

TMGO Biodiversity Compensation Plan

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Submitted To:



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INTERNATIONAL

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This report is submitted by Environmental Resources Management, subcontractor to Delphos International, Ltd, as a work product under Task 11.

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Glossary

Abbreviation	Description
BCP	Biodiversity Compensation Plan
CSE	Conservation Strategy of Ethiopia
EEP	Ethiopian Electric Power
EIA	Environmental Impact Assessment
ERM	Environmental Resources Management, Inc.
ESIA	Environmental and Social Impact Assessment
ESSD	Local environmental and social consultancy based in Addis Ababa
Ha	Hectare
IFC	International Finance Corporation
IO	Implementing Organization
KPI	Key Performance Indicator
M&E	Monitoring and Evaluation
MW	Megawatt
OFWE	Oromia Forest and Wildlife Enterprise
PPA	Power purchase agreement
PPC	Post-Planting Care
PS	Performance Standards
SWC	Soil and Water Conservation
TMGO	TM Geothermal Operations Private Limited Company
USTDA	U.S. Trade and Development Agency
WAO	Woreda Agriculture Office

1 Introduction

This report, titled “Biodiversity Compensation Plan” (the “Report” or “BCP”), is submitted by Environmental Resources Management, Inc. (“ERM”). The BCP was developed by ERM with support from its local consultant ESSD, an environmental and social consulting firm based in Addis Ababa.

ERM is part of a team (the “Team”) comprising Delphos International, Ltd. (“Delphos”) and its subcontractors as part of its provision of services to TM Geothermal Operations Private Limited Company (the “Grantee” or “TMGO”) under a feasibility study (the “Study”) agreement partially funded by the U.S. Trade and Development Agency’s (“USTDA”). The Grantee is acting as an administrator of the Study on behalf of TMGO. The Team led by Delphos includes POWER Engineers, Incorporated (“POWER”), ERM, BDO Consulting PLC (“BDO”), FLS Law Office (“FLS”), and Trinity International LLP (“Trinity”).

The purpose of the Study is to determine the technical, financial, and economic aspects of an anticipated 50 megawatt (“MW”) geothermal power plant (the “Project”) being developed by TMGO in Tulu Moye of the Federal Democratic Republic of Ethiopia. The Study is expected to complement the exploration and site development activities being carried out by the Grantee; including technical assessments of the geothermal resource and the plant, environmental and social impact assessments, financial assessments, and a comprehensive plan for implementing the Project.

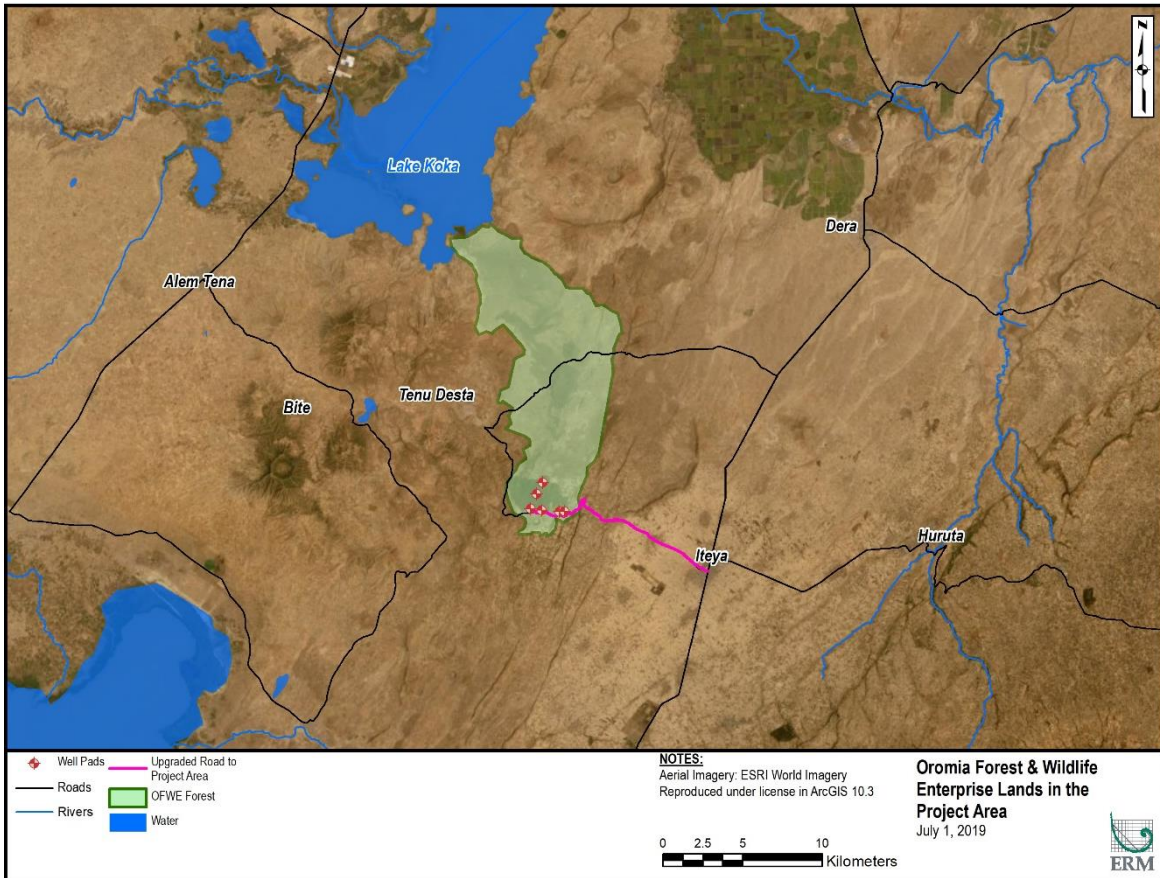
The Project is the first phase of a larger concession to develop up to 150 MW of geothermal power generation capacity awarded by the Government of Ethiopia (the “Concession”). The Grantee entered into a power purchase agreement (“PPA”) with Ethiopian Electric Power (“EEP”) in December 2017. The Grantee has selected Delphos International, Ltd. (“Contractor”) to perform the Study.

