GEM Sustainability Services and Consultancy Inc.

Diyadin Geothermal Resource Exploration Project

Environmental and Social Management Plan

Zorlu Jeotermal Enerji Elektrik Üretim A.Ş.

September 2024

Project	Details
Reference	**E23-033**
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Submitted to	**Zorlu Jeotermal Enerji Elektrik Üretim A.Ş.**
Prepared by	**GEM Sustainability Services and Consultancy Inc.** **www.gemtr.com**

Revision No.	Revision Date	Revision Detail
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Rev06	9 September 2024	Revised as per the comments and feedback of Lenders (received by GEM on 26 August 2024)

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Acronyms and Abbreviations

AoI	Area of Influence
BOP	Blowout Preventer System
CCVT	Closed-circuit television
CH	Cultural Heritage
CTF	Clean Technology Fund
E&S	Environmental and Social
EA	Environmental Assessment
EHS	Environmental Health and Safety
EIA	Environmental Impact Assessment
ESHS	Environmental, Social, Health and Safety
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
GEM	GEM Sustainability Services and Consultancy Inc.
GIIP	Good International Industry Practices
HSE	Health and Safety and Environment
ILO	International Labour Organization
IUCN	International Union for Conservation of Nature
KBA	Key Biodiversity Area
MoAF	Ministry of Agriculture and Forestry
MoCT	Ministry of Culture and Tourism
MoEUCC	Ministry of Environment, Urbanization and Climate Change
MTA	Directorate General of Mineral Research and Exploration
OHS	Occupational Health and Safety
OP	Operational Policy
PDoEUCC	Provincial Directorate of Environment, Urbanization and Climate Change
PIF	Project Information File
PPM	Public Participation Meeting
RAMEN	Turkish Regulation on the Assessment and Management of Environmental Noise
RPF	Resettlement Policy Framework
RSM	Risk Sharing Mechanism
SEP	Stakeholder Engagement Plan
TKYB	Türkiye Kalkınma ve Yatırım Bankası A.Ş.
TPAO	Turkish Petroleum Corporation
WB	World Bank
WPCR	Water Pollution Control Regulation

1. INTRODUCTION

Zorlu Jeotermal Enerji Elektrik Üretim A.Ş. (Zorlu Jeotermal) is planning to implement Diyadin Geothermal Resource Exploration Project in Diyadin district of Agri province in eastern Türkiye. Diyadin district is located 60 km to the east of Agri province with an area of approximately 1,274 km^2 at an altitude of 1,910-1,930 m above sea level, situated on an active tectonic depression.

Zorlu Jeotermal[1] was established in June 2008 as one of the indirect subsidiaries of Zorlu Yenilenebilir Enerji A.Ş (Zorlu Yenilenebilir). Zorlu Enerji Elektrik Üretim A.Ş. (Zorlu Enerji) is a 100% direct partner of Zorlu Yenilenebilir.

Zorlu Jeotermal's areas of operation include developing projects to fulfill all types of energy, steam, and heat needs, preparing feasibility studies, establishing electricity generation facilities based on all types of renewable energy sources, and selling the energy produced in these facilities.

Zorlu Jeotermal is planning to implement Diyadin Geothermal Resource Exploration Project within the scope of the Risk Sharing Mechanism (RSM) for Resource Validation Program of the World Bank (WB) Geothermal Development Project[2] financed by the Clean Technology Fund (CTF) as detailed below. The Development and Investment Bank of Türkiye is an implemented agency of the RSM Program. This Environmental and Social Management Plan (ESMP) is prepared in line with RSM Beneficiary Manual 3.0 (April 2023) as part of Zorlu Jeotermal's RSM application process.

As a Geothermal Developer/Beneficiary, Zorlu Jeotermal has applied to and been shortlisted within the scope of the third application round of the RSM for Diyadin Geothermal Resource Exploration Project for the exploration drilling of the following wells within Exploration License No. 37 (which has been converted to Operation License No. 15 in September 2024) (hereinafter "the Project" refers to this scope as part of the RSM process):

- ZDM-2
- ZDM-3
- ZDM-6

The main stages of the Diyadin Geothermal Resource Exploration Project involve (i) land preparation including topsoil stripping, earthworks and site preparation, (ii) exploration including drilling of geothermal exploration wells and subsequent well testing to assess the potential of the area's geothermal resource capacity for energy generation or alternative uses, and (iii) closure and land rehabilitation.

Background

The first geothermal exploration studies were carried out at Diyadin Geothermal Field back in 1997 by the Directorate General of Mineral Research and Exploration (MTA) of the Ministry of Energy and Natural Resources. Diyadin Geothermal Field is a pentagonal-shaped area of approximately 100 km^2. Between 1998-1999, six geothermal wells were drilled by MTA (the depth was maximum 215 m) and geothermal fluid of 23-70˚C was obtained. Afterwards in 2011, a private investor (Jeomar Company) drilled an exploration well at 1,425 m and reportedly had obtained geothermal fluid of 80°C.

The Implementation Regulation of the Geothermal Resources and Natural Mineral Waters Law (Official Gazette Date: 11 December 2007; No: 26727) requires an "Exploration License" to be secured to conduct geothermal exploration studies in a given area.

In August 2020, Zorlu Jeotermal acquired Exploration License No. 36 and Exploration License No. 37 from Agri Provincial Special Administration (Appendix A.1 and A.2). In August 2023, Zorlu Jeotermal has applied for an extension of 1 year for both Licenses. As per the official letter of Agri Provincial Special Administration (dated 16 August 2023), both licenses have been extended for 1 year (valid until August 2024, please see Appendix A.3). In September 2024, Zorlu Jeotermal has acquired Operation License No. 14 and Operation License No. 15 from Agri Provincial Special Administration (Appendix A.4 and A.4).The exploration license

[1] https://www.zorlu.com.tr/en/fields-of-activity/sectors/energy

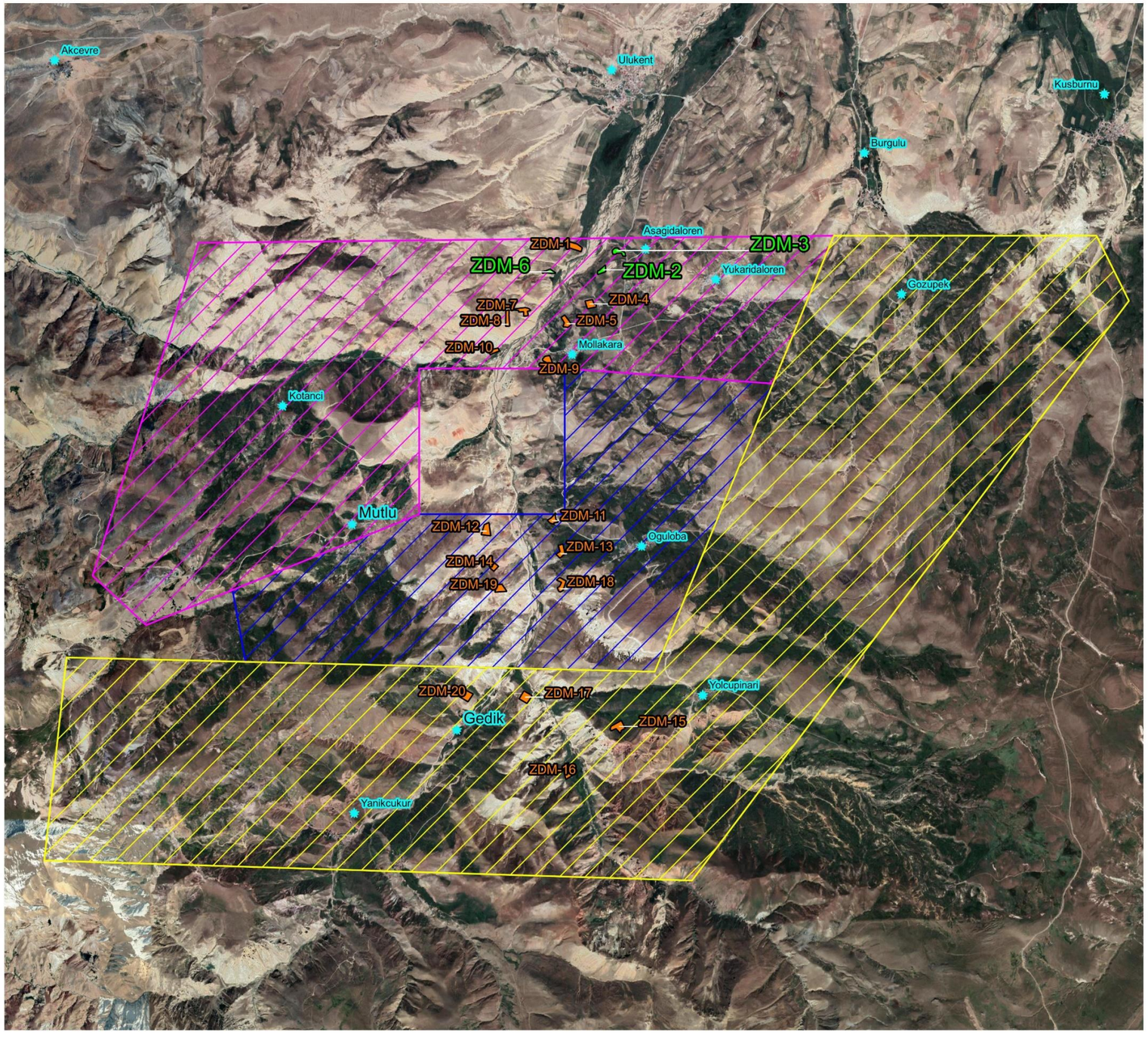
[2] https://projects.worldbank.org/en/projects-operations/project-detail/P151739

areas[3] are shown in Figure 1-1 and information on the license areas is summarized in Table 1-1. As can be seen in Figure 1-1, an area in the form of a square exists in the middle of the two exploration licenses. This area is a licensed geothermal area of a private company carrying out greenhouse activities.

The two exploration licenses of Zorlu Jeotermal are located at approximately 16 km to the south-southwest of Diyadin Geothermal Field as shown in Figure 1-2.

Following the acquisition of the exploration licenses, Zorlu Jeotermal had carried out site-specific studies starting with site geology in October 2021, site geophysics in May-June 2022 and geochemical studies in June 2022.

[3] The operation licenses obtained in September 2024 cover the same areas as the previously acquired exploration licenses. Therefore, references made to the exploration licenses in this report remain valid for the current Project Area.



Legend

- Geothermal Resource Exploration License Area No. 36 / 36 Numaralı Jeotermal Kaynak Arama Ruhsat Alanı
- Geothermal Resource Exploration License Area No. 37 (Polygon-1) / 37 Numaralı Jeotermal Kaynak Arama Ruhsat Alanı (Poligon-1)
- Geothermal Resource Exploration License Area No. 37 (Polygon-2) / 37 Numaralı Jeotermal Kaynak Arama Ruhsat Alanı (Poligon-2)
- Geothermal Resource Exploration Drilling Areas within the scope of RSM / RSM Kapsamındaki Jeotermal Kaynak Arama Sondaj Alanları
- Other Wells within the Scope of PIF/ PTD Kapsamındaki Diğer Kuyular
- Village Centers / Köy Merkezleri

GEM Sustainability Services and Consultancy Inc.

Project Name / *Proje Adı*	:	Geothermal Resource Exploration Project
Map Title / *Harita Başlığı*	:	Project Location / *Proje Yerleşimi*
Prepared for / *Proje Şirketi*	:	Zorlu Jeotermal Enerji Elektrrik Üretimi A.Ş.
Projected Coordinate System / *Projeksiyon Koordinat Sistemi*	:	ED 50 UTM Zone 38
Sheet Size / *Sayfa Boyutu*	:	A3

N

0 0.75 1.5 km

Basemap Source: Google Earth

Figure 1-1. Zorlu Jeotermal Exploration License Areas

Table 1-1. Operation Licenses of Zorlu Jeotermal

Information	Exploration License No. 36 (Operation License No. 14)	Exploration License No. 37 (Operation License No. 15)	
Location	Agri Province, Diyadin District, Gedik Village	Agri Province, Diyadin District, Mutlu Village	
Valid From	11 September 2024 for Operation License	11 September 2024 for Operation License	
Valid Until	11 September 2054 for Operation License	11 September 2024 for Operation License	
License Area	4,949.28 ha	4,345.16 ha	
		Polygon-1 (2,701.36 ha)	Polygon-2 (1,643.80 ha)
Exploration wells within License Area	Four wells: ✓ ZDM-15 ✓ ZDM-16 ✓ ZDM-17 ✓ ZDM-20	Ten wells: ✓ ZDM-1 ✓ **ZDM-2 (*)** ✓ **ZDM-3 (*)** ✓ ZDM-4 ✓ ZDM-5 ✓ **ZDM-6 (*)** ✓ ZDM-7 ✓ ZDM-8 ✓ ZDM-9 ✓ ZDM-10	Six wells: ✓ ZDM-11 ✓ ZDM-12 ✓ ZDM-13 ✓ ZDM-14 ✓ ZDM-18 ✓ ZDM-19
Environmental Impact Assessment (EIA) Decision	"EIA Not Required" Decision granted by Agri Provincial Directorate of Environment, Urbanization and Climate Change on 4 July 2022. As per Article 17 of the EIA Regulation, if a Project, without any force majeure, is not initiated within five (5) years of the "EIA Not Required" Decision, then the Decision shall be considered invalid.		
(*) Drilling wells within the scope of RSM process.			

Figure 1-2. Location of Zorlu Jeotermal Exploration License Areas (Ruhsat Alani) with respect to MTA and Jeomar Wells at Diyadin Geothermal Field[4]

[4] *Source:* Technical Report on Exploration License No. 37, Zorlu Jeotermal.

Risk Sharing Mechanism (RSM) Scope

The RSM for Resource Validation Program is one of the components of the WB financed Türkiye Geothermal Development Project. The objective of the RSM is to increase private sector investment in geothermal exploration drilling in Türkiye by providing partial coverage of drilling costs in case of unsuccessful exploration wells. Türkiye Kalkınma ve Yatırım Bankası A.Ş. (TKYB) serves as the implementation agency for the RSM. The WB, in its role as the Trustee of the Clean Technology Fund (CTF), is responsible for supervising the implementation of the RSM by the TKYB.

As a Geothermal Developer/Beneficiary, Zorlu Jeotermal has applied to and been shortlisted within the scope of the third application round of the RSM for Diyadin Geothermal Resource Exploration Project for the exploration drilling of the following wells within Exploration License No. 37 (which has been converted to Operation License No. 15 in September 2024) (hereinafter “the Project” refers to this scope as part of the RSM process):

- ZDM-2
- ZDM-3
- ZDM-6

As per the RSM Beneficiary Manual 3.0 (April 2023), the short-listed private sector developers are required to submit the following Environmental and Social (E&S) safeguard documents as part of their full proposal:

- E&S Screening Checklist (as per Annex 10A of the RSM Beneficiary Manual)
- E&S Management Plan (ESMP) (as per Annex 10B and Annex 12A of the RSM Beneficiary Manual)
- Stakeholder Engagement Plan (SEP) (as per Annex 10C and Annex 12B of the RSM Beneficiary Manual)

This Project ESMP has been prepared by GEM Sustainability Services and Consultancy Inc. (GEM or the Responsible Party) in line with the requirements set out in the RSM Beneficiary Manual 3.0.

The E&S assessment and mitigation strategy included in the Project ESMP is based on the review and evaluation of the Project related documentation by the experts of the Responsible Party listed in Table 1-2 and outcomes of the baseline studies and site surveys conducted as part of the national Environmental Impact Assessment (EIA) process completed in 4 July 2022 with the "EIA Not Required" Decision (Decision No. 202239) secured from the Agri Provincial Directorate of Environment, Urbanization and Climate Change (PDoEUCC) (Appendix B). No additional site visit or E&S baseline data collection trough field surveys was carried out within the scope of this ESMP.

Table 1-2. Responsible Party Experts Who Contributed to the Development of Project ESMP

Expert	Position/Expertise
Dr. Hande Yükseler	Project Director / Senior Environmental Expert
Burcu Yazgan Kayabalı	Project Manager / Senior Environmental and Social Expert
Sevil Avşaroğlu	EHS Specialist / Environmental Engineer
Fadime Yücel Kıbrıs	GIS and Environmental Specialist / Geological Engineer

2. PROJECT DESCRIPTION

Diyadin Geothermal Resource Exploration Project within the scope of the RSM process involves the drilling of geothermal exploration wells ZDM-2, ZDM-3, and ZDM-6 within the Exploration License No.37 (hereinafter "the Project" refers to this scope as part of the RSM process) and the subsequent well testing to assess the potential of the area's geothermal resource capacity for energy generation or alternative uses. Potential alternative uses of the resource will be evaluated upon completion of the well testing including potential use of the exploration wells either for production or re-injection purposes. In addition to drilling and well testing, the Project also includes earthworks and site preparation activities as well as land rehabilitation activities.

The Project is performed in three main phases;

(i) land preparation (presented in orange color below),

(ii) exploration (presented in blue color below) and,

(iii) closure and land rehabilitation (presented in green color below).

The steps of the overall workflow under these phases are summarized below:

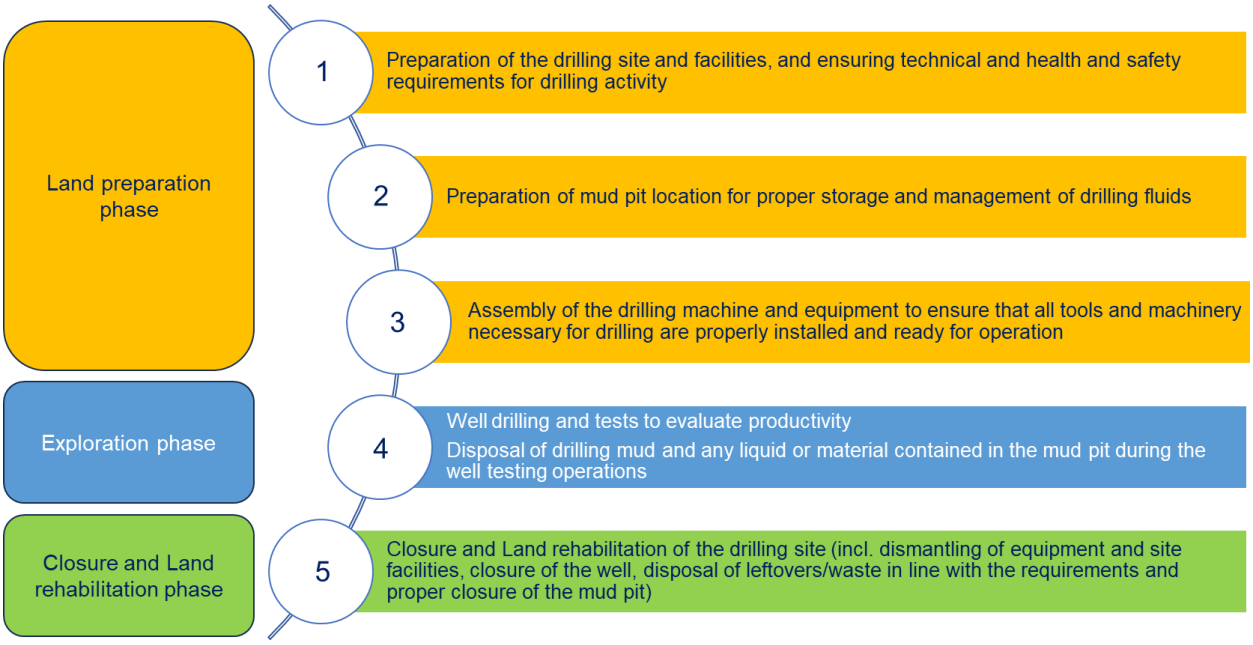


Figure 2-1. Workflow for Geothermal Well Drilling Activities

The Project activities will only be initiated once all the required permits/approvals are obtained. To this end, within the scope of the national EIA process, related governmental authorities have provided their official views as summarized in Chapter 9 (official letters in Turkish are presented in Appendix C).

2.1. Project Location

The Project is located in Diyadin district of Agri province in eastern Türkiye. Exploration wells ZDM-2 and ZDM-3 are located in Asagidaloren Village and ZDM-6 is located in Mollakara Village.

The settlements in the vicinity of the exploration wells are listed in Table 2-1 below with distances from the closest buildings within each settlement and their relative directions. Figure 1-1 shows the village centers.

Table 2-1. Settlements in the Vicinity of the Project Exploration Wells

Exploration Well	Settlement	Distance (m) of the Well to Settlement Center	Distance (m) of Well to Closest Building in the Settlement	Direction of the Well with respect to Settlement Centre
ZDM-2	Asagidaloren Village	590	485	Southwest
	Yukaridaloren Village	1,518	1,340	West
ZDM-3	Asagidaloren Village	285	227	West
	Yukaridaloren Village	1,278	1,095	Northwest
ZDM-6	Mollakara Village	1,137	1,024	Northwest
	Asagidaloren Village	1,284	929	Southwest

Exploration License No. 37 is at a distance of 60 km to Agri city center and 12 km to Diyadin district center. The population of Diyadin district was 19,556 in 2022 and the populations of the closest settlements are provided in Table 2-2.

Table 2-2. 2022 Population of the Closest Settlements

Settlement	2022 Population (*)		
	Female	Male	Total
Mutlu Village (Exploration License No. 37)	296	317	613
Asagidaloren Village (ZDM-2 and ZDM-3)	97	112	209
Mollakara Village (ZDM-6)	178	215	393

(*) Source: https://biruni.tuik.gov.tr/

The closest water resources to the well locations are summarized below.

Table 2-3. Water Resources in the vicinity of the Project Exploration Wells

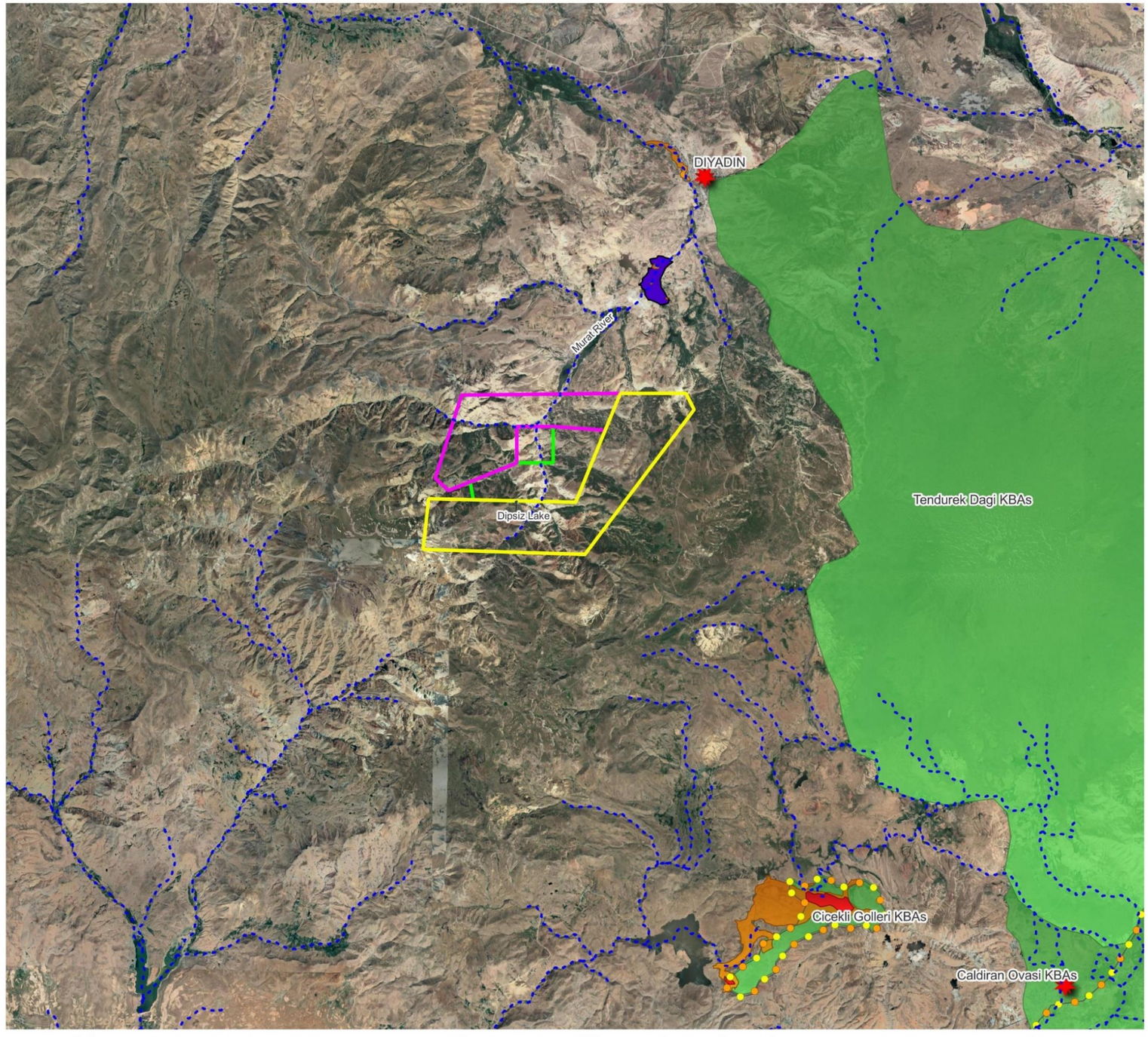
Water Resource	Closest Well	Distance (km) of the Well to the Water Resource	Direction of the Well with respect to the Water Resource
Dipsiz Lake	ZDM-6	5.6	Northeast
Murat River	ZDM-2	0.38	East
	ZDM-3	0.29	East
	ZDM-6	0.18	West

There are no legally protected and internationally recognized areas overlapping with Exploration License No. 37. The protected areas in the vicinity of the well locations are summarized below and shown in Figure 2-2.

Table 2-4. Legally Protected and Internationally Recognized Areas in the vicinity of the Project Exploration Wells

Protected Area	Closest Well	Distance (km) of the Well to the Protected Area	Direction of the Well with respect to the Protected Area
Sustainable Conservation and Controlled Use Area (*)	ZDM-3	6.9	Southwest
Tendürek Mountain Key Biodiversity Area (KBA)		12.0	West
Bazalt Canyon Qualified Natural Conservation Area		13.7	Southwest
Cicekli Golleri Qualified Natural Conservation Area	ZDM-2	28.7	Northwest

Protected Area	Closest Well	Distance (km) of the Well to the Protected Area	Direction of the Well with respect to the Protected Area
Cicekli Golleri Wetland		29.1	Northwest
Cicekli Golleri KBA		29.1	Northwest
Cicekli Golleri Strictly Protected Area		30.0	Northwest
Caldiran Ovasi KBA		36.5	Northwest
(*) Within the boundaries of this area there are three thermal springs, namely Diyadin Köprü Thermal Spring, Diyadin Yılanlı Thermal Spring and Diyadin Davud Thermal Spring. All these three springs are categorized as “Qualified Natural Conservation Area (*in Turkish: Nitelikli Doğal Koruma Alanı*)” https://webdosya.csb.gov.tr/db/turkce/sitalani/kopru-yilanli--8230-16615-20190130153852.pdf			



Legend

- Geothermal Resource Exploration License Area No. 36 / 36 Numaralı Jeotermal Kaynak Arama Ruhsat Alanı
- Geothermal Resource Exploration License Area No. 37 (Polygon-1) / 37 Numaralı Jeotermal Kaynak Arama Ruhsat Alanı (Poligon-1)
- Geothermal Resource Exploration License Area No. 37 (Polygon-2) / 37 Numaralı Jeotermal Kaynak Arama Ruhsat Alanı (Poligon-2)

Internationally Recognized Areas / Uluslararası Öneme Haiz Koruma Alanları

- Key Biodiversity Areas (KBAs) / Önemli Biyolojik Çeşitlilik Alanları

Legally Protected Areas / Ulusal Öneme Haiz Koruma Alanları

- Wetlands / Sulak Alanlar

Natural Sites / Doğal Sitler

- Strictly Protected Area / Kesin Korunacak Hassas Alan
- Qualified Natural Conservation Area / Nitelikli Doğal Koruma Alanı
- Sustainable Conservation and Controlled Use Area/ Sürdürülebilir Koruma ve Kontrollü Kullanım Alanı
- Lake / Göl
- River / Nehir
- District Centers / İlçe Merkezleri

GEM Sustainability Services and Consultancy Inc.

Project Name / *Proje Adı*	:	Geothermal Resource Exploration Project
Map Title / *Harita Başlığı*	:	Legally Protected and Internationally Recognized Area / *Ulusal ve Uluslararası Öneme Haiz Koruma Alanları*
Prepared for / *Proje Şirketi*	:	Zorlu Jeotermal Enerji Elektrrik Üretimi A.Ş.
Projected Coordinate System / *Projeksiyon Koordinat Sistemi*	:	ED 50 UTM Zone 38
Sheet Size / *Sayfa Boyutu*	:	A3

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Basemap Source: Google Earth

Figure 2-2. Legally Protected and Internationally Recognized Areas in the vicinity of Exploration License No. 36 and No. 37

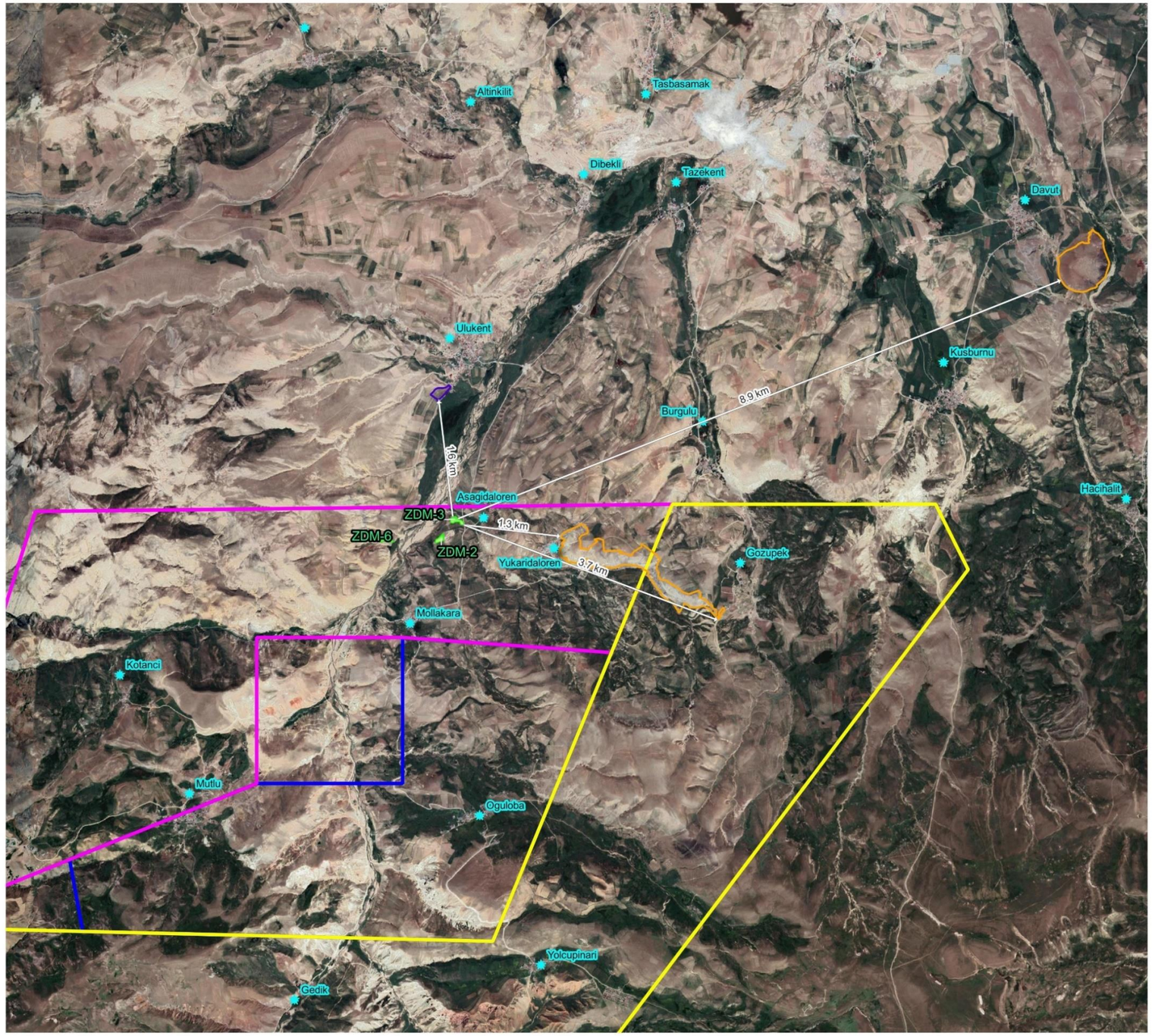
As per the information provided in the Project PIF, there are no registered cultural heritage sites within the EIA permitted well locations. This said, registered cultural heritage sites in the vicinity of the exploration wells is given below and shown in Figure 2-3.

Table 2-5. Registered Cultural Heritage (CH) Sites in the Vicinity of the Project Exploration Wells

Registered CH Site	Site Status	Closest Well	Distance (km) of the Well to the CH Site	Direction of the Well with respect to the CH Site
Yukaridaloren Village Residential Area	1st degree Archaeological Site	ZDM-3	1.3	West
Ulukent Village Cemetery	Immovable Cultural Property	ZDM-3	1.6	Southeast
Gozupek Village Residential Area	1st degree Archaeological Site	ZDM-3	3.7	Northwest
Davut Village Castle	1st degree Archaeological Site	ZDM-3	8.9	Southwest

Source: Van Directorate of Regional Board on Conservation of Cultural Assets Decisions[5]

[5] https://korumakurullari.ktb.gov.tr/TR-91065/tescil-kararlari.html



Legend

- Geothermal Resource Exploration License Area No. 36 / 36 Numaralı Jeotermal Kaynak Arama Ruhsat Alanı
- Geothermal Resource Exploration License Area No. 37 (Polygon-1) / 37 Numaralı Jeotermal Kaynak Arama Ruhsat Alanı (Poligon-1)
- Geothermal Resource Exploration License Area No. 37 (Polygon-2) / 37 Numaralı Jeotermal Kaynak Arama Ruhsat Alanı (Poligon-2)
- Geothermal Resource Exploration Drilling Areas within the scope of RSM / RSM Kapsamındaki Jeotermal Kaynak Arama Sondaj Alanları
- 1st degree Archaeological Site / 1. Derece Arkeolojik Sit Alanı
- Immovable Cultural Property / Taşınmaz Kültürel Varlık
- Village Centers / Köy Merkezleri

GEM Sustainability Services and Consultancy Inc.

Project Name / *Proje Adı*	:	Geothermal Resource Exploration Project
Map Title / *Harita Başlığı*	:	Cultural Heritage Sites / *Kültürel Miras Alanları*
Prepared for / *Proje Şirketi*	:	Zorlu Jeotermal Enerji Elektrrik Üretimi A.Ş.
Projected Coordinate System / *Projeksiyon Koordinat Sistemi*	:	ED 50 UTM Zone 38
Sheet Size / *Sayfa Boyutu*	:	A3

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Basemap Source: Google Earth

Figure 2-3. Registered Cultural Heritage Sites in the vicinity of Project Exploration Wells

2.2. Project Land Use and Ownership

Diyadin Geothermal Resource Exploration Project within the scope of the RSM process involves the drilling of geothermal exploration wells ZDM-2, ZDM-3, and ZDM-6 within Exploration License No.37.

Land use requirements for the drilling activities are limited to the EIA permitted drilling areas (all Project components and equipment such as mud pit(s), water tanks, septic tank, chemical storage area, drill equipment, on-site accommodation will take place within this EIA permitted areas). To this end, in total 2.4 ha of the entire 4,345.16 ha (total area for Exploration License No. 37) is permitted to be used by the Project activities that will take place at ZDM-2, ZDM-3 and ZDM-6 well locations.

Information on land use and land ownership at the well locations is summarized below in Table 2-6 based on land registry information. Further information on the current land use based on site observations and consultations is provided in Section 2.3. Images for each well location (from July 2022 and August 2024) are shown below in Figure 2-4, Figure 2-5, and Figure 2-6.

Table 2-6. Project Land Use and Land Ownership

Well	Working area for well drilling (m^2) (EIA Permitted Areas)	Settlement	Lot/ Parcel	Ownership	Land Use Type (***)
ZDM-2	7,453.9	Asagidaloren Village	102/2	Legal entity	Meadow (*Çayır)*
ZDM-3	10,858.3		102/25 (*)	Zorlu Jeotermal	Meadow (*Çayır)*
ZDM-6	6,066.2	Mollakara Village	102/12	Included within the scope of Article 5/b classification of Pasture Law (Law No. 4342) (**)	Raw soil (*Ham Toprak)*

Source: Project PIF (July 2022), Parcel Inquiry website (*parselsorgu.tkgm.gov.tr*), and Zorlu Jeotermal.

(*) This private property was formerly registered as parcel no.102/8 and deactivated through a Partitioning Transaction dated 19 December 2022 and divided into two separate parcels: Lot/Parcel No: 102/24 and 102/25 (*parselsorgu.tkgm.gov.tr)*. Lot/Parcel No: 102/24 is registered as a pylon area (4 m^2). The total area of Lot/Parcel No: 102/25 is 13,926 m^2. Lot/Parcel No: 102/25 has been acquired by Zorlu Jeotermal (title deed dated 15 February 2023, please see Appendix D). Zorlu Jeotermal requested the official opinion of Agri PDoEUCC on the validity of the "EIA Not Required" Decision after the Partitioning Transaction. Agri PDoEUCC stated in its official letter dated 10 April 2023 that "EIA Not Required" Decision is still valid as the EIA area has not changed (Appendix B).

(**) According to Article 5/b of Pasture Law, based on the needs determined by the commission, the following places shall be allocated as pasture, summer, and winter grazing lands to villages or municipalities: Lands under the state's jurisdiction and control or owned by the Treasury, which are deemed suitable (based on surveys) for use as pastures, summer, and winter grazing lands.

