MEDCOENERGI Geothermal PT. Medco Cahaya Geothermal	**Non Technical Summary (Ringkasan Non-Teknis)**	**No. Document:** **MCG-HSE-003-003** Rev.00 | Page 1 / 17 Date : September 21st, 2023

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1. Introduction

1.1. Overview

This Non-Technical Summary (NTS) provides an overview of the main findings of the Environmental and Social Impact Assessment (ESIA) prepared for the construction and operation of Geothermal Power Plant and Transmission Line Project Blawan-Ijen Banyuwangi Bondowoso.

This NTS does not, and is not intended to, convey all of the information relating to the Project and its potential environmental and social impacts. By necessity, the text provided herein is a summary of the detailed assessments discussed in the ESIA. Therefore, for detailed information pertaining to any part of this NTS, please refer to the ESIA documents and its technical appendices.

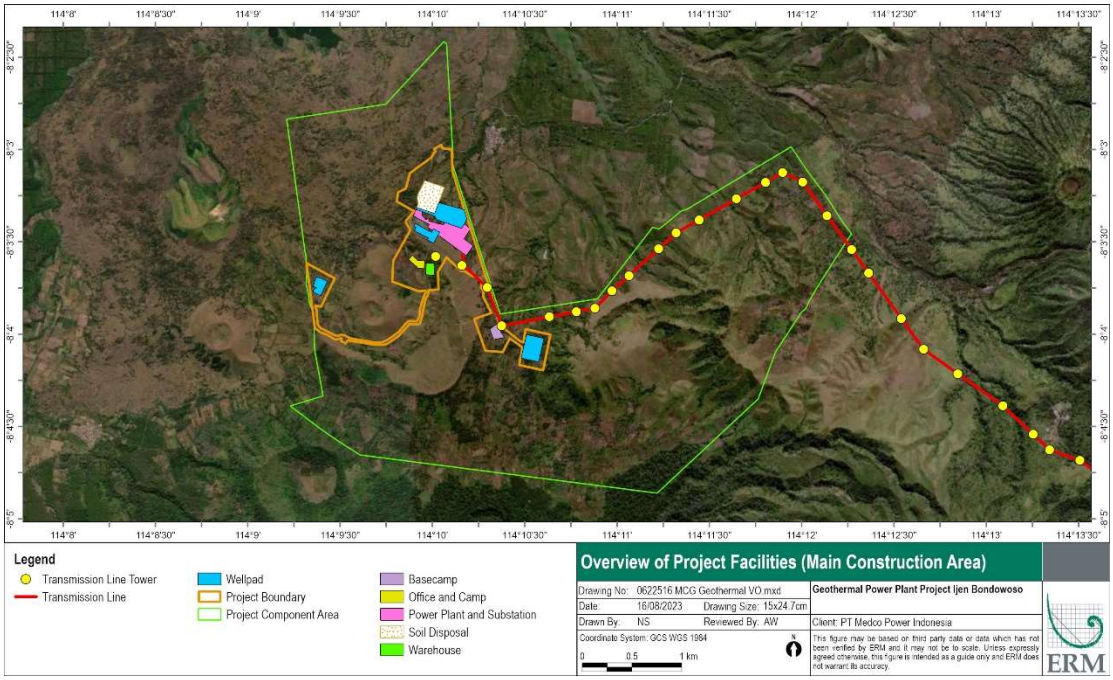
1.2. What is the Project

MCG proposes to develop a 34 MW geothermal project located at Blawan Ijen, Bondowoso East Java. The Project will be carried out in several stages. The first stage, referred to as Unit-1, will have a capacity of 34 MW and the final stage will reach the full capacity at 110 MW.

