FINAL REPORT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STUDY FOR NATURAL GAS PIPELINE FOR AKOLA GA, DISTRICT- AKOLA, MAHARASHTRA, INDIA

SUBMITTED TO

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ABBREVIATIONS

ATGL	Adani Total Gas Limited
AoI	Area of Influence
ASME	American Society of Mechanical Engineers
BCM	Billion Cubic Meters
BDPO	Block Development and Panchayat Office
CBM	Coal Bed Methane
CGD	City Gas Distribution
CGS	City Gate Station
CGWA	Central Ground Water Authority
CNG	Compressed Natural Gas
COP-26	26th UN Climate Change Conference of the Parties
CPCB	Central Pollution Control Board
DRS	District Regulatory Station
EHS	Environment, Health, and Safety
EIA	Environmental Impact Assessment
ESIA	Environmental and Social Impact Assessment
ESIA	Environmental and Social Impact Assessment
G.S.R	Gazette of India, Statutory Rules and Orders
GA	Geographical Area
GA	Geographical Area
GI	Galvanized Iron
GIGL	GSPL India Gasnet Limited
GIS	Geographic Information System
H.T. Line	High Tension Line
HDD	Horizontal Directional Drilling
IFC	International Finance Corporation
ISO	International Organization for Standardization
JV	Joint Venture
MoEF&CC	Ministry of Environment, Forests and Climate Change
MMSCMD	Million Metric Standard Cubic Meter per Day
MSS	Manufacturers Standardization Society
MUT	Mechanized Ultrasonic Testing
NG	Natural Gas
NH	National Highway
NOCs	National Oil Companies
OISD	Oil Industry Safety Directorate
PCV	Pressure Control Valve
PESO	Petroleum & Explosive Safety Organization
PNGRB	Petroleum & Natural Gas Regulatory Board
RoU	Right of Use

RoW	Right of Way
ROW	Right of Way
SCADA	Supervisory Control and Data Acquisition
SOP	Standard operating Procedure
SDG	Sustainable Development Goal
SH	State Highway
UN	United Nations

EXECUTIVE SUMMARY

INTRODUCTION

Adani Total Gas Limited (hereinafter referred as **ATGL**) is in the process of developing City Gas Distribution (CGD) networks to deliver Piped Natural Gas (PNG) to industrial, commercial, and residential sectors, as well as Compressed Natural Gas (CNG) to the transportation sector. Natural gas is a reliable, convenient, and environmentally friendly fuel that provides consumers with enhanced safety, convenience, and economic efficiency.

The company has already set up city gas distribution networks in various locations in India. To cater industrial, commercial and transportation demand of natural gas **ATGL** has planned to develop "***a City Gate Station (CGS)*** and total of ***65.5 km Natural Gas Pipeline Infrastructure***" in Akola and nearby Villages as part of Akola GA in Akola District of Maharashtra, India.

ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA STUDY) & SCREENING

TÜV SÜD South Asia Private Limited (hereinafter referred as **"TÜV SÜD")** has been entrusted by **ATGL** for providing consultancy services of Environmental and Social Impact Assessment Study (ESIA) for City Gas Distribution of Natural Gas Project at Akola town and nearby villages in Akola District, Maharashtra, India. The objective of the study is to assess potential Social and Ecological, Environmental Impacts from the project on the environment and social setting and address mitigation measures for the identified impacts. Environmental and Social management Plan (ESMP) has been designed in line with the impact identified and mitigation measures suggested in this report. In accordance with the screening criteria of IFC, and in accordance the observations of site reconnaissance survey, **TÜV SÜD** ESIA team has categorized Project as **Category B+**, since the proposed line route passes through NH, SH, Rural Roads, two rivers Purna and Morna Rivers, several canals, and natural drains and reserved forest area and requires permission/NOC from the relevant departments.

AREA OF INFLUENCE (AOI) FOR ESIA STUDY

ESIA study to evaluate environment and social risks and impacts associated with the Project.

The overall area covered by the assessment includes the following constituent areas:

- The footprint of the project, hereafter referred to as the 'Project Site'.
- The area extending 500 m (either side) outward from the project site boundary (estimated to contain the potential receptors of any project related environment, and ecological impacts), hereafter referred to as the 'Area of Influence' or 'AOI'; and the buffer zone is 5 km.
- The area 20 to 50 m (either side) is considered as a project impact area for identification of social impacts.

LEGAL FRAMEWORK

The Environmental and Social Impact Assessment study report has been prepared in accordance with major international and national regulatory frameworks. The major guidelines considered for the project

are the *IFC's EHS Guidelines dated 30th April 2007.* The *IFC performance standard, 2012 and Equators principle "EP4" guideline* has also been considered during the study.

PROJECT DESCRIPTION

ATGL is responsible for construction of CGS and laying, building, operating or expanding the CGD of natural gas pipeline (12 inches diameter) network of 65.5 km that is proposed to be laid in single stretch in two parts Part 1 of 38.3 km that traverses from Proposed CGS at GAIL IP-5 located at Poha village in Washim district to Barsi Takli village and Part 2 of 27.2 km from Barsi Takli to End of PMSGY Road.

BASELINE ENVIRONMENTAL AND SOCIAL CONDITION

The baseline environmental and ecological conditions of the project area have been assessed for project footprint area within 05 km radius of study area and Area of Influence extending 500 m (either side) of the route. Whereas the socio-economic conditions were assessed for 20–30-meter radius of study area. The secondary baseline monitoring was conducted from **15th to 20th July 2025** and the assessment of physical environmental parameters along with the ecological, and environmental survey was conducted during the site visit from **10th July 2025**.

ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT

As per impact assessment study conducted for the proposed CGD for the natural gas pipeline project, environmental and social parameters can be mitigated with prescribed measures. route has been strategically selected to minimize environmental and social impacts by avoiding sensitive areas and aligning with existing infrastructure. The stretches are spread across peri-urban, and rural landscapes, intersecting roads, railway, river, canals, drains, and forested areas.

Permission is required for River, Canal & Drain crossings, Railway crossings and Roads such as for NH from the NHAI, for SH from PWD Roads, and for PMGSY from Maharashtra rural road development authority. The Road crossing permissions, River, Canal & Drain crossing permissions are partially secured. Tree-cutting permissions for forests have been obtained, while clearance NH and railways is still pending. Sensitive receptors such as schools, hospitals, and markets lie along the route, requiring careful construction planning.

Construction impacts—such as dust, noise, and emissions—will be temporary and mitigated through best practices. No groundwater will be used, and 40% of the pipeline will be laid using HDD to avoid disturbing water bodies. The pipeline will be buried, minimizing land use impacts, and surplus soil will be reused.

During operation, environmental impacts are negligible. Safety will be ensured through SCADA systems and regular monitoring. A robust Environmental Management Plan and post-monitoring program will guide mitigation, especially considering Akola flood and seismic vulnerability.

During the construction Phase, various factors such as topography, drainage, water resources, ambient air and noise quality have moderate impacts, which can be reduced to minor with appropriate mitigation measures and efficient management. However, the impact on Ecology will still be moderate even after application of mitigation measures because removal of trees is involved and the impact due to this is irreversible. Socio-economic impacts are initially low but can become moderately beneficial because of community engagement and local employment. Occupational health and safety risks, which are moderate at first, are minimized to minor with proper safety measures. In the Operational Phase, the water

environment and health & safety impacts are low, and with effective measures, they reduce to insignificant. A summary of impacts has been provided in the table below.

Table: Summary of Impacts

Category	Impact Significance (without mitigation measures)	Impact Significance (post-mitigation)
Planning Phase		
Impact due to Land Procurement	Moderate	Minor
Construction Phase		
Topography and Drainage	Moderate	Minor
Water resources and availability	Moderate	Minor
Ambient air and noise quality	Moderate	Insignificant
Land and Soil Environment	Moderate	Minor
Ecology and Biodiversity	Moderate	Moderate
Socio-economic Impacts	Low	Moderate-beneficial
Occupational Health and Safety (OHS)	Moderate	Minor
Operational Phase		
Water Environment	Minor	Minor
Environmental Health & Safety	Moderate	Minor

**Source: Analysis by TUVSUD Team*

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

Environmental and Social Management Plan for the project has been designed in accordance with the impact identified during the project lifecycle (Construction and Operation phase). Adequate mitigation measures have been suggested against each identified impact during each of the above-mentioned phases.

Based on the ESIA Study conducted, it may be concluded that the project is eco-friendly and environmentally sustainable in the long run. The project will not only help in reducing the CO_2 emission responsible for global warming but also other gases and particulate emissions, which otherwise would be generated using conventional fossil fuel-based transportation vehicles and to cater energy demand for residential and commercial use. This Baseline ESIA study together with mitigation measures and follow up of recommendations on management actions will help **ATGL** in complying with the environmental & social standards/safeguard policy of MFIs & National regulations as well.

1 INTRODUCTION

1.1 BACKGROUND

Energy has been essential to human advancement since the "Industrial Revolution," and it will continue to be a key component of India's economic growth. India is home to about 18% of the world's population. Only about 6% of the world's basic energy resources are currently consumed by it. India uses around a third of the world's average amount of energy per person. However, as the nation continues to grow and prosper, so too will its energy needs in the years to come. The government's first objective is to guarantee that people have access to clean and sustainable energy sources. The Indian government is making strategic efforts to achieve Sustainable Development Goal (SDG) 7, which is to ***"Ensure access to affordable, reliable, sustainable, and modern energy for all."*** The government has taken various steps to achieve the five nectar elements (Panchamrit) of India's climate action as outlined during COP-26 by achieving the target of net-zero emissions by 2070 and reduction of the carbon intensity of the economy by 45 percent by 2030.

In India's energy portfolio, the Oil and gas sector holds a significant share of around one-third and is posed to continue serving as a critical enabler of India's rapidly growing economy. Energy is the mainstay of socio-economic growth and development for a nation like India which is currently the third largest primary energy consumer while its per-capita energy consumption is only a third of the global average. As per various projections, India's Energy Demand is expected to grow at 2.7% till 2050 as compared to World's 0.6%. India constitutes ~6% of the global primary energy demand wherein it constitutes 9.4% of the global oil demand and 2.2% of the global gas demand.

The demand for energy is met mostly by fossil fuels as fossil fuels make up 88% of India's primary energy requirement. Coal accounts for 55% of the energy mix, oil, and gas account for 28% and 6%, respectively. During the financial year 2022-23, 67% of natural gas production was by National Oil Companies from nomination regime, 33% of natural gas production was by Private/JV companies/ NOCs from Contract regimes (inclusive of ~2% was from Coal Bed Methane). The import dependency on crude oil and natural gas based on consumption of petroleum products in 2022-23 was about 87.4 % and 43.9 %, respectively. This provides a scope and opportunity for increasing energy consumption by India in near future and it being the central driving force in the global energy narrative. The Oil & Gas sector holds a prominent position as one of India's eight core industries, exerting significant influence on decision-making across various sectors of the economy. [1]

ATGL is in the process of developing City Gas Distribution (CGD) networks to deliver Piped Natural Gas (PNG) to industrial, commercial, and residential sectors, as well as Compressed Natural Gas (CNG) to domestic, industrial and the transportation sector. Natural gas is a reliable, convenient, and environmentally friendly fuel that provides consumers with enhanced safety, convenience, and economic efficiency.

The company has already set up city gas distribution networks in multiple Geographical Areas (GA)in India. Among these, Adani Total Gas Limited received authorization for the development of City Gate Station

[1] Indian Petroleum and Natural Gas Statistics (2022-23), Ministry of Petroleum & Natural Gas, GOI

and laying of CGD of Natural Gas pipeline for the Akola GA. To cater industrial, commercial and transportation demand of natural gas in has planned to develop a total of "***65.5 km Natural Gas Pipeline Infrastructure from IP-5 Poha Village to End Point of the PMGSY Road in Akola Town"*** in Akola District of Maharashtra.

1.2 PROJECT BRIEF

ATGL specializes in the development of city gas distribution (CGD) networks for the continuous supply of piped natural gas (PNG) and compressed natural gas (CNG). With intent of catering demand of natural gas of several industrial and commercial service sectors in, ATGL has planned to develop at total of "***laying of 65.5 km Natural Gas Pipeline Infrastructure in Akola GA in Akola District "*** The pipeline has been planned to be laid in single stretch starting from the IP-5 (Gail Gas Plant) Poha Village to the end of the PSGSY Road in the Akola Town of the Akola GA, in Akola District of Maharashtra, India.

ATGL is responsible for designing and installation of optimal size of the infrastructure in terms of pipeline of various types including steel belting of the authorized area, allied equipment and facilities in the NG pipeline network depending upon the potential demand for natural gas. The infrastructure in the network will be adequate to maintain uninterrupted flow of natural gas in the pipelines.

The service for Environment and Social Impact Assessment (hereinafter referred as "ESIA") has been aligned in accordance with the **International Finance Corporation (IFC's)** *Performance Standards (PS) on Environmental & Social Sustainability (2012)*. The pipeline being included within the regulatory framework of host country, attracts MoEF&CC EIA Notification 2006 & its subsequent amendments. The proposed natural gas pipeline has been categorised under "***Item 6(a)*** *i.e., Oil & gas transportation pipeline (crude and refinery/ petrochemical products), passing through national parks /sanctuaries/coral reefs /ecologically sensitive areas including LNG Terminal*" of Schedule of EIA Notification,2006 & its subsequent amendments[2].

1.3 OBJECTIVES OF ESIA

- Develop project baseline to understand and access the ground condition of the project study area for understanding and assessing impacts from the project.
- Assess the environmental, social, and ecological impacts from the project.
- Identify and characterize cumulative impacts that could result from the proposed project in relation to other existing & ongoing projects or reasonably foreseeable proposed activities within the surrounding area of the project site.
- Prepare mitigation measures and environmental and social management plan (ESMP) for the proposed solar power project.

1.4 PROJECT DEVELOPER

ATGL is a joint venture between Adani Group and Total Energies. ATGL is one of India's largest city gas distribution companies. The company specializes in the development of city gas distribution (CGD)

[22] standardtorreference.pdf

networks for the continuous supply of piped natural gas (PNG) and compressed natural gas (CNG). These networks provide natural gas as a convenient, economical, dependable, and environmentally friendly fuel option, offering consumers safety and convenience. ATGL has ventured into e-mobility and biomass business through two wholly owned subsidiaries – Adani Total Energies E-mobility Limited (ATEL) and Adani Total Energies Biomass Limited (ATBL) respectively.

The company is expanding its operations to include the production and distribution of clean energy derived from biomass, as well as the establishment of electric vehicle charging infrastructure. ATGL is adopting a comprehensive approach by providing a unified wallet offering that encompasses basket of services. Additionally, ATGL has entered the gas meter manufacturing sector (mechanical and smart meters), through its JV, SMTPL.

1.5 SCREENING OF THE PROJECT & RATIONAL

The purpose of this assignment is to evaluate the environmental and social impacts of the proposed project in line with the **International Finance Corporation (IFC's)** Performance Standards (PS) on Environmental & Social Sustainability (2012) and other national and international statutory regulations applicable to the project.

This project has been screened considering guidelines provided in **IFC's** Interpretation Note (IN) on Environmental and Social Categorization, 2012. Categories underlined in **IFC** Project screening methodology are as follows:

- **Category A:** Business activities with potential significant adverse environmental or social risks and/or impacts that are diverse, irreversible, or unprecedented.
- **Category B:** Business activities with potential limited adverse environmental or social risks and/or impacts that are few, generally site-specific, largely reversible, and readily addressed through mitigation measures.
- **Category B+:** The categorization of projects under B+ generally covers small to medium-scale projects which have localized impacts and can be managed through the implementation of specific mitigation measures. These projects might involve changes to land use, small-scale infrastructure development, or activities that don't significantly affect sensitive areas like forests, wetlands, or biodiversity hotspots.
- **Category C**: Business activities with minimal or no adverse environmental or social risks and/or impacts.
- **Category FI:** Business activities involving investments in financial institutions (FIs) or through delivery mechanisms involving financial intermediation.

In accordance with the screening criteria of IFC, and in accordance the observations of site reconnaissance survey, **TÜV SÜD** ESIA team has categorized Project as **Category B+**, which specifies that the project may have limited adverse social and environmental impacts, as the proposed route traverses' sensitive areas such as rivers, canals, railway crossings, and reserved forests. Consequently, obtaining the necessary permissions, that includes approvals for tree cutting and laying permissions will be required.

1.6 ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) CONSULTANT

TÜV SÜD South Asia Private Limited (hereinafter referred as **"TÜV SÜD"**) has been entrusted by **ATGL** for providing consultancy services of Environmental and Social Impact Assessment Study (ESIA) City Gas Distribution of Natural Gas Pipeline project in Akola GA at Akola District, Maharashtra, India.

TÜV SÜD is one of the leading testing, certification, and technical advisory firm. TUV SUD was established in 1995 in India & is a 100% owned subsidiary of **TUV SUD AG, Germany**. It is the trusted advisor to some of the world's leading businesses and institutions. The organization provides products, services, and insights to private, public, and independent sector organizations throughout the capital value chain, drawn from nearly two decades of front-line experience.

Working for many years with evaluation and assessment of sustainability, environment, safety, and social management, supply chain management and performance of companies all over the world and working with Bi-lateral and Multilateral Financial Institutions (MFIs), **TÜV SÜD** has developed an eclectic understanding in Environment, Social, Safety management system and presenting our studies in a balanced and trustworthy manner. Assessment of projects impact on environmental and social aspects and reporting by **TÜV SÜD** will therefore add trust and confidence to the report and your communication with stakeholders.

1.7 LIMITATIONS OF THE STUDY

The ESIA Report has been prepared based on professional judgement to ascertain facts with resultant subjective interpretations. Professional judgments expressed herein are based on the facts available within the limits of the scope of work, information provided by the client or its representatives, prevailing secondary data, budget, and schedule.

The walk-through survey along with a brief discussion with project stakeholders was undertaken during the site visit based on the present understanding of the project. This assessment may change in case of a change in the project location. The documents like SOPs, policy and procedures for EHS&S management were limited for review at the time of pre-project desktop review process. The TUV team did not conduct a traffic survey on-site, but the generalized traffic management plan has been prepared as part of the ESMP providing guidelines to prepare the site specific TMP.

1.8 CONTENTS OF EIA REPORT

The report has been divided into the following chapters:

Table 1-1: Contents of EIA Report

Chapter	Title	Description and Details
Chapter 1	Introduction	This chapter provides background information of the existing pipeline, brief description and objectives of the project, scope of the study.
Chapter 2	Project Description	This chapter presents the details of the proposed project with description of the resources required and emissions, waste and wastewater anticipated to be generated.

Chapter	Title	Description and Details
Chapter 3	Legal, Policy and Administrative Framework	Assessment of applicable laws & legislations, and institutional framework for its implementation.
Chapter 4	Description of Environment	This chapter describes the existing baseline status of environment components collected in a pre-defined study area based on primary and secondary data collection.
Chapter 5	Anticipated environment impacts and mitigation measures	This chapter describes the potential impacts of the proposed project and evaluates their significance based on parameters such as Intensity, Spatial extension, Temporal duration, and Environmental Vulnerability. Impact avoidance and mitigation measures are delineated.
Chapter 6	Analysis of Alternatives	The chapter to identify the most sustainable option with the least environmental and social impacts.
Chapter 7	Additional Studies	This chapter assesses the potential risks involved in the construction and operation of proposed facilities and presents a Disaster Management Plan (DMP).
Chapter 8	Project Benefits	This chapter presents the details of direct and indirect benefits due to proposed project.
Chapter 9	Environment Monitoring & Management Plan	This chapter describes the details of the monitoring schedule to be implemented for checking the effectiveness of mitigation measures. It covers the parameters, frequency, and location of monitoring. If existing monitoring schedule is sufficient to cover the proposed development, the same has been clearly mentioned. The chapter also describes the organizational structure and resources planned for implementing the mitigation measures and monitoring schedule.
Chapter 10	Summary & Conclusions	This chapter summarizes the potential positive and negative environmental impacts of the project.

1.9 NEED AND SCOPE OF ESIA

The purpose of this ESIA is to assess the potential environmental and social impacts due to the proposed project. The environmental and ecological impacts in a study area of 05 km radius around and 500 m on both sides of the pipeline and the socio-economic impacts were assessed for 20–30-meter radius of study area. The ESIA forecasts changes (positive and negative) that may occur because of key project activities to the baseline environmental conditions in the study area. Early identification of impacts and their mitigation reduces the risk of long-term adverse environmental effects.

The broad scope of work will be undertaken by the consultant for ESIA study including the following aspects of proposed project but not limited to the following:

- Literature survey, data collection, examination of available environmental, social reports/data, understanding the proposed project through project report and discussions etc.

Baseline environmental studies shall be carried out as below, but not limited to:

- **Physical environment**
  - Temperature, Wind speed, Wind direction, Wind rose patterns, relative humidity, Rainfall, Visibility, Cloud cover, Solar Radiation.
  - Ambient air quality (PM10, PM2.5, SO2, NOx, CO) to be monitored as per be monitored as per CPCB guidelines.
  - Noise levels of the study area shall be monitored and measured as per CPCB guidelines and IFC PS requirements.
  - Ground water quality (drinking purpose) shall be monitored against IS specifications.
  - Surface water quality shall be monitored and measured as per CPCB norms.
  - Soil quality of study area will be monitored and analyzed for parameters as per ICAR specification/guidelines.
  - Geological & hydro geological data/information will be compiled from secondary sources or as per study requirement.
  - Land use information/status will be based on the district census handbooks as well as with the help of satellite imagery.
- **Ecological environment**
  - This shall include assessments/information of terrestrial and aquatic communities (as applicable), presence of rare, threatened & endangered species etc. if any.
  - The survey also includes identification & presence of national parks, sanctuaries, Biodiversity Park, endangered/threatened/ rare species & assessment of the species diversity, density, abundance etc. and formulation of ecological indexes.
- **Socioeconomic environment**
  - Demographical information/status will be based on census documents and other state level /

district level databases.

- Socio-economic information and profile outlining data from census and socio- economic surveys, with information on livelihood profile, infrastructure, vulnerability, gender, indigenous peoples (ethnic minorities, scheduled tribes), and labour.
- Identification of historical/ archaeological sites/ monuments in the study area (if any) based on Archaeological Survey of India (ASI)/revenue records.
- Identification of common property resources within project site and mitigation measures, if any.
- Traffic survey for the present daily traffic, peak hour traffic and traffic composition & any change in traffic composition and volumes due to project development.

- **Assessment of E&S Impacts**
  - The potential E&S impacts will be assessed based on baseline data generated from studies. It should be analyzed and compared with applicable standards for each environmental attribute. The short-term and long-term impacts particularly on sensitive targets such as endangered species, plants and historically important monuments should also be identified.
  - A qualitative and quantitative assessment of sources of pollution from proposed project (dust, wastewater, noise pollution, solid waste, etc.) should be done to identify the adequacy of the proposed control measures as well as the likely impact on existing critical areas.
  - Discuss the land procurement / acquisition process, considering Indian laws, rules and regulations. Rates of compensation paid in accordance with market rates, consultation before land procurement shall be reflected with relevant evidence in the Study.
  - Discuss impacts on indigenous peoples or scheduled tribes.
  - Impacts will be assessed for both Construction & Operation phases.
- **Environmental, Social & Biodiversity management & monitoring plan**
  - Identify and summarize all anticipated significant adverse E&S impacts along with mitigation measures.
  - Define a set of policies and objectives for environmental performance and continual enhancement of performance.
  - Monitoring programme for the proposed project (for construction & operation phase) will be worked out covering all E&S attributes as per the best practices in the World Bank/IFC General and sector specific EHS.
  - For each potential negative impact identified, recommendations will be presented for avoidance, minimization or mitigation of impacts along with costs associated with potential mitigation. The ESMP will address the following:
    i. Recommend monitoring and reporting procedures including the parameters to monitored, methods to be used, sampling locations, frequency of measurements, detection limits and

definition of thresholds that will signal the need for corrective actions.

ii. Develop management plan for addressing specific issues such as waste management, disasters, emergencies, external grievances, construction safety, labour management, stakeholder engagement, indigenous peoples etc.

2 PROJECT DESCRIPTION

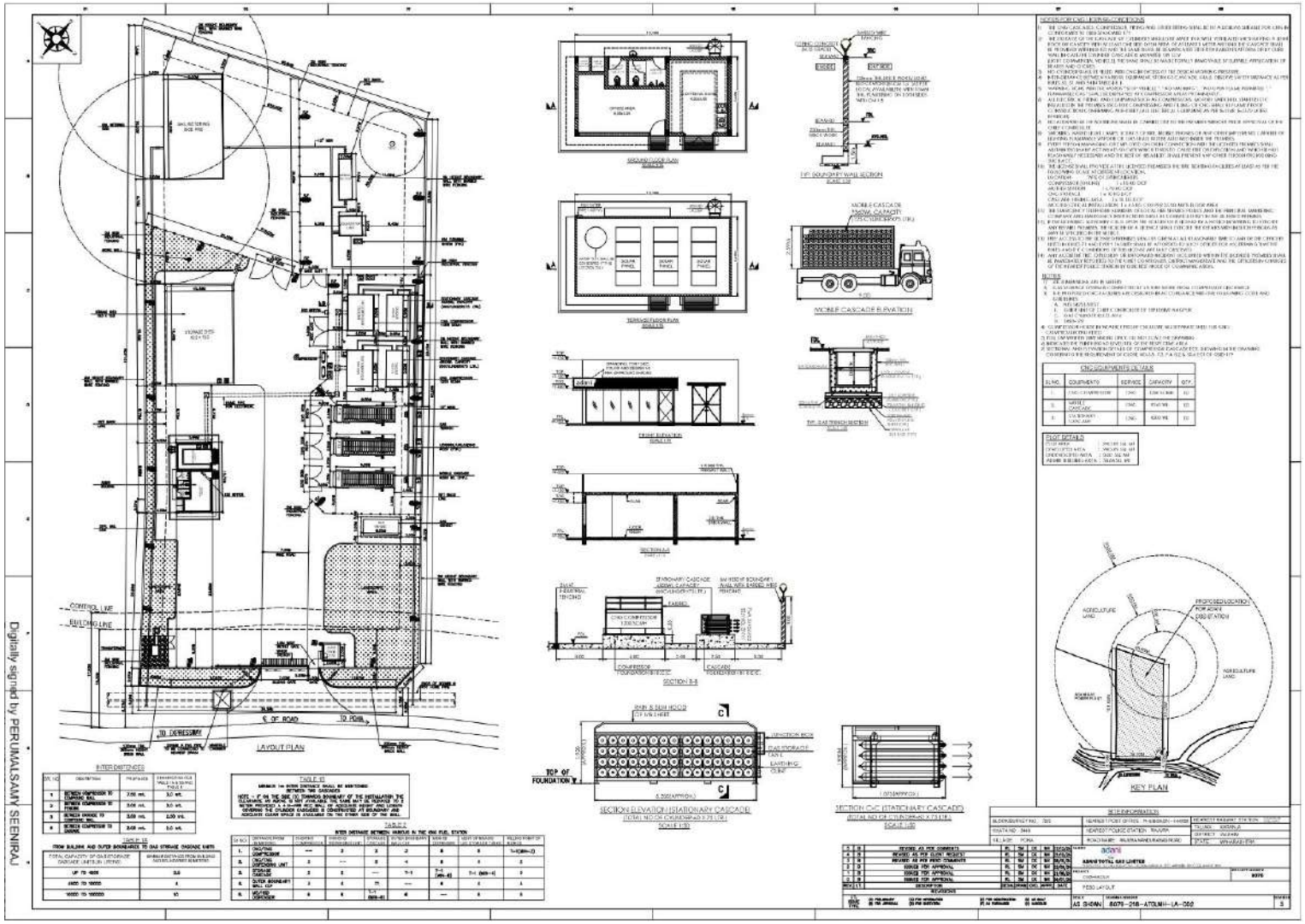
2.1 DESCRIPTION OF CGS AND NATURAL GAS PIPELINE NETWORK

ATGL has been granted authorization for laying, building, operating or expanding the City Gas Distribution CGD Network in Akola GA for Domestic, Automobile, Commercial and Industrial sectors. ATGL has planned to lay 12 inches (12'') diameter natural gas pipeline network in approximately 65.5 km the pipeline route passes through the Akola Town and the nearby Villages. The CGS and initial 3.837 km of stretch passes through the Washim District and 61.663 km in Akola District,

ATGL is responsible for laying, building, operating or expanding the (CGD) network of optimal size of the infrastructure in terms of pipeline of various types including steel belting of the authorized area, allied equipment and facilities in the NG pipeline network depending upon the potential demand for natural gas and a City Gate Station (CGS). The infrastructure in the NG pipeline network will be adequate to maintain uninterrupted flow of natural gas in the Akola Town and its nearby villages**.** Error! Reference s ource not found. provides the details of the layout of the NG pipeline network and Error! Reference source not found. provides the layout of the CGS located at the Village Poha, Karanja Taluka and Washim District in the state of Maharashtra.