(***) Information on land use type given in this column is taken from Parcel Inquiry website (*parselsorgu.tkgm.gov.tr*). It should be noted that, as per Annex-4 of the Project PIF, ZDM-2, ZDM-3, and ZDM-6 well locations are classified as marginal agricultural land. As per the official letter of Provincial Directorate of Agriculture and Forestry dated 1 June 2023 (please see Appendix C), the land use specification of the ZDM-3 well location (Lot/Parcel No: 102/25 of Asagidaloren Village) has been determined as "Dry Marginal Agricultural Land" and the permit for use of agricultural land for non-agricultural purposes has been granted (please see Chapter 9).

The exploration studies will start at ZDM-3 well location which is owned by Zorlu Jeotermal. Based on the outcome of the well tests, the decision to continue with other well locations will be made. In that case, Zorlu Jeotermal will consider either lease of the land from the landowner(s) through execution of land lease agreements or purchase of the land on willing buyer-willing seller basis. Other necessary permissions for land use will be obtained from the relevant authorities.

Images for each well location are shown below in Figure 2-4.

Image obtained from PIF, July 2022

Image as of August 2024

Figure 2-4. View of ZDM-2 Well Area

Image obtained from PIF, July 2022

Image as of August 2024

Figure 2-5. View of ZDM-3 Well Area

Image obtained from PIF, July 2022

Image as of August 2024

Figure 2-6. View of ZDM-6 Well Area

2.3. Land Acquisition Process for Drilling Locations

The exploration studies for the Project will start at ZDM-3 well location, for which the land acquisition has already been completed by Zorlu Jeotermal. Based on the outcomes of the well tests at ZDM-3, the decision to continue with other planned well locations (ZDM-2 and ZDM-6) will be made. The land acquisition process for ZDM-3 and the planned process for ZDM-2 and ZDM-6 is described below.

❖ **Land Acquisition Process for ZDM-3 (Completed):**

The current data and assessment on the land acquisition process of ZDM-3 well location is presented below. The data has been compiled based on the outcomes of stakeholder interviews and consultations held by Zorlu Jeotermal representatives within the scope of the land take process completed for the respective parcel (102/25) in February 2023:

- Parcel No. 102/25 (privately-owned), overlapping with ZDM-3 well location, was purchased by Zorlu Jeotermal based on negotiated settlement with the private landowner ("previous landowner "). The previous landowner had the full ownership of the parcel (there were no other shareholders). In mutual agreement with the previous landowner, Zorlu Jeotermal acquired the full shares of the parcel (as such, there is no unacquired part left from the parcel).
- Prior to acquisition by Zorlu Jeotermal, the parcel was **not** being cultivated or used for economic purposes by the landowner or other formal or informal land users. There were **no** crops, trees, buildings/structures or water sources on the parcel. The parcel was used by the previous landowner himself for grazing purposes[6], who owns a couple of ovine and bovine animals. He does not depend on the acquired parcel (102/25) for this activity as there are other parcels in the area under his ownership (reportedly three parcels) and there are also alternative grazing areas in the settlement. He has household members (sons) earning income from construction works in metropolitan cities.
- After the parcel (102/25) has been acquired and registered in the name of Zorlu Jeotermal on the title deed in February 2023, the parcel has not been fenced off by Zorlu Jeotermal to allow the previous landowner to continue using the land for grazing activities until the start of drilling works in addition to the cash compensation received by him in advance. Therefore, the previous landowner has not been adversely affected by the project related land acquisition that has already been completed.
- The compensation value to be proposed for the land was initially determined by Zorlu Jeotermal based on the current market prices in consultation with the village headman and the council of elders. Prior to offering the compensation value to the previous landowner, Zorlu Jeotermal has also secured the consent of the District Governorate ("*kaymakamlik*") on the land price to be proposed. Upon reaching an agreement on the proposed price between the previous landowner and Zorlu Jeotermal, the parcel was formally acquired by Zorlu Jeotermal and the title deed registration process has been completed.
- Prior to commencement of the drilling activities in due course, the parcel will be fenced off by Zorlu Jeotermal to ensure that there is no unauthorized access/trespass by local people or any other third party and no health and safety risk is posed.
- Because of the nature and scale of the drilling activity that require limited footprint and the fact that there are alternative parcels that will remain accessible to the previous landowner upon commencement of the drilling works by Zorlu Jeotermal, loss of the acquired parcel (approximately 14 decares) is not anticipated to result in any significant social or economic impact on the previous landowner.

In due consideration of other ongoing/planned industrial developments/investments in the region and the local dynamics as well as the site-specific sensitivities, and with the ultimate objective of managing potential expectations of the local people through a transparent, fair and appropriate approach, Zorlu Jeotermal has

[6] The lands in the region are cultivated mainly for grazing and growing forage for the winter season. It is a common practice that in addition to public grazing lands (such as pastures), vacant and/or harvested lands are used by the landowners for grazing purposes until the winter season.

decided and commits to undertaking additional consultation meetings with the owner of the acquired parcel (102/25) in the upcoming phases of the Project upon approval of the SEP by the RSM partners and prior to land entry and start of mobilization at this parcel.

- **Land Acquisition Process for ZDM-2 and ZDM-6:**

Based on the outcomes of the well tests, the decision to continue with other well locations will be made. Therefore, land permitting process for the parcels 102/2 (legal entity – location of ZDM-2) and 102/12 (under Pasture Law – location of ZDM-6) will be carried out in parallel to the progress with the technical studies at ZDM-3.

In that case, Zorlu Jeotermal will obtain necessary land use permits from the relevant authorities for the Parcel no. 102/2 (legal entity – location of ZDM-2) and Parcel no. 102/12 (under Pasture Law – location of ZDM-6). If any private land is to be used depending on the outcomes of the well tests at ZDM-3, Zorlu Jeotermal will consider either lease of the land from the landowner(s) through execution of land lease agreements or purchase of the land on willing buyer-willing seller basis, and will make all the reasonable efforts to avoid or minimize (if avoidance is not possible) significant impacts on formal or informal land user(s), if there is any.

For both ZDM-2 (Parcel No. 102/2) and ZDM-6 (Parcel No. 102/12) well locations;

- As per the information provided by Zorlu Jeotermal, parcels are generally used by public for grazing purpose and sporadically used for agricultural purposes (to obtain forage/hay for winter) for a limited period of the year as the lands in the area are not favorable for agriculture/cultivation due to the harsh weather conditions of Agri province. As of August 2024, there are no agricultural activities on the parcels (please see Figure 2-4, Figure 2-5, and Figure 2-6 for current site photographs).
- There are no trees, buildings/structures or water sources on either well locations.

Once the decision to proceed with ZDM-2 and ZDM-6 is taken and the land acquisition process planned in detailed, the formal and informal users (for agriculture, animal husbandry, etc.) of the parcels to be affected, if any, will be identified through site surveys and consultations with users of the lands to be affected will be planned and carried out prior to land entry and mobilization to determine any potential social and economic impact. If any formal and/or informal users of the affected parcels are identified, they will be compensated for their assets on the land prior to start of any construction activities in line with the replacement cost requirements of OP 4.12 and compliant with the entitlements and principles defined in the WB Geothermal Development Project Resettlement Policy Framework (RPF) for the respective impact categories and ownership types. As such, in case there is permanent or temporary loss of income for the owners, or formal/ informal users of the affected land leading to economic displacement impacts, affected people will be provided with livelihood assistance (type of assistance will be determined according to the nature and scale of the impact in consultation with the affected people and in agreement with the TKYB/RSM Consultant. Compensation/ assistance will be provided to affected people before the start of any civil works in these locations.

In due consideration of other ongoing/planned industrial developments/investments in the region and the local dynamics as well as the site-specific sensitivities, and with the ultimate objective of managing potential expectations of the local people through a transparent, fair and appropriate approach, Zorlu Jeotermal has decided and commits to undertaking consultation meetings with the relevant stakeholder specified in SEP (i.e. owner(s)/shareholder(s) and formal and informal users (if any) in the upcoming phases of the Project upon approval of the SEP by the RSM partners and prior to land entry and start of mobilization at those parcels to be required for ZDM-2 and ZDM-6.

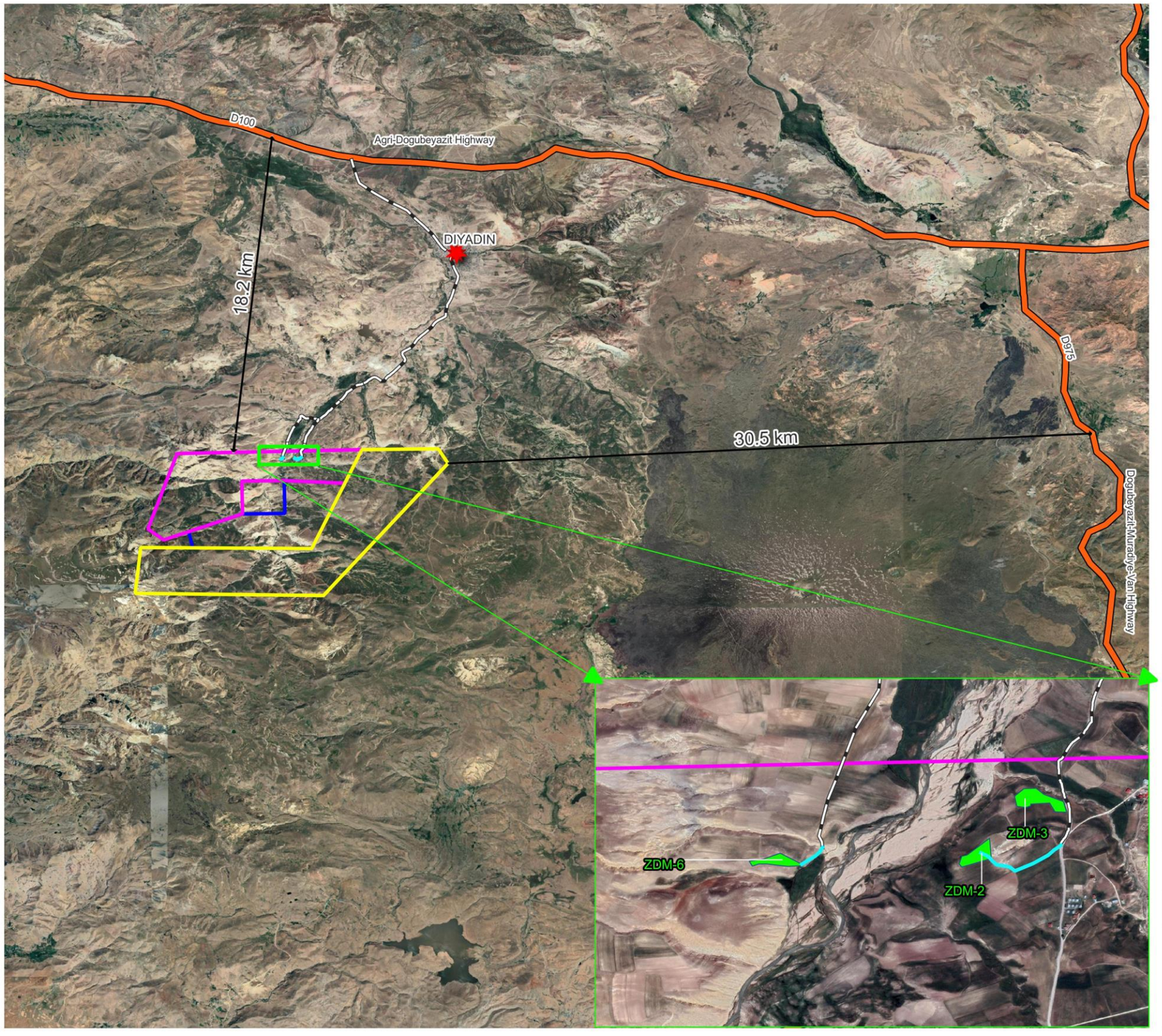
Zorlu Jeotermal commits to continuously record and regularly report to the RSM Unit the stages of the land acquisition process for ZDM-2 and ZDM-6 including engagements, consultations, agreements, efforts to avoid or minimize potential impacts on landowners and land users with evidential data and documents. Zorlu Jeotermal commits that once the decision to proceed with ZDM-2 and ZDM-6 is taken, the land acquisition requirements, consultation records and relevant measures/compensation strategies will be documented and shared with TKYB/RSM Consultant for their review/approval. No site work will start before the approval of TKYB/RSM Consultant on the land acquisition issues as per WB Geothermal Development Project Environmental and Social Management Framework (ESMF) requirements.

In addition, effective use of the Project Grievance Mechanism throughout the Project activities will allow identification and management of potential grievances (related to land take and other subjects) throughout the Project activities (from mobilization to closure) in accordance with the requirements of the applicable international standards as specified in the Project SEP.

2.4. Planning for Access Roads

The routes of the planned access roads to each well location considered as part of RSM are shown in Figure 2-7.

For both ZDM-2 and ZDM-6 well locations, the decision to proceed with drilling will be taken by the technical teams based on the test results to be obtained at ZDM-3. Thus, the final routes to be used to reach the ZDM-2 and ZDM-6 drilling sites will be determined in due course in consideration of the planned routes presented in Figure 2-7.



Legend

- Geothermal Resource Exploration License Area No. 36 / 36 Numaralı Jeotermal Kaynak Arama Ruhsat Alanı
- Geothermal Resource Exploration License Area No. 37 (Polygon-1) / 37 Numaralı Jeotermal Kaynak Arama Ruhsat Alanı (Poligon-1)
- Geothermal Resource Exploration License Area No. 37 (Polygon-2) / 37 Numaralı Jeotermal Kaynak Arama Ruhsat Alanı (Poligon-2)
- Highway / Anayol
- Existing Secondary Roads / Mevcut Tali Yollar
- Planned Access Roads / Planlanan Ulaşım Yolları
- District Centers / İlçe Merkezleri

GEM Sustainability Services and Consultancy Inc.

Project Name / *Proje Adı*	:	Geothermal Resource Exploration Project
Map Title / *Harita Başlığı*	:	Existing and Planned Road Infrastructure / *Mevcut ve Planlanan Yol Altyapısı*
Prepared for / *Proje Şirketi*	:	Zorlu Jeotermal Enerji Elektrrik Üretimi A.Ş.
Projected Coordinate System / *Projeksiyon Koordinat Sistemi*	:	ED 50 UTM Zone 38
Sheet Size / *Sayfa Boyutu*	:	A3

N

0 2.5 5 km

Basemap Source: Google Earth

Figure 2-7. Planned Access Roads to Well Locations

❖ Access to ZDM-3 Well Location

As can be seen, Parcel no. 102/25 **(ZDM-3)** is located next to an existing road. Access between the existing road and the drilling site will be provided through the boundaries of this acquired parcel. Thus, there will be no need for acquisition of additional parcels to provide access to ZDM-3 site.

Figure 2-8. Planned Access Route of ZDM-3 Well Location

❖ Access to ZDM-2 Well Location

The planned access road route for **ZDM-2** has been selected to follow the existing local roads to the extent possible with the objective of minimizing the land use and land take requirements. As shown in Figure 2-9 below, the following routes are used to access ZDM-2 well location:

- Existing secondary road (*tali yol*) will be used until the start of existing agricultural soil road at the eastern boundary of Parcel No. 102/15.
- Afterwards, the existing agricultural soil road passing between the boundaries of Parcel No. 102/15 and Parcel No. 102/16 will be used until the ZDM-2 well location.

Land use and ownership information of the parcels that are adjacent to the agricultural soil road to be used is provided in Table 2-7.

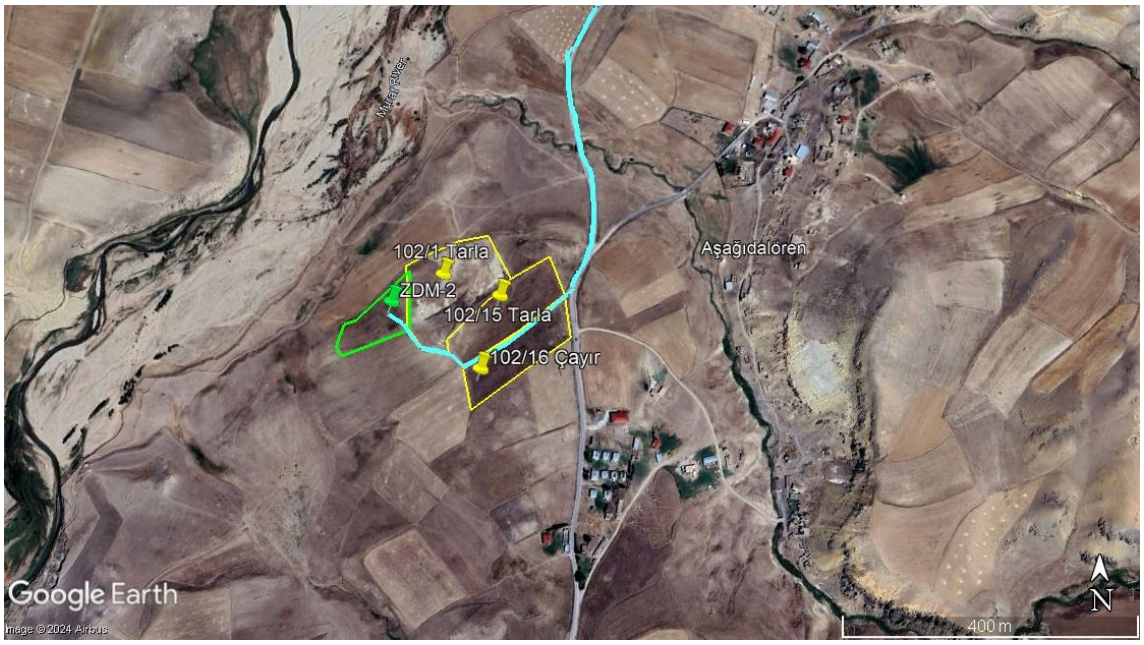


Figure 2-9. Planned Access Route of ZDM-2 Well Location

In case drilling is decided to be proceeded at ZDM-2 based on the test results of ZDM-3, soil road might be required to be expanded to ensure safe access of the drilling equipment to the well location.

- For the privately-owned parcels, the required permits to use the land will be obtained from relevant authorities and mutual agreements will be executed through consent letters based on market prices with the owner(s)/shareholder(s) for temporary use of lands for site access.
- For the non-registered state-owned parcels, relevant permits and land use rights will be obtained from the related authorities for temporary use of state-owned lands for site access.

Table 2-7. Land Use and Ownership information of the Neighboring Parcels (*)

Lot/Parcel	Ownership of the Parcel	Land Use Type (**)	Information on Land Use (as of August 2024)
102/1 (Asagidaloren Village)	To be confirmed by Zorlu	Agricultural land (*Tarla*)	As per the information provided by Zorlu Jeotermal, the lands in the area are generally used by public for grazing purposes. As of August 2024, there is no ongoing agricultural activity, standing agricultural crops, trees, buildings/structures or water sources on these parcels. The planned access route passes through an already existing agricultural soil road between the parcels. In case expansion on the road is required; - Zorlu Jeotermal will ensure that the least amount of land/area will be used as possible for the expansion. As the total area to be affected by any road expansion work would be very limited when compared to total parcel areas and the rest of the parcels (outside the access road) would remain accessible to any ongoing activities of the local users, the impact of any potential expansion work on the economic activities of any formal or informal user is anticipated to be insignificant. This said, road expansion works will only
102/15 (Asagidaloren Village)		Agricultural land (*Tarla*)	
102/16 (Asagidaloren Village)		Meadow (*Çayır*)	
Parcels to the south, southwest of the access road *As of January 2024, Lot/Parcel info for these parcels could not have been accessed through parsel sorgu.gov.tr*	State-owned	Non-registered	

			start after the following measures are implemented. - Once the decision to proceed with ZDM-2 is taken, the current status of formal and informal users (for agriculture, animal husbandry, etc.) of the respective parcels, if any, will be identified through site surveys and consultations with users of the lands to be affected, if any, will be planned and carried out prior to any road expansion activities to determine any potential social and economic impact. - Zorlu Jeotermal commits to continuously record and regularly report to the RSM Unit the stages of the land acquisition process for the access roads including engagements, consultations, agreements, efforts to avoid or minimize potential impacts on landowners and land users with evidential data and documents. - Zorlu Jeotermal commits that the land acquisition requirements, consultation records and relevant measures/compensation strategies will be documented and shared with TKYB/RSM Consultant for their review/approval. No site work will start before the approval of TKYB/RSM Consultant on the land acquisition issues as per WB Geothermal Development Project Environmental and Social Management Framework (ESMF) requirements.

(*) Available information regarding the parcels is presented in the Table and further information will be obtained in due course.

(**) Information on land use type given in this column is taken from Parcel Inquiry website (*parselsorgu.tkgm.gov.tr*)

❖ Access to ZDM-6 Well Location

The planned access road route for **ZDM-6** has been selected to follow the existing local roads to the extent possible with the objective of minimizing the land use and land take requirements. As shown in Figure 2-10, the following routes are used to access ZDM-6 well location:

- Existing secondary road (*tali yol*) will be used until the start of existing agricultural soil road at the northern boundary of Parcel No. 112/109.
- Afterwards, existing agricultural soil road passing through the boundaries of Parcel No. 112/109 and Parcel No. 102/21 will be used until the ZDM-6 well location.

Land use and ownership information of the parcels that the agricultural soil road passes through are provided in Table 2-8.

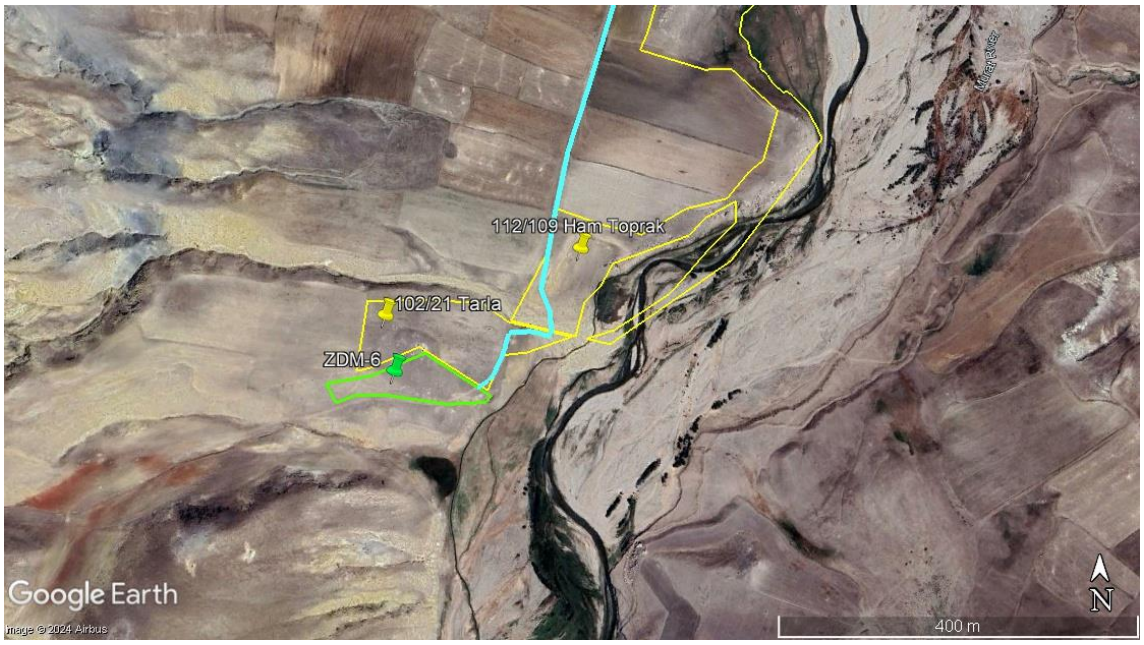


Figure 2-10. Planned Access Route of ZDM-6 Well Location

In case drilling is decided to be proceeded at ZDM-6 based on the test results of ZDM-3 and ZDM-2, soil road might be required to be expanded to ensure safe access of the drilling equipment to the well location.

- For the privately-owned parcel (Parcel No.102/21), the required permits to use the land will be obtained from relevant authorities and mutual agreements will be executed through consent letters on market prices with the owner(s)/shareholder(s) for temporary use of lands for site access.
- For the state-owned land, relevant permits and land use rights will be obtained from the related authorities for temporary use of treasury land for site access.

Table 2-8. Land Use and Ownership Information on the Parcels of which the Planned Access Route Passes Through

Lot/Parcel	Ownership of the Parcel	Land Use Type (*)	Information on Land Use (as of August 2024)
102/21 (Mollakara village)	Private-owner	Agricultural land (*Tarla*)	As per the information provided by Zorlu Jeotermal, the lands in the area are generally used by public for grazing purposes. As of August 2024, there is no ongoing agricultural activity, standing agricultural crops, trees, buildings/structures or water sources on these parcels. In case expansion is required; - Zorlu Jeotermal will ensure that the least amount of land/area will be used as possible for the expansion. As the total area to be affected by any road expansion work would be miniscule when compared to total parcel areas and the rest of the parcels (outside the access road) would remain accessible to any ongoing activities of the local users. Therefore, the impact of any potential expansion work on the economic activities of any formal or informal user is anticipated to be insignificant. This said, road expansion works will only start after the following measures are implemented. - Once the decision to proceed with ZDM-6 is taken, the current status of formal and informal users (for agriculture, animal husbandry, etc.)
112/109 (Ulukent village)	State owned (treasury parcel)	Raw soil (*Ham Toprak)*	

			of the respective parcels, if any, will be identified through site surveys and consultations with users of the lands to be affected, if any, will be planned and carried out prior to any road expansion activities to determine any potential social and economic impact. - Zorlu Jeotermal commits to continuously record and regularly report to the RSM Unit the stages of the land acquisition process for the access roads including engagements, consultations, agreements, efforts to avoid or minimize potential impacts on landowners and land users with evidential data and documents. - Zorlu Jeotermal commits that the land acquisition requirements, consultation records and relevant measures/compensation strategies will be documented and shared with TKYB/RSM Consultant for their review/approval. No site work will start before the approval of TKYB/RSM Consultant on the land acquisition issues as per WB Geothermal Development Project Environmental and Social Management Framework (ESMF) requirements. -

(*) Information on land use type given in this column is taken from Parcel Inquiry website (*parselsorgu.tkgm.gov.tr*)

Once the decision to proceed with ZDM-2 and ZDM-6 is taken and the land acquisition process planning in detailed, the formal and informal users (for agriculture, animal husbandry, etc.) of the affected parcels, if any, will be identified through site surveys during route studies and consultations with users of the lands to be affected for access road construction and/or expansion will be planned and carried out prior to land entry and mobilization to determine any potential social and economic impact, in a similar approach to the consultations to be held for ZDM-2 and ZDM-6 drilling locations (described above under Chapter 2.3 ("*Land Acquisition Process for Drilling Locations*").

Zorlu Jeotermal will make all the reasonable efforts to avoid significant impacts on any formal or informal land user(s) that may stem from access road construction. In case impacts on the livelihoods of the land users (if any) are identified during the access route finalization studies (such as loss of products, trees and structures/outbuildings, impact on water resources, restriction of access to lands, etc.), necessary measures will be planned and taken by Zorlu Jeotermal to minimize and compensate the impacts in consultation with the affected people.

Zorlu Jeotermal commits to continuously record and regularly report to the RSM Unit the stages of the land acquisition process for access roads reaching to ZDM-2 and ZDM-6 including engagements, consultations, agreements, efforts to avoid or minimize potential impacts on landowners and users with evidential data and documents.

In addition, effective use of the Project Grievance Mechanism throughout the Project activities will allow identification and management of potential grievances (related to land take and other subjects) throughout the Project activities (from mobilization to closure) in accordance with the requirements of the applicable international standards as specified in the Project SEP.

2.5. Project Activities and Components

Prior to any drilling, earthworks will be conducted at each well area within the scope of site preparation. As all wells are located close to existing roads, limited access road construction will be required during earthworks and site preparation, except for the roads to be located directly on the drill sites. The topsoil will be removed during this stage and stored in appropriate topsoil storage areas for use in site rehabilitation afterwards. Following earthworks, gravel will be laid and compacted on the entire drill site for drill equipment to be installed on.

The Project units, facilities and equipment that will be present temporarily at each drilling site throughout the Project operations are listed below and an indicative layout is given in the Figure 2-12.

- Drilling equipment
- Mud circulation system

  Mud circulation system, which will be located on the concrete area, consists of shale shakers, mud tanks, hopper system, mud cleaner system (including desander and desilter), mud cooling tower, mud pumps and preparation tanks.
- Two (2) mud pits:

  Two mud pits will be established at each drilling site for storing excess mud, cuttings generated from drilling activities, and other waste material. The mud stored in the mud pits will not be re-circulated from this mud pit into the system.

  The first mud pit will be used as the main pit under normal operating conditions. As reported in the PIF, the main mud pit will have a total volume of 1,575 m^3 (with the dimensions of 35 m x 15 m x 3 m having a surface area of 525 m^2). As detailed in the remainder of this section, the volume of the main mud pit is adequate to store excess mud, cuttings, geothermal fluid, and other waste material generated during the Project activities.

  The secondary mud pit has been designed as an emergency storage unit having identical dimension with the main pit, which would only be used when the capacity of the main mud pit becomes full under other than normal operating conditions (e.g. in case of emergencies, etc.).

  For stability purposes, the main and secondary mud pits have been designed as two separate units connected through pipelines at three connection locations. Both mud pits will be located at the same elevation. As the capacity of the main mud pit becomes full, the fluids in the main mud pit would overflow into the secondary mud pit. Figure 2-11 below provides the top and side view layouts of the mud pits system.

  Each mud pit will be lined with clay layer and geomembrane liner at the bottom and on the slopes to ensure impermeability and to avoid any leakages that may impact soil and groundwater resources.
- Camp site with on-site accommodation units, offices, and sanitary facilities
- Drainage facilities around the drilling site and the mud pits
- Chemical storage area
- Water tanks (55 m^3 capacity tank to store water to be used for the drilling operations and 10 m^3 capacity tank to store water to be used for the requirements of the Project personnel-other than drinking water purposes)
- Temporary waste storage area
- Septic tank
- Blowout preventer systems
- Gas (H_2S) detectors
- Security facilities (security gate, fences around the drilling site, fences around the mud pits, CCTV system that will be in operation for 24 hours)

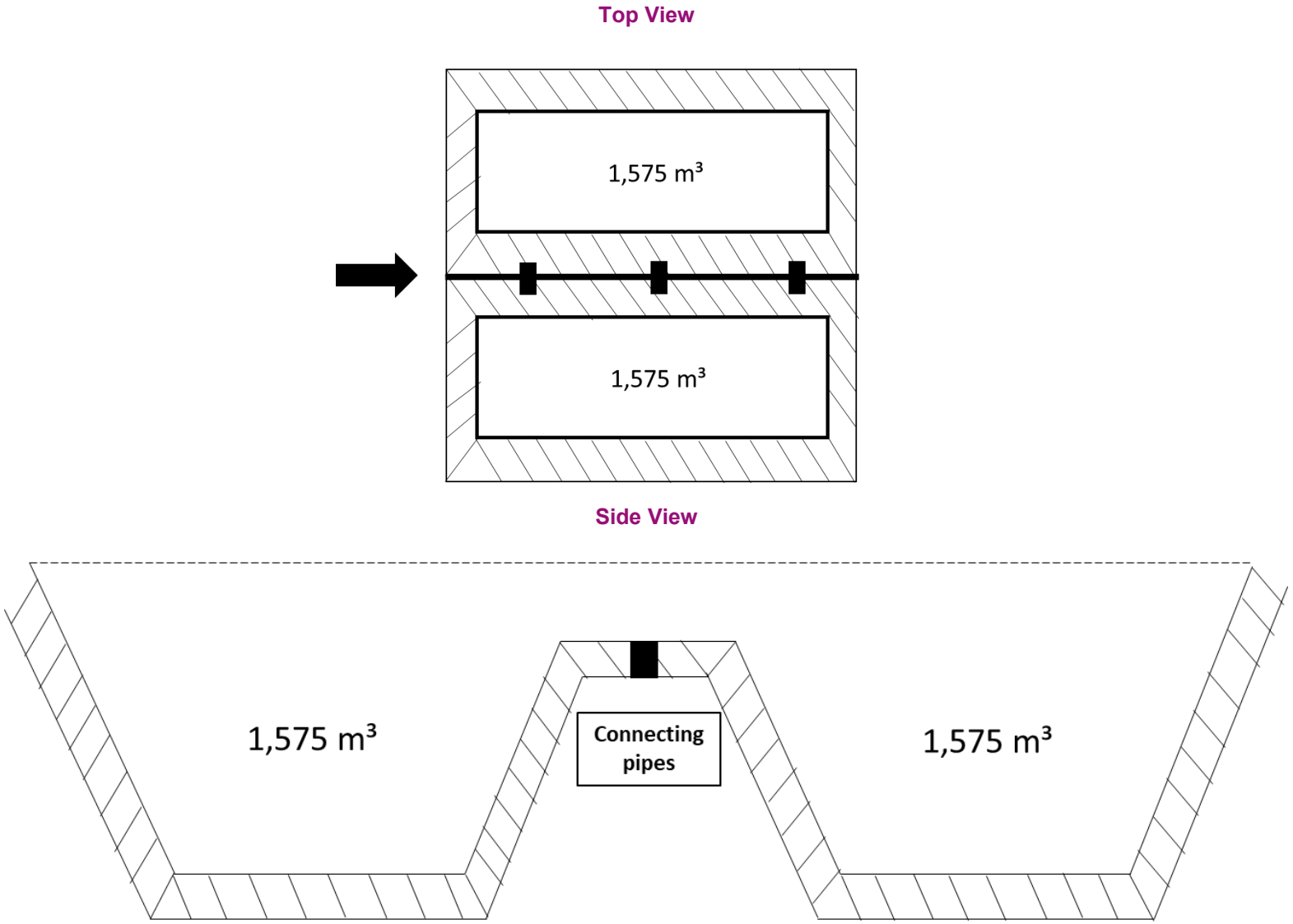


Figure 2-11. Top and Side Views of Mud Pits

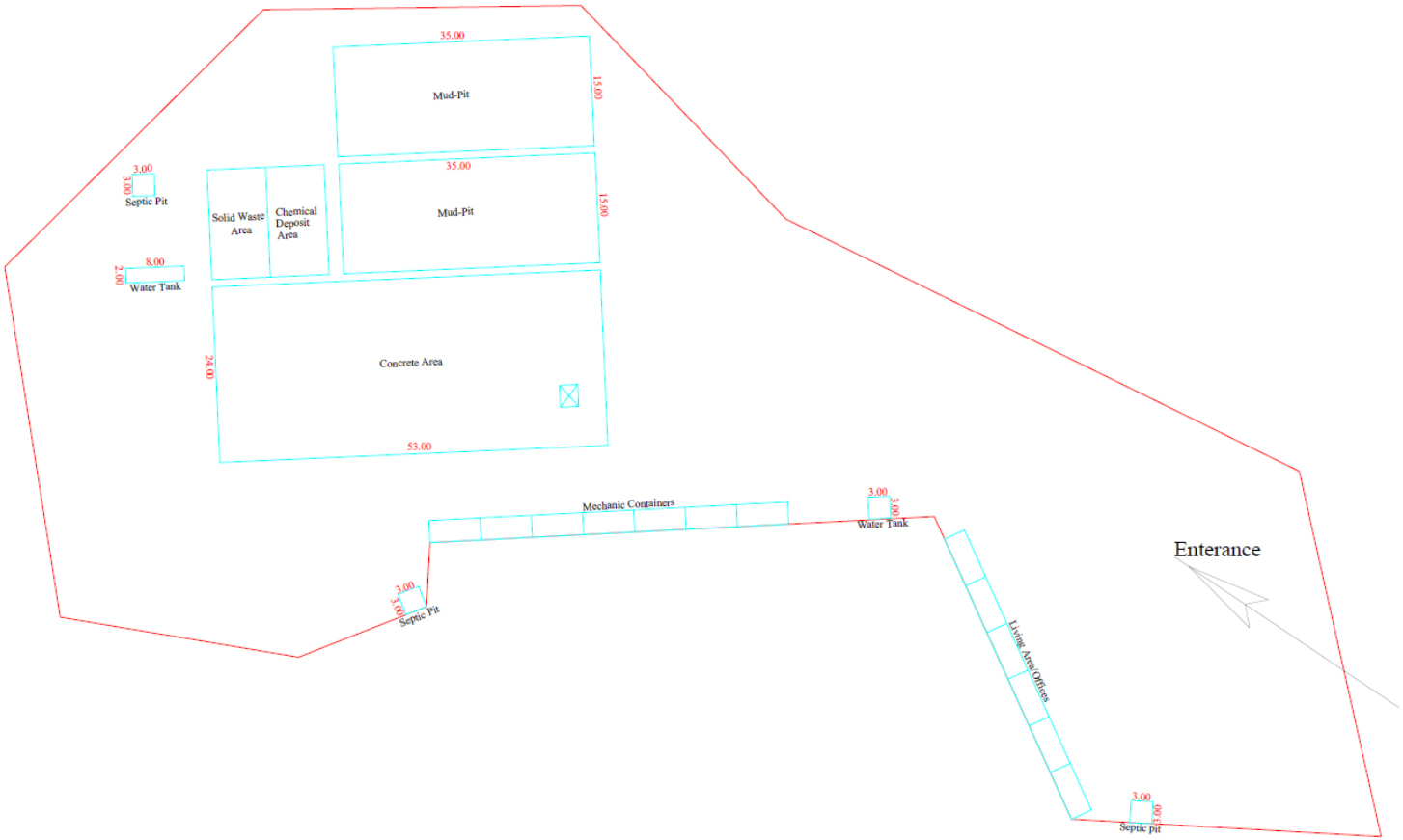


Figure 2-12. Well Location Plan for ZDM-3[7]

[7] Based on the outcomes of the well tests at ZDM-3, the decision to continue with other planned well locations (ZDM-2 and ZDM-6) will be made. Therefore, the layouts for the other 2 well locations have not been prepared yet. Zorlu Jeotermal will prepare and priorly submit the layout for these 2 wells to the RSM Unit for approval before commencing drilling activities at these wells.