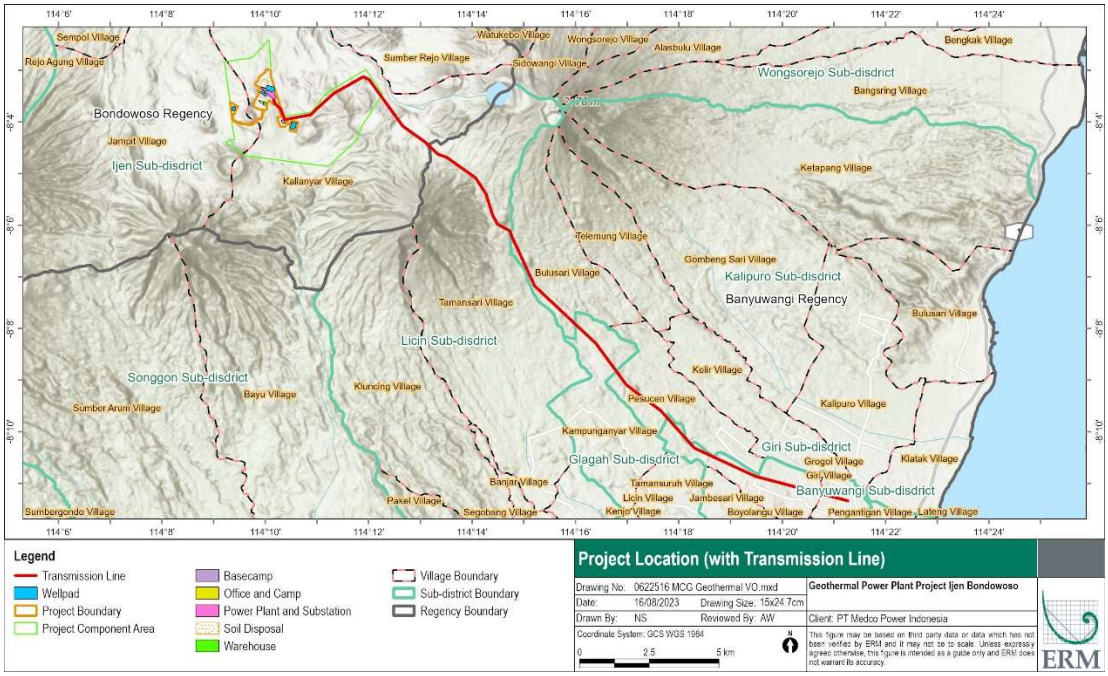
The key component of the project include:

- Exploitation Facilities including Geothermal Power Plant, separator and brine pump, vent station, base camp, office and car park,
- Drilling and exploration facilities including four well pad areas, including 6 production wells, 2 injection wells, and one backup injection well), logistics yard, and explosives bunker
- Access Roads (within the Project Site)
- 150 kV Transmission line and 83 towers (approximately 28.3 km)
- MCG have previously conducted drilling campaigns within this Project Site:
    - Two deep slim-holes exploration drilling in 2016-2017: IJN 01 and IJN 02; and
    - Three deep big-holes exploration drilling in 2020 : IJN 6-1 ST, IJN 5-1 dan IJN 6-2.

Figure below shows the project key components.



Overview of Project location and key components – Power Plant Area



Overview of project location and key components – Transmission Line Area

2. The Project

2.1. Project Located

The Project is located on Bondowoso and Banyuwangi regencies, East Java province, Indonesia and is approximately 270 km southeast of Surabaya.

The prospect is situated in a big rim caldera structure with diameter of +16-20 km at an altitude of +1,500 m above sea level. Young volcanic activity has occurred along the southern part of the caldera which includes Gunung (Mount) Merapi. The main construction area is located in Kalianyar Village, Ijen Sub-District, Bondowoso East Java. The transmission line will traverse the administrative areas as shown in table below:

Table of Administrative Areas of the Project

Regency	Sub-District	Village
Bondowoso	Ijen	Kalianyar
		Sempol
		Jampit
Banyuwangi	Licin	Tamansari
	Kalipuro	Pesucen
		Bulusari
	Glagah	Anyar Village
	Giri	Grogol
		Giri

2.2. Land Requirements

The power plant will have permanent infrastructure within the Project Area, representing about 40.9452 hectares (ha), and temporary infrastructure on 0.2523 ha of the total footprint. For the transmission line, excluding the Right Of Way (ROW), there will be acquisition of 2,780.5 ha for the transmission towers and no temporary area. The approximate permanent land required for the ROW is 24.2 ha. The worker accommodation for the construction phase is covered by the temporary power plant facility, which is owned by MCG. The total land required for the Project is 2822.2 ha.

2.3. Construction Schedule

Construction for unit-1 is estimate to be 21 months with 3 months for commissioning. The schedule can be found in the table below:

Activity	Estimated Duration (months)
Power plant construction	19
Transmission line construction	16
Commissioning	3

The timing are on the basis of all construction activities occurring at the same time, and transmission line will be handed over to PLN after COD.