The Tulu Moye geothermal prospect is located about 130 km southeast of Addis Ababa, with Lake Koka to the north and Lake Ziway to the south. The geothermal drilling targets are located beneath the Gnaro Lava Field and the drilling pad is located on the top of the lava field hill. The Gnaro Lava Field is largely rocky terrain, which rises a few hundred meters above the surrounding lands, and is a result of geologically recent volcanic eruptions, dating from less than 0.8 million years ago and continuing intermittently into historic times. The Gnaro Lava Field and the lands to the north are under the control of the Oromia Forest and Wildlife Enterprise (“OFWE”). Other land in the surrounding area is rural, characterized by sparse settlements with households primarily engaged in agriculture. Nearby Iteya town is a small population center, and the administrative seat of the Hitosa Woreda.¹

The BCP has been developed for the re-vegetation and flora and fauna management plan for the Project site. The BCP is being delivered as part of Task 11: Land Acquisition Plan of the Study.

¹ A Woreda can be thought of as a district and is a basic administration unit in Ethiopia.

Figure 1-1: Project Area



1.1 Scope and Approach

TMGO’s commitment to compliance with relevant laws in Ethiopia as well as to meeting the 2012 International Finance Corporation (“IFC”) Performance Standards (“PS”) on Environmental and Social Sustainability have guided the approach to the BCP.

The purpose of the BCP is to characterize the biodiversity impacts being caused by the Project’s acquisition of lands in the Gnaro Lava Field and formalize a plan by which the Project will compensate for related biodiversity impacts such that there is no net loss to natural habitat in the Project area.

The BCP focuses on complementing the compensation already paid by the Project for affected lands to the OFWE and associated stakeholders (described in Section 5.1). The following specific approaches were incorporated into the land acquisition planning and the formulation of this BCP:

- Avoidance of impacts on biodiversity as a first priority, and subsequent measures to minimize impacts and restore biodiversity where impacts could not be avoided;
- Confirmation of current habitat type and determination of appropriate compensation to achieve no net loss (species affected and suitable replacement species, as well as suitable land for replanting); and
- Establishment of a framework for effective implementation and monitoring of the BCP to ensure that compensation is administered in alignment with this BCP, and that adjustments are made as necessary to meet the overall objective of the BCP to support achievement of no net loss.

1.2 Report Structure

The BCP is structured as follows:

- Section 1 presents a general introduction, scope and approach of the BCP;
- Section 2 summarizes relevant national and international requirements that provide a policy framework for the BCP;
- Section 3 contains a brief description of the biodiversity baseline conditions;
- Section 4 describes how biodiversity impacts were avoided and minimized according to a mitigation hierarchy and describes the specific biodiversity impacts generated by the Project;
- Section 5 sets forth the proposed biodiversity compensation;
- Section 6 provides an overview of next steps to implement the BCP, considerations for the development of a detailed schedule, a description of roles and responsibilities, and tentative, high-level costs associated with the biodiversity compensation implementation; and
- Section 7 includes appendices.

2 Policy Framework

2.1 National Requirements

Relevant national legislation, guidelines and policies related to biodiversity include the following:

- Environmental Impact Assessment Proclamation No. 299/2002;
- Environmental Impact Assessment Procedural Guidelines Series 1, EPA, 2003;
- Environmental Impact Assessment Guideline for Mineral and Petroleum Operation Projects, EPA 2003;
- Environmental Policy of Ethiopia, 1997;
- Conservation Strategy of Ethiopia (CSE);
- National Biodiversity Conservation and Research Policy, 1998; and
- Forest Development, Conservation and Utilisation Proclamation No. 1065/2018.

Generally, per Proclamation No. 299/2002, Ethiopia requires that adverse impacts to the environment be analyzed in an Environmental Impact Assessment (“EIA”) including appropriate means to prevent such impacts.² The 1997 Environmental Policy seeks to ensure “that essential ecological processes and life support systems are sustained, biological diversity is preserved and renewable natural resources are used in such a way that their regenerative and productive capabilities are maintained and where possible enhanced so that the satisfaction of the needs of future generations is not compromised; where this capability is already impaired to seek through appropriate interventions a restoration of that capability.”

The Biodiversity Policy provides policy directives with regard to the need to explore, collect, characterize, evaluate, conserve and utilize biodiversity resources. Among others, it emphasizes the importance of community participation in the conservation and sustainable utilization of biodiversity resources together with the need to provide for access and benefit sharing for communities to and from biodiversity resources.

As per Article 25(5) of the Forest Proclamation, development projects to be implemented in areas covered with forest or demarcated as forest land must pass through environmental and social impact assessment that has to be approved by the Ministry of Environment, Forest & Climate Change (now Commission of Environment) or appropriate regional authority.

The OFWE is an autonomous fully government-owned organization established with regulation number 122/2009, issued in July 2009 by the Oromia State Council under the Federal Democratic Republic of Ethiopia. OFWE works to ensure conservation, sustainable development, and the use of forest and wildlife resources in its concessions through community participation; to ensure supply of forest products to domestic and international markets by enhancing the forest industry; and subsequently contribute to regional and national socio-economic development endeavors. Generally, when lands belonging to the OFWE are affected by a project, the OFWE carries out a valuation process and a project proponent must provide monetary compensation for the rights to develop a project on such land.

2.2 International Requirements

In addition to complying with local legal requirements, TMGO is also committed to implementing Project-related activities in accordance with the IFC PS. The IFC updated its Performance Standards on Environmental and Social Sustainability in January 2012. The outcome-based PS updated the pre-existing 2006 PS, strengthening environmental and social policy, and prescribing more comprehensive and integrated impact

² Environmental Impact Assessment Proclamation No. 299 /2002.

assessments and management systems. The IFC has also published Guidance Notes to help explain the requirements of the PS.