Source: Adani Total Gas Limited & Google Earth

Figure 2-1: Route Map for the Proposed NG Pipeline and CGS Start Point (on Google Earth)



Source: ATGL

Figure 2-2: Layout of the Proposed CGS at Poha Village

2.2 PIPELINE ROUTE & ACCESSIBILITY

The pipeline for the CGD that run along ROW of the Akola GA is spread across the nearby villages of Akola will be laid in single stretch the details of the stretch is given below in **Table 2-1**.

Table 2-1: Basic Details of the Pipeline

Sr. no.	Pipeline Route	Start Point	End Point	Total Length
1	**Stretch 01**	**Proposed CGS at GAIL IP-5 (POHA)**	**End of PMSGY Road**	**65.5 km**
	Part 1	Proposed CGS at GAIL IP-5 (POHA)	Barsi Takli	38.3 km
	Part 2	Barsi Takli	End of PMSGY Road	27.2 km

**Source: ATGL*

Details of all the major crossing, its chainage, width and location along with its permission status for the entire pipeline route is given below in the **Table 2-2.**

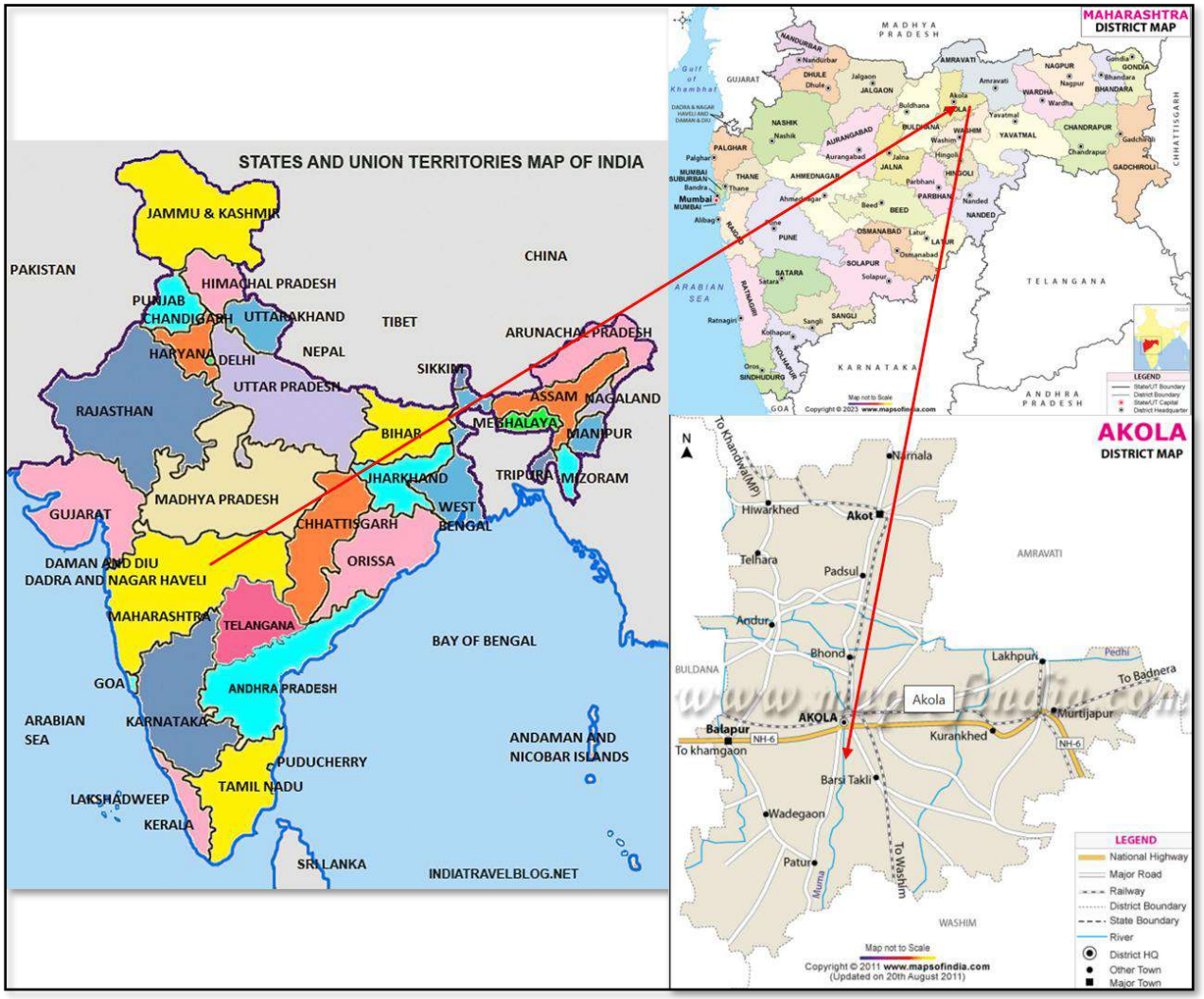
Table 2-2: Details of Major Crossings

S. No.	Crossing			Chainage (km)	Width of Crossing	Location	Permission Status
	Type of Crossing	No. of Crossing	Description				
Stretch 01 (Part-1); Proposed CGS at GAIL IP-5 (POHA) to Barsi Takli (38.3 km)							
1	**Railway**	**0**	-	-	-	-	-
2	**NH**	**0**	-	-	-	-	-
3	**SH**	**1**	RoW of the State Highway-274 (Barsi Takli to Amravati)	The stretch runs in the RoW of the SH from Ch-0.730 to 38.277			-
4	**Other Roads**	**28**	-		-	-	-
6	**River**	**4**	1. Uma Nadi	22.70 to 22.89	19.39	TP36-IP36/1	
			2. Pinjar Nadi	19.447 to 19.502	55.07	IP166/1-IP166/2	-
			3. Koyad Nadi	28.016 to 28.040	23.95	TP231-TP232	
			4. Indrupa Nadi	40.305 to 40.382	24.56	TP315-TP316	
7	**Canal**	**1**	Unlined Canal	38014.80 to 38038.80	24	IP300/1-IP300/2	-
8	**Drain/Nala**	**17**	-	-	-	-	-
9	**H.T/Powerline**	**134**	-	-	-	-	-
10	**Pipeline**	**1**	-	-	-	-	-
Stretch 01 (Part-2); Barsi Takli to end of PMSGY Road (27.2 km)							
1	**Railway**	**1**	Broad Gauge Railway Line (E) (Barsi Takli R.S. to Lahogad R.S.)	3+371.82	16.35	TP38-TP39	
2	**NH**	**3**	1. National Highway-161A (Mangrul Pir to Akola)	0+032.22	28.74	TP1-TP2	
			2. National Highway 161 (Shirla to Akola)	21+759.03	62.64	TP231-TP232	

S. No.	Crossing			Chainage (km)	Width of Crossing	Location	Permission Status
	Type of Crossing	No. of Crossing	Description				
			3. National Highway-53 (Akola to Kanheri)	24+257.32	62.86	TP253-254	
3	**SH**	**1**	State Highway-274 (NH-161A/Barsi Takli to Kapshi Fata/NH-161)	12+399.38	17.96	TP114-TP115	
4	**Other Roads**	**19**	-	-	-	-	
5	**Cart Track**	**27**	-	-	-	-	
6	**River**	**2**	1. Vidrupa River	2+064.88	85.93	TP22-TP23	
			2. Morna River	8+568.86	46.85	TP75-IP75/1	
7	**Canal**	**7**	-	-	-	-	
8	**Drain/Nala**	**33**	-	-	-	-	
9	**Stream/Minor Crossing**	**9**	-	-	-	-	
10	**H.T/Powerline**	**87**	-	-	-	-	
11	**Pipeline**		-	-	-	-	
12	**Underground Utility Crossings**	**29**	-	-	-	-	

**Source: ATGL's Detailed Engineering Survey Report*

The **Figure 2-3**, depicts the location map of the project site and **Photo Plate 2-1** provides the photographs of the site as per the primary survey conducted in Akola GA by the TUV-SUD team.



Source: Maps of India

Figure 2-3: Location Map of Project Site

Photo Plate 2-1 Photographs of Site

Photo 2.1- CGS Start Point- Tap Off Point

Photo 2.2-End Point- End of PMGSY Road

Photo 2.3- SH Crossing, Change in Road

Photo 2.4- Change in Road Point 2

Photo 2.5- Proposed Route Passes through Prabhat Kids School

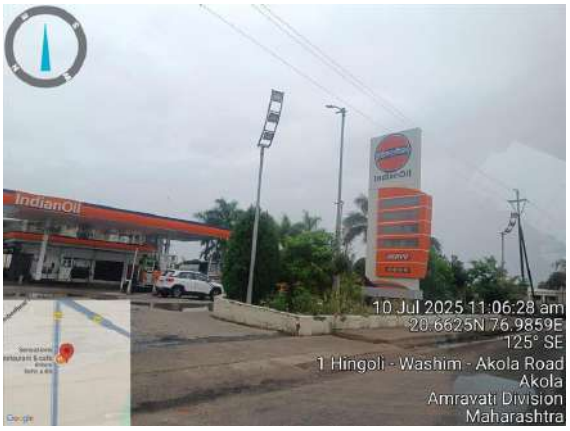


Photo 2.6- Proposed Route Passes through Petrol Pump

Photo 2.7- Proposed Route Passing through Temple

Photo 2.8- Proposed Route Passing through Drain

Photo 2.9- Prathmik Arogya Kendra Poha Village

Photo 2.10- Proposed Route Passing through Canal

Photo 2.11- Proposed Stress Passing through Several Cultivable Area

Photo 2.12- Proposed Stress Passing through Natural Drain

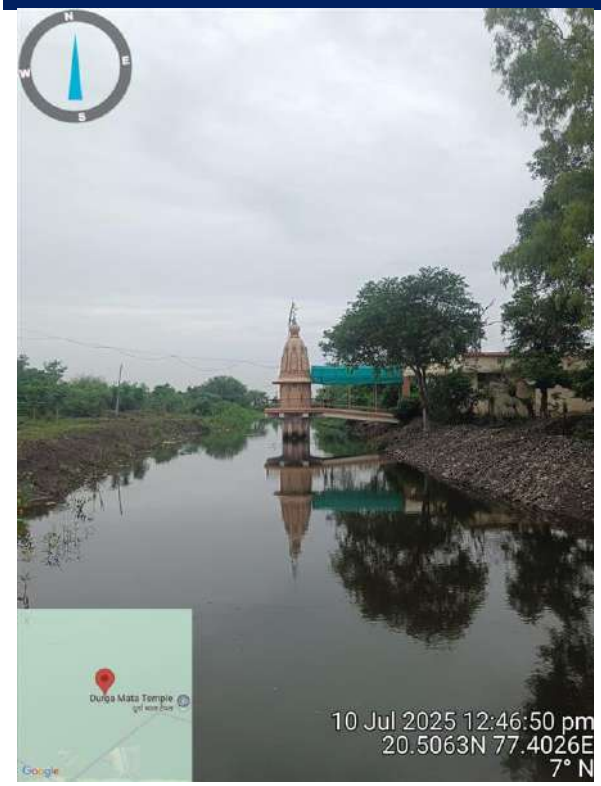


Photo 2.13- Proposed Route Passing through Temple

Photo 2.14- Proposed Route Passing through the Forest Strech

Photo 2.15- Proposed Route Passing through the Forest Strech

Photo 2.16- Proposed Route Passing through the Purna River

Photo 2.17- Proposed Stress Passing through Krishi Kendra

Photo 2.18- Stretch-02 Passing through the Railway Crossing

Table 2-3 depicts the technical specification of the pipe.

Table 2-3: Technical Specifications of Pipeline

Sl. No.	Description	Piping Details
1.	Pipeline internal Diameter (Inches)	4", 6", 8" and 12"
2.	Pipeline Nominal Wall Thickness (mm)	6.4 mm
3.	Pipeline Grade/Material Specifications	API 5L X 42 (PSL-2)
4.	Type of Coating	2.5 mm thick 3LPE
5.	Normal Operating Pressure	
6.	Maximum Allowable Operating Pressure (Design Pressure)	30 Bar
7.	Design Throughput (MMSCMD)	
8.	Pipeline Design Life	25 years
9.	Design Temperature (°C)	60°C
10.	Ball Valve- Inter distance Between Mainline Valve Stations	3 km (As distance between two subsequent SV shall not be more than 3 km as per PNGRB regulation)

**Source: Technical Specification report, Adani Total Gas Limited*

2.3 ASSOCIATED TECHNICAL FACILITIES

2.3.1 CGD Network

A typical CGD network shall comprise of one or more or all the following:

- City Gate Station (CGS)
- Pipeline Network-Steel pipeline, Polyethylene pipeline etc.
- Regulating stations- District Regulating Stations (DRS), Service Regulators, Domestic / Commercial / Industrial Regulators.
- Metering Stations / Metering & Regulating Stations (MRS)
- CNG Stations

Project Company will take tap-off from nearest natural gas transmission pipeline of Gas Suppliers and further lay steel pipeline network, build City Gate Stations (CGS), Compressed Natural Gas (CNG) stations & District Regulating Stations (DRS), lay MDPE pipeline network etc in the various GAs for supplying piped natural gas to Domestic Households, Commercial & Industrial consumers and CNG to Automotive sector. The steel pipeline route will be mainly along the National or State highways from CGS and will further spread inside city boundaries.

The Gas Distribution network will be designed and engineered primarily in accordance with the provisions of the PNGRB Regulations GSR 612(E), Aug' 2008 (T4S) and ASME Standards for Gas Transmissions and Piping Systems (ASME B31.8).

2.3.2 City Gate Station (CGS)

The gas from pipeline owner shall be available at a maximum pressure level of 49 Bar(g) at the upstream of CGS. Pressure reduction skid is assumed to be installed by pipeline owner or CGD entity within its premise as per their normal business practice. Un-odorized gas is assumed to be made

available from the downstream flange at the outlet of pressure reduction skid after metering at a maximum pressure of 45 Bar(g).

2.3.2.1 Steel Network

Steel pipeline sizes are generally restricted to 16" NB, 12" NB, 8" NB, 6" NB & 4" NB whereas, spur lines shall be of 4" NB. Steel pipeline is proposed to be installed at a minimum depth of 1.2 meters of soil cover, and in accordance with international standards for pipeline laying.

2.3.2.2 District Regulating Station (DRS)

DRS are provided at various demand centers based on the requirement. DRS are located either in customers' premises or at a safe location on the roadside. DRS capacity may be 5000 SCMH, 2500 SCMH, 1500 SCMH and 1000 SCMH or below is based on its availability and requirement in a particular area.

2.3.2.3 CNG Stations (MOTHER /ONLINE/DAUGHTER/ DAUGHTER BOOSTER Stations)

CNG Station

CNG station is a site consisting of interconnected equipment, which is designed to compress natural gas to a high pressure, store and dispose it directly to a natural gas vehicle. CNG stations are located at various locations in the city based on the demand and availability of land. CNG station can be either – On-line station (including mother stations) or daughter booster station.

Mother / Online Station

These are equipped with a compressor, which compresses low-pressure pipeline gas to the pressure of 255 bar for dispensing CNG to the vehicle cylinder at a pressure of 200 bar (g). Some of these stations also provide Cascade filling facility at 255 bars (g), used to fill gas in small cascades and transmitted to daughter booster stations. These kinds of stations are referred to as "Mother Stations". Online stations are the same as mother stations except that they do not have the cascade filling facility. The main components of an online CNG station are Compressors along with auxiliaries, Stationary cascades, Dispensers for cars and three-wheelers (autos), Dispenser for buses, Loading Facility for Mobile Cascades, Stainless steel tube connecting compressor, dispenser & cascades laid in U/G trenches, DG Set, UPS & Battery Bank, AVR, Electrical Control Panel, Instrument Air and Water Facilities and firefighting equipment.

Daughter Booster Station: Daughter station provided with the compressor (Known as booster) to compress the gas we are getting from the mother station are known as daughter booster station.

Daughter station: Daughter stations are established in those areas where laying a pipeline is not possible. In that case gas is delivered from mother station to daughter station, via mobile cascade van. The gas from mother station is filled in mobile cascade by LCV filling point.

2.3.3 Design Basis/Philosophy Considered for CGD Network Simulation

The detailed market assessment of natural gas demand for all four segments, that are Domestic, Commercial, Industrial and CNG Demand, has been conducted for 25 years. Based on 25th year natural gas demand, the major demand centres are mapped & identified. The network is planned in such a

way that it caters for all the major demand centres. The projected demand on 25th year is estimated to be 3.909 Million Metric Standard Cubic Meter per Day (MMSCMD) and the steel grid has been designed to take the load of 5.52 MMSCMD however the distributed network will be installed for 3.909 MMSCMD. Thus, calculation of CAPEX & OPEX has been done for steel grid complying with 3.909 MMSCMD.

The details of the four segments in which natural gas use/ application is primarily segmented are as follows:

- **Domestic segment (cooking/residential use**) – This segment includes Households and their usage for cooking and other house utilities such as geyser etc within the geographical area
- **Commercial segment**– This segment includes usage of gas in hotels, hospitals, bakeries, shops, hostels, food plazas, restaurants, sweet shops, malls and other commercial establishments for cooking/ heating purpose within the GA
- **Industrial segment (heating/ power generation use) –** This segment includes small/ medium scale industries (customers having requirement of natural gas up to 50,000 SCMD shall be supplied through the CGD network) located within GA for power generation, heating and other industrial applications.
- **CNG Segment (NGV applications)** – This segment primarily caters to the transportation fuel demand of the various vehicles and potentially inter-city floating vehicles.

2.3.4 SCADA, Telecommunication and Leak Detection System

SCADA system shall be devised to monitor and operate the NG pipeline network. The Master Control Station shall be equipped with Supervisory Control and Data Acquisition (SCADA) software running under multi-programming, multitasking real time operating system environment. The SCADA software shall incorporate control & monitoring of all locations including Block valves. Leak Detection system shall be provided, and the Leak Detection Software shall run in a separate machine at Master Control Station. Regular check and control will be conducted to assure the safe continuity of the gas supply to consumers. For the network, patrolling will be conducted by the owner operators. This operation shall include but not limited to the activities like, checking of local device such as levels of liquid, filter DP in filtration skid, regulator/ monitor/ SSV reliability etc. The gas quantity consumed by each end user will be totalized once a year. This package will enable the operator to take optimal control actions and thus ensure the safety and security of the pipeline network.

2.3.5 Filtration Skid

Cartridge type filters will be installed to remove entrained particles (filtration efficiency 99%) made up of Borosilicate fibre glass cartridge type. Equipment like regulators and metering are quite sensitive to dirt. Metering requires no particles above 5 microns.

2.3.6 Pressure Reduction Skid

The pressure reduction system shall consist of the following:

- Slam-shut valve actuated to close in case of downstream pressure increase above safe level; it needs local manual reset.
- *Monitor*: A Pressure Control Valve (PCV) which takes over control in case the Active PCV fails to maintain downstream pressure below required maximum pressure; Fail-safe is to open.
- *Active Pressure Control Valve (PCV)* that regulates the downstream pressure as required.
- Such concept is called “Non-Venting Pressure Safety” and allows avoiding the "Safety Relief Valves" more common in industrial plants. Indeed, large relieves as may be needed by the “Venting Pressure Safety” is then avoided and relevant hazards suppressed.

2.3.7 Metering Skid

Custody transfer metering will be provided before the gas is transferred to the end users. The custody transfer metering system will be Ultra Sonic Meter. The flow meters are connected to a flow computer which calculates the mass flow and corrects for temperature and pressure. Gas quality and gas compressibility data will be provided to the flow computer by a gas chromatograph located at a place before comingling of the gas from various sources.

2.3.8 Odorizer

Natural gas is, by nature, odourless what makes detection of leaks impossible without special gas detection tools. End-users connected to a Natural Gas Distribution System being not supposed to have adequate skill for gas handling, it is mandatory to add an odorant to the gas before it enters the CGD System. Odorization shall be based on the injection of suitable sulphur compound in adequate proportion (in function of actual flow) on the primary network system. The Odorization unit will consist of a Stainless-Steel storage vessel with reserve vessel internal piping & accessories, suitable cabinet & skid. This unit should be designed to provide the desired odour intensity for the entire gas stream.

A salient feature of odorization skid at CGRS is mentioned in table below:

Table 2-4: Salient Feature of Odorization

Sl. No.	Particulars	Specifications
1.	Operating Pressure	26 Bar (max.)
2.	Operating temperature	5-55 Degree C
3.	Design pressure	49 Bar
4.	Design temperature (min/max)	0/+65 Degree C
5.	Odorization agent	Tetra-Hydro-Thiophene (THT), Ethyl Mercaptan, Tetra-Butyl Mercaptan (TBM)
6.	Dosing rate	Enough for identifying leakage at far-off place

Source -Standard industry Norms

2.3.9 Fire Alarm and Fire Fighting System

As per the Petroleum and natural gas regulatory board notification 2008, Schedule 1 D, after construction activities relevant warning signs shall be displayed in the area. A proper Emergency Response Plan shall be in place and emergency contact numbers of relevant agencies should be visible. Firefighting equipment’s should be available during commissioning.

As per the PNGRB notification, 2008, ATGL shall provide an Emergency Control Room, staffed round the clock, and equipped with effective communication system and emergency vehicles fitted with communication facilities, first aid equipment, fire extinguishers, gas detectors, repair kits and tools, maps, plans, material safety data sheets etc. at its disposal. The entity shall put in place an Emergency Response Plan, a Disaster Management Plan, and a Pandemic Plan. While preparing these plans the entity shall take into confidence the various local authorities (i.e., Fire authorities, Police authorities, Health authorities, local administration, Disaster Management authorities, Mutual aid, Factory inspectorate etc) and clearly elaborate on their role in case of an incident.

2.3.10 Corrosion Protection

Underground carbon steel section beyond transition fitting is below ground, it shall be protected against corrosion by minimum 400 micron thick 2 pack high build epoxy coating. Above ground service piping shall be Galvanized Iron or copper, or carbon steel protected by anti-corrosive coating.

2.4 LAYING OF PIPELINE

The pipeline construction is proposed to be conducted through deployment of 4 to 5 spreads. The sequence and methodology of construction of new pipeline is given below:

- **Clearing and grading**: A 30 m wide Right of Use (RoU) area will be cleared off for vegetation and other obstacles such as boulders. Tree felling will not take place.
- **Stringing**: Pipes are transported to the site on trucks will be offloaded using side booms. Pipes are then strung adjacent to the trench. Trailers and cranes will be used for manoeuvring of pipes. This activity may be done before or after trenching.
- **Trenching**: Trenchers and backhoe type excavators will be used to dig the trench for laying the pipeline. The topsoil in agricultural areas will be removed and stockpiled for restoration. The excavated sub-soil will be stockpiled separately for backfill.
- **Bending**: Pipes will be bent using a bending machine to the appropriate angle to match the vertical and horizontal alignment of the trench.
- **Welding:** Welding will be done using conventional manual/ semi-automatic welding involving a crew of welders and fitters. Once the pipe is strung a line-up crew will position the pipe using side booms in preparation for welding. Pipe strings to be welded will be effectively earthed. During welding, at least one end of the pipe string will be closed to prevent a forced draught effect.
- **Non-Destructive Inspection**: Mechanized Ultrasonic Testing (MUT) is the specified method to be applied for the execution of NDT. Each field weld will be 100% radiographed to evaluate for soundness of the weld in compliance with specifications. NDT and its evaluation shall be performed in accordance with API Standard 1104.
- **Coating**: After welding at each weld joint, coating of field joints of bare pipes and the repair of coating shall be done by.
- **Burial**: General burial depth of the pipeline along the route will be with a minimum 1.0 m cover. Burial cover will be compacted to avoid future erosion by all weathers.

- **Backfilling**: The excavated sub-soil will be returned to the trench. The topsoil, which has been preserved on the side of the ROU, will be spread over the filled-up trench. A crown of soil will be kept on top of the trenched portion to allow for future settlement. Backfilling will be managed so that damage from sizable rocks is not used or any other materials that may damage the pipeline.
- **Crossings**: The method used for the crossing of waterways and other infrastructure facilities will vary from place to place depending on the environmental setting and the geo-technical features of the area. The detail method of various types of crossings is specified below.

