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**List of Acronyms**

AED	Automated External Defibrillator
ACGIH	Association Advancing Occupational and Environmental Health
CPR	Cardiopulmonary Resuscitation
CTO	Chief Technical Officer
CEO	Chief Executive Officer
dBA	A-weighted decibels
EEP	Ethiopian Electric Power
EPC	Engineering, Procurement and Construction
EPRP	Emergency Preparedness and Response Plan
ESMF	Environment and Social management Function
ESIA	Environment and Social Impact Assessment
E&S	Environment and Social
ESF	Environment and Social Function
ESMP	Environment and Social Management Plan
ESMS	Environment and Social Management System
TMGO	Tulu Moya Geothermal
H&S	Health and Safety
HSP	Health and Safety Plan
H <sub>2</sub> S	Hydrogen Sulfide
IFC	International Finance Cooperation
ISO	International Organization for Standardization
MoWIE	Ministry of Water Irrigation and Electricity



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MW	Megawatt
OE	Owners Engineer
PPE	Personal Protective Equipment
PS	Performance Standard
RAP	Resettlement Action Plan
RPF	Resettlement Policy Frameworks
REQI	Request for Expression of Interest
RFPs	Request For Proposals
SEP	Stakeholder Engagement Plan
WHO	World Health Organization

## **1.INTRODUCTION**

### **1.1 Introduction**

This document provides a description of the framework for the development of an Environmental and Social Management System (ESMS) for the Tulu Moyo Project (the “Project”) for Tulu Moyo Geothermal PLC. (“the Company”). It also provides an outline of the various environmental and social management plans, policies and procedures comprising the ESMS and describes their implementation schedule and responsibilities.

### **1.2 Project overview**

The Project Company, Tulu Moyo Geothermal Operations PLC (“TMGO”) was established in December 2017. The company signed the Power Purchase Agreement and the Implementation Agreement with the Ethiopia Electric Power and the Government of Ethiopia on the 19th of December 2017 making it one of the first independent power projects in Ethiopia.

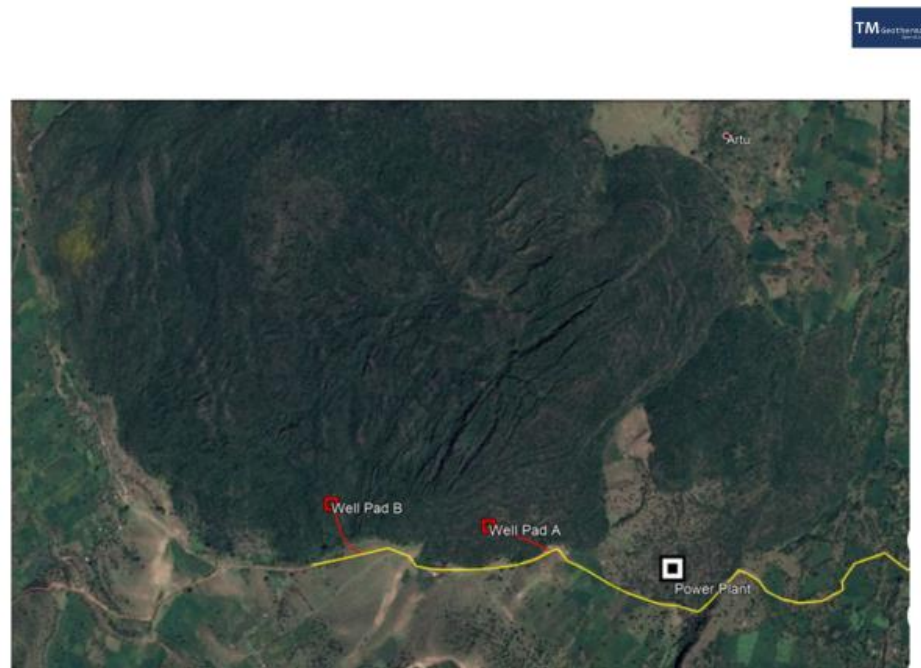
The objective of the proposed Tulu Moyo Geothermal Development Project (the Project) is to provide up to 150 MW of clean electric power from a renewable source. The Project will be implemented in two phases with a first phase of 50 MW capacity, followed by 100. It is currently planned that the first 50 MW is expected to be operational by 2023 and the full 150 MW be online by 2026.

The proposed project includes drilling full-size geothermal exploration wells to evaluate the feasibility of commercial geothermal development in Tulu Moyo. Directional drilling is planned for all 3 of these initial wells. Directional drilling will decrease the cost of civil works by having more wells per well pad, minimize work on roads and the well pad location chosen where minimal local disturbance and civil work is required. When the wells are turned into production wells, the wells can be connected at the well pad and share well testing equipment and therefore decrease the cost of the steam gathering system.

Many of the drilling targets within Tulu Moyo are also located beneath environmentally difficult areas, such as mountains and canyons. Utilizing mud motor can help reach these otherwise unattainable targets as well as improve the rate of penetration.

The project would include the following activities and components:

- Civil works and site development at two potential drilling areas
- Drilling up three exploration wells
- Well testing
- Well abandonment and site reclamation, if applicable.

**Figure 1: Potential drilling area**

### 1.3 Purpose

This document describes the system and associated plans that TMGO put in place for the life of the Project for implementation of the commitments and mitigation strategies identified in the Environmental and Social Impact Assessment (ESIA) report, and otherwise needed to meet TMGO Principles of Responsible Energy Development.

The ESIA report identifies Project-related environmental impacts and mitigation that serves as the initial basis for social and environmental management planning. The ESMS takes over where the ESIA report leaves off and focuses on the processes and plans necessary to ensure social and environmental commitments and mitigation measures are implemented and re-evaluated throughout the life of the Project, from Construction through to Closure and Post-Closure.

The ESMS ensures issues continue to be identified and managed throughout the life of the Project regardless of whether or not there are changes in physical or regulatory conditions. The ESMS commits TMGO to meet national and international regulatory requirements and other best practices identified for the management of the Project. As an adaptive management strategy, the ESMS and its attendant plans are living documents that will be reviewed and updated regularly during all phases of the Project.

Together, the TMGO Project Environmental and Social Management System and its supporting plans and procedures are designed to provide an appropriate level of detail and control that addresses Tulu Moye project environmental and social impacts, regulatory compliance requirements, stakeholder interests, and other practical environmental and social management issues associated with Tulu Moye project.

#### **1.4 Scope of ESMS**

TMGO Project Environmental and Social Management System applies to the full scope of the exploration, construction, operation of up to 150 MW clean electric power from a renewable source, and closure activities that will be conducted by Tulu Moye Geothermal (TMGO) or Contractor at Tulu Moye Project site. This document considers World Bank Group – International Finance Corporation guidelines, and ISO 14001, and appropriate elements of other internationally recognized standards and best management practices as the basis for management system development and implementation.