As seen below, there are eight PS covering various issues, with PS 1 and PS 6 being the most relevant to this BCP:

- PS 1: Assessment and Management of Environmental and Social Risks and Impacts
- PS 2: Labor and Working Conditions
- PS 3: Resource Efficiency and Pollution Prevention
- PS 4: Community Health, Safety and Security
- PS 5: Land Acquisition and Involuntary Resettlement
- PS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources
- PS 7: Indigenous Peoples
- PS 8: Cultural Heritage

PS 1 structures the way in which environmental and social issues are to be handled and serves as the core around which the other PS are framed. The specific objectives of PS 1 are:

- To identify and evaluate environmental and social risks and impacts of the project;
- To adopt a mitigation hierarchy to anticipate and avoid, or where avoidance is not possible, minimize risk and impacts, and, where residual impacts remain, compensate/offset for these risks and impacts to workers, affected communities, and the environment.
- To promote improved environmental and social performance through the effective use of management systems;
- To ensure that grievances from affected communities and external communications from other stakeholders are responded to and managed appropriately; and
- To promote and provide means for adequate engagement with affected communities throughout the project cycle on issues that could potentially affect them and to ensure that relevant environmental and social information is disclosed and disseminated.

PS 6 presents a framework for defining and managing impacts to biodiversity features such as forests; hence it was the most relevant Performance Standard for the development of this report. Specific objectives of PS 6 include:

- To protect and conserve biodiversity.
- To maintain the benefits from ecosystem services.
- To promote the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities.

Risks and impacts to biodiversity and ecosystem services should be identified as part of PS 1. For the purposes of implementing PS 6, where biodiversity and/or ecosystem services impacts are present, project proponents are required to classify affected habitats as either modified, natural, or critical habitat. Each habitat type and specific mitigation requirements for each are described below.

- **Modified habitat:**
 - IFC describes modified habitat as “areas that may contain a large proportion of plant and/or animal species of non-native origin, and/or where human activity has substantially modified an area’s primary ecological functions and species composition.” PS 6 only applies to modified habitats that have significant biodiversity value (e.g., threatened species and ecosystems, culturally important biodiversity features, ecological processes necessary for maintaining nearby critical habitats).
 - Impacts to modified habitat require minimization of impacts and appropriate mitigations.

- **Natural habitat:**
 - IFC describes natural habitat as “areas composed of viable assemblages of plant and/or animal species of largely native origin, and/or where human activity has not essentially modified an area’s primary ecological functions and species composition.”
 - Impact to natural habitat requires mitigation measures designed to achieve no net loss of biodiversity, where feasible.
- **Critical habitat:**
 - IFC describes critical habitat as a subset of modified or natural habitats, in particular as “areas with high biodiversity value, including (i) habitat of significant importance to Critically Endangered and/or Endangered¹¹ species; (ii) habitat of significant importance to endemic and/or restricted-range species; (iii) habitat supporting globally significant concentrations of migratory species and/or congregatory species; (iv) highly threatened and/or unique ecosystems; and/or (v) areas associated with key evolutionary processes.”
 - Implementing project activities in critical habitat sites is only permitted under specific circumstances. Where permitted, project proponents must implement a mitigation strategy designed to achieve net gains of those biodiversity values for which the critical habitat was designated.

2.3 Summary of Applicable Requirements for the BCP

Per local requirements, when lands belonging to the OFWE are affected, monetary compensation must be paid. Further to this, and as summarized in Section 2.1, national regulations do not have specific requirements for biodiversity compensation or offsets, beyond general requirements for EIAs that describe adverse impacts and propose mitigation requirements. As such, this BCP primarily follows the requirements of the IFC PS, in particular PS 6, which are complementary but go beyond national requirements due to their specificity on biodiversity protection.

As described in Section 3, according to a rapid biodiversity assessment carried out for the Project, habitat in the Project area can be classified as a mosaic of natural and modified habitat according to IFC PS 6. Natural habitat pockets, where the land is covered with natural vegetation and only minimal anthropogenic influence, exist within broader modified areas dedicated to cultivation and grazing. According to the same assessment, no critical habitat was identified.³ Given this conclusion and in alignment with IFC PS 6, the BCP will focus on achieving no net loss related to Project impacts to natural habitat.

³ TS Environment Technology, Tulu Moye Geothermal Project, Rapid Biodiversity Study Report, pages 17-21, September 2017.

3 Baseline Conditions

A 2017 Rapid Biodiversity Study Report for the wet season evaluated the Project area according to IFC PS6 and concluded that the vegetation in the area could be classified as a mix of natural and modified habitat. Natural habitats are areas supporting natural vegetation with limited anthropogenic influence. A modified habitat is one where the original natural vegetation cover has been converted into non-natural vegetation (e.g. Eucalyptus plantation), cropland, or pasture converted from forest or scrub land. The natural vegetation for the Tulu Moye area is classified as Dry Evergreen Afromontane Forest, and more specifically as Afromontane woodland, wooded grassland, and grassland subtype.⁴

With regards to land cover at the time of the study, the Tulu Moye Project area was separated into the following six cover types (see Table 3-1 and Figure 3-1):

- Regenerating Land;
- Natural Forest;
- Scrubland;
- Grazing Land;
- Cultivated Land; and
- Settlement.

Per Table 3-1, the natural habitat includes the natural forest and scrubland vegetation (together 22.32% of the mapped area).