Table 2-5: Type of Crossings

Sl. No.	Type of Crossing	Method of Crossing
1	National Highway	Conventional Trenching/ Horizontal Directional Drilling (HDD)
2	State Highway	Conventional Trenching/ HDD
3	Other Roads	Conventional Trenching/ HDD
4	Railway Crossing	HDD
5	Major Lined Canal	HDD
6	Unlined Canal	HDD

(Source: PNRGB Notification, 2008)

- **Restoration** - Restoration of the ROU will be conducted progressively following the completion of construction work. This will involve removal of foreign materials such as construction debris and wastes. The ROU will be returned to its original condition by spreading the topsoil over the areas from where it was stripped, so that green belt activities will be restored along roadside of the SEZ area. Special focus will be given to restoration of side slopes and beds of natural water body crossings.
- **Pipeline warning markers**–In the final stages of construction, warning marker posts will be erected indicating the location of the pipeline and the crossing of other pipelines, cables, and features. A marker tape will be placed in the trench 500 mm above the pipeline to indicate to future excavators that a pipeline is below and that they are nearing.

The major construction activity involved during laying of pipeline are as follows:

- Transport of pipes from the place of availability to stock/lining yard.
- Transporting of pipes from the stock / lining yard to suitable places along the route of the pipeline.
- Application of lining and coating.
- Fabrication of fittings and special lining and coating of the same.
- Excavation and preparation of trenches for the pipes. Topsoil to be kept separately.
- Lowering the pipes into the trench.
- Jointing of pipes inside the trench.
- Welding of pipes.
- Rectification of defects and re-testing
- Finishing the coating and lining at weld joints.
- Back-filling of the trench with topsoil layer.

- Construction of valve chambers and erection of valve.
- Construction of necessary pipe supports anchor blocks.
- Providing line markers

2.4.1 Site Preparation and Laying Methodology

The project is for laying of natural gas pipeline with open trenching. However, for the Portion passing through, train tracks, Canals, Horizontal Directional Drilling Method (HDD) will do ponds bridges to reduce the environmental impacts to minimum.

The usual approach to pipeline installation is to dig an open trench, place the pipeline and then bury it. Proposed pipeline is passing through commercial, industrial residential, agricultural areas, water bodies, public spaces etc. shall be laid by:

1. Horizontal Directional Drilling (HDD) method for pipeline.
2. Open cut method for remaining portion of pipeline.

2.4.1.1 Horizontal Directional Drilling (HDD)

It is a Trench-less methodology that provides an installation alternative that can offer several benefits over traditional open-cut method.

- In a sensitive wetland environment such as a river/creek crossing, wildlife habitats would be destroyed, and extensive mitigation efforts would be required while pipe laying by open cut method. As a result, trenchless or "no-dig" technology has been used extensively worldwide.
- HDD can be implemented with little disruption to surface activities, requires less working space, and may be performed more quickly than open-cut methods.
- 8” Nominal bore & 4” Nominal bore pipelines Steel Pipelines laid together by HDD methodology and remaining length of CRZ portion by Open Cut Method.

2.4.1.2 Open Cut Method

Open Cut Method is a usual approach to pipeline installation is to dig an open trench, place the pipeline and then bury it.

- Pressure shall be between 16-40 Bar, 3 layers of PE coated steel pipes for the transportation of gas to its delivery centres.

2.4.1.3 Laying Methodology to be Adopted by ATGL:

During the site visit the TUV-SUD team observed that since most of the stretches are passing through the heavy traffic areas where prominent settlements, market area and other sensitive receptors are observed hence ATGL Akola team has assured that they will use the HDD method for laying of the 80% pipes. Whereas, wherever it is possible (for example initial 5-7 km stretch from CGS and other roads where heavy movement of traffic is not observed), Open Cut Method will be adopted.

2.4.2 Pipeline Burial

As per the Petroleum and natural gas regulatory board notification 2008, all types of pipes (plastic and steel) and fittings shall be laid underground and shall not be exposed. The buried service lines are

provided with a minimum cover of 1.0- 1.5 m. Where it is impractical to provide 1.0 m cover due to physical constraints, additional protective measures such as concrete slabs or high impact resistance plastic sheets shall be installed at least 300 mm above the service line. In no case the depth of cover shall be less than 600mm. For transition from plastic pipe to GI pipe, transition fittings shall be used. Plastic part of transition fitting protruding above ground shall be protected by encasing it with concrete guard.

In case carbon steel section beyond transition fitting is below ground, it shall be protected against corrosion by minimum 400 micron thick 2 packs high build epoxy coating. Above ground service piping shall be Galvanized Iron or copper, or carbon steel protected by anti-corrosive coating.

In cases where HDD is used for pipeline burial, plastic or carbon steel, adequate depth of 2-2.5m shall be maintained under if the pipeline is going below from any of the listed features, i.e., River/ canal beds, highways, roads, houses, and industries.

Table 2-6: Minimum Depth of Cover for Buried

Sl. No.	Location	Minimum Cover (m)
1	Industrial, Commercial & Residential areas	1.5
2	Minor water crossings /Canals	2.5
3	Drainage ditches at road	2.5
4	Rocky area	1.5
5	Uncased / Cased Road Crossing	1.5
6	Railroad crossings	1.7
7	Major River Crossings	2.5
8	Other Areas	1.5

**Source: ATGL' Procedure for RoW)*

2.4.3 Testing, Cleaning and Drying

2.4.3.1 Filling of Nitrogen for Gas-in

The nitrogen shall be injected in the pipeline before filling the pipeline with gas (gas-in) to prevent direct mixing of gas with air. Nitrogen needed for Energization of the pipeline shall be provided by the contractor. The maximum allowable Oxygen content inside the pipeline shall be less than 1% by volume. The pipeline will be evaluated, cleaned, and dried, section after section.

2.4.3.2 Cleaning of Pipeline

Before starting the pigging activity, initial weight of the pig shall be measured at the Launching Station and after receiving the pig at the Receiving Station, the final weight of the pig shall also be measured. The difference between the initial and final weights of the Pig shall not exceed more than 20% of the initial weight of the pig. Air cleaning must be done by oil free compressors only.

2.4.3.3 Testing

Pre-Hydrostatic test Pressure and Final Hydrostatic Test Pressure shall be done at 1.4 times of design pressure. It should be confirmed that the hoop stress should not increase by 95% of SMYS.

2.4.3.4 Thermal Stabilization

If the difference of minimum and maximum atmospheric temperature should cause thermal instability on the pipe section directly exposed to atmospheric condition, the temporary scraper traps and above ground pipeline shall be properly protected. The test medium shall be evaluated to confirm soft non-aggressive water. The water to be used shall be filtered, shall not be contaminated, and free from sand or silt. Before filling operation, air driven pigs will clean the pipeline to remove all mill scale rust/sand from the internal of pipe sections. The final change shall be executed with pigs provided with air jet holes or nozzles to keep the internal dust in turbulence ahead of the pigs. Thermal stabilization shall be considered to have been achieved when a difference not higher than 1°C is attained between the average values of the last two readings.

2.4.3.5 Swabbing and Drying

Poly pigs followed by high and medium density foam pigs shall be propelled with compressed / Dry air for removal of residual water for swabbing operation. Drying shall be conducted round the clock, once started after the swabbing operation. If possible, the swabbing shall be preferably conducted using drying air to reduce the drying time. Mainline valves shall be kept fully open during operation and by passes shall be used only to check drying stage in between length and drying of valves.

After completion of swabbing and tie-in of valves, tap off etc. in each Hydrotest section, following operations shall be conducted for the drying. A sequence of three nos. of foam pigs, High, Medium & Low density (7 to 10-kg ranges) shall be launched with the super dry air at the interval of 30 minutes each. The discharge of drying unit shall be measured at every 06 hours using digital dew point meter and – 45°C at the outlet of dryer shall be maintained. The foam pigs when received at other end shall be removed and vents shall be kept open on receiving end to ensure min. backpressure. The dry air shall be allowed to flow continuously till – 8 to 10°C is achieved at the receiving end.

2.5 PROJECT REQUIREMENT

2.5.1 Land

The procurement/ lease of the land will not be involved in the project as the laying of NG pipeline will be done on the RoW of the roads spread across the Akola GA.

2.5.2 Manpower Resources

During the construction phase, local skilled and unskilled labour will get temporary employment based on required skill sets. However, as the development will be phase wise, the total number of locals employed at any one time may not be more than 100 at present the contractor has attained the labour license for 60 labours. **ATGL** has contracted out the construction works and management of labour to contractors, local skilled and unskilled workers and service providers are preferred to boost local employment generation. For operational phase is considered, guards will be employed to patrol the pipeline areas, which will be around 10-20 people for this stretch. Skilled workers will be employed for the operation and maintenance. All these will also be contracted out to the subcontractors.

2.5.3 Power Requirement

The power requirement will be met from DG sets during construction phase of the project. Bills will be raised by the concerned authority. During operational phase, power will be only required for SCADA & associated facilities. The same shall be supplied via state grid. As per the observation during the site visit the electricity requirement of the project is around 240 to 250 KV/month.

2.5.4 Water Requirement

Water requirement will be minimal for the project associated only with domestic use by the workers during construction, for the sprinkling purpose to avoid air pollution and office staff will require during constructions and operations period at the distribution centres. The water requirement for construction phase will be contracted out to private tankers. The average quantity of water required for the project is around 500-600 l/day. There will be no water requirement during operation phase expect for domestic usage of staff and workers.

2.5.5 Emission and Discharges

Fugitive dust shall be the main air pollutant, from the small diesel engines used for the construction works & movement of vehicles for which dust suppression system will be used as relevant points. No effluent will be generated during operation of the proposed project.

3 LEGAL, POLICY AND REGULATORY FRAMEWORK

The emerging environmental scenario calls for attention on conservation and judicious use of natural resources. There is a need to integrate the environmental consequences of development activities and for planning suitable measures to ensure sustainable development of the region. The environmental and social considerations in any developmental process have become necessary for achieving sustainable development. To achieve such goals, the basic principles to be adopted are:

- To enhance the quality of environment in and around the project area by adopting proper measures for conservation of natural resources.
- Prevention of adverse environmental and social impact to maximum possible extent; and
- To mitigate the possible adverse environmental and socio-economic impact on the project-affected areas.

This section highlights the environmental and social regulations applicable to proposed City Gas Pipeline distribution network project. The section broadly focuses institutional framework, applicable environment, health and safety and social legislative, World Bank's guidelines and IFC's Performance Standards requirements relevant to the proposed project.

3.1 ENFORCEMENT AGENCIES

All the permissions and the approvals must be taken from concerned ministries, line departments and the local civic bodies for any upcoming project in India. The environmentaland social governance approach in the country consists of:

1. Regulatory and implementing entities.
2. Legal framework includes policies, acts, and laws; and
3. Permitting system.

With the aim to create a National Gas Grid (One Nation, One Gas Grid) and increase the availability of natural gas across the country, Petroleum and Natural Gas Regulatory Board (PNGRB) under Ministry of Petroleum and Natural Gas has authorized to lay Natural Gas Pipeline network across the country and the environmental aspects are governed by Ministry of Environment, Forests and Climate Change (MoEF&CC), Central Pollution Control Board (CPCB). The social governance aspects at the micro level are addressed by institutions like panchayats and municipal bodies.

A brief description of the relevant enforcement agencies with respect to the institutional framework is described in the following sub-sections:

3.1.1 Ministry of Environment, Forests and Climate Change (MoEF&CC)

The Ministry of Environment, Forests and Climate Change (MoEF&CC) is the nodal agency in the administrative structure of the Central Government for the planning, promotion, co-ordination and overseeing the implementation of India's environmental and forestry policies and programs. The primary concerns of the ministry are implementation of policies and programs related to conservation

of the country's natural resources including its lakes and rivers, its biodiversity, forests, and wildlife, ensuring the welfare of animals, and the prevention and abatement of pollution. While implementing these policies and programs, the ministry is guided by the principle of sustainable development and enhancement of human well-being. The specific functions of MoEF&CC are as follows:

1. Environmental policy planning.
2. Effective implementation of legislation.
3. Monitoring and controlling pollution.
4. Environmental Clearances for industrial and development projects covered under EIA notification.
5. Promotion of environmental education, training, and awareness; and
6. Forest conservation, development, and wildlife protection.

3.1.2 Central Pollution Control Board (CPCB)

The Central Pollution Control Board (CPCB) was established in September 1974, for the purpose of implementing provisions of the Water (Prevention and Control of Pollution) Act, 1974. The executive responsibilities for the industrial pollution prevention and control are primarily executed by the CPCB at the Central level, which is a statutory body, attached to the MoEF&CC. CPCB works towards control of water, air and noise pollution, land degradationand hazardous substances and waste management. The specific functions of CPCB are as follows:

1. Prevent pollution of streams and wells.
2. Advise the Central Government on matters concerning prevention, control and abatement of water and air pollution.
3. Co-ordinate the activities of SPCB's and provide them with technical and research assistance.
4. Establish and keep quality standards under review for surface and groundwater and for air quality.
5. Planning and execution of national programmes for the prevention, control, and abatement of pollution through the Water and Air Acts; and
6. The CPCB is responsible for the overall implementation and monitoring of air and water pollution control under the Water Act, 1974, and the Air Act, 1981.

3.1.3 Maharashtra Pollution Control Board (MPCB)

Maharashtra Pollution Control Board (MPPCB) was established on 7th September,1970 under the provisions of Maharashtra Prevention of Water Pollution Act, 1969. The Water (P&CP) Act, 1974, that is a central legislation, was adopted in Maharashtra on 01/06/1981 and accordingly Maharashtra Pollution Board was formed under the provisions of section 4 of Water (P& CP) Act, 1974. The Air (P&CP) Act 1981 was adopted in the Maharashtra in1983 and initially, some areas were declared as Air Pollution Control Area on 02/05/1983. The entire state of Maharashtra has been declared as an

Air Pollution Control Area since 06/11/1996. The Board is also functioning as the State Board under section 5 of the Air (P&CP) Act, 1981.

To have uniform laws, all over the country for broad environmental issues endangering the health & safety of our people as well as of our flora and fauna and to check environmental degradation, the Parliament of India has enacted the following laws:

- The Water (Prevention & Control of Pollution) Act, 1974 as amended to date
- The Water Cess Act, 1977
- The Air (Prevention & Control of Pollution) Act, 1981 as amended to date
- Some of the provisions under the Environmental (Protection) Act, 1986 and the rules framed under this like:
  - Biomedical Waste (M&H) Rules, 2016,
  - Hazardous Waste (M&H) Rules, 2016,
  - Municipal Solid Waste Rules, 2016 etc.

The aforesaid laws have been adopted by the Govt. of Maharashtra to control environmental pollution in the State. The Govt. of India, Ministry of Environment & Forests, has also framed the following rules for the management of Hazardous Waste, Bio Medical Waste, Municipal Solid Waste, Recycled Plastic, Used Batteries, Control of Noise Pollution and Protection of Ozone Layer under the provisions of the Environment (Protection) Act, 1986.

- The Hazardous Waste (Management & Handling) Rules, 1989 as amended to date
- The Manufacture, Use, Import, Export and Storage of Hazardous Micro Organisms Genetically Engineered Organisms or Cells Rules, 1989
- The Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 as amended to date
- The Public Liability Insurance Act, 1991
- The Bio-Medical Waste (Management & Handling) Rules, 1998
- The Recycled Plastics Manufacture, Sale & Usage Rules, 1998 as amended to date
- The Municipal Solid Waste (Management & Handling) Rules, 2000
- The Noise Pollution (Regulation & Control) Rules, 2000
- The Ozone Depleting Substances (Regulation) Rules, 2000
- The Batteries (Management & Handling) Rules, 2001
- E-waste (Management) Rules, 2016

The Maharashtra Pollution Control Board has been entrusted with the task of implementation of environmental laws in the State of Maharashtra.

Some of the important functions MPCB are:

- To plan a comprehensive program for the prevention, control or abatement of pollution and secure executions thereof,
- To collect and disseminate information relating to pollution and the prevention, control or abatement thereof,
- To inspect sewage or trade effluent treatment and disposal facilities, and air pollution control systems and to review plans, specifications or any other data relating to the treatment plants, disposal systems and air pollution control systems in connection with the consent granted,
- Supporting and encouraging developments in the fields of pollution control, waste recycle reuse, eco-friendly practices etc.
- To educate and guide the entrepreneurs in improving the environment by suggesting appropriate pollution control technologies and techniques
- Creation of public awareness about the clean and healthy environment and attending to the public complaints regarding pollution.

3.1.4 Petroleum and Explosives Safety Organization (PESO)

The PESO is under the Department of Industrial Policy & Promotion, Ministry of Commerce and Industry, Government of India. The Chief Controller of Explosives is responsible for dealing with the provisions of

1. The Petroleum Act 1934 and the Rules 2002.
2. The Static and Mobile pressure vessels {Unfired} Rules, 1981 and amendment 2000,2004.
3. Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 and amendment 2000.

3.1.5 Ministry of Petroleum and Natural Gas

The MoPNG is the nodal ministry of Government of India for all matters related to petroleum and Natural Gas. The ministry formulates policies for the exploration, production, refining, distribution, and marketing of petroleum and natural gas. The ministry, through the Petroleum and Natural Gas Regulatory Board (PNGRB), authorizes entities to develop City Gas Distribution networks. These networks supply piped natural gas (PNG) to households, industries, and commercial establishments, and compressed natural gas (CNG) for vehicles. MoPNG promotes the development of infrastructure for natural gas, including pipelines and import terminals, to enhance the availability and accessibility of natural gas across the country. The ministry issues guidelines for the allocation and pricing of natural gas to ensure its efficient and equitable distribution.

3.1.6 Central Ground Water Authority (CGWA)

Central Ground Water Authority (CGWA) was constituted under sub-section (3) of Section 3 of the Environment (Protection) Act, 1986 for the purposes of regulation and control of ground water development and management. The authority is entrusted with the powers of:

- To resort the penal provisions contained in section 15 to 21 of the said act.

- To regulate and control, management and development of ground water in the country and to issue necessary regulatory directions for the purpose.
- Exercise of powers under section 4 of Environment (Protection) Act, 1986 for the appointment of Officers.

CGWA is regulating withdrawal of ground water by industries/ projects. CGWA has published guidelines/ criteria for evaluating proposals/ requests for ground water abstraction (with effect from 16/11/2015). As per the guidelines, for non-notified areas, NOC for ground water withdrawal will be considered for Industries as per the criteria given in the notification, presented **Table 3-1** below.

Table 3-1: Criteria for granting NOC to Industries/ Infrastructure/ Mining in Non-Notified Areas

Category	Requirement of NOC			
	Safe	Semi-Critical	Critical	Overexploited
Domestic use (rural & urban)/Rural drinking water supply schemes/armed forces establishment/MSME abstracting less than 10 cum/day	Not Required	Not Required	Not Required	Not Required
Residential Apartments / Group Housing Societies / Govt. Water Supply Agency	Required (GW abstraction charges to be paid)	Required (GW abstraction charges to be paid)	Required (GW abstraction charges to be paid)	Required (GW abstraction charges to be paid)
Agriculture	Not Required	Not Required	Not Required	Not Required
Industrial Use	Required	Required	Required	Prohibited except MSME excluding new packaged water industries
Mining	Required (GW abstraction charges to be paid)	Required (GW abstraction charges to be paid)	Required (GW abstraction charges to be paid)	Required (GW restoration charges to be paid)
Infrastructure Projects	Required (GW abstraction charges to be paid)	Required (GW abstraction charges to be paid)	Required (GW abstraction charges to be paid)	Prohibited for Water Parks/Theme Parks/Amusement Parks. For construction is allowed only if alternate options such as treated sewage water are not available within 05 km.

*Authorized water tankers will supply the water needed to clean the modules in areas where automated cleaning systems are not available. However, **ATGL** will adopt robotic cleaning technology and dry brush cleaning to conserve water.*

3.2 IFC EHS GUIDELINES

The IFC's EHS Guidelines dated 30th April 2007 shall be applicable for the project. **ATGL** should ensure using the Guidelines as guiding framework for addressing impacts on Environment, Occupational

Health and Safety, Community Health and Safety during construction, operation as well as decommissioning phase of the project.

The IFC's EHS Guidelines provides industry specific management measures for addressing impacts on biodiversity, occupational health, and safety as well as community health and safety as early as possible in the project cycle, including the incorporation of EHS considerations into the site selection, to maximize the range of options available to avoid and minimize potential adverse impacts.

The EHS Guidelines for Electrical Power Transmission and Distribution dated 30th April 2007 should be followed by **ATGL** for addressing EHS issues associated with electric power transmission and distribution that occur during the construction and operation phases of the project along with recommendations for their management.

3.3 IFC PERFORMANCE STANDARDS

The Performance Standards (PS) established stipulate that the project shall meet the following throughout the life of an investment by IFC or other relevant financial institutions:

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

These performance standards and guidelines provide ways and means to identify impacts and affected stakeholders and lay down processes for management and mitigation of adverse impacts. A brief on the requirements laid down in the performance standards is described below.

Table 3-2: Applicable performance Standards

PS No.	Performance Standards	Applicability
PS-1	Assessment and Management of Environmental and Social Risks & Impacts	• Yes ○ No
PS-2	Labour and Working Conditions	• Yes ○ No
PS-3	Resource Efficiency and Pollution Prevention	• Yes ○ No
PS-4	Community Health, Safety, and Security	• Yes ○ No
PS-5	Land Acquisition and Involuntary Resettlement	○ Yes • No
PS-6	Biodiversity Conservation and Sustainable Management of Living Natural Resources	• Yes ○ No
PS-7	Indigenous Peoples	○ Yes • No

PS No.	Performance Standards	Applicability
PS-8	Cultural Heritage	○ Yes • No

The details of applicability of IFC Performance Standards for proposed distribution of Natural Gas pipeline project are given below **Table 3-3:**

Table 3-3: Applicability of IFC Performance Standards for CGD Project

Title of Performance Standard	Performance Standard (PS) requirements in brief	Applicability to project(Compliance)	Actions Taken/Requirements
Assessment and Management of Environmental and Social Risks & Impacts (PS-1)	PS-1 establishes the importance of integrated assessment to identify the environmental and social impacts, risks, and opportunities of projects; effective community engagement through disclosure of project-related information and consultation with local communities on matters that directly affect them; the client's management of environmental and social performance throughout the life of the project.	The PS-1 is applicable to projects with environmental and/or social risks and/or impacts. The proposed project is a CGD of NGP Project and will have environmental and social impacts such as stress on existing water resources, generation of noise, air emission during construction activities and transportation, biodiversity impacts etc.	**Applicable** ***Policy and Environment and Social Assessment and Management System*** **ATGL** in coordination with other responsible government agencies and third parties as appropriate, will conduct a process of environmental and social assessment. The client will also establish an overarching policy defining the environmental & social objectives and principles that guide the project to achieve sound environmental and social performance. Further, **ATGL** needs to adhere with respect to measures suggested in ESMP of this report to manage the risks associated with its operations like stakeholder engagement, emergency response plan, contractor management plan, grievance redressal etc. and decommissioning phase of the project. ***Requirements: Identification of Risks and Impacts and Management Programs.*** **ATGL** will establish and maintain a process for identifying the environmental & social risks and impacts of the project. Management Programs will be developed depending upon nature and scale of the project. Impacts identified during construction and operation phase of the project have been detailed in **Chapter 5** of this ESIA report. **Chapter 9** defines framework for environmental and social management plan for the proposed project. ***Requirements: Organizational Capacity and competency*** **ATGL** in collaboration with appropriate & relevant third parties, will establish, maintain, and strengthen as necessary an

Title of Performance Standard	Performance Standard (PS) requirements in brief	Applicability to project(Compliance)	Actions Taken/Requirements
			organizational structure that defines roles, responsibilities in association with the project. Organization structure for implementation of environmental and social management plan has been detailed in **Section 9.3, ESMP** of the report. It reflects the role of corporate and site level EHS team in managing EHS aspects at site and outlines a clear responsibility of the EHS team in management of EHS with respect to ESMP. Some of the specific trainings that will be carried out on routine basis are as follows: • Occupational Health & Safety • Fire Safety & Prevention • Emergency Response Preparedness • Operational Training • HR Induction Training • PPE Training • Driver Safety The above-mentioned trainings are preliminary trainings which will be undertaken at inception stage once the employee/worker joins the company and/or project. Post that, monthly refresher training can be taken especially for the workers. **ATGL** will draw project specific HSE plan and other management plans like water management, waste management, labour management, site security etc ***Requirements: Emergency Preparedness and Response*** The **ATGL** will establish emergency preparedness and response system to respond to accidental and emergency situations associated with the project in a manner appropriate to prevent and mitigate any harm to people and/or the environment. The client is required to design emergency preparedness and response plans based on the risks to community health and safety identified during the risks and impacts identification process. The level of

Title of Performance Standard	Performance Standard (PS) requirements in brief	Applicability to project(Compliance)	Actions Taken/Requirements
			planning and communication should be commensurate with the potential impacts. **ATGL** will establish procedures to monitor & measure effectiveness of management program, as well as compliance with any related legal and/or contractual obligations and regulatory requirements. This ESMP will have to be monitored on aregular basis, quarterly or half-yearly and all outcomes would need to be audited in accordance with existing EHS commitments. ***Requirements: Monitoring and Review*** The monitoring process will cover all stakeholders including contractors, labourers, suppliers, and local community impacted by project activities and associated facilities. Inspection and monitoring of environmental & social impacts of construction and operation phase activities will increase the effectiveness of suggested mitigations. Through the process of inspection, audit, and monitoring, **ATGL** will ensure that all contractors comply with the requirements of conditions for all applicable permits including suggested action plans. The inspections and audits will be done by **ATGL's** trained team & external agencies/experts. The entire process of inspections & audits will be documented. The inspection and audit findings will be implemented by contractors in their respective areas. ***Requirements: Stakeholder Engagement, Disclosure of Information and Consultations*** **ATGL** should identify the range of stakeholders that may be interested in their actions and consider how external communications might facilitate a dialogue with all stakeholders. **ATGL** will develop and implement a Stakeholder Engagement Plan that is scaled to the project risks & impacts. It will be tailored to

