelines for Europe, 2nd edition (2000) [Online] Available at: [http://www.euro.who.int/\\_data/assets/pdf\\_file/0005/74732/E71922.pdf](http://www.euro.who.int/_data/assets/pdf_file/0005/74732/E71922.pdf) [Accessed 01 February 2018]

(2) Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on Ambient Air Quality and Cleaner Air for Europe Available at: <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32008L0050&from=EN> [Accessed 01 February 2018]

Salt deposition threshold values above which injury to crops have also been identified are presented in **Table 2.3** <sup>(2)</sup>. The research indicates that many species have thresholds for visible leaf damage in the range of 10-20

(1) International Finance Corporation (IFC) (2007) Environmental, Health and Safety Guidelines, General EHS Guidelines: Environmental Air Emissions and Ambient Air Quality [Online] Available at:

[http://www.ifc.org/wps/wcm/connect/topics\\_ext\\_content/ifc\\_external\\_corporate\\_site/sustainability-at-ifc/policies-standards/ehs-guidelines](http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/ehs-guidelines) [Accessed 06 February 2018]

(2) United States Nuclear Regulatory Commission (1999) Environmental Standard Review Plan. *Office of Nuclear Reactor Regulation* [Online] Available at: <https://www.nirs.org/wp-content/uploads/nukerelapse/levy/exhe6bacchus.pdf> [Accessed 09 March 2018]

kilogram/hectare/month (kg/ha/mo) of NaCl during the growing season. Threshold values vary depending on rainfall frequency, humidity, and the specific sensitivity of the species. Generally it's been found that deposition rates reaching or exceeding 10kg/ha/mo in any month throughout the growing season can lead to leaf damage in many species of plant. This threshold value will be used for comparison against predicted salt deposition rates in this air quality impact assessment.

**Table 2.3** *Salt Deposition Threshold*

Substance	Averaging Period	Threshold (kg/ha) <sup>(1)</sup>
Sodium Chloride (NaCl)	Month	10

(1) United States Nuclear Regulatory Commission (1999) Environmental Standard Review Plan. *Office of Nuclear Reactor Regulation* [Online] Available at: <https://www.nirs.org/wp-content/uploads/nukerelapse/levy/exhe6bacchus.pdf> [Accessed 09 March 2018]

### 2.1.3 *Guideline Air Emission Levels*

#### *International Finance Corporation*

The IFC EHS Guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities by using existing technology at reasonable costs. The IFC Performance Standard for 'Resource Efficiency and Pollution Prevention' <sup>(1)</sup> states that:

*“when host country regulations differ from the levels and measures presented in the World Bank Group EHS Guidelines, projects are required to achieve whichever is the more stringent. If less stringent levels or measures than those provided in the EHS Guidelines are appropriate in view of specific project circumstances, a full and detailed justification must be provided for any proposed alternatives through the environmental and social risks and impacts identification and assessment process. This justification must demonstrate that the choice for any alternate performance levels is consistent with the objectives of this performance standard.”*

The relevant emission limits as per the IFC EHS Guidelines for natural gas fired thermal power plants greater than 50 megawatt thermal input (MWth) are presented in **Table 2.4**.

(1) International Finance Corporation (IFC) (2012) Resource Efficiency and Pollution Prevention [Online] Available at: [http://www.ifc.org/wps/wcm/connect/topics\\_ext\\_content/ifc\\_external\\_corporate\\_site/sustainability-at-ifc/policies-standards/performance-standards/ps3](http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/performance-standards/ps3) [Accessed 01 February 2017]

**Table 2.4 International Finance Corporation (IFC) Air Emissions Guidelines for Combustion Turbine (>50MWth)**

Combustion Technology / Fuel	Particulate Matter (PM)	Sulphur Dioxide (SO <sub>2</sub> )	Nitrogen Oxides (NO <sub>x</sub> )	Dry Gas, Excess O <sub>2</sub> content (%)
	in mg/Nm <sup>3</sup> or as indicated			
	NDA <sup>(1)</sup> / DA <sup>(2)</sup>	NDA <sup>(1)</sup> / DA <sup>(2)</sup>	NDA <sup>(1)</sup> / DA <sup>(2)</sup>	
Natural Gas (all turbine types of unit >50MWth <sup>(3)</sup> )	n/a	n/a	51 (25ppm)	15%

(1) Non-degraded airshed  
(2) Degraded airshed  
(3) Megawatt thermal input

*Indonesian Regulation on Emission of Thermal Power Industry*

Indonesia has established industry specific emission limit guidelines for gas fired power plants published in the Indonesian Regulation of the Minister of Living Environment Number 21 (2008). These guideline values are presented below in **Table 2.5**.

**Table 2.5 Environmental Ministry Regulation No. 21 Year (2008) Emission Limits for Gas Fired Power Plant**

Combustion Technology / Fuel	Particulate Matter (PM)	Sulphur Dioxide (SO <sub>2</sub> )	Nitrogen Oxides (NO <sub>x</sub> )
Gas	30	150	320

(1) The gas volume is measured in standard state (25 ° C and atmospheric pressure 1).  
(2) All parameters were corrected with O<sub>2</sub> by 15% in dry state

*Applicable Emission Limits*

In accordance with the IFC performance standards the NO<sub>x</sub> emission guidelines advocated by the IFC should take precedence as it is more stringent than the local emission limits for gas fired power plants. On this basis the Project should ensure that emission concentrations in stack emissions from the CCGT power plant do not exceed 51mg/Nm<sup>3</sup>. The assessment of the likely impacts on ambient air quality presented in *Section 6.4* is based on this finding.

The impact on air quality resulting in emissions of SO<sub>2</sub> and PM have been scoped out of this air quality impact assessment and this is discussed in more detail in **Section 3.9**.

**2.1.4 Stack Height**

The IFC EHS guideline for ambient air quality and air emissions set out the Good International Industry Practice (GIIP) general approach for determining the stack height so as to avoid downwash from nearby structures. The guidance also provides information on the structures which should be considered. The guidance specifically states that the GIIP approach is recommended in order to “to avoid excessive ground level concentrations due to

*downwash, wakes, and eddy effects, and to ensure reasonable diffusion to minimize impacts.”* In order to assess whether any nearby structures would result in excessive ground level concentrations due to building downwash, the GIIP guidance was considered and the relevant buildings were included in the dispersion model as discussed in more detail in **Table 6.7**. The results of the air dispersion modelling were compared to the relevant air quality standards to evaluate if excessive ground level concentrations were apparent. Given that the predicted ground level concentrations are well below the relevant air quality standards, the stack height is determined to be in line with the stated objective of the stack height guidance (refer to **Section 6.4**).

### 3 SCREENING ASSESSMENT

#### 3.1 OVERVIEW

This section presents the findings of a preliminary qualitative screening assessment undertaken to identify Project activities, processes and emissions which require consideration within the scope of the detailed air quality impact assessment presented in **Section 6**.

#### 3.2 ON SITE CONSTRUCTION PLANT

During the construction phase of the Project there will be a requirement for mobile and non-mobile plant, including, for example, bulldozers, loaders, excavators, mobile cranes, pile machines, graders, scrapers, pile driver excavators, dump trucks, and generators, etc. Elevated ambient concentrations of nitrogen dioxide (NO<sub>2</sub>), sulphur dioxide (SO<sub>2</sub>), and particulate matter (PM<sub>2.5</sub> and PM<sub>10</sub><sup>(1)</sup>) from the exhaust emissions are expected. The Institute of Air Quality Management (IAQM)<sup>(2)</sup> states that:

*“exhaust emissions from on-site plant (also known as non-road mobile machinery or NRMM) and site traffic suggests that they are unlikely to make a significant impact on local air quality, and in the vast majority of cases they will not need to be quantitatively assessed. For site plant and on-site traffic, consideration should be given to the number of plant/vehicles and their operating hours and locations to assess whether a significant effect is likely to occur.”*

The detailed construction schedule including locations of individual sources in any given period of time is not known. Emissions to air from onsite mobile and non-mobile plant will be intermittent and spatially variable throughout the construction phase period as different activities take precedence. The impacts to air quality will be highly dependable on the operating time of individual mobile and non-mobile plant, meteorological conditions and the relative distance to sensitive receptors. On this basis it is recognised that a representative and accurate dispersion model is difficult to define.

Instead, whilst it is acknowledged that exhaust emissions will have some impact on air quality, the assumption is that with the implementation of internationally recognised good practice air quality management measures for

(1) TSP shall mean particulate matter with an aerodynamic diameter no greater than 30 µg; PM<sub>10</sub> shall mean particulate matter with an aerodynamic diameter no greater than 10µg; and PM<sub>2.5</sub> shall mean particulate matter with an aerodynamic diameter no greater than 2.5µg. Definitions from United States Environmental Protection Agency (USEPA) (1995) AP-42 Section 13.2 Fugitive Dust Sources [Online] Available at: <https://www3.epa.gov/ttnchie1/ap42/ch13/> [Accessed 06 February 2018]

(2) Institute of Air Quality Management (IAQM) (2014) Guidance on the Assessment of Dust from Demolition and Construction [Online] Available at: <http://iaqm.co.uk/guidance/> [Accessed 06 February 2018]

land based vehicles and equipment such as those presented in the IFC EHS Guidelines for Air Emissions and Ambient Air Quality <sup>(1)</sup>, impacts to relevant sensitive receptors in the study area due to exhaust emissions from diesel powered vehicles and equipment used on site are considered negligible and are therefore not considered further.

### 3.3 GENERAL CONSTRUCTION ACTIVITIES

Elevated ambient concentrations of TSP and PM<sub>10</sub> from earthwork activities, construction of the Project infrastructure, and trackout of dusty materials onto the public road network has the potential to cause impacts on sensitive receptors in the vicinity of the named activities if not managed accordingly. Dust deposition and/or visible dust plumes arising from construction sites can also cause nuisance affecting local amenities and quality of life. Dust emissions can vary substantially from day to day and will depend on the level of activity, the specific operations being undertaken and the meteorological conditions at the time of release. Given the complexity and specific nature of fugitive dust emissions, the potential impacts to air quality from construction related activities could lead to significant adverse impacts on air quality and have therefore been given further consideration in *Section 6.2* this air quality impact assessment.

### 3.4 OFFSITE TRAFFIC

The Project will generate additional traffic on the local road network during construction and operation phase as a result of worker vehicles and vehicles delivering materials to site and removing residual products. The Institute of Air Quality Management (IAQM) states that:

*“For site traffic on the public highway, if it cannot be scoped out (for example by using the EPUK’s criteria), then it should be assessed using the same methodology and significance criteria as operational traffic impacts.”*

The Environmental Protection UK (EPUK) <sup>(2)</sup> indicative criterion to proceed with a detailed air quality impact assessment is as follows:

- daily traffic flows increase by more than 500 vehicles/day; and/or

(1) International Finance Corporation (IFC) (2007) Environmental, Health and Safety Guidelines, General EHS Guidelines: Environmental Air Emissions and Ambient Air Quality [Online]  
Available at:

[http://www.ifc.org/wps/wcm/connect/topics\\_ext\\_content/ifc\\_external\\_corporate\\_site/sustainability-at-ifc/policies-standards/ehs-guidelines](http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/ehs-guidelines) [Accessed 06 February 2018]

(2) Guidance from the Environmental Protection UK and Institute of Air Quality Management (IAQM) (2017) Land-Use Planning & Development Control: Planning for Air Quality [Online]  
Available at: <http://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf>  
[Accessed 06 February 2018]

- heavy goods vehicles (HGV) flows increase by more than 100 vehicles/day.

During the construction phase it is expected that more than 40,000 vehicles will be utilised for material transportation required for the construction of the CCGT. This includes the mobilisation of vehicles to transport 57,000 m<sup>3</sup> of infill soil for levelling of the CCGT site. Based on an 8 m<sup>3</sup> (>3.5t) dump truck capacity this is estimated to be approximately 200 dump truck trips/day to the CCGT site. Transportation of the 57,000 m<sup>3</sup> construction materials for the CCGT requires an estimated 27,360 trips or 76 truck trips/day over the construction period. For the Cibatu substation site, approximately 15,000 truck trips are required for the site levelling, equating to 120 truck trips/day. For jetty construction, the transportation of infill material to site, small equipment and construction materials is estimated to require approximately 14 truck trips/day. Construction of the transmission towers will require a total of approximately 1,000 trips per year to transport materials such as steel piece, cement, sand and gravel.

Although the exact traffic route(s) and specific traffic flow increases on each route are unknown, the above information indicates that traffic flows during the construction phase of the project may exceed the EPUK criterion on certain roads. The potential impacts to air quality from exhaust emissions from offsite traffic therefore requires further consideration within the detailed air quality impact assessment and is presented in **Section 6.3**.

The specific increase in traffic flows during the operation phase is not known, however vehicle journeys during the operation phase are expected to be substantially less than during the construction phase and primarily associated with the workforce employed at the plant and some occasional deliveries etc. The change in traffic flows during the operation phase are not expected to exceed the EPUK screening criteria thus impacts to air quality are considered negligible and not considered further.

### 3.5

#### ***UNPAVED ACCESS ROADS***

Elevated ambient concentrations of TSP and PM<sub>10</sub> from vehicles operating on unpaved access roads has the potential to cause impacts on sensitive receptors within several hundred meters from the road. Dust deposition and/or visible dust plumes arising from unpaved roads can cause nuisance affecting local amenities and quality of life.

The main existing access road to the power plant site is paved, therefore dust emissions are not considered likely. It is understood that new access roads will be constructed for main access to the power plant and within the plant area itself. There will also be a new access road to connect the power plant to the jetty and intake pumping station area. It is expected that these roads will be paved therefore dust emissions are not considered likely.

The access to the construction areas associated with the transmission lines will be via existing main roads where possible. The exact route and proximity to sensitive receptors has not been defined, however it is expected that with the implementation of standard good practice mitigation measures, dust from unpaved roads can be controlled and reduced to an acceptable level throughout the duration of the construction phase.

The likely impacts from dust emissions and suggested mitigation is discussed in detail in **Section 6.2** of this air quality impact assessment. The relevant control measures should be applied to unpaved access roads associated with the Project throughout the construction and operation phase where necessary.

### 3.6 *SHIPPING*

The Project will generate additional ships during the construction and operation phase. Exhaust emissions of NO<sub>x</sub>, NO<sub>2</sub>, SO<sub>2</sub>, PM<sub>2.5</sub> and PM<sub>10</sub> from these ships has the potential to adversely impact ambient air quality. Research from UK technical guidance document TG (16) <sup>(1)</sup> recommends that a detailed assessment is only required for large ports, defined as more than 5,000 movements per year, and where there is relevant public exposure within 1km of berthing and manoeuvring.

During the construction and operation phase it is not known how many ship movements will be required exactly, but it is expected that the emission will be intermittent, short term and transient in nature; and the number of ship movements will not exceed 5,000. It is further expected that the international good practice recommendations to prevent, minimise and control exhaust emissions from ships presented in the IFC EHS Guidelines for Shipping <sup>(2)</sup> will be implemented the construction and operation phase. On this basis the potential impacts of shipping emissions are considered negligible and have not been considered further.

### 3.7 *FLOATING STORAGE AND REGASIFICATION UNIT (FSRU)*

The FSRU will be equipped with a number of dual fuel generators for operation activities. The generators will operate on gas during normal operation. It is considered unlikely that diesel oil will be required. Exhaust emissions of NO<sub>x</sub>, SO<sub>2</sub>, and PM has the potential to adversely impact ambient

(1) Department for Environment Food and Rural Affairs (DEFRA) Local Air Quality Management Technical Guidance (TG16) (2016) [Online] Available at: <https://laqm.defra.gov.uk/documents/LAQM-TG16-April-16-v1.pdf> [Accessed 06 February 2018]

(2) International Finance Corporation (IFC) (2007) Environmental, Health and Safety Guidelines for Shipping [Online] Available at: [http://www.ifc.org/wps/wcm/connect/topics\\_ext\\_content/ifc\\_external\\_corporate\\_site/sustainability-at-ifc/policies-standards/ehs-guidelines](http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/ehs-guidelines) [Accessed 06 February 2018]

air quality. The IFC EHS Guidelines for Air Emissions and Ambient Air Quality <sup>(1)</sup> states that:

*“significant sources of point emissions are considered to be a general source which contribute a net emission increase of one or more of the following pollutants within a given airshed: PM<sub>10</sub>: 50 tons per year (tpy); NO<sub>x</sub>: 500 tpy; SO<sub>2</sub>: 500 tpy.”*

Based on the Project information provided in **Table 3.1**, the estimated net emission increase of NO<sub>2</sub> and PM is 34tpy and <1tpy respectively when considering regasification capacity of 300 million standard cubic feet per day (mmscfd). The mass emission rates are therefore well below the IFC significance criteria. The sulphur content of the pilot oil is expected to be 0.1% and SO<sub>2</sub> emissions are therefore considered negligible. Furthermore, the FSRU will be located 8km from the shore and any sensitive receptor locations. On this basis the potential impacts on air quality from the FSRU generators are considered negligible and have not been considered further.

**Table 3.1 FSRU Dual-Fuel Generator Information Operating on Gas**

Parameter <sup>(1)</sup>	Unit	Generator Information		
		No.1 Main	No.2 Main	No.4 Main
Description		Generator	Generator	Generator
		Engine	Engine	Engine
Stack height	m	~51	~51	~51
Exhaust gas pipe diameter	m	0.648	0.648	0.598
Mass flow rate <sup>(2)</sup>	kg/h	18865	18865	14149
Emission temperature <sup>(2)(3)</sup>	C	254	254	247
<b>Mass Emission Rates</b>				
NO <sub>x</sub>	kg/hr	3.9	3.9	2.9
PM	kg/hr	0.04	0.04	0.03
SO <sub>2</sub> <sup>(4)</sup>	kg/hr	Negligible	Negligible	Negligible

(1) During normal operating condition (considering regas. capacity of 300 mmscfd), 3 sets of main generator engines are operating. The other fuel consumption equipment are not operating (e.g., auxiliary boilers, GCU).  
(2) Based on ISO condition and gas mode  
(3) Exhaust gas temperature after economiser  
(4) SO<sub>2</sub> emission is negligible as 0.1% sulphur content MGO is considered to be used as pilot oil

### 3.8 ONSHORE RECEIVING FACILITY (ORF)

During the operation phase of the Project there will be a 70 m high pressure cold gas vent located at the ORF. The purpose of the vent is to safely dispose of hydrocarbon to atmosphere under maintenance and emergency relief. The composition of the vented gas is presented in **Table 3.2**. The gas is ‘sweet’

(1) International Finance Corporation (IFC) (2007) Environmental, Health and Safety Guidelines, General EHS Guidelines: Environmental Air Emissions and Ambient Air Quality [Online] Available at:

[http://www.ifc.org/wps/wcm/connect/topics\\_ext\\_content/ifc\\_external\\_corporate\\_site/sustainability-at-ifc/policies-standards/ehs-guidelines](http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/ehs-guidelines) [Accessed 06 February 2018]

meaning it is largely free of acidic gases such as carbon dioxide (CO<sub>2</sub>) and hydrogen sulphide (H<sub>2</sub>S) and consists primarily of methane (CH<sub>4</sub>). Methane is relatively non-toxic and has no ambient air quality standard associated with it. It is noted that some small quantities of other hydrocarbons exist in the feed gas, however these are very small and considered unlikely to have an adverse impact on ambient air quality given the height of the stack and the occasional and short term nature of venting. Furthermore, the vent stack will be designed to account for the hydrocarbon lower explosive limits (LELs) acceptable on the facility and will have sufficient velocity to mix air with gas to maintain the mixed concentration below the flammable limit. It is expected that this design will effectively mix and disperse the gas into the atmosphere and impacts on air quality at ground level will be negligible. On this basis the potential impacts on air quality from the cold gas vent are considered negligible and have not been considered further.

**Table 3.2** *Feed Gas Composition*

Component	Typical Value (% Mol)	Min/Max value (% Mol)
Oxygen	0.00	Max 0.2%
Nitrogen	0.35	Max 1%
Carbon Dioxide	0.00	Max 3%
Methane	96.66	Min 85%
Ethane	2.30	Max 8%
Propane	0.47	Max 4%
i-Butane	0.09	Max 2%
n-Butane	0.11	Max 2%
i-Pentane	0.02	Max 0.1%
n-Pentane	0.00	Max 0.2%
HHV (BTU/SCF)	1036	1000 to 1150

### 3.9 COMBINED CYCLE GAS TURBINE (CCGT) POWER PLANT

The combustion of natural gas in the 1,760MW thermal power plant has the potential to impact air quality at sensitive receptors across a wide area depending on operating conditions and meteorological conditions. The European Commission<sup>1</sup> Best Available Techniques (BAT) Reference Document for Large Combustion Plants specifies that the emissions from the combustion of natural gas are principally NO<sub>x</sub> and CO with mostly negligible dust and SO<sub>2</sub> emissions. The document further states that dust and SO<sub>2</sub> emissions are not an environmental concern under normal and controlled combustion conditions.

The combustion of natural gas in the CCGT power plant and the subsequent NO<sub>x</sub> and CO emissions to air are considered the main focus of this air quality impact assessment and is given further detailed consideration in **Section 6.4**.

(<sup>1</sup>) European Commission (2017) Best Available Techniques (BAT) Reference Document for Large Combustion Plants [Online] Available at: [http://eippcb.jrc.ec.europa.eu/reference/BREF/LCP/JRC107769\\_LCP\\_bref2017.pdf](http://eippcb.jrc.ec.europa.eu/reference/BREF/LCP/JRC107769_LCP_bref2017.pdf) [Accessed 06 February 2018]

### 3.10 *DIESEL ENGINE-GENERATORS*

The Project will be equipped with twelve 2MWel (24MWel total) diesel powered engine-generators required to start-up the main power plant (i.e. black start). The exhaust emissions to air can result in elevated ambient concentrations of NO<sub>2</sub>, SO<sub>2</sub>, CO, PM<sub>10</sub> and PM<sub>2.5</sub> and subsequent short term impacts on ambient air quality. It is understood that for a black start, all twelve engines will be required to operate at their full power output for a 50 minute duration. Although the generators are expected to be used for only a limited duration when required, the short term (1-hour) impacts on air quality can be significant and have therefore been considered in more detail in **Section 6.5** of this air quality impact assessment.