- **Drilling Operations:**

Following earthworks and site preparation, geothermal exploration drillings will be initiated to identify a geothermal resource suitable for energy generation. Exploration well depths will range between 2,000-2,500 m. Rotary drilling will be used as the drilling method:

- 26'' wellhead (0-150 m)
- 17 ½'' wellhead (150-500 m)
- 12 ¼'' wellhead (500-1,250 m)
- 8 ½'' wellhead (1,250-2,500 m)

As per the information provided by Zorlu Jeotermal, the volume of each well to be drilled is planned as 198 m^3. After the placement of casing and filling of the annular space with cement, the total liquid well volume of each well will be approximately 114 m^3.

As per the drilling program provided by Zorlu Jeotermal in Q2 2024, the drilling activities will start at ZDM-3. The drilling of each well is expected to take approximately 3 months. Drilling activities are planned to be conducted for 7 days and 24 hours of work per day. The Project personnel will work in 12-hour shifts.

The expected well cross sections of ZDM-3, ZDM-2 and ZDM-6 as provided in the technical reports is given below:

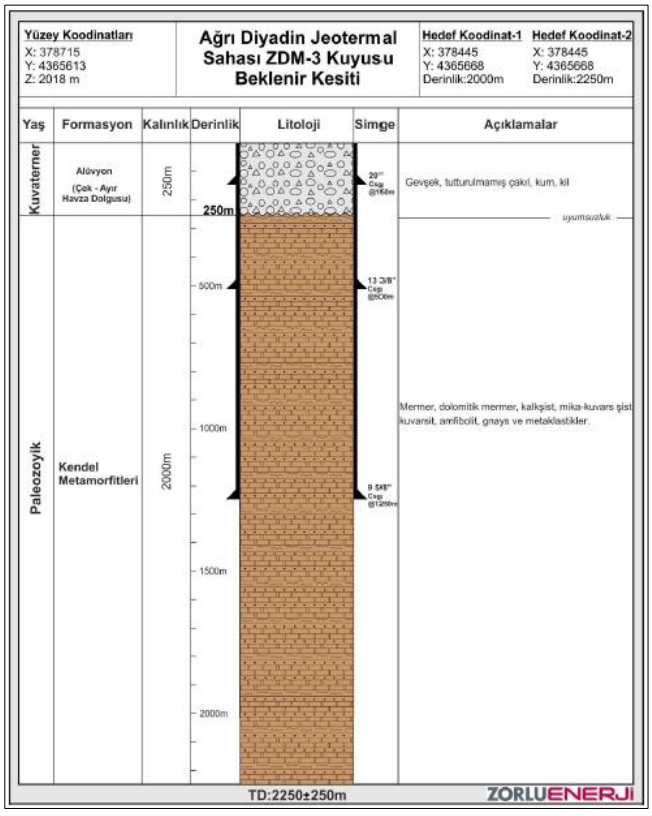


Figure 2-13. Expected Well Cross Section of ZDM-3

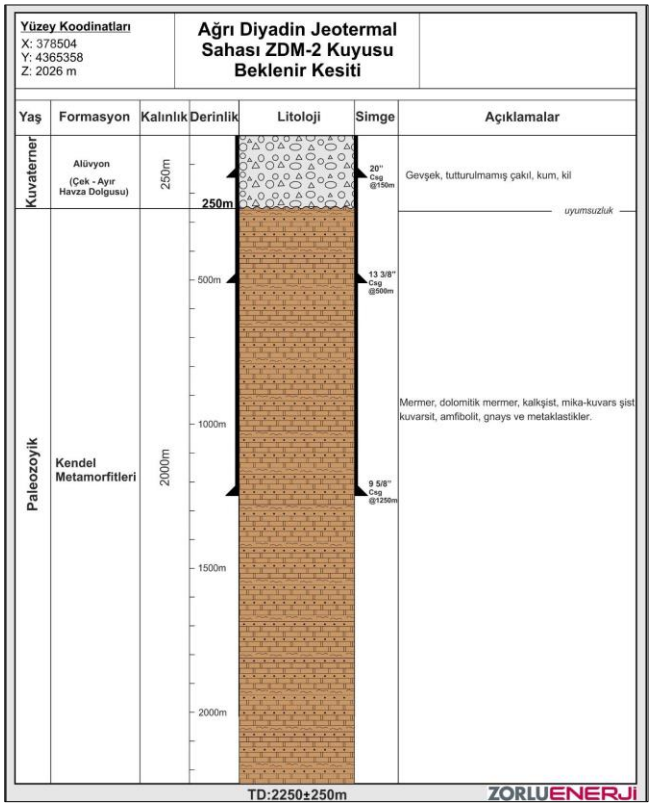


Figure 2-14. Expected Well Cross Section of ZDM-2

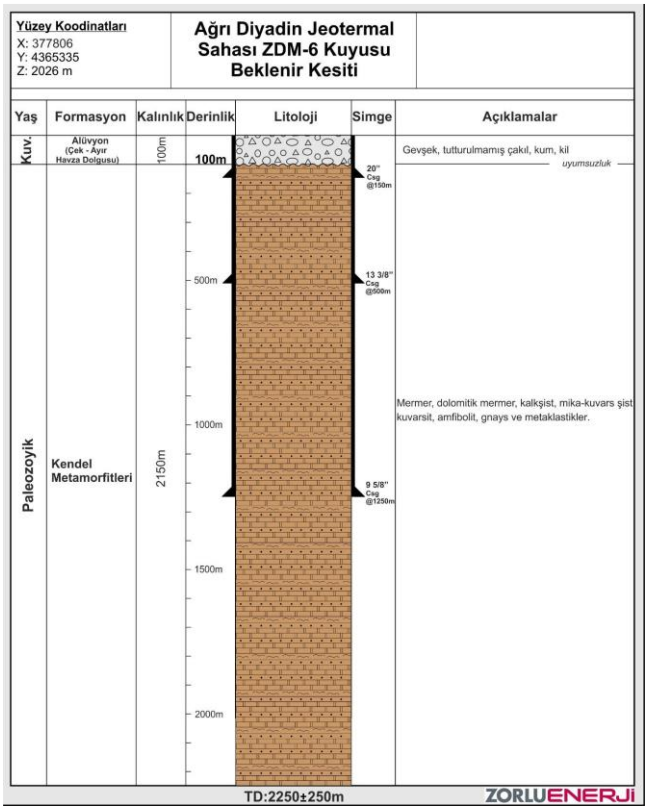


Figure 2-15. Expected Well Cross Section of ZDM-6

During the well drilling operations at the exploration stage, **drilling fluid**, prepared using waterbased polymer (bentonite), will be fed into the well, which is approximately 158 m^3 as estimated by Zorlu Jeotermal. This fluid will ensure that the solid particles inside the well **(cuttings)** are thrown out, drilling equipment is cooled down and the pressure in the well is kept under control throughout the drilling operations. Depending on the site conditions, other chemical additives such as barium sulfate (barite), calcium carbonate, lignosulfonate, etc. can be added to the drilling fluid.

The water-based drilling fluid is pumped into the well from the wellhead and comes out as **drilling mud**. This drilling mud, containing the cuttings mixed with returning drilling fluid, is then passed through mud cleaner system (shale shakers, desilter and desander) separating the solid particles from the fluid. Then, this waste solid section of the drilling mud is sent to the **mud pit(s)** for temporary storage until being sent to disposal (through licensed companies or municipality trucks depending on the analysis results) prior to start of testing operations. The under-sieve fluid will be circulated back to the wellhead and reused to minimize fresh water and polymer use throughout the drilling process **(circulating drilling fluid)**.

As estimated by Zorlu Jeotermal, the total amount of waste drilling mud (cuttings and the returning drilling fluid) will be approximately equal to the total volume of the well that is 198 m^3.

In addition to the waste drilling mud volume, 60 m^3 of water per well will be used for cleaning of the drilling site.

According to Article 4 of the Circular on the Disposal of Drilling Mud and Wastes Generated from the Physical Treatment of Chromium Mine[8] (dated 4 July 2012 and numbered 8865) of the General Directorate of Environmental Management of Ministry of Environment, Urbanizaiton and Climate Change (MoEUCC), "*Drilling mud can be disposed of in the mud pit prepared for the purpose of circulating the drilling mud and settling the debris from drilling. In this context, the volume of the mud pit must be at least 2 times the volume of the drilled well*." As indicated earlier, one of the mud pits will have a volume of 1,575 m^3 which will be approximately 8 times the total well volume of 198 m^3 and there will be two (2) mud pits established for the Project. Thus, this will be adequate to meet the requirements of the Circular.

Accordingly, as estimated by Zorlu Jeotermal, the maximum volume of waste drilling mud (including the cuttings) and fluid mixture that will be generated during the drilling operations and will be temporarily stored in the mud pit(s) is anticipated as:

- Waste drilling mud (cuttings and the returning drilling fluid) which is approximately equal to the total volume of the well, 198 m^3
- Mud (liquid) used for mud reclamation activities, 70 m^3
- Cleaning water to be used for the cleaning of the drilling area, 60 m^3

Therefore, the total amount of waste mud and fluid mixture that will be sent to the mud pit(s) will be approximately 328 m^3.

After setting the production casing, water will be pumped into the drilling well – **completion fluid-** which will be equal to the liquid well volume, 114 m^3. The drilling mud in the well will be displaced with completion fluid before the well testing operations therefore, there will be no drilling mud in the well. This 114 m^2 drilling mud will be sent into the mud pit.

Thus, the total amount of waste mud, fluid mixture and drilling mud displaced with the completion fluid is estimated to be 442 m^3, which is approximately 28% of the total volume of a one (1) mud pit (assuming no loss/evaporation). Within the mud pit(s), the heavier solid parts within the mud will rapidly settle down and there will be a mixed layer of mud (slow settling part) and water on top of the bottom mud layer.

Before starting the testing process in the next stage, the drilling mud accumulated at the bottom of the pit(s) and the mixed fluid layer (mud-water) on top of the mud layer will be sent to disposal separately by licensed vacuum trucks that have suitable features to transfer materials with different density levels (based on the

[8] https://webdosya.csb.gov.tr/db/turkce/mevzuat/mevzuat604.PDF

experience of Zorlu Jeotermal in other projects)[9]. Following completion of the drilling activities, the content of the mud pit will be analysed to identify its hazardousness and based on the test results the content will be disposed of by licensed firms. Zorlu Jeotermal will contractually require the drilling contractor to procure services from laboratories accredited to identify the hazardousness properties of the materials and dispose of the accumulated materials (mud and fluid mixture part) in accordance with the applicable requirements of Waste Management Regulation. Zorlu Jeotermal will monitor the process based on review of relevant disposal documentation and consultation with the responsible staff of the drilling contractor (i.e. management staff, EHS expert) to verify that the disposal practices are fully aligned with the requirements of national legislation and good international industry practices.

The mud pits will have a secondary fence (in addition to the fences to be constructed around each drill site) to ensure increased occupational and community health and safety. Drainage measures including drainage channels and high edges for the mud pits will be in place to avoid any surface run-off to enter into the mud pits. The waste drilling mud and waste cutting, and debris disposal is subject to approval of the RSM Unit and each stage of the disposal process such as the analysis, disposal methods, disposal firms' selection, transportation methods and others will be coordinated with the RSM Unit for a compliant, feasible and efficient disposal. It is the Zorlu Jeotermal's responsibility to act in accordance with the project requirements indicated here in this ESMP and in the scope of the Legal Framework during the disposal process whether or not the responsibility is attributed to the any contractor by the Zorlu Jeotermal.

At the end of disposal process, the mud pit(s) will be ready for storage of geothermal fluids that will come out as a result of the subsequent well testing stage nearly at full storage capacity.

In the worst-case scenario where the capacity of the mud pit(s) becomes insufficient to store waste drilling mud and wastewater or in case of emergencies, another nearby well's mud pits can be utilized where available. In such a case, transfer can be carried out without any leakage using interlocking clamped pipes[10]. Additionally, Zorlu Jeotermal will also require the contractor to be hired to dispose of the mud pits to provide an extra storage tank at the site throughout the exploration phase (drilling activities and well testing operations), which would be used to divert the fluids and waste mud in case of an emergency capacity. In such emergency cases, Zorlu Jeotermal will take necessary actions immediately to intervene and stop the drilling operations.

During the drilling operations, blowout preventer systems (BOP) will be installed to ensure control of potential well blowouts and safety. The primary use of this system is to seal the well, preventing uncontrolled flow or blowout of formation fluids. Portable H_2S detectors and fixed gas detectors are also going to be used to detect any potential sudden increase in gas leaks to notify the workers. The detectors are going to be checked for control and maintenance purposes by Zorlu Jeotermal.

- **Well Testing Operations:**

Once the drilling operations have been completed and waste drilling mud and wastewater which is temporarily stored in the mud pit(s) have been disposed of fully as described in the previous sub-heading, well testing process will be carried out to determine the characteristics of the geothermal source.

The testing period is anticipated to last for 8-10 hours in total within a period of 1-3 days.

In the first stages of the test operations, after the pumping of completion fluid, a mixture of both geothermal fluid and completion fluid will be resurfacing and after a while, **only geothermal fluid will be generated**.

Assuming an average flow rate of 100 m^3/hour during the testing period, approximately 1,000 m^3 **geothermal fluid** will be generated. As explained above, this 1,000 m3 also includes the completion fluid used at the start of the test operations.

[9] It should be noted that as Zorlu Jeotermal envisages conducting the drilling operations outside of the winter season taking into consideration potential operational challenges, evaporation is anticipated to be a factor that will help reduce the volume of fluid to be disposed of.
[10] Zorlu Jeotermal commits to inform the RSM Unit about its planning together with reports and data presenting the case resulting in such an event. In the event of planning of such a pipe use for transportation of the mud, the environmental and social risks and impacts should be assessed and reported along with the permits taken and measures to avoid/minimize the impacts. The assessment should also consider the land use/acquisition-based impacts clearly. Without approval of the RSM Unit, the piping system should not be established.

The generated geothermal fluid will be transferred to the mud pit(s) (fully emptied upon completion of drilling operations held in the former stage). This geothermal fluid will be coming directly from the geothermal resource and will not include any unnatural chemicals or additives.

The volume of two (2) mud pits (both mud pits will have almost 1,575 m^3 after disposal of drilling mud prior to start of testing operations) will be adequate to store the geothermal fluid to be generated (1,000 m^3, including the completion fluid) during the testing process, hence there will be no geothermal fluid discharge to the receiving environment at any stage of the well testing operations or afterwards.

Geothermal fluid is anticipated to evaporate largely right after it is transferred to the mud pit. Following the completion of the well testing operations, any material remaining within the mud pit will be analyzed for hazardousness by an accredited laboratory to be retained by the drilling contractor as per the conditions of the drilling contract and disposed of by licensed disposal firms as per the relevant provisions of the Waste Management Regulation.

The disposal of liquid or material contained in the mud pit(s) during the test operations is subject to approval of the RSM Unit and each stage of the disposal process such as the analysis, disposal methods, disposal firms' selection, transportation methods and others will be coordinated with the RSM Unit for a compliant, feasible and efficient disposal. It is the Zorlu Jeotermal's responsibility to act in accordance with the project requirements indicated here in this ESMP and in the scope of the Legal Framework during the disposal process whether or not the responsibility is attributed to the any contractor by the Zorlu Jeotermal.

In the worst-case scenario where the capacity of the mud pit(s) becomes insufficient to store geothermal fluid during testing operations or in case of emergencies), another nearby well's mud pit(s) can be utilized where available. In such a case, transfer can be carried out without any leakage using interlocking clamped pipes[11]. Additionally, Zorlu Jeotermal will also require the contractor to be hired to dispose of the mud pit(s) to provide an extra storage tank at the site throughout the exploration phase (drilling activities and well testing operations), which would be used to divert the fluids and materials in case of an emergency where the mud pit(s) cannot provide for sufficient storage capacity to accommodate all fluids and settled solid materials if any. In such emergency cases, Zorlu Jeotermal will take necessary actions immediately to intervene and stop the well testing operations to cut off the fluid flow.

Portable H_2S detectors and fixed gas detectors are also going to be used to detect any potential sudden increase in gas leaks to notify the workers. The detectors are going to be checked for control and maintenance purposes by Zorlu Jeotermal.

- **Closure and Land Rehabilitation Activities**

Following testing, the boreholes will be closed with control vanes and appropriate capping. The containers used for the Project will be removed together with the drilling rig. The removal of the concrete area will be decided by Zorlu Jeotermal, the concrete area may be kept to be used in other operations after the Exploration Project, if preferred. The mud pits will be filled and closed after allowing the geothermal fluid to evaporate and disposal of the remaining material in the mud pits, if there is any. Geomembrane liner used at the bottom and the slopes of the mud pit(s) are disposed of as per the national legislation. The septic tank will be emptied by licensed vacuum trucks and the emptied septic tank will be removed from the site for disposal or to be used for another operation of Zorlu Jeotermal. The waste stored in the waste storage area will also be disposed of by the licensed companies and the waste storage area and chemical deposit site will be removed and restored back. The disturbed sites will be restored and rehabilitated.

[11] Zorlu Jeotermal commits to inform the RSM Unit about its planning together with reports and data presenting the case resulting in such an event. In the event of planning of such a pipe use for transportation of the mud, the environmental and social risks and impacts should be assessed and reported along with the permits taken and measures to avoid/minimize the impacts. The assessment should also consider the land use/acquisition-based impacts clearly. Without approval of the RSM Unit, the piping system should not be established.

2.6. Project Water Requirements

Water will be mainly required for the following throughout the Project:

- Drinking and potable water requirements of the personnel: Water requirement of the personnel to be employed at land preparation and exploration stages of the Project will be approximately 4.35 m^3/day for 15 personnel. Drinking water will be procured from permitted local bottled water suppliers.
- Water required for dust suppression: During the land preparation stage including rehabilitation and construction of access roads, in order to reduce the dust that may occur in drilling well areas, water spraying will be done. The water spraying amount is anticipated to be on average 5 m^3 per day.
- Water required during drilling and well testing operations: The total amount of water required for the drilling and well testing operations will be approximately 402 m^3 with the breakdown of;
    - preparation of drilling fluid (158 m^3 as estimated by Zorlu Jeotermal, including approximately liquid well volume and losses in the circulation system),
    - mud reclamation activities (70 m^3),
    - water required for cleaning operations (60 m^3), and
    - completion fluid (114 m^3).

    Water required during the drilling and well testing operations will be transported to the site by water tankers (water trucks) from nearby suppliers.
- During the preparation of the site for drilling and testing operations, the required concrete will be procured from licensed third-party suppliers. Hence, there will be no on-site concrete production or water consumption associated with such a process.

Water to be required in this context (except drinking water) will be procured from local suppliers approved by the Diyadin Municipality. Water transported to the site by water tankers (water trucks) will be stored in water tanks (Figure 2-12. Well Location Plan for ZDM-3). One of the water tanks (with a capacity of 55 m^3) will be used to store water to be used for the drilling operations and the second water tank (with a capacity of 10 m^3) will be used for the requirements of the living areas/offices. During the start of the operations, the water delivered to the site to be used for drilling operations will also be stored in mud preparation tanks as they will be empty at this stage. No groundwater or surface water resource will be utilized for any of the activities to be conducted as part of the Project.

Domestic water requirements of the Project personnel (water other than drinking water – water to be used for food preparation or for personal hygiene) will be provided from local water suppliers which are permitted to supply water in line with the Regulation on Water Intended for Human Consumption. Water will be transported to the site by water tankers (water trucks) and stored in an adequate water tank with a capacity of 10 m^3.

Water for dust suppression and drilling and well testing activities will be supplied from local water suppliers approved by the Diyadin Municipality. Water will be transported to the site by water tankers (water trucks) and stored in a water tank with a capacity of 55 m^3. Additionally, at the start of the operations, the water delivered to the site can also be stored in mud preparation tanks to be used in the operations as they will be empty at this stage.

Therefore, no groundwater or surface water resource will be utilized for any of the activities to be conducted as part of the Project.

2.7. Machinery and Equipment Use

As per the PIF, during the land preparation and exploration phases of the Project, the vehicles/equipment to be used are listed as one (1) bulldozer, two (2) trucks, one (1) mud pump, one (1) generator, one (1) drilling machine and one (1) water tanker. Also, during the land preparation phase, only the construction machinery will be used. There will be no blasting operation that may require use of flammable or explosive materials or that may cause blasting-related vibration.

The electricity to be required for the operation of drilling machinery and equipment, and at other site facilities will be provided through generators. Fuel (diesel) for the generator will be provided from the licensed fuel suppliers operating in the region.

2.8. Project Workforce

Within the scope of the Project, following personnel will be employed full time at each drill site:

- 2 geological engineers (employed by Zorlu Jeotermal)
- 4 drilling engineers (2 employed by Zorlu Jeotermal and 2 employed by the drilling contractor)
- 1 ESHS expert (contracted by Zorlu Jeotermal) (the specialists contracted by OHS services are excluded)
- 1 HSE expert (employed by the drilling contractor)
- 30 workers (all employed by the drilling contractor)

The Corporate Sustainability Department will also play an active role in management of E&S risks and impacts of the site activities through the guidance and support to be provided to the site personnel and by involving in the key decision-making processes of the Project as needed. They will review corrective E&S actions periodically and receive regular reports on the Project's E&S performance on-site.

Accommodation will be provided on-site for the entire workforce, including catering services that will be provided by the drilling contractor. In addition to drilling personnel, experts to deal with E&S aspects will be employed at each well-site. An HSE expert will be employed by the drilling contractor (either directly or through an OHS consultancy firm), and an ESHS expert will be employed by Zorlu Jeotermal (through a consultancy firm).

The number of containers and the extent of personnel to be accommodated on-site will be determined upon selection of the drilling contractor in the upcoming phases of the Project.

It is planned that the drilling contractor will also be doing the land preparation activities. The contractor to be employed for the activities will be notified clearly on its requirements about E&S aspects and the contracts of the contractors to be selected will be used as a binding document including E&S requirements, E&S documents and binding clauses.

Security personnel will also be employed by the drilling contractor during the entire timeframe of ongoing works at each well site. The security personnel will be employed from the local, as a local person would be highly informed about the community sensitivities, which contributes to the prevention of potential conflicts. The security arrangements will follow the applicable national legislation, principles of proportionality and good international practice in relation to hiring, rules of conduct, training, equipping, and monitoring of the security workers. The security personnel will not be armed. Zorlu Jeotermal will make reasonable inquiries to ensure that those providing security are not implicated in past abuses; are adequately trained in the use of force, and appropriate conduct toward workers and affected communities.

As long as the necessary skill set is available at the local level, Zorlu Jeotermal will consider local employment apart from the security guard.

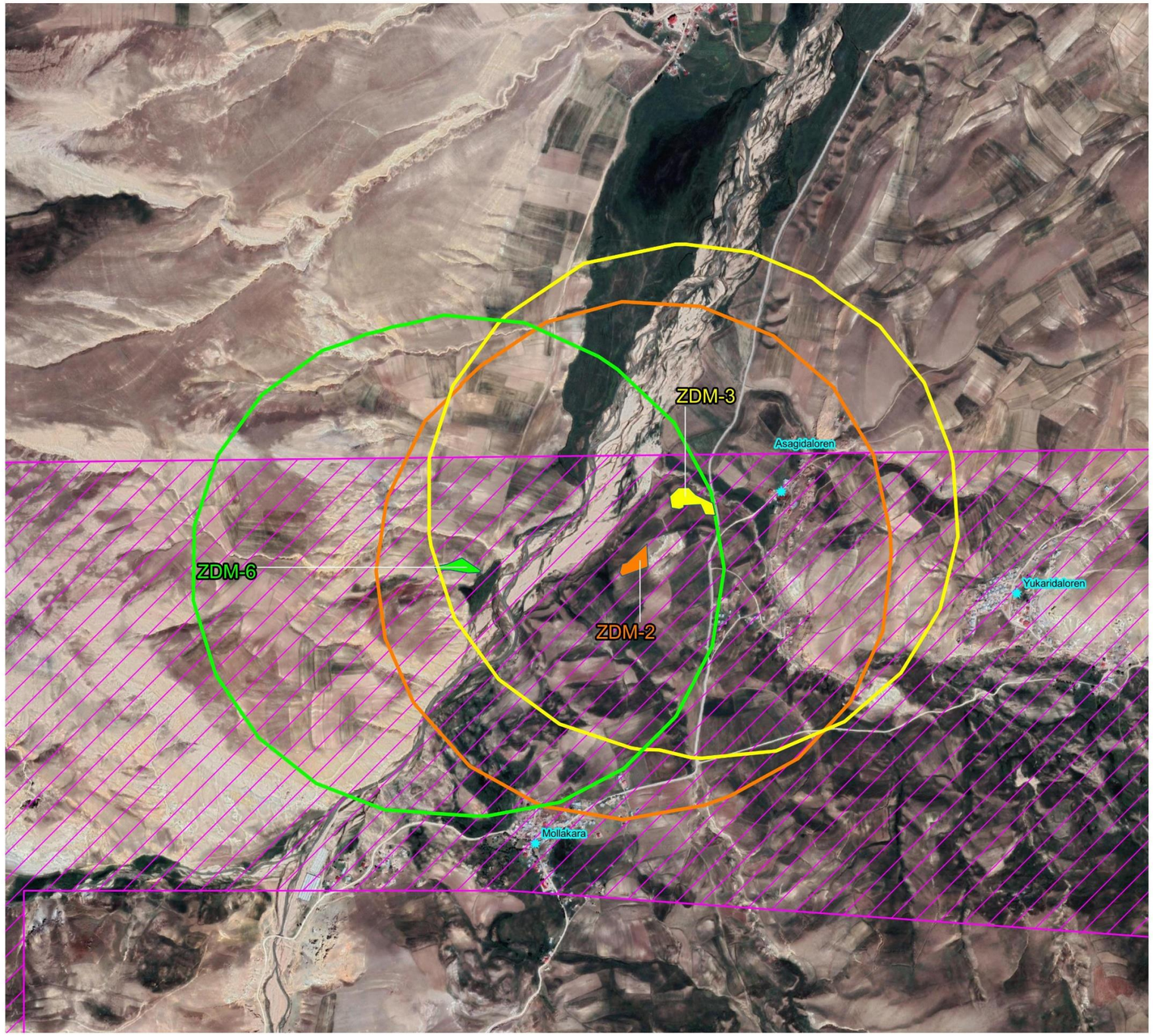
2.9. Project Area of Influence

The World Bank OP 4.01 – Annex A defines the Project Area of Influence (AoI) as; *"…the area likely to be affected by the project, including all its ancillary aspects, such as power transmission corridors, pipelines, canals, tunnels, relocation and access roads, borrow and disposal areas, and construction camps, as well as unplanned developments induced by the project (e.g., spontaneous settlement, logging, or shifting agriculture along access roads). The area of influence may include, for example, (a) the watershed within which the project is located; (b) any affected estuary and coastal zone; (c) off-site areas required for resettlement or compensatory tracts; (d) the airshed (e.g., where airborne pollution such as smoke or dust may enter or leave the area of influence; (e) migratory routes of humans, wildlife, or fish, particularly where they relate to public health, economic activities, or environmental conservation; and (f) areas used for livelihood activities (hunting, fishing, grazing, gathering, agriculture, etc.) or religious or ceremonial purposes of a customary nature*".

As per the OP 4.01, "Environmental Assessment (EA) is a process whose breadth, depth, and type of analysis depend on the nature, scale, and potential environmental impact of the proposed project" and that "EA evaluates a project's potential environmental risks and impacts in its AoI".

For the purpose of this ESMP, the Project AoI is defined as 1 km radius around the three (3) exploration well locations considering the following (Figure 2-16):

- PIF identified that the calculated noise levels will meet the noise limit values defined by the World Bank Group General EHS Guidelines for daytime (55 dBA) when the distance is between 300-350 m and for night-time (45 dBA) between 850-900 m.
- The closest registered archaeological/cultural heritage site in the vicinity of three (3) exploration wells is Yukaridaloren Village Residential Area which is 1.3 km from ZDM-3.
- The closest legally protected area to the three (3) exploration wells is Sustainable Conservation and Controlled Use Area, which is 6.9 km to the southwest of ZDM-3.
- The closest KBA to the three (3) exploration wells is Tendurek Mountain KBA, which is 12 km to the west of ZDM-3.



Legend

- Geothermal Resource Exploration License Area No. 37 (Polygon-1) / 37 Numaralı Jeotermal Kaynak Arama Ruhsat Alanı (Poligon-1)
- Area of Influence for ZDM-2 Geothermal Resource Exploration Drilling Areas (1 km radius)
- Area of Influence for ZDM-3 Geothermal Resource Exploration Drilling Areas (1 km radius)
- Area of Influence for ZDM-6 Geothermal Resource Exploration Drilling Areas (1 km radius)
- Village Centers / Köy Merkezleri

GEM Sustainability Services and Consultancy Inc.

Project Name / *Proje Adı*	: Geothermal Resource Exploration Project
Map Title / *Harita Başlığı*	: Area of Influence / *Etki Alanı*
Prepared for / *Proje Şirketi*	: Zorlu Jeotermal Enerji Elektrrik Üretimi A.Ş.
Projected Coordinate System / *Projeksiyon Koordinat Sistemi*	: ED 50 UTM Zone 38
Sheet Size / *Sayfa Boyutu*	: A3

N

0 0.25 0.5 km

Basemap Source: Google Earth

Figure 2-16. Area of Influence (AOI) of the Wells

3. LEGAL FRAMEWORK

3.1. National Legislation

The Environmental Law (Law No. 2872, 1983) of Türkiye first came into force after being published in the Official Gazette No. 18132 dated 11 August 1983. It defines the main principles for the protection of the environment in line with sustainable environment and sustainable development principles and relevant institutional responsibilities. Under its broad scope, it also provides the legislative framework for regulation of industries/facilities and their liabilities regarding the assessment and management of their potential impacts on the environment including permitting and information/declaration requirements. Several amendments have been made in the Environmental Law since 1983, most recent ones being introduced by the Constitutional Court Decisions dated 3 July 2014 (No. E:2013/89, K: 2014/116) and 22 April 2015 (No. E: 2015/35, K: 2015/40) (in the subjects of EIA process and administrative penalties).

Environmental legislation has been developed under the Environmental Law to set out the procedures and principles for the management of specific environmental aspects and horizontal legislation. As part of the EU accession process, reforms including transposition of environmental legislation, enhancement of the institutional capacity and reorganisation of the institutional structure have been made to ensure harmonisation and alignment with the EU environmental acquis.

Complementary to the Environmental Law and the associated legislation, the following laws will be applicable to the Project:

- Agricultural Law (Law No. 5488, 2006)
- Cadastre Law (Law No. 3402, 1987)
- Expropriation Law (Law No. 2942, 1983)
- Groundwater Law (Law No. 167, 1960)
- Highways Traffic Law (Law No. 2918, 1983)
- Labour Law (Law No. 4857, 2003)
- Land Registry Law (Law No. 2644, 1934)
- Law on the Conservation of Cultural and Natural Property (Law No. 2863, 1983)
- Law on Protection Against Flood Waters and Floods (Law No. 4373, 1943)
- Law on Soil Conservation and Land Use (Law No. 5403, 2005)
- Municipality Law (Law No. 5393, 2005)
- National Parks Law (Law No. 2873, 1983)
- Occupational Health and Safety Law (Law No. 6331, 2012)
- Pasture Law (Law No. 4342, 1998)
- Public Health Law (Law No. 1593, 1930)
- Settlement Law (Law No. 5543, 2006)
- Turkish Civil Code (Law No. 4721, 2001)
- Village Law (Law No. 442, 1924)
- Law on Social Insurance and General Health Insurance (Law No. 5510, 2006)
- Law on Unions and Collective Labor Contract (Law No: 6356, 2012)

2014 Environmental Impact Assessment Regulation (2014 EIA Regulation)

The Article 10 of the Environmental Law (Law No. 2872, 1983) sets forth the legal basis for the EIA procedure in Türkiye. According to this article, the institutions, organisations and facilities that can lead to environmental impacts as a result of their planned activities are obliged to prepare an EIA Report or a Project Information File (PIF).

Gaining its legal stand from the Environmental Law, the EIA Regulation was put into force for the first time after being published in the Official Gazette dated 7 February 1993 and numbered 21489. Since this date, several amendments were made on the original EIA Regulation and new EIA regulations were published in 2008, 2013 and 2014 repealing their predecessors. The latest and currently in force EIA Regulation was published in the Official Gazette dated 29 July 2022 and numbered 31907.

As per the Provisional Article 1 of the EIA Regulation, the favourable provisions of the Regulation and/or the provisions of the Regulation in force at the date of application shall be applied to the projects submitted to the Provincial Directorate or the Ministry before the effective date of the Regulation.

Based on the type of activity and/or capacity, the EIA Regulation categorises the investments as below:

- Annex-1: projects subject to full-scale EIA process that shall prepare an EIA Report; and
- Annex-2: projects subject to pre-screening and evaluation that shall prepare a PIF.

Accordingly, if the planned investment is defined as an activity under Annex-1 of the EIA Regulation, a full EIA Report is required.

If the planned investment is defined as an activity under Annex-2 of the EIA Regulation, initially a PIF is prepared in accordance with a limited format specified in the Annex-4 of the EIA Regulation and the MoEUCC evaluates the need for a full EIA process for the project.

Activities that are not included in the EIA Regulation or that are included but planned below the thresholds defined in the Annex-1 or Annex-2 of the EIA Regulation in terms of their characteristics, type, production method, etc. are defined by the Regulation as “Out of Scope Projects”. As per Article 17 of the Procedures and Principles published by MoEUCC for the implementation of current EIA Regulation (Date: 9 September 2022; No: 220.01.02.03/4527998), official applications are to be made to the MoEUCC for “Out of Scope Projects” and “Projects that are Legally Exempt” to secure required EIA Exemption Decisions as per the official letter of the MoEUCC on EIA Exemptions (Letter Date: 25 July 2014; Letter No: 20289998/220.03/12368).

Diyadin Geothermal Resource Exploration Project was evaluated within the scope of 2014 EIA Regulation[12] in force back then. According to 2014 EIA Regulation, geothermal exploration projects fall under Annex-2 (*Article 55 – Mine, petroleum and geothermal resource exploration projects except exploration by utilization of seismic, electric, magnetic, electromagnetic, geophysical, etc. methods*) of the 2014 EIA Regulation. Therefore, a PIF was prepared in line with Annex-4 of the 2014 EIA Regulation for Diyadin Geothermal Resource Exploration Project including all the twenty (20) exploration wells within the Exploration Licenses No. 36 and No. 37 as given in Table 1-1. Subsequently, an “EIA Not Required” Decision was granted by Agri Provincial Directorate of Environment, Urbanization and Climate Change (PDoEUCC) on 4 July 2022 (Decision No. 202239) (Appendix B).

Worthwhile to note is that the geothermal exploration projects fall under Annex-2 (Article 39 – Exploration and extraction of geothermal resources) of the latest and currently in force 2022 EIA Regulation (Official Gazette Date: 29 July 2022; No: 31907) as well.

Other Relevant Environmental and Social Legislation

Under the relevant laws, E&S legislation including regulations, communiques, by-laws, etc. have been published and put in force to provide specific provisions for E&S management. Those that pertain to the Project include, but are not limited to, those listed in Table 3-1 below.

[12] 2014 EIA Regulation (Official Gazette Date: 25 November 2014; No: 29186).

Within the scope of the Project PIF, calculations required by the national legislation were made for air quality and noise. These calculations and the related Project standards are provided in Appendix F and Appendix G.