Title of Performance Standard	Performance Standard (PS) requirements in brief	Applicability to project(Compliance)	Actions Taken/Requirements
			characteristics and interests of the affected communities. **ATGL** will provide affected communities with access to relevant information on: (i) Purpose, nature, and scale of the project. (ii) Duration of project activities (iii) Any risks to and potential impacts on such communities and Relevant mitigation measures. (iv) Envisaged stakeholder engagement process. (v) Grievance mechanism. When affected communities are subject to identified risks and adverse impacts from a project, the client will undertake a process of consultation in a manner that provides the affected communities with opportunities to express their views on project risks, impacts and mitigation measures. It will allow the client to consider & respond to them. **Chapter 9,** of the report details the stakeholder identification and engagement related to the project. A stakeholder's engagement plan is also formulated as a part of ESIA report (enclosed in **Section 9.5)** to correct any gaps and ensure adequate stakeholder engagement going forward.
Labour and Working Conditions (PS-2)	Performance Standard 2 recognizes that the pursuit of economic growth through employment creation and income generation should be accompanied by protection of fundamental rights of workers. The objectives of PS 2 are: • To promote fair treatment, non-discrimination, and equal opportunity of workers. • To establish, maintain, and improve worker- management	The proposed project will involve employment of direct and contracted workers during construction and operation phase. The client will engage direct workers, workers engaged through third parties (contracted workers), as well as workers engaged by the client's primary suppliers (supply chain workers).	**Applicable** ***Requirements: Working Conditions and Management of Worker Relationship*** The **ATGL** will provide workers with documented information that is clear and understandable, regarding their rights under national labour and employment law. The proponent shall ensure measures to: • Prevent child labour, forced labour, and discrimination. • Freedom of association and collective bargaining shall be provided. • Wages, work hours and other benefits shall be as per the

Title of Performance Standard	Performance Standard (PS) requirements in brief	Applicability to project(Compliance)	Actions Taken/Requirements
	relationship. • To promote compliance with national employment and labour laws. • To protect workers, including vulnerable categories of workers such as children, migrant workers, workers engaged by third parties, and workers in the client's supply chain. • To promote safe and healthy working conditions, and health of workers. • To avoid use of forced labour.		national labour and employment laws. **ATGL** will ensure that reasonable working conditions and terms of employment for both direct and contracted workers through contractor agreements are provided. Contractor engaged by **ATGL** for various activities should ensure that terms of employment include wages and benefits, wage deductions, hours of work, breaks, rest days, overtime arrangements, overtime compensation, medical insurance, pension, leave for illness, vacation, maternity, and holiday are communicated to workers clearly. Migrant workers, if employed shall also be providedsame working conditions equivalent to those of non-migrant workers performing the same type of work. It will be the responsibility of all theconstruction contractors engaged by **ATGL** for the project, to provide accommodation, transportation, and basic services including water, sanitation, & medical care to workers. ***Requirements: Non-Discrimination and Equal Opportunity*** **ATGL** will not discriminate with respect to any aspects of employment relationship, such as recruitment, hiring, compensation (including wages and benefits), working conditions, terms of employment, access to training, job assignment, promotion, termination of employment or retirement, and disciplinary practices. **ATGL** will take appropriate measures to prevent any discriminatory treatment of migrant workers. Measures to prevent any harassment, including sexual harassment or psychological mistreatment within the workplace will also be undertaken. ***Requirements: Retrenchment*** **ATGL** should ensure that all workers receive notice of dismissal

Title of Performance Standard	Performance Standard (PS) requirements in brief	Applicability to project(Compliance)	Actions Taken/Requirements
			and severance payments mandated by law and collective agreements in a timely manner. **ATGL** should ensure that proper consultations are undertaken with the workers before retrenchment, if any. Selection criteria for those to be laid off should be objective, fair, and transparent. The retrenchment should not be based on personal characteristics and unrelated to inherent job requirements. ***Requirements: Grievance Mechanism*** **ATGL** will provide a grievance mechanism for workers (and their organizations, where they exist) to raise workplace concerns. In providing a grievance mechanism through which workers may raise workplace concerns, **ATGL** should ensure that matters are brought to management's attention and addressed expeditiously. **ATGL** needs to document all grievances and follow up on any corrective actions. ***Requirements: Protecting the Work Force*** **ATGL** will not employ children in any manner that is economically exploitative or is likely to be hazardous or to interfere with the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral, or social development. **ATGL** is required to ensure that no child labour (as defined in IFC PS 2), forced labour is employed by the contractor during construction and operation phase of the project. **ATGL** should also exercise diligence regarding key contractors and subcontractors so that they do not knowingly benefit from practices that lead to bonded or indentured status of workers. ***Requirements: Occupational Health and Safety (OHS)*** **ATGL** will provide a safe and healthy work environment, considering inherent risks in its sector and specific classes of

Title of Performance Standard	Performance Standard (PS) requirements in brief	Applicability to project(Compliance)	Actions Taken/Requirements
			hazards in the client's work areas, including physical, chemical, biological, and radiological hazards, and specific threats to women. **ATGL** will extend a safe and healthy work environment to contracted workers and to any other workers who provide project-related work and services. **ATGL** should ensure that training is provided to all workers on relevant aspects of OHS associated with their daily work, including emergency arrangements and OHS briefing for visitors and other third parties accessing the premises. All occupational injuries, illnesses and fatalities are to be documented and should be clearly communicated to third parties, and if possible, to workers engaged by these third parties.
Resource Efficiency and Pollution Prevention (PS-3)	Performance Standard 3 recognizes that increased economic activity and urbanization often generate increased levels of pollution to air, water, and land, and consume finite resources in a manner that may threaten people and the environment at the local, regional, and global levels. The objectives of PS 3 are: • To avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities. • To promote more sustainable use of resources, including energy and water. • To reduce project related GHG emissions.	**ATGL** shall assess the impacts and risks associated with generation, use, storage, release, and/or disposal of pollutants during the ESIA, and implement them as per action plan. Also, pollution control measures shall be planned and implemented right from the project conception stage. Practices like minimal release of waste, handling of hazardous waste, safe disposal of waste, wastewater management etc. shall be considered prior to each phase. PS -3 is therefore applicable for the proposed project. The proposed project is a clean energy project and will not have major pollution sources associated with it. The construction works for development of project will entail generation of wastes like wastewater, waste oil and construction debris. The operation phase will result in generation of	**Applicable** **Requirements: Resource Efficiency** **ATGL** will implement technically and financially feasible and cost-effective measures for improving efficiency in its consumption of energy, water, as well as other resources and material inputs, with a focus on areas that are considered core business activities. ***Requirements: Greenhouse Gases*** **ATGL** needs to work on the management, mitigation, and reduction of GHG emissions associated with the construction, operation, and decommissioning of the pipeline. These emissions primarily include methane (CH_4), which is a potent GHG associated with natural gas distribution, and other related carbon emissions. ***Requirements: Water Consumption*** During the construction phase, water will be primarily required for dust suppression on the site, hydrostatic testing, concrete mixing, and providing catering and sanitation for the workforce.

Title of Performance Standard	Performance Standard (PS) requirements in brief	Applicability to project(Compliance)	Actions Taken/Requirements
		minor quantities of waste such as transformer oil and wastewater from cleaning of solar panels.	Sustainable sourcing prevents over-extraction, proper wastewater management prevents contamination. Compliance with local regulations and monitoring are crucial for sustainable water use. Continuous adjustment is essential to meet IFC Performance Standard 3 requirements and avoid the significant adverse impacts on others. ***Requirements: Pollution Prevention*** **ATGL** will avoid the release of pollutants or, when avoidance is not feasible, minimize and/or control the intensity and mass flow of their release. **ATGL** should monitor emissions to ensure that requirements of PS-3 are being met. Monitoring frequency of pollutant emissions should be appropriate to the nature, scale, and variability of potential impacts. ***Requirements: Waste and Hazardous Materials Management*** **ATGL** will avoid generation of hazardous and non-hazardous waste materials. Where waste generation cannot be avoided, they will reduce generation of waste, recover and reuse waste in a manner that is safe for human health and the environment. **ATGL** should investigate options for waste avoidance, waste recovery and/or waste disposal during the design and operational stage of the project. MSDS for all the hazardous chemicals to be used during construction and operation phase should be readily available. Also, arrangements for storage yard and scrap yard needs to be made for storage of construction material and disposal of scrap. The arrangements need to be made for segregation of biodegradable and non-biodegradable waste and a CPCB authorized vendor is required to be hired for waste handling and management.

Title of Performance Standard	Performance Standard (PS) requirements in brief	Applicability to project(Compliance)	Actions Taken/Requirements
Community Health, Safety, and Security (PS-4)	PS 4 recognizes that project activities, equipment, and infrastructure can increase community exposure to risks and impacts. Its main stress is to ensure that safeguarding of personnel and property is carried out in accordance with relevant human rights principles and in a manner that avoids or minimizes risks to the affected communities.	The proposed project will involve transportation of construction material and movement of construction machinery using existing road which may pose safety risks to the affected communities.	**Applicable** ***Requirements: Community Health and Safety and Community Exposure to Disease*** Community health and safety considerations should be addressed through a process of environmental & social risks and impact identification resulting in action plan for disclosure to project affected communities. **ATGL** is required to address community health and safety associated with the construction and operation phase of the project. A transport and traffic management plan required to be implemented during different phases of the project. Since the project will be using existing roads for transportation of equipment and machinery, impacts due to transportation on the community could be mitigated through implementation of Traffic Management Plan. ***Requirements: Infrastructure and Equipment Design and Safety*** For the **ATGL** it is essential to minimize risks and protect the health and safety of both workers and the surrounding community, they should also build its internal capacity to monitor engineering design and managing the potential hazards associated with the distribution of natural gas, including leaks, explosions, fire risks, and other operational safety concerns. ***During Construction Phase*:** The safety-first approach in pipeline design involves integrating safety features like gas leak prevention measures, pressure relief systems, and venting systems. It also ensures easy emergency access and provides worker safety equipment to minimize risks associated with natural gas exposure. The project will pass through and will involve movement of vehicles through the NH, SH, MDR and other roads mainly for transportation of construction material.

Title of Performance Standard	Performance Standard (PS) requirements in brief	Applicability to project(Compliance)	Actions Taken/Requirements
			Traffic and Road Safety: The movement of construction vehicles and equipment may increase the risk of accidents, particularly in densely populated or high-traffic urban areas. A traffic management plan will be developed and implemented to mitigate these risks, including designated transport routes, speed restrictions, and community awareness measures. Also, the roads should be continually repaired if damaged due to project activity. **Public Health and Nuisance Impacts:** Construction activities may generate dust, noise, and vibrations, which could affect nearby residents. Mitigation measures such as dust suppression, noise barriers, and restricted working hours will be adopted to minimize these impacts. **Emergency Preparedness and Response:** The ATGL need to establish emergency response protocols in coordination with local authorities to address any incidents that may arise during construction or operation. *During Operation Phase*: It is necessary for ATGL to ensure the Gas Distribution Safety systems such as automated shut-off valves, pressure regulation systems, and gas detection sensors to minimize the risk of leaks, fires, and explosions. Corrosion protection, Leak Detection Systems, Emergency Shut-Off Systems and worker's safety. ***Requirements: Hazardous Materials Management and Safety*** **ATGL** will avoid or minimize potential for community exposure to hazardous materials and substances that may be released by the project. The project will not use any hazardous chemicals. Limited number of hazardous substances such as diesel in DG sets, transformer oil etc., will be required. **ATGL** will either engage a contractor for handling used oil or will ensure proper handling and

Title of Performance Standard	Performance Standard (PS) requirements in brief	Applicability to project(Compliance)	Actions Taken/Requirements
			storage procedures will be followed to minimize any contamination due to accidental spills of such substances. ***Requirements: Ecosystem Services*** CGD of NGP project being linear project there will be no significant change to physical environment, such as natural vegetation cover, existing topography, and hydrologic regime due to the project. ***Requirements: Emergency Preparedness and Response*** **ATGL** will assist and collaborate with affected communities, local government agencies, and other relevant parties to respond effectively to emergency situations, especially when their participation and collaboration are necessary to respond to such emergency situations. **ATGL is** required to design emergency response plans based on risks to health and safety of the affected community and other stakeholders. Emergency plans should be developed in close collaboration and consultation with potentially affected communities and other stakeholders. The plans should include detailed preparation to safeguard health and safety of workers and communities during emergency. ***Requirements: Security Personnel*** When the client retains direct or contracted workers to provide security to safeguard its personnel and property, it will assess risks posed by its security arrangements to those within and outside the project site. **ATGL** will make reasonable inquiries to ensure that those providing security are not implicated in past abuses; will train them adequately in use of force (and where applicable, firearms),

Title of Performance Standard	Performance Standard (PS) requirements in brief	Applicability to project(Compliance)	Actions Taken/Requirements
			and appropriate conduct toward workers and affected communities.
Land Acquisition and Involuntary Resettlement (PS-5)	PS 5 recognizes that project-related land acquisition and restrictions on land use can have adverse impacts on communities and persons that use this land. The main aim is to anticipate and avoid, or where avoidance is not possible, minimize adverse social and economic impacts from land acquisition or restrictions on land use by providing compensation for loss of assets at replacement cost and ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected.	The proposed project will be implemented entirely within the existing Right-of-Way (ROW) of operational infrastructure, including roads, canals, drains, and railway crossings. This alignment ensures that the pipeline will be constructed along land already designated for public infrastructure use. These pre-existing ROWs are expected to have established legal agreements or easements that permit such development activities. Permissions from municipal authorities have been secured, with only the approval from the National Highways Authority currently pending. No additional land acquisition is required for the pipeline component of the project. The construction will occur within areas already allocated for road use, thereby avoiding any physical or economic displacement, involuntary resettlement, or loss of access to land or resources. Consequently, the project does not involve any new land purchases or changes in land use that would typically activate PS-5. PS-5 Compliance: Given that the project utilizes existing ROWs and involves no new land acquisition from community or involuntary resettlement, IFC Performance Standard 5 is not applicable. The project	***Not Applicable*** ***Requirements: verification of ROW and Land Use*** **ATGL** shall ensure that the ROW is legally clear for pipeline construction and that no new land acquisition or involuntary displacement occurs. Monitoring for Potential Issues: Even though the PS-5 is not applicable for laying, it is prudent to monitor the social and environmental impacts during construction, particularly regarding temporary disruption or access issues that could affect communities near the pipeline route. ***Requirements: Community Engagement and Engagement with Relevant Authorities*** **ATGL** shall engage with affected communities, including host communities, through the process of stakeholder engagement. **ATGL** engaged community for disclosure of relevant information and participation of affected communities during planning & implementation stage of the project. A Stakeholder Engagement Plan was developed as a part of environment and social management plan. **ATGL** shall engage with local authorities and stakeholders to ensure that the project complies with any regulatory or land-use guidelines relevant to the ROW, as well as any applicable local laws that may govern infrastructure development within road corridors. ***Requirements: Grievance Mechanism*** **ATGL** shall establish a grievance mechanism consistent with Performance Standard 2 in the project development phase. **ATGL**

Title of Performance Standard	Performance Standard (PS) requirements in brief	Applicability to project(Compliance)	Actions Taken/Requirements
		design ensures that there is no physical or economic displacement, and all land use remains consistent with its current designation for infrastructure development.	shall ensure to resolve grievances at the community level. It is also to be ensured that a designated person will be trained and available to receive grievances and coordinate efforts to redress those grievances through the appropriate channels, taking into consideration of any customary and traditional methods of dispute resolution within the affected communities. Grievance Redressal Mechanism is already in place with **ATGL** and the same will be implemented at project level. During consultation with the land seller and Sarpanch under which all the project villages fall, it was confirmed that they have no objection or any other concern with projects plan or the acquisition of land. They expressed their satisfaction with rates from market rate compensation they got from land sale. ***Requirements: Economic Displacement*** Economically displaced persons who face loss of assets or loss of livelihood during the development of project or access to assets shall be compensated for such loss at full replacement cost.
Biodiversity Conservation and Sustainable Management (PS-6)	PS 6 recognizes that protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources are fundamental to sustainable development. This standard is aimed to promote the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities.	Ground vegetation will be cleared for development of project. The project activities are not likely to have any significant impact on the ecology.	***Applicable*** ***Requirements: Protection and Conservation of Biodiversity*** For the protection and conservation of biodiversity, the mitigation hierarchy includes biodiversity offsets, that may be considered only after appropriate avoidance, minimization, and restoration measures. Baseline studies for ecological aspects have been described in "**Chapter 4 ENVIRONMENTAL DESCRIPTION**" of the report. The study has been collected through site survey, literature review and initial desktop analysis. The extent of the literature review will depend on sensitivity of biodiversity attributes associated with project's area of influence and ecosystem services that may be impacted. There is no critical habitat with high biodiversity value, including:

Title of Performance Standard	Performance Standard (PS) requirements in brief	Applicability to project(Compliance)	Actions Taken/Requirements
			i. habitat of significant importance to critically endangered and/or endangered species. ii. habitat of significant importance to endemic and/or restricted-range species. iii. habitat supporting globally significant concentrations of migratory species and/or congregatory species. iv. highly threatened and/or unique ecosystems; and/or v. areas associated with key evolutionary processes in the project area of influence (AoI) and its associated facilities and in buffer zone. **ATGL** should adopt mitigation measures to achieve no net loss of biodiversity wherever feasible. Appropriate actions include: • Avoiding impacts on biodiversity through the identification and protection of set asides. • Restoring habitats during operations and/or after operations; and • Avoiding intentionally introduces any new alien species. **ATGL** should take all precautionary measures during laying of the pipeline to avoid any impact during project construction activities. It is advised that the pipeline should adhere to the mitigation measures given in "**Chapter 5 ANTICIPATED ENVIRONMENTAL AND SOCIAL IMPACTS AND** MITIGATION MEASURES" **of ESIA Report.** ***Requirements: Management of Ecosystem Services*** With respect to impacts on priority ecosystem services of relevance to affected communities and where the client has direct management control or significant influence over such ecosystem services, adverse impacts should be avoided. Being a cleaner source of energy, no significant degradation and loss of ecosystem

Title of Performance Standard	Performance Standard (PS) requirements in brief	Applicability to project(Compliance)	Actions Taken/Requirements
			services are associated with the project that can pose operational, financial, and reputational risks to project sustainability.
Indigenous Peoples (PS-7)	Performance Standard-7 recognizes that indigenous peoples, such as social groups with identities that are distinct from mainstream groups in national societies, are often among the most marginalized and vulnerable segments of the population. In many cases, their economic, social, and legal status limits their capacity to defend their rights to, and interests in, lands and natural and cultural resources, and may restrict their ability to participate in and benefit from development.	Even though significant ST population is available in the Akola district is available, but the project does not pass through the areas near tribal habitations or forests. No land acquisition or access restriction to traditional resources is observed in the project. Also the project does not affect areas of cultural significance to ST communities,	***Not Applicable*** Since, for the pipeline route project no land acquisition is required, hence it can be said that no land of ST population is getting affected. However, **ATGL** has policy of not buying any land from SC/ST or other vulnerable community members to the maximum extent possible.
Cultural Heritage (PS-8)	PS 8 recognizes the importance of cultural heritage for current and future generations. Consistent with the convention concerning the Protection of the World Cultural and Natural Heritage, this Performance Standard aims to ensure that clients protect cultural heritage during their project activities. In addition, the requirements of this Performance Standard on a project's use of cultural heritage are based in part on standards set by the Convention on Biological Diversity. For this Performance Standard,	No archaeological monument or place of importance is located within a 05 km radius from the project site.	***Not Applicable*** ***Requirements: Protection of Cultural Heritage in Project Design and Execution*** In addition to complying with applicable law on the protection of cultural heritage, World Cultural and including national law implementing the host country's obligations under the Convention Concerning the Protection of the Natural Heritage, the client will identify and protect cultural heritage by ensuring that internationally recognized practices for the protection, field-based study, and documentation of cultural heritage are implemented. No clearance is required to be obtained from ASI as proposed development not identified within 200 meters of the protected site. However, project should be monitored during construction phase so that environmental pollution from the project would not

Title of Performance Standard	Performance Standard (PS) requirements in brief	Applicability to project(Compliance)	Actions Taken/Requirements
	cultural heritage refers to tangible forms of cultural heritage, such as tangible moveable or immovable objects, property, sites, structures, or groups of structures, having archaeological (prehistoric), paleontological, historical, cultural, artistic, and religious values.		impact the natural and cultural heritage sites around the project site. ***Requirements: Project's Use of Cultural Heritage*** Where a project proposes to use the cultural heritage, including knowledge, innovations, or practices of local communities for commercial purposes, the client will inform these communities of (i) their rights under national law; (ii) the scope and nature of the proposed commercial development; and (iii) the potential consequences of such development. The client will not proceed with such commercialization unless it (i) enters a process of ICP as described in Performance Standard 1 and which uses a good faith negotiation process that results in a documented outcome and (ii) provides for fair and equitable sharing of benefits from commercialization of such knowledge, innovation, or practice, consistent with their customs and traditions. The proposed project of gas pipeline, it **will not use cultural heritage** or the archaeological site for commercial purposes.

3.4 PROJECT SPECIFIC REGULATORY GUIDELINES

The Ministry of Environment, Forest, and Climate Change (MoEF&CC) has notified the Environmental Impact Assessment (EIA) Notification, 2006 under the provisions of the Environment (Protection) Act, 1986, which regulates development and their expansion/modernization of 39 sectors/activities listed in the Schedule to the EIA Notification, 2006. There are following categories of the projects in the notification namely Category 'A' and Category 'B' projects. Category 'A' projects are appraised at the level of MoEF&CC and Category 'B' projects are appraised by the respective State Environment Impact Assessment Authority (SEIAA) following the procedure prescribed under the EIA Notification, 2006.

As per project/ activity 6 (a) of Schedule of EIA Notification 2006, oil and gas transportation pipelines that pass through national parks, sanctuaries, coral reefs, or ecologically sensitive areas sites require Environmental Clearance (EC).

A recent notification by dated 7th November 2014 by MoEF&CC (Annexure-1) accorded general approval under the Forest (Conservation) Act, 1980 (FC Act) for underground laying of optical fiber cables, telephone lines, drinking water supply pipeline and CNG/ PNG pipelines along the petroleum pipelines within existing right of way not falling in National Parks and Wildlife Sanctuaries, without felling of trees, where the maximum size of the trench is not more than 2.00 meter depth and 1.00 meter width.

The present project does not fall under any notified area in the state of Maharashtra hence no clearance is required. However, the client needs to intimate the project detail to the respective State Environment Impact Assessment Authority (SEIAA) Maharashtra following the procedure prescribed under the EIA Notification, 2006.

The proposed pipeline alignment traverses' multiple categories of public infrastructure and environmentally sensitive areas, necessitating a range of statutory approvals from relevant authorities. The key clearances required for the project include:

- **Road Crossings and Alignments:**
  The pipeline route passes along National Highways, Public Works Department (PWD) roads, and Municipal roads. Accordingly, the project requires:
    - Clearance from the **National Highways Authority of India (NHAI)** for sections along or crossing national highways.
    - Approval from the **Maharashtra Public Works Department (PWD)** for state roads (PWD Washim and PWD Akola).
    - NOC from Zila Parishad Washim
    - NOC From Gram panchayat Poha
    - Pradhan Mantri Gram Sadak Yojna Roads (PMGSY)
- **Railway Crossings:**
  As the pipeline alignment intersects railway tracks, clearance from the **Northern Railways** is mandatory for safe and compliant execution of works in railway zones.

- **Water Bodies (Drains and Canals):**
  The pipeline crosses two rivers, several drains and irrigation canals. Therefore, prior approval from the Water Resources Department is required to ensure protection of water infrastructure and flow regimes.
- **Forest and Tree Removal Clearances:**
  The project involves the removal of trees and passes through designated **reserved forest areas**. As such:
    - A **No Objection Certificate (NOC)** from the **Forest Department** is required for tree felling.
    - Additional clearance under the **Forest (Conservation) Act** is necessary for laying the pipeline through protected forest zones.

Given the nature of the project, including its linear infrastructure, potential environmental and community interface, and the requirement for multiple regulatory clearances, the proposed pipeline project is categorized as a "**Category B+"** project. This classification reflects the moderate to significant environmental and social considerations associated with the project, necessitating a detailed Environmental and Social Impact Assessment (ESIA) and implementation of appropriate mitigation measures.