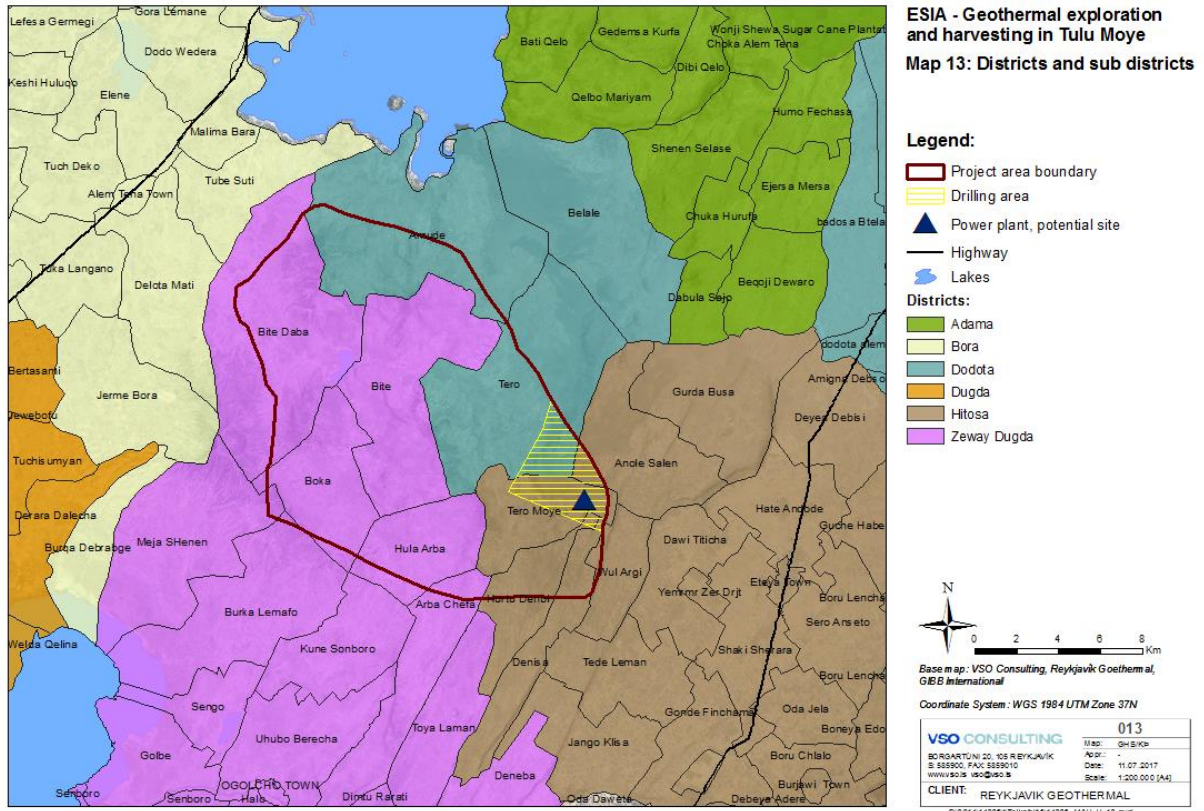
This ESMS applies to,

- Internal TMGO operations,
- Parties associated with the Tulu Moye project , including:
  - ✓ Parties to works contracts, including the engineer, and contractor.
  - ✓ Implementing entities
  - ✓ Consultants and contractors who will be engaged by TMGO within the life of the Tulu Moye project.





Figure: 2 Project area map



### 1.5 Environmental and Social Impact Assessment

On behalf of TMGO, VSO Consulting an international consulting and TS Environmental Technology PLC, local consulting, developed the first phase of the ESIA report. The extensive information on current state of environmental and social factors are based on baseline survey carried out by GIBB International in 2014-2015 and reviewed by TS in 2017. The ESIA report describes the first phase of the Project, which includes exploration drilling, production drilling, well pads, access roads, water supply, quarries, pipelines, and up to a 100 MW power station. Indicative results of the surface explorations suggest that the potential of the Tulu Moye area will probably support up to 500 MW without adversely affecting the geothermal resource.

The nature of geothermal projects is dynamic in the sense that they are continuously evolving during the entire life span of the resource harnessed; surface studies may indicate wide area that gets narrowed down and with more measurements additional areas may be indicated as further potential. The

geothermal model may change with each well drilled as more information accumulate and locations and plans will continue to change.

The ESIA report will be updated and amended with a new version to include updates of studies and additional information to the extent feasible to cover up to 100 MW in Phase I. Phase II will require a new ESIA study report that will be develop accordingly to cover development from 100 MW up to 500 MW.

Phase one ESIA report identifies potential Project environmental impacts, risks and opportunities through comparison of Project plans with baseline conditions, regulatory standards, and scientific evaluations, as informed by public consultation. These social and environmental impacts and opportunities will be identified for each Project phase and will form the basis for the plans outlined in the ESMS.

Environmental and Social Management Plan developed that outlined the mitigation measures to be adopted, responsible party for mitigation and monitoring, frequency and timing of monitoring and verifiable indicators. TMGO is committed to implementing the ESMS to ensure the Tulu Moye Project is implemented according to the company's values and Principles.

### **1.5 ESMS Document Control**

The Tulu Moye Project Environmental and Social Management System is documented in several tiers or levels of detail. Each level is further described as follows:

**Level 1** - consists of the Tulu Moye Project Environmental and Social Policies and Commitments documents.

- TMGO Environmental and Social Policy Framework
- TMGO Human Resource Policy
- TMGO Resettlement Policy Framework
- TMGO Workplace HIV and AIDS Policy

**Level 2** - consists of a suite of environmental management plans, which are invoked to support the continuing management and mitigation of the potential environmental and social impacts associated with Tulu Moye Project operations. Originally developed to support the ESIA process, these documents also play an active and continuing role as components of the Tulu Moye Project Environmental and Social Management System.

TMGO developed detailed Environmental Management Plans and/or procedures to address those areas of geothermal power generation for which the ESIA process has indicated that potentially



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significant environmental and social impacts are known to exist or could potentially occur in one or more phases of the geothermal power generation life cycle.

The following key environmental management plans have been developed:

- Water Management Plan
- Air Quality Management Plan
- Noise Management Plan
- Soil Erosion and Sediment Control Management Plan
- Water Resource Management Plan
- Spill Prevention Control and Countermeasures Plan
- Biodiversity and Soil Management Plan
- Waste Management Plan
- Drill Mud and Cuttings management Plan
- H2S Management Plan
- EHS Management Plan
- Decommissioning and Restoration Management Plan

During the life cycle of the project there are likely to be a range of social impacts that can affect the community. In order to manage these impacts TMGO developed a number of social management plans, frameworks and/or procedures to avoid these social impacts where possible and mitigate them through open and transparent community engagement; supporting the local economy; through generating employment, supporting local businesses and fair compensation of economic losses. The following management plans have been developed:

- Stakeholder Engagement Plan
- Community Health, Safety and Security Management Plan
- Cultural Heritage Management Plan
- Transportation and Traffic Management Plan

**Level 3:** The third tier of support documents includes lower-tier standard operating procedures and other operational practices that are established to support the Level 1 and 2 documents previously described, with emphasis on the management of those areas in which the ESIA process indicates that potentially significant environmental or social impacts are known to exist or are likely to occur in later phases of mine life.