Table 3-1. Main E&S Legislation Applicable to the Project

E&S Topic	Relevant Legislation
Environmental Permits and Licenses	• Environmental Impact Assessment (EIA) Regulation • Regulation Concerning Environmental Officers, Environmental Management Unit and Environmental Consulting Firms • Regulation for Starting Up and Opening a Workplace • Regulation on Environmental Audit • Regulation on Environmental Permits and Licenses • Regulation on Strategic Environmental Assessment
Land Use and Soils	• Implementation Regulation of 16th Article of the Forestry Law • Implementation Regulation on Soil Protection and Land Use • Regulation Concerning the Rehabilitation of the Lands Disturbed by Mining Activities • Regulation on the Protection, Utilization, and Planning of Agricultural Lands • Regulation on Pastures • Regulation on Soil Pollution Control and Point Source Contaminated Lands Regulation on the Extraction, Operation and Control of Sand, Gravel and Similar Materials • Implementation Regulation of 17/3rd and 18th Articles of the Forestry Law
Air Quality and Greenhouse Gas Emissions	• Industrial Air Pollution Control Regulation • Regulation of Control of Air Pollution Originated from Heating • Regulation on the Assessment and Management of Air Quality • Regulation on the Control of Emissions Causing Odour • Regulation on the Control of Exhaust Gas Emissions • Regulation on the Monitoring of Greenhouse Gas Emissions • Regulation on the Reduction of Ozone Depleting Substances • Communiqué on Monitoring and Reporting of Greenhouse Gas Emissions
Labour and Working Conditions	• Regulation on Annual Paid Vacation • Regulation on Certain Procedures and Principles for Works Conducted in Shifts • Regulation on Excess and Overtime Work related to the Labour Law • Regulation on Minimum Wage • Regulation on Principles and Procedures for Employment of Children and Young Workers • Regulation on Subcontractors • Regulation on Work Durations related to the Labour Law
Occupational Health and Safety	• First Aid Regulation • Implementing Regulation on OHS Services to Be Carried Out by The Employer or its Representative in the Workplace • Occupational Health and Safety Risk Assessment Regulation • Regulation Concerning the Protection of Workers from Risks Associated with Vibration • Regulation of Simple Pressure Vessels • Regulation on Classification, Labelling and Packaging of Substances and Mixtures • Regulation on Emergencies in Workplaces • Regulation on Equipment and Protective Systems Used in Potentially Explosive Atmospheres • Regulation on Health and Safety at Construction Works • Regulation on Health and Safety Conditions Regarding Use of Work Equipment • Regulation on Health and Safety Measures in Working with Display Screen Equipment • Regulation on Health and Safety Measures in Works with Chemical Substances • Regulation on Health and Safety Precautions Regarding Working with Chemicals • Regulation on Health and Safety Regarding Temporary and Time Limited Works • Regulation on Health and Safety Signs • Regulation on Machinery Safety • Regulation on Management of Dust • Regulation on Manual Handling Operations

E&S Topic	Relevant Legislation
	• Regulation on Occupational Health and Safety Committees • Regulation on Occupational Health and Safety Services • Regulation on Personal Protective Equipment • Regulation on Prevention of Major Industrial Accidents and Minimization of their Impacts • Regulation on Protecting Workers from Hazards of Explosive Environments • Regulation on Safety Data Sheets on Hazardous Materials and Mixtures • Regulation on Suspension of Work in Workplaces • Regulation on the Control of Polychlorinated Biphenyls (PCBs) and Polychlorinated Terphenyls (PCTs) • Regulation on the Duty, Authority, Responsibility and Training of Occupational Safety Specialists • Regulation on the Duty, Authority, Responsibility and Training of On-site Doctor and Other Health Personnel • Regulation on the Health and Safety Measures to be taken in Workplace Buildings and Additions • Regulation on the Procedures and Principles of Occupational Health and Safety Training of Employees • Regulation on the Protection of Buildings from Fire • Regulation on the Protection of the Workers against Risks Relevant to Noise • Regulation on the Transportation of Dangerous Materials on Motorways • Regulation on Vocational Training of the Employees Working in Dangerous and Highly Dangerous Workplaces • Communiqué on Hazard Classes List related to Occupational Health and Safety • Decree on Rules and Procedures for Production, Import, Transport, Storage, Sales, Use, Disposal and Inspection of Explosives and Hunting Equipment
Protected Natural Areas and Biodiversity	• Regulation on the Protection of Wetlands • Regulation Concerning the Wildlife Protection and Wildlife Development Areas
Noise and Vibration	• Environmental Noise Control Regulation • Regulation on Environmental Noise Emission Caused by Equipment Used Outdoors
Traffic	• Regulation on Highways Traffic • Regulation on the Transportation of Hazardous Substances by Road
Waste	• Waste Management Regulation • Regulation on the Control of End-of-Life Vehicles • Regulation on the Control of Medical Wastes • Regulation on the Control of Packaging Wastes • Regulation on the Management of Waste Oils • Regulation on the Control of Waste Batteries and Accumulators • Regulation on the Control of End-of-Life Tires • Regulation on the Control of Waste Vegetable Oils • Regulation on the Control of Excavation Soil, Construction and Demolition Waste • Regulation on Mining Wastes • Regulation on the Landfill of Wastes • Regulation on Zero Waste • Regulation on the Management of Waste Electrical and Electronic Equipment • Communique on Transportation of Wastes by Highway • Circular on COVID-19 Measures for the Waste Management of Single Use Masks, Gloves and Other Personal Hygiene Materials • Circular on the Disposal of Wastes Resulting from the Physical Processing of Drilling Muds and Chromium Mine
Water	• Water Pollution Control Regulation • Regulation Concerning Protection of Groundwater against Pollution and Deterioration • Regulation Concerning Water Intended for Human Consumption

E&S Topic	Relevant Legislation
	• Regulation on Control of Pollution Caused by Hazardous Substances in the Aquatic Environment and Its Surroundings • Regulation on Monitoring of Surface Water and Groundwater • Regulation on Pit Opening Where Sewer System Construction is not Applicable • Regulation on Surface Water Quality

3.2. International Agreements, Conventions and Protocols

Türkiye has become party to several conventions and protocols to contribute to the management of environmental resources, biodiversity and cultural heritage at regional and global scales.

Table 3-2. Conventions, Agreements and Protocols

Convention, Agreement, Protocol	Date of Signature	Date of Ratification by Türkiye
Air Quality and Climate Change		
Convention on Long Range Transboundary Air Pollution	13.11.1979	18.04.1983
Vienna Convention for the Protection of the Ozone Layer	22.03.1985	20.09.1991
Montreal Protocol on Substances Depleting the Ozone Layer (1990)	16.09.1987	19.12.1991
United Nations Framework Convention on Climate Change (UNFCCC)	21.03.1994	24.05.2004
Paris Agreement	22.04.2016	11.10.2021
Biodiversity		
International Convention on Wetlands of International Importance especially as Waterfowl Habitat (RAMSAR Convention)	21.12.1975	13.11.1994
Convention for the Conservation of European Wildlife and Natural Habitats (BERN)	19.09.1979	02.05.1984
UN Convention on Biological Diversity and the Cartagena Protocol on Biosafety	29.12.1993	14.02.1997
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)	03.03.1973	22.12.1996
Convention on the Conservation of Migratory Species of Wild Animals (CMS)	01.11.1983	Türkiye is not a party
Convention to Combat Desertification (CCD)	14.11.1994	31.03.1998
Cultural Heritage		
UNESCO Convention on the Protection of the World Cultural and Natural Heritage	23.11.1972	16.03.1983
Convention for the Protection of Human Rights and Fundamental Freedoms (ETS No. 5) (the European Convention on Human Rights) and its protocols	04.11.1950	18.05.1954
UNESCO Convention concerning the Protection of the World Cultural and Natural Heritage	16.06.1983	16.03.1983

Türkiye has ratified 59 ILO conventions including but not limited to the conventions on equal treatment of employees, gender equality, child labour, forced labour, OHS, right of association and minimum wage (https://www.ilo.org/ankara/conventions-ratified-by-turkey/lang--en/index.htm).

The Labour Law (Law No. 4857, 2003) of Türkiye is aligned with the international labour standards with regard to aspects including child labour, forced labour, non-discrimination, equal opportunity and right to join workers' organisations.

3.3. International E&S Standards and Guidelines

According to the RSM Beneficiary Manual 3.0 (April 2023), geothermal drilling projects within the scope of the RSM are to meet the requirements of the WB Operational Policies (WB OPs)[13].

A list of WB OPs is provided in RSM Beneficiary Manual 3.0 that may possibly be triggered in exploration drilling projects *(please see E&S Screening Checklist for the details on the OPs triggered by the Project)*:

- OP 4.01 Environmental Assessment
- OP 4.04 Natural Habitat – *not triggered by the Project as per the E&S Screening Checklist*
- OP 4.11 Physical Cultural Resources – *not triggered by the Project as per the E&S Screening Checklist*
- OP 4.12 Involuntary Resettlement – *not triggered by the Project as per the E&S Screening Checklist*
- OP 4.36 Forest – *not triggered by the Project as per the E&S Screening Checklist*

Under OP 4.01 Environmental Assessment, projects are classified under Category A, B and C according to the level of their likely impact on the environment.

According to the RSM Beneficiary Manual, an Environmental and Social Screening Checklist has been prepared for the Project to review the Project's key E&S aspects against the E&S Safeguard requirements. As per the E&S Screening Checklist, the Diyadin Geothermal Resource Exploration Project is categorized as **Category B**. As per the Manual, a proposed project is classified as Category B if the potential impacts on the environment are typically site-specific, reversible in nature; less adverse than those of Category A projects and for which mitigation measures can be designed more readily.

This ESMP has been prepared in line with relevant WB OPs mentioned above.

In accordance with the WB OPs, the following WB EHS Guidelines are also applicable to the Project:

- General EHS Guidelines (2007)
- EHS Guidelines on Geothermal Power Generation (2007)

Where Turkish requirements differ from the levels and measures presented in the WB EHS Guidelines, the more stringent limit value will be taken into consideration for the Project.

[13] WB OPs have been replaced by WB Environmental and Social Framework (ESF) in 2016. ESF applies to projects initiated on or after October 1, 2018.

4. ENVIRONMENTAL AND SOCIAL BASELINE

Environmental and social conditions of AoI i.e., flora & fauna, soil quality, water quality, air quality, noise levels, land use, waste / wastewater generation, landscape and visual, traffic, legally protected and internationally recognized areas, archaeological / historical sites, socio-economic status are described in this Chapter based on the information included in the PIF prepared by Zorlu Jeotermal and publicly available data relevant to the Project site. No site survey, measuring or sampling study conducted on site during preparation of this ESMP.

4.1. Biodiversity and Natural Resources

The International Union for Conservation of Nature (IUCN) defines “Protected Area” as “a clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values”.

In Türkiye, the Ministry of Agriculture and Forestry (MoAF) is the main official body responsible for the development and implementation of national biodiversity conservation policies. The General Directorate of Nature Conservation and National Parks of MoAF defines different categories of national nature conservation areas in Türkiye within its “Protected Area System”.

Additionally, the General Directorate of Conservation of Natural Assets under MoEUCC determines the procedures and principles for the identification, registration, approval, amendment and announcement of natural assets and natural protected areas and special environmental protection zones, to determine and register the borders of these areas, to manage them.

As stated in the official letter of the13th Regional Directorate of MoAF (dated 6 June 2022), the activity area does not overlap with any area that is legally protected within the scope of the Law on National Parks (Law No. 2873, 1983), Law on Land Hunting (Law No. 4915, 2003), and the Regulation on the Protection of Wetlands.

Internationally recognized areas are identified under international conventions or agreements, including, but not limited to, UNESCO Natural World Heritage Sites, UNESCO Man-and-Biosphere Reserves and the Ramsar List of Wetlands of International Importance. Key Biodiversity Areas (KBA) are “sites contributing significantly to the global persistence of biodiversity”, in terrestrial, freshwater and marine ecosystems. The Global Standard for the Identification of Key Biodiversity Areas (IUCN 2016) sets out globally agreed criteria for the identification of KBAs worldwide. The KBA Standard establishes a consultative, science-based process for KBA identification, founded on the consistent application of global criteria with quantitative thresholds that have been developed through an extensive consultation exercise spanning several years.

The area of Exploration License No. 37 is 4,345.16 ha, however PIF states that each drilling site will cover 1 ha area. Thus, as land use requirements for drilling activities are limited to these drilling sites, only a small portion of the entire Exploration License area will be used and physically affected by the drilling works.

There are no legally protected and internationally recognized areas overlapping with Exploration License No. 37. The protected areas in the vicinity of the well locations are summarized in Table 2-4 and shown in Figure 2-2.

According to PIF, the area of Exploration License No. 37 consists of grassland-pasture areas and agricultural areas, dominated by herbaceous formations of both annual and perennial plants. According to the Vegetation Map of Türkiye, provided in PIF, the vegetation of the area is indicated as "Eastern steppes".

Türkiye is subject to the influence of three (3) floristic regions due to its unique combination of topographic structure and climate conditions. These regions are Mediterranean, Iran-Turan and Euro-Siberian phytogeographic regions and the three (3) exploration well locations are within the Iran-Turan phytogeographic region.

Identified Flora and Fauna Species

As per the information obtained from Zorlu Jeotermal, a site visit for flora and fauna studies has been conducted on 22 April 2022 within the scope of PIF by an external biologist. The flora and fauna species identified in the PIF, together with information on endemism, phytogeographic regions, Bern Convention[14] and CITES[15] listings are provided in Appendix E. For fauna and avifauna species, Central Hunting Commission (2021-2022) listings and Hunting and wild animal lists determined based Article 2 and 4 of Land Hunting Law (Law No. 4915, 2003) are also provided.

PIF does not specify which species were directly observed in the field survey and which ones were determined as a result of the desktop study.

- 25 flora species have been identified in the PIF are provided in Appendix E.1. Among those one (1) of them is specified as endemic - *Hedysarum cappadocicum*. The geographical distribution of this specie within Türkiye is given in Figure 4-1. The species has a threat category of “Least Concern (LC)” as per the IUCN Red List. None of the flora species fall under Bern Convention.

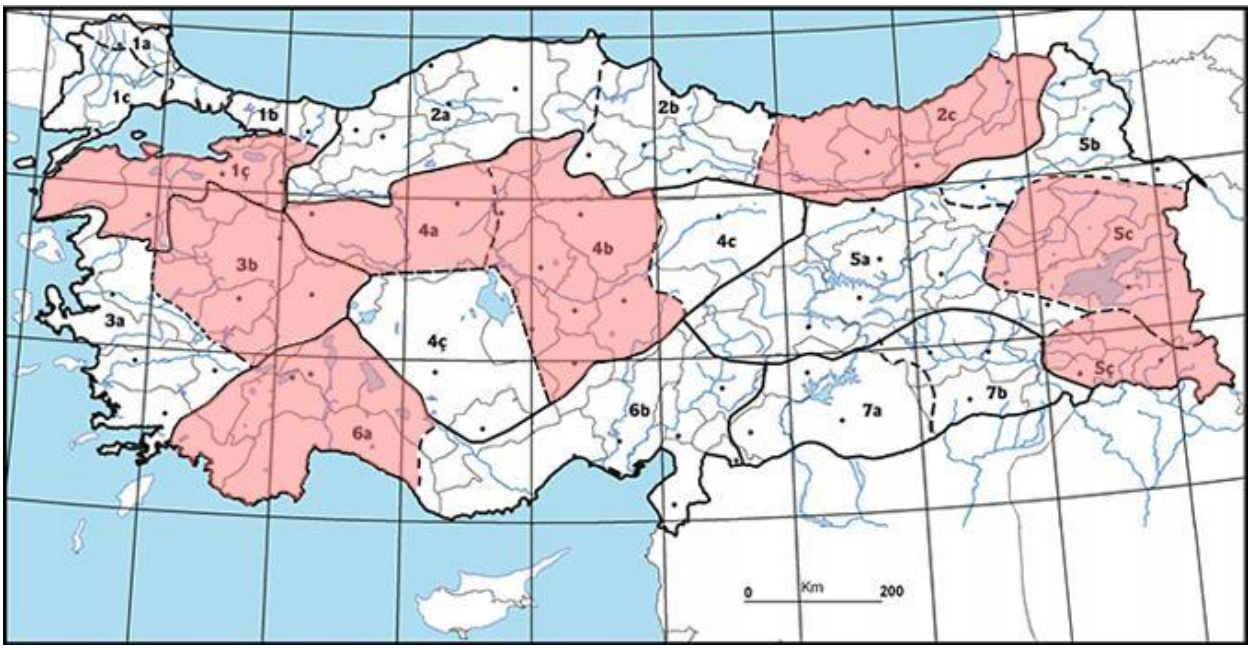


Figure 4-1. Distribution of *Hedysarum cappadocicum* in Türkiye[16]

- The fauna species identified in the vicinity of the Exploration License areas as per PIF are provided in Appendix E.2. The number of fauna species are stated below and none of them are endemic species:
    - 2 amphibian species
    - 7 reptile species
    - 4 mammal species

  All of the identified species have a threat category of “Least Concern (LC)” as per the IUCN Red List.

- 18 avifauna species have been identified in the PIF and all of them have a threat category of “Least Concern (LC)” as per the IUCN Red List. The list of avifauna species is listed in Appendix E.3 .

[14] Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention)
[15] Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
[16] https://bizimbitkiler.org.tr/yeni/demos/technical/

4.2. Soils and Land Use

The license areas (Exploration License No: 36 and 37) cover a total of 9,294.44 ha area. The actual land use requirement is anticipated to be as follows:

- Land use for three (3) wells, namely ZDM-2, ZDM-3 and ZDM-6, included in the RSM application will be 2.4 ha corresponding to about 0.026% of the total Exploration License areas.
- Cumulative land use for wells included in the PIF will be 34 ha (assuming 20 wells are all drilled) corresponding to about 0.37% of the total Exploration License areas.

The land use /cover and soil types of the wells within the scope of RSM program and access roads of each well are given below and shown in Figure 4-2 and Figure 4-3, respectively:

- According to Corine Land Cover Data[17], the land cover types of wells, ZDM-2 and ZDM-3 is non-irrigated arable land, while ZDM-6 is partly in non-irrigated arable land and partly in sparsely secondary rocks.
- As for the access roads, the land cover of the existing secondary roads to be used for ZDM-3, ZMD-2 and ZDM-6 are mostly non-irrigated arable lands and the land cover of the planned access roads for ZDM-2 and ZDM-6 is non-irrigated arable land as presented in Figure 4-2 below.
- According to Report of the Land Use of Agri Province[18], the soil type of Project wells is non-calcareous brown soils. The soil type of the existing secondary road and access road of the ZDM-2 and ZDM-3 is also non-calcareous brown soils. The soil type of the access road of the ZDM-6 is non-calcareous brown soils, while existing secondary roads are partly alluvial soils. According to cross sections of wells provided in Chapter 2.5 (Figure 2-13, Figure 2-14 and Figure 2-15), the non-calcareous brown soil consists of loose gravel, sand, and clay.

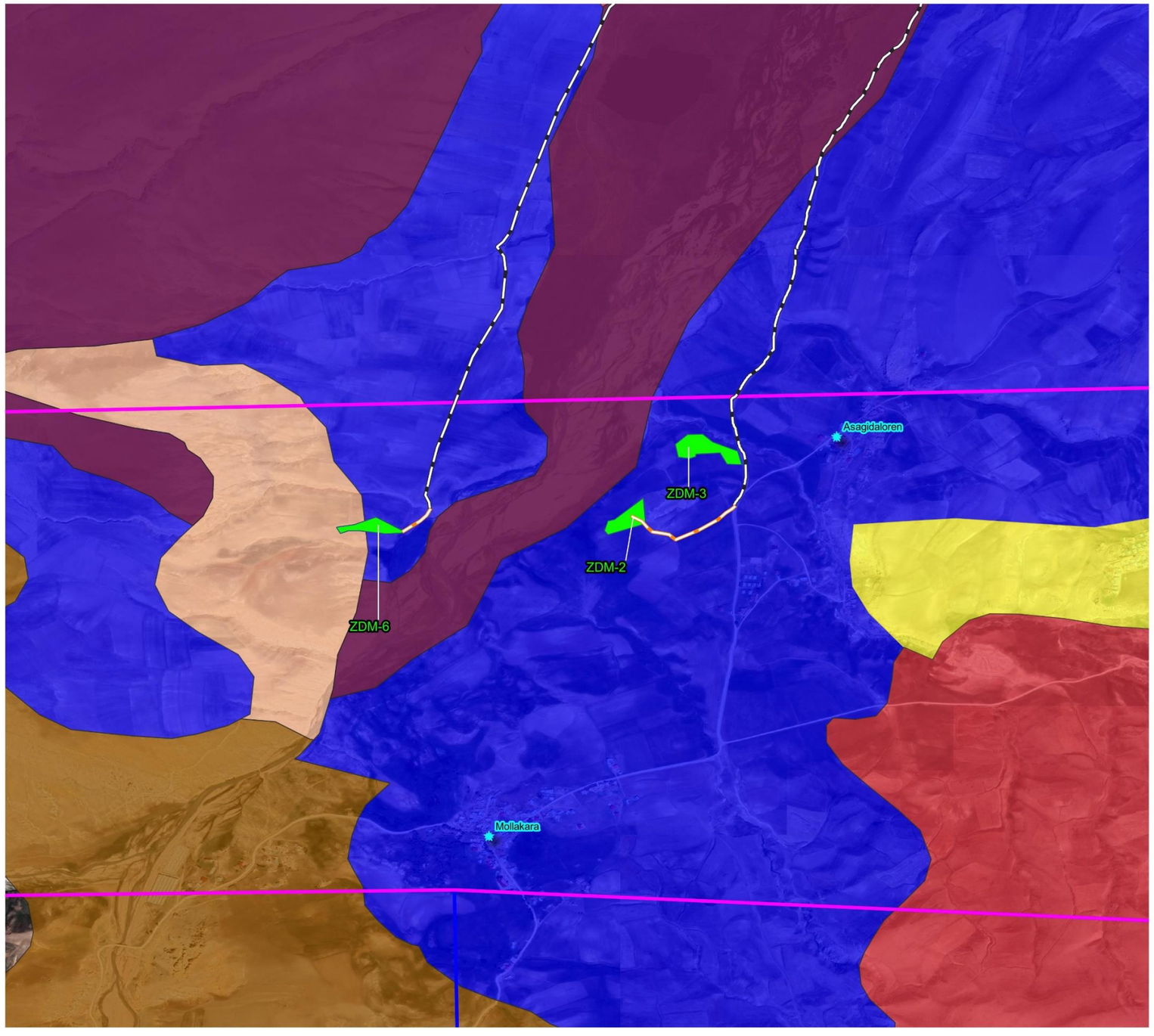
Table 4-1 below shows the land use types of well locations and parcels on/neighboring access roads.

Table 4-1. General Land Use Type of Well Site Area

Well	General Land Use Type of Well Site Area (Well Locations and Parcels Surrounding the Access Roads)
ZDM-2	*Grassland dominated by sparse herbaceous vegetation with partial stone formations and open spaces*
ZDM-3	*Grassland dominated by herbaceous vegetation with partial stone formations*
ZDM-6	*Raw soil dominated by stone formations and open spaces with little herbaceous vegetation*

Available information on the land use status of the well locations is provided in Section 2.3 ("*Land Acquisition Process for Drilling Locations"*) and access roads is provided in Section 2.4 ("*Planning for Access Roads*"). Photographs of ZDM-2, ZDM-3 and ZDM-6 well locations are provided in Figure 2-4, Figure 2-5 and Figure 2-6.

[17] https://land.copernicus.eu/en/products/corine-land-cover
[18] https://kutuphane.tarimorman.gov.tr/vufind/Record/5132



Legend

- Geothermal Resource Exploration Drilling Areas wtihin the scope of RSM/ RSM Kapsamındaki Jeotermal Kaynak Arama Sondaj Alanları
- Geothermal Resource Exploration License Area No. 37 (Polygon-1) / 37 Numaralı Jeotermal Kaynak Arama Ruhsat Alanı (Poligon-1)
- Geothermal Resource Exploration License Area No. 37 (Polygon-2) / 37 Numaralı Jeotermal Kaynak Arama Ruhsat Alanı (Poligon-2)

Land Use Types/ Arazi Kullanımı Tipleri

- Non-irrigated Arable Land/ Sulanmayan Ekilebilir Alanlar
- Pastures/ Mera Alanları
- Complex cultivation patterns/ Karışık Tarım Alanları
- Land Principally Occupied by Agriculture with Significant Areas of Natural Vegetation/ Doğal Bitki Örtüsü ile Birlikte Bulunan Tarım Alanları
- Bare Rocks/ Çıplak Kayalıklar
- Sparsely Vegetated Areas /Seyrek Bitki Alanları
- Existing Secondary Roads / Mevcut Tali Yollar
- Planned Access Roads / Planlanan Ulaşım Yolları
- Village Centers/ Köy Merkezleri

GEM Sustainability Services and Consultancy Inc.

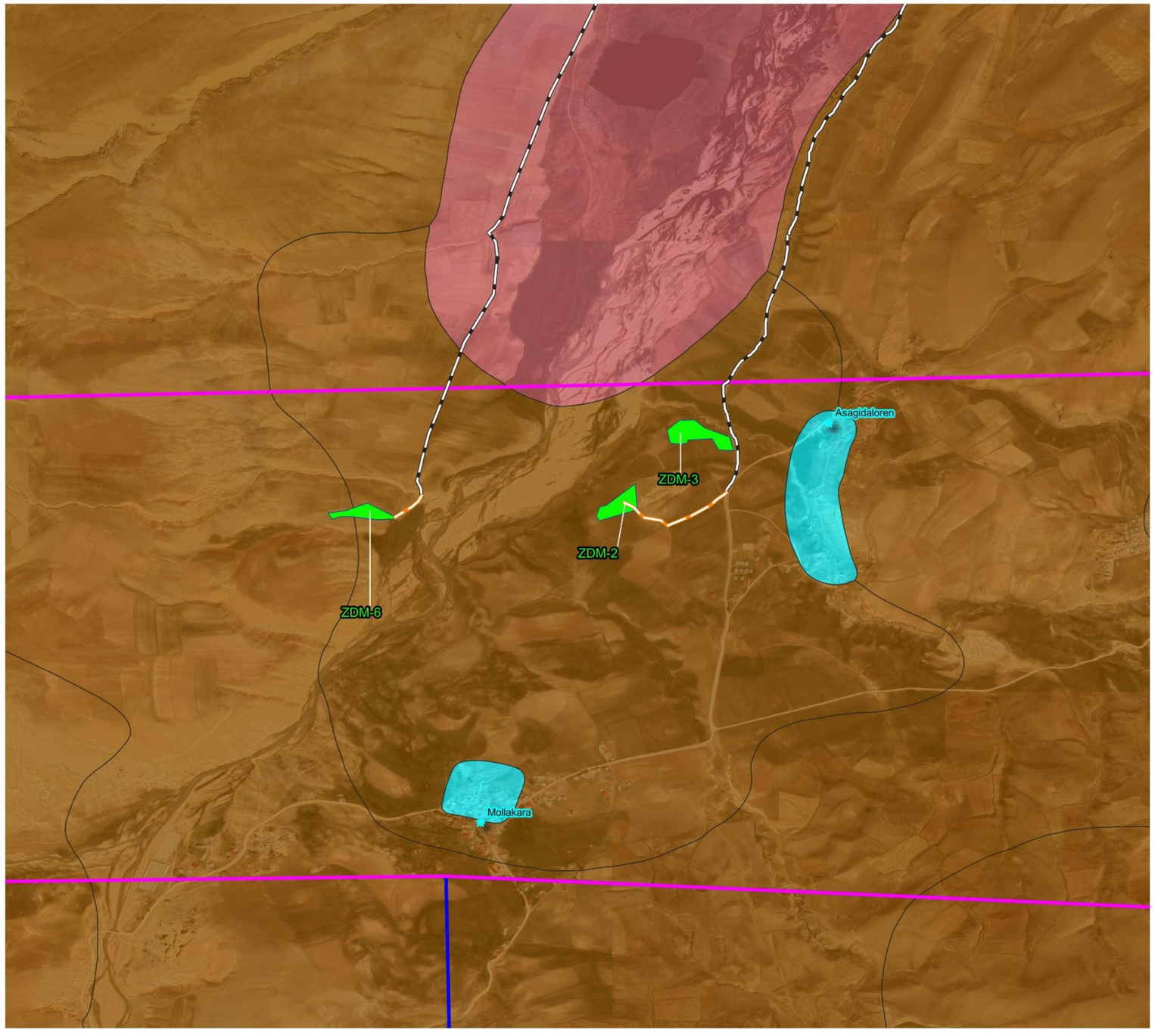
Project Name / *Proje Adı*	: Geothermal Resource Exploration Project
Map Title / *Harita Başlığı*	: Land Use / *Arazi Kullanımı*
Prepared for / *Proje Şirketi*	: Zorlu Jeotermal Enerji Elektrrik Üretimi A.Ş.
Projected Coordinate System / *Projeksiyon Koordinat Sistemi*	: ED 50 UTM Zone 38
Sheet Size / *Sayfa Boyutu*	: A3

N

0 250 500 m

Basemap Source: Google Earth

Figure 4-2. The Land Cover Types in the Vicinity of the Well Locations



Legend

- Geothermal Resource Exploration Drilling Areas wtihin the scope of RSM/ RSM Kapsamındaki Jeotermal Kaynak Arama Sondaj Alanları
- Geothermal Resource Exploration License Area No. 37 (Polygon-1) / 37 Numaralı Jeotermal Kaynak Arama Ruhsat Alanı (Poligon-1)
- Geothermal Resource Exploration License Area No. 37 (Polygon-2) / 37 Numaralı Jeotermal Kaynak Arama Ruhsat Alanı (Poligon-2)

Soil Types/ Toprak Tipleri

- Alluvial Soil/ Alüvyal Topraklar
- Non-calcareous Brown Soils/ Kireçsiz Kahverengi Topraklar
- Village Centers / Köy Merkezleri
- Existing Secondary Roads / Mevcut Tali Yollar
- Planned Access Roads / Planlanan Ulaşım Yolları
- Village Centers/ Köy Merkezleri

GEM Sustainability Services and Consultancy Inc.

Project Name / *Proje Adı*	: Geothermal Resource Exploration Project
Map Title / *Harita Başlığı*	: Soils / *Toprak Örtüsü*
Prepared for / *Proje Şirketi*	: Zorlu Jeotermal Enerji Elektrrik Üretimi A.Ş.
Projected Coordinate System / *Projeksiyon Koordinat Sistemi*	: ED 50 UTM Zone 38
Sheet Size / *Sayfa Boyutu*	: A3

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0 250 500 m

Basemap Source: Google Earth

Figure 4-3. The Soil Types in the Vicinity of the Well Locations

According to PIF, for one of the wells well, a total of 2,500 m^3 topsoil (25 cm from surface) and 1,575 m^3 excavation soil (3 m from the lower boundary of topsoil) will be stripped during earthworks.

Existing roads and side roads will be used and if necessary, new roads will be opened as narrow and short as possible, which will contribute to minimizing the impacts for accessing the area (please see Chapter 2.4 for detailed information on access roads).

Mitigation measures related with earthworks, drilling activities including construction of mud pits and camp site are given in Environmental and Social Mitigation Plan in Chapter 6.

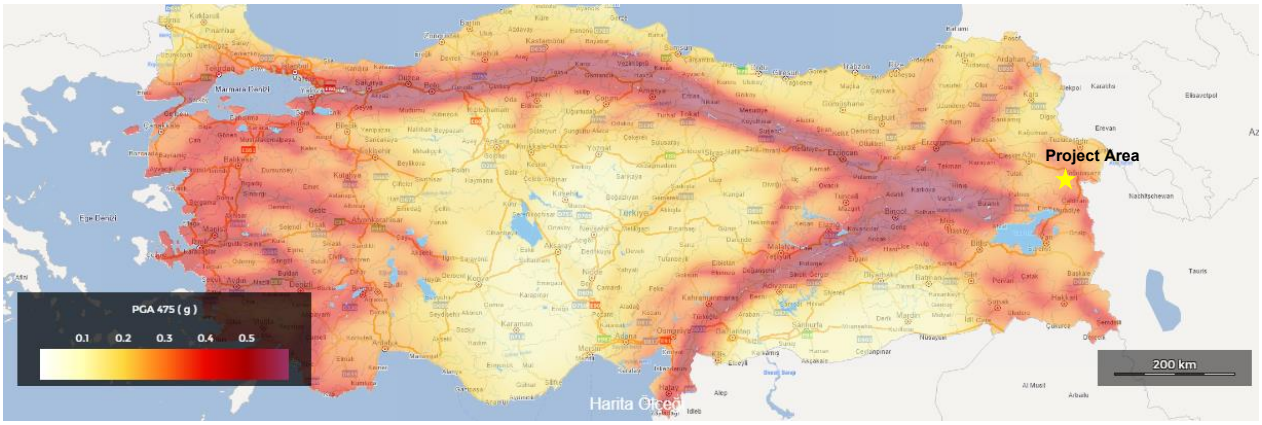
According to the official letter of Provincial Directorate of Agriculture and Forestry dated 23 June 2022 there are pastures, agricultural land, uncultivated land, meadow within the PIF area. As per the official letter, ZDM-2 and ZDM-3 well locations are not included within the scope of Pasture Law (Law No. 4342, 1998). However, ZDM-6 well location is included within the scope of Article 5/b classification of Pasture Law (Law No. 4342, 1998) (please see Chapter 2.2 Table 2-6 for further information on the land use specifications of the well locations).

Regarding the pastures, the Directorate stated in its letter that "*No activity or action should be undertaken without applying for a change of allocation purpose of these pasture lands as per Article 14 of the Pasture Law (Law No. 4342, 1998)".* Regarding the lands classified as "agricultural land, uncultivated land, meadow" within the PIF area, Provincial Directorate has no objection if the necessary permits are to be obtained in accordance with the provisions of Law on Soil Conservation and Land Use (Law No. 5403, 2005).

4.3. Geology and Seismicity

According to PIF, in the vicinity of the well locations, sandstone-mudstone-limestone alternation, marble, alluvial and locally ignimbrite and tuff are observed in terms of area geology. Sandstone-mudstone-limestone alternation is observed in ZDM-2, old alluvial is observed in ZDM-3 well locations. Sandstone-mudstone-limestone alternation, marble and alluvial are observed in ZDM-6. The geology in the vicinity of the well locations is shown in Figure 4-5.

According to the Türkiye Earthquake Risk Maps Interactive Web Application of Disaster & Emergency Management Presidency (AFAD), the Project area is located in a region with a low to medium risk of earthquake, as shown below. As per the Türkiye Earthquake Risk Map, the ground acceleration of the Project area is 0.249 g.



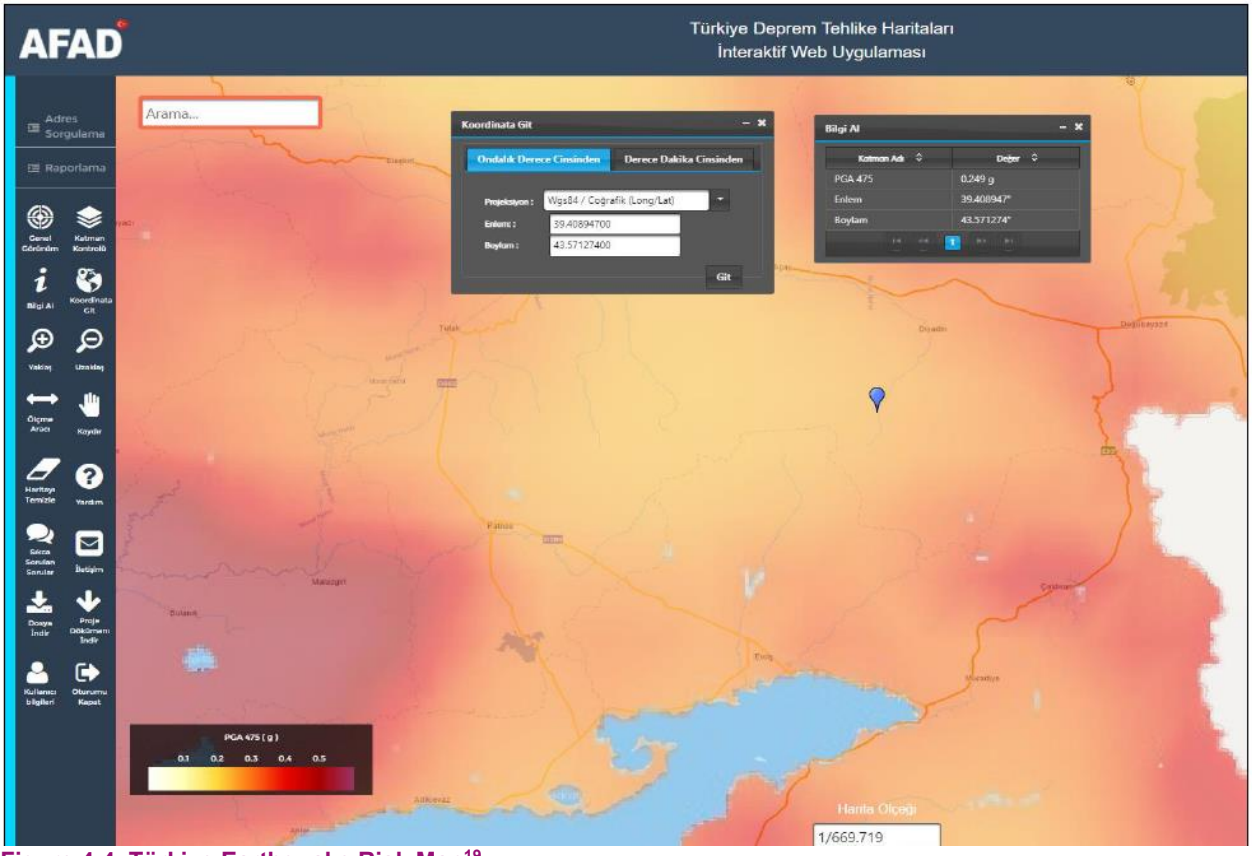
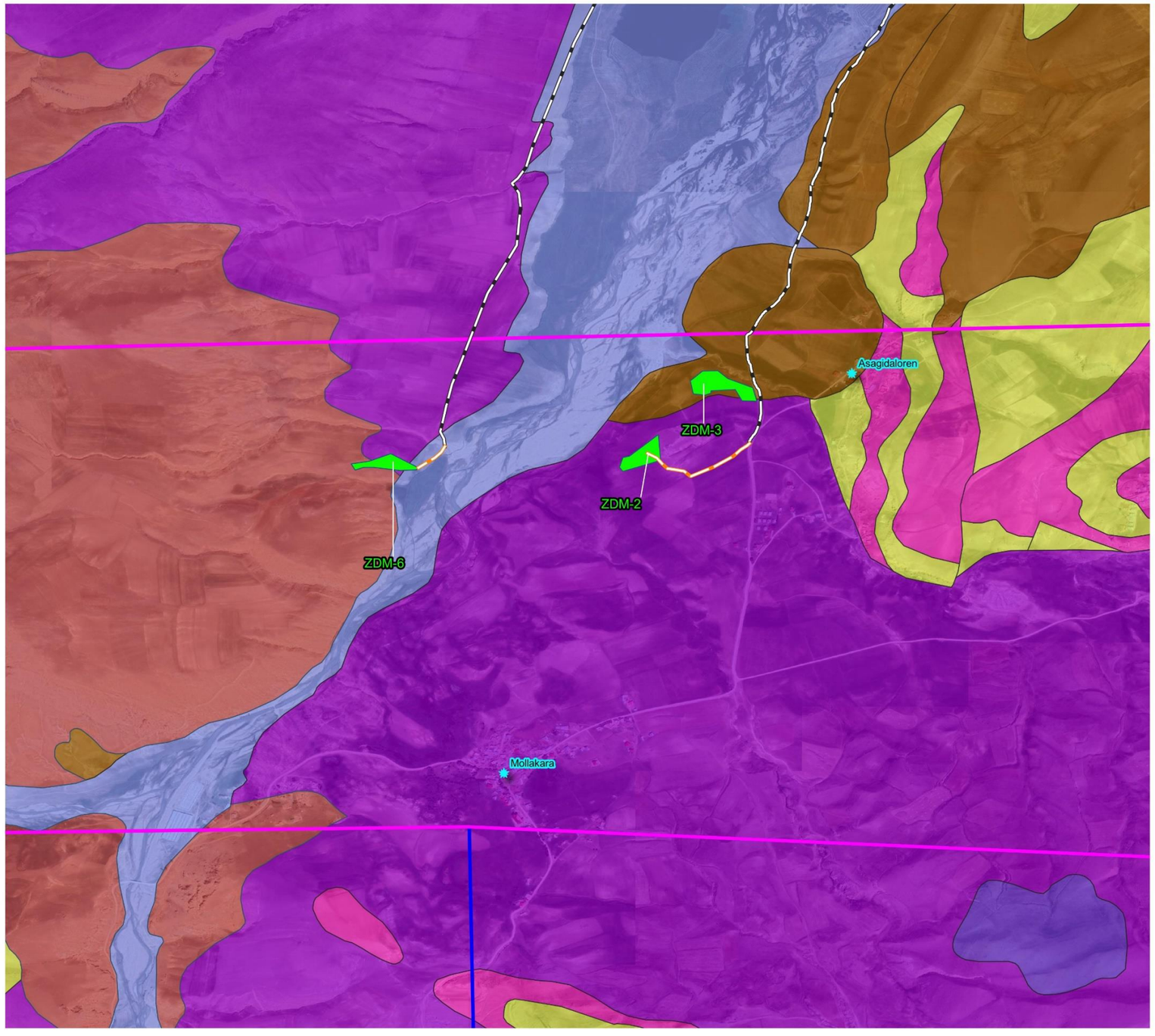


Figure 4-4. Türkiye Earthquake Risk Map[19]

According to PIF, ZDM-2 and ZDM-3 wells are situated on an old landslide. The Balik Lake Fault Zone is at a distance of 24.2 km in the northeast of ZDM-3 and the Diyadin Fracture is at a distance of 7.3 km in the northeast of ZDM-3. The biggest earthquake in the region was observed on 24 November 1976 in Çaldıran district with a magnitude of 7.0. The most recent earthquake in the region occurred on 7 September 2015 with a magnitude of 4.0 in Dogubeyazit district.