Table 3-4: Applicability of all acts, laws & rules to Pipeline Project

Sl. No.	Legal Instrument	Objective	Reason for Applicability	Authority	Applicable (Yes/No)
1.	Environmental (Protection) Act & Rules, 1986	To protect and improve overall environment	All environmental notifications, rules and schedules are issued under this act	MoEF&CC GoI, Forest, Ecology & Environment Department, CPCB, & Maharashtra Environment Conservation Board (MECB)	Yes
2.	The Irrigation Laws (Amendment) Act, 1964	To maintain the uninterrupted flow of natural water ways and canals	For using land under the right of way basis for laying the NG pipeline across either side of the flowing water course of all canals, branches, distributaries, major-minor channels etc.	Water Resources Department (Akola Division)	Yes The permission letter for the river crossing and canal crossing is enclosed in the **Annexure 1.** Permission for the Nala and one river is enclosed in the **Annexure 2**
3.	The Railways Act, 1989	To manage safety of railways	For using land under the right of way basis for laying the NG pipeline	Indian Railways (IR)	Yes. The permission from the railways is pending.
4.	The Control of National Highways (Land and Traffic) Act, 2002	To manage safety National Highway, State Highway	For using land along the highway on the right of way basis for laying the NG pipeline	National Highway Authority of India (NHAI) & Road and Building Department	Yes. For permission from the NH is pending.
5.	Environmental Impact Assessment (EIA) Notification, 2006	To provide environmental clearance to new development activities following environmental impact assessment.	As per project/ activity 6 (a) of Schedule of EIA Notification 2006, oil and gas transportation pipelines which pass through national parks, sanctuaries, coral reefs or ecologically sensitive areas sites require Environmental Clearance (EC).	MoEF&CC	No

Sl. No.	Legal Instrument	Objective	Reason for Applicability	Authority	Applicable (Yes/No)
6.	Forest (Conservation) Act, 1980 and amendments thereof	To check deforestation by restricting conversion of forested areas into non-forested areas.	The proposed stretches pass through the protected forest.	Forest Department Akola (Maharashtra)	Yes. Applied and the permission in order to cut the tree along the roadside is enclosed in **Annexure 12** and for reserved forest the permission is enclosed in **Annexure 13**Error! Reference source not found.
7.	National Forest Policy (Revised), 1988	To maintain ecological stability through preservation and restoration of biological diversity	Eco sensitive zone exists along the project corridor, from which the pipeline passes through.	Forest Department Akola (Maharashtra)	
8.	Wildlife Protection Act, 1972 & 2022 (Amended)	To protect wildlife sanctuaries and National Parks	Not Applicable.	NBWL, SBWL & Chief Wildlife Warden, MoEF&CC	No
9.	Water (Prevention and Control of Pollution) Act, 1974 and amendments thereof	To control water pollution by controlling emission & Water pollutants as per the prescribed standards	This act will be applicable during construction, for establishments of hot mix plant, construction camp, workers' camp, etc.	Maharashtra Pollution Control Board (MPCB)	Yes
10.	Air (Prevention and Control of Pollution) Act, 1981 and amendments thereof	To control air pollution by controlling emission and air pollutants according to prescribed standards	This act will be applicable during construction; for obtaining NOC for establishment of hot mix plant, workers' camp, stone crusher, construction camp, & other heavy machinery.	Maharashtra Pollution Control Board (MPCB)	Yes
11.	Noise Pollution (Regulation and Control) rules, 2000	Noise pollution regulation and controls	This act will be applicable as vehicular noise on project routes required to assess for future years and necessary protection measures need to be considered in design.	Maharashtra Pollution Control Board (MPCB)	Yes
12.	The Explosives Act (& Rules), 1884	An Act to regulate the manufacture, possession, use, sale, transport, import and export of Explosives	For transporting and storing diesel, bitumen etc.	Maharashtra Pollution Control Board (MPCB)	Yes

Sl. No.	Legal Instrument	Objective	Reason for Applicability	Authority	Applicable (Yes/No)
13.	Public Liability Insurance Act, 1991	Insurance for the purpose of providing immediate relief to the persons affected by accident occurring while handling any hazardous substance and for matters connected therewith or incidental thereto	Contractor needs to stock hazardous material like diesel, Bitumen, Emulsions etc. safely in designated locations within the construction camp	Maharashtra Pollution Control Board (MPCB)	Yes
14.	Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 (Amended,2023)	Storage, handling, transportation, and disposal of hazardous waste	Storage and handling hazardous waste during construction	Maharashtra Pollution Control Board (MPCB)	Yes
15.	Solid Waste Management Rules, 2016	Management and handling of solid waste	For disposal of solid waste generated during construction	Maharashtra Pollution Control Board (MPCB)	Yes
16.	Construction and Demolition Waste Management Rules, 2016	Management of construction and demolition waste	For disposal of solid waste generated due to construction and demolition	Maharashtra Pollution Control Board (MPCB)	Yes
17.	Batteries (Management & Handling) Amendment Rules, 2023	Management and handling of used lead acid batteries	Safe disposal of used lead batteries through authorized waste recyclers	Maharashtra Pollution Control Board (MPCB)	Yes
18.	E-Waste (Management) Amendment Rules, 2023	Effective mechanism to regulate generation, collection, storage, transport, import, export, recycling, treatment and disposal of e-wastes	Handling of e-waste	Maharashtra Pollution Control Board (MPCB)	Yes
19.	Central Motor Vehicles Act, 1988	To control vehicular air and noise pollution	This rule will be applicable to road users and construction machinery	Maharashtra Pollution Control Board (PPCB)	Yes
20.	The Petroleum Act 1934, as amended in August 1976 Petroleum Rules 1976, as amended in March 2002.	Operation, Storage and transportation of Petroleum products	The rule is applicable as the transportation and distribution of compressed natural gas will take place	Ministry of Petroleum & Natural Gas	Yes
21.	Petroleum and Natural Gas Rules, 1959, amended 2009.	As states own the blocks found within their territory and are therefore	The rule is applicable as the distribution of natural gas will take place in Maharashtra	Ministry of Petroleum & Natural Gas	Yes

Sl. No.	Legal Instrument	Objective	Reason for Applicability	Authority	Applicable (Yes/No)
		responsible for awarding the licenses for onshore blocks,			
22.	The Petroleum and minerals pipeline (acquisition of right of user in land) act, 1962	Acquisition of the rights of user in land [for laying pipelines for the transport of petroleum and minerals and Provision of compensation in case of any damage, loss or injury is sustained by any person interested in the land under which the pipeline is proposed to be, or is being, or has been laid	The pipeline passes through industrial, residential and commercial areas.	Ministry of Petroleum & Natural Gas	Yes
23.	Petroleum and Natural Gas Regulatory Board Act, 2006	Regulation of refining, processing, storage, transportation, distribution, marketing and sale of petroleum, petroleum products and natural gas excluding production of crude oil and natural gas so as to protect the interests of consumers and entities engaged in specified activities	The project is proposed under this act and is bid out by PNGRB for an uninterrupted and adequate supply of petroleum, petroleum products and natural gas in all parts of the country.	PNGRB	Yes
24	NOC from Gram Panchayat	As per The Maharashtra Village Panchayats Act, 1959	The Maharashtra Village Panchayats Act, 1959	Village Sarpanch	Yes, and the permission letter from Gram Panchayat Poha village is enclosed in the **Annexure 9.**
25	The Maharashtra Underground Pipelines and Underground Ducts (Acquisition of Right of User in Land) Act, 2018	To provide the right for the use of the land for laying underground pipelines utilities	Governs legal access to land for underground utilities, including within RoW of State Highways and PMGSY roads.	Maharashtra Jeevan Pradhikaran	Yes **Annexure 10:** Permission Letter for Utility Crossing from Maharashtra Jeevan Pradhikaran Akola
26	NOC for State Highway- PWD e-Permission System (Administrative Framework)	To regulate and streamline permissions for utility services within RoW of PWD-managed roads.	The pipeline crosses SH-274 and SH-287	Maharashtra Public Works Department (PWD)	Yes The permission letter for the laying of pipe in the RoW of SH-274 and SH-287

Sl. No.	Legal Instrument	Objective	Reason for Applicability	Authority	Applicable (Yes/No)
					along with the permission of road crossing is enclosed in the **Annexure 3** to **Annexure 8**
27	PMGSY Operational Guidelines (for rural roads)	To ensure protection and maintenance of rural roads built under PMGSY.	The proposed pipeline route passes through the village road that falls under PMGSY near Poha Village (CGS start point)	Maharashtra Rural Road Development Authority	Yes Letter of Permission from the Maharashtra Rural Road Development Authority is enclosed in the **Annexure 11**

Environmental issues during pipeline laying & construction stage generally involve equity, safety, and public health issues. The construction agencies require complying with laws mentioned below as well:

- **Workmen's Compensation Act 1923** (the Act provides for compensation in case of injury by accident arising out of and during employment).
- **Payment of Gratuity Act, 1972** (gratuity is payable to an employee under the Act on satisfaction of certain conditions on separation if an employee has completed 5 years).
- **Employees PF and Miscellaneous Provision Act 1952** (the Act provides for monthly contributions by the employer plus workers).
- **Maternity Benefit Act, 1951** (the Act provides for leave and some other benefits to women employees in case of confinement or miscarriage, etc.).
- **Contact Labor (Regulation and Abolition) Act, 1970** (the Act provides for certain welfare measures to be provided by the contractor to contract labour).
- **Minimum Wages Act, 1948** (the employer is supposed to pay not less than the Minimum Wages fixed by appropriate Government as per provisions).
- **Payment of Wages Act, 1936** (it lays down as to by what date the wages are to be paid, when it will' be paid and what deductions can be made from the wages of the workers).
- **Equal Remuneration Act, 1979** (the Act provides for payment of equal wages for work of equal nature to Male and Female workers and not for making discrimination against Female employees).
- **Payment of Bonus Act, 1965** (the Act provides for payments of annual bonus subject to a minimum of 83.3% of wages and maximum of 20% of wages).
- **Industrial Disputes Act, 1947** (the Act lays down the machinery and procedure for resolution of industrial disputes, in what situations a strike or lock-out becomes illegal and what are the requirements for laying off or retrenching the employees or closing the establishment).
- **Industrial Employment (Standing Orders) Act; 1946** (the Act provides for laying down rules governing the conditions of employment).
- **Trade Unions Act, 1926** (the Act lays down the procedure for registration of trade unions of workers and employers. The trade unions registered under the Act have been given certain immunities from civil and criminal liabilities).
- **The Child Labour (Prohibition and Regulation) Amendment Act, 2016**: An Act further to amend the Child Labour (Prohibition and Regulation) Act, 1986. (The Act prohibits employment of children below 14 years of age in certain occupations and processes and provides for regulation of employment of children in all other occupations and processes. Employment of child labour is prohibited in Building and Construction Industry).
- **Inter-State Migrant Workmen's (Regulation of Employment and Conditions of Service) Act, 1979** (the inter-state migrant workers, in an establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, traveling expenses from home to the establishment and back, etc.).
- **The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 and the Cess Act of 1996** (all the establishments who carry on any building or

other construction work and employs 10 or more workers are covered under this Act; the employer of the establishment is required to provide safety measures at the building or construction work and other welfare measures, such as canteens, first-aid facilities, ambulance, housing accommodation for Workers near the workplace, etc.).

- **The Factories Act, 1948** (the Act lays down the procedure for approval of plans before setting up a factory, health and safety provisions, welfare provisions, working hours and rendering information-regarding accidents or dangerous occurrences to designated authorities).

3.5 PIPELINE DESIGN AND CODE

According to the PNGRB Notification 2008, the design, materials and equipment, welding, fabrication, installation, testing, operation and maintenance, and corrosion control of the CGD network shall comply with the requirements of ASME B31.8, except where such requirements are specifically cancelled, replaced, or modified by the regulations specified in this notification.

It is intended to apply these regulations to all new and such aspects of already existing networks as design, fabrication, installation, testing at the time of construction and commissioning. However, if an Adani has laid, built, constructed, or expanded the CGD infrastructure based on some other standard or is not meeting the standards specified in these regulations, then it needs to carry out a detailed technical audit of its infrastructure through a Board authorized or approved third party agency by the Board. Adani thereafter shall submit the recommendations made by the third party along-with its time-based mitigation plan and implementation schedule to the Board for authorization within six months from the date of notification of these regulations.

Technical standards and specifications mentioned in PNGRB notification, 2008 including safety standards (hereinafter referred to as standards) for city or local natural gas distribution networks are as specified in Schedule–I which cover material and equipment (Schedule–1A), welding (Schedule–1B), piping system components and fabrication (Schedule– 1C), design, installation and testing (Schedule–1D), operating and maintenance procedures (Schedule–1E), corrosion control (Schedule–1F) and miscellaneous (Schedule–1G).

Table 3-5: Applicable Standards and Codes

Sl. No.	Code No.	Description
1.	ASME B31.8	Gas Transmission and Distribution Piping Systems
2.	ASME B16.5	Specification for Pipe flanges and flanged fittings
3.	ASME B16.9	Specification for Factory made Wrought Steel Butt welding fittings
4.	ASME B16.11	Specification for Forged Fittings, Socket – Welding and Threaded
5.	ASME B16.34	Pressure and temperature ratings for forgings, castings, plate, bar, and tubular products
6.	API 5L	Specification for Line Pipe
7.	API 6D	Specification for Pipeline Valve
8.	API RP 1102	Steel Pipelines Crossing Railroads & Highways
9.	API 1104	Welding of Pipelines and Related Facilities
10.	API RP 2201	Procedures for Welding or Hot. Tapping on Equipment in Service
11.	ASTM A106	Specification for Seamless Carbon Steel Pipe for High- Temperature Service

Sl. No.	Code No.	Description
12.	ASTM A234	Specification for Piping Fittings of Wrought Carbon steel and alloy steel for moderate and High Temp. service
	AS/NZS 2885.5	Pipelines – Gas and liquid petroleum – Field Pressure Testing
13.	ANSI 16.20	Ring-joint Gaskets & Grooves for Steel Pipe Flanges
14.	T4S	Technical Standards and Specifications Including Safety Standards for City or Local Natural Gas Distribution Networks
15.	INFRA/IMP/CGD/1/2013	Integrity Management System for City or Local Natural Gas Distribution Network
16.	G.S.R. 478(E)	Determining capacity of Petroleum, Petroleum products and Natural Gas Pipeline
17.	Codes	Details
18.	G.S.R 720(E)	Code of Practice for Quality-of-Service City or Local Natural Gas Distribution Networks
19.	G.S.R 196(E)	Authorizing Entities to Lay, Build, Operate or Expand City or Local Natural Gas Distribution Networks
20.	OISD 141	Design and Construction Requirements for Cross- Country Hydrocarbon Pipeline
21.	DIN 30671	Thermoset Plastic Coating for Buried Steel Pipes
22.	DIN 30672	Tape and Shrinkable Materials for the Corrosion Protection of buried or Underwater Pipelines without Cathodic Protection for Use at Operating Temperatures Up to 500 ^{o}C
23.	DIN 30673	Bitumen Coatings and Linings for Steel Pipes, Fittings and Vessel
24.	DIN 30675-1	External Corrosion Protection of Buried Pipes & Range of Applications for Steel Pipes
25.	DIN 30677	Protection of Buried Valves Against Corrosion Coating (External) with Duroplastics
26.	DIN 30670	Polyethylene Coating on Steel Pipes and Fittings
27.	EN 12062	Non-Destructive Examinations of Welds-General Rules of Metallic Materials
28.	EN 10285	Steel tubes and fittings for on shore and offshore pipelines- external three-layer extruded polyethylene-based coating
29.	EN 12068	Cathodic Protection – External Organic Coatings for the Corrosion Protection of Buried or Immersed Steel Pipelines Used in Conjunction with Cathodic Protection of Steel Structures
30.	IS 8062	Code of Practice for Cathodic Protection of Steel Structures
31.	IS 12944-5	Paints and Varnishes – Corrosion Protection of Steel Structures by Protective Paint System
32.	ISO 8502-3	Preparation of Steel Substrates before Application of Paints and Related Products – Tests for the Assessment of Surface Cleanliness
33.	ISO 9305	Seamless Steel Tubes for Pressure Purpose Full Peripheral Ultrasonic Testing for the Detection of Transverse Imperfections
34.	ISO 10124	Seamless 7 Welded (Except Submerged Arc Welded) Steel Tubes for Pressure Purposes. Ultrasonic Testing for the Detection of Laminar Imperfections
35.	ISO 12094	Welded Steel Tubes for Pressure Purpose. Ultrasonic Testing for the Detection of Laminar Imperfections in Strips / Plates used in Manufacture of Welded Tubes
36.	ISO 15741	Paints and Varnishes – Friction-Reduction coatings for the interior of on- and offshore steel pipelines for non- corrosive gases
37.	ISO 15590-1	Petroleum and natural gas industries-induction bends, fittings and flanges for pipeline transportation system- part:1 induction bends

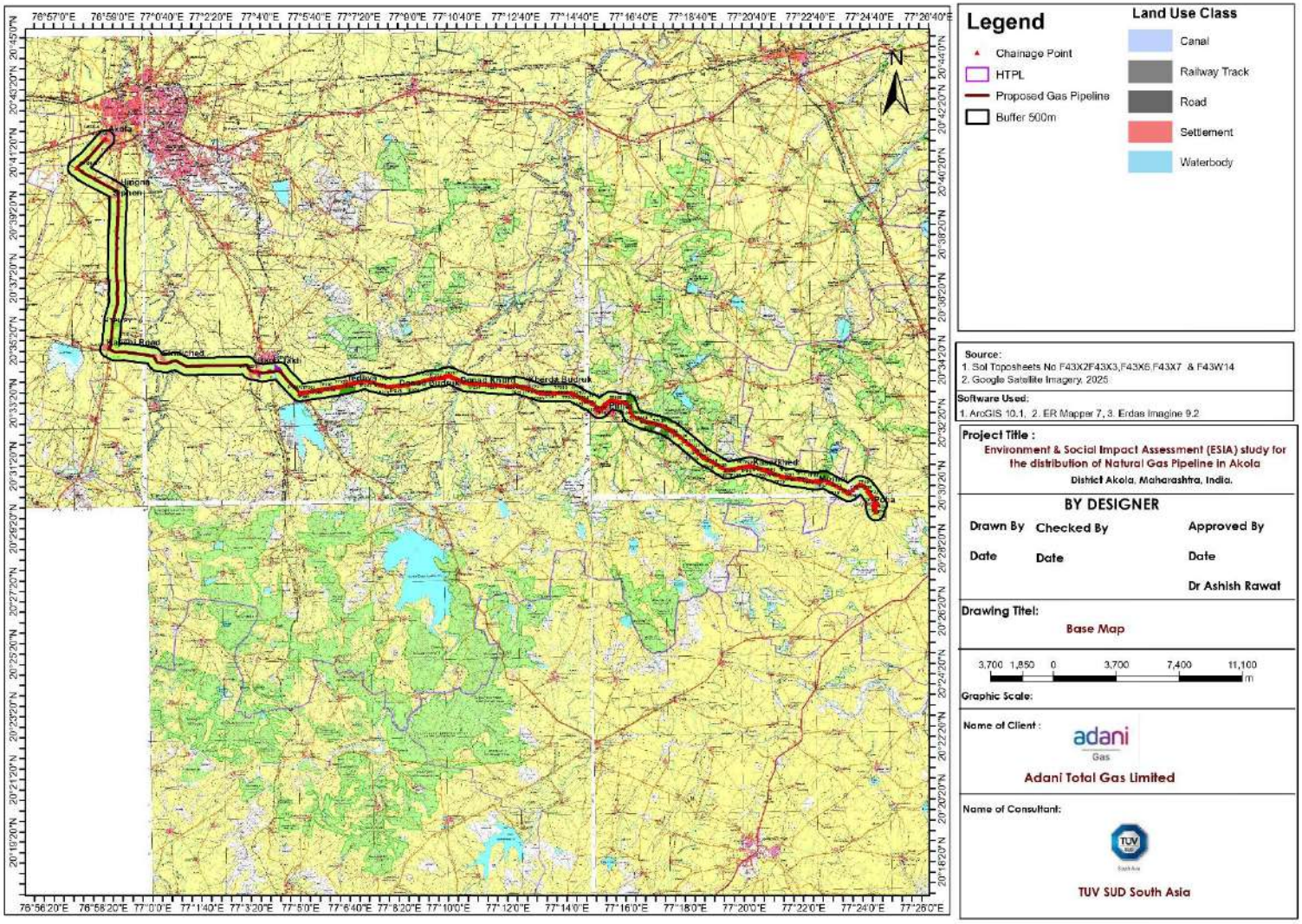
Sl. No.	Code No.	Description
38.	ISO 21809-3	Petroleum and Natural gas industries-external coatings for buried or submerged pipelines used in pipeline transportation system
39.	MSS-SP-44	Steel Pipeline Flanges
40.	MSS-SP-25	Standard Marking System for Valves
41.	MSS SP75	Specification for High Test, Wrought, Butt Welding Fittings
42.	G.S.R 198€	Exclusivity for City or Local Natural Gas Distribution Network
43.	OISD 105	Work Permit for Testing & Commissioning
	OISD 141	Design and construction requirements for cross-country hydrocarbon pipeline–" - latest edition.
44.	OISD 226	Natural Gas Transmission Pipeline & City gas Distribution
45.	OISD 179	Safety Requirements on Compression, Storage, Handling & Refueling of Natural Gas (CNG).
46.	PNGRB T4S	Technical Standards & Specifications including Safety Standards" for City or Local Natural Gas Distribution Network

4 ENVIRONMENTAL DESCRIPTION

Baseline data generation forms an integral part of the ESIA study and helps to evaluate the predicted impacts on the various environmental and social attributes in the study area by using scientifically developed and widely accepted environmental and social impact assessment methodologies.

4.1 STUDY AREA

The study area comprises “Project Footprint Area” (area to be physically impacted by the project activities across all phases) and “Area of Influence (up to 500 m)” and the “buffer zone” (5 km) as depicted in **Figure 4-1**. While the primary field investigations for the physical and biological and socio-economic environment have been collected from Project Footprint area and Area of influence. The Environmental baseline survey and study for the project has been carried out from **15th July to 20th July 2025**.



**Source: TUVSUD GIS Mapping*

Figure 4-1: Project Study Area superimposed on Toposheet

4.2 PROJECT FOOTPRINT AREA

The Project Footprint Area refers to the geographical extent that will be directly or indirectly affected by the physical activities associated with the project throughout its lifecycle—covering construction, operation, and decommissioning phases. For the City Gas Distribution (CGD) of Natural Gas Pipeline project in Akola Geographical Area (GA), the project footprint encompasses the entire stretch of the proposed Natural Gas (NG) pipeline, which spans approximately 65.5 kilometers. This pipeline will be laid in a continuous alignment starting from the proposed City Gate Station (CGS) at Poha Village located in Washim District and extending to the PMGSY road in Akola, within Akola district, (around 3.837 km of stretch passes through Washim District whereas, the rest of 61.663 falls within Akola District) of Maharashtra. The footprint includes the Right of Way (RoW) corridor required for pipeline installation, temporary construction zones, access roads, material storage yards, and any associated infrastructure. The area has been selected considering technical feasibility, environmental sensitivity, and minimal disruption to local communities and ecosystems.

4.3 AREA OF INFLUENCE (AOI)

Baseline monitoring for Environmental Impact Assessment study has been designed with primary data collection followed by secondary data review for establishing and interrelating the baseline condition of the project area. To collect data for baseline study, the 'Area of Influence' (AoI) has been defined as the area in which a direct or indirect impact on the physical, biological, social, or cultural environment might occur, and it has been considered as 500 m to the maximum buffer up to 05 km surrounding the project footprint area. For the detailed analysis of the current baseline of the project, the following areas of influence have been defined in **Table 4-1.**

Table 4-1: Detailed Area of Influence (AOI) considered for Different Attributes

Sl. No.	Environmental & Social issues	Area of Influence (AoI)	Justification
Physical Environment			
1.	Ambient Air Quality	Immediate vicinity of the project foot-print area	Dust Emissions, Fugitive dust etc. is typically observed within 100-200 meters from the Construction/operation areas. AoI minimum of 500 m to maximum 1.00 km has been taken to capture all sources of emissions including vehicular movement in surrounding and across access road.
2.	Noise Pollution	500 m	Primary Noise effect from a noisy source can often be detected up-to 400-500 m from any operation. However, keeping in view, an AoI of 500 m has been considered from noise pollution from all sources including vehicular movement.
3.	Surface Water	Surface Water Bodies (within 05 km of the project foot-print area)	The entire project area of influence has been considered for Surface Water Sampling. Surface water samples were collected from multiple surface water sources, which are coming within AoI (500-05 km) aerial distance from project foot-print areas.
4.	Ground Water condition	5.00 Km	Ground water quality of the project study area has been assessed in project influence area, close to the proposed construction activity sites and habitation areas.
5.	Land Environment	500 m	An area of 500 m has been considered around the project footprint area and near to habitation areas to predict the indirect effects usually occur due to accidental release of

Sl. No.	Environmental & Social issues	Area of Influence (AoI)	Justification
			hazardous waste, vehicular/heavy machinery movement and activities at allied sites.
Biology and Environment			
1.	Terrestrial Ecology	500 m- 05 km	Area of Influence has been considered as 500 m AOI & 05 km buffer around the project footprint area to identify the biodiversity of the area and its impacts due to the project.
Socio-economic Environment			
2.	Socio-economic conditions	05.00 km	An AoI of 05.00 Km radius is considered for the socio-economic consultations to determine perceived impacts due to the project including employment opportunity and increased anthropogenic/vehicular activities in remote areas.

4.4 METHODLOGY FOR ENVIRONMENTAL AND SOCIAL BASELINE SURVEY

Environmental & Social study includes the study of various baseline environmental aspects covering Physical, Biological and Socio-Economic parameters. Integration of these parameters gives an overall perception of positive and negative impacts due to construction of underground NG pipelines within the port area.

Initially after primary desktop assessment of the project, detailed project reports and site details were collected from Adani Total Gas Limited. A team comprising of Social, ecological, and environmental Experts from **TÜV SÜD** visited the site on **10th July 2025** to collect the primary baseline data of drainage, land-use, topographic, ecological condition of the site and collect data on socio-economic scenario of the project study area. Baseline monitoring plan has been finalized and subsequently, in accordance with the baseline monitoring plan, secondary baseline environmental monitoring is conducted from 15th to 20th July 2025 in accordance with the Terms of Reference and Guidelines of MoEF&CC & CPCB.

Apart from the baseline environmental monitoring for Ambient Air, Noise, Soil, Water (Groundwater & Surface water) various other attributes such as aquatic and terrestrial avifaunal habitat & biodiversity, socio-economic status, geology, hydrology, and land-use pattern etc. of the study area was also studied and data has been collected from primary and authenticated secondary sources.

Table 4-2: Secondary Data Sources for Baseline Study

Data	Source
Long term Climatological Data	India Meteorological Dept. (IMD), Govt. of India and data from other Remote climate monitoring stations
Toposheets	Survey of India (SOI), Dehradun
Soil Maps	NBCC Nagpur
Satellite Data	NRSA, Google Earth, etc.
Forest Characteristics, Forest Types & Resources	Forest Survey of India (FSI)
Details of Flora, Fauna & Wildlife Habitats	From various publicly available research papers, journals, and manuscripts
Land Record and Demography Status	State Revenue Dept., District Statistical Handbook & Census of India, etc.
Drainage Pattern	Water Resource Dept., NASA SRTM data
Hydro-geology Status	District Ground Water Report, Central Ground Water Board (CGWB)
Technical Data	Details provided by **ATGL**

Prior to the site visit, the following relevant and available documents related to the underground NG pipeline project at Akola and adjacent villages in Akola District and Washim District, have been collected from **ATGL**:

- Project Location Maps & KML
- Project specifications and technical details of the project – Detailed Engineering Report

Secondary environment baseline monitoring and data collection was undertaken as per process tabulated below in **Table 4-3.**

Table 4-3: Environmental and Social Attributes studied

Sl. No.	Attributes	Parameters	Source & Frequency
1.	Ambient Air Quality	SO_2, NO_2, PM_{10}, $PM_{2.5}$, CO	Twice a week for 1 month
2.	Ambient Noise quality	Noise level in dB(A)	Daytime and night-time sampling for single day for all locations
3.	Soil condition and its quality	Physical and chemical parameters	Composite sampling in all locations
4.	Ground water quality	Physical, chemical, biological parameters as per IS 10500:2012	Single sampling (mainly from Bore well/tube well)
5.	Surface water quality	Physical, chemical, biological parameters of different surface water stream/body within the project study area.	Single Sampling from surface water bodies.
6.	Socio-economic aspects	Socio-economic, demographic, livelihood characteristics	Secondary sources data like primary census abstracts of Census of India 2011.
7.	Hydrology & Drainage	Drainage area and pattern, nature of streams, aquifer characteristics,	Based on primary site visit and data collected from secondary sources.
8.	Ecology	Floral and faunal distribution, Terrestrial and water birds citing, identification of any migratory corridor within the project study area	From different places within study area

4.5 SECONDARY DATA COLLECTION

The environmental monitoring stations were selected for ambient Air Quality, Ambient Noise Quality, Surface Water Quality, Ground Water Quality, and Soil Quality. A NABL accredited & MoEF&CC approved laboratory is selected for conducting secondary environment baseline monitoring at project study area, under supervision of **TÜV SÜD** representative. In accordance with the Scope of Work, the baseline environmental monitoring is carried out in the project footprint and study area during **15th to 20th July 2024**.