It is understood that one of the twelve diesel powered engine-generators will be required in case of a station black out and/or emergency power for the safe shutdown of the power plant in the event of loss of main supply. The assessment of the potential short term (1-hour) impacts on air quality have been considered in detail in **Section 6.5** of this air quality impact assessment.

### 3.11 *COOLING TOWERS*

The Project will be equipped with two wet cooling tower systems necessary for the normal operation of the power station. The system will utilise sea water and will dissipate large heat loads to the atmosphere. Due to the direct contact between the cooling water and the air passing through it, small amounts of water are lost as liquid drift. The liquid drift evaporates to a solid salt crystal when the water in the drift evaporates. The deposition of salt (Sodium Chloride (NaCl)) on the surrounding agriculture can have an adverse impact on crop production. The assessment of NaCl deposition and its effect on agriculture has been considered in in **Section 6.6**.

### 3.12 *DECOMMISSIONING*

The decommissioning of the proposed Project will likely include deconstruction of structures and buildings and include similar activities and impacts as during the construction phase. It is assumed that mitigation and management implemented during construction will be similarly applied during decommissioning; therefore decommissioning impacts are not assessed further.

## 4 IMPACT ASSESSMENT CRITERIA FOR DETERMINING IMPACTS TO AIR QUALITY

### 4.1 OVERVIEW

With regard to air quality, there is no Project specific approach for determining the magnitude and significance of impacts. This air quality impact assessment, therefore, makes specific consideration of the guidance set out by the IFC when defining the magnitude and significance of impacts to air quality.

The significance criteria used in this air quality impact assessment are discussed in this section.

### 4.2 AIR QUALITY ASSESSMENT SIGNIFICANCE CRITERIA

The *magnitudes* of impacts during the construction and operation phase were quantified using qualitative and quantitative techniques (see *Section 6*). The magnitude of the impact was ascertained by means of comparison to air quality standards and is based upon whether or not the impacts result in air quality standards being exceeded or contribute a substantial proportion of airborne pollutants in the local airshed. Magnitude is based on both the 'Project Contribution (PC)'; this is the impact arising solely from project related emissions, and the Predicted Environmental Concentration (PEC); this is the PC added to the existing baseline.

In order to determine the *significance* of those impacts, consideration is then required to the sensitivity of the area in question, based on sensitivity of human health and ecology within the study area. Examples of receptor type and sensitivity for the purpose of this air quality impact assessment are presented in **Table 4.1**.

There are a small number of specific cases where the sensitivity may be defined as 'High'; these include hospitals, for example, where there are intensive care units or high dependency wards, or internationally designated sites e.g. RAMSAR. In general, the approach used in this assessment assumes that sensitivity within the general study area is 'Medium' for human health and ecological receptors, noting that no hospitals or internationally designated ecological sites have been identified (see **Section 5.2**). Under no circumstances is the sensitivity for human health described as 'Low'.

**Table 4.1** *Receptor Sensitivity*

Receptor Sensitivity	Human Health	Ecology
High	Hospitals	Internationally Designated Sites

Receptor Sensitivity	Human Health	Ecology
Medium	General Population	Nationally Designated Sites
Low	n/a	<ul style="list-style-type: none"> <li>Locally Designated Sites (Areas of specific ecological interest not subject to statutory protection)</li> <li>Agriculture</li> </ul>

The IFC make a differentiation in the significance of impacts, based upon the existing baseline. Essentially, this is whether air quality guidelines or standards are exceeded or not due to baseline concentrations.

The IFC General EHS Guidelines state:

*“Projects with significant sources of air emissions, and potential for significant impacts to ambient air quality, should prevent or minimise impacts by ensuring that:*

- Emissions do not result in pollutant concentrations that reach or exceed relevant ambient quality guidelines and standards by applying national legislated standards, or in their absence, the current WHO Air Quality Guidelines, or other internationally recognised sources.*
- Emissions do not contribute a significant portion to the attainment of relevant ambient air quality guidelines or standards. As a general rule, this Guideline suggests 25 percent of the applicable air quality standards to allow additional, future sustainable development in the same airshed [i.e. in an undegraded airshed]”.*

And:

*“An airshed should be considered as having poor air quality [degraded] if nationally legislated air quality standards or WHO Air Quality Guidelines are exceeded significantly”.*

The IFC guidelines further state:

*“Facilities or projects located within poor quality airsheds, and within or next to areas established as ecologically sensitive (e.g. national parks), should ensure that any increase in pollution levels is as small as feasible, and amounts to a fraction of the applicable short-term and annual average air quality guidelines or standards as established in the project-specific environmental assessment.”*

The significance of impacts is therefore defined in terms of the magnitude of impacts (i.e. the PEC), the sensitivity of the receptors, and whether the baseline pollution concentrations are above or below the air quality standards. Using this approach, the significance criteria for air quality have been defined.

Based upon these considerations the magnitude and significance of impacts for non-degraded and degraded airsheds has been derived and presented in **Table 4.2** and **Table 4.3** respectively.

**Table 4.2** *Magnitude Criteria for Assessment of Air Pollutants*

Magnitude of impact	Non-degraded airshed (i.e. baseline < AQS)	Degraded airshed (i.e. baseline > AQS)
Negligible	PC <25% of AQS	PC <10% of AQS
Small	PC between 25% and 50% of AQS and PEC <100% of AQS	PC between 10% and 30% of AQS
Medium	PC between 50% and 100% of AQS, and PEC <100% AQS; or PC between 25% and 50% of AQS, and PEC >100% of AQS	PC between 30% and 50% of AQS
Large	PC > 100% of AQS; or PC > 50% of AQS, and PEC >100% of AQS	PC > 50% of AQS

PC: Process Contribution  
 PEC: Predicted Environmental Concentration  
 AQS: Air Quality Standard/Guideline

**Table 4.3** *Determination of Significance*

Impact Magnitude	Receptor Sensitivity		
	Low	Medium	High
Negligible	Negligible	Negligible	Negligible
Small	Negligible	Minor	Moderate
Medium	Minor	Moderate	Major
Large	Moderate	Major	Major

**Box 4.1** provides a context for what the various impact significance ratings signify.

An impact of *negligible* significance is one where a resource/receptor (including people) will essentially not be affected in any way by a particular activity or the predicted effect is deemed to be 'imperceptible' or is indistinguishable from natural background variations.

An impact of *minor* significance is one where a resource/receptor will experience a noticeable effect, but the impact magnitude is sufficiently small (with or without mitigation) and/or the resource/receptor is of low sensitivity/ vulnerability/ importance. In either case, the magnitude should be well within applicable standards.

An impact of *moderate* significance has an impact magnitude that is within applicable standards, but falls somewhere in the range from a threshold below which the impact is minor, up to a level that might be just short of breaching a legal limit. Clearly, to design an activity so that its effects only just avoid breaking a law and/or cause a major impact is not best practice. The emphasis for moderate impacts is therefore on demonstrating that the impact has been reduced to a level that is as low as reasonably practicable (ALARP). This does not necessarily mean that impacts of moderate significance have to be reduced to minor, but that moderate impacts are being managed effectively and efficiently.

An impact of *major* significance is one where an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource/receptors. An aim of IA is to get to a position where the Project does not have any major residual impacts, certainly not ones that would endure into the long term or extend over a large area. However, for some aspects there may be major residual impacts after all practicable mitigation options have been exhausted (i.e. ALARP has been applied). An example might be the visual impact of a facility. It is then the function of regulators and stakeholders to weigh such negative factors against the positive ones, such as employment, in coming to a decision on the Project.

## 5 RECEIVING ENVIRONMENT

### 5.1 OVERVIEW

A critical part of the air quality impact assessment is to establish the state of the existing environment (referred to as the baseline). This section presents the air quality baseline conditions, relevant sensitive receptors meteorological conditions in the study area. This section is informed by air quality surveys undertaken by ERM to collect primary environmental data for the EIA.

### 5.2 STUDY AREA AND IDENTIFICATION OF SENSITIVE RECEPTORS

There are no set guidelines on the sphere of influence, however, taking into account the nature of activities during the construction and operation phases, and the relative locations of sensitive receptors, a study area of 500m (**Figure 5.1**) and 10km (**Figure 5.2**) around the Project has been established for the construction and operation phase respectively. The study areas have been determined so that all potentially impacted sensitive receptors closest to the Project activities during both construction and operation phase have been identified.

For the purpose of this impact assessment sensitive receptors are split into two categories as follows:

- Human – these are locations where people are present in the long term, and include villages and towns, isolated dwellings, schools, hospitals, clinics and government offices. The relevant pollutants of interest for sensitive human receptors are dust, PM<sub>2.5</sub>, PM<sub>10</sub>, NO<sub>2</sub> and SO<sub>2</sub>.
- Ecological – these are locations where there are local, national or internationally protected habitats. The relevant pollutants of interest for sensitive ecological receptors are dust, SO<sub>2</sub> and NO<sub>x</sub>. This receptor type will also include agricultural areas (i.e. paddy fields).

To provide an indication of the potentially impacted receptors during the construction and operation phase, the residential areas within 500m of the onshore pipeline and power plant site have been identified (**Figure 5.1**), and a number of representative air sensitive receptors have been plotted within 10km of the CCGT power plant (**Figure 5.2**). The latter have been selected to represent larger settlements in the study area and will be included in the dispersion model to understand the likely impacts on air quality at those specific locations (see **Section 6.4**). Air Sensitive receptors within 500m of the transmission line construction sites are also considered and part of this impact assessment however given the spatial extent of the transmission lines these have not been presented in a figure.

Within the study area there are a number of ecological receptors including protected mangrove forests as indicated by **Figure 5.3**. These areas will therefore be given consideration in the air quality impact assessment where necessary. For more information on the ecology of the area refer to **Chapter 7** of the ESIA.



Figure 5.2 Operation Phase Study Area and Representative Human Receptors

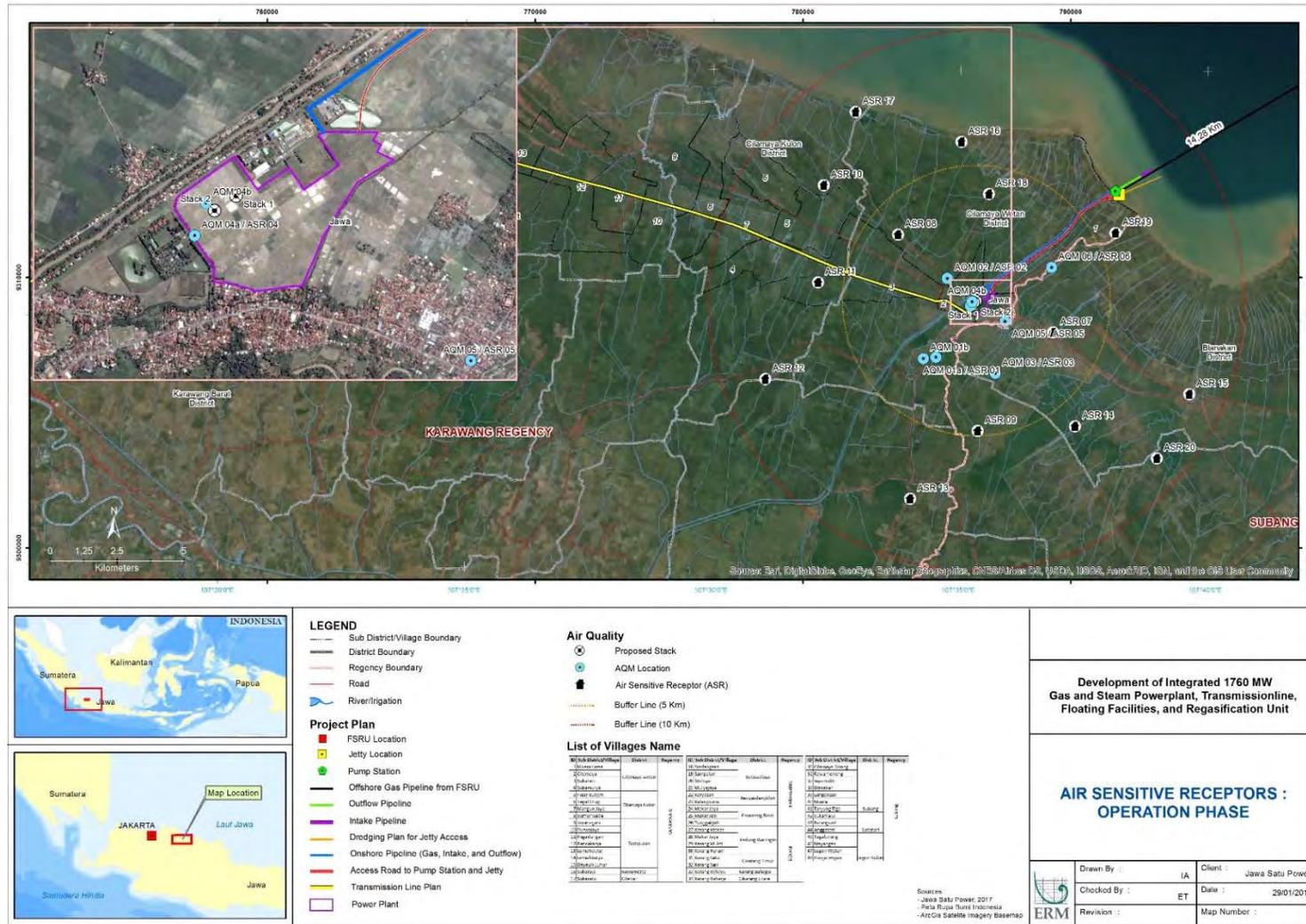
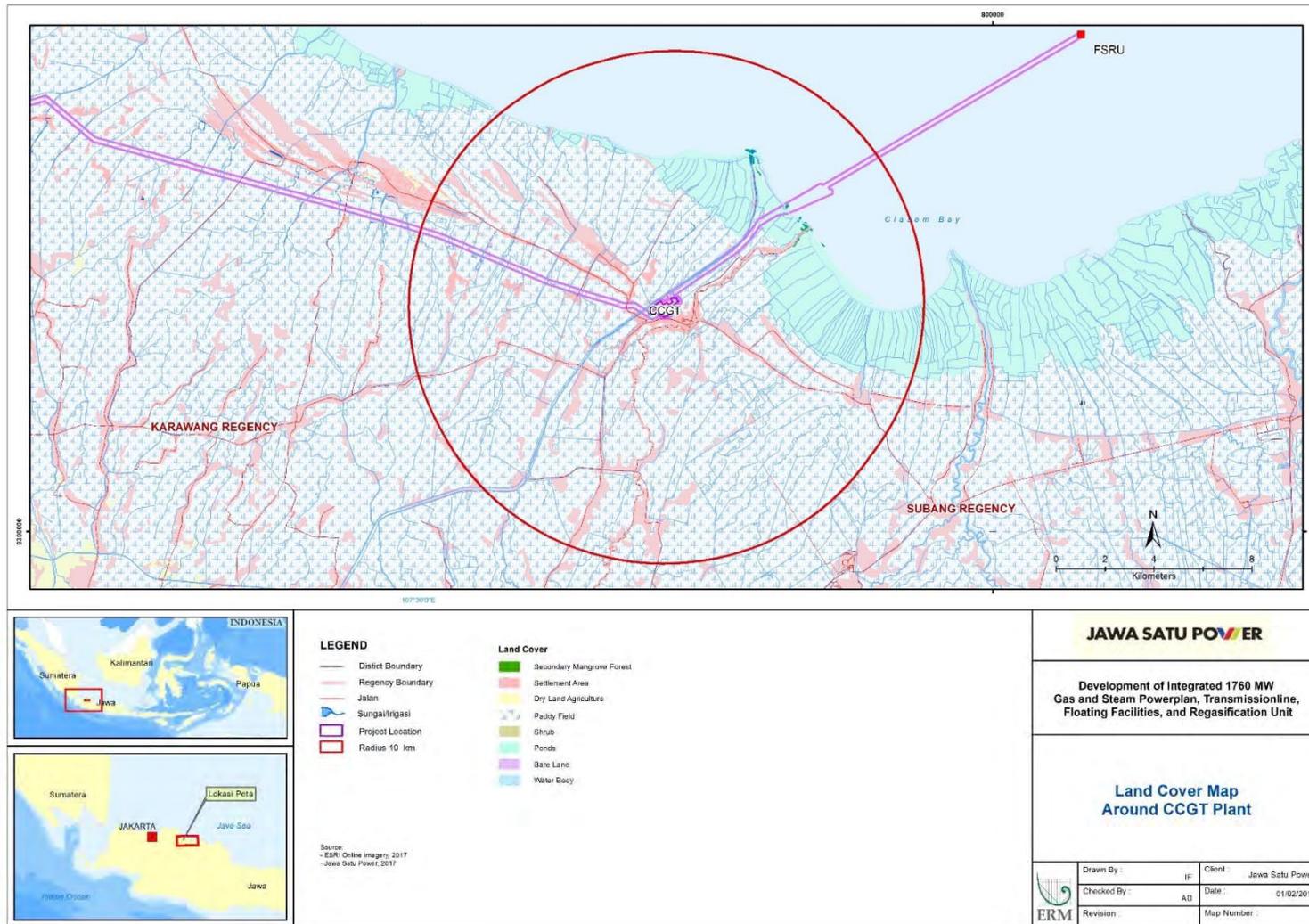


Figure 5.3 Ecology in the Study Area



## 5.3 AIR QUALITY BASELINE

### 5.3.1 Overview

In accordance with IFC guidelines <sup>(1)</sup>, measurement of existing air quality is required for emissions associated with the Project processes over time that have potential to impact the surrounding land use.

As discussed in **Section 3**, the primary focus of the air quality impact assessment relates to emissions of NO<sub>x</sub> and CO from power generation at the CCGT power plant. A project specific monitoring survey was undertaken at six locations in the vicinity of the proposed power plant site to provide an indication of ambient concentrations of NO<sub>2</sub> in the study area and to inform the air quality impact assessment. Ambient ozone (O<sub>3</sub>) concentrations were also monitored to inform the NO<sub>x</sub> to NO<sub>2</sub> conversion process in the atmosphere which is discussed in more detail in **Section 6.4**. Monitoring of CO was not undertaken as ambient concentrations of CO are typically well below the relevant air quality standards for the protection of human health and monitoring is not therefore not considered necessary.

This air quality impact assessment is informed by a twelve week Radiello diffusion tube survey and a 28 day continuous and real time monitoring survey conducted with two AQS Urban Air Quality Monitors (AQS1). Additional monitoring is currently being undertaken to further support the findings presented in assessment and will be reported as an addendum to the ESIA once completed. The expected completion date is April 2018.

The baseline assessment methods, monitoring locations and current baseline findings are discussed in more detail in the following sections.

### 5.3.2 Baseline Monitoring Methods

Ambient concentrations of NO<sub>2</sub> and O<sub>3</sub> were measured using Radiello diffusion tubes and the Aeroqual AQS Urban Air Quality Monitor (AQS-1).

#### *Radiello Diffusion Tubes*

A radiello diffusion tube is a passive sampler that consist of a small radial diffusive body made of porous polypropylene in which the cartridge with adsorbent is positioned. Radiello diffusion tubes were selected to monitor ambient NO<sub>2</sub> concentrations for the following reasons:

<sup>(1)</sup> International Finance Corporation (IFC) (2007) Environmental, Health and Safety Guidelines, General EHS Guidelines: Environmental Air Emissions and Ambient Air Quality [Online] Available at:

[http://www.ifc.org/wps/wcm/connect/topics\\_ext\\_content/ifc\\_external\\_corporate\\_site/sustainability-at-ifc/policies-standards/ehs-guidelines](http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/ehs-guidelines) [Accessed 05 February 2018]

- Tubes are inexpensive, lightweight, robust, easy to deploy and non-intrusive;
- No power source is required making them ideal in remote project locations;
- Can be located at several sites around the project location increasing the spatial variability of the assessment.

#### *Aeroqual AQS Urban Air Quality Monitor (AQS1)*

The AQS1 is a real time continuous air quality monitoring system capable of simultaneously monitoring concentrations of NO<sub>2</sub> and O<sub>3</sub> in the ambient air and logging information on a minute by minute basis. The AQS-1 was selected for the following primary reasons:

- It can operate using solar panel and batteries allowing flexibility when locating the monitor on site;
- In head to head tests with traditional United States Environmental Protection Agency (USEPA) approved analyzers, the AQS has shown r<sup>2</sup> correlations as high as 0.98;
- The monitor has a sensor for monitoring O<sub>3</sub>. Whilst not emitted from the combustion process an understanding of baseline O<sub>3</sub> is important in determining how much of the emitted NO will be converted to NO<sub>2</sub>; and
- The monitor is relatively lightweight, portable and easily deployed.

### 5.3.3 *Monitoring Locations and Duration*

A total of six air quality monitoring sites were established at locations in the vicinity of the Project. Diffusion tubes were deployed at all six locations for a total of 12 continuous weeks from the 10<sup>th</sup> August 2017 to the 20<sup>th</sup> November 2017. The AQS1 monitor system was deployed at two locations for 28 days continuously from the 08<sup>th</sup> January 2018 to the 05<sup>th</sup> February 2018.