The standard operating procedures are maintained separately in the TMGO Standard Operating Procedures and are grouped to correspond to the planning area that they are primarily designed to support. These are:

- TMGO-ES-OB-001:E&S Objectives
- TMGO-E-PRO-001: Site clearance Procedure
- TMGO-ESNCP:002: Non-conformance Procedure
- TMGO-ESMA-Pro-004; Environmental and Social Monitoring Audit Procedure
- TMGO-EHSH-PRO 003: Hazardous Substance Handling Procedure
- TMGO-EHS\_PROG-001: Contractor E&S Management Program
- TMGO-SP-PLN-001: Community Investment Guideline
- Training Program
- Training matrix
- Grievance log
- Grievance register
- Training attendance sheet

**Level 4** - consists of internal memoranda, correspondence, environmental aspects specifications, regulatory requirements lists, monitoring data, reports, regulatory submittals, and other *completed* documents or records developed in response to regulatory requirements or resulting from the implementation of the Tulu Moyo Project Environmental and Social Management Plan and its Level 2 and 3 support documents.



## 2. ENVIRONMENTAL AND SOCIAL POLICY OF TMGO

TMGO Environmental and Social Policy Statement define the company environmental and social commitments, the policy underlines the principles that the project and its contractors need to follow in construction and operations of the project.

- TMGO is committed to avoid or, where this is not possible, minimize our impacts, while contributing to lasting environmental and Social benefits where we operate. Where unacceptable impacts remain, we focus on implementing compensatory actions to address residual impacts to the environment.
- TMGO is committed to operate in compliance with all relevant environmental legislation and we will strive to use pollution prevention and environmental best practices in all we do.
- TMGO will support the UN Human Right Principle and will not engage or be complicit in any activity that solicits or encourages human rights abuse.
- TMGO is committed to engage with affected, potentially affected and interested stakeholders in a transparent manner to ensure that they can express their views on positive opportunities, risks, adverse impacts as well as prevention and mitigation measures.
- TMGO is committed to providing equal opportunity in all aspects of employment and will not engage in or tolerate unlawful workplace conduct, including discrimination, intimidation, or harassment.
- We acknowledge the potential influence and impacts associated with our suppliers and contractors. We, therefore, include appropriate social performance requirements as part of our contractual agreements when the contracted activity could have potentially significant adverse impacts and / or an ability to deliver significant positive development opportunities.
- TMGO committed to meet internationally accepted best practice and, where necessary, exceed local regulatory standards.
- TMGO committed to regularly monitor, audit and review environmental and social performance compliance to ensure continual improvement.



TMGO recognizes the potential environmental, social, and human health and safety risks and impacts that its operation and project activities could pose. This section describes the various processes, tools and approaches to be deployed by TMGO as it identifies, evaluates, and manages risks in its internal operations as well as project activities; thus, ensuring good environmental and social performance standards and sustainability of its interventions.

### **3.1 Risks Identification at Operational Level**

Within TMGO internal operations, key risks and impacts include accidents and driver safety, occupational health and safety of its staff and contractors involved in minor works and repairs; outbreak of fire; accidents resulting from slips, trips, and electrical shocks; and health and emergency in the office including but not limited to heart attack, stroke etc. TMGO staff responsible for project monitoring and visits could be exposed to accidents, health and safety, and threats from unresolved grievances from project affected communities and persons. TMGO's approach to addressing these risks include the following:

- Developing a health and safety policy and procedures manual, ensuring staff and partners are aware of key risks, and actions to take in such cases.
- Developing a stakeholder engagement plan taking on board the views of all stakeholders including project affected persons and establishing a grievance redress mechanism for addressing all grievances.
- Developing an emergency preparedness and response plan to handle emergency situations within offices and project locations when they arise.
- Developing continuous training and refreshers for all staff and partners on good environmental and social, health and safety management best practice at the workplace.

### **3.2 Risks Identification at Project Level**

Involuntary resettlement and health and safety presents the largest risks to successful implementation of activities and sub-activities. Additional risks and impacts including waste generation and erosion could also adversely affect project implementation. Key risks include:

- Involuntary resettlement has the potential to delay and interrupt project implementation. It also has the potential to impact negatively the livelihood of individuals and groups within project intervention areas. Proper planning and effective collaboration between stakeholders is key to ensure resettlement planning is properly addressed within the project life cycle. This will be done into taking account the needs of women, men, youth, the elderly and other vulnerable groups who are at risks of income loss and employment opportunities, and marginalization. TMGO Environment and Social Function (ESF) will collaborate effectively with TMGO, Chief Technical Officer (CTO) Team, Owners Engineers (OE), Drilling Contractor and relevant state



institutions to ensure proper resettlement planning considers during land acquisition processes.

- Health and Safety risks can affect implementation, operation, and maintenance of pipelines. Risks include electric shocks, slips, trips and falls from height, fire outbreak, noise, heat, poor accident reporting and data, lack of or poor use of personal protective equipment (PPE), use of hazardous chemicals, geothermal gases, improper management of heavy equipment and machinery, hand and power tools, poor control of traffic, poor maintenance of equipment and vehicles, poor housekeeping, security, and poor use of signage. A culture encouraging and emphasizing health and safety can help reduce risk here.
- Air Emissions, particularly of hydrogen sulfide and mercury are the main potential air pollutants associated with project activities. Emission may occur during well drilling and flow testing activities. Employing technology that fit to the geological resource and ongoing monitoring can help reduce the risk of pollution.

TMGO developed a Resettlement Policy Framework (RPF) to outline the resettlement action and livelihood restoration implementation plan and is separate document from this ESMS. The RPF highlights key resettlement planning actions from design through implementation of infrastructure activities. It spells out roles and responsibilities within TMGO and partners, including Project Management Consultants, to ensure proper coordination while considering project design, resettlement action plan, construction, and implementation timelines. In addition, TMGO will develop the health and safety policy and procedures manual, as well as the Emergency Preparedness and Response Plan (EPRP) as stand-alone documents to provide the framework for managing health, safety and emergency situations both at the operations and project levels.

**The following table outlines key project risks and impacts for planned activities**

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Project	Health and safety	Resettlement	Waste Management	Cultural Heritage	Retrenchment	Biodiversity/ Erosion	Air quality /Greenhouse gases
Relevant IFC performance Standard (PS)	2,4	5	4	8	2	6	3
Site preparation	Moderate	Moderate	Minor	Negligible		Moderate	Minor
Test drilling	Moderate	Moderate	Minor	Negligible	Minor	Minor/Moderate	Moderate
Field Development	Moderate	Moderate	Minor	Negligible		Moderate	Moderate
Power plant construction	Moderate	Moderate	Minor	Negligible		Moderate	Minor/Moderate
Commissioning	Minor	Minor	Minor	Negligible	Minor/Moderate	Minor	Minor
Operation	Minor	Negligible	Minor	Negligible		Minor	Minor
Decommissioning	Minor	Negligible	Minor	Negligible	Moderate	Negligible	Minor





### **3.3 Labor and Working Conditions**

Labor and working conditions possess a major risk to TMGO project implementation. IFC PS2 recognizes that the pursuit of economic growth through employment creation and income generation should be accompanied by protection of fundamental rights of workers. TMGO recognizes that the sustainability of Tulu Moyo geothermal project hinges on a sound worker – management relationship. To this end, TMGO will ensure provisions of PS2 will be applied to all categories of workers within the life of the Tulu Moyo project includes direct workers, contracted workers and supply chain workers (to the extent possible).