4.6 PHYSICAL ENVIRONMENT

The study related to physical environment was conducted through site visits and review of the data from secondary sources such as Census of India, District Statistical Handbook, State of the Forests Report, Central Groundwater Development Board Report, District Revenue Office, and other published peer information in respect of the topographical and physiographical features, regional and the local geology of the project area, climatology, and seismicity.

Soil characteristics were established through physio-chemical tests of the soil samples revalidated though the published literature while land use and land cover; slope of the study area were established through remote sensing by using GIS tools. Prior the initiating the baseline survey, monitoring design was prepared in coordination with **TÜV SÜD** Environmental Experts and the same was fine-tuned during site survey prior to the baseline monitoring.

The components of physio-chemical environment discussed in this section include:

1. Physiography & Topography
2. Geology
3. Geomorphology and Drainage
4. Land-Use & Land Cover
5. Soil Quality
6. Seismicity & Natural Hazards
7. Climate & Meteorology
8. Ambient Air Quality
9. Ambient Noise Levels
10. Ground Water Quality
11. Surface Water Quality

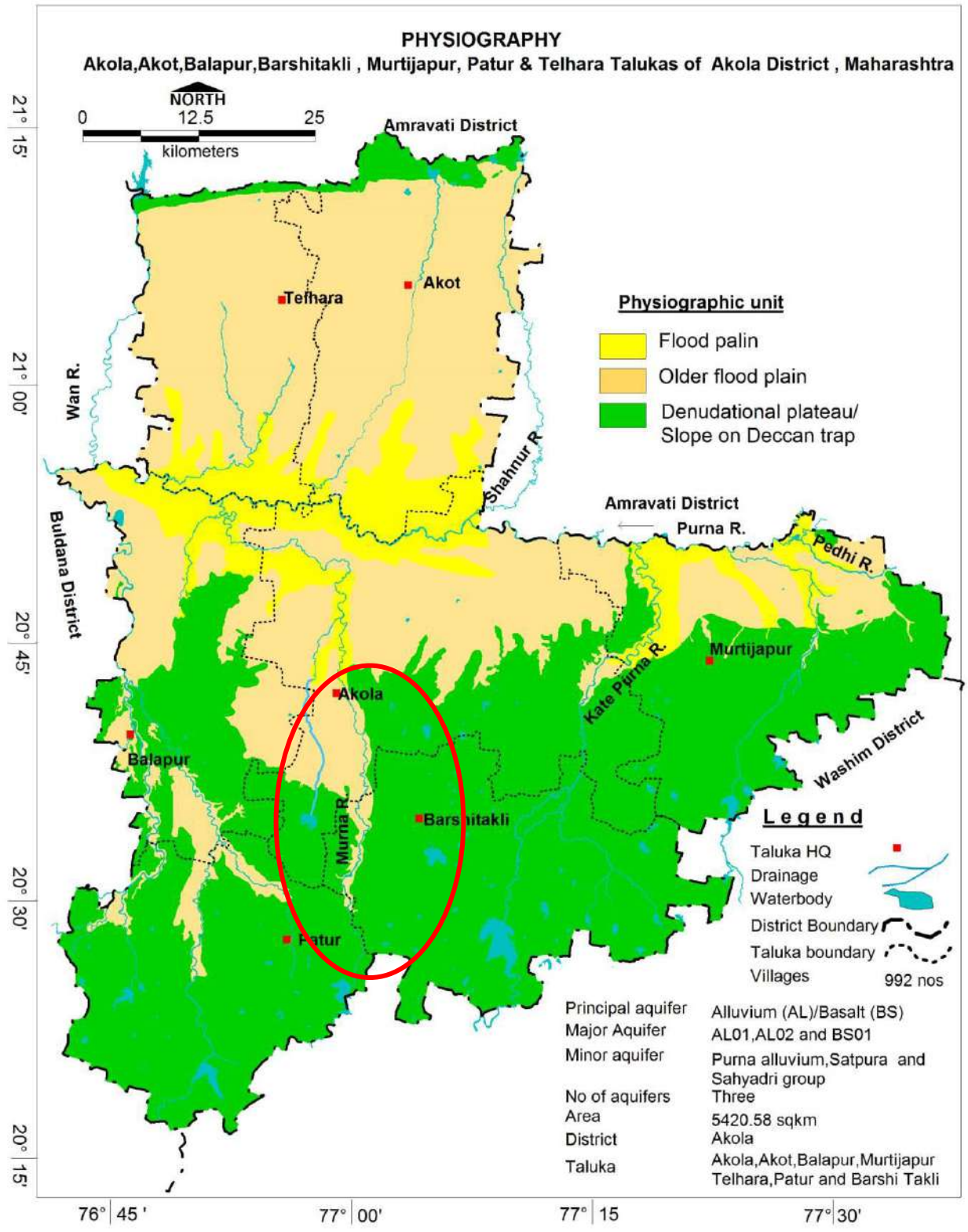
4.6.1 Physiography and Topography

Akola district is one of the eleven districts that make up the Vidarbha region in the state of Maharashtra. Located in the northern part of the state, it shares its border with Madhya Pradesh and lies between latitudes 20°16' to 21°17' North and longitudes 76°38' to 77°38' East. Covering a total area of 5,420 square kilometers (as shown in Physiographic and drainage map of Akola in **Figure 4-2**), the district spans parts of the Survey of India's degree sheets 55 C, 55 D, 55 G, and 55 H. It is bordered by Madhya Pradesh to the north, Amravati district to the east, Buldhana district to the west, and Washim district to the south and southeast.

The district headquarters is located at Akola Town. For administrative convenience, the district is divided into 7 blocks viz., Akola, Barshi Takli, Murtijapur, Akot, Telhara, Balapur and Patur. It has a total population of 18, 13,906 as per 2011 census. The district has 7 towns/blocks and 1009 villages. A major part of the district comes under Purna-Tapi basin. Purna is the main river flowing through the district. The Contour Map of project AOI is shown in the **Figure 4-3**.

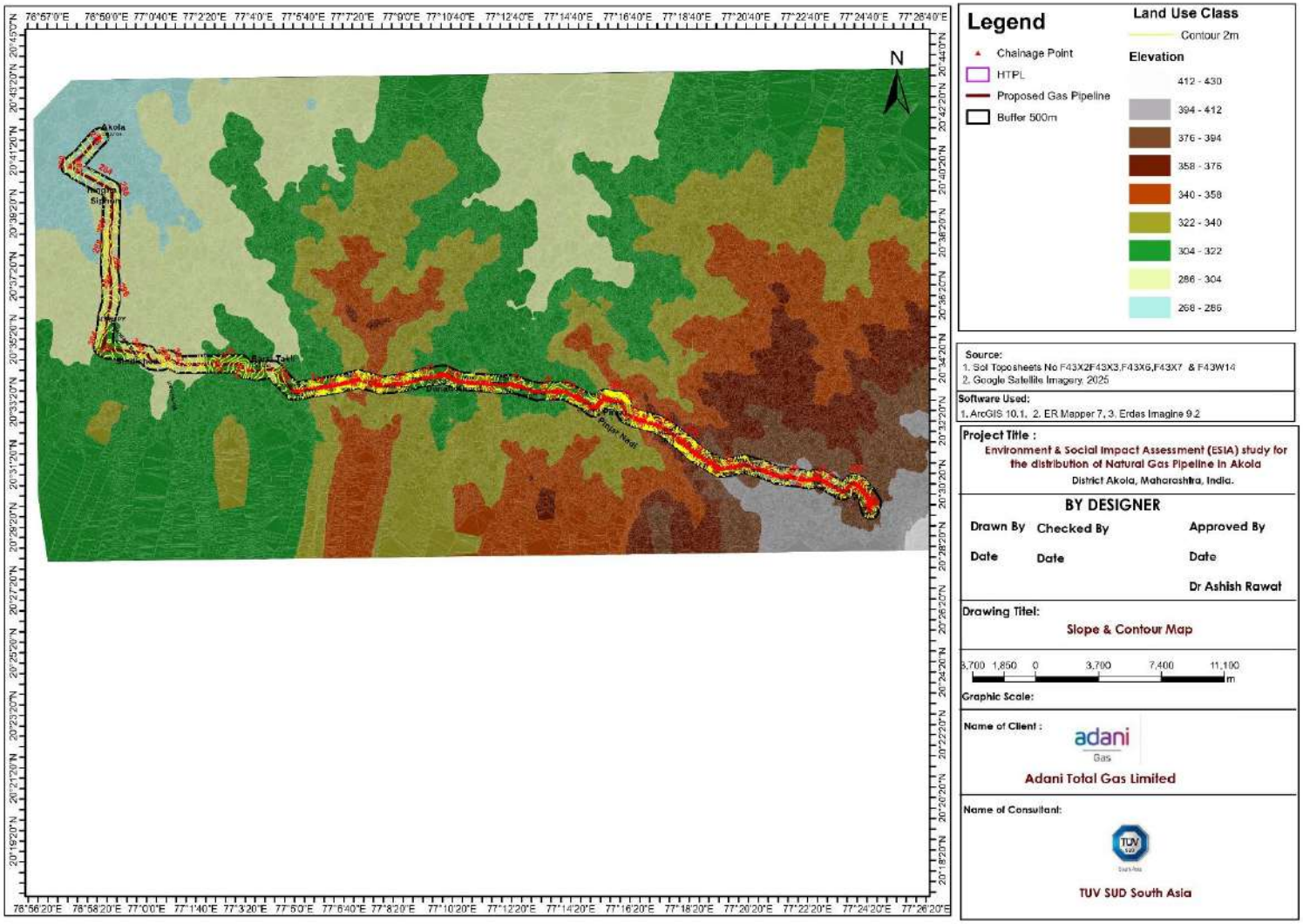
The northern fringe of the district is hilly and forms part of Satpura Range. South of these hill ranges, covering almost the entire north-central part constitutes the alluvial plain. The Purna River has formed a fertile basin covering four blocks of district viz., Akola, Akot, Balapur and Murtijapur blocks and also known as "PAYANGHAT". The southern part of the district is characterized by hilly rugged terrain as a part of Deccan Plateau. Purna is the main river flowing through the district. The river Purna originates in Satpura hills in Betul district of Madhya Pradesh. Other important rivers are Man, Uma, Pedhi, Aas, Shahnur, Van, Morna, Nirguna and Katepurna

Washim district is located in the western region of Vidarbha (20.1390° N, 77.1025° E). Akola lies to its north, Amravati lies to its north-east, Hingoli lies to its south, Buldhana lies to its west, Yavatmal lies to its east. River Penganga is the main river of the district.



(Source: Aquifer Map and Management Plan- Akola District)

Figure 4-2: Physiography and Drainage Map of Akola District (Black Circle: Project AOI)



**Source: TUV SUD GIS Mapping Study*

Figure 4-3: Terrain and Contour Map of Project AOI

4.6.2 Geology

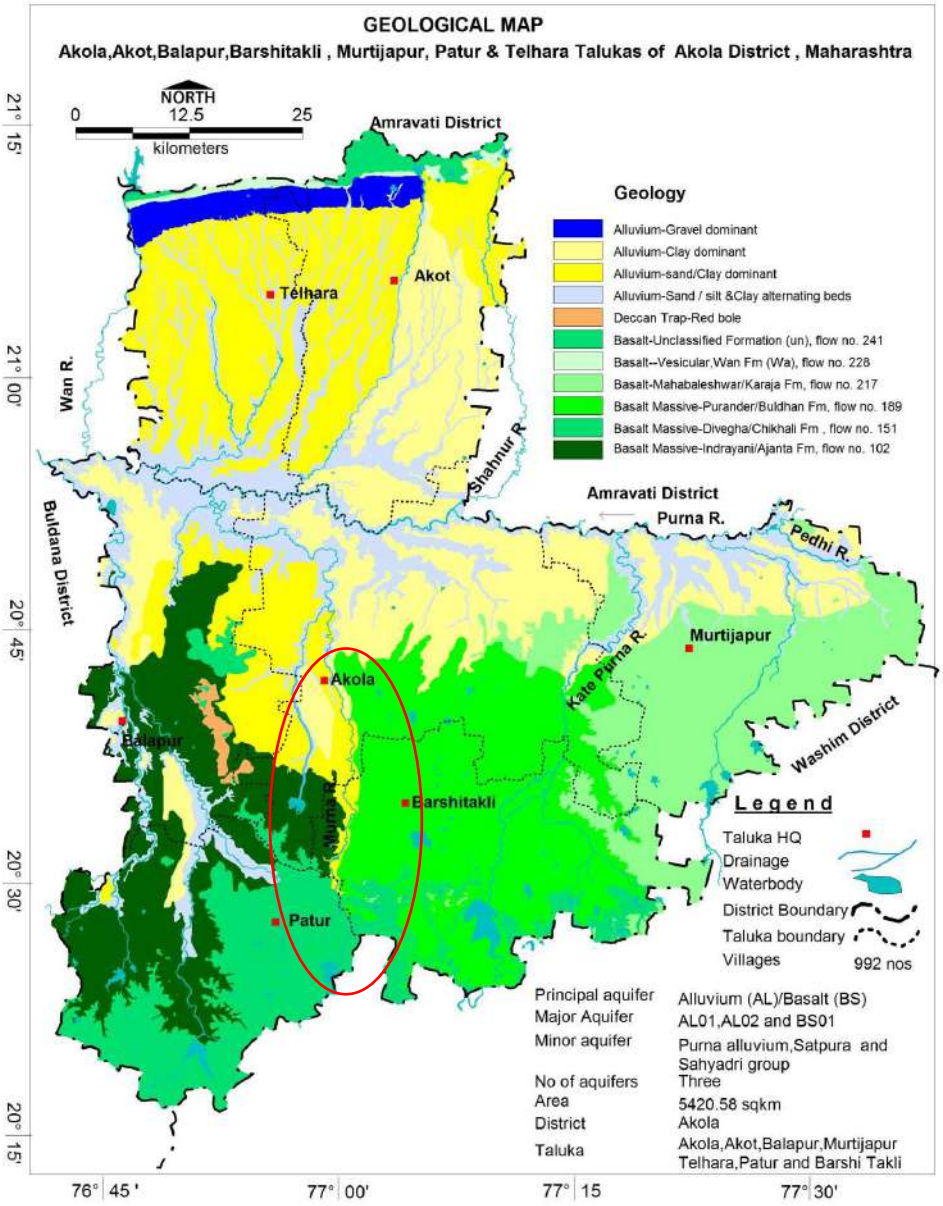
Geologically, the Akola District' area is divided into two parts, i.e., Alluvium and Deccan Trap Basalt formations. The generalized geological sequence occurring in the area is given in **Table 4-4** and the geological map with basaltic flows is shown in **Figure 4-4.**

Geologically, the Washim District' area is occupied by Recent River Alluvium and Basaltic lava flows known as Deccan Traps belonging to Cretaceous to Eocene (68-62 m.y.), with patches of inter-trappean beds.

Table 4-4: Generalized Geological Sequence of the Akola District

Geologic Period	Stratigraphic unit	Lithology
Akola District		
Recent to Sub-Recent	River Alluvium	Clay, Silt, Sand, Gravel, Kanker
Eocene to Upper Cretaceous	Deccan traps	Basalt hard, massive, vesicular, amygdaloidal varieties with Intertrappean.
Washim District		
Recent-Quaternary	Alluvium	Sand, silt and Gravel
Eocene-Upper Cretaceous	Deccan trap Volcanic lava flows with inter-trappean beds.	Basalt

**Source: Aquifer Map and Management Plan- Akola and Washim District*



**Source: Aquifer Map and Ground Water Management Plan of Akola District*

Figure 4-4: Geological Map of Akola District

As per the **Figure 4-4** the geology of the study area is predominantly characterized by **Alluvial Clay/sand**.

4.6.3 Geomorphology and Drainage

4.6.3.1 Geomorphology

Geomorphologically the Akola district is divided into two types of landforms

Purna Alluvium:

Alluvium, belonging to the Quaternary period forms the most prominent Aquifer in the north central part of the district and consists of boulders, Cobbles, Pebbles, Gravels, sand, silt, clay and Kankar. The clast size decreases from north to south towards Purna river; Graveliferous alluvium occupies the foothills of Satpura hills and with progressive decrease in dominant clast size, the sandy alluvium occupies the central

part of the district and further toward south Alluvium gets rich in clay content. The Purna alluvium attains a thickness of about 421 m as deciphered in the exploratory wells of CGWB. Alluvium is thickest in the north of the district near Akot town and decreases towards the south. Alluvium can be divided into younger and older alluvium. The younger Alluvium is about 70-80 m thick and includes mostly sub angular to sub rounded basaltic gravel and sand; and forms the productive Zone. On the other hand, the older alluvium is more than 250 m thick, consisting of mainly clay.

Deccan Trap Basalt:

The northern and southern parts of the district are occupied by Deccan trap basaltic lava flows of upper Cretaceous to lower Eocene age. The Deccan lava sequence is grouped under Satpura group in the northern part whereas in southern part it is grouped under Sahyadri Group. The Satpura comprises of three formations viz, the uppermost Bargonda formation followed by Indore formation and lower most Kalisindhi Formation. The basaltic flows belonging to Sahyadri Group occupying southern part of the district are classifiedunder Ajanta, Chikli, Buldhana and Karanja formations. Each individual lava flow consists of lower massive part becoming vesicular /amygdaloidal towards top, ranges in their individual thickness from a few centimeters to tens of meters. The flows have wide variation in colour and texture especially when they are amygdaloidal in nature with secondary mineral infillings such as Zeolites, calcite, and Agate and Chalcedony etc. The red /green/black bole beds constituting the marker horizons separating the two flows were discontinuous and generally inconsistent.

The geomorphic unit of the Akola block is Alluvial Plains of Purna River (younger and older Alluvium) and Plateau (Undissected to highly Dissected) with weathered thickness ranging from 0 to 1 m.

The geomorphological unit of the Washim District is Plateau, weathered (shallow) slightly dissected; Butte at some places (central and North-eastern part of the block).

4.6.3.2 Drainage

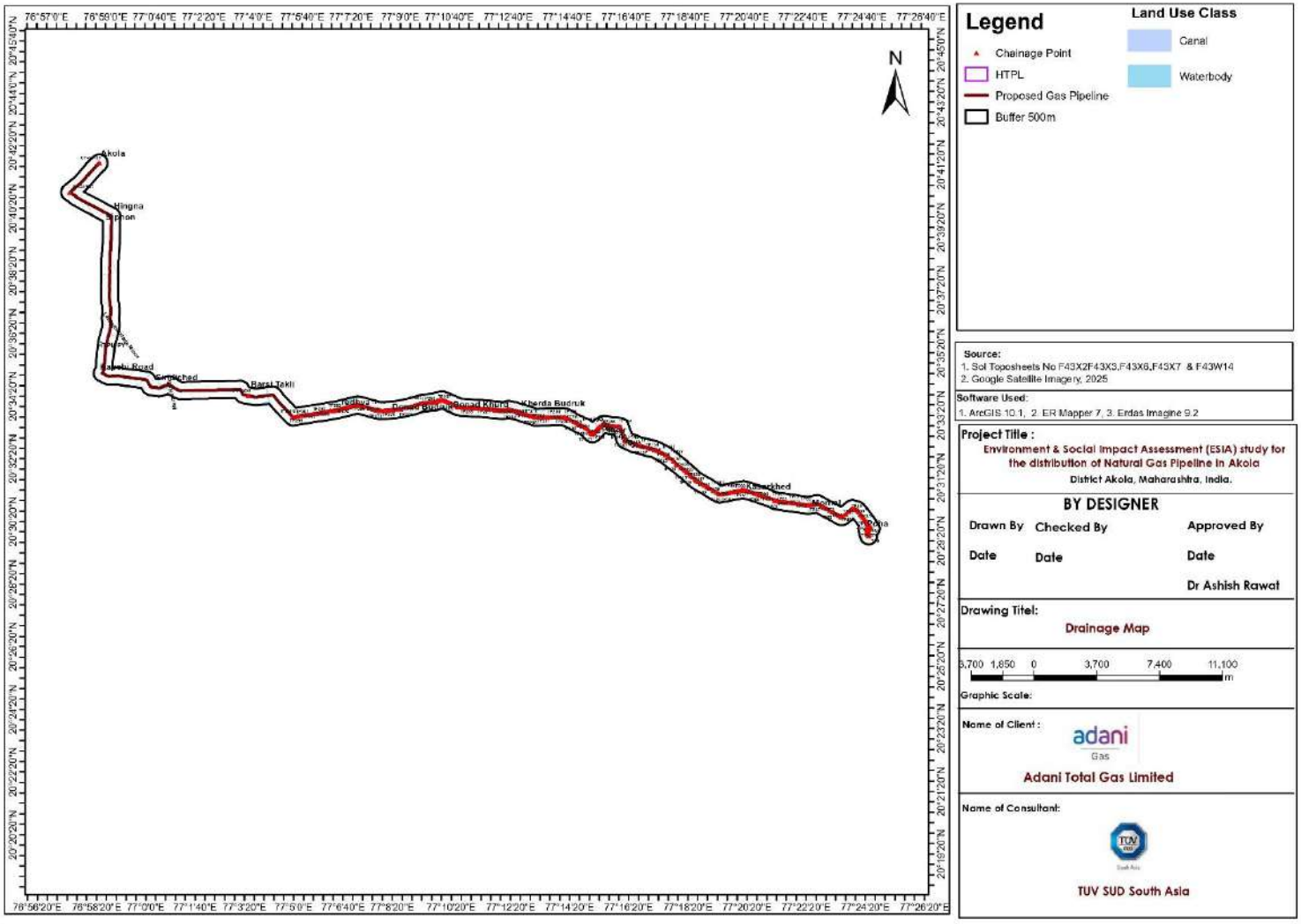
The drainage system of the district as depicted in **Figure 4-2**, it is drained by Purna River and its tributaries namely Katepurna, Morna, Nirguna, Uma, Mun, Shahnur, Pedhi, and Wan. The drainage of the Washim district is such that Aran River flows in the south of the block and its tributaries

The project study area has the following drainage patterns/river systems as mentioned as per chainage wise river crossing in **Table 4-5**:

Table 4-5: Details of Waterbodies in Project Study Area

S. No.	Pipeline	Type of Water Body Crossing			Centre Chainage (in m)
		River	Canal	Drain	
1	Stretch-01 (Part-1); Proposed CGS at GAIL IP-5 (POHA) to Barsi Takli (38.3 km)	Uma River	-	-	2279.92
2		Pinjar River	-	-	19474.82
3		Koyad River	-	-	28028.37
4		Kate Purna River	-	-	29435.59
5		Indrupa River	-	-	40343.96
6		Indrupa River	-	-	49037.44
7		-	Unlined Canal	-	38023.26
8		-	-	20 Nos	-
9		Vidrupa River	-	-	2/064.88

S. No.	Pipeline	Type of Water Body Crossing			Centre Chainage (in m)
		River	Canal	Drain	
10	Stretch 01 (Part-2); Barsi Takli to end of PMSGY Road (27.2 km)	Morna River	-	-	8/568.86
11		-	7 Nos	-	-
12		-	-	33 Nos.	-



Source: TUV SUD GIS Mapping Study

Figure 4-5: Drainage Map of Project Study Area

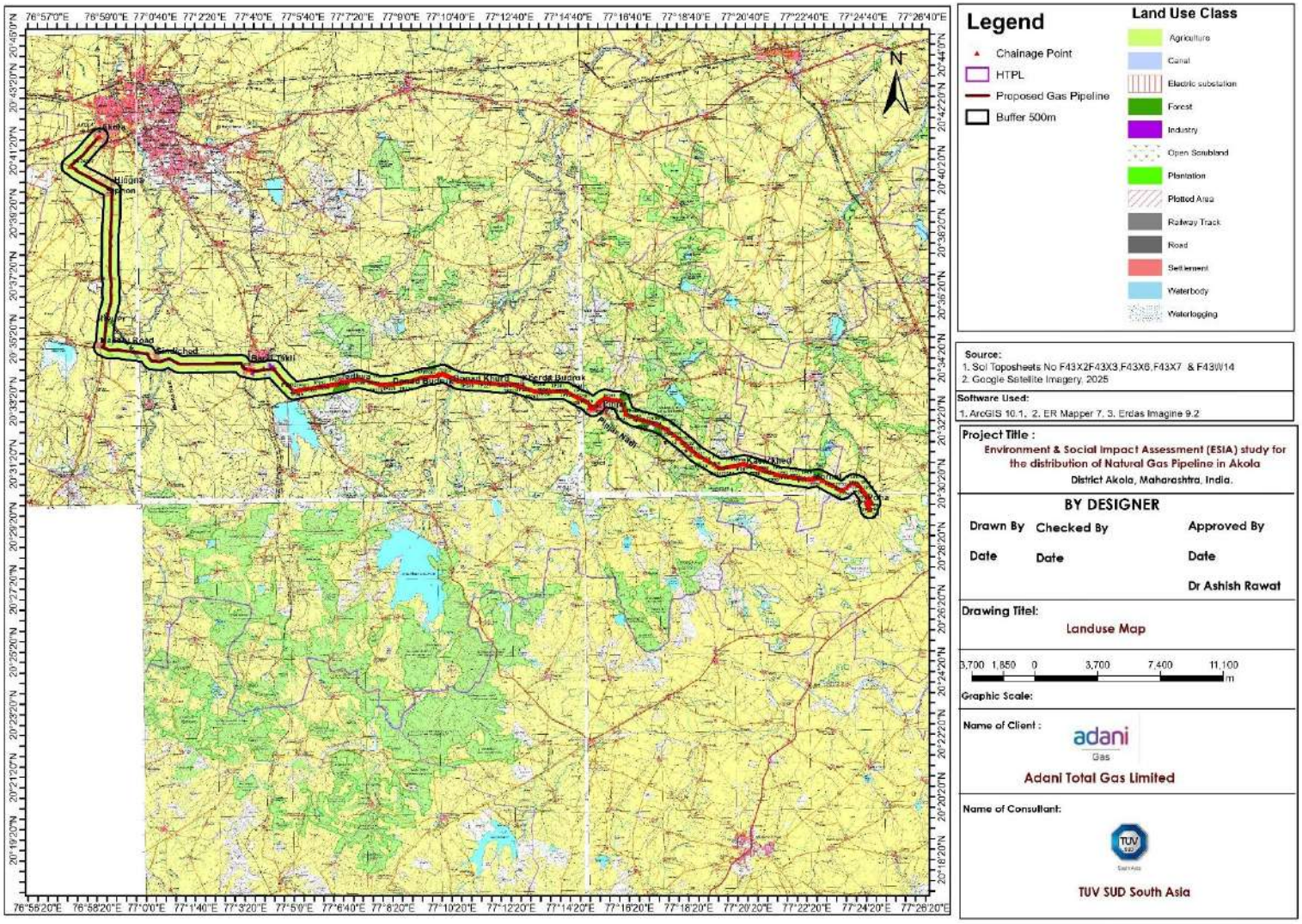
4.6.4 Land use and Land Cover

The total geographical area of the district is 5420 sq.km. The study area comprises diverse land use categories, including agriculture, industry, open Scrubland, and settlements. The largest land use category is Agriculture, covering 54.398 sq.km (83.087%), followed by Settlement at 2.715 sq.km (4.146%). Other significant land uses include forest 2.236 sq.km (3.416%) and roads 1.585 sq.km (2.421%). The detailed land-use breakup of the study area is given in **Table 4-6** and Land Use map of study area is depicted in **Figure 4-6** as follows:

Table 4-6: Land use Details of Project Study Area

Sl. No.	Land Use	Area in Sq. Km	Area in %
1	Agriculture	54.398	83.087
2	Canal	0.098	0.150
3	Electric substation	0.011	0.017
4	Forest	2.236	3.416
5	Industry	0.284	0.434
6	Open Scrubland	0.969	1.480
7	Plantation	0.241	0.369
8	Plotted Area	0.655	1.001
9	Railway Line	0.010	0.015
10	Road	1.585	2.421
11	Settlement	2.715	4.146
12	Solar Power Plant	0.048	0.073
13	Waterbody	2.220	3.391
14	Waterlogging	0.101	0.154
Study Area		**65.472**	**100**

**Source: TUV SUD Land Use Study*



Source: TUV SUD GIS Mapping Study

Figure 4-6: Land Use Map of Project Study Area

4.6.5 Soil Quality

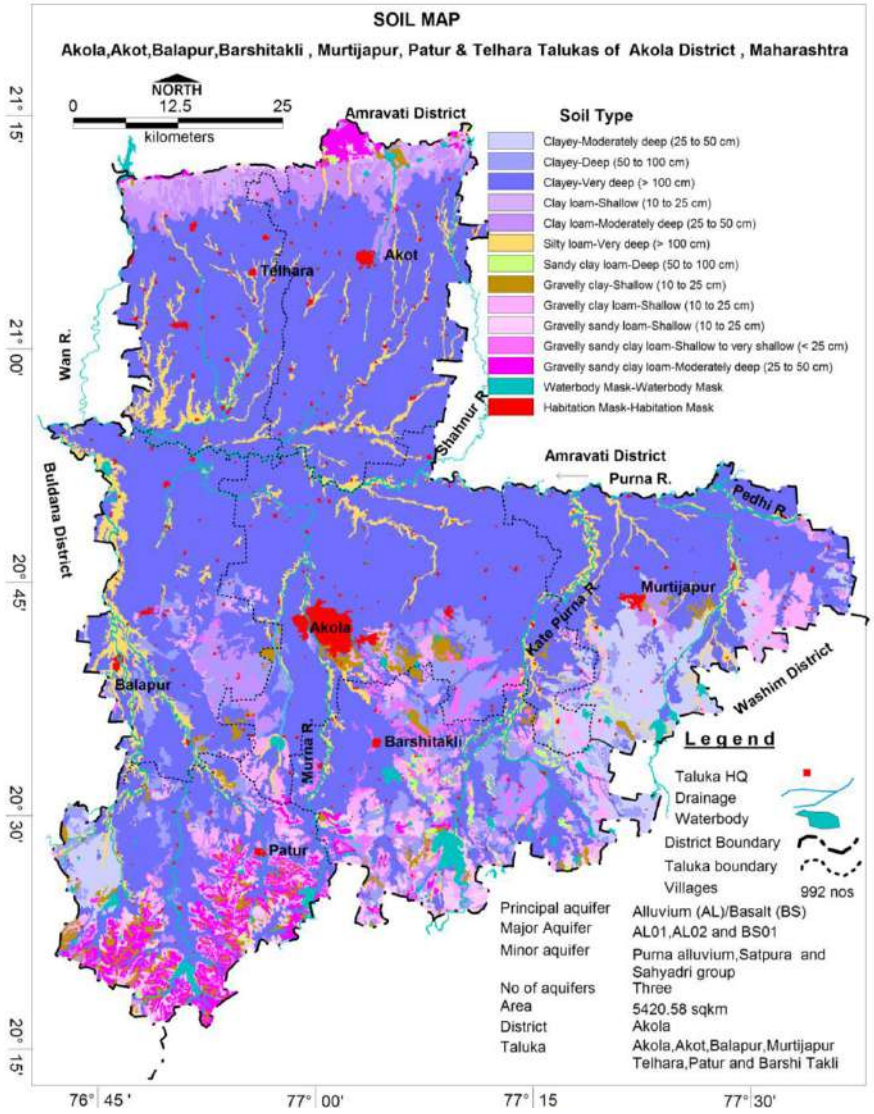
The soil in the Akola District is derived from the Deccan basalt formation. Two types of soil; medium black soil occurring in central part are rich in clay content and deep black soil occur in northern and southern parts of the district. Along the major river/tributaries silty loam soil (>100 cm) is observed. The thematic map of soil distribution in the district is shown in **Figure 4-7**.

The soil samples were analyzed for various physical and chemical parameters of soil. The soil quality monitoring locations are provided in **Table 4-7** and **Figure 4-8.** The result of soil quality monitoring is provided in the **Table 4-8.**

Table 4-7: Soil Quality Monitoring Locations

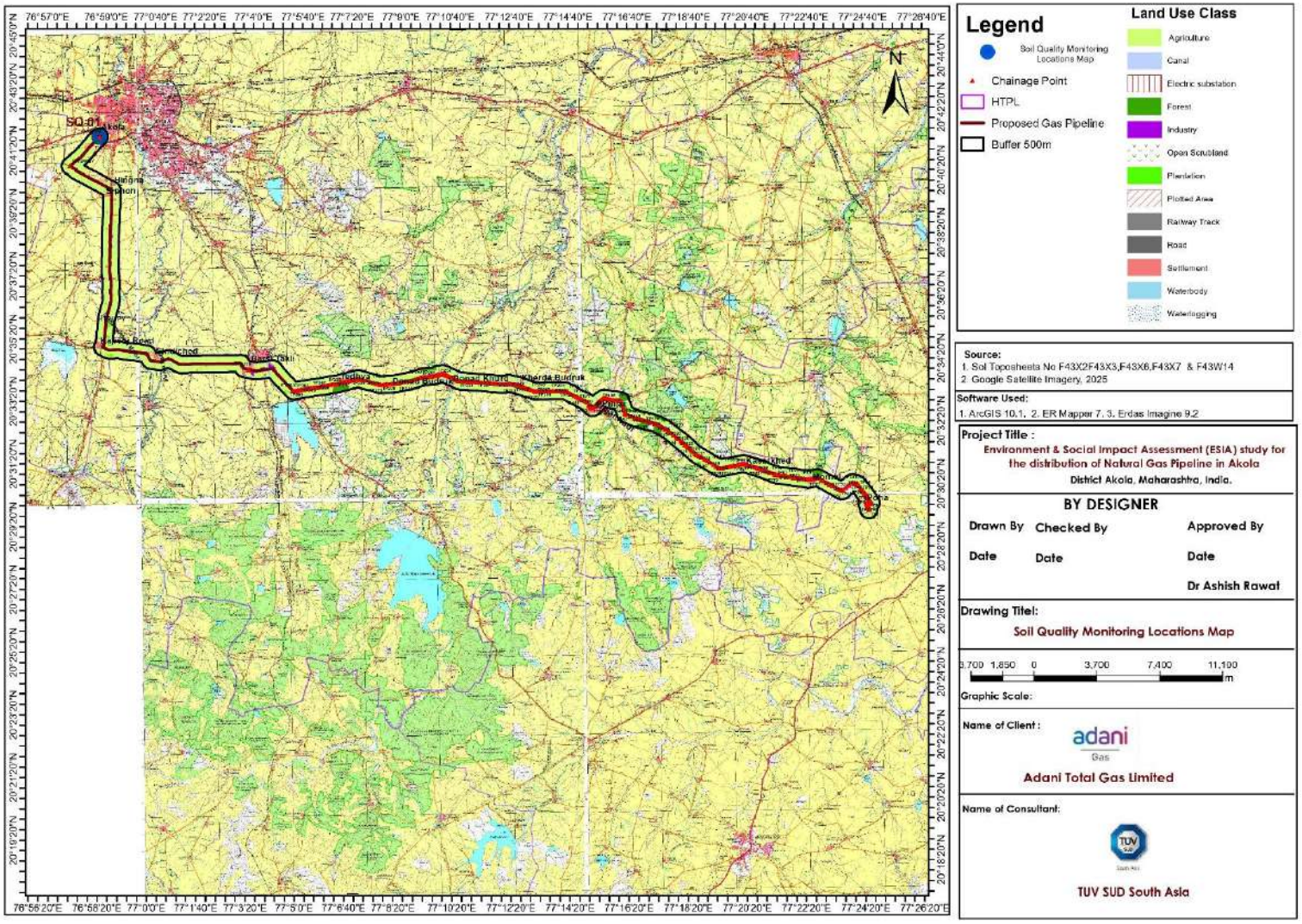
Sl. No.	Location code	Location name	Coordinates
1.	SQ-01	Road Crossing near Chainage CH-58.180 in Akola Town	20°42'9.65"N and 77° 0'12.99"E

**Source: Identified by TUV-SUD Team*



**Source: Aquifer Map and Ground Water Management Plan of Akola District*

Figure 4-7: Soil Map of the Akola District



Source: TUV SUD GIS Mapping Study

Figure 4-8: Soil Quality Monitoring Locations

Table 4-8: Soil Quality Analysis Result

S. No.	Parameter	Unit	Test Protocol	SQ-1
1	Texture	-	IS: 2720 (part-4), 1985 Reaff:2015)	Sandy clay Loam
2	Sand	-	IS: 2720 (part-4), 1985, (Reaff:2015)	44.4
3	Silt	%	IS: 2720 (part-4), 1985, (Reaff:2015)	26.6
4	Clay	-	IS: 2720 (part-4), 1985, (Reaff:2015)	29.0
5	Porosity	%	STRL /STP/SOIL/01,	49.1
6	Bulk Density	g/cc	STRL /STP/SOIL/01	1.23
7	pH	....	STRL /STP/SOIL/01	7.52
8	E. Conductivity	µs/cm	STRL /STP/SOIL/01	0.48
9	Magnesium	mg/kg	STRL /STP/SOIL/01	42.3
10	Calcium	mg/kg	STRL /STP/SOIL/01	210.2
11	Chlorides	mg/kg	STRL /STP/SOIL/01	58.2
12	Sodium	mg/kg	STRL /STP/SOIL/01	80.1
13	Potassium	mg/kg	STRL /STP/SOIL/01	54.9
14	Organic Carbon	%	IS: 2720 (Part-24)-1976(R-2015)	0.28
15	Organic matter	%	IS: 2720 (Part-24)-1976(R:2015)	0.16
16	Phosphorous	mg/kg	IS: 2720 (part 26),1987 (R:2011)	57.5
17	SAR	meq	STRL /STP/SOIL/01	1.48
18	Nitrogen (as N)	mg/kg	STRL /STP/SOIL/01	0.10
19	Salinity (as NaCl)	%	STRL /STP/SOIL/01	0.31

Analysis of Results:

- **Soil Texture and Composition**:
  SQ-1 is Sandy Clay Loam, indicating moderate to good drainage with moderate water-holding capacity. Sand content is high (44.4%), with moderate silt (26.6%) and clay (29%), supporting moderate fertility and aeration.
- **Porosity and Bulk Density:**
  Porosity is moderate (49.1%), and bulk density is within acceptable limits (1.23 g/cc), suggesting good root penetration and aeration.
- **pH and Electrical Conductivity (EC):**
  Neutral pH (7.52) and low EC (0.48 µS/cm) indicate non-saline and chemically balanced soil, suitable for most crops.
- **Macronutrients:**
  Nitrogen is low (0.10 mg/kg), which may limit plant growth.
  Phosphorus is medium (57.5 mg/kg), beneficial for root development.
  Potassium is moderate (54.9 mg/kg), supporting plant metabolism

Both soils have neutral pH, low salinity, and adequate nutrient levels, making them suitable for various crops. However, nitrogen supplementation may be necessary to enhance fertility. The laboratory results of the secondary baseline monitoring is enclosed in the **Annexure 14.**

4.6.6 Natural Hazards

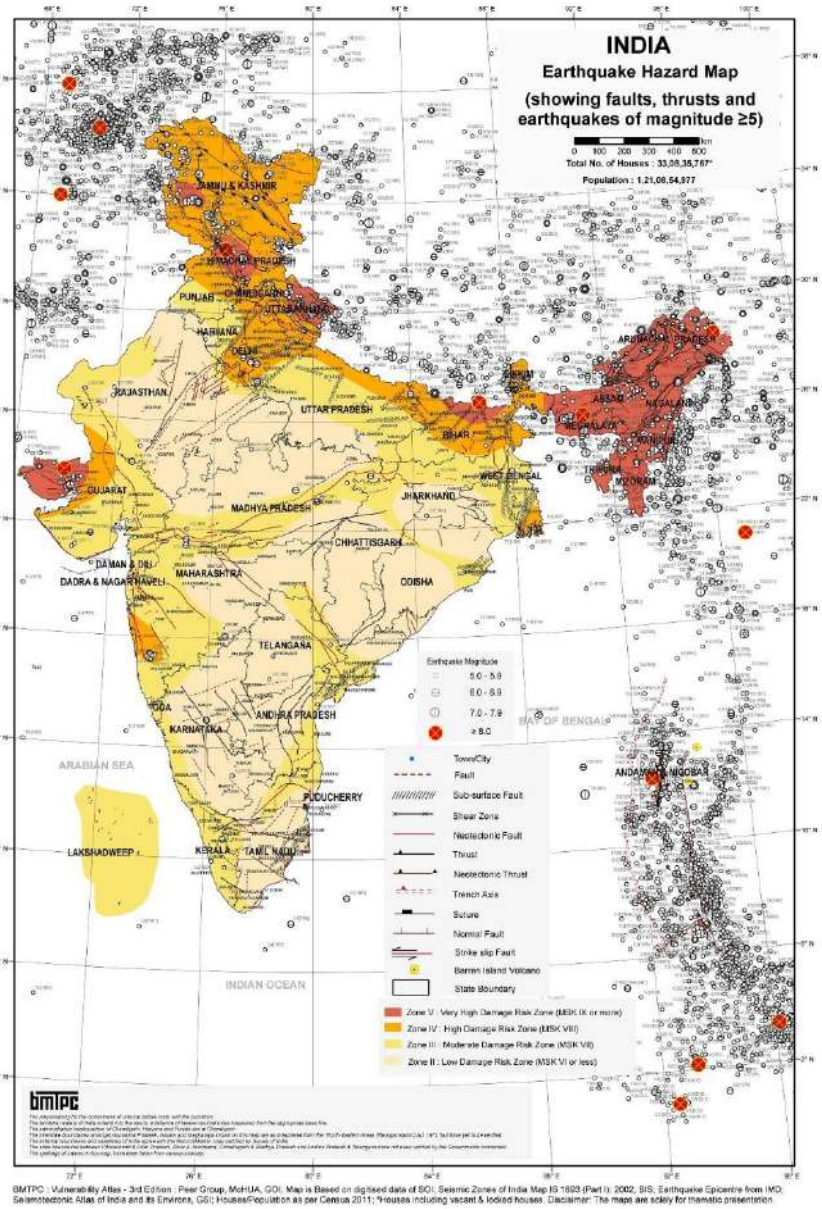
Natural hazards naturally occur physical phenomena caused either by rapid or slow onset events which can be geophysical (earthquakes, landslides, tsunamis, and volcanic activity), hydrological (floods), climatological (droughts, etc.), meteorological (cyclones and storms/wave surges) or biological (disease

epidemics and insect/animal plagues). Natural hazards can have impacts on the development; hence assessment of the natural hazards in the area is important for any proposed development.

Maharashtra is prone to multiple hazards, including landslides, floods, cyclones, earthquake, drought and lightning strikes.

4.6.6.1 Seismicity

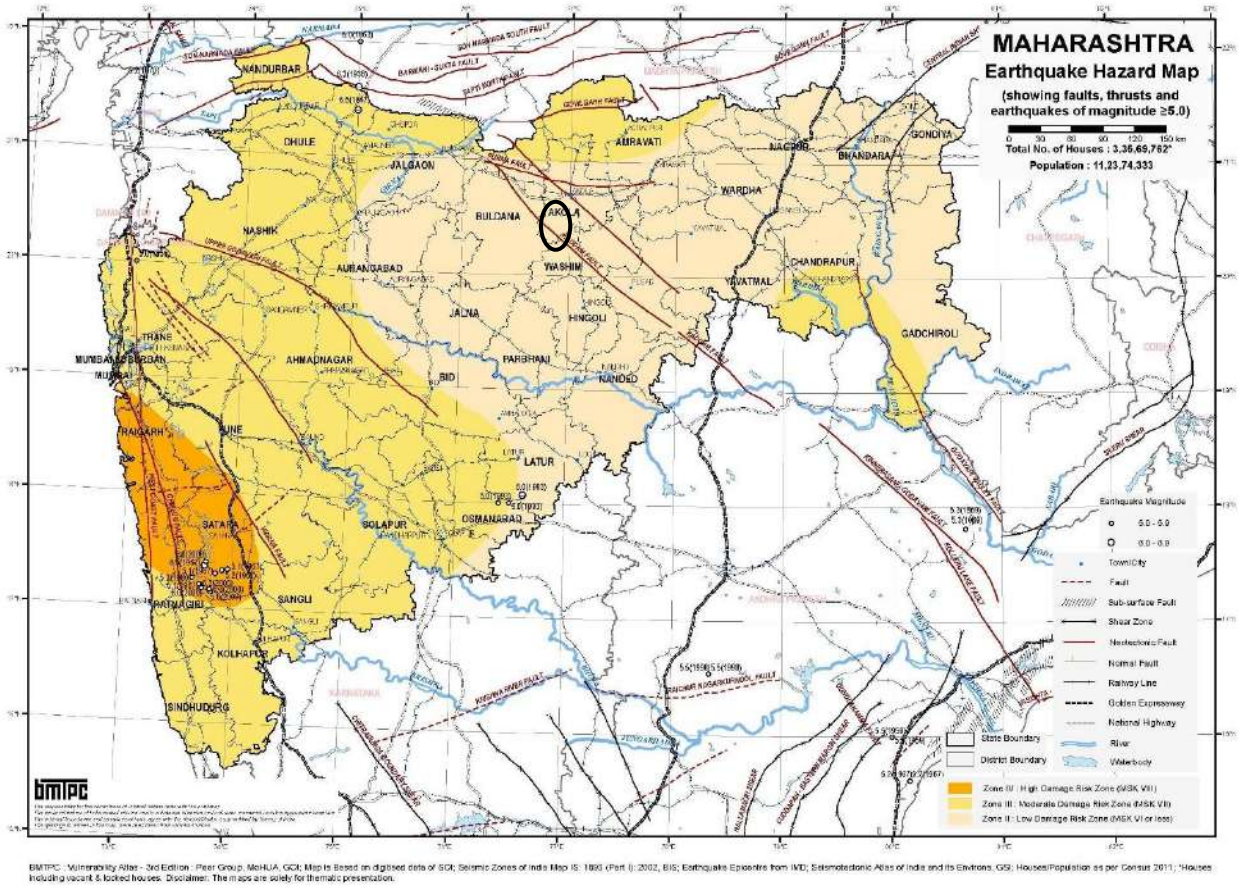
The state of Maharashtra lies in the Zone-II Low Risk Zone (MSK-VI or less), Zone-III Moderate Risk Zone and Zone-IV High Risk Zone. Whereas the study area located in Akola falls under Zone-II Low Risk Zone (MSK-VI or less). in the rates of seismic activity, as shown in seismic map of India **Figure 4-9** and the seismic map of the state of Maharashtra in **Figure 4-10**.



BMTPC : Vulnerability Atlas - 3rd Edition . Peer Group, MoHUA, GOI. Map is Based on digitised data of SOI, Seismic Zones of India Map IS 1893 (Part I): 2002, BIS, Earthquake Epicentre from IMD, Seismotectonic Atlas of India and its Environs, GSI | Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.

**Source-BMTPC Vulnerability Atlas*

Figure 4-9: Earthquake Hazard Map of India



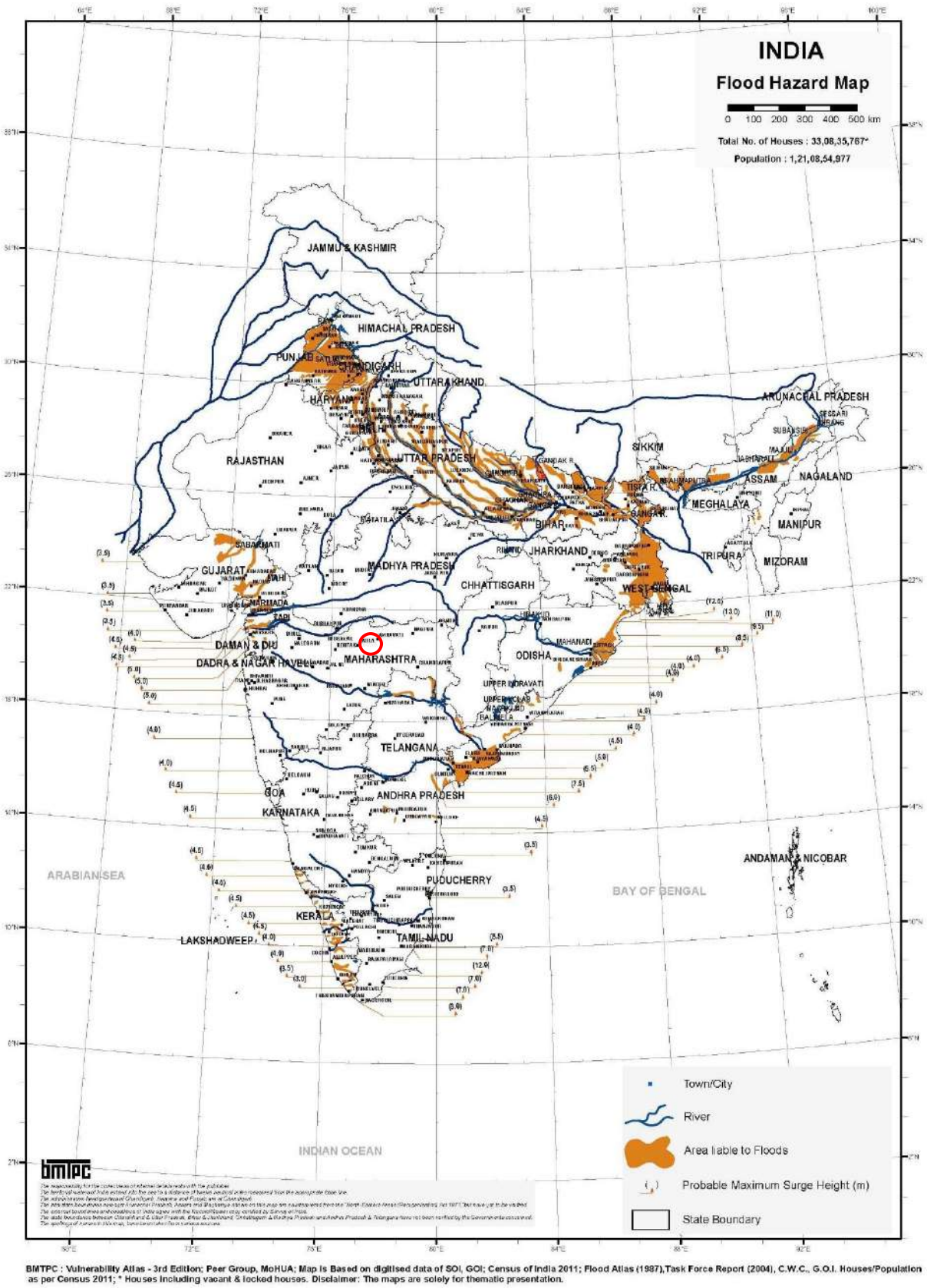
BMTPC - Vulnerability Atlas - 3rd Edition - Peer Group: MoHUA, GOI; Map is Based on digitised data of SOI; Seismic Zones of India Map IS: 1893 (Part I): 2002, BIS; Earthquake Epicentre from IMD; Seismotectonic Atlas of India and its Environs, GSI; Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.

** BMTPC Vulnerability Atlas*

Figure 4-10: Earthquake Hazard Map of Maharashtra (Black Circle-Project Study Area)

4.6.6.2 Flood

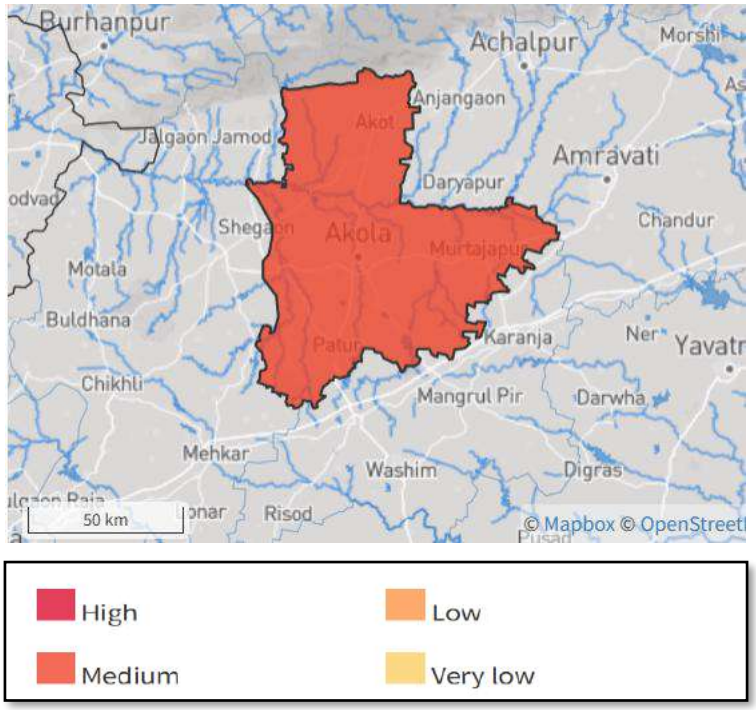
The flood hazard in Akola District is classified as **Medium,** this means that there is a chance of more than 20% that potentially damaging and life-threatening river floods occur in the coming 10 years. The flood situation remains under control in normal rainfall except a small patch near Gandhigram (on Akot road 17 km from Akola) where river Purna takes a turn and riverbed is shallow and wide without proper embankment. The Flood Hazard map of the India is provided in **Figure 4-11.** The Flood Hazard map of the Akola district is provided **Figure 4-12.**



BMTPC : Vulnerability Atlas - 3rd Edition; Peer Group, MoHUA; Map is Based on digitised data of SOI, GOI; Census of India 2011; Flood Atlas (1987),Task Force Report (2004), C.W.C., G.O.I. Houses/Population as per Census 2011; * Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.