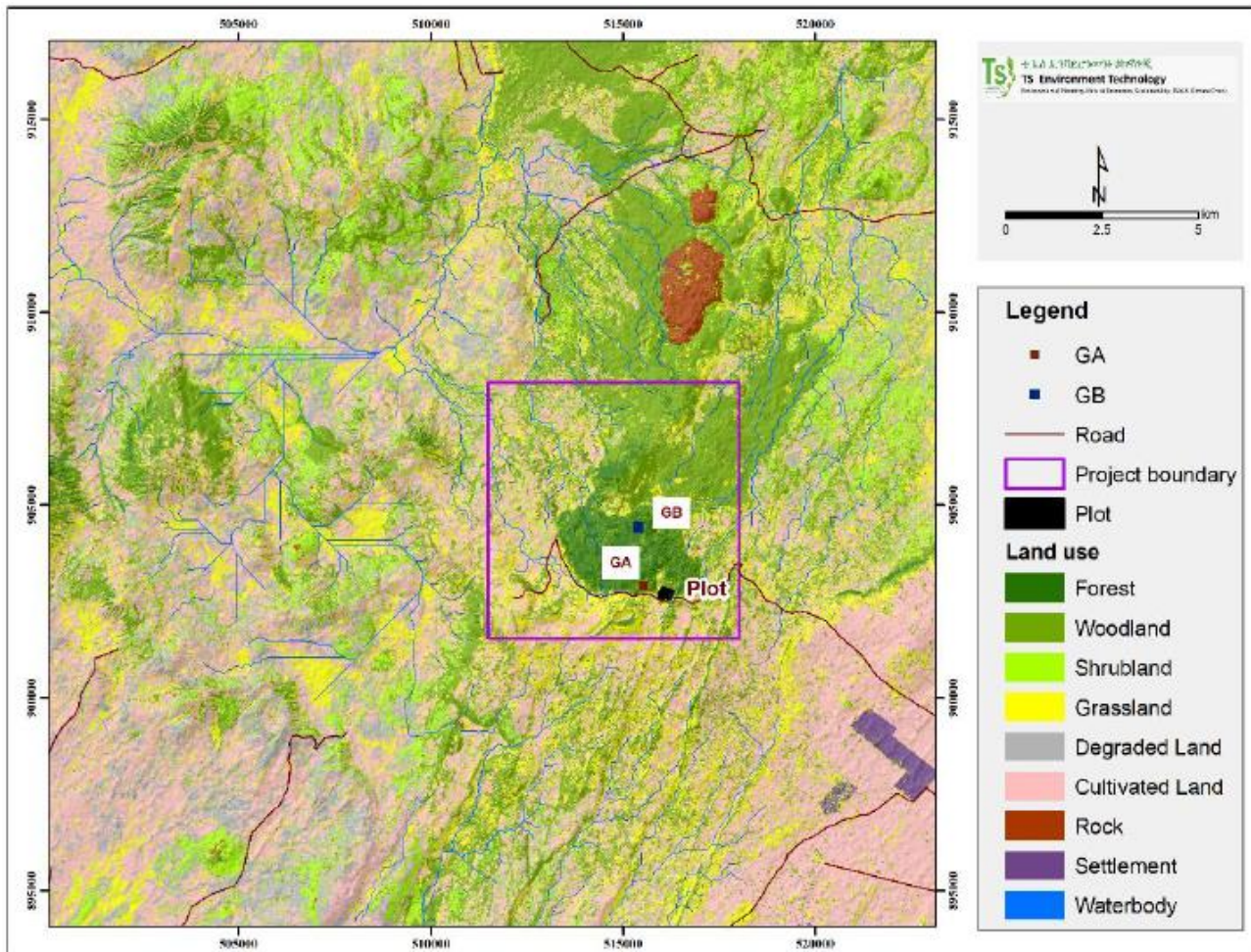
Table 3-1: Habitat Types by Area and Percent of Total

Habitat Type	Area (ha)	Percent
Regenerating Land	743.27	20.13%
Natural Forest	708.43	19.19%
Scrubland	115.71	3.13%
Grazing Land	538.02	14.57%
Cultivated Land	1559.79	42.25%
Settlement	26.24	0.71%

Source: TS Environment Technology

⁴ TS Environment Technology, Tulu Moye Geothermal Project, Rapid Biodiversity Study Report, September 2017.

Figure 3-1: Habitat Type Identification in the Project Area⁵



Later in the Project development as land near the first drilling targets was assessed for compensation purposes, species were inventoried by the OFWE in approximately 12 hectares (“ha”) of land to be acquired by the Project (described in further detail in Section 4.2). The OFWE’s inventory contains a list of 20 main species of vegetation in the affected area. A subsequent rapid assessment conducted by ESSD of the affected area and surrounding environs, confirmed the presence of 16 of these, along with an additional 22 species. Photos of the vegetation observed in the area can be found in Appendix B, (Figure 7-2, Figure 7-3, Figure 7-4, Figure 7-5, Figure 7-6, and Figure 7-7).

It is worth noting as well that the OFWE’s holdings in the Project area are utilized by local community members, and a local committee representing such users has a membership of 450 community members. OFWE recognizes these community members as legitimate users and local protectors of the forested areas and permits some livelihood activities which are compatible with natural forest preservation. In practice, however, some of the livelihood activities that take place in the enterprise are not permitted by the OFWE. These include tree cutting for construction material, firewood, and to make charcoal.

⁵ Points GA and GB were well pad siting locations considered at the time of the 2017 Phase I ESIA, under current plans, the Project has opted to pursue site GA.

4 Project Biodiversity Impacts

The Project will be developed in phases, the first phase of 50 MW capacity, followed by a second phase of 100 MW. This BCP focuses on the impacts associated with the initial Phase I development.

The Project entails drilling full-sized geothermal exploration wells to evaluate the feasibility of commercial geothermal development in the Tulu Moye area. Specifically, the Project includes the following activities and components:

- Civil works (including the expansion and upgrading of a 15km road, laydown area, and camp area), and site development for two initial drilling areas;
- Drilling up three exploration wells;
- Well testing; and
- Well abandonment and site reclamation, if applicable.