[19] https://tdth.afad.gov.tr/TDTH/



Legend

- Geothermal Resource Exploration Drilling Areas wtihin the scope of RSM/ RSM Kapsamındaki Jeotermal Kaynak Arama Sondaj Alanları
- Geothermal Resource Exploration License Area No. 37 (Polygon-1) / 37 Numaralı Jeotermal Kaynak Arama Ruhsat Alanı (Poligon-1)
- Geothermal Resource Exploration License Area No. 37 (Polygon-2) / 37 Numaralı Jeotermal Kaynak Arama Ruhsat Alanı (Poligon-2)

Geology / Jeoloji

- Alluvial/Alüvyon
- Basalt/ Bazalt
- Old Alluvial/ Eski Alüvyon
- Ignimbrite/ İgnimbirit
- Sandstone-Mudstone- Limestone/ Kumtaşı- Çamurtaşı- Kireçtaşı
- Marble/Mermer
- Tuff/Tüf
- Existing Secondary Roads / Mevcut Tali Yollar
- Planned Access Roads / Planlanan Ulaşım Yolları
- Village Centers/ Köy Merkezleri

GEM Sustainability Services and Consultancy Inc.

Project Name / *Proje Adı*	:	Geothermal Resource Exploration Project
Map Title / *Harita Başlığı*	:	Geology / *Jeoloji*
Prepared for / *Proje Şirketi*	:	Zorlu Jeotermal Enerji Elektrrik Üretimi A.Ş.
Projected Coordinate System / *Projeksiyon Koordinat Sistemi*	:	WGS 84
Sheet Size / *Sayfa Boyutu*	:	A3

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0 250 500 m

Basemap Source: Google Earth

Figure 4-5. The Geology in the Vicinity of the Well Locations

4.4. Water Resources

Murat River is the major water resource in the vicinity of the Exploration License area. Murat river shows a continuous flow with a total length of 722 km. The length of the river within the provincial borders is 221 km and its flow rate is 64 m^3/sec. (Agri Province Environmental Status Report for 2022). The surface water resources in the vicinity of the well locations are shown in Figure 4-6. Other water resources in the vicinity of the Exploration License area are given in Table 4-2 below.

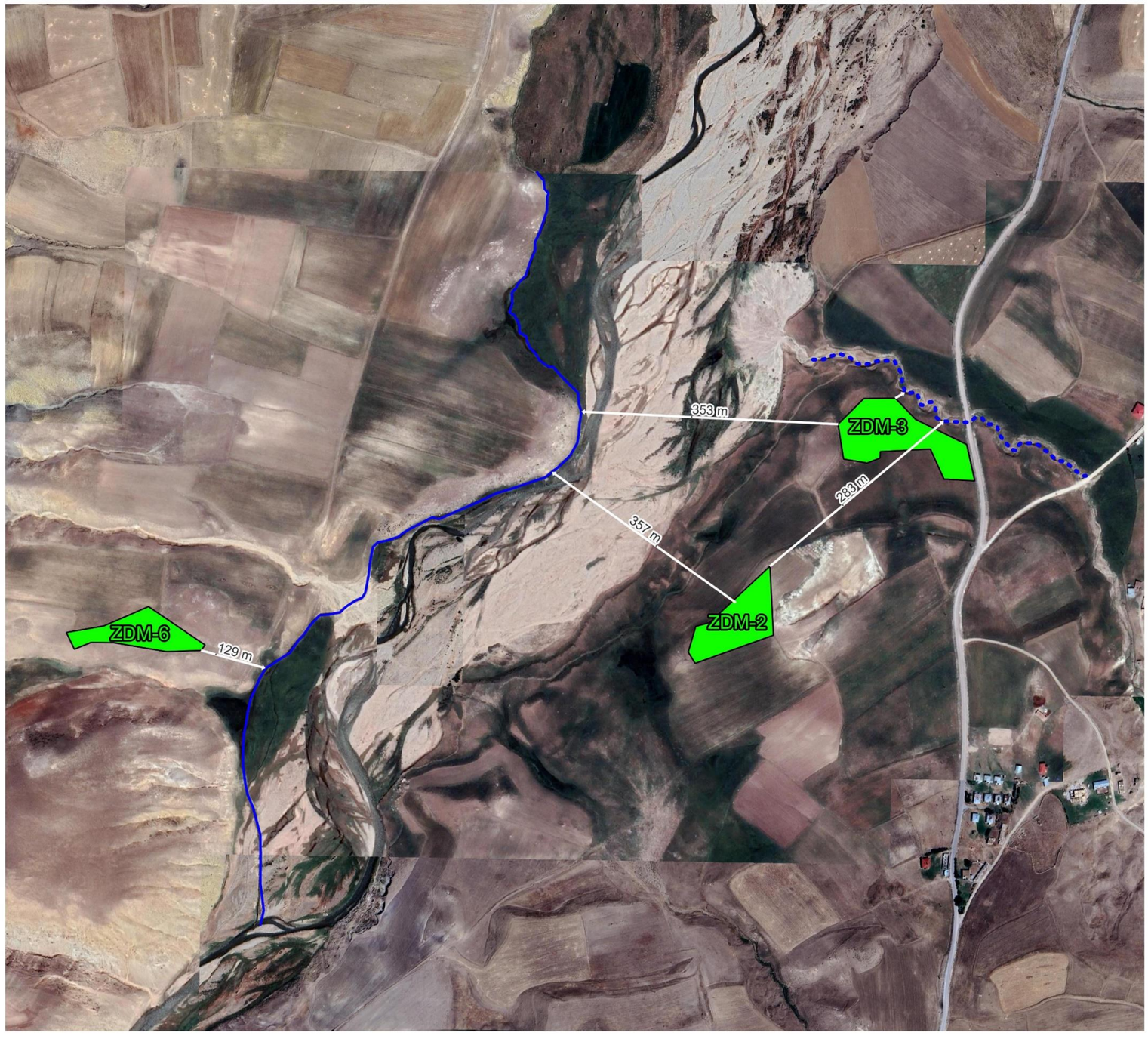
Table 4-2. Water Resources in the Vicinity of Exploration License Area

Lake/Dam/River	Closest Well	Distance (km) of the Well to the Water Resource	Direction of the Well with respect to the Water Resource
Dry Creek	ZDM-3	15 m	Northwest
Murat River	ZDM-2	0.4	West
	ZDM-3	0.3	West
	ZDM-6	0.1	East
Dipsiz Lake	ZDM-6	5.6	South
Hidirmentes Lake	ZDM-2	31.1	Southwest
Balik Lake	ZDM-3	34.0	Northwest
Kockopru Dam	ZDM-2	40.0	Southwest
Saz Lake	ZDM-3	46.7	Northwest
Altincayir River	ZDM-6	51.2	Northwest
Patnos Dam	ZDM-6	60.0	Southwest
Aras River	ZDM-3	70.0	North

In the mountainous parts of the Exploration License areas, the groundwater level is 15-20 m higher than the thalweg level of the Murat River. However, this level falls a few meters below the level of the Murat River in the down-slope and partially subsidence areas (Source: Diyadin- Mutlu License Field Technical Report No. 36).

Zorlu Jeotermal commits to review the groundwater resources around the well locations, identify formal or informal users of such resources if any, and inform the RSM Unit about the outcomes of these studies prior to mobilization for the Project.

Within the scope of the Project, official opinion letter of the 8th Regional Directorate of DSI has been obtained on 19 June 2022 and 22 May 2023 (See Appendix C). According to the official letter, there is no objection of the authority on the condition that the measures stipulated within the letter are met within the EIA permitted areas. Those measures/commitments to be fulfilled by the Project are listed under the E&S Mitigation Plan of the Project presented in Chapter 6.



Legend

- Geothermal Resource Exploration Drilling Areas within the scope of RSM / RSM Kapsamındaki Jeotermal Kaynak Arama Sondaj Alanları
- Murat River/ Murat Nehri
- Dry Creek/Kuru Dere

GEM Sustainability Services and Consultancy Inc.

Project Name / *Proje Adı*	:	Geothermal Resource Exploration Project
Map Title / *Harita Başlığı*	:	Surface Water Resources / *Yerüstü Suyu Kaynakları*
Prepared for / *Proje Şirketi*	:	Zorlu Jeotermal Enerji Elektrrik Üretimi A.Ş.
Projected Coordinate System / *Projeksiyon Koordinat Sistemi*	:	ED 50 UTM Zone 38
Sheet Size / *Sayfa Boyutu*	:	A3

N

0 100 200 m

Basemap Source: Google Earth

Figure 4-6. The Surface Water Resources in the Vicinity of the Well Locations

4.5. Air Quality

No ambient air quality measurement has been conducted within the scope of PIF. The distance of the closest buildings to three (3) exploration wells within the scope of RSM process is provided in Table 4-3. All three (3) buildings are located in Asagidaloren village. The direction of the wells with respect to Asagidaloren village are also provided. The sensitive receptors in the vicinity of the well locations are presented in Figure 4-7.

Table 4-3. Closest Buildings to Exploration Wells

Exploration Well	Distance of Well to the Closest Buildings (m)	Settlement of the Closest Buildings	Direction of the Well with respect to Settlement Centre
ZDM-2	485	Asagidaloren Village	Southwest
ZDM-3	227	Asagidaloren Village	West
ZDM-6	929	Asagidaloren Village	Southwest

Publicly available databases have been reviewed in order to identify projects and enterprises in the vicinity of Exploration License No. 36 and Exploration License No. 37 that may have adverse effects on the ambient air quality. There is Mollakara Gold and Silver Mining Project[20] which is planned to be realized by Koza Altın İşletmeleri A.Ş. is located in Mollakara village, Diyadin district, Agri province. The mining project's EIA boundaries' approximate distances to each drilling well are provided in Table 4-4. The mining project obtained its "EIA Positive" decision on 29 September 2023. According to the EIA report of the mining project, the total EIA area is approximately 470.56 ha. As of December 2023, the mining project has yet to be started and as per Zorlu Jeotermal's information, there aren't any other facilities and/or enterprises in the vicinity that could affect the air quality in the region.

Table 4-4. Distances of the Exploration Wells to the Closest Project in the Vicinity

Exploration Well	Distance of Well to Mollakara Gold and Silver Mining Project (m)	Direction of the Well with respect to Mollakara Gold and Silver Mining Project
ZDM-2	830	Northeast
ZDM-3	1,150	Northeast
ZDM-6	400	North

4.6. Noise

No baseline noise measurement has been conducted within the area of Exploration License No. 37. The distance of the closest buildings to three (3) exploration wells within the scope of RSM process is provided in Table 4-3. The sensitive receptors in the vicinity of the well locations are presented in Figure 4-7.

Publicly available databases have been reviewed in order to identify projects and enterprises in the vicinity of Exploration License No. 36 and Exploration License No. 37 that may have adverse effects on environmental noise. Information on the Mollakara Gold and Silver Mining Project is provided in Chapter 4.5.

As of December 2023, the mining project has yet to be started and as per Zorlu Jeotermal's information, there aren't any other facilities and/or enterprises in the vicinity that could affect the ambient noise in the region.

[20] S: 55411 RUHSAT NOLU MOLLAKARA ALTIN VE GÜMÜŞ AÇIK OCAĞI, CEVHER ZENGİNLEŞTİRME TESİSİ (YIĞIN LİÇ ALANI, ADR ÜNİTESİ, KIRMA ELEME TESİSİ) REVİZYON PROJESİ

4.7. Waste Management

Wastes generated during land preparation, exploration and closure and land rehabilitation phases of the Project include domestic waste, recyclable waste (e.g. packaging, plastic, glass, etc.), medical waste, waste oil, waste vegetable oil, excavation waste, drilling mud, chemical waste, used accumulators and batteries, electrical and electronic waste etc. Detailed measures to be taken on-site in line with the waste hierarchy (including conditions at the temporary on-site waste storage area) are described in Chapter 6.

During the Project phases, there will be no discharge to the receiving environment.

There is one Class II Landfill (Municipal Waste and Non-hazardous Waste) in Agri province, located in Yukarikupkiran village, Central district, approximately 55 km to the ZDM-6 well location (closest well).

The information obtained from the 2022 Environmental Status Report of Agri (the latest published report), are provided below:

- In Ağrı province, an average of 14,673 tons of garbage is produced monthly. The amount of solid waste produced in Diyadin Municipality is stated as 4.33 tons/day in summer and 2.79 tons/day in winter. Wastes are collected by the municipalities.
- There is one landfill in Agri province located in Yukarikupkiran village, Central district.
- Since there is only one landfill in the province, there are several wild waste storage areas in the districts, including Diyadin district.
- There is no Waste Collection Separation and Recovery Facility. For this reason, the waste collected by municipalities is not subjected to any waste separation.
- It was stated that the facilities that generate construction demolition waste were informed about the need to manage their waste within the scope of the Regulation on the Control of Excavation Soil, Construction and Demolition Waste.
- There is one Medical Waste Sterilization Facility located in Asagikupkiran village, Merkez district (approximately 55 km to the ZDM-6 well location).

4.8. Cultural Heritage

Cultural heritage (CH) is defined as movable or immovable objects, sites, structures, natural features, and landscapes that have archeological, paleontological, historical, religious, or other cultural significance.

In Türkiye, Law on Conservation of Cultural and Natural Property (Law No: 2863, 1983) and secondary legislation (e.g. regulations, principal decisions) govern the procedures about the conservation of cultural and natural assets. The Principal Decision No. 658 issued on 5 November 1999 states that all archaeological sites need to be classified and protected according to their significant features. As per the Principal Decision, 1st Degree Archaeological Sites are define as:

Areas requiring highest level of protection. They shall be preserved except for scientific excavations. The area shall be free of any type of buildings and construction. All kinds of construction, excavation, and modification activities are prohibited. However, for exceptional cases such as the necessity for essential infrastructure construction, Regional Preservation Boards may permit such activities based on the approval of the relevant museum and the head of the scientific excavation team.

The Exploration License areas fall under the jurisdiction of Van Directorate of Regional Board on Conservation of Cultural Assets of the Ministry of Culture and Tourism.

As per the information provided in the Project PIF, no cultural heritage assets were identified in the Exploration License areas. The registered cultural heritage sites in the vicinity of three (3) exploration wells within the scope of RSM program are shown in Figure 2-3 and their distances are provided below.

Registered CH Site	Site Status	Closest Well	Distance (km) of the Well to the CH Site	Direction of the Well with respect to the CH Site
Yukaridaloren Village Residential Area	1st degree Archaeological Site	ZDM-3	1.3	West
Ulukent Village Cemetery	Immovable Cultural Property	ZDM-3	1.6	Southeast
Gozupek Village Residential Area	1st degree Archaeological Site	ZDM-3	3.7	Northwest
Davut Village Castle	1st degree Archaeological Site	ZDM-3	8.9	Southwest

Source: Van Directorate of Regional Board on Conservation of Cultural Assets Decisions[21]

4.9. Socio-Economy

According to the Address-Based Population Registration System (ABPRS), Agri province's population is 510,626 as of 2022. The population density in the province is 45 persons per km2, as opposed to 111 persons per km^2 in Türkiye as a whole. In Agri province, population growth rate (per thousand) for the year 2022 is -27.08. The population has presented a general decreasing trend between the years 2012 – 2022. On the other hand, the population of Diyadin district has -48.7 population growth rate (per thousand) in 2022. The population of the district was recorded as 19,556 in 2022. According to Turkish Statistical Institute, average household size of Agri province for the year 2022 is 4.4 (www.tuik.gov.tr)

The populations of the closest settlements are provided in Table 4-5. Among the settlements closest to the wells included in RSM, Yukarıdaloren village has the largest population with 750 individuals; whereas, Asagidaloren village has the lowest population with 209 individuals.

[21] https://korumakurullari.ktb.gov.tr/TR-91065/tescil-kararlari.html

Table 4-5. 2022 Population of the Closest Settlements

Settlements	2022 Population (*)		
	Female	Male	Total
Settlements in the vicinity of the wells included in RSM			
Asagidaloren	97	112	209
Mollakara	178	215	393
Yukaridaloren	359	391	750
Settlements in the vicinity of other wells included in the PIF			
Mutlu	296	317	613
Gedik	65	90	155
Kotanci	70	67	137
Oguloba	142	145	287
Ulukent	591	657	1,248
Yanikcukur	166	235	401
Yolcupinari	107	133	240

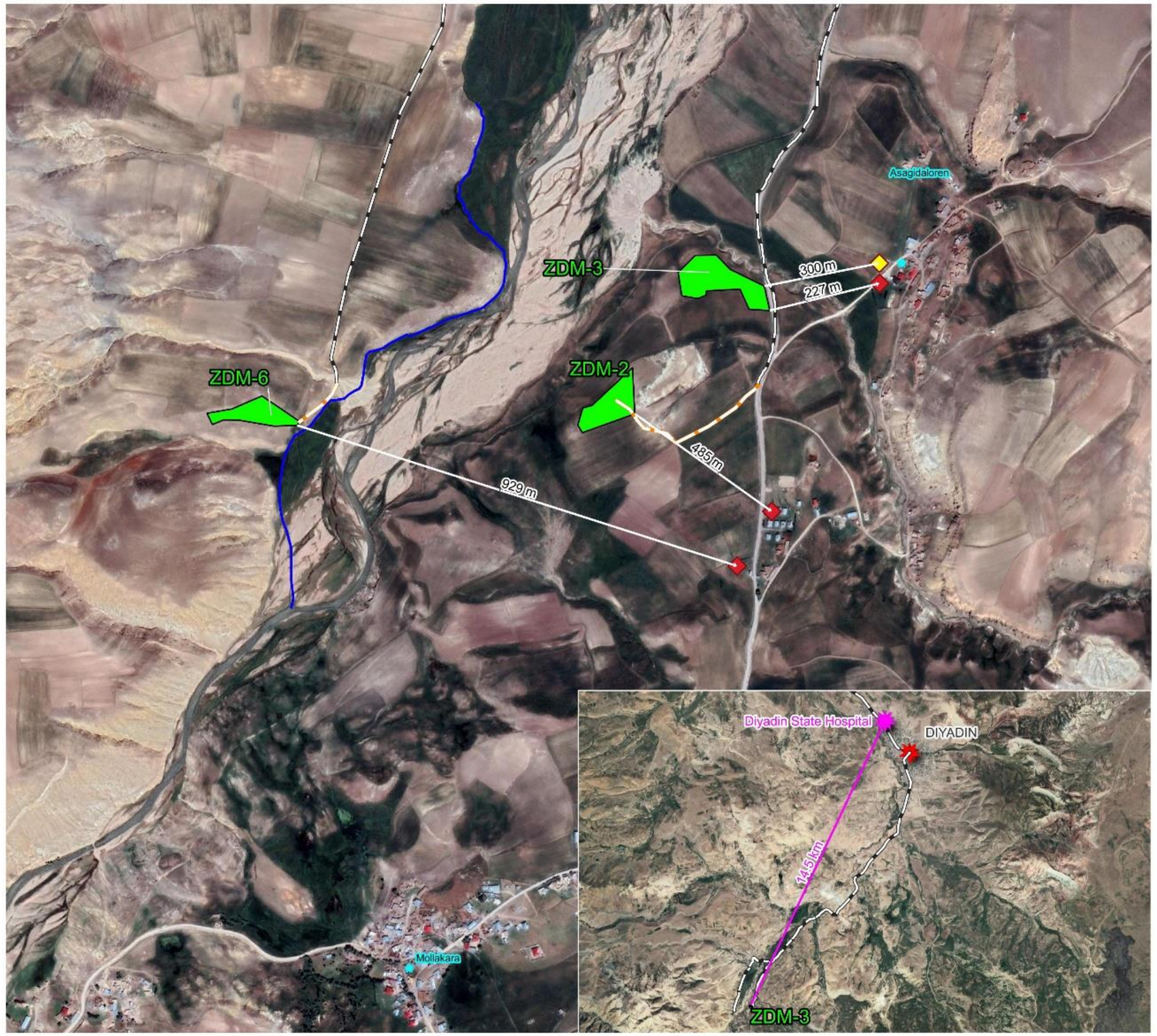
(*) Source: https://biruni.tuik.gov.tr/

According to the Agri 2022 Activity Report published by the Turkish Employment Agency, the province's employment ratio is 43.7%, whereas the number for Türkiye is 47.5% for the year 2022. The unemployment ratio on the other hand is 13.7% for the same year, as opposed to 10.4% in Türkiye. Most important industrial sectors in the province are production, service and mining (*Turkish Employment Agency, 2022*). The main source of livelihood for the people in Agri province is agriculture and animal husbandry (*www.agri.bel.tr*)

The closest school (Asagidaloren Primary School) is located in Asagidaloren village, 300 m northeast of ZDM-3, near Asagidaloren village center. The closest hospital is Diyadin State Hospital, which is located 14.5 km northeast of ZDM-3. These sensitive receptors in the vicinity of the well locations as well as the closest houses to each drilling well are shown in Figure 4-7 below. As seen in the Figure, Asagidaloren Primary School is located close to Asagidaloren village center and since access roads to the drilling sites do not pass through the village, neither the school nor the hospital will be affected by the Project.

According to Labour Force Statistics of TurkStat for the year 2022, the number of unemployed persons aged 15 years old and over is 3 million 582 thousand persons. The unemployment rate is 10.4%. The number of employed persons aged 15 years old and over is 30 million 752 thousand persons and employment rate are 47.5%. This rate is at 65% for men and 30.4% for women. Project phases will involve employment of personnel by the drilling contractor, as well as Zorlu Jeotermal personnel to be working at the drilling sites.

As long as the necessary skill set is available at the local level, Zorlu Jeotermal will consider local employment for the Project. If the drilling activities verify that geothermal power plant development is feasible at this site, the employment impact of the investment will potentially multiply.



Legend

- Geothermal Resource Exploration Drilling Areas within the scope of RSM / RSM Kapsamındaki Jeotermal Kaynak Arama Sondaj Alanları
- Closest Building/ En Yakın Hane
- Asagidaloren Primary School/ Aşağıdalören İlkokulu
- Diyadin State Hospital/ Diyadin Devlet Hastanesi
- Existing Secondary Roads/ Mevcut Tali Yollar
- Planned Access Roads/ Planlanan Ulaşım Yolları
- Murat River/ Murat Nehri
- Village Centers/ Köy Merkezleri

GEM Sustainability Services and Consultancy Inc.

Project Name / *Proje Adı*	:	Geothermal Resource Exploration Project
Map Title / *Harita Başlığı*	:	Sensitive Receptors / *Hassas Alıcılar*
Prepared for / *Proje Şirketi*	:	Zorlu Jeotermal Enerji Elektrik Üretimi A.Ş.
Projected Coordinate System / *Projeksiyon Koordinat Sistemi*	:	ED 50 UTM Zone 38
Sheet Size / *Sayfa Boyutu*	:	A3

N

0 100 200 m

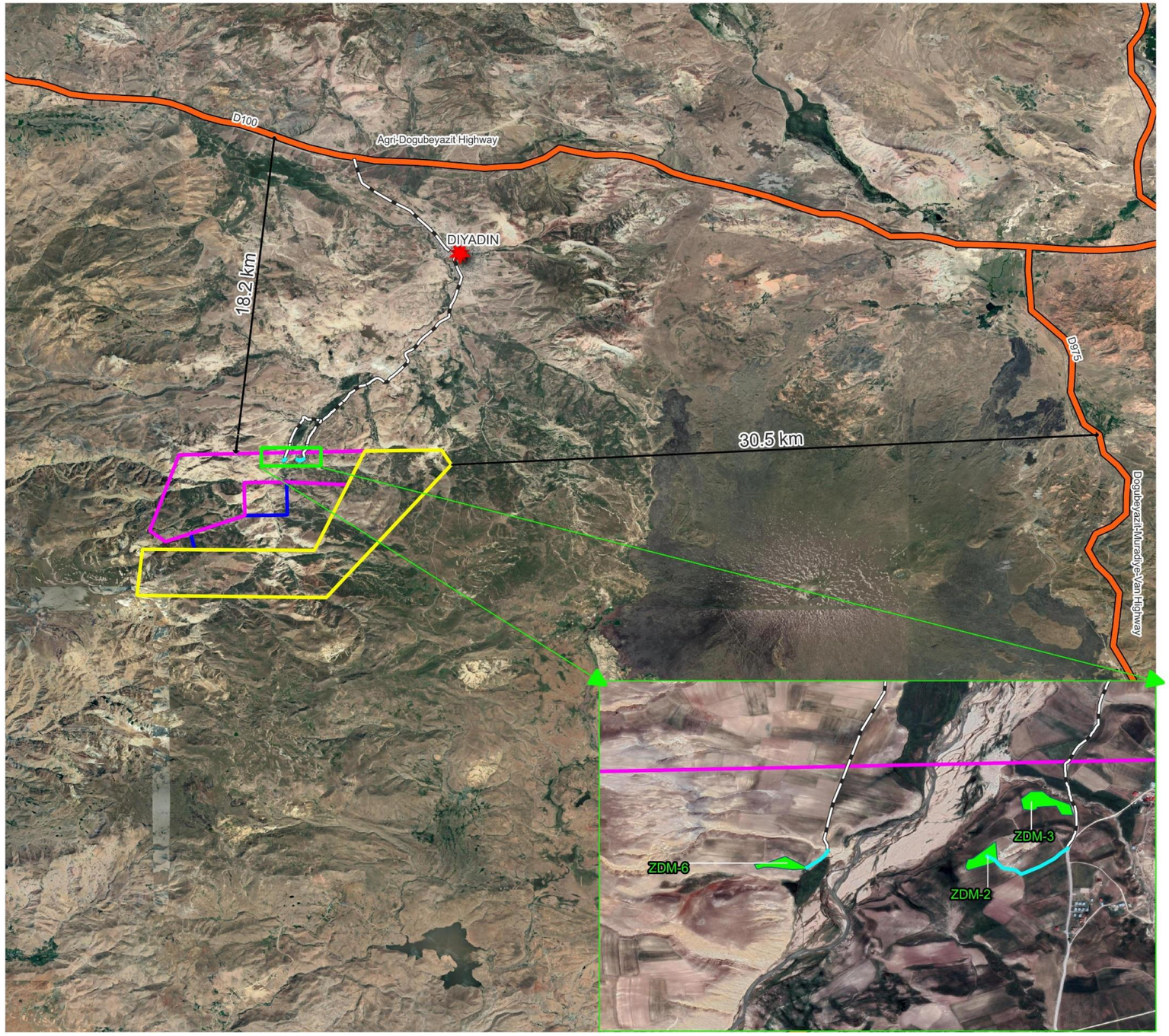
Basemap Source: Google Earth

Figure 4-7. The Sensitive Receptors in the Vicinity of the Well Locations

4.10. Traffic Baseline

The main highways (D100 Agri-Dogubeyazit Highway and D975 Dogubeyazit-Muradiye-Van Highway) and the existing side roads to be used for the transportation from/to the exploration license areas are shown in Figure 4-8 below. The Exploration License areas (License No: 36 and 37) are located approximately 18.2 km south of the D100 Agri-Dogubeyazit Highway. They are situated about 30.5 km west of the D975 Doğubeyazıt-Muradiye-Van Highway.

Parcel no. 102/25 (ZDM-3) is located next to an existing road. Access between the existing road and the drilling site will be provided through the boundaries of this acquired parcel. Thus, there will be no need for acquisition of additional parcels to provide access to ZDM-3 site. For both ZDM-2 and ZDM-6 well locations, as the decision to proceed with drilling will be taken by the technical teams based on the test results to be obtained at ZDM-3, final route to be used to reach the drilling sites will be determined in due course in consideration of the planned routes presented in Chapter 2.4, Figure 2-7.



Legend

- Geothermal Resource Exploration License Area No. 36 / 36 Numaralı Jeotermal Kaynak Arama Ruhsat Alanı
- Geothermal Resource Exploration License Area No. 37 (Polygon-1) / 37 Numaralı Jeotermal Kaynak Arama Ruhsat Alanı (Poligon-1)
- Geothermal Resource Exploration License Area No. 37 (Polygon-2) / 37 Numaralı Jeotermal Kaynak Arama Ruhsat Alanı (Poligon-2)
- Highway / Anayol
- Existing Secondary Roads / Mevcut Tali Yollar
- Planned Access Roads / Planlanan Ulaşım Yolları
- District Centers / İlçe Merkezleri

GEM Sustainability Services and Consultancy Inc.

Project Name / *Proje Adı*	:	Geothermal Resource Exploration Project
Map Title / *Harita Başlığı*	:	Existing and Planned Road Infrastructure / *Mevcut ve Planlanan Yol Altyapısı*
Prepared for / *Proje Şirketi*	:	Zorlu Jeotermal Enerji Elektrrik Üretimi A.Ş.
Projected Coordinate System / *Projeksiyon Koordinat Sistemi*	:	ED 50 UTM Zone 38
Sheet Size / *Sayfa Boyutu*	:	A3

N

0 2.5 5 km

Basemap Source: Google Earth

Figure 4-8. Location of the Exploration License Areas to the Highways

Annual average daily traffic values on D100 Agri-Dogubeyazit Highway and D975 Dogubeyazit-Muradiye-Van Highway are given in Figure 4-9 below.

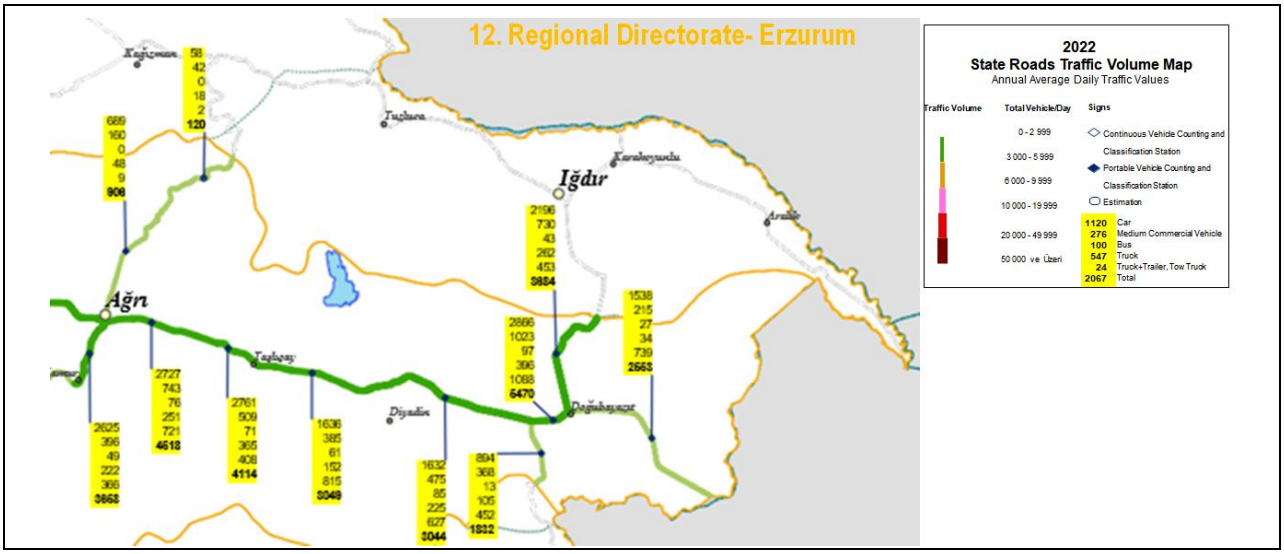


Figure 4-9. Traffic Volume Map for Agri province (www.kgm.gov.tr)

5. POTENTIAL IMPACTS

The potential impacts of the Project assessed within the scope of this ESMP as per the WB requirements are presented in Table 5-2. The definition of significance levels of potential impacts before mitigation measures are provided in Table 5-1 below. Duration of the potential impacts are classified as short-term (within the land preparation, exploration and closure and land rehabilitation phases of the respective well), medium-term (within 1 year following the completion of activities at the respective well site) and long term (beyond 1 year).

Mitigation measures addressing the potential impacts on each environmental and social component identified are further provided under the Environmental and Social Mitigation Plan (ESMP) for land preparation, exploration and closure and land rehabilitation phases of the Project is presented in Chapter 6 – Table 6-1. Mitigation Plan for the Project.

Table 5-1. Definition of Significance Levels

Significance Level	Definition of Significance Levels
Major	Impacts are considered to be very important and are likely to be material in decision-making, which would be associated with sites or features of international, national or regional importance as well as local importance if the site or feature is subject to a major change. Mitigation measures are imperative to reduce the significance to lower levels before proceeding with the Project.
Moderate	Impacts are not likely to be key decision-making factors. The cumulative impacts of such factors may influence decision-making, if they lead to an increase in the overall adverse effect on a particular receptor/resource. If possible, impact significance are to be reduced to lower levels by taking mitigation measures; otherwise acceptance of associated risks is required for proceeding with the Project.
Minor	Impacts may be raised as local factors, which are unlikely to be critical in the decision-making process, but important in enhancing the subsequent design of the Project. Assurance of compliance with standards and safety criteria is sufficient to proceed.
Negligible	No impact or impacts are beneath the level of perception so that they are acceptable with normal operating procedures.

Note: The matrix and the definitions have been adapted by GEM from Institute of Environmental management and Assessment-IEMA, 2011

Table 5-2. Potential Impacts for the Project

Environmental and Social Topics/Impacts	Project Phase	Duration and Significance of the Impact (before mitigation/ management)	Summary Description of Potential Impact (before mitigation/ management)
Negative/Positive Impacts			
Biodiversity and Natural Resources	Land preparation Closure and Land rehabilitation	Short-term minor impact	• Disturbance of habitats and wildlife species due to Project activities, e.g. dust, noise, unseasonal working, poor sitting of new works, disposal of untreated wastes, etc. • Habitat loss and fragmentation due to removal of topsoil, clearance of vegetation • Damage to/loss of flora species due to Project activities • Disturbance to fauna species due to Project activities
	Exploration	Short-term minor impact	• Disturbance of habitats and wildlife species due to Project activities, e.g. dust, noise, unseasonal working, poor siting of new works, disposal of untreated wastes, etc. • Damage to/loss of flora species due to Project activities • Disturbance to fauna species due to Project activities
Soil and Land Use	Land preparation Closure and Land rehabilitation	Short-term minor impact	• Loss of topsoil during preparation of rig sites, construction of access roads or disposal of excavated materials • Soil contamination due to accidental spills and releases of hazardous materials and wastes associated with storage and handling of fuels, oil and chemicals • Soil contamination due to accidental discharge of domestic wastewater • Damage to soil structure due to material storage, traffic etc. • Erosion due to uncontrolled surface run-off where vegetation is cleared • Landslips on embankments and hillsides

	Exploration	Short-term minor impact	• Soil contamination due to accidental spills and releases of hazardous materials and wastes associated with storage and handling of fuels, oil and chemicals as well as drilling and well testing activities
			• Damage to soil structure due to material storage, traffic etc.
			• Erosion due to uncontrolled surface run-off where vegetation is cleared
			• Landslips on embankments and hillsides
			• If mitigation measures are not in place contamination/pollution of soil due to
			  ○ discharge of drilling fluid, drilling mud, cuttings, debris
			  ○ discharge of cleaning water
			  ○ discharge of domestic wastewater from camp site
			  ○ possible overflow from mud pits
			  ○ discharge of geothermal fluid and extracted water from exploration wells during testing i.e., completion fluids

Environmental and Social Topics/Impacts	Project Phase	Duration and Significance of the Impact (before mitigation/ management)	Summary Description of Potential Impact (before mitigation/ management)
			○ project activities: use of drilling chemicals, use of fuel and oil, leakages/spills from on-site use and storage of hazardous chemicals and hazardous wastes, etc. ○ well blowout during drilling
Water Resources	Land preparation Closure and Land rehabilitation	Short-term minor impact	• If mitigation measures are not in place contamination/pollution of water resources due to ○ discharge of domestic wastewater from camp site ○ project activities: use of chemicals, use of fuel and oil, leakages/spills from on-site use and storage of hazardous chemicals and hazardous wastes, etc.
	Exploration	Short-term minor to moderate impact	• If mitigation measures are not in place contamination/pollution of water resources due to ○ discharge of drilling fluid, drilling mud, cuttings, debris ○ discharge of cleaning water ○ discharge of domestic wastewater from camp site ○ possible overflow from mud pits ○ discharge of geothermal fluid and extracted water from exploration wells during testing i.e., completion fluids ○ project activities: use of drilling chemicals, use of fuel and oil, leakages/spills from on-site use and storage of hazardous chemicals and hazardous wastes, etc. ○ well blowout during drilling • Contamination of fresh groundwater resources in case of percolation of thermal groundwater and mud leak to concerning formations during drilling and testing
Air Quality	Land preparation Closure and Land rehabilitation	Short-term minor impact	• Dust emissions due to earthmoving activities, i.e. arrangement of drilling rig area, construction of access roads, closure of site, land rehabilitation and on-site and off-site transport traffic • Generation of exhaust gas from generators and vehicles • Project's potential impacts on ambient air quality including dust emissions are calculated and evaluate as per the national legislation in Project PIF, which are provided in Appendix F.
	Exploration	Short-term minor impact	• Toxic gas emissions during drilling and well testing (hydrogen sulfide, mercury etc.) as well as emergencies • Dust emissions due to on-site and off-site transport traffic • Generation of exhaust gas from generators and vehicles Project's potential impacts on ambient air quality including dust emissions are calculated and evaluate as per the national legislation in Project PIF, which are provided in Appendix F.