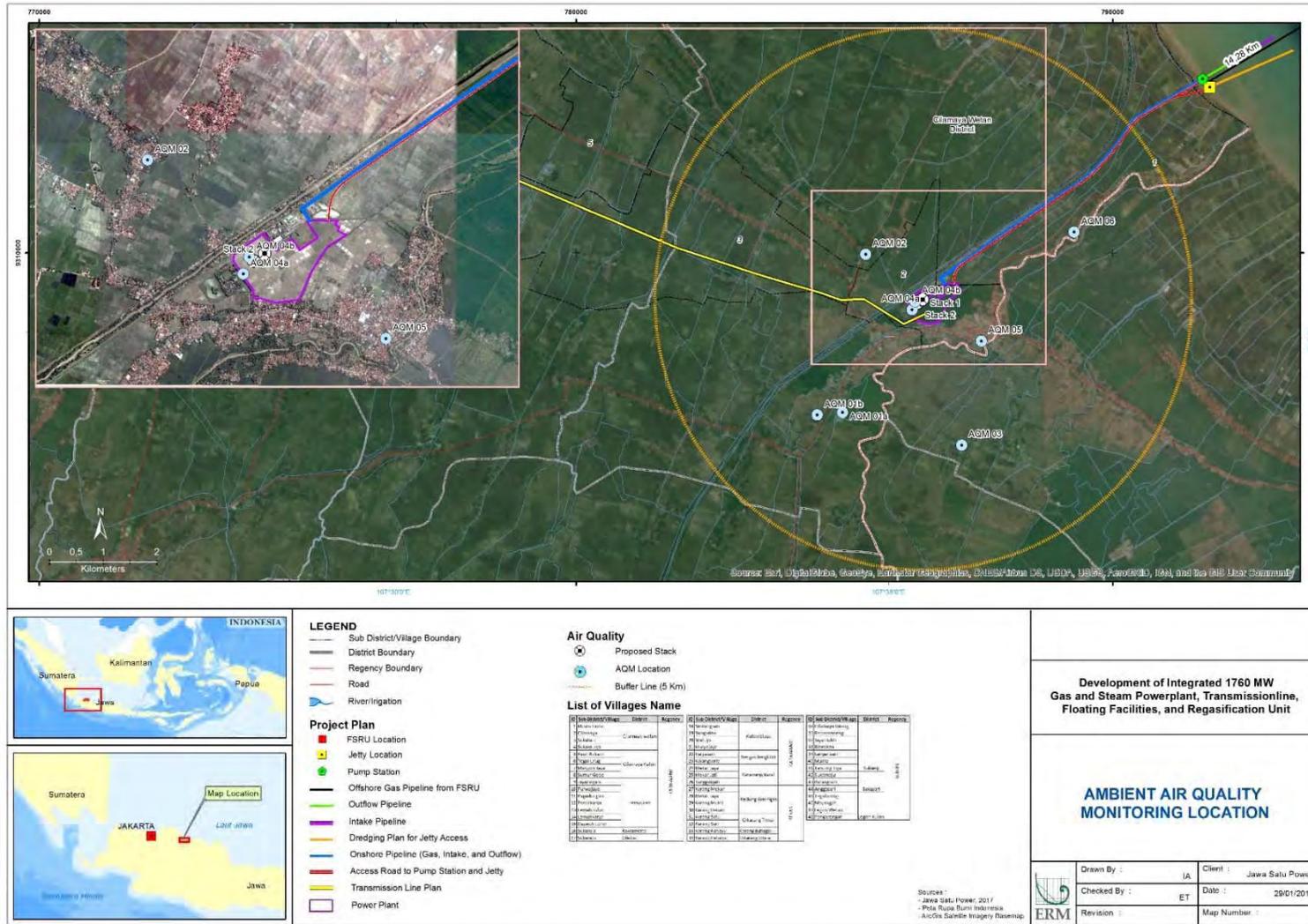
Monitoring locations were initially selected using aerial photography, local available knowledge about villages, accessibility and security to determine the most suitable locations. The final decision on locations was then made while in the field to determine the most suitable and representative locations for monitoring equipment to be deployed. The locations were generally chosen to determine the background concentration levels in areas of high population density where feasible i.e. where sensitive receptors are located.

Information regarding the monitoring locations and duration of monitoring are presented in **Table 5.1**; aerial mapping showing the location of the monitoring sites relative to the Project site is presented in **Figure 5.4** and the images of the sites are presented in **Figure 5.2 – Figure 5.12**.

**Table 5.1** *Air Quality Monitoring Summary*

Site	Land-use	Location		Method	Period	Duration	Measured Substances
		Latitude	Longitude				
AQM1a	Residential	6°15'45.62"S	107°34'31.31"E	Passive	10/08/2017 – 06/11/2017	12 weeks	NO <sub>2</sub>
AQM1b	Residential	6°15'47.29"S	107°34'16.07"E	Active	08/01/2018 – 05/02/2018	28 days	NO <sub>2</sub> and O <sub>3</sub>
AQM2	Residential	6°14'10.68"S	107°34'44.96"E	Passive	10/08/2017 – 06/11/2017	12 weeks	NO <sub>2</sub>
AQM3	Residential	6°16'4.94"S	107°35'43.62"E	Passive	10/08/2017 – 06/11/2017	12 weeks	NO <sub>2</sub>
AQM4a	Fenceline	6°14'43.79"S	107°35'13.24"E	Passive	10/08/2017 – 06/11/2017	12 weeks	NO <sub>2</sub>
AQM4b	Fenceline	6°14'38.84"S	107°35'14.94"E	Active	08/01/2018 – 05/02/2018	28 days	NO <sub>2</sub> and O <sub>3</sub>
AQM5	Residential	6°15'2.42"S	107°35'55.24"E	Passive	10/08/2017 – 06/11/2017	12 weeks	NO <sub>2</sub>
AQM6	Residential	6°13'56.72"S	107°36'51.19"E	Passive	10/08/2017 – 06/11/2017	12 weeks	NO <sub>2</sub>

Figure 5.4 Air Quality Monitoring Locations



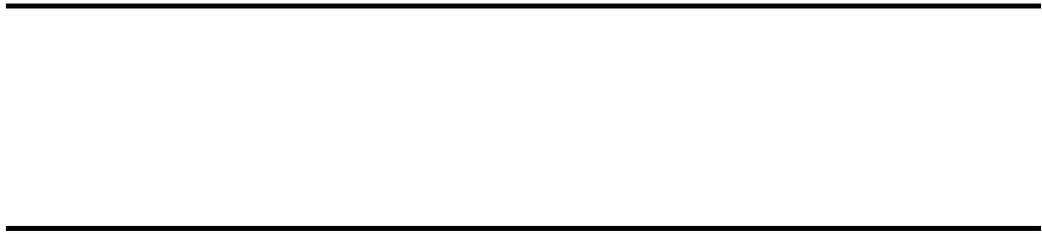
*Figure 5.5 Air Quality Monitoring Site (AQM) 1a-HOLD*



*Figure 5.6 Air Quality Monitoring Site (AQM) 1b - HOLD*



*Figure 5.7 Air Quality Monitoring Site 2 - HOLD*



*Figure 5.8 Air Quality Monitoring Site 3 - HOLD*



*Figure 5.9 Air Quality Monitoring Site 4a - HOLD*



*Figure 5.10 Air Quality Monitoring Site 4b - HOLD*



*Figure 5.11 Air Quality Monitoring Site 5 - HOLD*



*Figure 5.12 Air Quality Monitoring Site 6 - HOLD*



*Radiello Diffusion Tubes*

The NO<sub>2</sub> monitoring data from the air quality survey undertaken by ERM and supported by a specialist sub-contractor from the 10<sup>th</sup> August 2017 to the 20<sup>th</sup> November 2017 is presented below in **Table 5.2** and has indicatively been used to represent annual average background concentrations of NO<sub>2</sub> in the study area.

The baseline information also needs to be interpreted for short term periods to compare against the short term air quality standards presented in **Table 2.1**. The United Kingdom Department for Environment, Food and Rural Affairs (DEFRA) <sup>(1)</sup> recommends that the short term (i.e. the one hour average) baseline is derived by multiplying the long term by a factor of two. Furthermore, DEFRA sets out conversion factors for converting between the one hour and 24 hour periods. These conversions have been undertaken to provide baseline concentrations for comparison against the short term air quality standards and the results from applying this methodology are presented in **Table 5.2, Table 5.3** and **Table 5.4**.

A review of the baseline data against the relevant air quality standards indicates the following:

- The indicative annual mean baseline concentration is below the relevant air quality standard for the protection of human health at all monitoring locations. The highest indicative annual average is 10.1µg/m<sup>3</sup> at AQM5, 10% of the relevant air quality standard.
- The maximum indicative 1-hour average concentration is below the relevant air quality standard for the protection of human health at all monitoring locations. The highest indicative maximum 1-hour average is 35.2µg/m<sup>3</sup> at AQM5, 8.8% of the relevant air quality standard.
- The maximum indicative 24-hour average concentration is below the relevant air quality standard for the protection of human health at all monitoring locations. The highest maximum indicative 24-hour average is 20.7µg/m<sup>3</sup> at AQM5, 13.8% of the relevant air quality standard.

The results from the diffusion tube monitoring survey indicate that the ambient NO<sub>2</sub> concentrations at all sites are below the relevant air quality standards. The receiving airshed can therefore be classified as non-degraded.

(1) Department for Environment, Food and Rural Affairs (DEFRA) (2016) Air emissions risk assessment for your environmental permit [Online] Available from: <https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit> [Accessed 14 December 2017]

**Table 5.2** *Indicative Annual Mean NO<sub>2</sub> Background Concentrations Estimated from Weekly Diffusion Tube Results*

Monitoring Period	Date on	Date off	Season	AQM1a	AQM2	AQM3	AQM4a	AQM5	AQM6
				NO <sub>2</sub> µg/m <sup>3</sup>					
Week 1	10/08/17	17/08/17	Inter-monsoon	6.00	8.60	6.32	6.28	8.15	5.02
Week 2	17/08/17	24/08/17	Inter-monsoon	6.49	6.60	5.79	5.53	7.04	4.21
Week 3	28/08/17	04/09/17	Inter-monsoon	6.28	8.03	6.36	5.98	8.52	4.80
Week 4	04/09/17	11/09/17	Inter-monsoon	7.17	7.77	7.15	7.69	8.82	6.00
Week 5	11/09/17	18/09/17	Inter-monsoon	7.41	7.86	8.01	8.03	9.42	6.30
Week 6	18/09/17	25/09/17	Inter-monsoon	7.71	11.42	11.57	8.77	12.98	8.03
Week 7	25/09/17	02/10/17	Monsoon	6.37	9.61	8.23	9.2	9.8	5.17
Week 8	02/10/17	09/10/17	Monsoon	8.95	7.20	7.80	11.4	13.5	8.65
Week 9	09/10/17	16/10/17	Monsoon	8.14	6.99	8.31	11.0	17.6	7.20
Week 10	16/10/17	23/10/17	Monsoon	3.57	3.95	3.38	3.52	5.38	2.14
Week 11	23/11/17	30/11/17	Monsoon	2.78	3.68	4.89	2.91	6.22	2.52
Week 12	30/11/17	06/11/17	Monsoon	3.31	2.95	4.31	3.03	5.45	2.27
Twelve week Average Concentration <sup>(1)</sup>				5.83	6.54	6.93	7.12	10.1	5.14
Annual Air Quality Standard <sup>(2)</sup>				100					
(1) Used as an indication of the annual average concentration at each monitoring site									
(2) Indonesia (PP41/1999) Ambient Air Quality Standards									

**Table 5.3** *Maximum Indicative 1-Hour NO<sub>2</sub> Background Concentrations Estimated from Weekly Diffusion Tube Results*

Monitoring Period	Date on	Date off	Season	AQM1a <sup>(1)</sup>	AQM2 <sup>(1)</sup>	AQM3 <sup>(1)</sup>	AQM4a <sup>(1)</sup>	AQM5 <sup>(1)</sup>	AQM6 <sup>(1)</sup>
				NO <sub>2</sub> µg/m <sup>3</sup>					
Week 1	10/08/17	17/08/17	Inter-monsoon	12.0	17.2	12.6	12.6	16.3	10.0
Week 2	17/08/17	24/08/17	Inter-monsoon	13.0	13.2	11.6	11.1	14.1	8.42
Week 3	28/08/17	04/09/17	Inter-monsoon	12.6	16.1	12.7	12.0	17.0	9.60
Week 4	04/09/17	11/09/17	Inter-monsoon	14.3	15.5	14.3	15.4	17.6	12.0
Week 5	11/09/17	18/09/17	Inter-monsoon	14.8	15.7	16.0	16.1	18.8	12.6
Week 6	18/09/17	25/09/17	Inter-monsoon	15.4	22.8	23.1	17.5	26.0	16.1
Week 7	25/09/17	02/10/17	Monsoon	12.7	19.2	16.5	18.3	19.6	10.3

Monitoring Period	Date on	Date off	Season	AQM1a <sup>(1)</sup>	AQM2 <sup>(1)</sup>	AQM3 <sup>(1)</sup>	AQM4a <sup>(1)</sup>	AQM5 <sup>(1)</sup>	AQM6 <sup>(1)</sup>
				NO <sub>2</sub> µg/m <sup>3</sup>					
Week 8	02/10/17	09/10/17	Monsoon	17.9	14.4	15.6	22.8	27.0	17.3
Week 9	09/10/17	16/10/17	Monsoon	16.3	14.0	16.6	22.1	35.2	14.4
Week 10	16/10/17	23/10/17	Monsoon	7.14	7.90	6.77	7.03	10.8	4.29
Week 11	23/11/17	30/11/17	Monsoon	5.56	7.37	9.78	5.83	12.4	5.04
Week 12	30/11/17	06/11/17	Monsoon	6.62	5.90	8.61	6.05	10.9	4.55
Maximum Concentration <sup>(2)</sup>				17.9	22.8	23.1	22.8	35.2	17.3
Annual Air Quality Standard <sup>(3)</sup>				400					

(1) The results at each monitoring site are based on multiplying the 1-week average value from the diffusion tube data set presented in *Table 5.2* by a factor of two

(2) The indicative maximum 1 hour average concentration at each monitoring site

(3) Indonesia (PP41/1999) Ambient Air Quality Standards

**Table 5.4** *Maximum Indicative 24-Hour NO<sub>2</sub> Background Concentrations Estimated from Weekly Diffusion Tube Results*

Monitoring Period	Date on	Date off	Season	AQM1a <sup>(2)</sup>	AQM2 <sup>(2)</sup>	AQM3 <sup>(2)</sup>	AQM4a <sup>(2)</sup>	AQM5 <sup>(2)</sup>	AQM6 <sup>(2)</sup>
				NO <sub>2</sub> µg/m <sup>3</sup>					
Week 1	10/08/17	17/08/17	Inter-monsoon	7.08	10.1	7.46	7.41	9.62	5.92
Week 2	17/08/17	24/08/17	Inter-monsoon	7.66	7.79	6.83	6.53	8.3	4.97
Week 3	28/08/17	04/09/17	Inter-monsoon	7.41	9.48	7.50	7.06	10.1	5.66
Week 4	04/09/17	11/09/17	Inter-monsoon	8.46	9.17	8.44	9.07	10.4	7.08
Week 5	11/09/17	18/09/17	Inter-monsoon	8.74	9.3	9.5	9.5	11.1	7.43
Week 6	18/09/17	25/09/17	Inter-monsoon	9.10	13.5	13.65	10.3	15.3	9.48
Week 7	25/09/17	02/10/17	Monsoon	7.52	11.3	9.7	10.8	11.6	6.10
Week 8	02/10/17	09/10/17	Monsoon	10.6	8.50	9.21	13.4	15.9	10.2
Week 9	09/10/17	16/10/17	Monsoon	9.61	8.25	9.81	13.0	20.7	8.50
Week 10	16/10/17	23/10/17	Monsoon	4.21	4.66	3.99	4.15	6.34	2.53
Week 11	23/11/17	30/11/17	Monsoon	3.28	4.35	5.77	3.44	7.34	2.97
Week 12	30/11/17	06/11/17	Monsoon	3.90	3.48	5.08	3.57	6.43	2.68
Maximum Concentration <sup>(2)</sup>				10.6	13.5	13.7	13.4	20.7	10.2
Annual Air Quality Standard <sup>(3)</sup>				150					

Monitoring Period	Date on	Date off	Season	AQM1a <sup>(2)</sup>	AQM2 <sup>(2)</sup>	AQM3 <sup>(2)</sup>	AQM4a <sup>(2)</sup>	AQM5 <sup>(2)</sup>	AQM6 <sup>(2)</sup>
				NO <sub>2</sub> µg/m <sup>3</sup>					
(1)	The 24-hour average concentrations have been derived by multiplying the concentrations in <i>Table 5.3</i> by a factor of 0.59								
(2)	The indicative maximum 24 hour average concentration at each monitoring site								
(3)	Indonesia (PP41/1999) Ambient Air Quality Standards								

### *Aeroqual AQS Urban Air Quality Monitor (AQS-1)*

The maximum 1-hour and 24-hour average NO<sub>2</sub> and O<sub>3</sub> concentrations collected using the AQS1 monitoring system from the 08<sup>th</sup> January 2018 to the 05<sup>th</sup> February 2018 are presented below in **Table 5.5** and **Table 5.6**. The 28 day average has also been presented to provide an indication of the long term background concentrations at each site and to provide a comparison to the annual average air quality standard. A review of the NO<sub>2</sub> baseline data against the relevant air quality standards indicates the following:

- The indicative annual mean baseline concentration is below the relevant air quality standard for the protection of human health at both monitoring locations. The highest indicative annual average is 24.1µg/m<sup>3</sup> at AQM1b, 24% of the relevant air quality standard.
- The maximum 1-hour average concentration is below the relevant air quality standard for the protection of human health at both monitoring locations. The highest maximum 1-hour average is 63.8µg/m<sup>3</sup> at AQM1b, 16% of the relevant air quality standard.
- The maximum 24-hour average concentration is below the relevant air quality standard for the protection of human health at both monitoring locations. The highest maximum 24-hour average is 32.6µg/m<sup>3</sup> at AQM1b, 22% of the relevant air quality standard.

The results from the survey indicate that the ambient NO<sub>2</sub> concentrations at both sites are below the relevant air quality standards when considering the highest 1-hour and 24-hour period. Furthermore, although not directly comparable, the 28 day average is below the long term air quality standard. The receiving airshed can therefore be classified as non-degraded for the purpose of this air quality impact assessment.

The O<sub>3</sub> data will not be used for comparison to the air quality standards, rather it has been used to determine the NO<sub>x</sub> to NO<sub>2</sub> conversion of modelled NO<sub>2</sub> predictions in **Section 6.4** and **Section 6.5**.

**Table 5.5** *AQS1 - NO<sub>2</sub> Monitoring Summary*

Monitoring Site	Maximum 1-hour	Maximum 24-hour	28-Day Average <sup>(1)</sup>
	NO <sub>2</sub> µg/m <sup>3</sup>		
AQM1b	57.1	32.6	24.1
AQM4b	63.8	32.2	23.3
Air Quality Standard <sup>(2)</sup>	400	150	100

(1) Indicative of long term average and compared to annual average air quality standard  
(2) Indonesia (PP41/1999) Ambient Air Quality Standards

**Table 5.6** *AQS1 - O<sub>3</sub> Monitoring Summary*

Monitoring Site	Maximum 1-hour <sup>(1)</sup>	Maximum 24-hour <sup>(1)</sup>	28 day Average <sup>(1) (2)</sup>
	O <sub>3</sub> µg/m <sup>3</sup>		
AQM1b	146	52.2	34.6
AQM4b	141	49.1	31.9

(1) Data has been used to determine NO<sub>x</sub> to NO<sub>2</sub> conversion rates in *Section 6.4* and *Section 6.5*.  
(2) Indicative of long term average and compared to annual average air quality standard

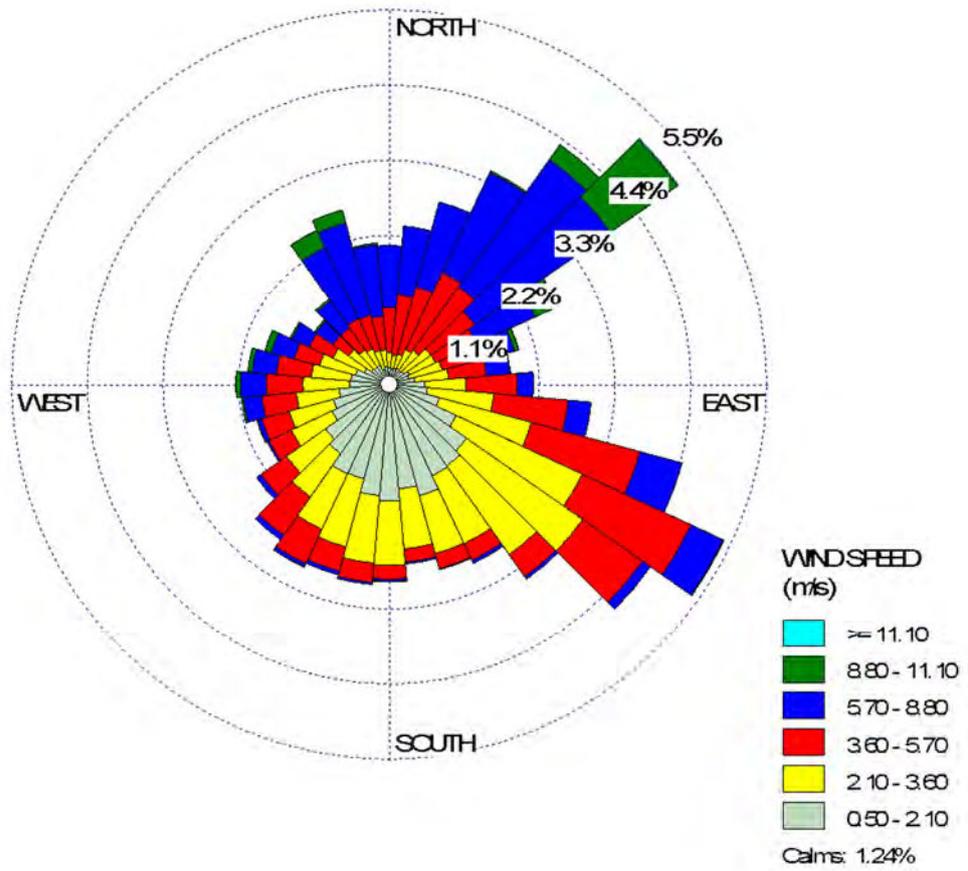
**5.4** *CLIMATOLOGY*

Meteorological data representative of the study area is crucial for supporting the detailed dispersion model assessment (see **Section 6.4** and **Section 6.5**). Following IFC recommendations, data is required for five (5) years in order to capture year on year variability. In order to fully define the meteorology, hourly sequential meteorological data is required for:

- wind speed;
- wind direction;
- precipitation;
- relative humidity;
- temperature; and
- cloud cover.

There are no meteorological stations in the vicinity of the Project that capture all these parameters or have sufficient data availability. Therefore five years of meteorological data (2013 - 2017) were modelled using the Weather Research and Forecasting Model (WRF) centred on the CCGT power plant location. The WRF model is a next-generation mesoscale numerical weather prediction system designed for both atmospheric research and operational forecasting needs. The model is extensively validated using actual observations to ensure the best possible accuracy and precision. The wind rose generated using the AERMOD meteorological pre-processor AERMET is presented in **Figure 5.13**.