Potential risks associated with lack or absence of sound worker – management relationship and guiding principles could include labor agitations and strikes, lack of mutual trust, and delays in completion of assigned tasks. These risks have the potential to derail the benefits that the Tulu Moyo project seek to achieve.

TMGO developed labor and employment policies and procedures that address issues related to non-discrimination, personal rights, respectful workplace, sexual harassment and equal opportunity for employees. Conditions relating to these issues will be imposed on contractors and major suppliers in the contract terms. For recruitment and hiring, applicants and candidates will be selected on the merit of their qualifications, experience and skills. The company developed additional recruitment, procurement, and training strategies to ensure local hire opportunities are maximized. TMGO has developed communication programs to ensure that employees are aware of their rights according to labor, health and safety laws and membership rights to labor associations. The Human Resources Department will ensure that a grievance mechanism is established, communicated and maintained to address employee and/or contractor concerns. The employment policy includes termination of employees as a result of closure or temporary shutdowns.

<b>Related document</b>
Employment Policy and Procedures
Local Resource Development Plan



#### 4. MANGEMENT PROGRAM

The principle objective of TMGO's ESMS is to implement efficient and effective environmental, social, health and safety management plans to protect human life and the natural environment and to ensure sustainability of our interventions. TMGO Environment and Social Management Function (ESMF) will provide oversight of all environmental and social management programs to assure adequate and ongoing implementation, a requirement for success.

##### 4.1 Role of Key Actors

- **Owners Engineer / OE /**

TMGO will appoint a consulting firm, the "Owners Engineer" to act for TMGO. Their duties are assigned based on contract agreement with TMGO as the Employer. Subject to the authority delegated to the Engineer's duties and responsibilities include, among others: Design, Technical Specification, supervise construction including inspection and testing to ensure adherence to the contract, and issue of instructions to the Contractor.

- **Works Contractors:**

Contractors will be responsible for executing the contracted works according to the designs and specifications developed by the OE, within the prices and schedule requirements allocated within their contract. The key responsibilities of the contractor include, among others: Design execution, and completion of works in accordance with the contract and remedy any defects thereof; be responsible to inform self on risks and conditions; develop quality assurance system; comply with all applicable health and safety regulations and take care of the safety of persons on the site; take all reasonable steps to protect the environment and combat the trafficking in persons; and be responsible for staff and labor.

This ESMS applies to internal TMGO operations and projects activities. It applies to all TMGO staff, implementing entities, consultants and contractors who will be engaged by TMGO within the life of the Tulu Moye project. This document also spells out how TMGO will engage and collaborate with the actors described above, their partners, and other key stakeholders to ensure good environmental, social, health and safety best practices on the ground. As part of its procurement processes for works contracts and activities that have the potential to adversely affect the environment, the Environmental and Social Management Function, ESMF shall collaborate effectively with the Project Engineering, Procurement and Construction or OE, contractor and others to develop incentives into works contract by drafting specifications and requirements for works and structuring bill of quantities or activity schedule for good environmental and Social implementation.

TMGO shall require all its contractors directly involved in infrastructure works to develop and successfully implement site specific ESMPs for approval by TMGO ESMF/OE prior to commencement

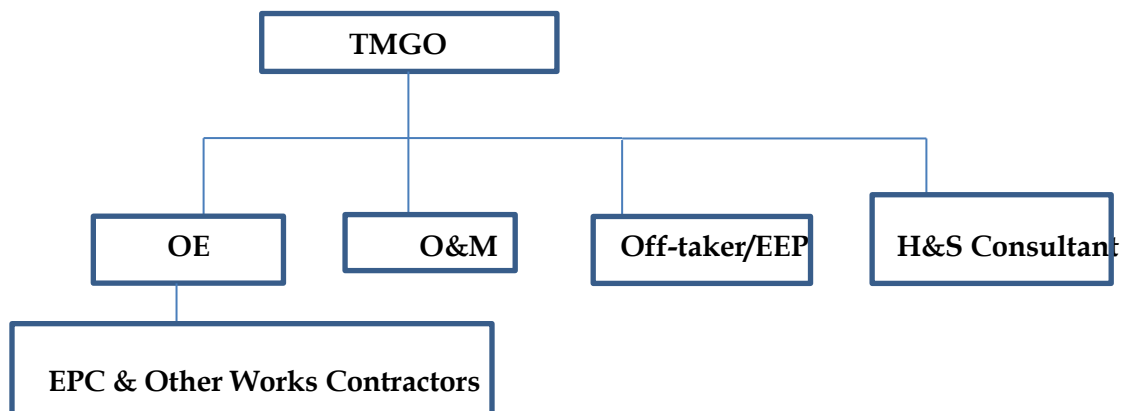
of works. Proposals for works contracts shall be evaluated based on contractors' approach and management program including essential staffing for developing and implementing site specific ESMPs.

#### **4.2 Relationship between Key Tools and Approaches of the ESMS**

TMGO as an employer has developed an Environmental and Social Management System (ESMS) to provide the overall framework for good E&S implementation of Tulu Moye project. This is a living document that will be updated at least once a year to reflect changing implementation issues, challenges and successes. TMGO plans to procure the services of Owners Engineering, /OE/ contracted to provide overall design and supervision services for works, goods and services. The OE will be required to have an Environmental, Health and Safety specialists on board to provide oversight during design and implementation of activities. This specialist will be the eye of the OE for good environmental, health and safety design and implementation. TMGO has also procured separate H&S consultant to assist in reviewing site specific ESMP and as well as developing and delivering training programs for contractors. Works contractors will be required by TMGO to develop site specific ESMP and HSP for good on the ground E&S implementation.

During design, TMGO ESMF will effective collaboration with OE to ensure effective environmental and social sound design. This will be done to ensure design avoids (if possible) or minimizes the potential for resettlement as well as ensuring RAPs are developed and implemented on time to avoid delays in construction. During implementation of works contracts, the EPC contractor will be expected to provide on the ground day to day supervision of works including environmental, social, health and safety issue as well as gender consideration and report to TMGO. Joint field visits involving TMGO, ESMF and OE contractor will be facilitated to ascertain E&S issues on the ground and assist works contractors develop corrective measures to address instances of non-compliance with good E&S standards.