2.4. Construction Phase

Power plant construction activities include construction of the power plant facility and associated infrastructure, including air-cooled condenser, pipelines, and facilities for treatment and reinjection of wastewaters and gases.

The power plant construction will include:

- Tree Cutting and Land Clearing;
- Earthworks (Site Preparation), Slope Protection (Stability) and Drainage;
- Concrete piling works
- Foundation (Excavation and concrete);
- Power Block Installation;
- Building Construction (Control Room, Workshop, etc.);
- Switch Yard Installation; and
- Commissioning.

The geothermal pipeline network will typically follow existing road construction to facilitate the construction process. Pipelines have certain slope, security, and safety requirements, thus the pipeline is required to adjust the slope and flow using gravity. The geothermal pipeline consists of the steam pipelines from the production wells to the geothermal power plant and brine and condensate pipelines from the power plant to the injection wells

MCG will upgrade the access road (widen and asphalt) from regency road junction to all facilities with total length of 8.6 km.

The transmission line construction will include:

- Tree Cutting and Land Clearing;
- Foundation (Excavation and concrete);
- Tower Erection and Isolator/Accessories Installation;
- Stringing (Conductor Installation); and
- Commissioning.

2.5. Operation Phase

Prior to the power plant being put into operation, a series of performance and reliability tests are conducted. This stage is known as 'commissioning' and for the Project, it involves pre-operational testing of the power plant and transmission line. Once the power plant is completed and passes the performance and reliability tests, the power plant will proceed into commercial operation.

The geothermal fluid from wells will be separated into Steam and Brine in the Separator. The brine will be fed to Preheater to increase the motive fluid's temperature and steam will be fed into the vaporizer to vaporize the motive fluid and then introduced to new organic turbine to produce electricity. Process flow diagram of Binary System Power Plant can be found in the figure below:

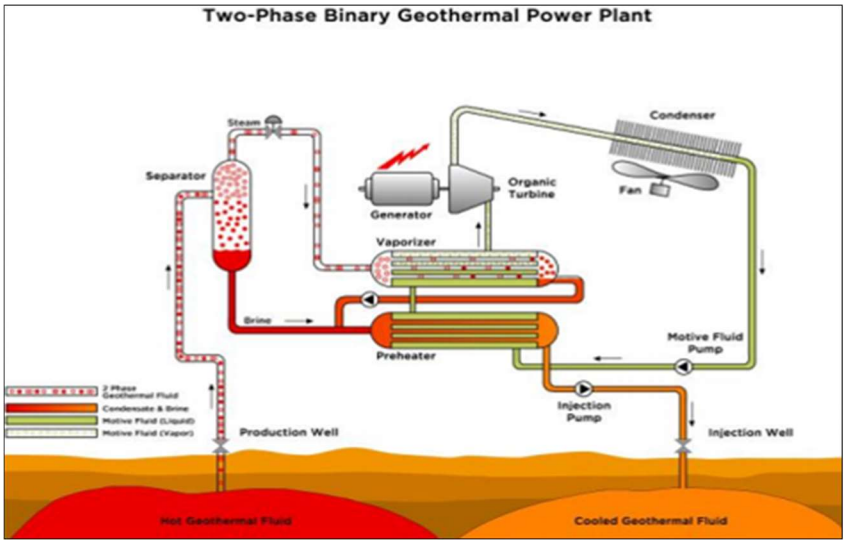


Figure of Two phase Binary Geothermal Power Plant

3. Description of the Environment

3.1. Condition of the Physical Environment at Site

3.1.1. Climate and Meteorology

In the Project Area, high rainfall occurs in the wet season between November and April. January is the wettest month, while May to October is usually dry and August is the driest month. The average temperature is between 19-34 degrees Celsius. The warmest month in East Java in general is October with an average maximum temperature of 22 degree Celsius.

3.1.2. Ambient Air

Based on primary air quality baseline data (taken in February 2022), the ambient air quality show that there were no parameters that exceeded the threshold levels based on national or international standard. All parameters examined are present in low concentrations, thus indicating that the condition of ambient air quality is deemed to be relatively good (unpolluted).

3.1.3. Ambient Noise

The noise at several noise sampling locations are still below the national quality standard. The acoustic environment of the areas crossed by the Project can be described as being typical of natural and rural areas. The existing sources of noise mostly came from community activities and transportation.

3.1.4. Land Use and Land Cover

The Project area is located within an area of production forest that has been permitted for use for the Project from the local government.