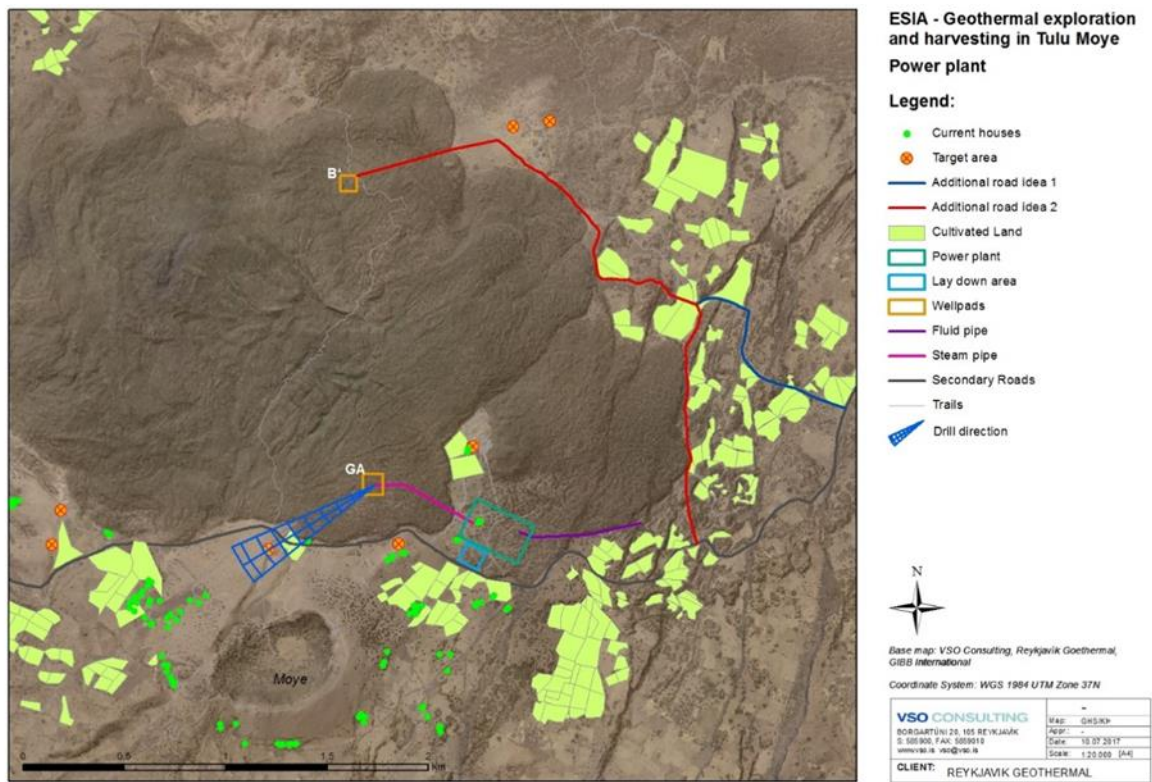
4.1 Avoidance and Minimization of Biodiversity Impacts

In accordance with the mitigation hierarchy established in PS 1, the Project has sought to avoid and minimize adverse impacts to the environment and communities in several ways. These include design considerations such as directional drilling for the initial exploration wells, which results in having more wells per well pad and thus a smaller surface footprint, and location considerations via the selection of the well pad placement where there would be minimal local disturbance and where less civil work is required for road accessibility.⁶ Additionally, when the exploration wells are turned into production wells, they can be connected at the well pad and share well testing equipment and therefore decrease further infrastructure works.

In considering siting options for the well pads specifically, the Project had to seek a balance between environmental and social considerations. In particular, regarding the drilling targets for Phase I, the choice to site the well pads in the Gnaro Lava Field was due to a long-standing Project commitment to avoid physical resettlement and attempt to avoid impacting productive agriculture and grazing land to the greatest extent possible to minimize economic displacement. Utilizing directional drilling technology, the Project can reach subsurface targets under such socially-sensitive areas with no surface disturbance. The figure below from the 2017 ESIA illustrates this point, demonstrating seven targets of interest to the Project, and the well pad siting at points GA and B from which targets can be reached with minimal surface disturbance. This choice, however, resulted in impacts to the biodiversity values of the Gnaro Lava Field.

⁶ Directional drilling technology allows underground reach in a circular path from the surface entrance point, in this case estimated to reach a horizontal distance approximately 800 meters from the well pad.

Figure 4-1: Siting of Main Project Components for Phase I⁷



4.2 Project Footprint and Associated Biodiversity Impacts

The Project's land acquisition process resulted in the acquisition of 12 ha of land in the Gnaro Lava Field, which is part of the OFWE's concession area. OFWE manages forest areas totaling approximately 3.4 million ha across the Oromia regional state, including 10,241 ha of what the OFWE categorizes as natural forest that has some overlap with the Project area, as seen in the figure below. These 12 ha are being cleared by the Project for development of the well pads and associated infrastructure; the overall area will not be fenced in. An additional 15.51 ha was acquired from individual land holders by the Project for civil works including the upgraded road, camp and laydown area. According to a rapid biodiversity assessment carried out for the Project, habitat in the Project area can be classified as a mosaic of natural and modified habitat according to IFC PS 6 (see Section 3). Natural habitat pockets, where the land is covered with natural vegetation with only minimal anthropogenic influence, exist within broader modified areas dedicated to cultivation and grazing. The BCP focuses on the 12 ha of OFWE land which, as demonstrated in Section 3, has biodiversity value and can be classified as Natural Habitat per IFC PS 6, while the 15.51 ha is Modified Habitat (private land partially forested but actively managed for wood and fuel harvesting and grazing) and thus only requires general/appropriate mitigations, which are being implemented by the Project under its ESMS.

⁷ VSO and TS Environmental Technology, Tulu Moye Geothermal Development Project – Phase I: Environmental and Social Impact Assessment Report, November 2017.