#### **Structure of work relations**





**4.3 Programs by Project Cycle**

<b>Project phase</b>	<b>Risk Management</b>
Design and preparation	<p>Collaborate with contractor and consultants to ensure design is environmentally and socially sound as well as gender responsiveness. Designing to minimize the potential for both economic and social displacement either temporary and or permanent of project affected persons.</p> <p>Designing to avoid environmentally and culturally sensitive areas</p> <p>Designing to ensure high safety standards during implementation, operation and maintenance of infrastructure thus ensuring sustainability; and</p> <p>Designing that involves continuous engagement with key stakeholders including project affected persons.</p>
<b>Project Procurement</b>	<p>The ESMF and CTO and OE team shall work closely to ensure all procurement documents including Request for Proposals RFPs, Request for Expression of Interest REOI, and Invitation for Bids etc. contain the appropriate environmental, social, health and safety provisions and properly structured in works contracts.</p> <p>Relevant environmental and social assessments and reports including the ESIA, ESMP and health and safety plans shall be included in the tender documents to support good environmental and social performance on the ground.</p> <p>During technical evaluation of bids especially for projects and activities with potential for environmental and social impacts, OE, ESMF shall collaborate with CTO to assess bidders' approach to;</p> <ul style="list-style-type: none"> <li>✓ Address and manage environmental, social, health and safety risks associated with project activities</li> <li>✓ Team composition with respect to capacity for managing environmental, social and health and safety issues. Capacity will be assessed based on required experience and relevant educational qualifications</li> <li>✓ Estimated budget for managing environmental and social impacts. To the extent possible, health and safety and other</li> </ul>



	<p>higher risks impacts shall be required to have budget line items as part of the overall project budget.</p>
<p><b>Project implementation</b></p>	<p>Prior to start of construction, TMGO ,OE, ESMF shall request of contractors where relevant appropriate site specific ESMPs including health and safety plans, training program for staff directly involved in construction, local procurement and recruitment plan, and designated point of contact persons responsible for leading efforts to mitigate risks and impacts associated with implementation.</p> <p>TMGO requires contractor to provide environmental and social performance, milestones for mitigating key risks and impacts in their monthly, quarterly, semi-annual and annual reports. A standardized framework template for reporting environmental, social, health and safety risks shall be developed by TMGO and shared with contractors.</p> <p>TMGO will ensure monthly or regular Works Contracts Payment Approval Form submitted by contractors for payment has a clearance line from TMGO E&amp;S manager. This will be done to ensure payment for works deemed to have significant adverse environmental and social impacts have satisfied, the E&amp;S requirements for the said works including contractors’ ESMP and HSPs implementation. To this end, and to ensure its effective operationalization, TMGO ESMF will require of the work contractors to provide a monthly Environmental Compliance Certificate confirming that the contractor(s) have been complying with their approved E&amp;S plans.</p> <p>TMGO (OE, ESMF, CTO team) shall undertake regular planned site visits to project locations to access the effectiveness or otherwise of mitigation measures.</p> <p>CTO and OE shall collaborate to ensure project regular reporting provides updates on their risks mitigation approaches, successes and challenges.</p> <p>Monitoring of project activities with respect to E&amp;S will also include monitoring for gender and social impacts. ESMF team shall lead efforts in collaboration with OE and CTO team to recommend</p>



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	<p>approaches for addressing gaps in environmental and social performance.</p> <p>To ensure sustainability and to resolve any outstanding environmental, social, health and safety issues related to project implementation, a site-specific closure plan will be required of contractors. This will be developed prior to completion of all project activities.</p>
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- reporting to Senior Management on the performance of the ESMS for review including recommendations for improvement.

The success of the ESMS will depend on clear definition of respective roles and responsibilities for environmental and social performance. Throughout the company organization and Project activities, many individuals will have an influence on the environmental and social performance of the Project. TMGO will establish, communicate and reinforce lines of authority, responsibility and accountability throughout the organization. Lines of authority, responsibility and accountability will be established by specifying and documenting the scope of area or activity under the control of each functional area or individual. These responsibilities will be identified in functional area descriptions (e.g., engineering, process plant, warehouse, and administrative areas), job descriptions, operating procedures, and contracts. Where responsibilities overlap, the ESMS will facilitate the identification of shared roles and responsibilities. ESMS roles and responsibilities for key personnel are identified below.

### **5.2.1. Chief Executive Officer (CEO)**

The CEO will have overall responsibility for the implementation and effectiveness of the ESMS in managing environmental social impacts and opportunities. He/ She will be responsible for ensuring that adequate resources, both personnel and financial, are available to implement the ESMS and related social and environmental plans and programs. He/she communicate responsibilities and expectations and ensure that the ESMS is fully integrated into Project plans and activities. The CEO will track and report performance to TMGO management.

### **5.2.2 Chief Technical Officer (CTO)**

CTO will be directly responsible for ensuring the implementation of the ESMS and related commitments, plans and programs within respective functional areas and associated activities. He/she will also be responsible for ensuring site personnel are carrying out their responsibilities with respect to the Company's policies, expectations and commitments. He will be responsible for waste rock, road dust, and noise and vibration management. He will be responsible for the warehouse and water management, and for meeting discharge water quality standards and air quality emission standards, and the on-site laboratory.

### **5.2.3 Environmental and Social Manager**

Environment and Social Manager will be responsible overseeing ESMS overall implementation. He/she will be responsible for implementing TMGO environmental and social policy, and for ensuring TMGO meets its regulatory obligations and environmental and social performance commitments to governments and the public. He/she will provide regulatory information and technical assistance to the CEO and other operational line managers on environmental protection and management programs. He/she will have overall responsibility for ensuring effective implementation of the ESMS and





attendant plans for the Project in conjunction with the CTO, under the direction of the CEO. The Environmental and Social Manager will have overall responsibility to develop, implement and maintain the ESMS.

- ensuring that ESMS requirements are established, implemented and maintained in accordance with the ISO 14001 standard.
- ensuring that enough resources are allocated for the proper implementation of the environmental policy and the ESMS
- regularly reviewing the policy and the effectiveness of the ESMS, and ensuring that the necessary changes are made
- coordinating internal ESMS audits to ensure the ESMS has been properly implemented and maintained
- handling and investigating nonconformity and ensuring corrective and preventive action has been taken to mitigate any impacts caused
- reporting on the performance of the ESMS to the top management for review and as a basis for improvement of the ESMS.
- the internal communication of environmental matters between management and employees; and promoting environmental awareness among company staff
- ensuring the effective implementation of environmentally related operational controls and programmes

#### **5.2.4. Health and Safety Consultant**

The Health and Safety Service Provider, in conjunction with the Owners Engineer will oversee all health and safety aspects of the project to ensure continuing compliance with the ESMS.

Responsibilities include:

- Providing overall co-ordination of the ESMS on site;
- Ensuring the Risk Register is up to date
- Ensure that significant Health and Safety risks are identified, correctly managed and communicated to all staffs.
- Ensuring the promotion of Health and safety awareness of all who work for and on behalf of TMGO;
- Ensuring that all who work for and on behalf of TMGO are aware of the relevant legal obligations and other requirements the site is required to comply with for all activities and operations conducted;



- Assisting with the implementation of programmes required to meet objectives and targets;
- Ensuring that all relevant registers, records and other documentation are kept up to date;
- Ensuring that all who work for and on behalf of TMGO are aware of all procedures;
- Liaising with the E&S Manager and Project CEO
- Ensuring incidents and complaints are suitably addressed
- Identifying applicable environmental training requirements for all staff and ensuring that training is undertaken.
- Review monthly stakeholder engagement reports to assess issues related to environment, health and safety performance.
- Inform the E&S manager of any activity or change that will impact on stakeholders.