Figure 5.13 Wind Rose (2013 - 2017)



## 6.1 OVERVIEW

The air quality impact assessment approach utilises qualitative and quantitative methods, including air dispersion modelling, to assess potential impacts to sensitive receptors from the key emission sources identified in **Section 3**. Where appropriate, the assessment considers existing air quality baseline conditions and assesses predicted impacts at sensitive receptors by comparing them to the relevant air quality standards presented in **Section 2.1.2**.

The main sources of emissions associated with the proposed Project which require further more detailed assessment have been identified as follows:

- Construction activities: These activities are specifically associated with earthworks, the construction of the Project infrastructure, and track-out (carrying and contamination) of materials onto public roads leading to increased ambient concentrations of TSP and PM<sub>10</sub>.
- Offsite construction traffic: The use of vehicle on the public road network during the construction phase resulting in elevated concentrations of NO<sub>2</sub> and PM<sub>10</sub>;
- Operation of the CCGT power plant: The continuous operation of two Combined Cycle Gas Turbines (CCGT) used for power generation during the normal operation of the Project resulting in elevated ambient concentrations of NO<sub>2</sub> and CO; and
- Operation of diesel-engine generators: The intermittent and infrequent use of diesel generators required for black start and emergency shut down procedures during the operation phase resulting in elevated ambient concentrations of NO<sub>2</sub>, SO<sub>2</sub>, PM<sub>2.5</sub> and PM<sub>10</sub>.

## 6.2 IMPACTS TO AIR QUALITY FROM DUST EMISSIONS DURING CONSTRUCTION

### 6.2.1 Overview

As discussed in **Section 3.3**, the activities associated with the construction phase of the Project have the potential to generate TSP and particulate matter (PM<sub>10</sub>). These activities include ground excavation, material transfer, material stockpiling, construction of the main infrastructure including the power plant, ORF and transmission lines, and trackout of dusty materials and dirt onto the public road network. Fugitive dust has the potential to cause impacts on sensitive receptors in the vicinity of the above named activities if not managed accordingly. Dust emissions can vary substantially from day to day and will depend on the level of activity, the specific operations being undertaken and the meteorological conditions.

The following section qualitatively addresses the potential impacts on human health and ecology as well as potential nuisance concerns from dust emissions associated with construction phase activities. Where activities are considered likely to result in generation of dust with potential to impact ambient air quality and/or local amenities and quality of life, mitigation has been identified so that those impacts are reduced to an acceptable level. For the purpose of the impact assessment, the construction phase activities have been grouped into three categories including earthworks, construction and trackout.

## 6.2.2 *Qualitative Impact Assessment Methodology*

The Institute of Air Quality Management (IAQM) <sup>(1)</sup> provide guidance for defining the significance arising from construction sites based on the magnitude of the change and the sensitivity of the receptors identified. The IAQM guidance has been used as the main reference document for undertaking this qualitative impact assessment.

The IAQM define the risk of dust emissions using a number of variables including, but not limited to the activities being undertaken, the duration of activities, the size of the site and the meteorological conditions. The criteria for estimating the magnitude of dust impacts as per the IAQM guidance note is presented in **Table 6.1**. The guidance further provides screening criteria of 350m and 50m from the construction site and access road respectively beyond which impacts are not considered likely. The premise of the guidance is that with the implementation of effective site specific mitigation measures, the environmental effect will not be significant in most cases. However, as the guidance is primarily developed for use in the UK, consideration is given to its applicability in Indonesia due to the dissimilar climate and differing construction working practices. On this basis, further evidence has been explored such as that specified by the USEPA <sup>(2)</sup> <sup>(3)</sup> which states that:

*“The potential drift distance of particles is governed by the initial injection height of the particle, the terminal settling velocity of the particle, and the degree of atmospheric turbulence. Theoretical drift distance, as a function of particle diameter and mean wind speed, has been computed for fugitive dust emissions. Results indicate that, for a typical mean wind speed of 16 km/hr (10 mph), particles larger than about 100 µm are likely to settle out within 6 to 9 meters (20 to 30 feet [ft]) from the edge of the road or other point of emission. Particles that are 30 to 100 µm in diameter are likely to*

(1) Institute of Air Quality Management (IAQM) (2014) Guidance on the Assessment of Dust from Demolition and Construction [Online] Available at: <http://iaqm.co.uk/guidance/> [Accessed 05 February 2018]

(2) United States Environmental Protection Agency (USEPA) (1995) AP-42 Section 13.2 Fugitive Dust Sources [Online] Available at: <https://www3.epa.gov/ttnchie1/ap42/ch13/> [Accessed 05 February 2018]

(3) United States Environmental Protection Agency (1995) AP-42 Section 13.2 Fugitive Dust Sources [Online] Available at: <https://www3.epa.gov/ttnchie1/ap42/ch13/> [Accessed 05 February 2018]

*undergo impeded settling. These particles, depending upon the extent of atmospheric turbulence, are likely to settle within a few hundred feet from the road. Smaller particles, particularly PM-15, PM-10, and PM-2.5, have much slower gravitational settling velocities and are much more likely to have their settling rate retarded by atmospheric turbulence."*

And:

*"Entrainment of dust particles by the action of turbulent air currents, such as wind erosion, are likely to occur from open exposed surfaces (such as stripped ground and stock piles) at wind speeds greater than 19 kilometers per hour( 5.3 m/s)."*

And:

*"All roads are subject to some natural mitigation because of rainfall and other precipitation and emission factors can be extrapolated to annual average uncontrolled conditions (but including natural mitigation) under the simplifying assumption that annual average emissions are inversely proportional to the number of days with measurable (more than 0.254 mm [0.01 inch]) precipitation."*

The evidence presented suggests that particulate matter generated by the Project can remain airborne and can travel several hundred feet from the source, and emissions and subsequent impacts to air quality associated with the construction activities will depend a lot upon the nature of the activities occurring at any one time or location and local meteorological conditions at the time of release.

On this basis, the potential impacts on air quality from activities including earthworks, construction and trackout have therefore been considered at a conservative distance of 500m from the project components including the CCGT power plant site and onshore pipeline right of way (RWO).

The potential impact significance from the different project components and activities and the specific mitigation measures which are required have been considered. The construction of the FSRU and Jetty have been screened out on the basis that no dust will be generated in the marine environment and no sensitive receptors exist within 500m. Where necessary professional judgement has been used to estimate the impact magnitude from the different project components and activities.

**Table 6.1 Dust Emission Magnitude (IAQM)**

Activity	Impact Magnitude		
	Small	Medium	Large
Earthworks	Total site area <2,500m <sup>2</sup> , soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4m in height, total material moved <20,000 tonnes, earthworks during wetter months	Total site area 2,500 m <sup>2</sup> - 10,000 m <sup>2</sup> , moderately dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 4 m - 8 m in height, total material moved 20,000 tonnes - 100,000 tonnes	Total site area >10,000 m <sup>2</sup> , potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds >8 m in height, total material moved >100,000 tonnes
Construction	Total building volume <25,000m <sup>3</sup> , construction material with low potential for dust release (e.g. metal cladding or timber).	Total building volume 25,000m <sup>3</sup> - 100,000m <sup>3</sup> , potentially dusty construction material (e.g. concrete), on site concrete batching;	Total building volume >100,000m <sup>3</sup> , on site concrete batching, sandblasting
Trackout	<10 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50 m.	10-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 m - 100 m	>50 HDV (>3.5t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100m

### 6.2.3

### *Construction Phase Impacts (pre mitigation)*

#### *Earthworks*

Earthwork activities are primarily associated with excavating material, haulage, tipping and stockpiling. The definition will also include site levelling and landscaping. The assessment considers the construction of the power plant and the installation of the onshore pipeline to be the project components with the greatest potential to generate dust emissions due to earthwork activities. Earthwork activities associated with the transmission line towers and the substation are also considered.

The CCGT Power Plant will be developed on a 21 ha parcel of land and earthworks will be carried out to raise the power plant platform to 4.0m above mean sea level (msl). The site is currently at 2.5m above msl, requiring the site to be raised by 1.5m from the current level, with a predicted 310,000 m<sup>3</sup> of soil needed for backfilling purposes. The IAQM consider the dust impact magnitude to be large for a site which requires >100,000m<sup>3</sup> of material to be handled (see **Table 6.1**). On the basis that all residential properties within 500m of the power plant site are considered medium sensitivity (see **Section 4.2** and **Figure 5.1**), the impact significance from earthwork activities at the power plant can be considered major adverse prior to site specific mitigation being implemented.

The proposed onshore pipelines will include three (3) main pipelines i.e. the seawater supply pipe, the waste water discharge pipe and the 20-inch gas supply pipeline. The total length of pipeline will be approximately 7.6km from the landfall point to the CCGT power plant. The right of way (ROW) for pipeline installation will be cleared and will be graded to same level using bulldozers and/or excavators. All roots and stumps shall be removed by grubbing, digging or such other means. All unwanted stumps, roots and other vegetation shall be disposed outside the boundaries of worksite. Prior to excavating in work area, all topsoil shall be stripped, stored and topsoil which is deemed to be unsuitable shall be disposed of offsite. The exact amount of material moved or number of vehicles operating at once during the onshore pipeline installation is not known. As a conservative assumption the impact magnitude from the installation of the onshore pipeline is considered medium (see **Table 6.1**). On the basis that all residential properties within 500m of the onshore pipeline ROW site are considered medium sensitivity (see **Section 4.2** and **Figure 5.1**), the impact significance from earthwork activities at the power plant can be considered moderate adverse prior to site specific mitigation being implemented.

This impact assessment associated with the earthworks within the proposed Cibatu substation site assumes that the total volume of soil for site elevation will be 125,000 m<sup>3</sup> with additional construction material with low potential for dust release (e.g. metal cladding or timber). Given the volume of soil handling the impact magnitude is considered large (see **Table 6.1**). On the basis that the

majority of residential properties are located > 500m of the substation location are not considered, however due to the existence of rice paddy in these area the sensitivity is considered low. The impact significance from the construction of the substations can therefore be considered moderate prior to site specific mitigation being implemented.

The actual land area required for each transmission line tower will depend on the nature of the tower and will range from 784m<sup>2</sup> to 1,7642m<sup>2</sup>. The IAQM consider the dust impact magnitude to be small for a site less than 2,500m<sup>2</sup> (see **Table 6.1**). Given the location of the tower footing locations, the majority of residential properties are > 500m and so are not considered, however due to the existence of rice paddy in these area the sensitivity is considered low. The impact significance from earthwork activities for the installation of the transmission lines can be considered negligible prior to site specific mitigation being implemented.

### *Construction*

The key considerations when determining the potential dust emission magnitude during the construction phase include the size of the building(s)/infrastructure, method of construction and construction materials.

The power plant complex will consist of five main buildings supported by other infrastructure. The main buildings include the Onshore Receiving Facilities (ORF), two turbine buildings, Heat Recovery Steam Generator (HRSG), Control and Electrical building (CEB), Cooling Towers, administration building and a workshop/warehouse building. The Project estimates that 57,000m<sup>3</sup> of construction materials will be required and as such is considered to have a medium impact magnitude (see **Table 6.1**). On the basis that all residential properties within 500m of the power plant site are considered medium sensitivity (see **Section 4.2** and **Figure 5.1**), the impact significance from construction activities at the power plant can be considered moderate adverse prior to site specific mitigation being implemented.

There are no construction activities *per se* associated with the installation of the onshore pipeline. Pipelines from the laydown area will be transported using trailer trucks to pipeline ROW. Dust impacts from the construction of the pipeline are considered negligible and have not been considered further.

This impact assessment of the proposed Cibatu substation assumes that the total building volume will be <25,000 m<sup>3</sup> and construction material with low potential for dust release (e.g. metal cladding or timber). On this basis the impact magnitude is considered small (see **Table 6.1**). The residential properties are > 500m and so are not considered, however due to the existence of rice paddy in these area the sensitivity is considered low. The impact significance from the construction of the substations can be considered negligible prior to site specific mitigation being implemented.

The transmission line tower foundations will be made of iron framework casted with casted concrete consist of sand, coral and cement. The project predicts that  $\pm 14,150$  cement sacks,  $\pm 1,179\text{m}^3$  sand and  $\pm 1,769\text{m}^3$  gravels will be required for the construction. Approximately  $\pm 2,463$  tons of steel material will be required to construct the towers. Given the quantity and type of materials, the impact magnitude from the construction of the transmission lines is considered small (see **Table 6.1**). Based on the proposed locations of the 118 towers, residential properties are  $> 500\text{m}$  and so are not considered, however due to the existence of rice paddy in these area the sensitivity is considered low. The impact significance from earthwork activities for the installation of the transmission lines can therefore be considered negligible prior to site specific mitigation being implemented.

#### *Trackout*

Factors which determine the dust emission magnitude are vehicle size, vehicle speed, vehicle numbers, geology and duration.

During the construction activities at the power plant site, approximately 40,000 vehicles are expected to be utilised for material transportation of the  $315,000 \text{ m}^3$  of infill soil for levelling of the CCGT site. Based on an  $8 \text{ m}^3$  ( $>3.5\text{t}$ ) dump truck capacity this is estimated to be approximately 200 dump truck trips/day to the CCGT site. Transportation of the  $57,000 \text{ m}^3$  construction materials for the CCGT requires an estimated 27,360 trips or 76 truck trips/day over the construction period. The impact magnitude with regard to trackout is therefore considered large (see **Table 6.1**). On the basis that all residential properties within 50m of the power plant site access road and up to 500m from the site entrance are considered medium sensitivity (see **Section 4.2**), the impact significance from trackout can be considered major adverse prior to site specific mitigation being implemented.

For the Cibatu substation site, approximately 15,000 truck trips are required for the site levelling, equating to 120 truck trips/day. With a medium sensitivity for residential properties within 50m of the substation and site access road, large impact magnitude for the numbers of truck trips/day ( $>50/\text{day}$ ) (see **Table 6.1**), the impact significance from trackout can be considered major adverse for the Cibatu substation.

For jetty construction, the transportation of infill material to site, small equipment and construction materials is estimated to require approximately 14 truck trips/day. An additional 400 trips per year will be required for mobilisation of  $\pm 1650$  joint pipes, pulleys and welding equipment required for the construction of the seawater supply and waste water discharge pipeline and gas pipeline. The access road for the onshore pipeline installation will use the same public road as that for CCGT access, before entering the purpose built access road from the CCGT site to the jetty and pipeline ROW. Based on this information, the impact magnitude is medium and sensitivity medium, equating to a medium impact significance.

Construction of the transmission towers will require a total of approximately 1,000 trips per year to transport materials such as steel piece, cement, sand and gravel. The movements will be coordinated from a deposition camp that is yet to be selected but will be local to the tower installation sites, relocating along the transmission line route as required. The individual transportation activities will therefore be localised to each tower location with small numbers of trucks required to transport the materials to the nearest access road for hand carry to each installation site. The impact magnitude from this Project infrastructure is therefore considered small. On the basis that any residential properties within 50m of the roads and up to 500m from the site entrance used to access the pipeline ROW and transmission line towers are considered medium sensitivity the impact significance from trackout can be considered minor adverse prior to site specific mitigation being implemented.

#### *Summary of Impacts*

A summary of the impact magnitude and impact significance pre-mitigation during the construction phase is presented below in **Table 6.2**.

**Table 6.2** *Summary of Impacts during Construction (pre-mitigation)*

<b>Project Component</b>	<b>Activity</b>	<b>Impact Magnitude</b>	<b>Impact Significance</b>
CCGT Power Plant	Earthworks	Large	Major
	Construction	Medium	Moderate
	Trackout	Large	Major
Onshore Pipeline	Earthworks	Medium	Moderate
	Construction	Negligible	Negligible
	Trackout	Medium	Moderate
Transmission Line Towers	Earthworks	Small	Negligible
	Construction	Small	Negligible
	Trackout	Small	Minor
Substations	Earthworks	Large	Moderate
	Construction	Small	Negligible
	Trackout	Large	Major

#### **6.2.4** *Recommended Mitigation, Management and/ or Monitoring Measures*

At all construction sites a series of specific project component mitigation measures for earthworks, construction and trackout are required and are presented in **Table 6.3**. Where the assessment predicts minor adverse or negligible impacts no site specific mitigation measures are proposed.

**Table 6.3** *Proposed Mitigation Measures*

Project Component	Activity	Mitigation
All construction sites	Construction	<ol style="list-style-type: none"> <li>1. Daily onsite and offsite inspections will be undertaken to visually assess the dust emissions from earthwork and construction activities, and from vehicles exiting the construction sites. Results from the inspection will be recorded and appropriate measures will be taken to reduce emissions where necessary.</li> <li>2. All dust and air quality complaints will be recorded, the cause identified and the appropriate measures taken to reduce emissions in a timely manner.</li> <li>3. Use of site watering to suppress wind and physical disturbance dust generation.</li> </ol>
	Earthworks	<ol style="list-style-type: none"> <li>1. Re-vegetate earthworks and exposed areas including stockpiles to stabilise the surfaces as soon as is practicable.</li> <li>2. Use hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.</li> <li>3. Only remove the top cover in small and specific areas during the construction phase and not all at once.</li> <li>4. Stockpiles will be placed as far as reasonably practicable from air sensitive receptor locations.</li> <li>5. The design of stockpiles will be optimised to retain a low profile with no sharp changes in shape.</li> <li>6. Real time PM<sub>10</sub> monitoring will be undertaken at two fence line locations. Monitoring will commence 3-months prior to the earthwork phase commencing.</li> </ol>
CCGT Power Plant/Substation	Construction	<ol style="list-style-type: none"> <li>1. The construction site will be planned so that machinery and dust causing activities are located away from air sensitive receptors as far as possible</li> <li>2. Wind breaks will be erected around the construction site at least the height of any stockpile on site.</li> <li>3. All sand and aggregates will be stored in bunded areas and are not allowed to dry out unless specifically required.</li> <li>4. Deliveries of cement and other fine powders will be delivered in enclosed tankers and stored in silos with suitable emission controls to prevent escape of material and overfilling during delivery.</li> </ol>
	Trackout	<ol style="list-style-type: none"> <li>1. Ensure that all vehicles entering and leaving the site are covered to avoid fugitive emissions during transport.</li> <li>2. Inspect on-site haul roads for integrity and instigate the necessary repairs to the surfaces as soon as reasonable practicable.</li> <li>3. Implement a wheel washing system.</li> <li>4. Regularly dampen/clean the site access and local roads to remove any materials tracked out of the site.</li> <li>5. Access gates will be located at least 10m from air sensitive receptors where possible.</li> </ol>

Project Component	Activity	Mitigation
Onshore Pipeline	Earthworks	<ol style="list-style-type: none"> <li>1. Re-vegetate earthworks and exposed areas including stockpiles to stabilise the surfaces as soon as is practicable.</li> <li>2. Use hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.</li> <li>3. Only remove the top cover in small and specific areas during the construction phase and not all at once.</li> <li>4. Stockpiles will be placed as far as reasonably practicable from air sensitive receptor locations.</li> <li>5. The design of stockpiles will be optimised to retain a low profile with no sharp changes in shape.</li> </ol>
	Trackout	<ol style="list-style-type: none"> <li>1. Ensure that all vehicles entering and leaving the site are covered to avoid fugitive emissions during transport.</li> <li>2. Implement a wheel washing system.</li> <li>3. Regularly dampen/clean the site access and local roads to remove any materials tracked out of the site.</li> </ol>

## 6.2.5 *Residual Impacts (post mitigation)*

When correctly applying and actively managing the mitigating controls outlined in **Section 6.2.4**, the impacts to receptors located within 500m downwind of any construction activity are likely to experience negligible impacts to air quality for the large majority of the time. However, due to the nature of construction activities and the scale and duration of the construction phase, no guarantee can be made that significant impacts will not arise under any circumstance. It can be concluded, therefore, that construction phase activities are likely to result in **Minor impact** post mitigation.

## 6.3 *IMPACTS TO AIR QUALITY FROM OFFSITE TRAFFIC DURING CONSTRUCTION*

### 6.3.1 *Overview*

As identified in **Section 3.4**, exhaust emissions from increased offsite traffic required during the construction phase could potentially lead to impacts on air quality at sensitive receptors in the study area. The potential impact to sensitive receptors has been assessed using a screening method based upon the formulae presented in the UK Highways Agency Design Manual for Roads and Bridges (DMRB) <sup>(1)</sup>.

### 6.3.2 *Assessment Methodology*

DMRB sets out a number of formulae to determine the process contribution (PC), in  $\mu\text{g}/\text{m}^3$  (atmospheric concentration) per  $\text{g}/\text{km}/\text{hr}$  (emission), of a stream of traffic to pollutant concentrations at a distance  $d$  from the road centre. These formulae are based upon modelling of a generic road and represent decreasing impacts with increasing distance from the roadside. In terms of  $\text{NO}_2$  and  $\text{PM}_{10}$ , impacts are assumed to be negligible at distances  $>200\text{m}$ .

The DMRB formulae are as follows:

- For distances 5m and less:
  - Process Contribution (PC) =  $0.063541 \mu\text{g}/\text{m}^3$  per  $\text{g}/\text{km}.\text{hr}$  (*Equation 1*)
- For distances (d) of 5m - 168m:
  - Process Contribution (PC) =  $0.17887 + 0.00024 d - (0.295776 / d) + (0.2596/d^2) - 0.0421 \ln(d) \mu\text{g}/\text{m}^3$  per  $\text{g}/\text{km}.\text{hr}$  (*Equation 2*)

<sup>(1)</sup> Design Manual for Roads and Bridges (2007) Volume 11, Section 3, Part 1 Air Quality [Online] Available at: <http://www.standardsforhighways.co.uk/ha/standards/dmr/b/vol11/section3/ha20707.pdf> [Accessed 06 February 2018]

- For distances (d) of 168m – 200m:
  - Process Contribution (PC) =  $0.0017675 - (0.0000276173 * (d-168))$   
 $\mu\text{g}/\text{m}^3$  per  $\text{g}/\text{km.hr}$  (Equation 3)

To calculate the PC for both  $\text{PM}_{10}$  and  $\text{NO}_x$ , the equation for expressing pollutant emission rates as a function of average vehicle speed takes the standard form where  $E$  is the emission rate expressed in  $\text{g}/\text{km}$ ;  $v$  is the average speed of the vehicle in  $\text{km}/\text{hr}$ ; and  $a$  to  $j$  and  $x$  are coefficients.