Figure 4-2: OFWE Lands in the Project Area

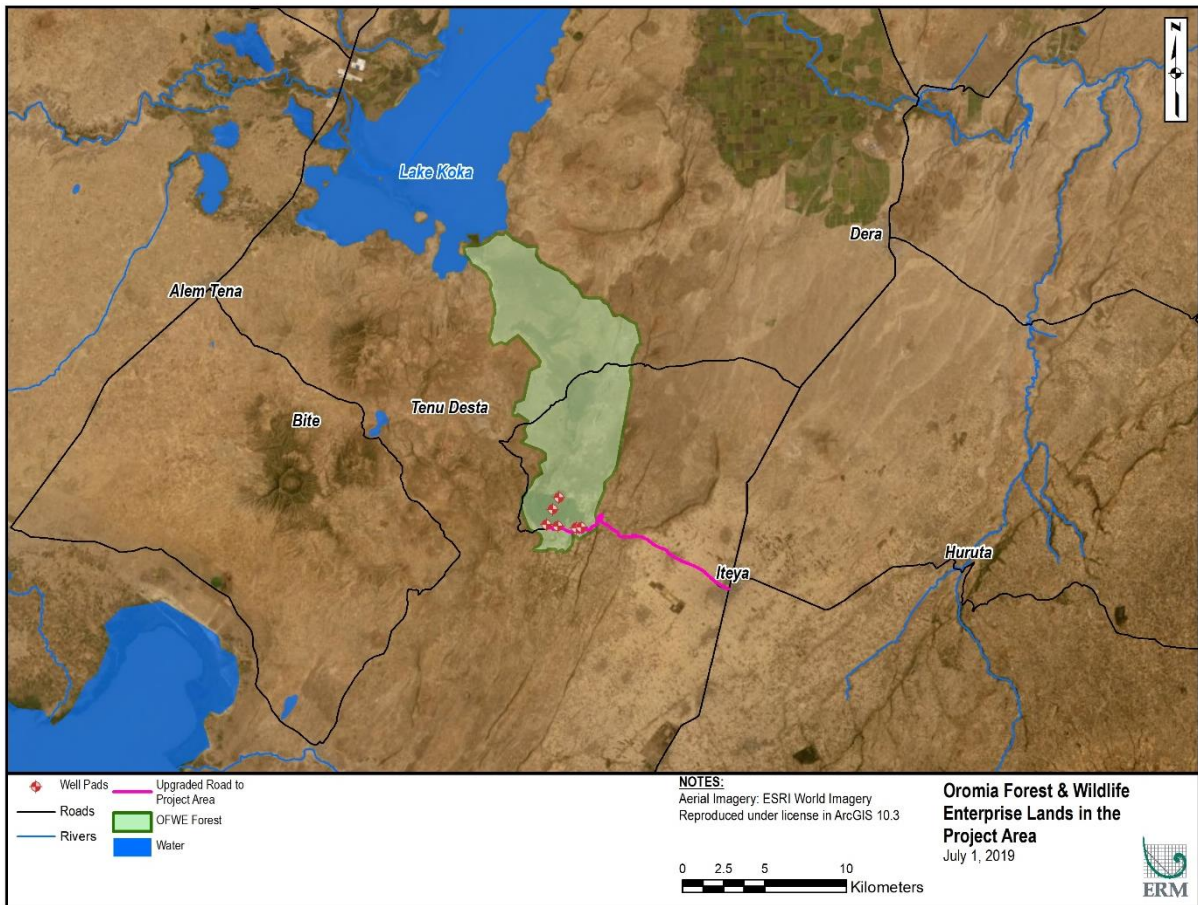


Table 4-1: OFWE Affected Species Inventory

Local Name (Oromiffa)	Scientific Name	Volume	Description	Type
1. Hawaasee	<i>Salix subserrata</i>	40.689	Tree	Indigenous
2. Aartuu	<i>Pittosporum viridiflorum</i>	30.370	Tree	Indigenous
3. Ejersa	<i>Olea europaea</i>	51.855	Tree	Indigenous
4. Gaattiraa Biyyaa	<i>Juniper procera</i>	96.062	Tree	Indigenous
5. Biixxannaa	<i>Nuxia congesta</i>	69.719	Tree	Indigenous
6. Abayyii	<i>Maesa lanceolata</i>	0.780	Tree	Indigenous
7. Dambii	<i>Ficus ovata</i>	154.371	Tree	Indigenous
8. Gunaan	<i>Olinia rochetiana</i>	3.821	Tree	Indigenous
9. Arfattuu	<i>Cussonia arborea</i>	3.824	Tree	Indigenous
10. Aaraa	<i>Pittosporum viridiflorum</i>	6.505	Tree	Indigenous
11. Kaaroo	<i>Osyris quadripartita</i>	1.456	Shrub/Small tree	Indigenous
12. Bakkanniisa ⁸	<i>Croton macrostachyus</i>	47.822	Tree	Indigenous

⁸ Also referred to as Makkanniisa by locals.

Local Name (Oromiffa)	Scientific Name	Volume	Description	Type
13. Kombolcha	<i>Maytenus senegalensis</i>	3.401	Shrub/Small tree	Indigenous
14. Adaaddoo	<i>Buddleja polystachya</i>	8.473	Small tree	Indigenous
15. Bireessa/Baresaa	<i>Terminalia brownii</i>	0.395	Tree	Indigenous
16. Baatee	<i>Acacia persicifolia</i>	0.305	Tree	Indigenous
17. Loxxobbaa	<i>Acacia tortilis</i>	4.285	Tree	Indigenous
18. Waaccuu	<i>Acacia seyal</i>	0.564	Tree	Indigenous
19. Qilxuu	<i>Ficus vasta</i>	29.532	Tree	Indigenous
20. Turmanturii	<i>Schinus molle</i>	1.234	Tree	Exotic
Total		555.463		

Source: OFWE, Chilalo Galema District, Arsi Branch, with scientific name, description and type from ESSD

5 Biodiversity Compensation

5.1 Completed Monetary Compensation

In accordance with legal requirements, the OFWE was responsible for performing its own valuation of the land on a volume basis for the species of trees and other plant resources contained on average in the area (Table 4-1). Per the bylaws for the local forest area committee, 45% of this compensation amount is paid to the community members who are users/protectors of the resource, while 5% is paid to the Kebele administration and the OFWE retains the remaining 50%. Compensation monies paid through this process are left to the discretion of the recipient as to how to utilize the resources; there is no obligation that such funds be used for replanting, conservation or any other type of offset/mitigation activities. According to interviews with relevant officials conducted by TMGO, ERM and ESSD, the parties did not plan to specifically utilize the compensation for any replanting or restoration efforts.

5.2 Additional Biodiversity Compensation

5.2.1 Approach and Process

To further develop and assess feasibility of key aspects of the BCP, ESSD carried out a site visit and conducted interviews with key stakeholders in early December 2019. The objectives of those efforts included:

- To conduct a rapid biodiversity assessment of the Gnaro Lava Field and surrounding environment area to confirm an existing OFWE species inventory;
- To meet with key stakeholders including relevant Woreda Offices (Woreda Agriculture Office (“WAO”) and Environment Office), the OFWE, Kebele leaders and the local community to gather their feedback on the biodiversity compensation concept (See Appendix A);
- To assess possible replanting site(s) and local availability of necessary inputs (seedlings); and
- To learn about any similar local programs and gather lessons learned from such experiences.