3.1.5. Geology

The geological review of Bondowoso Regency indicates that its stratigraphy is composed of volcanic deposits from older Quaternary volcanoes and younger Quaternary volcanoes. These deposits consist mainly of leucite, tuff, and sandstone, alluvium, and Mio-Pliocene sediment facies dominated by clay, silt, sandy silt, and fine sand, and coarse sand, gravel, cobbles, and boulders. The project site is located within the Kendeng Caldera, which erupted approximately 294,000 years ago. Ijen was designated as a UNESCO Global Geopark on 24 May 2023, at the 216th Executive Council meeting of the United Nations Educational, Scientific, and Cultural Organization (UNESCO) in Paris, France.

3.1.6. Soil

Based on soil baseline data, all metals, pesticides, PCB, and Total Petroleum Hydrocarbon contained in the soil are under the regulation limit and present in low concentrations suggesting limited soil contamination in the Project Area.

3.1.7. Surface Water

Based on surface water baseline data, the surface water quality for mostly meet the threshold according to Government Regulation. Some parameter that exceed the threshold namely BOD, TSS, COD, Chloride and coliform.

3.1.8. Groundwater

The results of the surface water monitoring show that the majority of parameters tested are within the Groundwater Quality Standards. The total coliform that exceed the quality standard may be due to the lack of wastewater treatment in neighboring communities and human and animal feces/waste from traditional farm and plantation fertilizer.

3.1.9. Natural Hazard

Natural hazard may include the following: as earthquakes, volcanic eruptions, tsunamis, floods, landslides, droughts, and forest fires. the project site is located within Radius 8 km from Ijen Volcano which potentially affected by ash fall possibly affected by incandescent ejected rock fragments. The potential for landslides is based on the amount of rainfall and the slope conditions of a particular area. The project site is located in Sempol sub-district, the annual rainfall is less than 1000 mm, which falls into the classification of very low rainfall. As for the slope conditions, the project site is situated in the central part of the Kendeng Caldera with relatively flat or gentle slopes.

3.2. Condition of the Biological Environment at Site

The wet and dry season biodiversity studies conducted in 2022 with the focus study of terrestrial biodiversity, aquatic biodiversity and vantage survey for birds.

The wet and dry season biodiversity studies recorded a total of 290 terrestrial fauna and 345 flora species.

Recorded fauna species consists of 109 birds, 22 mammals, 23 herpetofaunas, 136 insects, 3 fishes, and 18 aquatic macroinvertebrates. Referring to the International Union for Conservation of Nature (IUCN) red list data base, it is identified that most of the encountered species were listed List Concern-LC (160 species) and none of them listed as Critical Endangered-CR, however it is understood that there are one Endangered-EN, two Vulnerable-VU, two Near threatened-NT and the remaining 60 species are listed Not Evaluated-NE. and Flora found at the project site include agricultural land, shrub land, savannah, secondary forests, and mixed plantation.

3.3. Condition of the Economy and Communities at Project Site

3.3.1. Population

The population of Ijen District was 11,896 people in 2020. This comprises of 6,027 males and 5,869 females. For the transmission line, the population of Kalipuro has the highest population up to 84,172 people in 2021, The population of Giri was 31,834 people in 2021, Glagah was 36,667 people in 2021, and Licin population was 2,952 people in 2021.

3.3.2. Gender

In Bondowoso regency, Sempol has slightly higher female population with sex ratio of 98. The male population in Kalianyar is greater with the sex ratio of 104.

In Banyuwangi regency, Pesucen, Kampung Anyar, Grogol and Giri village have higher female population

3.3.3. Religion

Islam is the most widely practice religion in all village, followed by Christianity, Catholicism and Buddhism.

3.3.4. Ethnicities

The dominant ethnic group in the Project Area in Banyuwangi Regency are include Osing, Madurese, and Javanese ethnic group, followed by Balinese.

The dominant ethnic group in the Project Area in Bondowoso Regency are belong to madurenese ethnic group, followed by Javanese.

3.3.5. Land Acquisition

Initial identification of landowners indicates that there are a total of 31 affected landowners; 18 landowners in Grogol, 8 landowners in Bulusari, 2 in Pesucen and 3 landowners in Giri, Banyuwangi. It was reported that not all of the landowners have land certificates. However, these landowners will need to be consider in the acquisition process regardless of legal status.