Environmental and Social Topics/Impacts	Project Phase	Duration and Significance of the Impact (before mitigation/ management)	Summary Description of Potential Impact (before mitigation/ management)
Noise	Land preparation Closure and Land rehabilitation	Short-term minor impact	• Noise impacts on local communities and local fauna features due to on-site and off-site use of vehicles, and on-site use of equipment and generators
	Exploration	Short-term minor impact	• Noise impacts on local communities and local fauna features due to on-site and off-site use of vehicles, and on-site use of equipment and generators • Increased noise levels and impacts on local communities and fauna features due to drilling activities including drilling rig, testing activities, usage of vehicles, equipment, and generators, increased traffic etc. Worst-case scenario noise values of vehicles and equipment to be used within the Project provided in Project PIF are provided in Appendix G. Worst-case noise levels as per distances table is also included and compared with the Project's standards on noise. As per the table provided in Appendix G, the estimated noise levels exceed the noise limit values at the closest receptors identified for the drilling wells.
Land Loss/Acquisition	Land preparation Exploration Closure and Land rehabilitation	Short to medium-term minor impact	• Displacement impacts due to Project-related land acquisition and access restrictions (e.g. economic displacement) (please see Chapter 2.2 for information on Project Land Use and Ownership) • Damage to neighboring land plots/structures/assets
Waste Management	Land preparation Closure and Land rehabilitation	Short-term minor impact	• Impacts of hazardous and non-hazardous wastes including domestic waste, recyclable waste (e.g. packaging, plastic, glass, etc.), medical waste, waste oil, waste vegetable oil, excavation waste, chemical waste, used accumulators and batteries, electrical and electronic waste etc. generated on site (on environmental resources, community and personnel health and safety and visual amenity), if not managed properly
	Exploration	Short-term minor to moderate impact	• Impacts of hazardous and non-hazardous wastes including domestic waste, recyclable waste (e.g. packaging, plastic, glass, etc.), medical waste, waste oil, waste vegetable oil, excavation waste, drilling mud, cuttings and debris, chemical waste, used accumulators and batteries, electrical and electronic waste, waste geomembrane etc. generated on site (on environmental resources, community and personnel health and safety and visual amenity), if not managed properly • Contamination/pollution due to storage and disposal of drilling mud including cuttings and debris, if not managed properly
Landscape and Visual Impacts	Land preparation Exploration	Short-term low impact	• Local visual impact of completed works and some intrusions into general manmade and natural landscape, change of vegetation etc.

Environmental and Social Topics/Impacts	Project Phase	Duration and Significance of the Impact (before mitigation/ management)	Summary Description of Potential Impact (before mitigation/ management)
	Closure and Land rehabilitation		• Visual impacts due to removal of vegetation, preparation of drilling areas including earthworks and ground movement, construction of access roads and the physical presence of drill rig, mud pits, construction vehicles and equipment • Dust emissions during the Project activities • On-site waste generation and storage during the Project activities
Traffic and Transport	Land preparation Exploration Closure and Land rehabilitation	Short-term low impact	• Increased traffic in the vicinity of the drilling wells due to Project activities
Cultural Heritage and Archaeology	Land preparation Closure and Land rehabilitation	Short-term medium impact	• Disturbance, damage, degradation to undiscovered sites
Community Health and Safety	Land preparation Exploration Closure and Land rehabilitation	Short-term minor to moderate impact	• Impact mainly caused by disturbance from site activities and labor including; - Light - Toxic gas emissions - Noise - Generation of dust emissions - Impacts on water resources - Unauthorized site access - Conflict between local communities and security personnel - Labor influx
Labor and Working Conditions	Land preparation Exploration Closure and Land rehabilitation	Short-term minor impact	• Risks/impacts associated with workers' accommodation conditions (e.g. incompliance with the international standards, spread of diseases among the Project personnel, reduced worker motivation, etc.) • Labor related impacts associated with incompliance with WB policies, ILO Conventions and national Labor Law • As long as the necessary skill set is available, local employment for the Project
Occupational Health and Safety	Land preparation Exploration Closure and Land rehabilitation	Short-term minor to moderate impact	• Traffic, • Hot work and heat from geothermal drilling, • Toxic gas emissions, • Air emissions (other than toxic geothermal gasses), • Noise, • Exposure to chemicals,

Environmental and Social Topics/Impacts	Project Phase	Duration and Significance of the Impact (before mitigation/ management)	Summary Description of Potential Impact (before mitigation/ management)
			• Confined spaces • Physical hazards (collision with moving objects and machinery, working at height, lifting operations, falling objects, ergonomic injuries and illnesses, slips and falls) • Other potential hazards (potential heat exhaustion, dehydration, hypothermia, excessive exposure to sun, etc.) • Communicable diseases (potential increase in prevalence of communicable and vector borne diseases) • Non-routine exposures including potential blowout accidents during drilling

6. ENVIRONMENTAL AND SOCIAL MITIGATION PLAN

The Environmental and Social Mitigation Plan for the land preparation, exploration and closure and land rehabilitation phase of the Project is presented in Table 6-1. Mitigation Plan for the Project. The Plan has been prepared to set forth measures to be taken to mitigate potential impacts on environmental and social components that are identified within the scope of this document.

The main objective of the Mitigation Plan is to identify and implement environmentally and socially sound practices that are required to avoid and where avoidance is not possible, minimize the Project's potential impacts on the environment, Project workforce, local communities, and the biodiversity features, and to ensure compliance with provisions of the Turkish legislation, applicable international standards and guidelines, as well as good international industry practice (GIIP).

The Mitigation Plan also identifies the requirement for development and implementation of subject-specific environmental and social sub-management plans as also referenced by the RSM Beneficiary Manual v3.0 (April 2023).

6.1. Pre-mobilization Requirements

- **Permits**

- In August 2020, Zorlu Jeotermal acquired Exploration License No. 36 and Exploration License No. 37 from Agri Provincial Special Administration (Appendix A.1 and A.2). In August 2023, Zorlu Jeotermal has applied for an extension of 1 year for both Licenses. As per the official letter of Agri Provincial Special Administration (dated 16 August 2023), both licenses have been extended for 1 year by the Agri Provincial Special Administration (valid until August 2024, please see Appendix A.3).

- "EIA Not Required" Decision for the Geothermal Resource Exploration Project (which includes 3 drilling wells within the scope of RSM process) was obtained on 4 July 2022 by Agri PDoEUCC (Decision No. 202239) (Appendix B).

- The exploration studies of Zorlu Jeotermal will start in ZDM-3 well location.

  Permit for the use of agricultural land for non-agricultural purposes has been obtained for the ZDM-3 well location (Parcel No. 102/25) with the official letter Provincial Directorate of Agriculture and Forestry, dated 1 June 2023 (See Appendix Appendix C).

- In case Zorlu Jeotermal decides to continue with ZDM-2 and ZDM-6 well locations based on the outcomes of ZDM-3 drilling well;

  - Zorlu Jeotermal will obtain the change of allocation permit for pasture land for ZDM-6 well location prior to the start of activities, as per the official letter of Provincial Directorate of Agriculture and Forestry dated 23 June 2022 (See Appendix Appendix C).

  - For ZDM-2 well location, Zorlu Jeotermal will consider either lease of the land from the landowner(s) through execution of land lease agreements or purchase of the land on willing buyer-willing seller basis and permits that are required by the authorities will be obtained prior to land entry.

- Regarding the access roads, ZDM-3 well location (Parcel No. 102/25) is located next to an existing road. Access between the existing road and the drilling site will be provided through the boundaries of this acquired parcel. The planned access routes to reach ZDM-2 and ZDM-6 well locations are described in detail in Section 2.4 ("*Planning for Access Roads*"). Within the scope of access routes, for the privately-owned parcels, mutual agreements will be executed through consent letters on market prices with the owner(s)/shareholder(s) and for state-owned parcels relevant permits and land use rights will be obtained from the related authorities for temporary use of lands for site access. Permits required by the authorities as per the national legislation will be obtained prior to land entry on these parcels (e.g. permit for the use of agricultural land for non-agricultural purposes

for agriculture parcels or change of allocation purposes for parcels within the scope of Pasture Law (Law No. 4342, 1998)).

- All the permits/licenses required for the Project activities will be obtained prior to start of operations at each well site.
- Water usage permit will be taken in case make-up water will be obtained from groundwater well prior to the mobilization.

- **E&S Documents**

The following sub-management plans are to be developed in accordance with the provisions of this ESMP and the contractors' E&S practices, their roles and responsibilities and associated procedures after the approval of the ESMP and before the site mobilization:

- Community Health and Safety Management Plan
- Effluent Management Plan
- Hazardous Materials Management Plan
- Occupational Health and Safety Plan (including Emergency Response Plan and risk assessment)
- Traffic Management Plan
- Waste Management Plan
- Chance Finds Procedure

Zorlu Jeotermal is responsible for preparing the sub-management plans and ensuring obtaining approval for the sub-management plans by RSM Unit before any site activities.

The ESMP and sub-management plans will be provided as appendices to the contractors' contracts and the requirement of compliance will also be emphasized within the contracts. Zorlu Jeotermal shall ensure effective implementation of the provisions given in this ESMP, SEP and the sub-management plans by the drilling contractor and all other subcontractors through contractual requirements.

Zorlu Jeotermal will submit the required E&S documentation (obligatory OHS documents, employment records of personnel, OHS file of employees etc.) of its own and of its contractors to the RSM Unit to obtain approval. Zorlu Jeotermal will take the approval from the RSM Unit before entering the site. With each contractor engagement, the E&S documentation of the contractor will be submitted to the RSM Unit for approval before the contractor enters the site. With each new employment, the OHS file and training records of the employee will be submitted to the RSM Unit within the monthly E&S monitoring reports.

Zorlu Jeotermal will ensure that this ESMP and sub-management plans are updated by qualified persons as necessary, providing necessary resources and personnel for implementation of the plans throughout the exploration and drilling activities.

- **Project Team**

A full time and site based ESHS Representative will be appointed by Zorlu Jeotermal for management of environmental and social issues at the Project site. The ESHS Representative will be an OHS specialist and supported by an E&S consultancy company which will conduct daily and weekly audits at the Project site and prepare monthly monitoring reports to RSM Unit during the Project lifetime.

During the Project lifetime, the ESHS Representative will monitor the site works of the contractors and support them during implementation of the E&S mitigation measures provided in the ESMP and sub-management plans.

The ESHS Representative will check the required E&S documentation of Zorlu Jeotermal and the contractors (obligatory OHS documents, employment records of personnel, OHS file of employees etc.) and internally approve them.

- **Land Acquisition**

The Project land acquisition process for drilling locations is detailed in Section 2.3 ("*Land Acquisition Process for Drilling Locations*"). Zorlu Jeotermal will undertake additional consultation meetings with the owner of the acquired parcel of ZDM-3 well location (Parcel No. 102/25). In case Zorlu Jeotermal decides to continue with ZDM-2 and/or ZDM-6 well locations, and with the ultimate objective of managing potential expectations of the local people through a transparent, fair and appropriate approach, Zorlu Jeotermal will be undertaking consultation meetings with the users of public lands and/or landowner(s).

Regarding the access roads, Parcel No. 102/25 (ZDM-3 well location) is located next to an existing road.

For ZDM-2, in case the existing agricultural soil road passing between the boundaries of the neighboring parcels are required to be expanded, and for ZDM-6, for the parcels located on the agricultural soil road and in case expansion is required on the existing road (please see Section 2.4 ("*Planning for Access Roads*") for more details):

- For the privately owned parcels, the required permits to use the land will be obtained from relevant authorities and mutual agreements will be executed through consent letters on market prices with the owner(s)/shareholder(s) for temporary use of lands for site access.
- For the state-owned parcels, relevant permits and land use rights will be obtained from the related authorities for temporary use of treasury land for site access.

Once the decision to proceed with ZDM-2 and ZDM-6 is taken and the land acquisition process planning is detailed, the formal and informal users (for agriculture, animal husbandry, etc.) of the affected parcels, if any, will be identified through site surveys during the route studies and consultations with users of the lands to be affected for access road construction and/or expansion will be planned and carried out prior to land entry and mobilization to determine any potential social and economic impact, in a similar approach to the consultations to be held for ZDM-2 and ZDM-6 drilling locations. If any formal and/or informal users of the affected parcels are identified, they will be compensated for their assets on the land prior to start of any construction activities in line with the replacement cost requirements of OP 4.12 and compliant with the entitlements and principles defined in the WB Geothermal Development Project Resettlement Policy Framework (RPF) for the respective impact categories and ownership types including formal and informal users of land. As such, in case there is permanent or temporary loss of income for the owners, or formal/ informal users of the affected land leading to economic displacement impacts, affected people will be provided with livelihood assistance (type of assistance will be determined according to the nature and scale of the impact in consultation with the affected people and in agreement with the TKYB/RSM Consultant. Compensation/ assistance will be provided to affected people before the start of any civil works in these locations.

Zorlu Jeotermal commits to continuously record and regularly report to the RSM Unit the stages of the land acquisition process for ZDM-2 and ZDM-6 well locations and access roads reaching to ZDM-2 and ZDM-6 including engagements, consultations, agreements, efforts to avoid or minimize potential impacts on landowners and users with evidential data and documents. As such, Zorlu Jeotermal commits that the land acquisition requirements, consultation records and relevant measures/compensation strategies will be documented and shared with TKYB/RSM Consultant for their review/approval. No site work will start before the approval of TKYB/RSM Consultant on the land acquisition issues as per WB Geothermal Development Project Environmental and Social Management Framework (ESMF) requirements.

In the case of need of expansion of the existing soil road reaching to ZDM-2, Zorlu Jeotermal execute mutual agreements through consent letters with the owner(s)/shareholder(s) for temporary use of lands for site access and obtain all required permits from the relevant authorities to use the land before site entry.

The draft final versions of the ESMP and SEP will be disclosed and consulted with the stakeholders and will be finalized by incorporating the feedback received from the stakeholder consultations.

Consultations with the relevant stakeholders specified in the SEP will be conducted in the upcoming phases of the Project upon approval of the SEP by the RSM partners and prior to land entry and start of mobilization at parcels.

- **Others**

During the Project lifetime, the E&S monitoring studies will be performed by utilizing inspections, audits, control and checks. The identified corrective measures will be recorded, reported and tracked with the non-conformity logs.

On the first day when the employee enters the site, an orientation training will be hold on OHS and E&S aspects of the Project for each project personnel (Zorlu Jeotermal's, contractor's, subcontractor's, service provider's personnel, if there is any) employed and for visitors by the ESHS Representative of Zorlu Jeotermal. The Contractors will provide OHS and E&S trainings to its employees and take the records. Zorlu Jeotermal will ensure the OHS and E&S trainings are provided by the contractors and the records are in place. Zorlu Jeotermal will also conduct OHS and E&S trainings for its employees and for project employees and take the records.

An internal audit system will be implemented by Zorlu Jeotermal to check and monitor the compliance of drilling contractor, and all subcontractors with the environmental and social requirements of the Project. This internal audit system will be documented in the form of a procedure before the site entry.

The baseline measurement-analysis program will be reported to the RSM Unit in advance including measurement and analysis sampling points on map, duration of the measurements, parameters to be analyzed, reference to the parameters (regulations, best practices etc.). Once the RSM Unit approves the program, the quotes will be taken and presented to the RSM Unit for approval. After the approval, the program could start. The results will be presented as a brief report containing result reports as an annex.

Zorlu Jeotermal commits to review the groundwater resources around the well locations, identify formal or informal users of such resources if any, and inform the RSM Unit about the outcomes of these studies prior to mobilization for the Project.

6.2. Mitigation Plan

Table 6-1. Mitigation Plan for the Project

			Cost to:		Institutional Responsibility to:	
Topic/Impact	**Project Phase**	**Mitigation Measure**	**Install**	**Operate**	**Install**	**Operate**
Biodiversity and Natural Resources	• Land preparation • Closure and Land rehabilitation	• Careful micro-siting, alignment, design of rig sites. • Limit earthworks and land preparation activities to work zones. • Plan the location of the mud pits away from riparian ecosystems, wetlands and flood plains. • Do not allow vehicle and machinery use outside designated sites and routes. • Allow enough time for animal species to leave the working areas before work starts. • If encountered, ensure nests of birds and mammals are empty before activities continue. • Prevent intentional killing of any animal species that will be encountered. • Prevent secondary impacts of air emissions, noise and waste generation on biodiversity values through implementing related mitigation measures (mitigation measures to be implemented for each subject are included in this table under relevant sub-headings). • Train site personnel on the significance of biodiversity values and include subject specific trainings within the scope of EHS trainings to be provided at the time of the employment and then regularly. • Avoid destruction of vegetation for purposes other than planned Project activities. • Avoid direct impact on water bodies through disturbance/contamination. • Implement speed limits to minimize effects on biodiversity values. • Limit Project activities to designated areas to prevent direct impacts, to the extent feasible. • Avoid sediment transport to aquatic ecosystems induced by erosion at the drilling well areas. • After the completion of exploration activities, fully reinstate all land that is not permanently affected during exploration works. • Quantity of natural sources (energy, water, fuel oil etc.) used during the project works will be recorded and it will be aimed to decrease use of the natural sources every month in accordance with the resource efficiency target.	No additional cost (Included in the scope and budget of drilling contractor)	No additional cost (Included in the scope and budget of drilling contractor)	Zorlu Jeotermal and Drilling Contractor (under supervision of Zorlu Jeotermal)	Zorlu Jeotermal and Drilling Contractor (under supervision and monitoring of Zorlu Jeotermal)
	• Exploration	• Do not allow vehicle and machinery use outside designated sites and routes. • Allow enough time for animal species to leave the working areas before work starts. • If encountered, ensure nests of birds and mammals are empty before activities continue. • Prevent intentional killing of any animal species that will be encountered. • Prevent secondary impacts of air emissions, noise and waste generation on biodiversity values through implementing related mitigation measures (mitigation measures to be implemented for each subject are included in this table under relevant sub-headings). • Train site personnel on the significance of biodiversity values and include subject specific trainings within the scope of EHS trainings to be provided at the time of the employment and then regularly. • Avoid destruction of vegetation for purposes other than planned Project activities. • Avoid direct impact on water bodies through disturbance/contamination. • Implement speed limits to minimize effects on biodiversity values. • Limit Project activities to designated areas to prevent direct impacts, to the extent feasible. • Avoid sediment transport to aquatic ecosystems induced by erosion at the drilling well areas. • Cover the top of mud pits in order to prevent birds from coming into contact with contaminated mud. • Quantity of natural sources (energy, water, fuel oil etc.) used during the project works will be recorded and it will be aimed to decrease use of the natural sources every month in accordance with the resource efficiency target.				
Soil and Land Use	• Land preparation • Closure and Land rehabilitation	• Prior to start of activities, conduct baseline soil quality measurements at around drilling sites that have no potential for future contamination for parameters identified based on the NACE Code of the Project listed in Appendix-2 Table 2 of TSPCR in line with the WBG EHS Guidelines and national legislation to identify baseline conditions (inform the RSM Unit before the measurements for obtaining the consent of the RSM Unit). • Strip topsoil at a sufficient depth suitable for local soil conditions prior to site activities. • Do not carry out stripping when soil is wet and use lightweight tracked vehicles or wheeled vehicles for soil stripping to avoid compaction. • Store topsoil and excavation material separately from each other at the designated topsoil and excavation material areas at suitable conditions so as to preserve its vegetative properties. • Provide topsoil be stored with a slope of no more than 5%, no more than 2 m height and on a fishbone shaped where slopes are lightly compacted with the excavator bucket to prevent erosion and preserve the quality of the soil.	No additional cost (Included in the scope and budget of drilling contractor)	No additional cost (Included in the scope and budget of drilling contractor)	Zorlu Jeotermal and Drilling Contractor (under supervision of Zorlu Jeotermal)	Zorlu Jeotermal and Drilling Contractor (under supervision and monitoring of Zorlu Jeotermal)

			Cost to:		Institutional Responsibility to:	
Topic/Impact	**Project Phase**	**Mitigation Measure**	**Install**	**Operate**	**Install**	**Operate**
		• Provide drainage at topsoil storage areas by open channels. • Apply organic or inorganic materials on the topsoil to improve quality and avoid erosion or invasion of wild species. • Provide drainage channels where necessary to minimize erosion induced by surface runoff especially to higher risk areas such as drilling rig. • Design of slopes and retaining structures to minimize the risk of erosion, provide appropriate drainage, soil stabilization/vegetation cover. • Limit site works only to work zones and do not allow machinery/vehicles to conduct work outside of the work zones. • Do not schedule earthworks activities during extreme weather conditions (heavy rain, heavy wind, etc.). • Include subject specific trainings to site personnel within the scope of EHS trainings to be provided at the time of the employment and then regularly. • Develop and implement a Hazardous Materials Management Plan compliant with the national legislation, WB OPs, WBG EHS Guidelines, and applicable requirements of GIIP in order to manage risks associated with potential spills and leaks. See the spill response measures briefly given in the measures list for Water Resources. • Ensure commitments as stipulated by Provincial Directorate of Agriculture and Forestry dated 23 June 2022 are in place for land use for ZDM-6 well location: - No activity or action should be undertaken without applying for a change of allocation purpose of these pasture lands as per Article 14 of the Pasture Law (Law No. 4342, 1998). - Regarding the lands classified as “agricultural land, uncultivated land, meadow”, Provincial Directorate has no objection if the necessary permits are to be obtained in accordance with the provisions of Law on Soil Conservation and Land Use (Law No. 5403, 2005). • Submit Activity Preliminary Information Form (*Faaliyet Ön Bilgi Formu*) through the web-based platform of MoEUCC, as per the requirements of Regulation on Soil Pollution Control and Point Source Contaminated Lands (TSPCR). • Ensure that existing roads and side roads are used to access drilling well locations. If access road construction is required, ensure the access roads are as narrow and short as technically possible. • Ensure the septic tanks are in effective use to avoid soil contamination by domestic wastewater. • Reuse the excavated material in the filling of the mud pits. • Reuse topsoil for rehabilitation and restoration of soil profiles. • After the completion of Project activities, fully reinstate all land that is not permanently occupied, including the camp site area. • Send the excess excavation material that will not be used in the filling activities to the licensed waste storage areas as per the requirements of the Regulation on the Control of Excavation Soil, Construction and Demolition Waste.				
	• Exploration	• Develop and implement a Hazardous Materials Management Plan compliant with the national legislation, WB OPs, WBG EHS Guidelines, and applicable requirements of GIIP in order to manage risks associated with potential spills and leaks. See the spill response measures briefly given in the measures list for Water Resources. • Collect/store the drilling mud generated during the drilling activities in leak-proof mud pits that will be constructed adjacent to the drilling site (Please see Section 2.5 for information on the mud pits’ capacity). • Ensure the septic tanks are in effective use to avoid soil contamination by domestic wastewater. • Ensure the base and sidewalls of the mud pits are lined with a geomembrane to ensure impermeability. • Construct drainage channels around mud pits and establish the edges of the pit higher than the surface level to divert the surface runoff from entering. • Include subject specific trainings to site personnel within the scope of EHS trainings to be provided at the time of the employment and then regularly. • Limit site works only to work zones and do not allow machinery/vehicles to conduct work outside of the work zones. • Ensure both mud pits for each drilling well are established before the start of exploration phase. • Ensure the mud pits are emptied after the drilling operations and before the well testing operations begin. • Ensure extra storage tanks to be provided by the contractor as per Zorlu Jeotermal’s request are provided and ready to use before the test operations. • Install blowout and leak prevention systems (i.e. blowout preventer (BOP) systems) in each well.				
Water Resources	• Land preparation • Closure and Land rehabilitation	• Prior to start of activities, conduct baseline surface water quality measurements at the closest surface water resource (please see Table 2-3) for parameters listed in Appendix-5 of Regulation on Surface Water Quality in line with the WBG EHS Guidelines and national legislation to identify baseline conditions (inform the RSM Unit before the measurements for obtaining the consent of the RSM Unit).	No additional cost (Included in the scope and budget	No additional cost (Included in the scope and budget	Zorlu Jeotermal and Drilling Contractor (under	Zorlu Jeotermal and Drilling Contractor (under supervision and

			Cost to:		Institutional Responsibility to:	
Topic/Impact	**Project Phase**	**Mitigation Measure**	**Install**	**Operate**	**Install**	**Operate**
		• Develop and implement an Effluent Management Plan compliant with the national legislation, WB OPs, WBG EHS Guidelines, and applicable requirements of GIIP. • Fulfill the following measures/commitments stipulated by 8th Regional Directorate of DSI in their official letters dated 19 June 2022 and 22 May 2023 for the protection of water resources throughout the Project operations: - In case of any Project-related adverse impacts on the quality and quantity of groundwater, all damages shall be borne by the owner of the activity, and the activity shall be ceased, and the actions shall be put in place as per the requirements of the related institution. - All necessary measures for containment and leak-proofness of the Project components and waste areas shall be in place. All applicable legislation shall be complied with in the framework of the protection of groundwater and groundwater resources. - Throughout construction, operation, and subsequent stages of the activity, no solid or liquid waste shall be discharged to groundwater and streams, the flow of dry streams shall not be disrupted, the specified permitted EIA coordinates shall not be exceeded, necessary precautions should be taken regarding flooding and material flow, the narrowness of dry and perennial flowing river beds corresponding to the mentioned areas shall not be altered, river bed stability shall not be compromised, unrestricted flow should be maintained, no waste materials shall be dumped into rivers, no damage shall be caused to agricultural lands, and all damages or losses that may occur due to the Project activities shall be covered by the activity owners/facility operators. Compliance with the relevant provisions of the Water Pollution Control Regulation, applicable laws, and other commitments as stated in the PIF is mandatory throughout Project implementation. - Activities on Lot/parcel no: 102/25 shall be conducted after establishing a 10-meters protection zone from the dry riverbed and taking necessary flood protection measures. • Ensure the domestic wastewater generated at the camp site is managed by storing in septic tanks, control of septic tanks for fullness and regularly emptying the septic tanks by licensed vacuum trucks discharging to treatment facilities in line with the Effluent Management Plan, preventing any discharge into groundwater and surface water resources. • Ensure the domestic wastewater is only collected in impermeable cesspools/ septic tanks, with no discharge to receiving environments. • Ensure appropriate domestic wastewater transport agreements are in place with the related Municipality and continuously monitor the used capacity of the impermeable cesspools/ septic tanks for transport by Municipality vacuum trucks, as required. • Keep the records of each transportation with sufficient evidence of transport. • Keep an up to date hazardous material list showing the name, hazards, amount and location. • Ensure hazardous materials are managed and stored in designated areas with secondary containment as per WBG General EHS Guidelines, keeping absorbent pads or materials next to storage areas and keeping drums and containers containing fuel, oil or other chemicals in a containment with a capacity of up to 110% of the volume of material stored. • Provide Safety Data Sheets (SDS) written in the native language of the workers for each hazardous material at the hazardous materials storage areas and at work sites where the materials are used. • Ensure only competent and authorized personnel are permitted to use the hazardous materials and substances and that they have obtained specific training regarding the handling of hazardous materials. • Implement Hazardous Material Management Plan to minimize possible effects of any spillage and or leakage to any water body. • Provide spill response material including spill kits, and fire extinguishers in hazardous materials storage areas and where the hazardous materials are in use in case of any spillage and leakage. • Ensure competent and trained personnel/team are appointed for a timely and effective response to spills and leaks. • Ensure clear procedures are in place and informed/trained to personnel for adequate spill response. • Ensure spill drills are performed with the participation of all personnel on site to raise awareness. • Report environmental incidents to the RSM Unit in 1 business day and then submit the investigation report the RSM Unit in 15 business days. • Ensure dust suppression is applied during land preparation and closure and land rehabilitation phases and also if a grievance is received. • Ensure periodical maintenance of vehicles is conducted off-site and by licensed firms. If required, ensure that onsite maintenance is conducted on impermeable ground to prevent any potential leakage/ spill from reaching the soil.	of drilling contractor)	of drilling contractor)	supervision of Zorlu Jeotermal)	monitoring of Zorlu Jeotermal)

			Cost to:		Institutional Responsibility to:	
Topic/Impact	**Project Phase**	**Mitigation Measure**	**Install**	**Operate**	**Install**	**Operate**
		• Include subject specific trainings to site personnel within the scope of EHS trainings to be provided at the time of the employment and then regularly. • Identify existing groundwater users, if any, in the vicinity of the exploration wells (e.g. 1 km) to ensure any accidental leakage/spillage to the groundwater due to project activities can be communicated on time. Inform the RSM Unit about the outcomes of these studies prior to mobilization. • During the Project activities, if a groundwater well is identified in the Project AoI during pre-mobilization site surveys conduct monthly analysis to monitor the quality of groundwater during exploration. The parameters to be monitored will include the parameters listed in Appendix-3 and Appendix-5 Article 2 of the Regulation Concerning Protection of Groundwater against Pollution and Deterioration. (inform the RSM Unit before the measurements for obtaining the consent of the RSM Unit).*Please see Section 4.4, as per the information provided by Zorlu Jeotermal, there is no available information currently on whether there is a groundwater well within the 1km area around the drilling wells.* • For Lot/Parcel 102/25 (ZDM-3 well location) - Ensure as per DSI's requirements (official letter dated 22 May 2023) of 10 m protection zone from the dry creek is established and flood protection measures are put in place. - Ensure sufficient distance will be maintained between the dry creek and operation area throughout the Project activities to avoid any impact. - Check the temporary waste storage area and chemical storage area on a daily basis to ensure that there is no spill/leakage and waste management practices do not pose any risk.				
	• Exploration	• Develop and implement an Effluent Management Plan compliant with the national legislation, WB OPs, WBG EHS Guidelines, and applicable requirements of GIIP. • Under no circumstances allow the discharge of drilling mud, geothermal fluids or any other fluid to receiving environments. • Fulfill the following measures/commitments stipulated by 8th Regional Directorate of DSI in their official letters dated 19 June 2022 and 22 May 2023 for the protection of water resources throughout the Project operations: - In case of any Project-related adverse impacts on the quality and quantity of groundwater, all damages shall be borne by the owner of the activity, and the activity shall be ceased, and the actions shall be put in place as per the requirements of the related institution. - All necessary measures for containment and leak-proofness of the Project components and waste areas shall be in place. All applicable legislation shall be complied with in the framework of the protection of groundwater and groundwater resources. - Throughout construction, operation, and subsequent stages of the activity, no solid or liquid waste shall be discharged to groundwater and streams, the flow of dry streams shall not be disrupted, the specified permitted EIA coordinates shall not be exceeded, necessary precautions should be taken regarding flooding and material flow, the narrowness of dry and perennial flowing river beds corresponding to the mentioned areas shall not be altered, river bed stability shall not be compromised, unrestricted flow should be maintained, no waste materials shall be dumped into rivers, no damage shall be caused to agricultural lands, and all damages or losses that may occur due to the Project activities shall be covered by the activity owners/facility operators. Compliance with the relevant provisions of the Water Pollution Control Regulation, applicable laws, and other commitments as stated in the PIF is mandatory throughout Project implementation. - Activities on Lot/parcel no: 102/25 shall be conducted after establishing a 10-meters protection zone from the dry riverbed and taking necessary flood protection measures. • Ensure the domestic wastewater generated at the camp site is managed by storing in septic tanks, control of septic tanks for fullness and regularly emptying the septic tanks by licensed vacuum trucks discharging to treatment facilities in line with the Effluent Management Plan, preventing any discharge into groundwater and surface water resources. • Ensure the domestic wastewater is only collected in impermeable cesspools/ septic tanks, with no discharge to receiving environments. • Ensure appropriate domestic wastewater transport agreements are in place with the related Municipality and continuously monitor the used capacity of the impermeable cesspools/ septic tanks for transport by Municipality vacuum trucks, as required. • Ensure hazardous materials are managed and stored in designated chemical storage areas with secondary containment as per WBG General EHS Guidelines, keeping absorbent pads or materials next to storage areas and keeping drums and containers containing fuel, oil or other chemicals in a containment with a capacity of up to 110% of the volume of material stored.				

			Cost to:		Institutional Responsibility to:	
Topic/Impact	**Project Phase**	**Mitigation Measure**	**Install**	**Operate**	**Install**	**Operate**
		• Storage area will be established in a location away from the containers and also where transport vehicle to unload chemicals can approach. • The area will be kept closed and the entrance door will be locked. The keys will be kept by authorized personnel. • The contact information of the personnel in charge of the storage area and warning signs will be posted at the storage area. • The floor of the area will be covered with concrete and similar impermeable material, and the edges of the floor will be raised with a concrete threshold for each section/storage area. If these conditions cannot be met, a membrane of at least 1 mm should be laid between the concrete and the soil to ensure impermeability. • There will be a blind channel and a blind well against any possible spills/leakages that may occur in the hazardous waste storage area. The ground slope will be directed towards this blind channel. The blind channel will be constructed within the waste area (in order not to be affected by rain). • Provide Safety Data Sheets (SDS) written in the native language of the workers for each hazardous material at the hazardous materials storage areas and at work sites where the materials are used. • Ensure only competent and authorized personnel are permitted to use the hazardous materials and substances and that they have obtained specific training regarding the handling of hazardous materials. • Implement Hazardous Material Management Plan to minimize possible effects of any spillage and or leakage to any water body. • Provide spill response material including spill kits, and fire extinguishers in hazardous materials storage areas and where the hazardous materials are in use in case of any spillage and leakage. • Ensure competent and trained personnel/team are appointed for a timely and effective response to spills and leaks. • Ensure clear procedures are in place and informed/trained to personnel for adequate spill response. • Ensure spill drills are performed with the participation of all personnel on site to raise awareness. • Report environmental incidents to the RSM Unit in 1 business day and then submit the investigation report to the RSM Unit in 15 business days. • Ensure dust suppression is applied during exploration phase and also if a grievance is received. • Ensure periodical maintenance of vehicles is conducted off-site and by licensed firms. If required, ensure that onsite maintenance is conducted on impermeable ground to prevent any potential leakage/ spill from reaching the soil. • Include subject specific trainings to site personnel within the scope of EHS trainings to be provided at the time of the employment and then regularly. • Continuously maintain the drilling mud circulation system to minimize the total drilling mud to be stored in mud pit. • Ensure the mud pits to be used for storage of used drilling mud and geothermal fluids are lined with impermeable geomembrane layers and continuously monitored to ensure capacities are not surpassed. • Ensure the drilling mud sent to the mud pits is disposed of after and as per the hazard analysis and the mud pits have been emptied before the test operations. • Construct drainage channels around mud pits and establish the edges of the pit higher than the surface level to divert the surface runoff from entering. • Construct drainage channels around the concrete rig location to divert the surface runoff from entering. • Ensure the contractor hired to dispose of the waste mud stored in the mud pits provides an extra storage tank throughout the drilling activities, which would be used to divert the fluid and materials in case of an emergency. • Take necessary actions to intervene and stop the well operations to cut off the fluid flow in case of an emergency where the mud pits cannot provide sufficient storage capacity. • Install blowout and leak prevention systems (i.e. blowout preventer (BOP) systems) in each well. • Ensure design measures such as the well blowout prevention systems and casings are implemented in line with design specifications. • Ensure proper well casing and well casing material selection for groundwater aquifer sections. • Inform RSM Unit immediately once the drilling activities reach to groundwater aquifer and regarding the mitigation measures applied/currently applying. • Inform RSM Unit once there is a leakage to any of the formations and regarding the mitigation measures applied/currently applying. • For Lot/Parcel 102/25 (ZDM-3 well location) - Ensure as per DSI's requirements (official letter dated 22 May 2023) of 10 m protection zone from the dry creek is established and flood protection measures are put in place.				

			Cost to:		Institutional Responsibility to:	
Topic/Impact	**Project Phase**	**Mitigation Measure**	**Install**	**Operate**	**Install**	**Operate**
		- Ensure sufficient distance will be maintained between the dry creek and operation area throughout the Project activities to avoid any impact. - Check the temporary waste storage area and chemical storage area on a daily basis to ensure that there is no spill/leakage and waste management practices do not pose any risk.				
Air Quality	• Land preparation • Closure and Land rehabilitation	• Prior to start of activities, conduct baseline PM10 measurements last for 24 hours at closest building listed in Table 4-3 in line with the WBG EHS Guidelines to identify baseline conditions (inform the RSM Unit before the measurements for obtaining the consent of the RSM Unit) • Ensure exhaust gas emissions of the construction machinery to be used in the Project will be regularly measured by authorized institutions. • Ensure that the vehicles and machinery are certified to comply with the specified emission limit values for exhaust gas emissions. • Carry out fuel refills and oil changes for the machinery at licensed fuel stations. • During dry seasons, implement water spraying at work sites and access roads to minimize dust generation. In case of a related grievance, investigate the potential source of emissions and implement additional measures such as increasing the water spraying frequency. • Operate and maintain equipment and vehicles appropriately to minimize emissions. • Carry out loading and unloading of excavated materials without throwing and scattering. • Define and obey speed limitations for vehicles. • Ensure relevant trainings are provided to drivers. • Ensure topsoil and excavated material storage areas are kept moist. • Implement the Project Grievance Mechanism to ensure stakeholder grievances and complaints are received and addressed as appropriate. • Conduct air quality measurement if a related grievance is received, to ensure air quality levels are within limit values (inform the RSM Unit before the measurements for obtaining the consent of the RSM Unit). • Include subject specific trainings to site personnel within the scope of EHS trainings to be provided at the time of the employment and then regularly.	No additional cost (Included in the scope and budget of drilling contractor)	No additional cost (Included in the scope and budget of drilling contractor)	Zorlu Jeotermal and Drilling Contractor (under supervision of Zorlu Jeotermal)	Zorlu Jeotermal and Drilling Contractor (under supervision and monitoring of Zorlu Jeotermal)
	• Exploration	• Ensure exhaust gas emissions of the construction machinery to be used in the Project will be regularly measured by authorized institutions. • Ensure that the vehicles and machinery are certified to comply with the specified emission limit values for exhaust gas emissions. • Carry out fuel refills and oil changes for the machinery at licensed fuel stations. • During dry seasons, implement water spraying at work sites and access roads to minimize dust generation. In case of a related grievance, investigate the potential source of emissions and implement additional measures such as increasing the water spraying frequency. • Operate and maintain equipment and vehicles appropriately to minimize emissions. • Define and obey speed limitations for vehicles. • Ensure relevant trainings are provided to drivers. • Conduct on site toxic gas measurements such as H2S and mercury using portable and fixed detectors (to be provided by the drilling contractor) to detect/monitor geothermal gas releases continuously to ensure levels are below exposure limits[22]. The measurement results will be kept for monitoring purposes. • Ensure personnel working at the drilling site have their portable gas detectors at their collars at all times. • Ensure the usage of necessary protective equipment during works conducted in pits, excavations, and similar areas as H2S has is heavier than air. • Ensure related emergency procedures dealing with toxic gas releases such as H2S and mercury are in place and included in the Occupational Health and Safety Plan and Community Health and Safety Management Plan. • Implement the Project Grievance Mechanism to ensure stakeholder grievances and complaints are received and addressed as appropriate. • Conduct air quality measurement if a related grievance is received, to ensure air quality levels are within limit values (inform the RSM Unit before the measurements for obtaining the consent of the RSM Unit). • Include subject specific trainings to site personnel within the scope of EHS trainings to be provided at the time of the employment and then regularly.				