#### **5.2.5. Community Liaison Officer**

The Community Liaison Officer will be responsible for TMGO Community and Local government engagement activities.

- To proactively maintain regular contact with affected communities through regular community visits (at least monthly).
- To produce daily and monthly stakeholder engagement reports.
- Ensure communication with vulnerable groups by meeting women, youth and as well as community, community leaders and Kebele leaders.
- Courtesy visits to Hitosa, Dodota, Zeway Dugeda and Bora Woredas (at least monthly) to monitor opinions and provide updates on Project activities.
- To report grievances to the Environmental and Social Manager

#### **5.2.6. Human Resource Officer**

- Ensure staff orientation includes section on elements of TMGO's environment, social, health and safety policy and procedures
- Ensure staff orientation includes section on guiding principles for effective worker - management relationship in accordance with provision of PS2
- Develop and update TMGO's human resource policy and procedure to capture provisions of labor and working conditions per PS2
- Coordinates with ESMF team in planning for training on the ESMS for staff and partner

#### **5.2.7. All Employees**

All employees are responsible for working in accordance with the documented environmental procedures and instructions, specific responsibilities defined in individual job descriptions and instructions. All employees are individually and collectively responsible for:



- Working safely, within the guidelines provided by workplace health and safety procedures, the TMGO Occupational Health and Safety policy, and the TMGO Emergency Preparedness and Spill Contingency Plan;
- Supporting the environmental and social policy goals set for the TMGO Project in the daily performance of their work;
- Complying with the specific requirements of the TMGO Project Environmental and Social Management Plan and its supporting documents;
- Notifying their immediate manager, supervisor, or Environmental and Social Manager regarding any spills, equipment malfunctions, or unsafe situations that could have a negative environmental or social impact; and
- Notifying the Manager, Environmental and Social Manager, Community Liaison Officer, of any conditions or weaknesses in practice that could represent a non-conformance with the requirements of this TMGO Project Environmental and Social Management System.

### **5.2.8 EPC/Other Contractors**

All contractors working for TMGO will adhere to pertinent obligations presented in any of the plans included in the ESMS. Relevant obligations and performance expectations will be incorporated into contracts and monitored in the same manner as all other functional areas and activities. Each primary contractor will appoint a designated person to oversee environmental and social performance, and to liaise and report to the E&S Manager. Specifically, where relevant, each contractor will be required to develop an environmental and social management plan prior to contract finalization, addressing at least the following topic areas:

- environmental protection procedures and spill mitigation plans.
- management of hazardous materials procedures.
- procedures for handling and disposing of non-hazardous waste.
- environmental monitoring procedures.
- health and safety plan.
- detailed worker accommodation arrangements and code of conduct for employees, if not provided by the Company.
- transportation arrangements, if not provided by the Company;
- enforcement of traffic safety rules, including speed limits; and
- control of sub-contractors

Contractors responsibility includes:

- Ensuring their staff are familiar with the TMGO requirements, including the environmental, health and safety and social policies, plans and procedures.



- Reporting incidents and accidents and non-conformances to TMGO
- Providing data related to performance/monitoring (e.g. water consumption)
- Conducting Risk Assessments for all activities.
- Complying with relevant national, local and international legal requirements.
- Attend meetings established to discuss environmental, health and safety and social issues.

### **5.3 Competency, Training and Awareness**

TMGO will ensure that any persons performing tasks that have the potential to cause a significant environmental effect to have appropriate education, training or experience, and retain associated records of such. TMGO will identify training needs associated with its environmental and social aspects and the ESMS and will provide training or take other action to meet these needs and retain associated records.

TMGO will establish, implement, and maintain procedures to make persons working for it or on its behalf aware of:

- the importance of conformity with the environmental and social policy and procedures and with the requirements of the ESMS.
- the significant environmental and social aspects and related potential environmental and social effects associated with their work, and the benefits of improved personal performance.
- their roles and responsibilities in achieving conformity with the requirements of the ESMS; and
- the potential consequences of departure from specified procedures. Site inductions for all new employees and contractors will address environmental and community relations issues and responsibilities. The site inductions will address:
  - obligations under TMGO environmental and social policy.
  - site safety, environmental and community relations guidelines.
  - specific procedures concerning key environmental and social aspects.
  - workforce management and social code of conduct requirements; and
  - procedures for engaging environmental and community relations personnel in support roles.

Additional specific training and standard operating procedures will be provided to personnel involved in, among other things:

- operating equipment and conducting activities that may have an effect on the environment or local communities.
- maintaining and operating pollution control equipment.
- storing and handling hazardous materials; and
- responding to environmental incidents (e.g., fuel spills).



Records will be retained of all persons being inducted, with all employees being required to undertake a re-induction periodically, as needed. Regular staff meetings will be held to provide personnel with updates of the information received at induction. These meetings will:

- emphasize the importance of conforming with Project environmental and social policy and its associated procedures.
- focus on topical environmental management issues and significant environmental and/or community relations issues, either actual or potential.
- include reporting on regular components of the ESMS environmental management and community relations program (such as water quality results or issues of concern to residents), other relevant issues, or updating of changes to site environmental requirements; and
- maximize face-to-face contact on a frequent basis between senior management and employees and promote internal communication.

<b>Related document:</b>
• Training Needs Matrix
• Training Programme
• Training Attendance Template
• Induction Material for Staff
• Induction Material for Contractors
• Induction Material for Visitors



## 6. EMERGENCY PREPAREDNESS AND RESPONSE PLAN

While TMGO recognizes that majority of accidents and emergency situations are associated with project implementation and are site specific; it also is aware that accidents and emergency situations can occur within its internal operations. These could include traffic accidents involving TMGO staff, fire in TMGO office building, health emergency in the office including but not limited to heart attack, stroke, fall, electric shock etc. The Emergency Preparedness and Response Plan (EPRP) which is a stand-alone document and forms part of the ESMS family of instruments for TMGO is designed to focus on internal TMGO operations and all phases of project activities within the life of the Tulu Moyo project.

It is designed to avoid (if possible) and minimize the potential for accidents and emergency situations and to provide corrective actions or measures to address such incidents when they happen. All TMGO staff, consultants, contractors and implementing entities that work with TMGO are responsible for ensuring compliance with the approved EPRP. The main contractor will have responsibility in developing and implementing site specific EPRP. TMGO E&S manager and OE will have the responsibility of reviewing and approving the contractor EPRP.

An emergency preparedness and response team comprising of health and safety personnel and environment officers from TMGO, contractors and consultants and headed by Chief Technical Officer, and TMGO E&S Manager will be set up. This team will be ultimately responsible for ensuring incidents or accidents and emergency situations are identified early on, prepared for and mitigated appropriately. Staff and stakeholder capacity, competence and awareness for complying with the EPRP will be facilitated and led by this team. Review and revision of the plan will be done every year to reflect changing conditions.

An Emergency Preparedness and Response team will be trained to activate and implement the Project EPRP in reaction to on-site and off-site accidental releases or other environmental emergencies that may occur. Additionally, contractors performing work for the Project will be required to be appropriately trained and have ready access to equipment and supplies that would allow them to contain and control any accidental release until the arrival of the Emergency Preparedness and Response Team.