3.3.6. Labour Force

The majority of the labor force in Bondowoso are engaged in farming. Meanwhile, most of Banyuwangi's labor force work in service sector and agriculture sector.

3.3.7. Minimum Wage and Income

Based on discussion and Key Informant Interview-KII with village leader, monthly household income is around IDR 1,500,000. This is mostly generate from the agriculture sector, where the daily wages of farmworkers ranging from IDR 35,000 to IDR 50,000.

3.3.8. Local Livelihood

The majority of people within the Project area are working as farmers and farmworkers, while few people work as daily laborer with unstable income and have small businesses of groceries shops.

3.3.9. Education

There is a decreasing trend of school enrolment rate in all education level. Many decided to leave lower secondary school (SMP) to work in the plantations (for male student) or get married (for female student).

3.3.10. Health

The community health center in Ijen District records most prevalent health issues. Essential hypertension was recorded as the most prevalent diseases, followed by influenza, gastritis, diabetes mellitus and spinal diseases. And for Banyuwangi regency based on Kelir Community Health Centre, top 3 diseases recorded are Acute upper respiratory infections, Essential hypertension, and common cold.

3.3.11. Utilities

- **Water**
  All villages in Ijen District use water spring as clean water source. Glagah, Kalipuro, and Giri District use clean water provide by PDAM. Communities in Tamansari, Kampung Anyar, and Bulusari Village use spring water from Kalibendo Plantation for domestic and drinking water.
- **Energy**
  All households in villages in the AoI have secured electricity access from PLN, also used 3 kg LPG for cooking.
- **Waste Management**
  Domestic waste management awareness among local communities within the Project Area is considerably low. waste segregation is not commonly practiced. mostly burn domestic waste on vacant plantation area or dump them in the ground. Some also dispose plastic waste on nearby river.

3.3.12. Road Transportation Network

The road conditions to access villages in Ijen District are asphalted, but there are some areas with uneven surface. The roads are generally winding and uphill, with a width of approximately 3 to 3.5 meter. Road users are mainly dominated by tourist cars heading to the tourism destinations (e.g. Ijen Crater, Wurung Crater, Blawan hot spring, etc.), agriculture transporter cars and trucks, and communities heading to the plantation or collecting grass for animal feed using motorbikes.

The regency road near the transmission route is winding and steep with no lighting. The road has been asphalted, but uneven surface is observed in some areas. The width of the road is uneven; ranging from 3 to 6 m and is prone to landslide. The road is relatively quiet. Only a few number vehicles heading to Ijen Crater is passing by.

3.3.13. Vulnerable Groups

The community members below can be categorised as potentially vulnerable groups in the Project Area:

- People with poor living condition; with income below the poverty line and live in a crowded surrounding with sanitation and hygiene issues within the Project AoI;
- Landless people/people without legitimate land ownership documentation /certificates. This category includes informal land users and squatters;
- Elderly, disabled people, women and children with multiple disadvantages/ vulnerability factors such as poor, head of household/ sole bread winner. Especially if these groups' income is solely generated from activities substantially affected by the Project; and
- Farmers and other local people who are prone to hazards due to close proximity with the power plant.

3.3.14. Indigenous People

The site surveys conducted for this Project did not identify any physical displacement, which includes cultural heritage and collective attachment, limiting the impact to Osing households to economic impacts.

3.3.15. Tourism

The Project is located within the Kawah Wurung Park which is a tourism hiking area known for scenic views and a number of crater features such as Kawah Wurung and Kawah Ilalang which are adjacent to the access road and transmission line respectively.

3.3.16. Cultural Heritage

The majority of all identified cultural sites surrounding the project area are located over 10 km from the Project and unlikely to be impacted. However, the Mbah Parto Rejo Astama burial site is located 780m from the nearest well pad (well pad 5). The burial site has significant cultural and spiritual importance for people in Jampit and surrounding area as well as others from outside East Java.

3.3.17. Traffic

The major road in the Bondowoso Regency is the provincial route between Bondowoso - Situbondo and Bondowoso - Jember

4. Stakeholder Consultation

4.1. Consultation that have Occurred

MCG has conducted multiple rounds of consultations and held several stages of negotiation since 2018. Based on MCG's stakeholder engagement database, consultations were conducted with various different groups of stakeholders including local authorities, community leaders, affected community members, youth groups, women's groups, Osing representatives and community groups.