The equation is expressed as follows:

$$E = (a + b.v + c.v^2 + d.v^e + f.\ln(v) + g.v^3 + h/v + i/v^2 + j/v^3).x \text{ (Equation 4)}$$

For the purpose of this assessment, emissions function coefficients in Equation 4 have been based on EURO Tier 1 emission standards for HGV as specified in DMRB and presented in **Table 6.4** for reference. Concentrations of  $\text{SO}_2$  from traffic are considered negligible when using this methodology. The average speed of the vehicles is assumed to be a constant 40km per hour.

### 6.3.3 *Traffic Related Impacts (pre-mitigation)*

The DMRB methodology has been used to determine the PC of  $\text{NO}_x/\text{NO}_2$  and  $\text{PM}_{10}$  at 5m, 20m, 50m, 100m and 200m from the road side to determine the potential magnitude of the impact at air sensitive receptors located along access roads used by construction traffic during the construction phase.

Given that the exact number of vehicle movements on any given road during the construction period are not precisely known, a conservative value of 1,000 and 10,000 additional heavy good vehicle (HGV) movements per day has been used to understand the likely impacts on ambient air quality. The results from the screening assessment are presented below in **Table 6.5** and **Table 6.6**.

These results are comparable to the annual mean AQS as presented in **Table 2.1**. To compare against the short term AQS, the process contributions have conservatively been multiplied by a factor of two as per the DEFRA) <sup>(1)</sup> recommendation. The results indicate that the concentration of  $\text{NO}_2$  and  $\text{PM}_{10}$  is well below the relevant air quality standard at all distances from the road when considering the most conservative value of 10,000 HGV movements per day.

(1) Department for Environment, Food and Rural Affairs (DEFRA) (2016) Air emissions risk assessment for your environmental permit [Online] Available from: <https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit> [Accessed 14 December 2017]

**Table 6.4 Emission Function Coefficients for Total Oxides of Nitrogen and Particulate Matter**

Legislation Class	Substance	Engine Size or Vehicle Configuration	Coefficients							Valid Speed Range (km/hr)
			a	b,c,d,e,f	g	h	i	j	x	
HGV - Euro 1	NO <sub>x</sub>	Rigid	4.4	0	1.87x10 <sup>-6</sup>	126	0	-805	1	5-100
	PM		0.0896	0	5.16x10 <sup>-8</sup>	7.43	0	0	1	

**Table 6.5 Process Contribution from Construction Traffic Vehicle Exhausts (1000 AADT)**

Pollutant	HGV per day	Speed (km/hr)	Emission Rate(E) (g/km/hr)	Process Contribution (PC) µg/m <sup>3</sup>				
				5m	20m	50m	100m	200m
NO <sub>x</sub>	1000	40	319	20.3	13.9	6.50	1.93	0.282
NO <sub>2</sub> <sup>(1)</sup>			6.29	4.57	2.36	0.770	0.118	
PM <sub>10</sub>			11.6	0.738	0.504	0.236	0.0704	0.0103

(1) To calculate NO<sub>2</sub> from the calculated NO<sub>x</sub> PC is as follows: NO<sub>2</sub> road = NO<sub>x</sub> road [(-0.068 ln (NO<sub>x</sub> total) + 0.53)] (DMRB (2007) Volume 11, Section 3, Part 1 - Air Quality)

**Table 6.6 Process Contribution from Construction Traffic Vehicle Exhausts (10,000 AADT)**

Pollutant	HGV per day	Speed (km/hr)	Emission Rate(E) (g/km/hr)	Process Contribution (PC) µg/m <sup>3</sup>				
				5m	20m	50m	100m	200m
NO <sub>x</sub>	1000	40	3190	203	139	65.0	19.3	2.82
NO <sub>2</sub> <sup>(1)</sup>			33.9	26.6	15.7	6.05	1.10	
PM <sub>10</sub>			116	7.38	5.04	2.36	0.704	0.103

(2) To calculate NO<sub>2</sub> from the calculated NO<sub>x</sub> PC is as follows: NO<sub>2</sub> road = NO<sub>x</sub> road [(-0.068 ln (NO<sub>x</sub> total) + 0.53)] (DMRB (2007) Volume 11, Section 3, Part 1 - Air Quality)

#### 6.3.4 *Recommended Mitigation, Management and/or Monitoring Measures*

Based on the findings of the screening assessment presented in **Section 6.3.3** no additional mitigation or management is necessary. It is expected, however, that good practice procedures such as those outline in the IFC EHS Guidelines for Air Emissions and Ambient Air Quality <sup>(1)</sup> are implemented. These include:

- Replacing old vehicles with new, more fuel efficient alternatives;
- Converting high use vehicles to cleaner fuels, where feasible; and
- Implementing a regular vehicle maintenance and repair program.

#### 6.3.5 *Residual Impacts (post mitigation)*

The impacts to air quality from exhaust emissions due to offsite traffic during the construction phase of the Project are expected to be well below the relevant air quality standards at all distances from the road. The significance of the impact is considered minor adverse at worst when considering the overly conservative assumption that an additional 10,000 HGV movements per day will be generated by the Project. In practice this amount of HGVs is not likely and the impact to air quality is expected to be negligible.

### 6.4 *IMPACTS TO AIR QUALITY FROM CCGT POWER PLANT DURING OPERATION*

#### 6.4.1 *Overview*

As identified in **Section 3.9**, the combustion of natural gas has the potential to impact air quality at sensitive receptors across a wide area depending on operating conditions and meteorological conditions. Potential impacts to air quality from the CCGT power plant were quantified using detailed dispersion modelling.

#### 6.4.2 *Assessment Methodology*

The dispersion model used in the assessment was the USEPA AERMOD dispersion model version 16216r. AERMOD is a state of the art detailed dispersion model that can be used to represent complex multiple emission sources and predict air quality at receptor locations taking into account meteorology. The model is widely recognised for use in this type of application, including by the IFC, US EPA, UK Environment Agency and state based EPA's throughout Australia.

(1) International Finance Corporation (IFC) (2007) Environmental, Health and Safety Guidelines, General EHS Guidelines: Environmental Air Emissions and Ambient Air Quality [Online] Available at: [http://www.ifc.org/wps/wcm/connect/topics\\_ext\\_content/ifc\\_external\\_corporate\\_site/sustainability-at-ifc/policies-standards/ehs-guidelines](http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/ehs-guidelines) [Accessed 06 February 2018]

Detailed dispersion modelling was used to predict concentrations of emitted substances at ground level locations outside the Project site boundary. Five (5) years of hourly sequential meteorological data was used so that inter annual variability was incorporated into the model.

The modelling scenarios and methodology, including receptor grid spacing, meteorological data information, NO<sub>x</sub> to NO<sub>2</sub> conversion and the treatment of buildings, land use and terrain is presented in **Table 6.7** and the emission inventory is presented in **Table 6.8**

The results of the assessment comprise the maximum process contribution predicted over a period of five years from 2013 to 2017 on the receptor grid. At each of the representative human air sensitive receptors the maximum PC and the PEC for each substance of interest is presented and the significance of the impact defined using the approach outlined in **Section 4**. In addition, the maximum process contribution and predicted environmental concentration at any point on the receptor grid outside of the power plant site boundary has been identified and the significance defined.

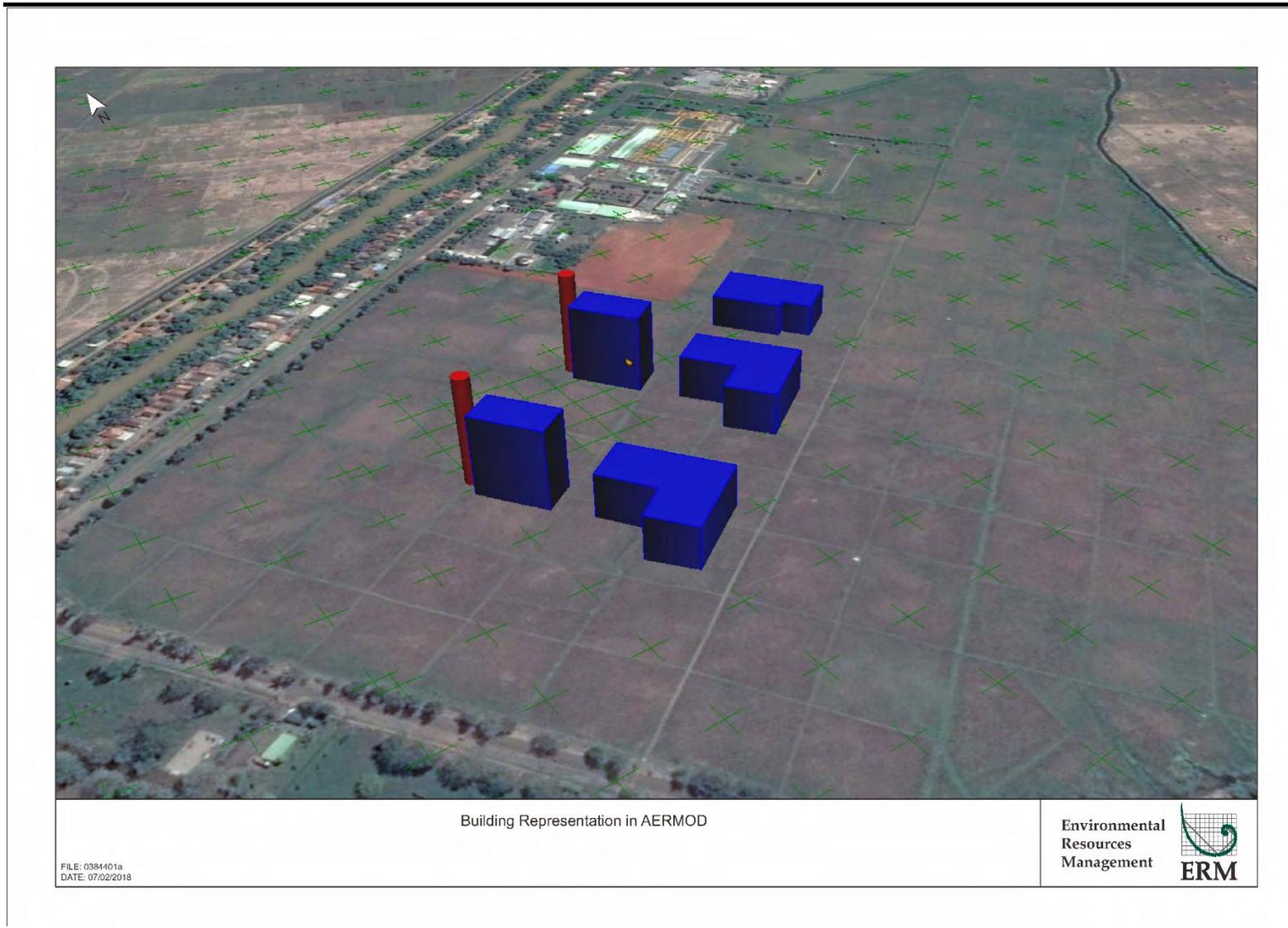
**Table 6.7 Detailed Modelling Methodology**

Modelling Component	Method/Approach
Assessment Scenario(s)	The potential short and long term impacts to air quality for relevant substances were assessed and compared against the air quality standards presented in <b>Table 2.1</b> . The air quality standards do not specify any allowable exceedances of the stated standard in any given period of time, therefore the short term 1-hour and 24-hour impacts from the project were based on the highest 99.9th and 100th percentile ground level concentration from any of the five meteorological years used respectively. Similarly, the highest annual average of any of the five met years was used to define the significance of the long term impact on air quality.
Use of the 99.9th percentile for 1-hour average ground level concentrations	The predicted hourly ground level concentrations can be high due to extreme, rare and transient meteorological conditions. For example, the absolute worst hour may have a concentration twice that of the second-worst hour, and 10 times that of the ninth-highest hour, however the ninth-highest hour may only be fractionally above the tenth-highest hour. For this reason, it is suggested that the highest values are considered outliers and the 99.9 percentile (9th highest hour) is used and the highest 8 predicted 1-hour average concentrations disregarded to remove model uncertainty. <sup>(1)(2)(3)</sup>
Defining Sources	The representation of emission sources in AERMOD was based on the nature of the source being considered. As discussed, the substances of interest are from the combustion of natural gas resulting in emissions to the atmosphere through two stationary stacks. The sources were therefore modelled as point sources.
Defining Emissions	The scenario assumed continuous emissions throughout one entire year comprising of 365 days. Stack parameters and emission rates were defined for each substance with the potential to have adverse impacts on air quality during normal operation. The emission inventory for the project is presented in <b>Table 6.8</b> and is based on the maximum allowable emissions concentrations as per IFC guidelines <sup>(4)</sup> (refer to <b>Section 2.1.3</b> ).
Receptor Grid	<p>The dispersion model uses a nested grid extending up to 10 km from the stack locations to determine the maximum process contribution in the study area and the process contribution arising at representative air sensitive receivers and in each air sensitive receiver classification. The receptor spacing varies with distance from the point source locations in order to provide sufficiently dense receptors close to the site, and suitable spatial coverage further afield. The spacing of receptors is as follows:</p> <ul style="list-style-type: none"> <li>• 50 meter spacing from 0 to 500 meters;</li> <li>• 100 meter spacing from 500 to 1,000 meters;</li> <li>• 200 meter spacing from 1,000 to 2,000 meters;</li> <li>• 400 meter spacing from 2,000 meters to 4,000 meters; and</li> <li>• 500 meter spacing from 4,000 meters to 10,000 meters.</li> </ul> <p>Furthermore, specific receptor points were included in the model to reflect the locations of representative air sensitive receivers (refer to <b>Figure 5.2</b>).</p>

Modelling Component	Method/Approach
Meteorological Data	<p>The meteorological data used in the model must be reflective of the local conditions. There is very little meteorological data available for Indonesia therefore five (5) years of meteorological data was modelled using the Weather Research and Forecasting Model (WRF) using a 4km x 4km resolution (see <b>Section 5.4</b>).</p>
Conversion of NO <sub>x</sub> to NO <sub>2</sub>	<p>The USEPA's Ozone Limiting Method (OLM) was used to convert the modelled NO<sub>x</sub> concentrations to NO<sub>2</sub> for comparison to the air quality standards. <sup>(3)</sup> <sup>(5)</sup></p> <p>The approach to estimate ground level concentrations of NO<sub>2</sub> was therefore undertaken as follows:</p> <ol style="list-style-type: none"> <li>NO<sub>x</sub> ground level concentrations were modelled using AERMOD at 2925 receptor points in the study area.</li> <li>10% of the modelled NO<sub>x</sub> concentration at each receptor point was assumed to be emitted as NO<sub>2</sub>, and the remaining NO<sub>x</sub> (90%) was assumed to be NO available for reaction with ozone.</li> <li>At each receptor point a comparison was made to the ambient ozone concentration and the remaining NO concentration discussed in item (b). If the ambient ozone concentration was greater than the remaining NO, all of the available NO was converted to NO<sub>2</sub> i.e. 100% NO<sub>x</sub> to NO<sub>2</sub> conversion. If the ambient ozone concentration was less than the remaining NO, the amount of NO converted was considered equal to the available ozone such that <math>NO_2 = (0.1 \times (NO_x) + \text{ozone})</math>.</li> <li>The results were then added to the existing NO<sub>2</sub> baseline to determine the predicted environmental concentration (PEC) at each receptor point on the grid.</li> </ol> <p>The assessment incorporated the use of the maximum 1-hour, 24-hour and annual background concentrations of NO<sub>2</sub> and O<sub>3</sub> from the baseline assessment presented in <b>Section 5.3</b> and is considered a worst case approach.</p>
Buildings	<p>When air flow passes over buildings, a phenomenon known as building downwash occurs where the air is entrained in the lee of the building and drawn down to ground level. This effect can bring the plume from the stack down to ground level quicker than would otherwise be the case, and therefore increase the ground level concentration relative to a case where there are no buildings.</p> <p>The USEPA <sup>(6)</sup> suggest that emissions from stacks greater than 2.5 times the height of the highest nearby structure would escape building influences on dispersion. On this basis only nearby buildings which are higher than 24m require consideration in the assessment.</p> <p>The buildings included in the dispersion model included the gas and steam turbine halls (H = 25m); the heat recovery steam generator (HRSG) buildings (H = 45m); and the main electrical building (H = 20m). The representation of the buildings within AERMOD can be seen in <b>Figure 6.1</b> and were modelled to account for building downwash.</p>
Land Use	<p>The land use and terrain around the Project will affect dispersion. Airflow over the ground is disturbed by protuberances into the air, for example buildings, trees and vegetation. The surface roughness length is a representation of the disruption</p>

Modelling Component	Method/Approach
	of airflow close to the ground due to these obstructions. In this case, the land use type in the study area is primarily cultivated land. The AERMOD pre-processor AERSURFACE was used to define the land use characteristics around the project site.
Terrain	Hills, mountains and valleys can affect dispersion by directing the plume. The terrain pre-processor AERMAP using the Shuttle Radar Topographic Mission (SRTM) 90 x 90m imagery was run to provide information on the a) base elevation of each receptor and source defined in the model; and b) the terrain height that has the greatest influence on dispersion for each individual receptor, otherwise known as the hill height scale. Both the base elevation and hill height scale were incorporated into AERMOD. The terrain throughout the study area is generally flat (simple terrain) therefore it is unlikely that terrain has much effect on the meteorology conditions within the study area.
	<ol style="list-style-type: none"> <li>(1) New Zealand Ministry for the Environment (2004) Good Practice Guide for Atmospheric Dispersion Modelling [Online] Available at: <a href="http://www.mfe.govt.nz/sites/default/files/atmospheric-dispersion-modelling-jun04.pdf">http://www.mfe.govt.nz/sites/default/files/atmospheric-dispersion-modelling-jun04.pdf</a> [Accessed 06 February 2018];</li> <li>(2) Alberta Government (2013) Air Quality Model Guideline [Online] Available at: <a href="http://aep.alberta.ca/air/air-quality-modelling/documents/AirQualityModelGuideline-Oct1-2013.pdf">http://aep.alberta.ca/air/air-quality-modelling/documents/AirQualityModelGuideline-Oct1-2013.pdf</a> [Accessed 06 February 2018]</li> <li>(3) New South Wales Environment Protection Agency (EPA) (2005) Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales [Online] Available at: <a href="http://www.environment.nsw.gov.au/resources/air/ammodelling05361.pdf">http://www.environment.nsw.gov.au/resources/air/ammodelling05361.pdf</a> [Accessed 06 February 2018]</li> <li>(4) International Finance Corporation (IFC) (2007) Environmental, Health and Safety Guidelines for Thermal Power Plants [Online] Available at: <a href="http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/ehs-guidelines">http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/ehs-guidelines</a> [Accessed 06 February 2018]</li> <li>(5) United States Environmental Protection Agency (USEPA) (2015) Technical Support Document (TSD) for NO2 Related AERMOD Modifications [Online] Available at: <a href="https://www3.epa.gov/scram001/11thmodconf/AERMOD_NO2_changes_TSD.pdf">https://www3.epa.gov/scram001/11thmodconf/AERMOD_NO2_changes_TSD.pdf</a> [Accessed 06 February 2018]</li> <li>(6) United States Environmental Protection Agency (USEPA) (1985) Guideline for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack Height Regulations) [Online] Available at: <a href="https://www3.epa.gov/scram001/guidance/guide/gep.pdf">https://www3.epa.gov/scram001/guidance/guide/gep.pdf</a> [Accessed 06 February 2018]</li> </ol>

Figure 6.1 Building Representation in AERMOD



**Table 6.8 Emission Inventory for CCGT Power Plant**

	Unit	Stack A	Stack B
Stack Location	Lat/Long	6°14'37.84"S 107°35'19.58"E	6°14'40.04"S 107°35'16.25"E
<i>Actual Stack Conditions <sup>(1)</sup></i>			
Stack height	m	60	60
Stack diameter	m	9.44	9.44
Exit Temperature	k	340	340
Emission Velocity	m/s	15.2	15.2
Actual oxygen (O <sub>2</sub> ) content (dry)	%	10.7	10.7
Actual moisture (H <sub>2</sub> O) content (wet)	%	13.2	13.2
Actual volume flow rate	Am <sup>3</sup> /s	1067	1067
<i>Reference Conditions <sup>(2)</sup></i>			
Temperature	K	273.15	273.15
Oxygen content (dry gas)	%	15	15
Moisture content (dry gas)	%	0	0
<i>Normalised Volume Flow Rate <sup>(3)</sup></i>			
Normalised volume flow rate	Nm <sup>3</sup> /s	1283	1283
<i>Emission Concentrations</i>			
Oxides of Nitrogen (NO <sub>x</sub> ) <sup>(2)</sup>	mg/Nm <sup>3</sup>	51	51
Carbon Monoxide (CO) <sup>(1)</sup>	mg/Nm <sup>3</sup>	50	50
<i>Emission Rates</i>			
Oxides of Nitrogen (NO <sub>x</sub> )	g/s	65.4	65.4
Carbon Monoxide (CO)	g/s	64.2	64.2

(1) Data provided by Marubeni

(2) International Finance Corporation (IFC) (2008) Environmental, Health and Safety Guidelines for Thermal Power Plants [Online] Available at: [http://www.ifc.org/wps/wcm/connect/topics\\_ext\\_content/ifc\\_external\\_corporate\\_site/ifc+sustainability/our+approach/risk+management/ehsguidelines](http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/ifc+sustainability/our+approach/risk+management/ehsguidelines) [Accessed 05 February 2018].

(3) Calculated using the Environment Agency (2013) Pollution Inventory Reporting – Combustion Activities Guidance Note [online] Available at: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/296994/LIT\\_7825\\_e97f48.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/296994/LIT_7825_e97f48.pdf) [Accessed 05 February 2018]

### 6.4.3 Impacts to Air Quality (pre-mitigation)

The modelling results based on the impact assessment criteria detailed in **Section 4**, the modelling methodology detailed in **Table 6.7**, the emissions inventory detailed in **Table 6.7**, the Indonesian air quality standards presented in **Table 2.1**, and the WHO critical levels presented in **Table 2.2** are reported below in **Table 6.9** to **Table 6.14**.

The significance of impacts are discussed as follows:

- Nitrogen Dioxide (NO<sub>2</sub>) 1-hour Average
  - The modelling results presented in **Table 6.9** indicate that **Minor impacts** to air quality from the Project are likely at offsite locations. A contour figure showing the area of predicted minor adverse impacts is presented in **Figure 6.2**.