During stakeholder meetings, the basic concept of biodiversity compensation was explained and discussed with participants to inform their understanding regarding TMGO’s desired approach to its biodiversity impacts on the Gnaro Lava Field. Participant input was sought on the availability of degraded land that could be allocated for the replanting effort, sources of seedlings, appropriate tree species, approach to implementation of the BCP (including planting and post-planting management), and what support services local entities might be able to provide (especially the Woreda offices and OFWE). The implications of any land use controls/restrictions in available areas were also discussed.

In addition, ESSD visited open areas that could be allocated to the replanting effort to the south of the Project site alongside Woreda and OFWE officials, to assess suitability and observe any current anthropogenic influences (See Appendix B: Figure 7-8 and Figure 7-9). The team also visited two existing nursery sites – one managed by the WAO (located at 5 km south of Iteya) and the other by OFWE (located in Asela) to assess their capacity for raising the seedlings required for the proposed tree planting effort (See Appendix B: Figure 7-10 and Figure 7-11). Lastly, the team visited Deyea Mountain Rehabilitation area where area closure, Soil and Water Conservation (“SWC”), and tree planting activities have been implemented through a partnership of Foundation Green Ethiopia, the WAO and a licensed cooperative. The purpose of such visit was to learn about the effectiveness of the program’s approach for degraded area rehabilitation and afforestation programs.

5.2.2 Biodiversity Compensation Objectives

The objectives of the biodiversity compensation proposal include the following:

- To protect and conserve biodiversity and maintain benefits from ecosystems services in line with pre-Project conditions and in accordance with Ethiopian law and IFC PS 6; and
- Specifically, to compensate for biodiversity impacts in a way that achieves no net loss of the biodiversity values contained in the affected 12 ha of land in the Gnaro Lava Field.

5.2.3 Biodiversity Compensation Proposal

5.2.3.1 Replanting Volume

The OFWE's inventory and valuation approach for the acquisition of the 12 ha of land in the Gnaro Lava Field constitutes the official record of the volume of plant species that existed prior to the Project's clearance of the area. Per such assessment, there was a volume of 555 m³ of primarily indigenous tree and shrub species. In order to compensate for this biodiversity loss, the Project will plant seedlings that, once mature, will represent the same total volume.

5.2.3.2 Replanting Site

The stakeholders consulted in the Project area recommended the open land on the hillside of Tulu Moyo Mountain, located south of the Project site, to be used for the replanting efforts. The proposed planting site falls within the boundary of the OFWE concession area and OFWE Chilalo Galama District has initially agreed to provide the land for such purposes, assuming proper planning steps are undertaken in consultation with the OFWE and its stakeholders. OFWE and WAO have indicated their disposition to support delineation of an appropriate area. The site is currently used for livestock grazing by the local community; however, during consultations they were also amenable to the site hosting the replanting efforts. Community members expressed that the benefits of the planting and SWC efforts would be positive for their nearby farmlands, and that livestock could still be sustained through a 'cut and carry' system of the grasses grown in the area in a way that would be compatible with the biodiversity compensation proposal.

5.2.3.3 Proposed Species

Consistent with the biodiversity of the Gnaro Lava Field area, primarily covered in indigenous species, the Project will support the replanting of indigenous tree species for biodiversity compensation purposes. These species are preferred due to their ability to flourish in the local area, support SWC, and attract fauna native to the area. Primary species suggested for replanting include Juniper, Olea and Acacia (several species) which are among the dominant species found in the impacted area, are considered hearty and likely to grow within a reasonable establishment period, and can be sourced from local nurseries.

6 Implementation Arrangements

6.1 Implementation Steps and Schedule

The completion of the BCP marks the end of the planning phase and the beginning of the implementation phase. The steps and schedule that follow below provide a framework to move into implementation of the BCP.

6.1.1 Steps

- 1. Recruitment of an Implementing Organization (IO):** A well-qualified IO with relevant local experience implementing reforestation programs should be recruited by TMGO to carry out detailed management of all major implementation aspects of this BCP.
- 2. Agreement on Land Use for the Replanting Site:** A formal agreement should be sought with the OFWE regarding the use of an appropriately sized degraded parcel of the suggested land that can be dedicated to the replanting effort, including commitments with regard to the time necessary to fully realize the objectives of the BCP. Such agreement should be inclusive of an exit strategy for the IO and adoption of local ownership on the part of the OFWE to take on responsibilities with regard to protection of the replanted area after the expiration of the establishment period. This should include bylaws to be established with local community members that would establish prohibited activities (such as tree cutting for construction material or fuel wood) and reasonable penalties for engaging in such activities, as well as rules regarding 'cut and carry' of grasses grown in the area for livestock sustenance.
- 3. Seedling Production:** This entails the sourcing from nurseries of the appropriate amount and mix of seedlings to adequately compensate for the 555 m³ of mature species cleared for the Project including an agreement on price and time schedule for production. Aspects for attention include nursery site preparation, order placement/purchase, and production time).
- 4. Site Preparation and SWC Works:** This will include a land survey and delineation of the planting site and designing of appropriate SWC works. The proposed site is characterized by steep slopes, which are prone to soil erosion. Therefore, it is necessary to design and construct SWC structures such as hillside terraces, soil bunds, and micro-basins that would help control soil erosion, promote water conservation and improve soil moisture.
- 5. Planting:** This includes the organization of an appropriate workforce (through volunteers or paid workers) to carry out the planting effort in a timely manner under appropriate expert supervision and according to pre-established planting designs, as well as provision and transportation of materials and equipment. Per the considerations on schedule below, it is especially important that the timing of the planting coincide with the beginning of the rainy season. In addition, improved pits are recommended for planting of seedlings, as these will optimize catchment of precipitation and runoff, which in turn will optimize seedling survival rates. Recommended spacing for the indigenous woody species is 2m by 2m.
- 6. Post-Planting Care ("PPC"):** This includes measures to guard the seedlings from livestock and wildlife, maintenance of structures, monitoring of species health, replanting of any dead seedlings, protection from cutting for construction material and fuel wood, etc. See considerations on timeframe below.
- 7. Monitoring and Evaluation ("M&E"):** A detailed M&E plan should be developed by the IO no later than the start of site preparation. This should include regular internal data collection and the formulation of Key Performance Indicators ("KPIs") based on such data to regularly monitor performance and produce monitoring reports. In such reports, the effects of the biodiversity compensation effort should be tracked against baseline conditions of the affected area. With regard to evaluation, a suitably qualified third party should be recruited to conduct an interim and completion evaluation to assess the BCP implementation

process, and evaluate whether the overall objectives of the BCP are on track to be met (in the case of the interim evaluation), and have been successfully met (in the case of the completion evaluation).