<b>Related Documents</b>
• Emergency Preparedness and Response Plan
• Training Programme
• Training Attendance Template
• Induction Material for Staff
• Induction Material for visitors
• Incident Reporting forms



## 7. COMMUNITY AND STAKEHOLDER ENGAGEMENT PLAN

This section of the ESMS provides an overview of TMGO plans and commitments to provide ongoing opportunities for community and stakeholder engagement with the Tulu Moyo Project, as well as with plans to advance sustainability initiatives during Project exploration, Construction, Operation and through to Decommissioning phases. These plans and commitments are consistent with TMGO Environmental and Social Policy and commitments to working shoulder to shoulder with the community and stakeholder groups to achieve the responsible development of the Tulu Moyo geothermal project and to contribute to the sustainable development of the communities around it.

Stakeholder Engagement Plan (SEP) is a critical element of TMGO Environmental and Social Management System ESMS to ensuring smooth implementation and sustainability of Tulu Moyo project activities. TMGO acknowledges the importance of engaging with all stakeholders involved in its Tulu Moyo project on an on-going basis to ensure smooth running of the project, buy-in from potential project beneficiaries and affected persons and sustainability of its interventions. TMGO's stakeholder engagement plan is developed on the sound principles of transparency, fairness and equity, consensus building, continuous dialogue and feedback.

The stakeholder engagement plan encompasses the following key elements, stakeholder mapping, engagement strategies, awareness creation among vulnerable groups, grievance redress mechanisms for affected communities and disclosure of relevant project information.

### **7.1 Stakeholders Mapping**

This will involve identification of relevant stakeholders at all levels of TMGO project including design, awards and implementation. This will help access their level of interest or concerns on operations and projects, influence on the outcome of project interventions, roles and responsibilities, and ways of engaging and managing expectations.

### **7.2 Stakeholders Consultation**

Having buy-in and inputs from key stakeholders including beneficiaries and project affected persons and communities early on in project design and implementation is key to ensuring sustainability of Tulu Moyo project. TMGO will ensure all stakeholders are properly consulted, engaged and involved where necessary at all stages of its operations and projects. Mechanisms for ongoing process of engagement, information disclosure and dissemination will be promoted within the life of the Tulu Moyo project



### **7.3 External Communication and on-going Reporting of Affected Communities**

Communication with the community and other stakeholders shall be conducted in accordance with the Stakeholder Engagement Plan (SEP). The SEP sets out and defines a framework of standardized measures to be undertaken for proactively engaging and communicating with external Project stakeholders and to guide the strategies to engage with them according to their respective needs and interests. It is designed to demonstrate that TMGO will undertake consultation and participation that is meaningful, consistent, comprehensive, coordinated and culturally appropriate in line with all the relevant legal and regulatory commitments including international good practice, and national and TMGO corporate requirements.

### **7.4 Grievance Redress Mechanism**

Mechanism for receiving, documenting, addressing and communicating to project affected persons and communities will be established to guide operations and projects. TMGO will develop, publicize, and implement a Grievance Procedure that is described in the Stakeholder Engagement Plan (SEP). The Grievance Procedure describes how project affected communities and persons can raise grievances regarding project’s activities. The Grievance Procedure addresses verbal or written grievances, which must include sufficient information about the complaint or claim so that a proper and informed evaluation of the grievance can be made. The grievance procedure also ensures that women and other vulnerable groups are consulted, and their grievances captured. When a grievance is filed, it will be logged and evaluated using the process outlined in the SEP. All grievances will be tracked for monitoring and reporting purposes and to ensure timely and proper resolution.

<b>Related Document</b>
Stakeholders Engagement Plan
Grievance/Concern forms
Grievance log



## 8. MONITORING AND REVIEW

Monitoring, reporting and review of environmental and social management plans is a key component of TMGO ESMS. Environmental and social monitoring will be a normal component of project monitoring and evaluation. Project monitoring will be carried out to ensure mitigation measures as contained in approved project environmental and social management plans, health and safety plans and resettlement policy framework are adequate, effective and are working.

Environmental and social performance monitoring will be mainstreamed in TMGO operations and all phases of project cycle. To this end, environmental and social performance working groups comprising personnel from OE and work contractors will be established to provide Environmental and Social Performance oversight within the life of Tulu Moyo project. Templates and checklists are developed to monitor effectiveness of the ESMS within the life of the project. Corrective actions will be developed to address instances of noncompliance.

Responsibility for monitoring of project activities will be shared between contractors and their subcontractors, OE, H&S consultant and TMGO Environmental and Social Management team. For infrastructure type interventions, contractors and their sub-contractors will develop an internal monitoring and auditing system to monitor the implementation of all approved environmental, social, health and safety management plans and report to TMGO Environmental and Social Manager. The EPC/OE and contractors will complement TMGO Environmental and Social team effort in carrying out planned monitoring and site visits to verify the effectiveness of mitigation measures and together with the Environmental and Social team prescribe corrective measures for non-compliance situations.

### 8.1 Non-Conformance Reporting

TMGO established, implementing and maintain procedures for dealing with actual and potential non-conformities and for taking corrective action and preventive action. TMGO non-conformance procedure defines requirements for:

- identifying and correcting non-conformities and taking actions to mitigate their environmental effects.
- investigating non-conformities, determining their cause and taking actions in order to avoid their recurrence.
- evaluating the need for actions to prevent non-conformities and implementing appropriate actions designed to avoid their occurrence.
- recording the results of corrective actions and preventive actions taken; and
- reviewing the effectiveness of corrective and preventive actions taken.

Actions taken will be appropriate to the magnitude of the problems and environmental and social effects encountered.



## 8.2 Reporting

Regular monthly reporting will be required of all contractors and their subs working on Tulu Moyo project. Reports will provide an auditable record of compliance with approved environmental and social management plans. Regular project reports will include separate sections on environmental and social performance. These sections will provide enough information on the status of the ESMPs implementation for TMGO to effectively fulfill its oversight and performance monitoring role.

<b>Related documents</b>
TMGO-ESNCP-002: TMGO E&S Non-Conformance Reporting and Corrective Action Procedure
TMGO-ESC-01: TMGO E&S Site Inspection Checklist
TMGO-ESMA-Pro-004: TMGO E&S Monitoring and Audit Procedure

## 8.3 Review of ESMS

Performance and effectiveness of TMGO ESMS will be measured against a set of indicators. Annual review and updates of the ESMS will be carried out by TMGO Environmental and Social staff based on experiences and lessons learned from field of implementation.

## 8.4. Control of Records

TMGO will establish and maintain records as necessary to demonstrate conformity to the requirements of the ESMS and will establish, implement and maintain procedures for the identification, storage, protection, retrieval, retention and disposal of records.