- Nitrogen Dioxide (NO<sub>2</sub>) 24-hour Average
  - The modelling results presented in **Table 6.10** indicate that **Minor impacts** to air quality from the Project are likely at offsite locations. A contour figure showing the area of predicted minor adverse impacts is presented in **Figure 6.3**.
- Nitrogen Dioxide (NO<sub>2</sub>) Annual Average
  - The modelling results presented in **Table 6.11** indicate that the adverse impacts to air quality from the Project are expected to be **Negligible** throughout the entire study area.
- Carbon Monoxide (CO) 1-hour Average
  - The modelling results presented in **Table 6.12** indicate that the adverse impacts to air quality from the Project are expected to be **Negligible** throughout the entire study area.
- Carbon Monoxide (CO) 24-hour Average
  - The modelling results presented in **Table 6.13** indicate that the adverse impacts to air quality from the Project are expected to be **Negligible** throughout the entire study area.
- Oxides of Nitrogen (NO<sub>x</sub>) Annual Average
  - The modelling results presented in **Table 6.14** indicate that the adverse impacts to air quality from the Project are expected to be **Minor** at worst in a small area approximately 500m south west of the site boundary. It is noted that in the coastal areas where protected mangrove have been identified the impacts to air quality are **Negligible** (see **Figure 6.4**).

**Table 6.9 Nitrogen Dioxide (NO<sub>2</sub>) 1-Hour Average – 99.9 Percentile (Human Health)**

Site	Baseline (µg/m <sup>3</sup> )	AQS <sup>(1)</sup> (µg/m <sup>3</sup> )	Airshed classification	PC <sup>(2)</sup> (µg/m <sup>3</sup> )	PC/AQS (%)	PEC <sup>(3)</sup> (µg/m <sup>3</sup> )	PEC/AQS (%)	Impact Significance
Maximum concentration <sup>(4)</sup>				125	31%	188	47%	Minor
ASR1a				27.4	6.9%	91.2	23%	Negligible
ASR1b				23.8	6%	87.6	22%	Negligible
ASR2				45.0	11%	109	27%	Negligible
ASR3				23.6	5.9%	87.4	22%	Negligible
ASR4a (fence line)				29.3	7.3%	93.1	23%	Negligible
ASR4b (fence line)				17.8	4.5%	81.6	20%	Negligible
ASR5				50.8	13%	115	29%	Negligible
ASR6				26.5	6.6%	90.3	23%	Negligible
ASR7				21.8	5.4%	85.6	21%	Negligible
ASR8				31.7	7.9%	95.5	24%	Negligible
ASR9	63.8 <sup>(5)</sup>	400	ND <sup>(6)</sup>	15.6	3.9%	79.4	20%	Negligible
ASR10				23.7	5.9%	87.5	22%	Negligible
ASR11				22.5	5.6%	86.3	22%	Negligible
ASR12				14.9	3.7%	78.7	20%	Negligible
ASR13				12.1	3.0%	75.9	19%	Negligible
ASR14				13.4	3.4%	77.2	19%	Negligible
ASR15				12.7	3.2%	76.5	19%	Negligible
ASR16				21.7	5.4%	85.5	21%	Negligible
ASR17				20.4	5.1%	84.2	21%	Negligible
ASR18				26.4	6.6%	90.2	23%	Negligible
ASR19				20.7	5.2%	84.5	21%	Negligible
ASR20				10.5	2.6%	74.3	19%	Negligible

<sup>(1)</sup> Air Quality Standard (Regulation of the Republic of Indonesia Number 41 (1999))

<sup>(2)</sup> Process Contribution

<sup>(3)</sup> Predicted Environmental Contribution

<sup>(4)</sup> The maximum ground level concentration outside of the Power Plant site boundary

<sup>(5)</sup> The maximum 1-hour average concentration was measured at AQM4b using the AQS1 real time air quality monitor (see **Table 5.5**). This was used as the 1-hour average baseline across all sites as a worst case approach.

<sup>(6)</sup> Non-degraded (Baseline < AQS)

**Table 6.10 Nitrogen Dioxide (NO<sub>2</sub>) 24-Hour Average – 100 Percentile (Human Health)**

Site	Baseline (µg/m <sup>3</sup> )	AQS <sup>(1)</sup> (µg/m <sup>3</sup> )	Airshed classification	PC <sup>(2)</sup> (µg/m <sup>3</sup> )	PC/AQS (%)	PEC <sup>(3)</sup> (µg/m <sup>3</sup> )	PEC/AQS (%)	Impact Significance
Maximum concentration <sup>(4)</sup>				39.3	26%	71.9	48%	Minor
ASR1a				8.72	5.8%	41.3	28%	Negligible
ASR1b				7.76	5.2%	40.4	27%	Negligible
ASR2				8.85	5.9%	41.4	28%	Negligible
ASR3				6.88	4.6%	39.5	26%	Negligible
ASR4a (fence line)				4.53	3.0%	37.1	25%	Negligible
ASR4b (fence line)				4.74	3.2%	37.3	25%	Negligible
ASR5				14.6	9.7%	47.2	31%	Negligible
ASR6				3.68	2.5%	36.3	24%	Negligible
ASR7				6.06	4.0%	38.7	26%	Negligible
ASR8				3.40	2.3%	36.0	24%	Negligible
ASR9	32.6 <sup>(5)</sup>	150	ND <sup>(6)</sup>	4.49	3.0%	37.1	25%	Negligible
ASR10				4.83	3.2%	37.4	25%	Negligible
ASR11				2.32	1.5%	34.9	23%	Negligible
ASR12				3.16	2.1%	35.8	24%	Negligible
ASR13				2.82	1.9%	35.4	24%	Negligible
ASR14				3.19	2.1%	35.8	24%	Negligible
ASR15				2.08	1.4%	34.7	23%	Negligible
ASR16				2.67	1.8%	35.3	24%	Negligible
ASR17				2.50	1.7%	35.1	23%	Negligible
ASR18				3.73	2.5%	36.3	24%	Negligible
ASR19				2.97	2.0%	35.6	24%	Negligible
ASR20				2.18	1.5%	34.8	23%	Negligible

<sup>(1)</sup> Air Quality Standard (Regulation of the Republic of Indonesia Number 41 (1999))

<sup>(2)</sup> Process Contribution

<sup>(3)</sup> Predicted Environmental Contribution

<sup>(4)</sup> The maximum ground level concentration outside of the Power Plant site boundary

<sup>(5)</sup> The maximum 24-hour average concentration was measured at AQM4b using the AQS1 real time air quality monitor (see Table 5.5). This was used as the 24-hour average baseline concentration across all sites as a worst case approach.

<sup>(6)</sup> Non-degraded (Baseline < AQS)

**Table 6.11 Nitrogen Dioxide (NO<sub>2</sub>) Annual Average (Human Health)**

Site	Baseline (µg/m <sup>3</sup> )	AQS <sup>(1)</sup> (µg/m <sup>3</sup> )	Airshed classification	PC <sup>(2)</sup> (µg/m <sup>3</sup> )	PC/AQS (%)	PEC <sup>(3)</sup> (µg/m <sup>3</sup> )	PEC/AQS (%)	Impact Significance
Maximum concentration <sup>(4)</sup>				9.14	9.1%	33.2	33%	Negligible
ASR1a				2.54	2.5%	26.6	27%	Negligible
ASR1b				2.35	2.4%	26.4	26%	Negligible
ASR2				0.964	<1%	25.1	25%	Negligible
ASR3				1.22	1.2%	25.3	25%	Negligible
ASR4a (fence line)				0.772	<1%	24.9	25%	Negligible
ASR4b (fence line)				0.185	<1%	24.3	24%	Negligible
ASR5				0.967	<1%	25.1	25%	Negligible
ASR6				0.426	<1%	24.5	25%	Negligible
ASR7				0.494	<1%	24.6	25%	Negligible
ASR8				0.519	<1%	24.6	25%	Negligible
ASR9	24.1 <sup>(5)</sup>	100	ND <sup>(6)</sup>	0.594	<1%	24.7	25%	Negligible
ASR10				0.396	<1%	24.5	24%	Negligible
ASR11				0.374	<1%	24.5	24%	Negligible
ASR12				0.322	<1%	24.4	24%	Negligible
ASR13				0.526	<1%	24.6	25%	Negligible
ASR14				0.347	<1%	24.4	24%	Negligible
ASR15				0.191	<1%	24.3	24%	Negligible
ASR16				0.245	<1%	24.3	24%	Negligible
ASR17				0.264	<1%	24.4	24%	Negligible
ASR18				0.271	<1%	24.4	24%	Negligible
ASR19				0.403	<1%	24.5	24%	Negligible
ASR20				0.182	<1%	24.3	24%	Negligible

<sup>(1)</sup> Air Quality Standard (*Regulation of the Republic of Indonesia Number 41 (1999)*)

<sup>(2)</sup> Process Contribution

<sup>(3)</sup> Predicted Environmental Contribution

<sup>(4)</sup> The maximum ground level concentration outside of the Power Plant site boundary

<sup>(5)</sup> The maximum derived annual average concentration was measured at AQM4b using the AQS1 real time air quality monitor (see **Table 5.5**). This was used as the annual average baseline concentration across all sites as a worst case approach

<sup>(6)</sup> Non-degraded (Baseline < AQS)

**Table 6.12 Carbon Monoxide (CO) 1-Hour Average - 99.9 Percentile (Human Health)**

Site	Baseline (µg/m <sup>3</sup> )	AQS <sup>(1)</sup> (µg/m <sup>3</sup> )	Airshed classification	PC <sup>(2)</sup> (µg/m <sup>3</sup> )	PC/AQS (%)	PEC <sup>(3)</sup> (µg/m <sup>3</sup> )	PEC/AQS (%)	Impact Significance
Maximum concentration <sup>(4)</sup>				76.1	<1%	76.1	<1%	Negligible
ASR1a				26.9	<1%	26.9	<1%	Negligible
ASR1b				23.4	<1%	23.4	<1%	Negligible
ASR2				44.1	<1%	44.1	<1%	Negligible
ASR3				23.2	<1%	23.2	<1%	Negligible
ASR4a (fence line)				28.7	<1%	28.7	<1%	Negligible
ASR4b (fence line)				17.5	<1%	17.5	<1%	Negligible
ASR5				49.9	<1%	49.9	<1%	Negligible
ASR6				26.1	<1%	26.1	<1%	Negligible
ASR7				21.4	<1%	21.4	<1%	Negligible
ASR8				31.2	<1%	31.2	<1%	Negligible
ASR9	n.a <sup>(5)</sup>	30,000	ND <sup>(6)</sup>	15.3	<1%	15.3	<1%	Negligible
ASR10				23.2	<1%	23.2	<1%	Negligible
ASR11				22.1	<1%	22.1	<1%	Negligible
ASR12				14.6	<1%	14.6	<1%	Negligible
ASR13				11.9	<1%	11.9	<1%	Negligible
ASR14				13.2	<1%	13.2	<1%	Negligible
ASR15				12.4	<1%	12.4	<1%	Negligible
ASR16				21.3	<1%	21.3	<1%	Negligible
ASR17				20.1	<1%	20.1	<1%	Negligible
ASR18				25.9	<1%	25.9	<1%	Negligible
ASR19				20.4	<1%	20.4	<1%	Negligible
ASR20				10.3	<1%	10.3	<1%	Negligible

<sup>(1)</sup> Air Quality Standard (Regulation of the Republic of Indonesia Number 41 (1999))

<sup>(2)</sup> Process Contribution

<sup>(3)</sup> Predicted Environmental Contribution

<sup>(4)</sup> The maximum ground level concentration anywhere on the modelled receptor grid

<sup>(5)</sup> No quantitative baseline information was collected on the basis that ambient concentrations are typically low and project contributions negligible

<sup>(6)</sup> Non-degraded (Baseline < AQS)

**Table 6.13 Carbon Monoxide (CO) 24-Hour Average – 100 Percentile (Human Health)**

Site	Baseline (µg/m <sup>3</sup> )	AQS <sup>(1)</sup> (µg/m <sup>3</sup> )	Airshed classification	PC <sup>(2)</sup> (µg/m <sup>3</sup> )	PC/AQS (%)	PEC <sup>(3)</sup> (µg/m <sup>3</sup> )	PEC/AQS (%)	Impact Significance
Maximum concentration <sup>(4)</sup>				28.0	<1%	28.0	<1%	Negligible
ASR1a				8.54	<1%	8.54	<1%	Negligible
ASR1b				7.61	<1%	7.61	<1%	Negligible
ASR2				8.68	<1%	8.68	<1%	Negligible
ASR3				6.76	<1%	6.76	<1%	Negligible
ASR4a (fence line)				4.45	<1%	4.45	<1%	Negligible
ASR4b (fence line)				4.65	<1%	4.65	<1%	Negligible
ASR5				14.3	<1%	14.3	<1%	Negligible
ASR6				3.61	<1%	3.61	<1%	Negligible
ASR7				5.94	<1%	5.94	<1%	Negligible
ASR8				3.34	<1%	3.34	<1%	Negligible
ASR9	n/a <sup>(5)</sup>	10,000	ND <sup>(6)</sup>	4.41	<1%	4.41	<1%	Negligible
ASR10				4.74	<1%	4.74	<1%	Negligible
ASR11				2.27	<1%	2.27	<1%	Negligible
ASR12				3.11	<1%	3.11	<1%	Negligible
ASR13				2.77	<1%	2.77	<1%	Negligible
ASR14				3.13	<1%	3.13	<1%	Negligible
ASR15				2.04	<1%	2.04	<1%	Negligible
ASR16				2.62	<1%	2.62	<1%	Negligible
ASR17				2.45	<1%	2.45	<1%	Negligible
ASR18				3.66	<1%	3.66	<1%	Negligible
ASR19				2.92	<1%	2.92	<1%	Negligible
ASR20				2.14	<1%	2.14	<1%	Negligible

<sup>(1)</sup> Air Quality Standard (Regulation of the Republic of Indonesia Number 41 (1999))

<sup>(2)</sup> Process Contribution

<sup>(3)</sup> Predicted Environmental Contribution

<sup>(4)</sup> The maximum ground level concentration anywhere on the modelled receptor grid

<sup>(5)</sup> No quantitative baseline information was collected on the basis that ambient concentrations are typically low and project contributions negligible

<sup>(6)</sup> Non-degraded (Baseline < AQS)

**Table 6.14** *Oxides of Nitrogen (NO<sub>x</sub>) - Maximum Annual Average (Ecology)*

Receptor	Baseline(µg/m <sup>3</sup> )	Airshed classification	AQS <sup>(1)</sup> (µg/m <sup>3</sup> )	PC <sup>(2)</sup> (µg/m <sup>3</sup> )	PC / AQS (%)	PEC <sup>(3)</sup> (µg/m <sup>3</sup> )	PEC/AQS (%)	Impact Significance
Maximum <sup>(4)</sup>	n/a	ND <sup>(6)</sup>	30	9.14	31%	9.1	31	Minor

<sup>(1)</sup> WHO/EU Critical Level for the Protection of Vegetation  
<sup>(2)</sup> Process Contribution  
<sup>(3)</sup> Predicted Environmental Contribution  
<sup>(4)</sup> The maximum ground level concentration found anywhere on the grid  
<sup>(5)</sup> NO<sub>x</sub> baseline not available  
<sup>(6)</sup> Assumed non-degraded (Baseline < AQS)

Figure 6.2 Nitrogen Dioxide (NO<sub>2</sub>) 1-Hour Average - 99.9 Percentile (Human Health)

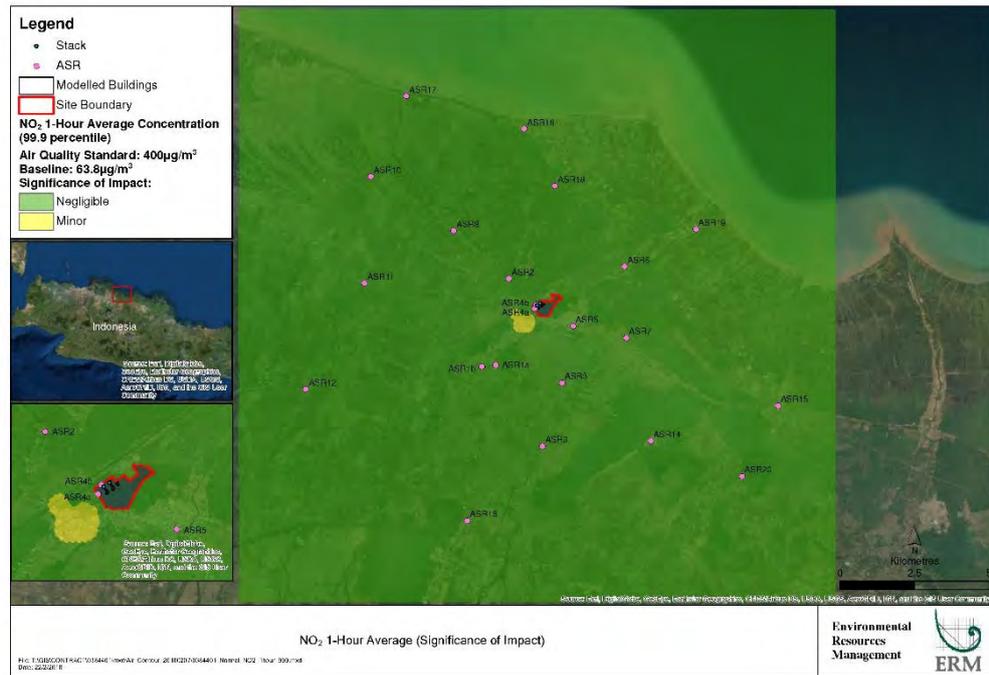


Figure 6.3 Nitrogen Dioxide (NO<sub>2</sub>) 24-Hour Average - 100th Percentile (Human Health)

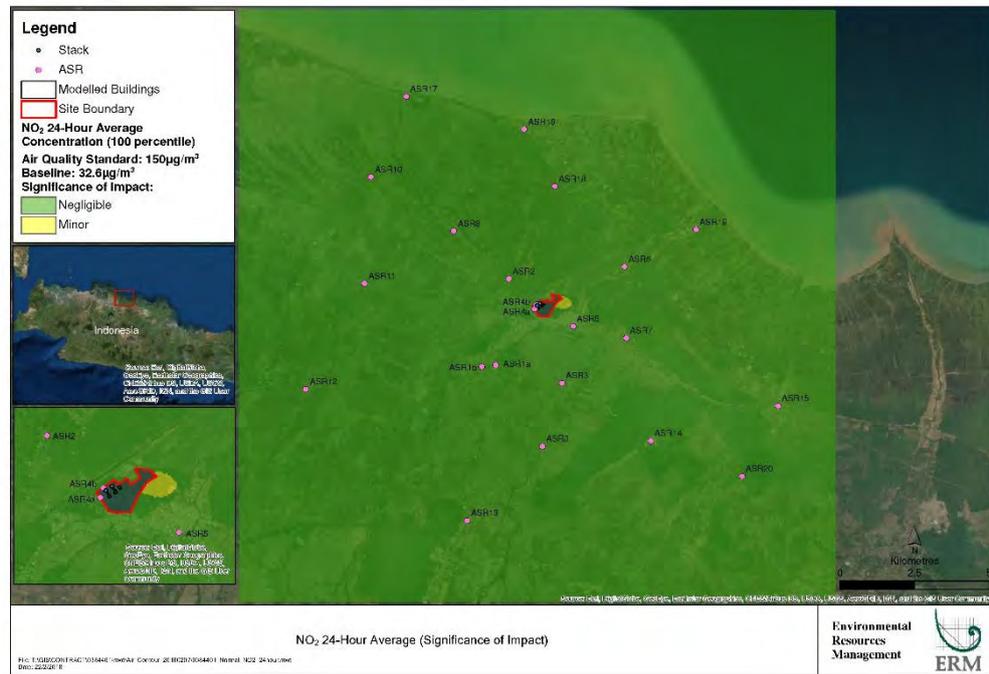
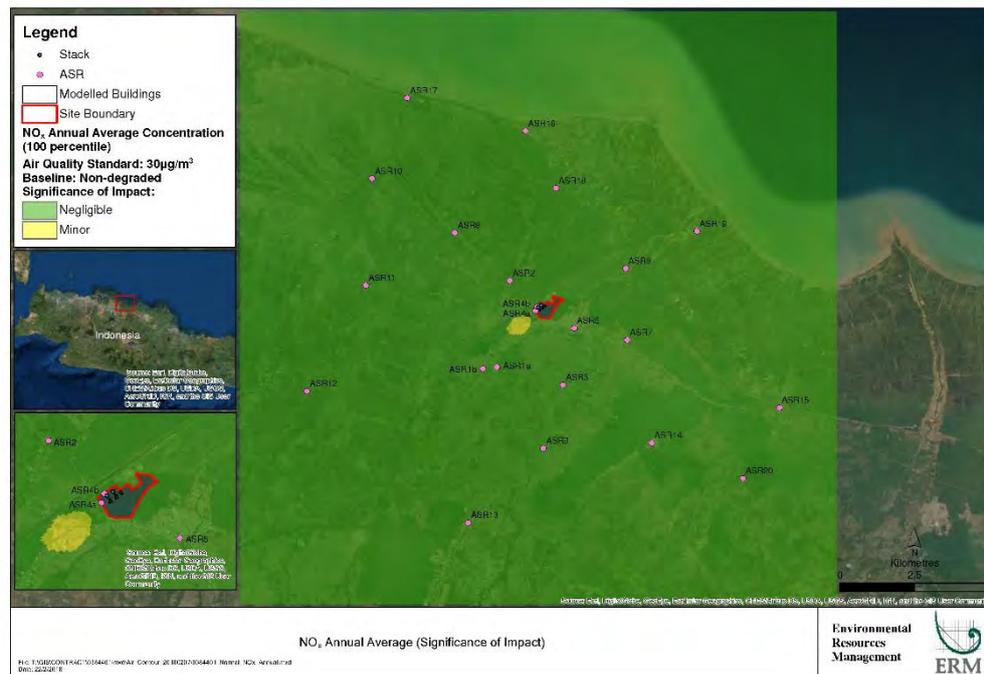


Figure 6.4 Nitrogen Dioxide (NO<sub>x</sub>) Maximum Annual Average (Ecology)



#### 6.4.4 Recommended Mitigation, Management and/ or Monitoring Measures

The findings indicate that minor adverse impacts to air quality are expected at worst due to the continuous and normal operation of the CCGT power plant operating at the maximum allowable NO<sub>x</sub> emission limit concentration of 51mg/Nm<sup>3</sup>. Impacts to air quality from CO emissions are considered negligible. In practice the plant is not expected to operate at the emission limit on a continuous basis and the subsequent impacts to air quality when operating at decreased loads will be reduced further. On this basis no additional mitigation is suggested, however the following good practice monitoring measures are advised:

- Implementation of continuous stack emission monitoring throughout the operational lifetime of the Project to ensure that the NO<sub>x</sub> emission concentration from the CCGT does not exceed the IFC emission limit guideline value of 51mg/Nm<sup>3</sup> as specified in **Table 2.4** of this air quality impact assessment.