[22] At least 3 gas detectors will be located on the drilling equipment.

			Cost to:		Institutional Responsibility to:	
Topic/Impact	**Project Phase**	**Mitigation Measure**	**Install**	**Operate**	**Install**	**Operate**
Noise	• Land preparation • Closure and Land rehabilitation	• Prior to start of activities, conduct baseline background noise measurements last for 24 hours at buildings listed in Table 4-3 in line with the WBG EHS Guidelines to identify baseline conditions. • Inform affected communities of significant activities such as start of the site activities and rig mobilization ahead of the start of activities. • Operate and maintain vehicles and equipment in accordance with related technical specifications and record the maintenances, controls, and checks. • Restrict truck and vehicle movements to daylight hours. • Ensure adequate PPE is in use by the personnel. • Appendix G provides the locations where noise limit values might potentially be exceeded based on the calculations given in Project PIF. At locations where the Project Standards are determined to be exceeded during day or nighttime[23] during Project implementation, do not conduct activities simultaneously. Restrict the use of equipment with high noise levels to the extent possible. • Implement the Project Grievance Mechanism to ensure stakeholder grievances and complaints are received and addressed as appropriate. • Conduct noise monitoring measurement if a related grievance is received, to ensure noise levels are within limit values (inform the RSM Unit before the measurements for obtaining the consent of the RSM Unit). • Comply with noise limit values given in the WBG EHS Guidelines. • Provide noise barriers for closest building to the ZDM-3 well location where noise grievances could not be resolved by other applicable methods (inform the RSM Unit before the measurements for obtaining the consent of the RSM Unit).. • Include subject specific trainings to site personnel within the scope of EHS trainings to be provided (e.g. use of horns, handling of pipes, etc.) at the time of the employment and then regularly.	No additional cost (Included in the scope and budget of drilling contractor)	No additional cost (Included in the scope and budget of drilling contractor)	Zorlu Jeotermal and Drilling Contractor (under supervision of Zorlu Jeotermal)	Zorlu Jeotermal and Drilling Contractor (under supervision and monitoring of Zorlu Jeotermal)
	• Exploration	• Inform affected communities of significant activities such as start of the site activities and rig mobilization ahead of the start of activities. • Operate and maintain vehicles and equipment in accordance with related technical specifications and record the maintenances, controls, and checks. • Restrict truck and vehicle movements to daylight hours. • Ensure adequate PPE is in use by the personnel. • As per the table provided in Appendix G, the estimated noise levels exceed the noise limit values at the closest receptors identified for the drilling wells (Table 2-1). At the locations where the Project Standards are exceeded during day or nighttime, do not conduct activities simultaneously. Restrict the use of equipment with high noise levels to the extent possible. • Since the drilling activities are performed 24-hour a day, a nighttime work permit will be obtained from the authorities i.e., Local Environmental Board. • Implement the Project Grievance Mechanism to ensure stakeholder grievances and complaints are received and addressed as appropriate. • Conduct noise monitoring measurement if a related grievance is received, to ensure noise levels are within limit values (inform the RSM Unit before the measurements for obtaining the consent of the RSM Unit). • Comply with noise limit values given in the WBG EHS Guidelines. • Provide noise barriers for closest building to the ZDM-3 well location where noise grievances could not be resolved by other applicable methods (inform the RSM Unit before the measurements for obtaining the consent of the RSM Unit). • Include subject specific trainings to site personnel within the scope of EHS trainings to be provided (e.g. use of horns, handling of pipes, etc.) at the time of the employment and then regularly.				
Land Loss/Acquisition	• Pre-Land preparation	• Obtain necessary land use permits for parcels 102/2 (legal entity – location of **ZDM-2**) and 102/12 (under Pasture Law – location of **ZDM-6**) prior to land entry on each parcel. • In the case of need of expansion of the existing agricultural soil road to access ZDM-2 and ZDM-6 well locations: - For the privately-owned parcels (*for ZDM-2, Parcel No. 102/1, 102/15 and 102/16 and for ZDM-6, Parcel No. 102/21*), execute mutual agreements through consent letters on market prices with the owner(s)/shareholder(s) for temporary use of lands for site access and obtain all required permits from the relevant authorities to use the land before site entry and mobilization.	No additional cost (Included in the scope and budget of drilling contractor)	No additional cost (Included in the scope and budget of drilling contractor)	Zorlu Jeotermal	Zorlu Jeotermal

[23] According to the Table provided in Appendix G, Project standards for daytime (55 dBA) are met when the distance is between 300- 350 m and Project standards for nighttime (45 dBA) are met when the distance is between 850- 900 m.

			Cost to:		Institutional Responsibility to:	
Topic/Impact	**Project Phase**	**Mitigation Measure**	**Install**	**Operate**	**Install**	**Operate**
		- For state-owned parcels (*for ZDM-2, non-registered state-owned parcels to the south, southwest of the planned access route and for ZDM-6, Parcel No. 112/109*), obtain relevant permits and land use rights from related authorities for temporary use of lands for site access. • In case expansion is required on the already existing agricultural soil roads to reach ZDM-2 and ZDM-6, ensure that the least amount of land/area will be used as possible. • Ensure adequate reporting on the land acquisition process is completed by Zorlu Jeotermal for ZDM-2 and ZDM-6 drilling wells as well as access roads, as detailed in Section 2.2, 2.3 and 2.4). • Continuously record and regularly report to the RSM Unit the stages of the land acquisition process for ZDM-2 and ZDM-6 drilling well locations and access roads including engagements, consultations, agreements, efforts to avoid or minimize potential impacts on landowners and land users with evidential data and documents. • Identify formal and informal users of the lands (for agricultural purposes, grazing activities, etc.), if any, to be used for project activities (drilling location, access roads) prior to land entry and develop measures to compensate any economic losses in consultation with the users as necessary[24] Assessment of the parcels of both well location and access roads are provided in Section 2.3 ("*Land Acquisition Process for Drilling Locations*") and Section 2.4 ("*Planning for Access Roads*"); compensate any formal and/or informal users of the affected parcels identified for their assets on the land prior to start of any construction activities in line with the replacement cost requirements of OP 4.12 and compliant with the entitlements and principles defined in the WB Geothermal Development Project Resettlement Policy Framework (RPF) for the respective impact categories and ownership types; in case there is permanent or temporary loss of income for the owners, or formal/ informal users of the affected land leading to economic displacement impacts, provide affected people with livelihood assistance (type of assistance will be determined according to the nature and scale of the impact in consultation with the affected people and in agreement with the TKYB/RSM Consultant; ensure that compensation/ assistance is provided to affected people before the start of any civil works in these locations. • Ensure due care is taken by project workers in order not to enter neighboring lands, damage lands/good/crops on these lands. • Any unanticipated damage during the project lifetime to neighboring land plot/structures/crops etc. will be compensated in accordance with the WB OP 4.12 and Resettlement Framework.				
	• Land preparation • Exploration • Closure and Land rehabilitation	• Implement the Project Grievance Mechanism to ensure stakeholder grievances and complaints are received and addressed as appropriate *(please see Chapter 2 for further information on Project Land Use and Ownership).*				
Waste Management	• Land preparation • Closure and Land rehabilitation	• Develop and implement a Waste Management Plan compliant with the national legislation, WB OPs, WBG EHS Guidelines, and applicable requirements of GIIP based on mitigation hierarchy. • Ensure topsoil and excavation material are stored separately from each other to the designated and labelled topsoil and excavation material areas. • Provide adequate and appropriate temporary waste storage areas in line with Waste Management Regulation and WBG EHS Guidelines. • The characteristics of the temporary waste storage area to be establish is as follows: - Temporary waste storage area will be established in a location away from the containers and drilling work area and away from any possible traffic and also where licensed vehicles to receive hazardous waste can approach. - Removal of wastes will be ensured in appropriate frequencies so that storage capacities at the temporary waste storage areas/storage compartments are observed. - Hazardous and non-hazardous waste will be collected and stored separately from each other, and separate entrances/gates will be established for both sections/storage areas. - At the entrance of the section where hazardous wastes are stored, "Attention! Hazardous Waste" phare will be posted. - The area will be kept closed and the entrance door will be locked. The keys will be kept by authorized personnel. - The contact information of the personnel in charge of the temporary waste storage area and warning signs will be posted at the temporary waste storage area. - The floor of the area will be covered with concrete and similar impermeable material, and the edges of the floor will be raised with a concrete threshold for each section/storage area. If these conditions cannot be met, a membrane of at least 1 mm should be laid between the concrete and the soil to ensure impermeability.	No additional cost (Included in the scope and budget of drilling contractor)	No additional cost (Included in the scope and budget of drilling contractor)	Zorlu Jeotermal Drilling Contractor (under supervision of Zorlu Jeotermal)	Zorlu Jeotermal Drilling Contractor (under supervision and monitoring of Zorlu Jeotermal)

[24] The exploration studies for the Project will start at ZDM-3 well location, for which the land acquisition has already been completed by Zorlu Jeotermal. Based on the outcomes of the well tests at ZDM-3, the decision to continue with other planned well locations (ZDM-2 and ZDM-6) will be made. For Parcel No. 102/25, parcel of ZDM-3 well, it has been stated in Section 2.3 that prior to acquisition by Zorlu Jeotermal, the parcel was not being cultivated or used for economic purposes by the landowner or other formal or informal land users.

			Cost to:		Institutional Responsibility to:	
Topic/Impact	**Project Phase**	**Mitigation Measure**	**Install**	**Operate**	**Install**	**Operate**
		- There will be a blind channel and a blind well against any possible spills/leakages that may occur in the hazardous waste storage area. The ground slope will be directed towards this blind channel. The blind channel will be constructed within the waste area (in order not to be affected by rain). - Waste will be stored separately from each other in tanks and containers. - Secondary containment will be provided for liquid wastes in line with the legislation. - On the compartment where each type of waste will be stored, a sign indicating the type of waste and waste codes will be posted. - The sections/storage areas where hazardous waste will be stored will be covered on all four sides in order to be protected from rain. - Adequate ventilation systems will be established for the temporary waste storage area. - Fire extinguishers will be available against possible fires. - Periodic visual checks will be conducted to identify any leakages/spillages or emergencies. • Segregate hazardous and non-hazardous wastes by specific waste type at source and store separately for further disposal/recycling/reuse by related municipality and/or licensed waste handling firms, in line with Waste Management Regulation and other related legislation listed in Chapter 3 and WB EHS Guidelines. .. • Collect and store recyclable and non-recyclable solid waste separately until transport by the related Municipality/licensed firm. • Keep records of waste sent to recycling/disposal in each time with sufficient content and evidence for an effective monitoring and in order to fulfill the annual Waste Declarations as per the Waste Management Regulation. • Submit official waste declarations for all waste generated to the online system of MoEUCC as per the requirement of national legislation. • Ensure container types are selected adequate for waste type, adequate labelling is provided, classifying the waste is in accordance with its types and SDS provisions, etc., in the storage areas in line with Waste Management Regulation and other related legislations depending on the type of waste (such as Regulation on the Control of Packaging Waste, Regulation on the Control of Medical Waste etc.). • Avoid accidental spills during waste transportation, and leakages at the waste storage areas. • In case of an accidental spill, ensure the source is isolated, absorbers are used to clean up the spill and contaminated soil and absorbers is disposed of as per the requirements of Waste Management Regulation. • Ensure the firms that will conduct transport/recovery/disposal of hazardous and non-hazardous wastes are licensed. • Implement the Project Grievance Mechanism to ensure stakeholder grievances and complaints are received and addressed as appropriate. • Include subject specific trainings to site personnel within the scope of EHS trainings to be provided at the employment and then regularly. • Under no circumstances, dispose of or bury waste on site. • Prepare Waste Management Plan required by Waste Management Regulation for all waste generated at the drilling site as per the format defined by the MoEUCC and present to PDoEUCC if requested. • Execute Hazardous Materials and Hazardous Waste Compulsory Liability Insurance as per the relevant provisions of the Waste Management Regulation, for the hazardous waste temporary storage areas/containers regardless of the amount of hazardous waste stored. • Use the stored excavation material in the closing process of the mud pit. • Ensure the geothermal fluid is evaporated and the remaining material in the mud pits, if there are any remaining materials, they will be disposed of as per the Waste Management Regulation and other relevant legislation. • Dispose of geomembrane liners used at the bottom and the slopes of the mud pits as per the Waste Management Regulation and other relevant legislation. • Ensure the containers are removed from the site together with the drilling rig. • Ensure the leftovers of the container system are disposed of as per the Waste Management Regulation and other relevant legislation. • Ensure the septic tank is emptied by licensed vacuum trucks and the emptied septic tank has been removed from the site for disposal or to be used for another operation of Zorlu Jeotermal. • Ensure the waste stored in the waste storage area is disposed of by the licensed companies and the waste storage area is removed and the site is restored back. • In case the concrete area is decided to be removed, ensure the concerning waste is disposed of as per Waste Management Regulation and other relevant legislation and the site is restored and rehabilitated.				
	• Exploration	• Develop and implement a Waste Management Plan compliant with the national legislation, WB OPs, WBG EHS Guidelines, and applicable requirements of GIIP based on mitigation hierarchy. • Provide adequate and appropriate temporary waste storage areas in line with Waste Management Regulation and WBG EHS Guidelines.				

			Cost to:		Institutional Responsibility to:	
Topic/Impact	**Project Phase**	**Mitigation Measure**	**Install**	**Operate**	**Install**	**Operate**
		• The characteristics of the temporary waste storage area given above is valid for this stage and should be implemented. • Segregate hazardous and non-hazardous wastes by specific waste type at source and store separately for further disposal/recycling/reuse by related municipality and/or licensed waste handling firms, in line with Waste Management Regulation and other related legislation listed in Chapter 3 and WB EHS Guidelines. • Collect and store recyclable and non-recyclable solid waste separately until transport by the related Municipality/licensed firm. • Keep records of waste sent to recycling/disposal in each time with evidence for an effective monitoring and in order to fulfill the annual Waste Declarations as per the Waste Management Regulation. • Submit official waste declarations for all waste generated to the online system of MoEUCC as per the requirement of national legislation. • Ensure container types are selected adequate for waste type, adequate labelling is provided, classifying the waste is in accordance with its types and SDS provisions, etc., in the storage areas in line with Waste Management Regulation and other related legislations depending on the type of waste (such as Regulation on the Control of Packaging Waste, Regulation on the Control of Medical Waste etc.). • Avoid accidental spills during waste transportation, and leakages at the waste storage areas. • In case of an accidental spill, ensure the source is isolated, absorbers are used to clean up the spill and contaminated soil and absorbers is disposed of as per the requirements of Waste Management Regulation. • Ensure the firms that will conduct transport/recovery/disposal of hazardous and non-hazardous wastes are licensed. • Use only the licensed firms for analyses, transport and disposal of the drilling mud. • Implement the Project Grievance Mechanism to ensure stakeholder grievances and complaints are received and addressed as appropriate. • Include subject specific trainings to site personnel within the scope of EHS trainings to be provided at the employment and then regularly. • Under no circumstances, dispose of or bury waste on site. • Prepare Waste Management Plan required by Waste Management Regulation for all waste generated at the drilling site as per the format defined by the MoEUCC and present to PDoEUCC if requested. • Execute Hazardous Materials and Hazardous Waste Compulsory Liability Insurance as per the relevant provisions of the Waste Management Regulation, for the hazardous waste temporary storage areas/containers regardless of the amount of hazardous waste stored. • Establish mud pits with adequate capacity, that will be able to temporarily store both the waste drilling mud and fluid mixture to be generated during the drilling operations and geothermal fluid generated during the well testing operations, are established at the drilling site *(the mud pits will have a volume of 1,575 m^3 and there will be two (2) mud pits established at each drilling well site).* • Ensure that mud pits will have clay and geomembrane liner at the bottom and on the slopes to avoid any leakages. • Prior to start of test operations at each drilling location, in line with Waste Management Regulation Appendix-3/B, identify the hazardousness class of the stored drilling mud. Depending on the analysis results (i.e., drilling mud identified as non-hazardous waste or hazardous waste), dispose of the drilling mud accordingly in line with Article 13 of Waste Management Regulation, WB OPs, WBG EHS Guidelines during closure and land rehabilitation phase by licensed firms[25]. • Ensure the drilling mud containing cuttings and debris mixed with the returning drilling fluid is sent to mud cleaner system. Ensure all of the waste solid section that is generated with the mud cleaner system is directly sent to the mud pits for disposal.				
Landscape and Visual Impacts	• Land preparation • Exploration • Closure and Land rehabilitation	• Limit site works only to work zones and do not allow machinery/vehicles to conduct work outside of the work zones. • Position any lighting to minimize light emanating from the drilling wells. • Remove drill rigs and camps on the site promptly, especially from visible locations. • Implement management strategies to ensure waste on-site is stored and disposed of as appropriate. • Obtain the permits related to the use of roads by the truck transporting drilling equipment prior to transporting machinery to the sites.	No additional cost (Included in the scope and budget of contractor)	No additional cost (Included in the scope and budget of drilling contractor)	Zorlu Jeotermal Drilling Contractor (under supervision of Zorlu Jeotermal)	Zorlu Jeotermal Drilling Contractor (under supervision and monitoring of Zorlu Jeotermal)

[25] After the analysis of the drilling mud, Zorlu Jeotermal study on the potential disposal methods and submit its study report to the RSM Unit which includes methods for disposal, its compliance with regulations and project requirements, at least 3 quotations taken from disposal firms for alternative methods including use of the drilling mud as alternative raw material following the Waste Derived Fuel, Additional Fuel and Alternative Raw Materials Communique. The RSM Unit and Zorlu Jeotermal will take the decision on the disposal method together. The aim here is to achieve the most economic and efficient method for disposal in accordance with the Beneficiary Agreement.

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		• Implement water spraying at work sites and access roads to minimize dust generation. • Rehabilitate all well sites upon completion of drilling activities and reinstate land. • Reuse topsoil for rehabilitation and restoration of soil profiles.				
Traffic and Transport	• Land preparation • Exploration • Closure and Land rehabilitation	• Develop and implement Traffic Management Plan compliant with the national legislation, WB OPs, WBG EHS Guidelines, and applicable requirements of GIIP. • Ensure speed limits will be set for and implemented by the Project personnel. • Ensure all personnel are aware of designated access roads to be used for the Project along with sensitive receptors neighboring the access roads. • Avoid personnel using roads other than designated ones. • In the event of a spill/leak by the Project traffic, ensure spill response measures are implemented timely and effectively. • Install warning signs and speed limits on and off site. • Notify public and authorities of major traffic movement. • Prevent of rig movements across the villages. • Communicate impacts and risks associated with traffic and transport resulting from the Project activities with local communities through stakeholder engagement activities. • Establish limitations to traffic activities to daytime to the most possible extent. • Implement the Project Grievance Mechanism to ensure stakeholder grievances and complaints are received and addressed as appropriate. • Include subject specific trainings to site personnel within the scope of EHS trainings to be provided at the employment and then regularly.	No additional cost (Included in the scope and budget of drilling contractor)	No additional cost (Included in the scope and budget of drilling contractor)	Zorlu Jeotermal and Drilling Contractor (under supervision of Zorlu Jeotermal)	Zorlu Jeotermal and Drilling Contractor (under supervision and monitoring of Zorlu Jeotermal)
Cultural Heritage and Archaeology	• Land preparation • Closure and Land rehabilitation	• Develop and implement Chance Find Procedure compliant with the national legislation, WB OPs, WBG EHS Guidelines, and applicable requirements of GIIP (noting that in line with Law on Conservation of Cultural and Natural Property (Law No. 2863, 1983). • In case of a chance find, halt all work at the area and contact the related Museum Directorate by the Project immediately. Follow the following provisions; - Stop the work immediately in case of a chance find and demarcate the area until an official notification is received. - Inform the HSE Representative and Site Manager about chance find. - Protect the found elements/elements with a security strip and record the status of their presence by taking photos of the area. - Contact the Provincial Museum Directorate, village headman or the local administrators and notify its representatives about the chance find. - Museums Directorate to assess findings and to determine the significance of the finding and give information about the result. - Act on the decision of Museum Directorate representatives and do not start work until receiving a written approval of Museum Directorate. - Report the chance find incident in 3 business days to RSM Unit. • Activities shall only be resumed after the approval of the museum archeological expert). • Implement the Grievance Mechanism, to promptly and appropriately respond to any grievances to be received regarding cultural heritage. • Include Chance Finds Procedure trainings to site personnel within the scope of EHS trainings to be provided at the time of employment and then regularly.	No additional cost (Included in the scope and budget of drilling contractor)	No additional cost (Included in the scope and budget of drilling contractor)	Zorlu Jeotermal and Drilling Contractor (under supervision of Zorlu Jeotermal)	Zorlu Jeotermal and Drilling Contractor (under supervision and monitoring of Zorlu Jeotermal)
Community Health and Safety	• Land preparation • Exploration • Closure and Land rehabilitation	• Develop and implement Community Health and Safety Management Plan compliant with the national legislation, WB OPs, WBG EHS Guidelines, and applicable requirements of GIIP. • Implement respective mitigation measures as listed within this table to mitigate impacts related to noise, air quality (dust and toxic gas emissions), waste and wastewater management, traffic and transport and landscape and visual impacts, land loss/acquisition topics/impacts for land preparation, exploration and closure and land rehabilitation phases to minimize disturbance to local communities. • Implement access restrictions at drill sites by installing fences and other appropriate means such as reflective barriers to prevent potential harm to community members. • Ensure adequate cautionary signs are in place and maintained. • Conduct legal inquiries during the hiring process of security personnel (or the company the security service is procured from) to check competency and existence of any former abuse incidents. • Conduct legal inquiries during the hiring process of security personnel to ensure competency.	No additional cost (Included in the scope and budget of drilling contractor)	No additional cost (Included in the scope and budget of drilling contractor)	Zorlu Jeotermal and Drilling Contractor (under supervision of Zorlu Jeotermal)	Zorlu Jeotermal and Drilling Contractor (under supervision and monitoring of Zorlu Jeotermal)

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		• Ensure that security personnel (or the company the security service is procured from) receives trainings on Code of Ethics, gender sensitivities (including GBVH and SHA) and local cultural sensitivities threat. • In case GBVH is reported through the external grievance mechanism, this will be investigated by trained investigators and responded in accordance with current GIIPs. Through the implementation of SEP, local women will be specially informed by qualified Project personnel/representatives about the following: - Project external grievance mechanism and privacy policy - Women's rights - Self-protection in cases of violence and sexual abuse - Emergency phone numbers, and - Contact information • Provide training to Project personnel including contractor personnel on Code of Ethics of Zorlu Enerji covering the approach to relations with the local communities, prevention of GBVH and SHA. • Implement the Project Grievance Mechanism (developed as part of SEP) to ensure stakeholder grievances and complaints are received and addressed as appropriate.				
Labor and Working Conditions	• Land preparation • Exploration • Closure and Land rehabilitation	• Ensure compliance with Workers' accommodation: processes and standards (IFC and EBRD, 2009) and national legislation for accommodation and on-site facilities (canteen, sanitary facilities, adequate amenities for socialization and resting, etc.). • Manage labor and working conditions of the Project addressing the requirements of the Turkish legislation, ILO conventions Türkiye is a party to, as well as international standards which can be listed as: - Working conditions and management of working relationships (terms and conditions of employment, nondiscrimination and equal opportunity, worker's organizations) - Protecting the workforce (child labor and minimum age, forced labor) - Internal grievance mechanism - Occupational health and safety (OHS) • It is required to provide clear and detailed information on dismissal process that will occur after the land preparation, exploration and closure and rehabilitation phases and on the rights of employees in accordance with the date specified in the labor law. • All workers, subcontractors and subcontractors' workers will start the work with a mutually agreed and signed contract which includes a code of conduct. A code of conduct and the code of ethics of Zorlu Enerji covering the approach to relations with the local communities, prevention of GBVH and SHA will be prepared and signed by all personnel. • Keep up to date personnel list (for each party on site). • Archive personnel files on site (for each party on site). • Fair treatment, non-discrimination, and equal opportunity of workers will be promoted. • Rest times will be provided to workers and overtime will be paid. • Accommodation facilities will be provided with adequate heating, cooling and ventilation systems. • Facilities will be provided with both natural and artificial lighting (e.g., window surfaces of 5%-10% of flooring surface) • Rooms/dormitories are kept in good condition and cleaned at regular intervals. • Adequate floor space will be provided for the workers in the rooms in order to ensure their comfort, with a minimum ceiling height of 2.1 m. • Each worker is provided with a comfortable mattress, pillow, cover and clean bedding which are washed frequently. • Sanitary and toilet facilities will be built using materials that are easily cleaned and will be cleaned frequently and kept in working condition. • Kitchens will be designed, built and equipped so to maintain adequate personal hygiene and to permit food hygiene practices, including protection against contamination. • Food goods will be dated and stored hygienically according to their refrigeration and dry pantry needs. • Security will be guaranteed to workers and their property (personal belongings) on site. • Ensure all Project personnel have access to sufficient drinking water meeting the drinking water quality requirements set by the national legislation. To this end, procure drinking water from local bottled water suppliers that operate in line with the permits obtained by the supplier companies in line with the relevant requirements of the Regulation on Water Intended for Human Consumption. • Provide domestic water requirements of the Project personnel (water other than drinking water – water to be used for food preparation or for the purpose of personal hygiene) from local water suppliers which are permitted to supply water in line with the Regulation on Water Intended for Human Consumption (permitting documentation of the	No additional cost (Included in the scope and budget of drilling contractor)	No additional cost (Included in the scope and budget of drilling contractor)	Zorlu Jeotermal and Drilling Contractor (under supervision of Zorlu Jeotermal)	Zorlu Jeotermal and Drilling Contractor (under supervision and monitoring Zorlu Jeotermal)

			Cost to:		Institutional Responsibility to:	
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		supplier will be checked by the contractor, documented as part of internal monitoring and shared with Zorlu Jeotermal and as required with other third-party consultants under the RSM program); contractor will store water in adequate water tanks that is covered to prevent water stored from becoming contaminated and polluted. • Ensure domestic water served for workers use is safe; for this, analyses for microbiological parameters sampled from one of the serving points of the container units is performed by accredited laboratories on monthly basis during the lifecycle of the project. • Supply water required for dust suppression and drilling and well testing activities from local water suppliers approved by Diyadin Municipality *(please see Section 2.5 for more information on water supply)*. • Include subject specific trainings to site personnel within the scope of EHS trainings to be provided at the time of the employment and then regularly. • Provide camp site and accommodation areas with sufficient emergency response equipment such as first aid kits and fire-fighting equipment and conduct periodic checks to ensure they are in working condition. • Ensure a transparent and constructive engagement with internal stakeholders of the Project including direct and indirect employees of Zorlu Jeotermal and subcontractors is established. • Prevent use of child and forced labor. • Ensure the contract to be signed with the drilling contractor includes clauses related to forced labour, child labour, non-discrimination, etc.). • Ensure all Project personnel will be provided with documented information (through employment contracts and supporting documentation) that is clear and understandable, regarding their rights under national Labour Law (Law No.4857, 2003), applicable collective agreements, including their rights related to hours of work, duration of works, wages, overtime, compensation, and benefits at the time of employment and when any material changes occur. • Implement Internal Grievance Mechanism (developed as part of SEP) to ensure continuous engagement with the Project personnel and to address any complaints/comments timely and effectively. • In case GBVH is reported through the internal grievance mechanism, this will be investigated by trained investigators and responded in accordance with current GIIPs. • Ensure local employment is prioritized as long as the necessary skill set is available. • Ensure local procurement is prioritized as long as the necessary quality of supply is available.				
Occupational Health and Safety	• Land preparation • Exploration • Closure and Land rehabilitation	• Develop and implement Occupational Health and Safety Management Plan compliant with the national legislation, WB OPs, WBG EHS Guidelines, and applicable requirements of GIIP. This Plan shall be developed/reviewed/improved by the Zorlu Jeotermal's ESHS Expert, certified and assigned safety specialist and assigned occupational physician before submission to RSM Unit for approval. • Ensure the Project-specific Risk Assessment is developed according to national legislation using control hierarchy in the assessment process. • Ensure the Project-specific Emergency Plan is developed according to the national legislation. The Plan lists the roles and responsibilities, emergency situations, prevention methods, provisions for preparedness, a clear emergency action plan, recovery strategies, notification requirements (e.g. related authorities such as emergency services, police, administrative authorities, etc.), methods for reporting, evacuation policy and procedures, emergency escape routes, route assignments and measures to be taken for a multitude of related emergency situations. • Procure required OHS services, in accordance with the scope and durations stipulated in the legislation, by certified OHS Specialists including occupational physician (in-house or from licensed Joint Health and Safety Units). • Ensure the drilling contractor also procures the OHS services in line with the national requirements. • Employ a full time, on site and competent ESHS Expert before mobilization. • Ensure the drilling contractor employs a full time, on site and competent safety specialist before the start of its works. • Conduct medical checks for all Project personnel (direct and contracted) at the beginning of employment before start of work and then periodically. • Provide EHS trainings and drills to personnel on site included but not limited to: orientation training (by Zorlu Jeotermal to each contractor, subcontractor and visitor), mandatory OHS trainings (16 hours as per national legislation), general waste management, housekeeping, first aid and firefighting and search and rescue trainings, emergency drills, working at height trainings, spill response, safety method of work, permit to work, risk assessment, workers' representative, roles and responsibilities.	No additional cost (Included in the scope and budget of drilling contractor)	No additional cost (Included in the scope and budget of drilling contractor)	Zorlu Jeotermal and Drilling Contractor (under supervision of Zorlu Jeotermal)	Zorlu Jeotermal and Drilling Contractor (under supervision and monitoring Zorlu Jeotermal)

			Cost to:		Institutional Responsibility to:	
Topic/Impact	**Project Phase**	**Mitigation Measure**	**Install**	**Operate**	**Install**	**Operate**
		• Report, record and archive all OHS documentation including but not limited to assessments, plans, training data, training sheets, assignments, permit to work records, medical surveillances, controls, checks, inspections, checklist, control forms, non-conformities, noncompliance, corrective measures, near-misses, accidents, incidents, investigation reports, review of documentation records, management reviews, statistics, meeting minutes, consultations, OHS specialists contracts, drill reports, periodical control records for vehicles and machinery, up to date on site vehicles and machinery list, up to date personnel lists. Kep the OHS documentation on site. • Keep all documentation with evidential data showing date, time, duration, signatures, responsibles, attendees, photos etc. • Conduct weekly ESHS meetings lead by Zorlu Jeotermal with participation of responsibles from contractors and subcontractors. • Utilize an effective permit to work system for high risk works such as rig installation, start of drilling, cementing, casing placement, test operations etc. • Ensure an adequate number of trained first aiders, with valid certifications from authorized institutions, are provided at the sites and shifts and working arrangements are prepared accordingly. • Establish firefighting and search and rescue teams with sufficient number of Project personnel (direct and indirect) in line with national legislation. • Announce the team members at the information boards. • Designate appropriate emergency assembly points. • Ensure personnel who will be responsible for works with specific hazards are properly trained on the specific job type. • Conduct toolbox trainings daily by competent personnel such as OHS Specialists and/or ESHS Expert and/or trained foremen. • Establish an incident/accident reporting (including near miss), investigation (including root cause analysis, identifies corrective actions, responsible parties and dues) and recording systems and provide clear procedures in Occupational Health and Safety Management Plan. • Ensure incidents and accidents, findings of the root cause analysis and corrective actions planned for specific work sites are communicated to OHS personnels and ESHS Expert. • Provide adequate and sufficient PPE to all Project personnel and visitors and ensure use of these Provide adequate replacement stocks to be kept at site in adequate numbers. • Provide necessary information and training related to the effective and safe usage of the PPEs to all Project personnel. • Provide adequate type and sufficient number of fire extinguishers at site at all times. Conduct periodical checks of fire extinguishers. • Ensure non-compliances at site are identified and related corrective measures are applied by Zorlu Jeotermal and/or drilling contractor or subcontractor in a timely manner. • Ensure the non-compliances, corrective measures, responsible personnel, and deadlines for completion alond with status are recorded by Zorlu Jeotermal. • Ensure speed limits for both on-site and off-site traffic and the right of way practices are implemented by Project vehicles. • Conduct on site toxic gas measurements such as H2S and mercury, use portable and fixed detectors to detect/monitor geothermal gas releases to ensure levels are below exposure limits. • Conduct periodical checks of all equipment and vehicles within legally required intervals and maintain regularly. • Ensure hazardous materials are managed and stored in designated areas as per the SDS requirements. • Set appropriate exclusion zones below any working at height activities to avoid incidents/accidents due to falling objects. • Ensure fall protection systems are in place during works at height (e.g. fall arrest equipment, etc.). • Ensure wastewater treatment and solid waste are adequately managed as per the mitigation measures described in this ESMP to prevent contamination of any water body, to ensure hygiene and to avoid the spread of infections and diseases, the proliferation of mosquitoes, flies, rodents, and other pest vectors. • Inform RSM Unit in the event of any serious accident/incident/social unrest/protest etc. in the same day of the event. Investigate the incident and inform the RSM Unit in 15 days with the investigation report.				

			Cost to:		Institutional Responsibility to:	
Topic/Impact	**Project Phase**	**Mitigation Measure**	**Install**	**Operate**	**Install**	**Operate**
		• Provide working area, camp site and accommodation areas and all vehicles with sufficient emergency response equipment such as first aid kits and fire-fighting equipment and conduct periodic checks to ensure they are in working condition. • Implement Internal Grievance Mechanism (developed as part of SEP) to ensure continuous engagement with the Project personnel and to address any complaints/comments timely and effectively.				

7. MONITORING PLAN

The monitoring plan for the Project is presented in Table 7-1 below. The main aim of the monitoring plan is to provide set of monitoring parameters that could be measured numerically and methods for such monitoring, which will ensure that the Project activities are conducted in full compliance with related legislation and international standards. Additional monitoring locations and monitoring methods can also be added to update the Mitigation Plan as necessary depending on the Project conditions.

The following activities and methods will be used by Zorlu Jeotermal for monitoring Project's E&S performance and to ensure that the Project activities are conducted in full compliance with related legislation, international standards and contractual requirements:

- Perform daily site inspections and weekly walkthroughs to oversee the contractors' and subcontractor's E&S performance for management, mitigation and monitoring aspects, develop observation reports/records/checklist showing date, time and duration of inspections/walkthroughs, its participants, observations, recommendations with responsible parties and timeline.
- Review of daily site audits/visual observations and subcontractors on a daily/weekly basis and supervise to improve the E&S performance. Record the non-conformities to the Non-conformity Tracking Log with date of observation, details of observer, recommended actions, its responsible parties and timeline and then track for closure.
- Review, check and control of all environmental, social and OHS plans, assessments, reports, files, tracking logs and records kept by the drilling contractor and subcontractors including grievance records, OHS reports, records, statistics and data, waste disposal records, water supply records, records regarding labor and working conditions-, soil management, site management, emergencies, trainings, drills, reinstatement, noise, air quality, surface quality, soil quality,, vehicle and equipment maintenance records, etc. on a daily and weekly basis.
- Perform weekly ESHS meetings with participation of responsible parties of contractors and subcontractors where clear records of the meetings will be developed containing actions decided to be taken with responsible parties and due dates.
- Record all non-conformities to the Non-conformity Tracking Log with date of observation, details of observer, recommended actions, its responsible parties and timeline and then track for closure.

Zorlu Jeotermal will review the grievances received from external stakeholders (such as affected communities) weekly, throughout the Project activities. If a grievance is received, monitoring at the receptor for which the grievance has been received will be conducted by the drilling contractor. This requirement will be incorporated into the contractors' contracts.

It should be noted that apart from the parameters listed below, monitoring by Zorlu Jeotermal as part of the following sub-management plans will be in place and reported accordingly to RSM Unit:

- Community Health and Safety Management Plan
- Effluent Management Plan
- Hazardous Materials Management Plan
- Occupational Health and Safety Plan (including Emergency Response Plan)
- Stakeholder Engagement Plan (SEP) – *developed as part of RSM Application process.*
- Traffic Management Plan
- Waste Management Plan
- Chance Finds Procedure

Contractors and subcontractors will also conduct daily site inspections and participate in the weekly walkthroughs to ensure the implementation of mitigation measures identified within the ESMP and E&S management plans and the HSE expert of the contractor will be responsible for the site implementation.

Drilling contractor will provide regular updates to Zorlu Jeotermal as per its site practices and its performance on the implementation of provision given in the Mitigation Plan given in Section 6.2. Besides, the contractor regularly provides information relating with the practices implemented on site within the scope of the monitoring scheme of the Project established in Chapter 7 of this ESMP and provide monitoring results to Zorlu Jeotermal upon receiving them.