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# Appendixes



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**Appendix 1 : ESMS Implementation Plan**

<b>Action</b>	<b>Responsible Party</b>	<b>Timeline</b>
Environment and Social Management System	TMGO	In Place
<b>Policies Plans and Procedures</b>		
Environmental and Social Policy	TMGO	In Place
Labor and working condition policy	TMGO	In place
Code of Conduct	TMGO	In Place
Health and Safety Procedure	TMGO	In Place
Local Resource Development Plan	TMGO	In Place
Community Investment Guideline	TMGO	In Place
Resettlement and livelihood restoration Plan	TMGO	In Place
Contractors Environmental and Social Performance Management Plan	TMGO	In Place
Labor grievance Management Procedure	TMGO	In Place
Labor and working condition procedure	TMGO	In Place
Site Health and Safety Plan	OE & CONTRACTORS	Prior to start of drilling and Construction
Site Specific Environmental and Social Management Plans/ ESMS/	OE & CONTRACTORS	Prior to start of drilling and Construction
Traffic safety Management Plan	OE & CONTRACTORS	Prior to start of drilling and Construction
Emergency Preparedness and Response plan	OE & CONTRACTORS /TMGO	Prior to start of drilling and Construction
Hazardous Material and Waste Management Plan	OE & CONTRACTORS	Prior to start of drilling and Construction
Code of Conduct for site operation	OE & CONTRACTORS	Prior to start of drilling and Construction
Environmental Training and Induction Manual	OE & CONTRACTORS Contractors/TMGO	Prior to start of drilling and Construction



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Employment and training Plan	Contractor /TMGO	Prior to start of drilling and Construction
Local Procurement and Recruitment Plan	CONTRACTORS	Prior to start of drilling and Construction
Spill Prevention and containment Procedure	CONTRACTORS	Prior to start of drilling and Construction
Monitoring and Reporting Checklists	TMGO	Prior to start of drilling and Construction
Internal Monitoring and Auditing System	OE & CONTRACTORS, TMHO	Prior to start of drilling and Construction
Site Specific Closure Plan	OE & CONTRACTORS	Prior to work completion

The ESMS implementation plan for the project includes further development of the ESMS and the various plans, policies and procedures described in the ESMS. The majority of these operational documents will be developed prior to the commencement of the applicable Project phase. The table below lists the specific components of the ESMS and associated plans, the party responsible, and the current schedule for completion and implementation of each.



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**Appendix 2: Environmental & Social Monitoring Action Plan**

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Environmental and Social Components	Parameters	KPI	Location or Number of Monitoring Sites	Monitoring Frequency	Sampling Technique	Report Type and Frequency	Reporting Responsibilities	Submitted
Air Quality	H2S	ACGIH Guidelines	At each site and the closest down gradient residence	Continuous (real-time)	Electrochemical sensor in a monitoring instrument	Monthly E&S Performance Report	TMGO E&S Manager  Drilling, EPC/OE Contractor	TMGO/Regulatory body (MOWIE)
Noise	Leq dBA	IFC standards	Closest noise sensitive receptors (e.g., residence), one location in nearby wildlife habitat and another in nearest community	Initial one week monitoring when drilling is at full operation and when steam flow testing is at full operation.	Calibrated sound level	Monthly E&S Performance Report	TMGO E&S Manager  Drilling, Civil contractors, EPC/OE Contractors	TMGO/Regulatory body (MOWIE)
Soil	Soil Erosion and Contamination	No visible evidence of sediment leaving the Project site  Number and volume of spills	Within construction area	Daily site inspection and audit reports	Inspection	Monthly E&S Performance Report	E&S Manager  Civil /EPC/OE Contractors	TMGO/Regulatory body (MOWIE)



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Wastes (drill mud and cuttings)	Volume of wastes spilled or improperly managed	Volume of drill mud spilled	Waste tracking and reporting on all waste amounts	Daily site inspections  Audit reports	Daily site inspection and audit reports	Monthly E&S Performance Report	TMGO E&S Manager  Drilling, EPC/OE Contractors	TMGO/Regulatory body (MOWIE)
Water resources	Surface water quality - pH, turbidity, conductivity, TDS, TSS, the principal elements found in the geothermal fluids, sulphate, and coliforms	No deterioration in water quality from present drinking water resources.  WHO drinking water guidelines	Sampling from each water source used for community drinking water	Sample before starting construction activities to establish baseline.  Monthly throughout construction.	Hand dipped sample	Monthly E&S Performance Report	TMGO E&S Manager  Drilling, EPC/OE Contractor	TMGO/Regulatory body (MOWIE)
	Surface water quantity	Maintain minimum environmental flow required by Government	Regular or continuous water level recordings at existing water resources	Continuous or daily before and throughout construction	Water level recorder	Monthly E&S Performance Report	TMGO E&S Manager  Drilling, EPC/OE Contractors	TMGO/Regulatory body (MOWIE)
	Groundwater quality	WHO drinking water guidelines	Closest downgradient well or borehole drilled for Project water consumption	Before construction to establish baseline and in response to any groundwater	Monitoring wells	Monthly E&S Performance Report	TMGO E&S Manager  Drilling, EPC/OE Contractor	TMGO/Regulatory body (MOWIE)

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				related complaints				
Biodiversity	Terrestrial flora and fauna	100% Survival of translocated plants. Same for animals where feasible to monitor translocated individuals.	Translocation sites (to be determined based on species and habitat requirements)	Monthly for three months following translocation	Qualified biodiversity specialist	Monthly E&S Performance Report	TMGO E&S Manager  Civil works contractors  Drilling contractor EPC/OE	TMGO/Regulatory body (MOWIE)
	Red Listed bird breeds	No nest abandonment	Forest surrounding the pad sites	Monthly during breeding season	Qualified biodiversity specialist	Monthly E&S Performance Report	TMGO E&S Manager	TMGO/Regulatory body (MOWIE)
	If surface water, then include Aquatic flora and fauna	No entrainment of aquatic organisms	Water intake	Monthly during water extraction	Visual inspection	Monthly E&S Performance Report	TMGO E&S Manager  Civil works, OE Contractor	TMGO/Regulatory body (MOWIE)
Displacement	Physical resettlement	Number and type of grievances regarding physical resettlement	NA	Ongoing throughout resettlement process	Monthly meetings with physically resettled people	Monthly Environmental and Social Performance Report  Annual summary report on the RAP progress	TMGO E&S Manager and Community Liaison Officer	TMGO/Regulatory body (MOWIE)



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						Resettlement completion report		
	Economic displacement	Income levels before and after displacement and performance of livelihood restoration strategies  Number and type of grievances, regarding economic displacement	N/A	Formal quarterly engagement with and survey of local farmers impacted by economic displacement	Meetings /interviews with local farmers  Submissions to the grievance mechanism	See monitoring for physical displacement above  Quarterly report based on analysis of engagement with local farmers	TMGO E&S Manager and Community Liaison Officer	
Socioeconomics	Economic benefits	Number of local full time equivalent hires	N/A	Monthly	Track in payroll	Monthly Environmental and Social Performance Report	TMGOEHS Manager  Drilling Contractor	RG
	Recreational	Number and type of grievances received from recreational users or guides	To be determined during stakeholder engagement process	Monthly	Grievance Reports and CLO coordination with communities	Monthly Environmental and Social Performance Report	TMGO E&S Manager and Community Liaison Officer	RG



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