In March 2022 and July 2023, MCG had conducted consultations with various stakeholders (in addition to the household surveys conducted with affected households).
The stakeholder involved in the consultation for ESIA baseline Study can be found in the table below:

No	Location	Key Stakeholders Involved
1	Ijen District	Head of Sempol Village Head of Kalianyar Village Religious leader of Kalianyar Village Youth representative of Kalianyar Village Women representative of Sempol Village Community leader of Jampit Village Head of LMDH / Forest village community organization Kalianyar Head of Ijen Community Health Centre Local farmers – land users within the Project Area Representative of PTPN XII Representative of Perhutani
2	Glagah District	Secretary of Kampung Anyar Village Osing youth Representative of Kalibendo Plantation
3	Kalipuro District	Head of Bulusari Village Secretary of Bulusari Village Head of Bulupayung Hamlet, Bulusari Head of Kelir Community Health Centre
4	Grogol District	Head of Giri Village Secretary of Giri Village Secretary of Grogol Village

During the consultation, the following information was provided to the stakeholders:

- Description of the Project and the potential environmental and social impacts; and
- ESIA process and Project activities

4.2. Consultation Feedback

Concern raised by the public included:

- concerns regarding the potential disturbance on the community's clean water source due to Project operation,
- expect the Project to create job opportunities as a pulling factor of students going to school,
- local recruitment,
- concern regarding compensation that should be fair, transparent and benefiting the affected communities,
- concerns related to access road and traffic due to project mobilization of equipment,
- concerns related to vehicle noise creates disturbance during night time in the community residential area,
- some community unaware of the Project, and
- concern of limited socializations that may lead to negative perception and risk of social unrest.

4.3. Commitments to Address Concerns and Grievances

External stakeholders, such as village authorities, community figures and other key stakeholder, are currently communicating directly with MCG chief security and community relations through phone calls or face to face meetings. A Stakeholder Engagement Plan (SEP) and Community Grievance Redress Mechanism (GRM) has been prepared for the project to guide engagement for the project.

The Objective of SEP and GRM as follow:

- Identify the local legal framework of consultation activities and disclosure requirements;
- Identify potential stakeholders in the area of influence, as well as relevant interested parties such as government agencies and other key stakeholders;
- Record and monitor all consultation activities;
- Describe how concerns or grievances will be handled via a GRM;
- Provide a disclosure plan

4.4. Opportunity to Comment/Grievance on the Project

The Following member of MCG can be contact.

Name : Ahmad Taufik
Phone Number : +6282376061882
Email : Ahmad.Taufik@contractor.medcoenergi.com

5. Managing Environmental and Social Impact

5.1. Environment and Social Impact During Construction and Drilling

The following impacts have been identified during Construction

5.1.1. Ambient Air Quality

The closest residential property to the Project is located approximately 300 m from the nearest well pad. There are also potential communities within 500 m of the transmission line route.

There is potential for air emissions and dust generation from construction to impact ambient air quality as well as local communities.

The main activity that would emit H2S air emissions is well testing. Because non-condensable geothermal gases, including H2S, are heavier than air, the gases can accumulate in confined spaces and low-lying areas.

5.1.2. Ambient Noise

Drilling at each well pad would occur intermittently for 21 months and consist of noise generating equipment such as a drill rig, generator, drilling mud mixing/separation facility, and mud pump. Drilling operations would be carried out 24 hours per day. Silencers and wellhead valves equipped with blow-out preventer would be installed for blow testing. Vehicle traffic would be intermittent, likely occur during daytime hours, and would mostly occur only during the first stage of construction. Therefore, noise impacts from these sources are not expected to be significant.

5.1.3. Water Resources

The impact on surface and ground water during construction is related to drilling and wastewater discharges and waste management from the workers camps and construction sites. The construction and drilling activities associated with the Project may result in negative impacts to water resources within the Project footprint. Potential impacts could include changes to downstream surface runoff patterns; over-extraction of surface water from a nearby river; and changes in surface and groundwater quality.

5.1.4. Soil Environment

The construction and operation activities associated with the Project (including land clearance, grading, excavated material disposal, and placement) have the potential to impact the geomorphology, landscape, and soils of the Project area. Potential impacts could include soil erosion and soil contamination. Oil, chemical and waste from construction site or vehicle during construction phase can also cause soil contamination.