#### 6.4.5 Residual Impacts (post mitigation)

With a suitably designed and well managed stack emission monitoring program, the residual impacts from the operation of the CCGT power plant are likely to be minor adverse at worst throughout the study area during the normal operation of the Project.

## 6.5 *IMPACTS TO AIR QUALITY FROM BLACK START/EMERGENCY DIESEL ENGINE-GENERATORS*

### 6.5.1 *Overview*

As identified and discussed in **Section 3.10**, the combustion of diesel in engine-generators used for black start and emergency shut down conditions has the potential to adversely impact air quality at sensitive receptors across a wide area depending on operating conditions and meteorological conditions. Potential impacts to air quality from the operation of the diesel engine-generators were quantified using detailed dispersion modelling.

### 6.5.2 *Assessment Methodology*

Similar to the methodology discussed in **Section 6.4**, the dispersion model used in the assessment was the USEPA AERMOD dispersion model version 16216r.

Detailed dispersion modelling was used to predict concentrations of emitted substances at ground level locations outside the Project site boundary. Five (5) years of hourly sequential meteorological data was used so that inter annual variability was incorporated into the model.

The modelling scenarios and methodology is presented in **Table 6.15** and the engine locations and emission inventory is presented in **Table 6.16** and **Table 6.17** respectively.

The results of the assessment comprise the maximum process contribution predicted over a period of five years from 2013 to 2017 on the receptor grid. At each of the representative human air sensitive receptors the maximum PC and the PEC for each substance of interest is presented and the significance of the impact defined using the approach outlined in **Section 4**. In addition, the maximum process contribution and predicted environmental concentration at any point on the receptor grid outside of the power plant site boundary has been identified and the significance defined. While this is considered good practice for air quality impact assessment, given the short term nature and infrequent requirement for all twelve engine-generators to be operating simultaneously (i.e. black start seldom required), the possibility that the emissions to air will occur at the same time as the worst case meteorological condition used to define the significance of the impact at each receptor point is considered extremely unlikely in practice.

**Table 6.15 Detailed Modelling Methodology**

Modelling Component	Method/Approach
Assessment Scenario(s)	<p>The power plant will typically use power from the main grid for black start and in an emergency condition. The diesel engine generators are therefore only required when the main electrical grid is down and unable to provide power to the power plant. It is considered extremely unlikely that the requirement to use the generators will coincide with main grid failure. As a conservative assumption, however, it is expected that a black-start may occur once in any given year and take fifty minutes, and an emergency condition would occur six times in any given year for two hours. The assessment scenarios on this basis are as follows:</p> <ul style="list-style-type: none"> <li>• Scenario 1 (Black start): The likely impacts on air quality from all twelve diesel engine-generator sets running at full power. The scenario assumes that a black-start will take 50 minutes. To account for this, the 1-hour average modelling results were reduced by 1/6<sup>th</sup> and compared to the relevant 1-hour air quality standard.</li> <li>• Scenario 2 (Emergency): The likely impact on air quality from one of the twelve diesel engine-generator sets (Generator No. 1) running at full power. The assessment assumes that the engine-generator may operate for two hours, six times a year as a worst case and the results compared to the relevant 1-hour air quality standard.</li> </ul> <p>The air quality standards do not specify any allowable exceedances of the stated standard in any given period of time, therefore the short term 1-hour impacts from the project were based on the highest 99.9th percentile ground level concentration from any of the five meteorological years used respectively.</p>
Use of the 99.9th percentile for 1-hour average ground level concentrations	<p>The predicted hourly ground level concentrations can be high due to extreme, rare and transient meteorological conditions. For example, the absolute worst hour may have a concentration twice that of the second-worst hour, and 10 times that of the ninth-highest hour, however the ninth-highest hour may only be fractionally above the tenth-highest hour. For this reason, it is suggested that the highest values are considered outliers and the 99.9 percentile (9th highest hour) is used and the highest 8 predicted 1-hour average concentrations disregarded to remove model uncertainty. <sup>(1)(2)(3)</sup></p>
Defining Sources	<p>The representation of emission sources in AERMOD was based on the nature of the source being considered. As discussed, the substances of interest are from the combustion of diesel oil resulting in emissions to the atmosphere through a number of stationary stacks. The sources were therefore modelled as point sources.</p>
Defining Emissions	<p>Stack parameters and emission rates for both modelling scenarios were defined for each substance with the potential to have adverse impacts on air quality while the generators are operational. The emission inventory for the project is presented in <b>Table 6.17</b> and is based on the diesel engine-generator information provided by engine manufacturer MTU for engine type 20V4000G23 6ETC.</p>
Receptor Grid	<p>The dispersion model uses a nested grid extending up to 10 km from the stack locations to determine the maximum process contribution in the study area and the process contribution arising at representative air sensitive receivers and in each air</p>

Modelling Component	Method/Approach
	<p>sensitive receiver classification. The receptor spacing varies with distance from the point source locations in order to provide sufficiently dense receptors close to the site, and suitable spatial coverage further afield. The spacing of receptors is as follows:</p> <ul style="list-style-type: none"> <li>• 50 meter spacing from 0 to 500 meters;</li> <li>• 100 meter spacing from 500 to 1,000 meters;</li> <li>• 200 meter spacing from 1,000 to 2,000 meters;</li> <li>• 400 meter spacing from 2,000 meters to 4,000 meters; and</li> <li>• 500 meter spacing from 4,000 meters to 10,000 meters.</li> </ul> <p>Furthermore, specific receptor points were included in the model to reflect the locations of representative air sensitive receivers (refer to <b>Figure 5.2</b>).</p>
Meteorological Data	<p>The meteorological data used in the model must be reflective of the local conditions. There is very little meteorological data available for Indonesia therefore five (5) years of meteorological data was modelled using the Weather Research and Forecasting Model (WRF) using a 4km x 4km resolution (see <b>Section 5.4</b>).</p>
Conversion of NO <sub>x</sub> to NO <sub>2</sub>	<p>The USEPA's Ozone Limiting Method (OLM) was used to convert the modelled NO<sub>x</sub> concentrations to NO<sub>2</sub> for comparison to the air quality standards. <sup>(3) (4)</sup></p> <p>The approach to estimate ground level concentrations of NO<sub>2</sub> was therefore undertaken as follows:</p> <ul style="list-style-type: none"> <li>e) NO<sub>x</sub> ground level concentrations were modelled using AERMOD at 2925 receptor points in the study area.</li> <li>f) 10% of the modelled NO<sub>x</sub> concentration at each receptor point was assumed to be emitted as NO<sub>2</sub>, and the remaining NO<sub>x</sub> (90%) was assumed to be NO available for reaction with ozone.</li> <li>g) At each receptor point a comparison was made to the ambient ozone concentration and the remaining NO concentration discussed in item (b). If the ambient ozone concentration was greater than the remaining NO, all of the available NO was converted to NO<sub>2</sub> i.e. 100% NO<sub>x</sub> to NO<sub>2</sub> conversion. If the ambient ozone concentration was less than the remaining NO, the amount of NO converted was considered equal to the available ozone such that <math>NO_2 = (0.1 \times (NO_x) + \text{ozone})</math>.</li> <li>h) The results were then added to the existing NO<sub>2</sub> baseline to determine the predicted environmental concentration (PEC) at each receptor point on the grid.</li> </ul> <p>The assessment incorporated the use of the maximum 1-hour and 24-hour background concentrations of NO<sub>2</sub> and O<sub>3</sub> from the baseline assessment presented in <b>Section 5.3</b> and is considered a worst case approach.</p>
Buildings	No building information was included in the dispersion model.

Modelling Component	Method/Approach
Land Use	The land use and terrain around the Project will affect dispersion. Airflow over the ground is disturbed by protuberances into the air, for example buildings, trees and vegetation. The surface roughness length is a representation of the disruption of airflow close to the ground due to these obstructions. In this case, the land use type in the study area is primarily cultivated land. The AERMOD pre-processor AERSURFACE was used to define the land use characteristics around the project site.
Terrain	Hills, mountains and valleys can affect dispersion by directing the plume. The terrain pre-processor AERMAP using the Shuttle Radar Topographic Mission (SRTM) 90 x 90m imagery was run to provide information on the a) base elevation of each receptor and source defined in the model; and b) the terrain height that has the greatest influence on dispersion for each individual receptor, otherwise known as the hill height scale. Both the base elevation and hill height scale were incorporated into AERMOD. The terrain throughout the study area is generally flat (simple terrain) therefore it is unlikely that terrain has much effect on the meteorology conditions within the study area.
<p>(1) New Zealand Ministry for the Environment (2004) Good Practice Guide for Atmospheric Dispersion Modelling [Online] Available at: <a href="http://www.mfe.govt.nz/sites/default/files/atmospheric-dispersion-modelling-jun04.pdf">http://www.mfe.govt.nz/sites/default/files/atmospheric-dispersion-modelling-jun04.pdf</a> [Accessed 06 February 2018];</p> <p>(2) Alberta Government (2013) Air Quality Model Guideline [Online] Available at: <a href="http://aep.alberta.ca/air/air-quality-modelling/documents/AirQualityModelGuideline-Oct1-2013.pdf">http://aep.alberta.ca/air/air-quality-modelling/documents/AirQualityModelGuideline-Oct1-2013.pdf</a> [Accessed 06 February 2018]</p> <p>(3) New South Wales Environment Protection Agency (EPA) (2005) Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales [Online] Available at: <a href="http://www.environment.nsw.gov.au/resources/air/ammodelling05361.pdf">http://www.environment.nsw.gov.au/resources/air/ammodelling05361.pdf</a> [Accessed 06 February 2018]</p> <p>(4) United States Environmental Protection Agency (USEPA) (2015) Technical Support Document (TSD) for NO2 Related AERMOD Modifications [Online] Available at: <a href="https://www3.epa.gov/scram001/11thmodconf/AERMOD_NO2_changes_TSD.pdf">https://www3.epa.gov/scram001/11thmodconf/AERMOD_NO2_changes_TSD.pdf</a> [Accessed 06 February 2018]</p>	

**Table 6.16 Generator Locations**

Generator Number	Modelled Stack Location (Lat/Long)
1	6°14'42.11"S 107°35'24.12"E
2	6°14'41.98"S 107°35'24.29"E
3	6°14'41.85"S 107°35'24.45"E
4	6°14'41.75"S 107°35'24.64"E
5	6°14'41.62"S 107°35'24.80"E
6	6°14'41.49"S 107°35'24.97"E
7	6°14'41.39"S 107°35'25.16"E
8	6°14'41.26"S 107°35'25.32"E
9	6°14'41.16"S 107°35'25.52"E
10	6°14'41.03"S 107°35'25.68"E
11	6°14'40.90"S 107°35'25.84"E
12	6°14'40.80"S 107°35'26.04"E

**Table 6.17 Emission Inventory for Black Start and Emergency Generators**

Parameter	Unit	Generator 1 - 12 <sup>(1)</sup>
Stack height	m	9
Stack Diameter	m	0.478
Exit Velocity	m/s	40.1
Volume Flow Rate	m <sup>3</sup> /s	7.20
Exit Temperature	k	813
Power Output <sup>(2)</sup>	kW	2200
NO <sub>x</sub> Emission rate	g/kWh	10.4
	g/s	6.4
PM Emission rate	g/kWh	0.0400
	g/s	0.0244
SO <sub>2</sub> Emission rate	g/kWh	2.00x10 <sup>-3</sup>
	g/s	1.2x10 <sup>-3</sup>

(1) Data provided by engine manufacturer MTU for engine model 20V4000G23 6ETC  
(2) Single Engine-Generator

### 6.5.3

#### *Scenario 1: Impacts to Air Quality (pre-mitigation)*

The modelling results based on the impact assessment criteria detailed in **Section 4**, the modelling methodology detailed in **Table 6.15**, the emissions inventory detailed in **Table 6.17** and the Indonesian air quality standards presented in **Table 2.1** are reported below in **Table 6.18** to **Table 6.19**.

The significance of the modelled impacts on ambient air quality are as follows:

- Nitrogen Dioxide (NO<sub>2</sub>) 1-hour Average
  - The modelling results presented in **Table 6.18** indicate that moderate adverse impacts to ambient air quality are expected at worst when a black start is required. The significance of the impacts to air quality throughout the study area is presented in **Figure 6.5**.
- Sulphur Dioxide (SO<sub>2</sub>) 1-hour Average
  - The modelling results presented in **Table 6.19** indicate that negligible impacts to ambient air quality are expected at worst when a black start is required.

**Table 6.18 Scenario 1: Nitrogen Dioxide (NO<sub>2</sub>) 1-Hour Average – 99.9 Percentile (All Engine-Generators at 100% Load for 50-minutes)**

Site	Baseline (µg/m <sup>3</sup> )	AQS <sup>(1)</sup> (µg/m <sup>3</sup> )	Airshed classification	PC <sup>(2)(3)</sup> (µg/m <sup>3</sup> )	PC/AQS (%)	PEC <sup>(4)</sup> (µg/m <sup>3</sup> )	PEC/AQS (%)	Impact Significance
Maximum concentration <sup>(5)</sup>				269	67%	332	83%	Moderate
ASR1a				100	25%	164	41%	Minor
ASR1b				110	27%	174	43%	Minor
ASR2				147	37%	211	53%	Minor
ASR3				98.2	25%	162	41%	Negligible
ASR4a (fence line)				257	64%	321	80%	Moderate
ASR4b (fence line)				266	67%	330	82%	Moderate
ASR5				150	37%	214	53%	Minor
ASR6				131	33%	195	49%	Minor
ASR7				134	33%	198	49%	Minor
ASR8				132	33%	195	49%	Minor
ASR9	63.8 <sup>(6)</sup>	400	ND <sup>(7)</sup>	35.1	8.8%	98.9	25%	Negligible
ASR10				121	30%	185	46%	Minor
ASR11				109	27%	173	43%	Minor
ASR12				68.1	17%	132	33%	Negligible
ASR13				25.4	6.4%	89.2	22%	Negligible
ASR14				79.3	20%	143	36%	Negligible
ASR15				79.1	20%	143	36%	Negligible
ASR16				100	25%	164	41%	Negligible
ASR17				111	28%	175	44%	Minor
ASR18				113	28%	177	44%	Minor
ASR19				102	26%	166	42%	Minor
ASR20				58.1	15%	122	30%	Negligible

<sup>(1)</sup> Air Quality Standard (Regulation of the Republic of Indonesia Number 41 (1999))

<sup>(2)</sup> Process Contribution

<sup>(3)</sup> The modelled 1-hour process contribution at each receptor point was reduced by 1/6<sup>th</sup> to account for the diesel engine generators operating for 50-minutes during black start

<sup>(4)</sup> Predicted Environmental Contribution

<sup>(5)</sup> The maximum ground level concentration outside of the Power Plant site boundary

<sup>(6)</sup> The maximum 1-hour average concentration was measured at AQM4b using the AQS1 real time air quality monitor (see **Table 5.5**). This was used as the 1-hour average baseline across all sites as a worst case approach.

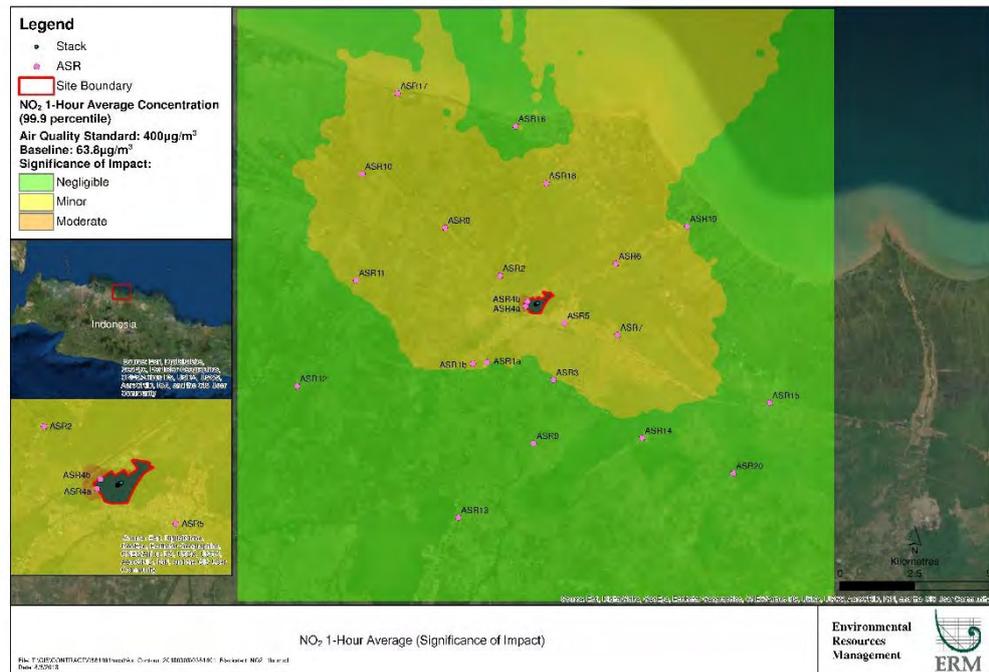
<sup>(7)</sup> Non-degraded (Baseline < AQS)

**Table 6.19 Scenario 1: Sulphur Dioxide (SO<sub>2</sub>) 1-Hour Average - 99.9 Percentile (All Engine-Generators at 100% Load for 50-minutes)**

Site	Baseline (µg/m <sup>3</sup> )	AQS <sup>(1)</sup> (µg/m <sup>3</sup> )	Airshed classification	PC <sup>(2)(3)</sup> (µg/m <sup>3</sup> )	PC/AQS (%)	PEC <sup>(4)</sup> (µg/m <sup>3</sup> )	PEC/AQS (%)	Impact Significance
Maximum concentration <sup>(5)</sup>				0.292	<1%	0.292	<1%	Negligible
ASR1a				0.0189	<1%	0.0189	<1%	Negligible
ASR1b				0.0207	<1%	0.0207	<1%	Negligible
ASR2				0.0629	<1%	0.0629	<1%	Negligible
ASR3				0.0185	<1%	0.0185	<1%	Negligible
ASR4a (fence line)				0.270	<1%	0.270	<1%	Negligible
ASR4b (fence line)				0.287	<1%	0.287	<1%	Negligible
ASR5				0.0679	<1%	0.0679	<1%	Negligible
ASR6				0.0317	<1%	0.0317	<1%	Negligible
ASR7				0.0373	<1%	0.0373	<1%	Negligible
ASR8				0.0335	<1%	0.0335	<1%	Negligible
ASR9	n/a <sup>(6)</sup>	900	ND <sup>(7)</sup>	6.63x10 <sup>-3</sup>	<1%	6.63x10 <sup>-3</sup>	<1%	Negligible
ASR10				0.0229	<1%	0.0229	<1%	Negligible
ASR11				0.0206	<1%	0.0206	<1%	Negligible
ASR12				0.0129	<1%	0.0129	<1%	Negligible
ASR13				4.80x10 <sup>-3</sup>	<1%	4.80x10 <sup>-3</sup>	<1%	Negligible
ASR14				0.0150	<1%	0.0150	<1%	Negligible
ASR15				0.0149	<1%	0.0149	<1%	Negligible
ASR16				0.0188	<1%	0.0188	<1%	Negligible
ASR17				0.0209	<1%	0.0209	<1%	Negligible
ASR18				0.0214	<1%	0.0214	<1%	Negligible
ASR19				0.0193	<1%	0.0193	<1%	Negligible
ASR20				0.0110	<1%	0.0110	<1%	Negligible

Site	Baseline ( $\mu\text{g}/\text{m}^3$ )	AQS <sup>(1)</sup> ( $\mu\text{g}/\text{m}^3$ )	Airshed classification	PC <sup>(2)(3)</sup> ( $\mu\text{g}/\text{m}^3$ )	PC/AQS (%)	PEC <sup>(4)</sup> ( $\mu\text{g}/\text{m}^3$ )	PEC/AQS (%)	Impact Significance
(1)	Air Quality Standard ( <i>Regulation of the Republic of Indonesia Number 41 (1999)</i> )							
(2)	Process Contribution							
(3)	The modelled 1-hour process contribution at each receptor point was reduced by 1/6 <sup>th</sup> to account for the diesel engine generators operating for 50-minutes during black start							
(4)	Predicted Environmental Contribution							
(5)	The maximum ground level concentration outside of the Power Plant site boundary							
(6)	Background SO <sub>2</sub> concentrations were not quantified for the purpose of this 'abnormal' assessment scenario							
(7)	Assumed non-degraded (Baseline < AQS)							

**Figure 6.5 Scenario 1: Nitrogen Dioxide (NO<sub>2</sub>) 1-Hour Average – 99.9 Percentile (All Engine-Generators at 100% Load for 50 minutes)**



**6.5.4 Scenario 1: Recommended Mitigation, Management and / or Monitoring Measures**

The findings indicate that moderate adverse impacts to air quality from NO<sub>x</sub> emissions are expected at worst due to operation of twelve diesel engine generators at full load for 50 minutes. Impacts to air quality from SO<sub>2</sub> emissions are considered negligible. No assessment of PM has been undertaken as no 1-hour air quality standard exists in Indonesia.

Given that the impacts to air quality are moderate, it is suggested that the following mitigation and management measures are implemented to reduce the likelihood of unacceptable impacts on air quality during a black start:

- The simultaneous operation of all twelve diesel engine-generators will only occur when required and for the amount of time necessary to black start the power plant. The operator will endeavour to reduce this time period as much as is feasible to minimise the likelihood of unacceptable impacts on air quality;
- All engine-generators will be routinely checked and maintained in accordance with the manufactures specifications. This routine maintenance will ensure that the operational performance of the engine-generator is maintained at a high level throughout the operational lifetime of the Project;

- Diesel fuel with a maximum sulphur content of 0.5% will be used at all times.