6.1.2 Schedule

The IO will be charged with formulating a detailed schedule to kick off the biodiversity compensation implementation process. The schedule should take into account the following considerations:

- While local nurseries (visited as part of the process of developing the BCP) have the capability and access to seeds to produce appropriate native species, orders will need to be placed in advance to grow the volume of species required to a suitable seedling stage capable of surviving once planted. Seedling production will require approximately 6 months of lead-time prior to the desired planting date.
- For best results, planting should take place during the rainy season (June to August).
- According to stakeholders consulted for this BCP, two years are typically required as an establishment period for the seedlings, thus, the PPC should last at least this long.
- PPC could be extended if necessary based on monitoring and the interim evaluation results.

6.2 Roles and Responsibilities

In general, direction and oversight of the BCP is at the charge of the TMGO Environmental and Social Manager. Per step one in the above subsection on implementation steps, an IO will be contracted to carry out detailed management of implementation aspects (steps two through six) with partial responsibilities for step seven. TMGO will remain involved in implementation as required, especially to ensure continuity in information disclosure, stakeholder engagement and grievance management, as such aspects fall under already established channels for the Project, and the local TMGO office and CLO play a key role.

6.3 Costs

A summary of overall costs for the implementation of the BCP is provided in Table 6-1 below. It is important to note these are roughly estimated high-level costs provided as a starting point for planning purposes and subject to further refinement, especially as TMGO receives proposals from IO service providers with detailed approaches and budgets for consideration. Seedling production, transportation, SCW, planting, and PPC costs are based on estimates consulted with officials from the WAO and OFWE. The IO will be free to source materials and see to these tasks as it deems best, so long as selections comply with the objectives and requirements of this BCP.

Table 6-1: Biodiversity Compensation Plan Implementation Cost Estimate

Cost Category	Cost in ETB	Cost in USD
I. Seedling Production & Transport to Planting Site		
i. Nursery site preparation, seed purchase & seedling production, material costs	50,000	1,550
ii. Nursery site preparation & seedling production, labor costs	54,000	1,674
iii. Transport costs - transport costs during seedling production & for seedling transport to planting site	30,000	930
iv. Professional fees (including local taxes) and allowances	64,800	2,009
<i>I. Sub-total</i>	<i>198,800</i>	<i>6,164</i>
II. SWC Works, Seedling Planting & PI Management		
i. SWC material costs	10,000	310
ii. Labor costs (for SWC works, digging pits & planting seedlings)	350,000	10,853

Cost Category	Cost in ETB	Cost in USD
iii. PPC, labor costs (guarding from livestock and wildlife, maintenance of structures, replanting of any dead seedlings, etc.)	150,000	4,651
iv. Professional fees for design of structures, supervision of SWC works & seedling planting, and PIM monitoring & evaluation (including local taxes)	210,000	6,512
v. Allowance for experts during field works	42,000	1,302
vi. Transport costs (car rent & fuel cost)	150,000	4,651
vii. Stationary, maps & report production	20,000	620
vii. Communication cost	15,000	465
<i>II. Sub-total</i>	<i>947,000</i>	<i>29,364</i>
Total (I+II)	1,145,800	35,529
Contingency (20%)	229,160	7,106
IO Markup (20%)	274,992	8,527
VAT (15%)	247,493	7,674
Grand Total	1,622,453	50,309

Source: ESSD

7 Appendices

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A. Stakeholder Meetings Conducted During ESSD Field Visit

Table 7-1: Stakeholder Meetings on Biodiversity Compensation

Stakeholders	Participants	Location	Date
1. Hetossa Woreda & Natural Resource Devt Office (ANRDO), and Woreda Environment, Forest & Climate Change Office (EFCCO)	<ul style="list-style-type: none"> • Head of ANRDO • Team Leader NRD • Head of EFCCO • ESSD 	ANRDO, Iteya	3rd Dec. 2019
2. Oromia Forest & Wildlife Enterprise (OFWE) Chilalo Galama District	<ul style="list-style-type: none"> • Head of the District • Forest Specialist Team • ESSD 	District Office, Asela	3rd Dec. 2019
3. Tero Moye Kebele Leaders	<ul style="list-style-type: none"> • Kebele Chairman • Kebele Participatory Forest Management Committee Chairman • OFWE Forest Specialist • Head of EFCCO • ESSD 	Hetossa W. Adm. Office	5th Dec. 2019
4. Local Community around the TMGO project site	<ul style="list-style-type: none"> • Community members (24 in number), • Kebele Chairman • Kebele PFMC Chairman • Head, EFCCO • TL NRD, ANRDO • OFWE Forest Specialist • ESSD 	Near TMGO site office, Tero Moye Kebele	6th Dec. 2019
5. ANRDO, EFCCO & OFWE	<ul style="list-style-type: none"> • Head, ANRDO • TL NRD, ANRDO • Head, EFCCO • OFWE Forest Specialist • ESSD 	ANRDO, Iteya	6th Dec. 2019

Source: ESSD

Figure 7-1: Meeting held with the local community



B. ESSD Site Visit Photos

Figure 7-2: Cleared Drill Pad A under Construction



Figure 7-3: Dense Bushland near Drill Pad A



Figure 7-4: Dense Bushland around Water Storage Site near the Access Road



Figure 7-5: Cleared Water Storage Pond Site under Construction Surrounded by Dense Natural Vegetation



Figure 7-6: Drill Pad B Site Covered in Dense Shrub/Bushland Vegetation



Figure 7-7: Power Station Site Forested with Dense Bushland Vegetation



Figure 7-8: Tulu Moye Mountain



Figure 7-9: Tulu Moya Mountain, Partially Forested with Juniper Trees



Figure 7-10: Seedlings at the Shorima Nursery (WAO)



Figure 7-11: Seedlings at the OWFE Nursery