Table 7-1. Monitoring Plan

					Cost to:		Responsibility to:	
Project Phase	**Parameter What Parameter is to be monitored?**	**Monitoring Location Where is to it to be monitored?**	**Monitoring Method How is it to be monitored/type of monitoring equipment**	**Monitoring Frequency When is it to be monitored – frequently or continuous?**	**Install**	**Operate**	**Install**	**Operate**
Exploration	Hydrogen Sulfide (H_2S)	Drilling sites	Continuous monitoring with portable and fixed detectors which are systematically maintained and calibrated	Continuous throughout the exploration phase of the Project	Drilling Contractor (through contractual requirements to be enforced by Zorlu Jeotermal)	Drilling Contractor (through contractual requirements to be enforced by Zorlu Jeotermal)	Drilling Contractor	Drilling Contractor
Pre-Land preparation	Environmental Noise	At the closest building (see Table 4-3) before the land preparation phase of the Project	48 hours measurements in line with applicable national and international standards	Baseline monitoring before the land preparation phase of the Project	Drilling Contractor (through contractual requirements to be enforced by Zorlu Jeotermal)	Drilling Contractor (through contractual requirements to be enforced by Zorlu Jeotermal)	Drilling Contractor	Drilling Contractor
Land preparation Exploration Closure and Land rehabilitation		Receptors with noise related grievances		If a grievance has been received for the duration of the Project activities				
Pre-Land preparation	Air quality (PM10 and dust)	At the closest building (see Table 4-3) before the land preparation phase of the Project	24 hours measurement in line with applicable national and international standards	Baseline monitoring before the land preparation phase of the Project	Drilling Contractor (through contractual requirements to be enforced by Zorlu Jeotermal)	Drilling Contractor (through contractual requirements to be enforced by Zorlu Jeotermal)	Drilling Contractor	Drilling Contractor
Land preparation Exploration		Receptors with air quality related grievances		If a grievance has been received for the duration of the Project activities				

					Cost to:		Responsibility to:	
Project Phase	**Parameter What Parameter is to be monitored?**	**Monitoring Location Where is to it to be monitored?**	**Monitoring Method How is it to be monitored/type of monitoring equipment**	**Monitoring Frequency When is it to be monitored – frequently or continuous?**	**Install**	**Operate**	**Install**	**Operate**
Closure and Land rehabilitation								
Pre-Land preparation	Soil Parameters listed in Appendix-2 Table 2 of TSPCR	Drilling sites that have no potential for future contamination	In line with applicable national and international standards	Baseline monitoring before the land preparation phase of the Project and if a grievance has been received for the duration of the Project activities	Drilling Contractor (through contractual requirements to be enforced by Zorlu Jeotermal)	Drilling Contractor (through contractual requirements to be enforced by Zorlu Jeotermal)	Drilling Contractor	Drilling Contractor
Pre-Land preparation	Surface water quality Parameters listed in Appendix-5 of Regulation on Surface Water Quality	Surface water closest to the location (see Table 2-3)	In line with applicable national and international standards	Baseline monitoring before the land preparation phase of the Project and if a grievance has been received for the duration of the Project activities	Drilling Contractor (through contractual requirements to be enforced by Zorlu Jeotermal)	Drilling Contractor (through contractual requirements to be enforced by Zorlu Jeotermal)	Drilling Contractor	Drilling Contractor
Pre-Land preparation	Groundwater quality, *If a groundwater well is identified in the Project AoI* Parameters listed in Appendix-3 and Appendix-5 Article 2 of the Regulation Concerning Protection of Groundwater against Pollution and Deterioration	Groundwater well in the direction of groundwater flow in the immediate vicinity of the drilling sites	In line with applicable national and international standards	Monthly *If a groundwater well is identified in the Project AoI*	Drilling Contractor (through contractual requirements to be enforced by Zorlu Jeotermal)	Drilling Contractor (through contractual requirements to be enforced by Zorlu Jeotermal)	Drilling Contractor	Drilling Contractor

					Cost to:		Responsibility to:	
Project Phase	**Parameter What Parameter is to be monitored?**	**Monitoring Location Where is to it to be monitored?**	**Monitoring Method How is it to be monitored/type of monitoring equipment**	**Monitoring Frequency When is it to be monitored – frequently or continuous?**	**Install**	**Operate**	**Install**	**Operate**
Exploration	Drilling mud waste characteristics	Drilling mud ponds	Laboratory analysis (by accredited laboratories)	Once at each site	Drilling Contractor (through contractual requirements to be enforced by Zorlu Jeotermal)	Drilling Contractor (through contractual requirements to be enforced by Zorlu Jeotermal)	Drilling Contractor	Drilling Contractor
Exploration	Geothermal fluid characteristics	Geothermal fluid pits	Laboratory analysis (by accredited laboratories)	Once at each site	Drilling Contractor (through contractual requirements to be enforced by Zorlu Jeotermal)	Drilling Contractor (through contractual requirements to be enforced by Zorlu Jeotermal)	Drilling Contractor	Drilling Contractor
Land preparation Exploration Closure and Land rehabilitation	Internal Grievances and (on labor and working conditions etc.) External Grievances (on land acquisition, community H&S, labor influx, reinstatement)	Project site	Verbal and written grievances received	Continuous throughout Project activities	Zorlu Jeotermal	Zorlu Jeotermal	Zorlu Jeotermal	Zorlu Jeotermal

8. INSTITUTIONAL ARRANGEMENTS

Zorlu Jeotermal will take full responsibility for E&S management of the Project in line with this ESMP through its Team Leader's coordinative role at the Project sites with support from the on-site team and E&S experts at the headquarters.

Zorlu Jeotermal will be responsible for controlling and checking the site conditions and the implementation of the E&S provision, organizational structure and recording system provided in this ESMP and given as Project standards. Zorlu Jeotermal will also control and check design and planning (design of the layout, well depth, etc.), whether any risks/impacts are raised other than the ones assessed in the ESMP. In the event of any change in the design, planning and provisions, and identification of any unexpected E&S risks/impacts, the ESMP and SEP shall be revised and submitted for approval of RSM Unit. Without obtaining approval of the RSM Unit, no site works will be performed.

The key E&S responsibilities of Zorlu Jeotermal will include the following:

- Obtaining all the necessary permits and approvals prior to start of site works.
- Implementation of this ESMP and the Project SEP throughout Project activities.
- Ensuring this ESMP is implemented by contractors with strict adherence.
- Carry out stakeholder engagement activities.
- On-site E&S monitoring and reporting in line with this ESMP, SEP and Project E&S requirements.

The main Project activities including land preparation, exploration and closure and rehabilitation activities will be conducted by the drilling contractor. To this end, and as required by contractual agreements, the drilling contractor will also be responsible for following the requirements and standards and implementing the measures set by this ESMP and the national legislation. For the Project workplaces, Zorlu Jeotermal will be registered as employer to Social Security Institution and the drilling contractor will be registered as subcontractor under the employer's Social Security Institution registration number. The employer and the subcontractor shall then follow the provisions of relevant national legislation.

Zorlu Jeotermal will monitor the drilling contractors' ESMP implementation performance. For this purpose, the drilling contractor will establish mechanisms to inform Zorlu Jeotermal Team Leader on the E&S performance of the Project. Zorlu Jeotermal will establish mechanisms to manage the overall implementation by the drilling contractor. Within this scope, the roles and responsibilities will be as follows:

The Zorlu Jeotermal Team Leader/Project Coordinator will:

- Ensure adequate resources required for ESMP implementation are in place and key roles and responsibilities are assigned to individual team members.
- Direct contract oversight in ensuring that the Project receives the services identified in the contracts, including full compliance with the ESMP.
- Ensure Project SEP (including grievance mechanism) is implemented.
- Act as the primary contact person at the site to lead stakeholder engagement activities in liaison with the E&S team at the headquarters and assign site team members to support the stakeholder engagement activities and reporting as outlined in the Project SEP.

The ESHS Representative will:

- Manage the E&S issues at the Project site
- Conduct daily and weekly audits at the Project site, record and report the audit findings and issues relating to the ESHS and prepare monthly monitoring reports to RSM Unit during the Project lifetime
- Conduct weekly ESHS meetings lead by Zorlu Jeotermal with participation of responsibles from contractors and subcontractors.

- Monitor the site works of the contractors and support them during the implementation of the E&S mitigation measures provided in the ESMP and the management plans.
- Check the required E&S documentation of Zorlu Jeotermal and the contractors (obligatory OHS documents, employment records of personnel, OHS file of employees, etc) and internally approve them
- Conduct toolbox trainings at site
- Conduct E&S trainings within the scope of orientation training to all relevant employees of Zorlu Jeotermal, contractors and subcontractors
- Develop and review Occupational Health and Safety Management Plan compliant with the national legislation, WB OPs, WBG EHS Guidelines, and applicable requirements of GIIP and ensure the implementation of the management plan at site.

The envisaged Project workforce has been described in Chapter 2 of this ESMP.

E&S performance data (e.g. grievances, spill/leakage records, waste records, accident/incident statistics, any recorded non-compliances and implemented follow-up actions) will be monitored and reported by the site team members under Zorlu Jeotermal and the drilling contractor.

For the duration of the Project, Zorlu Jeotermal staff will be in charge of liaison with the community members and the relevant authorities.

For monitoring of ESMP implementation performance, Zorlu Jeotermal will prepare and submit monthly E&S Monitoring Reports to TKYB[26]. The E&S Monitoring Reports will cover the following subjects:

- General Environment
- Air Emissions
- Soil
- Surface water and groundwater monitoring
- Waste Management
- Effluent Management
- Biodiversity
- Noise and dust emissions
- Worker Health and Safety
- Public Safety
- Social Monitoring (including land acquisition impacts-if any-, grievance management, community H&S, labor management and any impacts on vulnerable groups to monitor)

The ESMP Monitoring report will include the data monitored, comparison of the data measured against ESMP and national laws and regulations, any non-compliances observed with respect to international standards and national requirements, the suggested corrective actions and a due date for these actions.

The E&S Monitoring Report template will be provided to the Zorlu Jeotermal who is responsible for performing its reporting following the template.

[26] As per the RSM Beneficiary Manual 3.0 (April 2023), TKYB, through its Engineering Department, is the Project Implementation Agency for the RSM. TKYB's RSM Unit will be supported by a Technical Consultant for management and implementation of the RSM (RSM Consultant). The World Bank will be responsible for carrying out supervision of RSM implementation by TKYB.

All E&S including OHS documentation including but not limited to assessments, plans, training data, training sheets, assignments, permit to work records, medical surveillances, controls, checks, inspections, checklist, control forms, non-conformities, noncompliance, corrective measures, near-misses, accidents, incidents, investigation reports, review of documentation records, management reviews, statistics, meeting minutes, consultations, OHS specialists contracts, drill reports, periodical control records for vehicles and machinery, up to date on site vehicles and machinery list, up to date personnel lists, tracking logs, disposal records should be kept and archived with evidential data showing date, time, duration, signatures, responsible parties, attendees, photos etc.

An internal audit system to check and monitor the compliance of drilling contractor and all subcontractors with the environmental and social requirements of the Project will be developed by Zorlu Jeotermal and Zorlu Jeotermal submit its documented system to the RSM Unit for approval before the mobilization.

As detailed by the RSM Beneficiary Manual 3.0 (April 2023), monthly monitoring reports to RSM Unit where all technical, environmental and social issues will be reviewed, monitored and supervised by the RSM Unit in close coordination and support with the RSM Consultant. Monitoring will include progress on the implementation of ESMP and its relevant sub-management plans, any E&S issues including Project-level grievances (both community or employee as well as any OHS incidents, environmental spills, near misses, as well as any progress related to land acquisition if any, etc.).

It should be noted that relevant ministries may also conduct announced or unannounced audits to identify the Project's compliance with related national legislation and to investigate any grievance/ concern relayed to them.

Zorlu Enerji have the following Corporate level E&S Procedures in place which will also be applicable to the Project:

- Environmental Management Procedure
- E&S Impacts Management Procedure
- Biodiversity Monitoring, Mitigation and Inspection Procedure
- Biodiversity Communication and Awareness Procedure
- Biodiversity Non-Compliance Procedure
- Biodiversity Trainings Procedure
- Invasive Species Monitoring and Control Procedure
- Chance Finds Procedure
- Waste Management Procedure
- Environmental Spill Management Procedure
- Legislation Liability Follow-up Procedure
- Sustainability Audits Procedure
- Grievance and Feedback Procedure
- Geothermal Well Drilling, Well Completion, Reservoir Management and Artificial Production Works OHS-E Plan
- Drilling Reservoir and Well Completion Emergency Plan

All relevant employees of Zorlu Jeotermal, contractors and subcontractors will have E&S training within the scope of orientation training by Zorlu Jeotermal's ESHS Expert and regularly during the Project lifecycle.

The training subjects at least includes:

- requirements of the ESMP,
- procedures to follow and mitigation measures to implement,
- roles and responsibilities, and
- grievance mechanism.

9. CONSULTATIONS WITH AFFECTED GROUPS AND NON-GOVERNMENTAL ORGANIZATIONS

In order to ensure effective and meaningful engagement with different stakeholder groups, Zorlu Jeotermal will use various appropriate methods of information disclosure and communication throughout the Project.

A Stakeholder Engagement Plan (SEP) has been prepared by GEM in line with RSM Beneficiary Manual 3.0 (April 2023) as part of Zorlu Jeotermal's RSM application process. The objective of the SEP is to ensure that Project Affected Persons (PAPs), non-governmental organizations, internal stakeholders (direct and contracted workers of the Project) and other interested stakeholders are provided with relevant, timely and accessible information so that they have an opportunity to express their views and concerns about the Project and its potential E&S impacts. The SEP will be applicable throughout the Project life.

The stakeholder engagement activities within the scope of the Project started with the national EIA process. The EIA Regulation categorizes investments as projects subject to full-scale EIA process (Annex-1) or projects subject to screening-elimination criteria (Annex-2).

According to the 2014 EIA Regulation, it is a legal obligation for the project owners only during a full EIA process, i.e. for Annex-1 projects, to organize a Public Participation Meeting (PPM). As the Project was not subject to a full EIA process, a PPM was not conducted as part of the national EIA process. This said, the PIF was publicly disclosed at the official website of the MoEUCC and has been fully available for the public to review[27].

Within the scope of the national EIA process, governmental authorities have provided their official views as summarized in Table 9-1.

Zorlu Jeotermal had engagement with the local authorities and the neighboring geothermal greenhouse owner in early 2023. In February 2023, Zorlu Jeotermal purchased the parcel of ZDM-3 well location from a private owner on willing buyer-willing seller basis.

The stakeholder engagement strategy and engagement methods/program for the Project is provided in Chapter 5 ("*Stakeholder Engagement Program*") of SEP.

After the draft final versions of ESMP and SEP are approved by the RSM Unit, they will be disclosed to public on Beneficiary's webpage (in Turkish) and consulted with the stakeholders through a stakeholder engagement meeting to be held in Asagidaloren village.

The meeting will be publicly announced at minimum 10 calendar days before the meeting date. Project-affected stakeholders will be directly contacted and invited by the Beneficiary representatives. Mukhtars of the Project-affected settlements will be separately informed about the meeting. Posters including information on the meeting will be posted in public places, such as mukhtars' offices, mosques, coffee houses, etc., for visibility purposes. Public announcement methods will also be used for informing the public about the meeting's purpose, date, time and place.

All such invitations will be documented, including evidence such as signed confirmations from mukhtars for posters displayed in their offices and photographs. Relevant documentation will be submitted to the RSM Unit. A Project brochure (in Turkish) will be developed, including a brief description of the Project with clear maps and/or layouts indicating the lands to be used by the Project, grievance mechanism and Project contact details. Project brochures will be made available at mukhtars' offices and will also be distributed to attendees during the stakeholder engagement meeting. The Project brochure, along with the draft final versions of the ESMP and SEP, will be disclosed on Beneficiary's webpage. Documentation of this disclosure will be submitted to the RSM Unit. The relevant webpage link will be included in the Project brochure, posters and all invitation materials.

After the meeting aiming for broad participation has been held, the Beneficiary will revise the draft final versions of the ESMP and SEP to incorporate public comments and concerns. Information about the

[27] https://eced-duyuru.csb.gov.tr/eced-prod/duyurular.xhtml

stakeholder engagement meeting will be documented using the form given in Beneficiary Manual – Annex 12E and appended to the SEP.

Once the information on and outcomes from the stakeholder engagement meeting information are integrated into the ESMP and SEP, the revised draft final versions will be submitted to the RSM Unit for approval. After the RSM Unit approves the documents, they will be considered and recorded as final. The final versions of the ESMP and SEP will then be disclosed on the Beneficiary's web page.

All disclosed documents will comply with personal privacy rights, ensuring that any personal information related to land acquisition, etc. is kept confidential and not disclosed to the public.

The stakeholder engagement meeting will be planned and undertaken in consultation of the RSM Unit. Before sending out the invitations to the relevant stakeholders, the Beneficiary will submit its planning of the process in a documented format to the RSM Unit for approval.

Turkish versions of the ESMP and SEP will be available at public places (e.g. muhktar's offices and other public places such as mosques, teahouses and places commonly visited by women at the affected settlements).

Project affected stakeholders will also be consulted in the event of significant changes to the Project which may result in additional risks or impacts.

Table 9-1. Summary of the Official Correspondences from the Governmental Authorities

Governmental Authority	Date of the Official Letter	Content of the Official Letter
Ministry of Agriculture and Forestry – 13th Regional Directorate	6 June 2022	The official letter states that as a result of the review of the PIF, it has been concluded that the activity area is not located in a protected area within the scope of Law on Land Hunting (Law No. 4915, 2003), National Parks Law (Law No. 2873, 1983) and Regulation on the Protection of Wetlands. To this end, there is no objection of the authority regarding the implementation of the Project, if the abovementioned related laws and regulations are strictly complied with, and the commitments stated in the PIF are adhered to.
Ministry of Agriculture and Forestry, General Directorate of State Hydraulic Works (DSI), 8th Regional Directorate	19 June 2022	There is no objection of the authority on the condition that the following are met within the EIA permitted areas (to be explicitly referenced within the PIF): - In case of any Project-related adverse impacts on the quality and quantity of groundwater, all damages will be borne by the owner of the activity, and the activity will be ceased, and the actions will be put in place as per the requirements of the related institution. - All necessary measures for containment and leak-proofness of the Project components ad waste areas to be in place. All applicable legislation will be complied with in the framework of the protection of groundwater and groundwater resources. - Throughout construction, operation, and subsequent stages of the activity, no solid or liquid waste shall be discharged to groundwater and streams, the flow of dry streams shall not be disrupted, the specified permitted EIA coordinates shall not be exceeded, necessary precautions should be taken regarding flooding and material flow, the narrowness of dry and perennial flowing river beds corresponding to the mentioned areas shall not be altered, river bed stability shall not be compromised, unrestricted flow should be maintained, no waste materials shall be dumped into rivers, no damage shall be caused to agricultural lands, and all damages or losses that may occur due to the Project activities shall be covered by the activity owners/facility operators. Compliance with the relevant provisions of the Water Pollution Control Regulation, applicable laws, and other commitments as stated in the PIF is mandatory throughout Project implementation.
	22 May 2023	Activities to take place on Lot/Parcel No: 102/25 are permitted on the condition that 10-meter protection zone from the dry creek is established and flood protection measures are put in place (Figure 4-6).

Governmental Authority	Date of the Official Letter	Content of the Official Letter
Governorship of Agri, Provincial Directorate of Agriculture and Forestry	23 June 2022	Amongst the 20 well locations within the scope of the PIF, the official letter states that at the well locations classified as pasture, as annexed to the official letter, no activity or action should be undertaken without applying for a change of allocation purpose of these pasture lands as per Article 14 of the Pasture Law (Law No. 4342, 1998). Furthermore, for lands classified as "agricultural land, uncultivated land, meadow" within the EIA permitted well areas, Provincial Directorate has no objection if the necessary permits are obtained in accordance with the provisions of Law on Soil Conservation and Land Use (Law No. 5403, 2005). Information on land use and ownership for 20 parcels is annexed to the official letter.
	1 June 2023	<u>Decision on the Land Use Specification of ZDM-3 Well Location:</u> As per the on-site study conducted on 23 May 2023 by the technical personnel from the Provincial Directorate of Agriculture and Forestry, the land use specification of Lot/Parcel No: 102/25 of Asagidaloren Village, ZDM-3 well location, has been determined as "**Dry Marginal Agricultural Land**". The parcel area, which is 1.3921 ha, is granted "Non-Agricultural Use" on the condition to adhere to the requirements as set out in the official letter of DSI dated 22 May 2023 and the conditions established in the Soil Conservation Project. As per the Article 12(8) of the Regulation on Protection, Utilization, and Planning of Agricultural Lands, "*Permissions granted for land use shall be considered invalid if, **within two years** from the date of permission, plans are not approved for non-agricultural purposes or if license is not obtained for the structures used for agricultural purposes. The granted permissions cannot be used for purposes other than their intended use. In the event that unauthorized use is determined, procedures shall be carried out in accordance with Articles 20 and 21 of the Law*." As per Article 9(15) of the Circular on the Protection, Use, and Planning of Agricultural Lands (Circular Date: 09 May 2023, No: E-58125898-230.04.02-9637520), the relevant authority shall inform the Provincial Directorate within one month from the date when the granted permissions are linked to the Plan or License. Therefore, it is necessary to notify Provincial Directorate of Agriculture and Forestry **within one month** from the date the permission is connected to the License or Plan.

Appendices

Appendix A	Exploration Licenses
Appendix B	EIA Decision
Appendix C	Governmental Approvals/Opinion Letters
Appendix D	Title Deed for ZDM-3
Appendix E	List of Flora and Fauna Species as Provided in PIF
Appendix F	Ambient Air Quality Calculations as Provided in PIF
Appendix G	Worst-case Scenario Noise Values of Vehicles and Equipment to be Used with in the Project as Provided in PIF

Appendix A – Exploration & Operation Licenses

A.1 Exploration License No.36

A.2 Exploration License No.37

A.3 Official Letters Regarding Extension of the Exploration Licenses

A.4 Operation License No. 14

Appendix B Operation License No. 15– "EIA Not Required" Decision

Appendix C – Governmental Approvals/Opinion Letters

Appendix D – Title Deed for ZDM-3

Appendix E – List of Flora and Fauna Species as Provided in PIF

E.1 List of Flora Species Identified in the Vicinity of the Exploration License Areas as per PIF

No	Taxon Name	Common Name *(Turkish)*	Endemic	Phytogeographic Region	Red Data Book[28]	BERN
1	*Asplenium viride*					
2	*Lepidium vesicarium*			Iran-Turan		
3	*Alyssum alyssoides*					
4	*Turritis glabra*					
5	*Arenaria gypsophiloides* var.			Iran-Turan		
6	*glabra*					
7	*Gypsophila patrinii*	Çöven		Iran-Turan		
8	*Silene saxatilis*					
9	*Astragalus macrostachys*	Geven		Iran-Turan		
10	*Astragalus christianus*	Dallıgeven				
11	*Trifolium hirtum*			Mediterranean		
12	*Melilotus indica*					
13	***Hedysarum cappadocicum***		**X**	**Iran-Turan**	**LC**	
14	*Alchemilla erythropoda*			Europe-Siberia		
15	*Saxifraga tridactylites*	Taşkıran Otu				
16	*Eryngium giganteum*			Black Sea region		
17	*Pimpinella aurea*			Iran-Turan		
18	*Falcaria vulgaris*	Kazayağı				
19	*Malabaila dasyantha*			Iran-Turan		
20	*Valerianella oxyrhyncha*			Iran-Turan		
21	*Centaurea polypodiifolia* var.			Iran-Turan		
22	*polypodiifolia*					
23	*Taraxacum serotinum*	Gecikmeli Karahindiba				
24	*Campanula crispa*			Iran-Turan		
25	*Primula veris* subsp. *Macrocalyx*	Çuha Çiçeği		Europe-Siberia		

Source: PIF, 2022

[28] Red Data Book of Turkish Plants 'Türkiye Tabiatı Koruma Derneği ve Van 100. Yıl Üniversitesi, 2000'

E.2 List of Fauna Species Identified in the Vicinity of the Exploration License Areas as per PIF

No.	Taxon Name	Common Name *(Turkish)*	Endemic	IUCN[29]	CITES	BERN	MAK(*)	AYK(**)
	AMPHIBIAN							
	BUFONIDAE							
1	*Bufo bufo*	Kara Kurbağası	-	LC	-	App-III		-
2	*Bufo virdis*	Gece Kurbağası	-	LC	-	App-II		-
	REPTILES							
	LACERTIDAE							
1	*Ophisops elegans*	Tarla Kertenkelesi	-	LC	-	App-III		App-3
2	*Lacerta parva*	Cüce Kertenkele	-		-	App-II		App-3
3	*Lacerta trilineata*	Büyük Yeşil Kertenkele	-	LC	-	App-II		App-3
4	*Lacerta viridis*	Küçük Yeşil Kertenkele	-	LC	-	App-II		App-3
	COLUBRIDAE							
5	*Coluber jugularis*	Kara Yılan	-	LC	-	App-II		App-3
	VIPERIDAE							
6	*Vipera ammodytes*	Boynuzlu Engerek	-	LC	-	App-II		App-3
7	*Vipera xanthina*	Şeritli Engerek	-	LC	-	App-II		App-3
	MAMMALS							
	VESPERTILIONIDAE							
1	*Pipistrellus pipistrellus*	Cüce Yarasa	-	LC	-	App-III	-	App-3
2	*Myotis blythii*	Farekulaklı Yarasa	-	LC	-	App-II	-	App-3
	RHINOLOPHIDAE							
3	*Rhinolophus ferrumequinum*	Büyük Nalburunlu Yarasa	-	LC	-	App-II	-	App-3
	LEPORIDAE							
4	*Lepus europaeus*	Yabani Tavşan	-	LC	-	App-III	App-2	App-2

Source: PIF, 2022

(*) Central Hunting Commission Decision (2021-2022)
(**) Hunting and wild animal lists determined based Article 2 and 4 of Land Hunting Law (Law No. 4915, 2003)

[29] IUCN Red List of Threatened Species at https://www.iucnredlist.org/

E.3 List of Avifauna Species Identified in the Vicinity of the Exploration License Areas as per PIF

No.	Taxon Name	Common Name *(Turkish)*	Status (***)	Red Data Book(****)[30]	IUCN	CITES	BERN	MAK(*)	AYK(**)
	ACCIPITRIDAE								
1	*Accipiter nisus*	Atmaca	Y	A.3	LC	App-II	App-II	-	App-3
2	*Buteo buteo*	Şahin	Y	A.3	LC	App-II	App-II	-	App-3
3	*Buteo rufinus*	Kızıl Şahin	Y	A.3	LC	App-II	App-II	-	App-3
	CUCULIDAE								
4	*Cuculus canorus*	Bayağı Guguk	G	A.2	LC	-	App-II	-	App-3
	FALCONIDAE								
5	*Falco subbteo*	Delice Doğan	Y	A.3.1	LC	App-II	App-II	-	App-3
6	*Falco tinnunculus*	Kerkenez	Y	A.2	LC	App-II	App-II	-	App-3
	COLUMBIDAE								
7	*Columba palambus*	Tahtalı Güvercin	Y	A.4	LC	-	App-III	App-2	App-2
8	*Columba livia*	Kaya Güvercini	Y	A.5	LC	-	App-III	App-2	App-2
9	*Streptopleia decaocta*	Kumru	Y	A.5	LC	-	App-III	App-1	App-2
	STRIGIDAE								
10	*Athene noctua*	Kukumav	Y	A.2	LC	App-II	App-II	-	App-3
	APODIDAE								
11	*Apus apus*	Kara Sağan,Ebabil	G	A.3.1	LC	-	App-III	-	App-3
	ALAUDIDAE								
12	*Lullula arborea*	Orman Toygarı	Y	A.3	LC	-	-	App-1	App-2
13	*Galerida cristata*	Tepeli Toygar	Y	A.3	LC	-	App-III	App-1	App-2
	HIRUNDINIDAE								
14	*Hirundo rustica*	Kır Kırlangıcı	G	A.5	LC	-	App-III	-	App-3
	OTACILLIDAE								
15	*Motacilla cinerea*	Dağ Kuyrukkakanı	Y	A.2	LC	-	App-II	-	App-3
16	*Motacilla alba*	Akkuyrukkakan	Y	A.3.1	LC	-	App-II	-	App-3
	TURDIDAE								
17	*Turdus viscivorus*	Ökse Ardıcı	Y	A.2	LC	-	App-II	App-3	App-2
	LANIIDAE								
18	*Lanius nubicus*	Akalın Ümüksıkan	-	A.2	LC	-	App-III	App-3	App-3

Source: PIF, 2022

(*) Central Hunting Commission Decision (2021-2022)

(**) Hunting and wild animal lists determined based Article 2 and 4 of Land Hunting Law (Law No. 4915, 2003)

(***) **K:** Wintering bird species, wintering regularly

G: Migrating bird species, migrating regularly and seasonally between breeding and wintering areas

Y: Resident and breeding bird species, breeds regularly

T: Migrating bird species, migrating as transit and they can be observed in a short time at the migration seasons

V: Vagrant, observed as accidentally or randomly

(****) Turkish Red List of Bird Species (Kiziroğlu,İ., 2009. The Pocket Book for Birds of Türkiye)

A.2. **(EN)** Endangered and breeding species in Türkiye

A.3. **(VU)** Vulnerable and breeding species in Türkiye

A.3.1. **(D)** Declining, vulnerable and breeding species in Türkiye

A.4. **(NT)** Near threatened. Breeding species do not face to risk now but are likely to qualify for threatened category

A.5. **(LC)** Least Concern, Breeding species that are widespread in Türkiye

[30] Turkish Red List of Bird Species (Kiziroğlu,İ., 2009. The Pocket Book for Birds of Türkiye)

Appendix F – Ambient Air Quality Calculations as Provided in PIF

According to PIF, air quality assessment calculations were conducted considering the worst-case scenario where all vehicles operating within the Project scope operate simultaneously and at the same location (please see Section 2.7 for the vehicles planned to be operated within the Project), It has been determined that the mass flow rates determined comply with the values given in the Industrial Air Pollution Control Regulation.

Industrial Air Pollution Control Regulation, Table 2.1 – Mass Flows for Normal Operating Conditions and Operating Hours on Weekly Working Days

Pollutant	Mass flowrate (kg/hour)	
Emissions	From the stack	From places other than stack
PM	10	1
CO	500	50
SO2	60	6
NO2	40	4

Source: Industrial Air Pollution Control Regulation, Table 2.1

The national legislative requirements as per the Regulation on Assessment and Management of Air Quality and international standards applicable to the Project are summarized below. Regarding the air quality standards, the strictest levels, the guideline values given in WBG General EHS Guidelines, have been adopted as Project Standards.

Project Air Quality Standards

Parameter	Regulation on Assessment and Management of Air Quality		WBG EHS General Guidelines & WHO Air Quality Guidelines	
	Averaging Period	Limit Value (µg/m^3)	Averaging Period	Limit Value (µg/m^3) (*)
SO_2	1-hour (cannot be exceeded more than 24 times a year)	350	24-hour	125 (interim target 1) 50 (interim target 2) 20 (guideline)
	24-hour (cannot be exceeded more than 3 times a year)	125		
	Annual and winter season (October 1 – March 31)	20	10 minutes	500 (guideline)
	Long term value (**)	60		
NO_2	1-hour (cannot be exceeded more than 18 times a year)	200	1-hour	200 (guideline)
	Annual	40	Annual	40 (guideline)
PM_{10}	24-hour (cannot be exceeded more than 35 times a year)	50	24- hour	150 (interim target 1) 100 (interim target 2) 75 (interim target 3) 50 (guideline)
	Annual	40	Annual	70 (interim target 1) 50 (interim target 2) 30 (interim target 3) 20 (guideline)

(*) Interim targets are proposed within the WHO Ambient Air Quality Guideline (Global update 2005) as incremental steps in a progressive reduction of air pollution and are intended for use in areas where pollution is high. Progress towards the guideline values should, however, be the ultimate objective.

(**) Source: Industrial Air Pollution Control Regulation

Source: Regulation on Assessment and Management of Air Quality, Annex 1 & WBG EHS General Guidelines, Table 1.1.1.

Pollutant Values Expected to Result from Work Machinery

Pollutant	Expected/Calculated Value (kg/hr)
CO	0.25
Hydrocarbons	0.76
Nitrogen oxides	0.94
Sulfur oxides	0.17
Dust	0.47

Source: PIF, 2022

As per PIF, the total dust emission values obtained from calculations based on uncontrolled and controlled scenario for the land preparation phase activities to be carried out at the drilling locations are shown in Table below. The values are below the limit value of 1 kg/hour stated in Industrial Air Pollution Control Regulation. Therefore, dust dispersion modeling has not been conducted.

Dust Emission that will Result from Land Preparation Phase Activities to be Carried out at Drilling Locations (*)

Land preparation phase activities	Uncontrolled situation (kg dust/hr)	Controlled situation (kg dust/hr)
Topsoil stripping of drilling areas	0.467	0.233
Excavation for mud pit construction in the drilling area	0.332	0.168
Total	**0.799**	**0.401**

Source: PIF, 2022

(*) Calculations are made per one drilling well

Appendix G – Worst-case Scenario Noise Values of Vehicles and Equipment to be Used with in the Project as Provided in PIF

The Project PIF file was prepared in accordance with the Regulation on the Assessment and Management of Environmental Noise which was in force at the time the "EIA Not Required" decision was obtained. The Environmental Noise Control Regulation was put into force on 30 November 2022 and there have been changes in the environmental noise limit values determined within the scope of the regulation. The Environmental Noise Control Regulation provides limit values for the environmental noise for construction phase of projects for daytime (07:00-19:00), evening-time (19:00-23:00) and night-time (23:00-07:00). The table below shows the environmental noise limit values determined within the Environmental Noise Control Regulation.

Environmental Noise Limits Values (as per Annex-2, Table 1 of Environmental Noise Control Regulation)

Source of Noise	$L_{eq\text{-}daytime}$ (dBA) Day (07:00 – 19:00)	$L_{eq\text{-}evening}$ (dBA) Day (19:00 – 23:00)	$L_{eq\text{-}nighttime}$ (dBA) Day (23:00 – 07:00)
Industrial facilities, transportation sources	65	60	55
Businesses that broadcast music	60	55	50
Workplaces	Background noise + 5 dBA		Background noise + 3 dBA
If there is more than one workplace	Background noise + 7 dBA		Background noise + 5 dBA

Additionally, WB EHS Guidelines noise levels are provided in Table below.

Project Noise Standards for Residential Receptors

Receptor	One Hour L_{eq} (dBA)	
	Daytime (07:00 – 22:00)	Nighttime (22:00 – 07:00)
Residential areas (*)	55	45
Commercial/industrial areas	70	70

(*) Guideline values are applicable to noise levels measured out of doors. Acceptable indoor noise levels for residential, institutional, and educational settings are provided by WHO Guidelines, which recommends, at night-time, outside sound levels about 1 meter from facades of the living spaces should not exceed 45 dB LAeq, so that people may sleep with bedroom windows open *(WHO, 1999)*

The noise limits set by Environmental Noise Control Regulation and WB EHS Guidelines have been considered for the Project and the strictest levels have been adopted as Project Standards for environmental noise.

Project Standards for Environmental Noise

Time of the Day(*)	Noise Limits for Residential Areas		Project Standards at Residential Receptors (for time slots specified by WBG)
	WB Group EHS Guidelines(**)	Environmental Noise Control Regulation	
Daytime	55 dBA	65 dBA	55 dBA
Evening	-	60 dBA	-
Night-time	45 dBA	55 dBA	45 dBA
(*) The WB Group EHS Guidelines define the daytime as 07:00-22:00 and nighttime as 22:00-07:00. The Turkish RAMEN defines the daytime as 07:00-19:00, evening as 19:00-23:00 and nighttime as 23:00-07:00. It should be also noted that the nighttime absolute lower limit of 45 dBA is also based on World Health Organization guidelines for the protection of sleep indoors with windows open.			

(**) Noise impacts should not exceed the levels presented in or result in a maximum increase in background levels of 3 dB at the nearest receptor location off-site.

The number of vehicles and equipment to be used within the Project are provided in Section 2.7. Within PIF, based on the number of vehicles and equipment to be used, cumulative noise level at the source was calculated, based for the worst-case scenario, assuming that all machinery and equipment will operate at the same time and location. It should be noted that atmospheric, ground absorption or barrier effects (topographical conditions, vegetation) were not taken into consideration in order to simulate the worst-case conditions in the scope of the PIF. The construction activities will be conducted progressively such that land excavation and levelling activities will be followed by concrete pavement of the study area and installation of the drilling equipment along with other ancillary components. Finally, drilling activities will be initiated. Thus, all these activities will be carried out successively at each drilling site.

PIF has made a noise assessment for the machinery and equipment to be used for the activities to be carried out at the well locations considering the worst-case scenario where all the vehicles and equipment are located in the same place at the same time. The Table below provides the worst-case scenario noise levels calculated within PIF as per distances. As stated above, for the Project standards, the strictest noise limit levels will be adopted.

According to the Table, Project standards for daytime (55 dBA) are met when the distance is between 300- 350 m and Project standards for nighttime (45 dBA) are met when the distance is between 850- 900 m. As provided in Table 4-3, of the three (3) buildings identified, the closest one is 227 m to ZDM-3 well. The mitigation measures for environmental noise levels are provided in Chapter 6.

Worst-case Scenario Noise Levels of Vehicles and Equipment as per Distances

Distance (m)	L_{eqv}
20	81.36
50	73.20
72	69.89
100	66.86
117	65.40
124	64.85
150	63.05
200	60.29
250	58.10
300	56.29
350	54.74
400	53.39
500	51.10
600	49.21
700	47.60
800	46.20
1000	43.83

Source: PIF, 2022

Environmental Noise Control Regulation Annex-2 Table-2 specifies the allowed time periods for activities carried out outdoors in residential areas. According to the Regulation, construction site activities are allowed between 10:00 – 22:00. Since the drilling activities are performed 24-hour a day, a nighttime work permit will be obtained from the authorities. The requirement is indicated in Chapter 6.