#### 6.5.5 *Scenario 1: Residual Impacts (post-mitigation)*

With the implementation of the suggested mitigation and management measures discussed in **Section 6.5.4**, it is considered likely that the significance of the NO<sub>2</sub> process contribution at ground level will be **Moderate** adverse at worst at offsite locations within the study area.

#### 6.5.6 *Scenario 2: Impacts to Air Quality (pre-mitigation)*

The modelling results based on the impact assessment criteria detailed in **Section 4**, the modelling methodology detailed in **Table 6.15**, the emissions inventory detailed in **Table 6.17** and the Indonesian air quality standards presented in **Table 2.1** are reported below in **Table 6.20** to **Table 6.21**.

The significance of the modelled impacts on ambient air quality are as follows:

- Nitrogen Dioxide (NO<sub>2</sub>) 1-hour Average
  - The modelling results presented in **Table 6.20** indicate that minor adverse impacts are expected at worst during emergency conditions.
- Sulphur Dioxide (SO<sub>2</sub>) 1-hour Average
  - The modelling results presented in **Table 6.21** indicate that impacts to air quality will be negligible throughout the study area during emergency conditions.

**Table 6.20 Scenario 2: Nitrogen Dioxide (NO<sub>2</sub>) 1-Hour Average – 99.9 Percentile (Generators 1 Only at 100% Load)**

Site	Baseline (µg/m <sup>3</sup> )	AQS <sup>(1)</sup> (µg/m <sup>3</sup> )	Airshed classification	PC <sup>(2)</sup> (µg/m <sup>3</sup> )	PC/AQS (%)	PEC <sup>(3)</sup> (µg/m <sup>3</sup> )	PEC/AQS (%)	Impact Significance
Maximum concentration <sup>(4)</sup>				157	39%	221	55%	Minor
ASR1a				10.3	2.6%	74.1	19%	Negligible
ASR1b				11.2	2.8%	75.0	19%	Negligible
ASR2				33.5	8.4%	97.3	24%	Negligible
ASR3				9.85	2.5%	73.6	18%	Negligible
ASR4a (fence line)				153	38%	216	54%	Minor
ASR4b (fence line)				153	38%	217	54%	Minor
ASR5				36.5	9.1%	100	25%	Negligible
ASR6				16.5	4.1%	80.3	20%	Negligible
ASR7				19.4	4.8%	83.2	21%	Negligible
ASR8				17.7	4.4%	81.5	20%	Negligible
ASR9	63.8 <sup>(5)</sup>	400	ND <sup>(6)</sup>	3.43	<1%	67.2	17%	Negligible
ASR10				12.0	3.0%	75.8	19%	Negligible
ASR11				11.2	2.8%	75.0	19%	Negligible
ASR12				6.75	1.7%	70.5	18%	Negligible
ASR13				2.55	<1%	66.3	17%	Negligible
ASR14				8.00	2.0%	71.8	18%	Negligible
ASR15				8.07	2.0%	71.9	18%	Negligible
ASR16				10.0	2.5%	73.8	18%	Negligible
ASR17				11.0	2.7%	74.8	19%	Negligible
ASR18				11.5	2.9%	75.3	19%	Negligible
ASR19				10.1	2.5%	73.9	18%	Negligible
ASR20				5.89	1.5%	69.7	17%	Negligible

<sup>(1)</sup> Air Quality Standard (Regulation of the Republic of Indonesia Number 41 (1999))

<sup>(2)</sup> Process Contribution

<sup>(3)</sup> Predicted Environmental Contribution

<sup>(4)</sup> The maximum ground level concentration anywhere on the receptor grid

<sup>(5)</sup> The maximum 1-hour average concentration was measured at AQM4b using the AQS1 real time air quality monitor (see **Table 5.5**). This was used as the 1-hour average baseline across all sites as a worst case approach.

<sup>(6)</sup> Non-degraded (Baseline < AQS)

**Table 6.21 Scenario 2: Sulphur Dioxide (SO<sub>2</sub>) 1-Hour Average - 99.9 Percentile (Generators 1 Only at 100% Load)**

Site	Baseline (µg/m <sup>3</sup> )	AQS <sup>(1)</sup> (µg/m <sup>3</sup> )	Airshed classification	PC <sup>(2)</sup> (µg/m <sup>3</sup> )	PC/AQS (%)	PEC <sup>(3)</sup> (µg/m <sup>3</sup> )	PEC/AQS (%)	Impact Significance
Maximum concentration <sup>(4)</sup>				0.0387	<1%	0.0387	<1%	Negligible
ASR1a				1.94x10 <sup>-3</sup>	<1%	1.94x10 <sup>-3</sup>	<1%	Negligible
ASR1b				2.12 x10 <sup>-3</sup>	<1%	2.12 x10 <sup>-3</sup>	<1%	Negligible
ASR2				6.32 x10 <sup>-3</sup>	<1%	6.32 x10 <sup>-3</sup>	<1%	Negligible
ASR3				1.86 x10 <sup>-3</sup>	<1%	1.86 x10 <sup>-3</sup>	<1%	Negligible
ASR4a (fence line)				0.0299	<1%	0.0299	<1%	Negligible
ASR4b (fence line)				0.0311	<1%	0.0311	<1%	Negligible
ASR5				6.89 x10 <sup>-3</sup>	<1%	6.89 x10 <sup>-3</sup>	<1%	Negligible
ASR6				3.11 x10 <sup>-3</sup>	<1%	3.11 x10 <sup>-3</sup>	<1%	Negligible
ASR7				3.66 x10 <sup>-3</sup>	<1%	3.66 x10 <sup>-3</sup>	<1%	Negligible
ASR8				3.34 x10 <sup>-3</sup>	<1%	3.34 x10 <sup>-3</sup>	<1%	Negligible
ASR9	n/a <sup>(5)</sup>	900	ND <sup>(6)</sup>	6.47 x10 <sup>-4</sup>	<1%	6.47 x10 <sup>-4</sup>	<1%	Negligible
ASR10				2.27 x10 <sup>-3</sup>	<1%	2.27 x10 <sup>-3</sup>	<1%	Negligible
ASR11				2.11 x10 <sup>-3</sup>	<1%	2.11 x10 <sup>-3</sup>	<1%	Negligible
ASR12				1.27 x10 <sup>-3</sup>	<1%	1.27 x10 <sup>-3</sup>	<1%	Negligible
ASR13				4.80 x10 <sup>-4</sup>	<1%	4.80 x10 <sup>-4</sup>	<1%	Negligible
ASR14				1.51 x10 <sup>-3</sup>	<1%	1.51 x10 <sup>-3</sup>	<1%	Negligible
ASR15				1.52 x10 <sup>-3</sup>	<1%	1.52 x10 <sup>-3</sup>	<1%	Negligible
ASR16				1.89 x10 <sup>-3</sup>	<1%	1.89 x10 <sup>-3</sup>	<1%	Negligible
ASR17				2.07 x10 <sup>-3</sup>	<1%	2.07 x10 <sup>-3</sup>	<1%	Negligible
ASR18				2.16 x10 <sup>-3</sup>	<1%	2.16 x10 <sup>-3</sup>	<1%	Negligible
ASR19				1.91 x10 <sup>-3</sup>	<1%	1.91 x10 <sup>-3</sup>	<1%	Negligible
ASR20				1.11 x10 <sup>-3</sup>	<1%	1.11 x10 <sup>-3</sup>	<1%	Negligible

<sup>(1)</sup> Air Quality Standard (Regulation of the Republic of Indonesia Number 41 (1999))

<sup>(2)</sup> Process Contribution

<sup>(3)</sup> Predicted Environmental Contribution

<sup>(4)</sup> The maximum ground level concentration anywhere on the receptor grid

<sup>(5)</sup> Background SO<sub>2</sub> concentrations were not quantified for the purpose of this 'abnormal' assessment scenario

<sup>(6)</sup> Assumed non-degraded (Baseline < AQS)

### 6.5.7 *Scenario 2: Recommended Mitigation, Management and / or Monitoring Measures*

The findings from the air quality impact assessment indicate that minor adverse impacts to air quality are expected at worst due to the operation of one diesel fired engine-generator operating at full load during black outs and/or when emergency power is required for the safe shutdown of the power plant in the event of loss of main supply. On this basis no additional mitigation is required.

### 6.5.8 *Scenario 2: Residual Impacts (post-mitigation)*

The residual impacts are likely to be **Minor** adverse at worst throughout the study area during black outs and/or when emergency power is required for the safe shutdown of the power plant in the event of loss of main supply.

## 6.6 *IMPACTS FROM COOLING TOWERS*

### 6.6.1 *Overview*

As identified in **Section 3.11**, the cooling tower systems have the potential to increase salt deposition on the surrounding area and have adverse impacts on agriculture. The potential impacts from the cooling towers were quantified using detailed dispersion modelling and presented in the following section.

### 6.6.2 *Assessment Methodology*

The USEPA AERMOD dispersion model version 16216r was used to predict the maximum deposition rates of NaCl averaged over a one month period in the study area. The same meteorological data set, receptor grid spacing, land use and terrain as that presented in **Section 6.4** and **Section 6.5** was used for the assessment. Five (5) years of hourly sequential meteorological data was used so that inter annual variability was incorporated into the model and the highest one month average of any of the five meteorological years was used to define the impact significance as a worst case.

The amount of total particulate matter (TPM) released to the atmosphere was calculated using the following formula <sup>(1)</sup>:

- $TPM [g/h] = \text{Total Dissolved Solids (TDS) [ppmw]} \times \text{Drift Loss [\%]} / 100\% \times \text{Circulating Water Rate [m}^3/\text{hr]}$

(1) Government of Canada (2015) Wet cooling tower particulate matter emission: guide to reporting [Online] Available at: <https://www.canada.ca/en/environment-climate-change/services/national-pollutant-release-inventory/report/sector-specific-tools-calculate-emissions/wet-cooling-tower-particulate-guide.html> [Accessed 07 March 2018]

The location of each cooling tower fan is presented in **Table 6.22**. Each fan was treated as a point source and modelled using the information presented in **Table 6.23**.

**Table 6.22** *Cooling Tower Fan Locations*

Fan Number	Modelled Point Source Location (Lat/Long)
1	6°14'38.54"S, 107°35'29.57"E
2	6°14'38.24"S, 107°35'30.02"E
3	6°14'37.98"S, 107°35'30.44"E
4	6°14'37.65"S, 107°35'30.86"E
5	6°14'37.39"S, 107°35'31.29"E
6	6°14'37.10"S, 107°35'31.74"E
7	6°14'36.80"S, 107°35'32.16"E
8	6°14'36.51"S, 107°35'32.58"E
9	6°14'36.21"S, 107°35'33.00"E
10	6°14'35.92"S, 107°35'33.46"E
11	6°14'35.62"S, 107°35'33.88"E
12	6°14'35.33"S, 107°35'34.30"E
13	6°14'35.03"S, 107°35'34.72"E
14	6°14'34.74"S, 107°35'35.17"E
15	6°14'34.44"S, 107°35'35.59"E
16	6°14'34.15"S, 107°35'36.02"E
17	6°14'38.99"S, 107°35'29.90"E
18	6°14'38.70"S, 107°35'30.32"E
19	6°14'38.40"S, 107°35'30.74"E
20	6°14'38.11"S, 107°35'31.19"E
21	6°14'37.81"S, 107°35'31.61"E
22	6°14'37.52"S, 107°35'32.03"E
23	6°14'37.22"S, 107°35'32.45"E
24	6°14'36.93"S, 107°35'32.88"E
25	6°14'36.63"S, 107°35'33.33"E
26	6°14'36.34"S, 107°35'33.75"E
27	6°14'36.04"S, 107°35'34.17"E
28	6°14'35.75"S, 107°35'34.59"E
29	6°14'35.45"S, 107°35'35.05"E
30	6°14'35.16"S, 107°35'35.47"E
31	6°14'34.86"S, 107°35'35.89"E
32	6°14'34.57"S, 107°35'36.31"E

**Table 6.23** *Cooling Tower and Modelling Information*

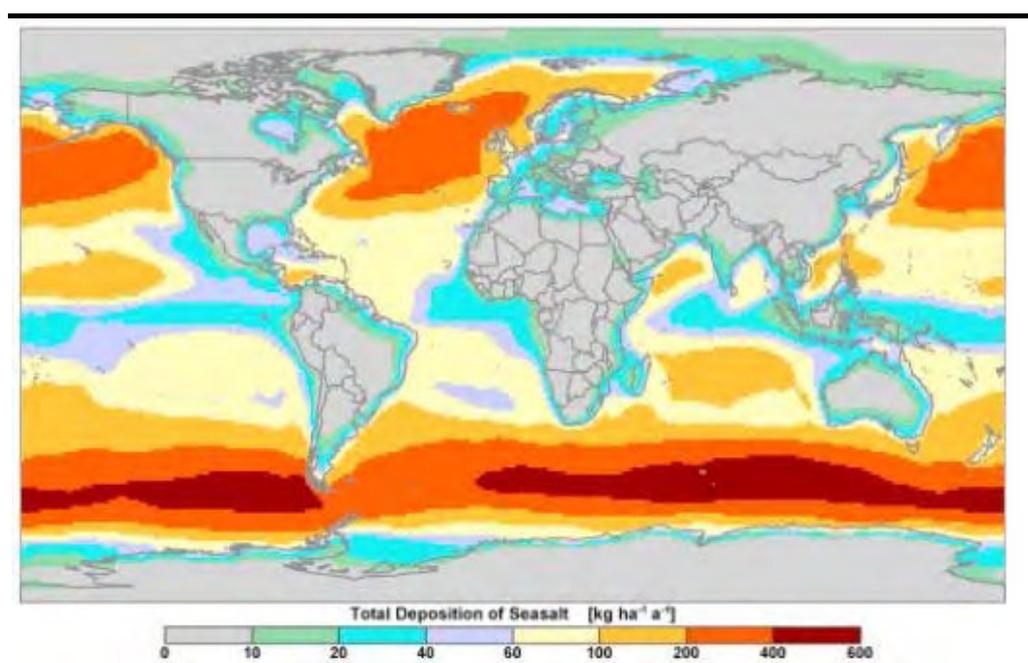
Item	Data	Unit
Number of cooling towers	2	-
Cells/fans per cooling tower	16	-
Total cells/fans	32	-
Cooling tower structure height	18.7	m
Cell/fan diameter	9.75	m
Exit velocity	8.73	m/s
Exit temperature	37.8	C
Circulating rate	54478	m <sup>3</sup> /hr
	907603 <sup>(1)</sup>	lpm
Total dissolved solids (TDS)	44,100	mg/l
Design drift	0.0005	%
	4.54	lpm

Item	Data	Unit
	200127	mg/min
	3.34	g/s
	0.208	g/s/PM <sub>10</sub> /cell
Operating hours	8760	hours
Sodium Chloride (NaCl) Particle Density	2.165	g/cm <sup>3</sup>
(1) 1 cubic meter / hour = 16.7lpm		

### 6.6.3 Impacts to Agriculture (pre mitigation)

Salt water bodies are the dominant global source of airborne salt particles. The coastal location of the Project would suggest that the existing vegetation is already exposed to salt deposition from the natural injection of sea water droplets into the atmosphere. Research indicates that global sea salt deposition rates can reach 400-600kg/ha/a (refer to **Figure 6.6**<sup>(1)</sup>) however these extreme values are primarily found in the northern and southern most oceans. Total deposition in continental areas has been researched and the evidence suggests that salt deposition rates at the Project site are likely to be between 20 and 40kg/ha/a. For the purpose of this impact assessment, the median value of 30kg/ha/a has been adopted as a baseline.

**Figure 6.6** Global Sea Salt Deposition



Source: Robert Vet et al (2014) A global assessment of precipitation chemistry and deposition of sulphur, nitrogen, sea salt, base cations, organic acids, acidity and pH, and phosphorus. *Atmospheric Environment*. [Online] Available at: <https://www.sciencedirect.com/science/article/pii/S1352231013008133> [Accessed 7 March 2018]

<sup>(1)</sup> Robert Vet et al (2014) A global assessment of precipitation chemistry and deposition of sulphur, nitrogen, sea salt, base cations, organic acids, acidity and pH, and phosphorus. *Atmospheric Environment*. [Online] Available at: <https://www.sciencedirect.com/science/article/pii/S1352231013008133> [Accessed 7 March 2018]



damage. Impacts may also occur to plant and equipment within the Project area from salt corrosion.

#### **6.6.4** *Recommended Mitigation, Management and/or Monitoring Measures*

Monitoring of salt deposition rates is recommended within 500m of the Project area. The monitoring should be designed to determine the level of salt deposition against appropriate standards. Monitoring of foliage on vegetation within the 500m boundary is also to occur to determine the extent of leaf damage (leaf necrosis).

Where impacts to vegetation is determined from the monitoring, engagement within affected parties is to occur to determine appropriate actions. These actions may include (but are not limited to): investigation and support of alternative cropping methods/species; adoption of spray irrigation methods; and/or compensation for lost agricultural production or impacts on households.

Regarding impacts on plant and equipment, it is recommended that all exposed surfaces be coated or painted to reduce corrosion from salt deposition. Regular maintenance of exposed surfaces is also required.

Salt tolerant vegetation should also be planted within the Project area and within 500m of the Project.

#### **6.6.5** *Residual Impacts (post mitigation)*

Residual impacts may consist of lost agricultural production within 500m of the Project area, damage to household structures from corrosion and damage to plant and equipment within the project area, predominately during the dry season. The adoption of the recommended mitigations are likely to reduce the residual impact to **Minor**.

## 7.1 INTRODUCTION

The IFC Performance Standard 1 (Paragraph 5) defines the broader Project area to include “... areas potentially impacted by cumulative impacts from further planned development of the Project, any existing project or condition, and other project-related developments that are realistically defined at the time the Social and Environmental Assessment is undertaken.”

In addition, the IFC Performance Standard 1 (Paragraph 6) states that the “... assessment will also consider potential trans-boundary effects, such as pollution of air, or use or pollution of international waterways, as well as global impacts, such as the emission of greenhouse gases.”

Cumulative impacts are those impacts that act together with other impacts (including those from concurrent or planned future third party activities) to affect the same resources and/or receptors as the proposed Project. Cumulative impacts are therefore generally impacts that act with others in such a way that the sum is greater than the parts. This is, however, not always the case – sometimes they will simply be the sum of the parts, but that sum becomes significant.

This chapter considers the cumulative impacts that would result from the combination of the Project and other actual or proposed future developments in the broader Project Area.

## 7.2 IDENTIFIED CUMULATIVE IMPACTS

Within the study area it is primarily the operation of a flare at the SKG Pertamina Gas facility located immediately to the north east of the Project site that could lead to cumulative impacts on air quality at sensitive receptor locations. It should be noted, however, that during normal operation the flare will combust only small quantities of gas to maintain a pilot light and emissions to air are considered small. Although the flaring rates and periods of flaring at the facility are not known, it is considered acceptable to assume that emission from the flare will have been captured within the baseline assessment presented in **Section 5.3** and as such have already been assessed within this air quality impact assessment.

The proposed Project has the potential to adversely impact on ambient air quality throughout its lifetime from construction through operation and decommissioning. This air quality impact assessment identifies those emissions which are potentially significant and then quantifies the impact so that suitable mitigation and/or recommendations can be identified where required.

### *8.1 CONSTRUCTION PHASE*

During the construction phase of the Project, the potential impacts to air quality are primarily associated with dust and PM<sub>10</sub> from earthwork activities, construction of the Project infrastructure, and trackout of dusty materials onto the public road network. Without the correct implementation of mitigation, the significance of the impacts associated with these activities can be major adverse at sensitive receptor locations within 500m of construction activities. Emissions from mobile and non-mobile plant as well increased traffic movements on the public road network have also been considered, however these are expected to be negligible.

Based on the predicted impacts during the construction phase, site specific mitigation measures have been identified. These measures are intended to minimise the potential impacts associated with the construction activities where necessary. Based on the correct implementation of the mitigation measures, the residual impacts are expected to be negligible for the majority of the time. However, because of the environment in which the Project is set, the potential for significant emissions of dust is acknowledged to be elevated. Therefore, although the proposed mitigation is designed to reduce dust emissions as far as possible, it is recognised that in reality this will not necessarily be feasible all of the time and there may be short term minor adverse impacts during the construction phase.

### *8.2 OPERATION PHASE*

The potential impacts to ambient air quality from the CCGT and diesel fired engine-generators were assessed quantitatively through the use of the dispersion model AERMOD.

The assessment indicates that during the normal and continuous operation of the CCGT power plant operating at the IFC NO<sub>x</sub> emission limit guideline of 51mg/Nm<sup>3</sup>, impacts to ambient air quality in the study area will be minor adverse at worst in small areas within approximately 500m of the main stack locations. The impacts to air quality from CO emissions at a concentration of 50mg/Nm<sup>3</sup> was found to be negligible throughout the study area. It is assumed likely that the plant will not continuously operate at the specified emission limits and impacts to ambient air quality will be further reduced

during periods of reduced loading. On this basis no additional mitigation measures have been advised, however stack monitoring should be undertaken on a continuous basis throughout the operational lifetime of the plant to ensure that NO<sub>x</sub> emission concentrations do not exceed 51mg/Nm<sup>3</sup> and the resulting ambient concentrations are maintained within an environmentally acceptable level.

With regard to the diesel fired engine-generators required for black start and in case of a station black out and/or emergency power for the safe shutdown of the power plant, the assessment considers two scenarios including: scenario a) the operation of twelve engine-generators at full loading for a period of 50 minutes for black start; and scenario b) the use of one engine-generator for black out and safe shutdown procedures. Both assessment scenarios considered only the short term impacts as such events are only expected periodically and for short periods of time.

The assessment indicates that moderate adverse impacts to air quality are expected during a black start as a result of all twelve engine-generators operating simultaneously and at full load. The use of one engine-generator at full and continuous loading for black out and safe shutdown procedures is expected to have minor adverse impacts on air quality at worst. It is suggested that all engine-generators should be routinely checked and serviced so that their operational performance is maintained throughout the operational lifetime of the Project.

Impacts to vegetation due to increased salt deposition from the cooling towers is likely to have a major adverse impact up to 380 metres outside of the Project boundary. Monitoring and mitigation measures including investigation and support of alternative cropping methods/species; adoption of spray irrigation methods; and/or compensation for lost agricultural production or impacts on households are suggested. The assessment concludes that with the adoption of the recommended mitigation measures the residual impact is likely to be minor.