5.1.5. Landscape and Visual

The construction and operation activities associated with the Project—including land clearance, grading, excavated material disposal, and placement—have the potential to impact the landscape.

The presence of the towers for the transmission line is likely to cause impacts to visual.

5.1.6. Biodiversity

Mortality of individual fauna may occur during construction due to vehicle or machinery strike or falling debris during clearing activities; and worker influx and hunting/poaching of extant fauna.

During construction, vehicle and machinery use may strike fauna within the Project area, however this is likely to impact livestock rather than species of conservation significance. Clearance activities within the natural critical habitat however may impact species of conservation significance, although these are likely to be birds.

Hunting and poaching by local people and the workforce may impact on species of conservation significance, especially birds captured for the animal trade that may occasionally visit the Project area.

5.1.7. Livelihood and Land Acquisition

It is estimated that 2,805.2 ha of potential land will need to be acquired for the Project (exclusively for the transmission line) and approximately 31 households will be impacted by the transmission line and ±250 households will be impacted by the ROW. There is no physical displacement from the Project.

The Project may bring job opportunities for the local communities. MCG is committed to absorbing local workers, especially in the Ijen District area.

5.1.8. Cultural Heritage

The Mbah Parto Rejo Astama burial site is located 780m from the nearest well pad (well pad 5). The burial site has significant cultural and spiritual importance for people in Jampit and surrounding area. Impacts to the mosques along the transmission line route from air and noise emissions will be transitional and temporary during the construction

5.1.9. Tourism

The air, noise, and dust emissions during construction could cause impacts to local tourism up to 500 m of the Project. Issues from tourism can include restriction of access to hiking / tourism sites and landscape and visual impacts from presence of facilities.

There is likely to be a visual impact from the construction of the Project on local craters (KawahWurung and Kawah Ijen) that are utilized for panoramic views

5.1.10. Infrastructure and Services

Activities such as Transportation of equipment, supplies and labor; Supply of labor, equipment, and services; and Storage, handling and disposal of waste, fuel, chemicals, oil, gas, may impact infrastructure services during the Construction Phase of the Project.

These activities will impact existing infrastructure (road networks, waste streams, population flows, health care systems, etc.). Transmission lines will be constructed along the existing road network and the access road to the Project (8 km) will be upgraded for vehicle mobility.

The impact from the transmission line installation will be transient and unlikely to have significance impacts.

5.1.11. Community Health and Safety

Regarding ambient air quality, it is likely that potential negative impacts will arise continuously during the construction phase of the Project. Health impacts from fugitive dust, PM_{10} and $PM_{2.5}$ include:

- Effects on breathing and respiratory systems; and
- Decreased lung function and symptomatic effects, including acute bronchitis, particularly in children and asthmatics.

The construction period would be long term (around 21 months). The local communities have aspects of vulnerability; many are landless without legitimate land titles, farming close to the project area, and have elderly populations. The local communities who are categorised as vulnerable groups may be more sensitive to the Project's negative impact.

5.1.12. Occupational Health and Safety

The impacts of SOx, CO and particulate emissions on the human health, depending upon the degree of exposure, have been correlated with nausea, localized pains, weakness in extensor muscles, tremors, palpitations, indigestions, dizziness, irritation of eyes, nervousness, and anxiety.

During well drilling and testing, impacts on air quality can be caused by H_2S emissions. CO2 is also in the steam vented out during blow testing, although its emissions are considered negligible compared to fossil fuel combustion sources.

The drilling and construction involves high-risk activities with the potential for accidents that may result in injuries and potential fatalities as well as lost man-hours. Employees of local contractors and those in the supply chain may not have international standard training in occupational health and safety, covering issues such as use of personal protective equipment, and in general, there is poor enforcement of occupational health and safety regulations.

5.1.13. Employment

Total 450 workers are required for peak labor during construction phase. In the construction phase, 77% of labor or 346 persons will be employed from local areas, especially in the Ijen district. The employment impact to the local community mainly will bring the economic opportunities and improve local livelihood of the community. Considering the estimated monthly income from the primary form of livelihood in the Project area is lower than the minimum wages of the Regencies and positive perception including expectation of employment opportunities as a result of the Project.

5.1.14. Traffic

The Project will generate additional traffic during the construction phase as a result of workers commuting to the site as well as truck deliveries of equipment and supplies. The equipment and supplies will primarily be transported via Surabaya-Progolinggo Road and continue using the national road to Bondowoso Regency.

During stakeholder consultations, several complaints were noted regarding traffic levels and traffic congestion during the exploration stage..In order to avoid these same issues occurring again during the construction phase, the Project proposes to implement the following measures;

- Equipment and supplies delivery will be carried out in stages and during off-peak hours to reduce traffic congestion;
- Heavy vehicles, like those causing the delays that local residents were complaining about, will be limited to night-hours and will be escorted by police

5.2. Environment and Social Impact During Operation

The following impacts have been identified during Operation

5.2.1. Surface and Groundwater

The impact on surface and ground water during operation is related to wastewater disposal and waste management from the maintenance works. The impact will be localised and short-term

5.2.2. Landscape and Visual

The construction and operation activities associated with the Project—including land clearance, grading, excavated material disposal, and placement—have the potential to impact the landscape.

The potential impacts likely to have negative impacts on landscape, will include mainly vegetation clearance and site preparation for both the geothermal plant and the transmission line construction. Impacts will be limited to areas adjacent to the Project. And the presence of the towers of transmission line have the potential to be visible in the nearby areas, although not continuously due to the variability of the landscape for the area surrounding the Project and the presence of vegetation.

5.2.3. Biodiversity

Impact to the habitat during operation phase is expected resulted from the maintenance of ROW. The impacts are expected to be minor impact since the dedicated ROW is considered disturbed area. Impact during from the maintenance of ROW can cause disturbances to the surrounding habitats particularly the transmission area surrounding Kawah Ijen Natural Reserve area which known to be habitat for conservation significance species.

5.2.4. Tourism

Restriction of access to hiking / tourism sites and landscape and visual impacts from presence of facilities. There is likely to be a visual impact from the operation of the Project on local craters (Kawah Wurung and Kawah Ijen) that are utilised for panoramic views.

5.2.5. Community Health and Safety

The influx of workers and in-migration could change the disease profile in the community resulting in declining community health and well-being. The handling, transport and treatment of the Project waste during construction may also result in risks to public health due to contamination of water resources and spread of disease carrying species such as rats.

5.2.6. Occupational Health and Safety

Expected impacts due to maintenance of power plants and transmission lines during operation will be similar to those discussed in the construction phase with less risk associated with the spread of disease as the number of employees will be much less than in the construction phase.

5.2.7. Employment

During operation, there will only be around 69 workers employed. Most workers will be sourced locally, especially in the Ijien District area. It is highlighted that there are training opportunities available to enable some villagers to work in these positions.The employment impact to the local community mainly will bring the economic opportunities and improve local livelihood of the community even though the number of workers is lower compared to the construction phase.

6. Mitigation and Monitoring

6.1. Reducing the Potential Impacts

MCG will implement measures to prevent and mitigate the potential negative impacts and to effectively manage the Project for environmental protection, for the construction and operation stages of the Project. Mitigation measures summarised in the ESIA, Environmental and Social Management Plan (ESMP). Mitigation measures have been proposed to meet the requirements of Indonesian laws and regulations and international guidance.

The types of mitigation measures identified are implemented in a number of ways such as:

- incorporated into the plant design;
- specifying construction methods;
- developing and implementing management plans;
- conducting monitoring; and
- stakeholder consultation and grievance mechanism procedures.

6.2. Monitoring the Potential Impacts

A recommended environmental monitoring program as set out in the ESMP will be designed to conduct sufficient monitoring to demonstrate compliance with the applicable international guidelines and Indonesian standards specified for the receiving environments. The monitoring programmes will also assess the performance of containment and treatment during construction and operation.

The Monitoring Procedures will set out the location of the sampling points, sampling methodology to be used, number of samples to be collected each round, frequency of sampling, sample handling and preservation, parameters to be analysed for and analytical methods, and reporting requirements.

This monitoring will include, but will not be limited to:

- Surface water quality
- Ambient noise
- Air quality;
- Waste generation;
- Occupational Health and Safety;
- Biodiversity Terrestrial and Aquatic; and
- Social.

7. Conclusion

This ESIA summarises a large amount of technical work undertaken to assess the impacts of the proposed Project. The ESMP sets out mitigation and monitoring actions that address the key environmental and social impacts identified in the analysis. Control measures will be implemented through a Project Environmental and Social Management System to ensure that the environmental and social impacts of the Project are acceptable and in compliance with the Indonesian legislation and international guidelines.