**Source-BMTPC Vulnerability Atlas*

Figure 4-11: Flood Hazard Map of India (Red Circle indicating Project Area)

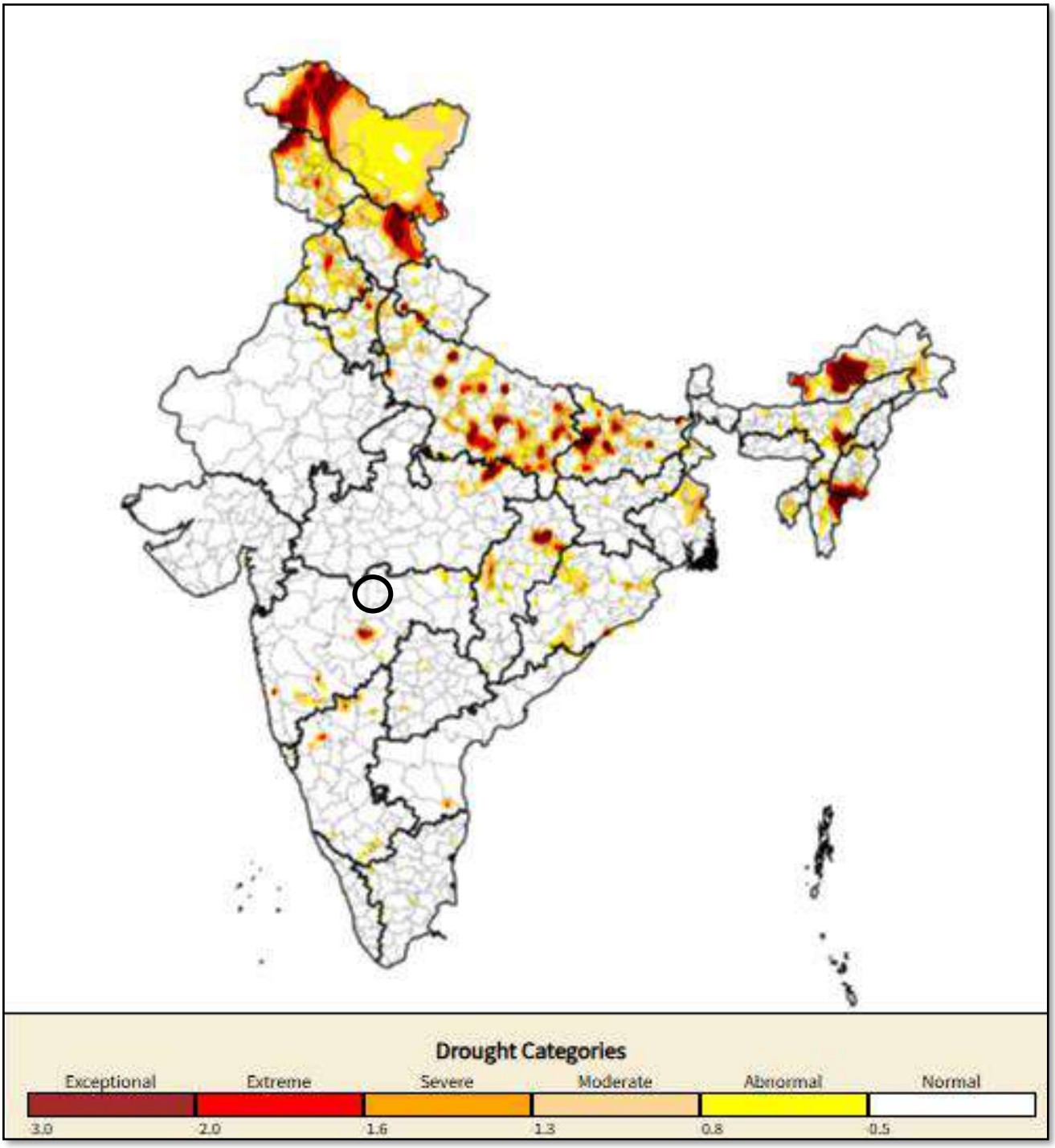


** Source: Global Facility for Disaster Reduction and Recovery by World Bank*

Figure 4-12: Flood Hazard Map of Akola District

4.6.6.3 Drought

Akola district in Maharashtra in in Normal drought zone as depicted in the **Figure 4-13** Drought Prone Map of India. The region's climate is mostly dry, with extreme temperatures during the summer months and limited rainfall but the district is drained by Purna river and the several tertiary channel and tributaries of the Purna river hence the risk of draught in the region is less.

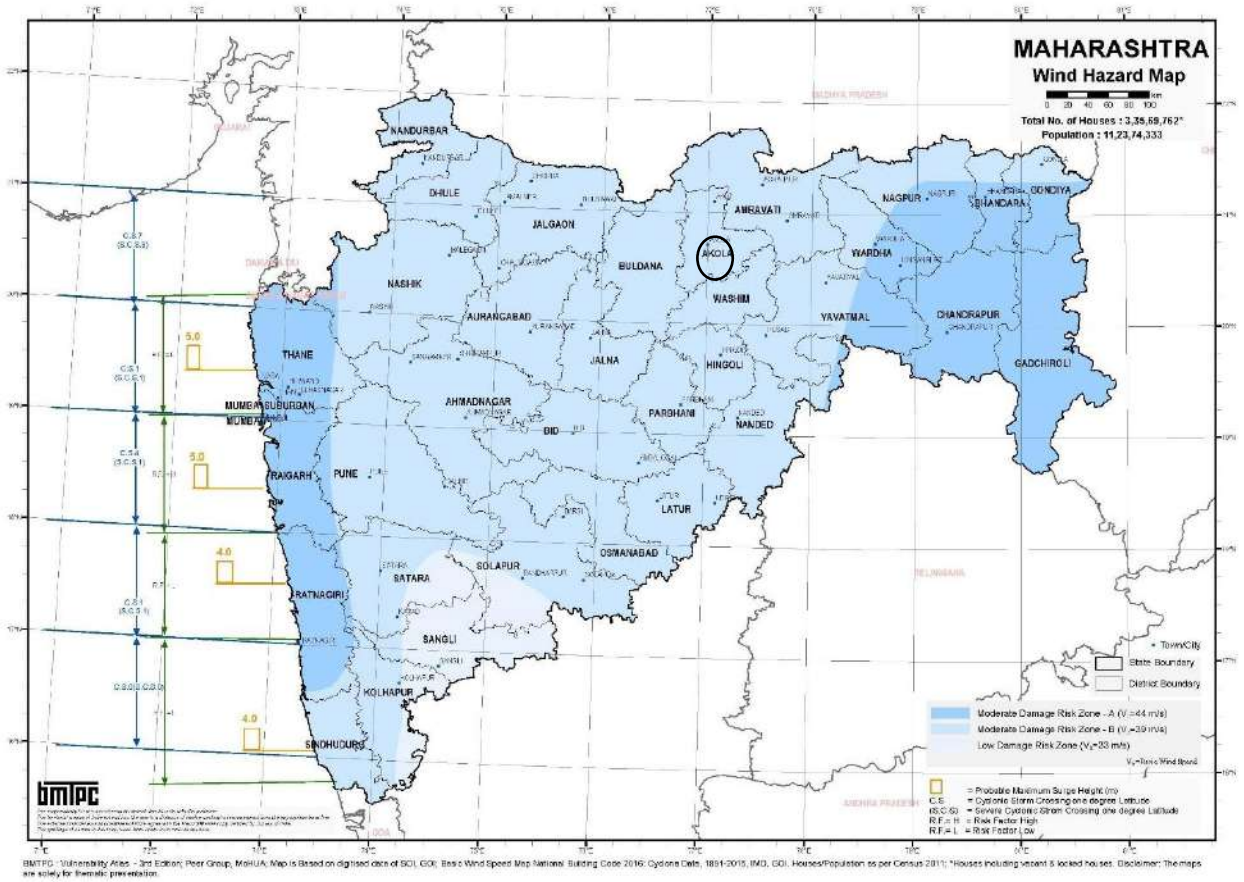


**Source: India Drought Monitor by IIT Gandhinagar*

Figure 4-13: Drought Prone Map of India (Black Circle indicating Project Area)

4.6.6.4 Wind Hazard

The project study area has been identified in Moderate Risk Zone - B (V_b=39 m/s), according to the Wind Hazard map of Maharashtra, Vulnerability Atlas of 3rd edition, 2019 prepared by BMTPC that has been depicted in **Figure 4-14** indicating project study area marked under Black circle.



**BMTPC Vulnerability Atlas*

Figure 4-14: Wind Hazard Map, Maharashtra (Project Area identified with "Black Circle")

4.6.7 Climate and Meteorology

The climate of study area is characterized by a hot summer and general dryness throughout the year except during the south-west monsoon season. In accordance with [3]Köppen–Geiger Climate Classification system (**Figure 4-15)** the climate zone of project area of Akola is Tropical Savanna, dry winter (Classification: Aw). The year may be divided into four seasons. The period from about the middle of November to the end of February constitutes the winter season. The summer season extends from March to June. This is followed by the south-west monsoon season which extends upto the end of September. October and November constitute the post-monsoon season. The climatological trends in the district is depicted in **Figure 4-16.**

The average annual rainfall of the district is 846.5 mm (33.33"). The rainfall generally increases from the north-west towards the south-east in the district and varies from 767.3 mm. (30.21") at Telhara near the north-western border of the district to 926.8 mm. (36.49") at Washim near the south-eastern border of the district. The rainfall during the monsoon months constitutes about 85 per cent of the annual rainfall,

[3] Köppen-Geiger Climate Classification is one of the most widely used climate classification systems. The system is based on the concept that native vegetation is the best expression of climate. Thus, climate zone boundaries have been selected with vegetation distribution in mind. It combines average annual and monthly temperatures and precipitation, and the seasonality of precipitation.

July being the rainiest month. During the fifty-year period, 1901 to 1950, the highest annual rainfall amounting to 150 per cent of the normal occurred in 1949, while the lowest annual rainfall, which was only 45 per cent of the normal occurred in 1920. In the same fifty-year period, the annual rainfall in the district was less than 80 per cent of the normal in ten years, two of them being consecutive. **Figure 4-17** depicts the precipitation data of the study area.

The temperature trend of the study area is depicted in **Figure 4-18**. Temperature rises rapidly after February till May which is the hottest month of the year. In May, the mean daily maximum temperature at Akola is 42.4 °C and the mean daily minimum temperature is 27.5 °C. The heat in the summer season is intense during the day and the nights are comparatively tolerable. During the period from April to June, on individual days, the day temperature rises upto about 46 °C or 47 °C. The afternoon heat is sometimes relieved by thunder showers. With the arrival of the south-west monsoon in the district by about mid-June there is an appreciable drop in the day's temperature and the weather becomes pleasant. After the withdrawal of the monsoon the day temperature increases gradually and a secondary maximum in day temperature is reached in October. However, night temperature decreases progressively after September. Both day and night temperatures decrease rapidly from October till December, which is the coldest month of the year. The mean daily maximum temperature during this month is 29.3 °C and the mean daily minimum temperature is 11.9 °C. In the rear of the western disturbances which move across north India in the winter months, cold waves affect the district at times and night temperatures may go down to about 2 to 4 °C.

Except during the south-west monsoon season when the humidity is between 60 to 80 per cent, the air is generally dry over the district. The summer months are the driest when the relative humidity is even less than 20 per cent in the afternoons on many days.

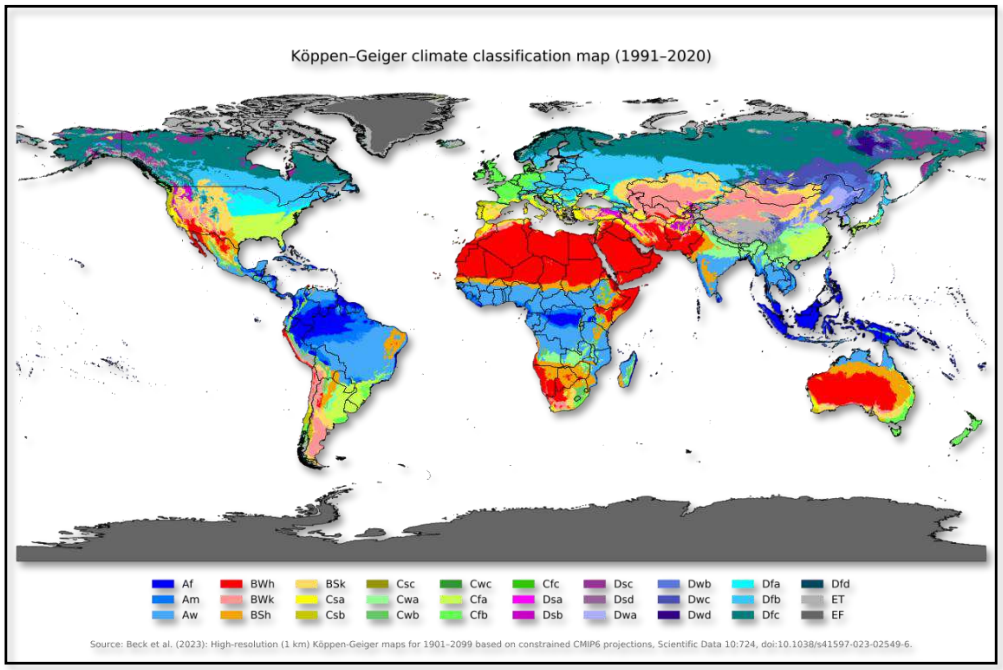
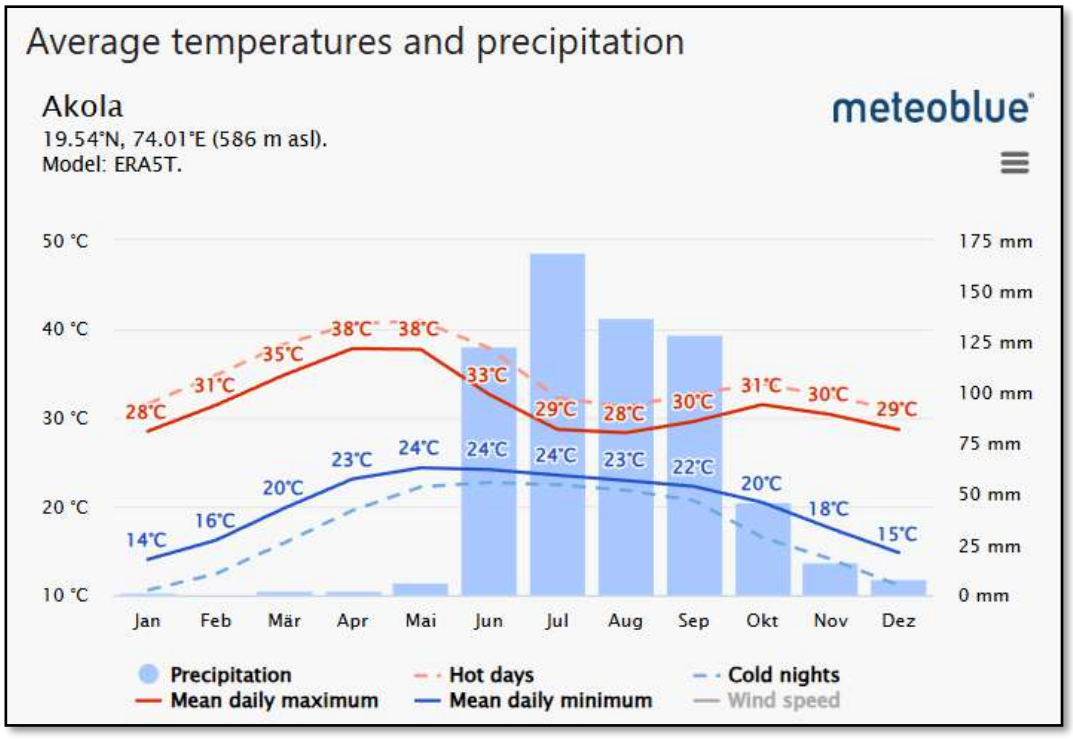
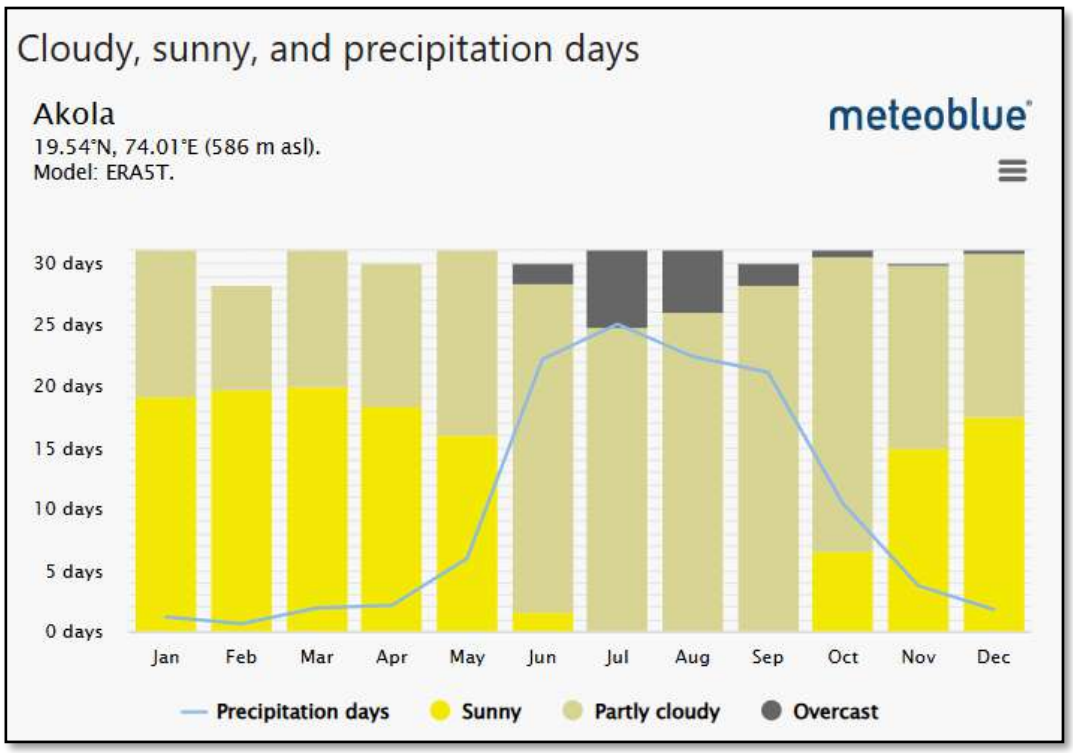


Figure 4-15: World Map of Köppen–Geiger Climate Classification



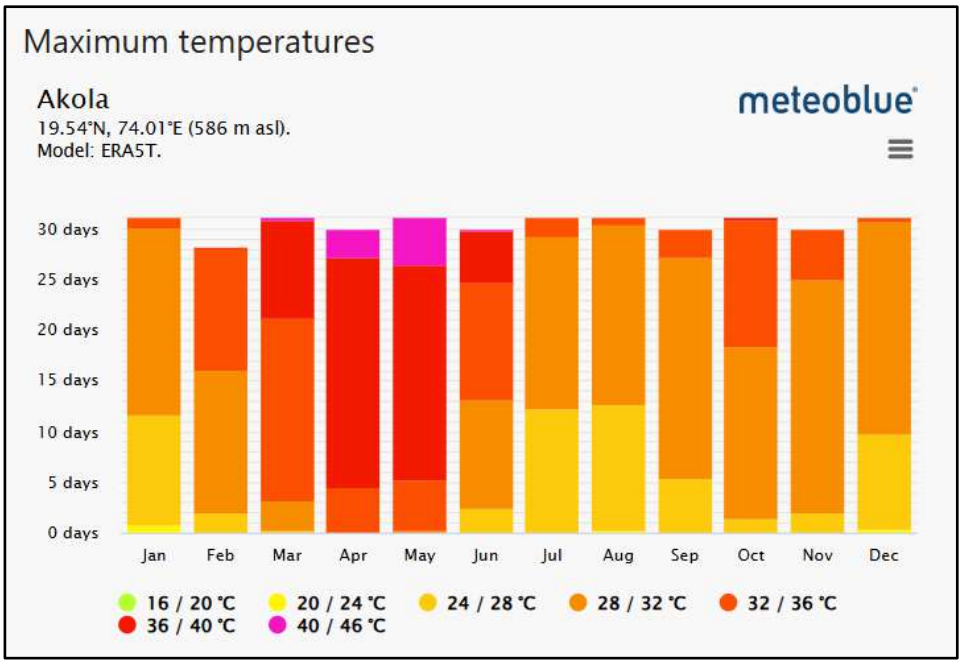
Source: Meteoblue.com

Figure 4-16: Climatological Trend in Study Area (Last 30 years)



Source: Meteoblue.com

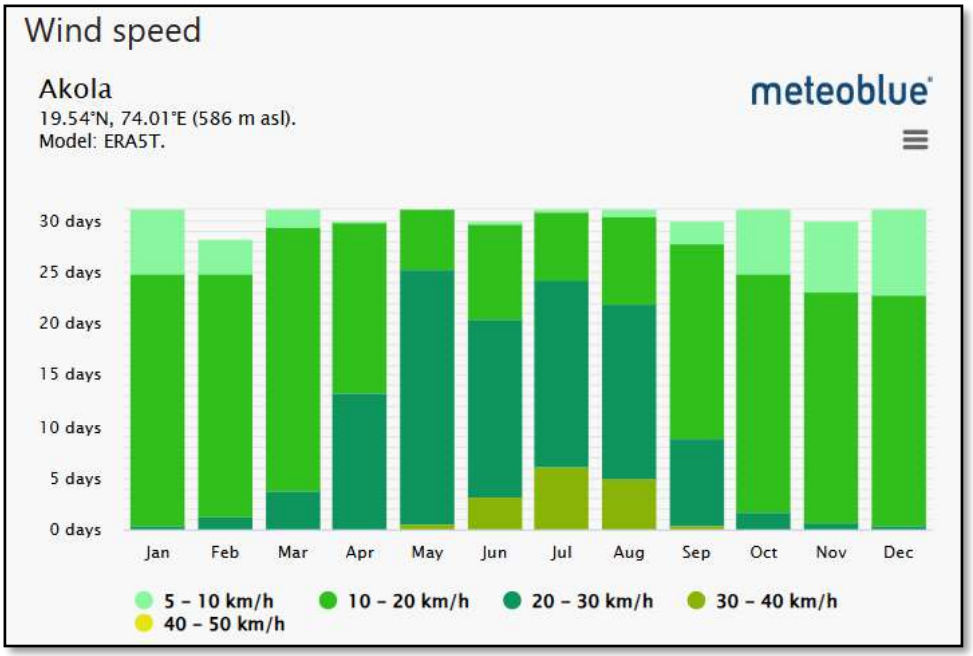
Figure 4-17: Precipitation Graph of Study Area



Source: Meteoblue.com

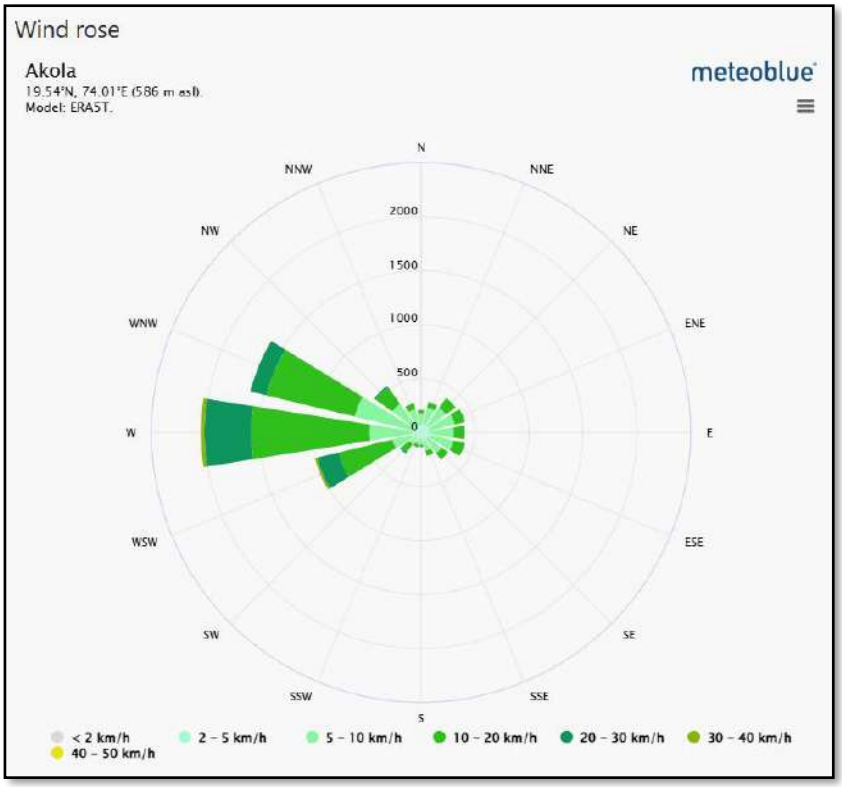
Figure 4-18: Temperature Trend in Study Area (for last 30 Years)

Winds are generally light with some strengthening in speed in the latter part of the not season and in the early part of the monsoon season. The winds are mostly from the northeast or the east during the post-monsoon and early cold weather seasons. By February, winds become westerly to northwesterly and continue to be so till June. In the south-west monsoon season, winds, from directions between. south-west and north-west are most common. The wind intensity analysis and wind-rose diagram for study area is given in **Figure 4-19** and **Figure 4-20** respectively.



Source: Meteoblue.com

Figure 4-19: Wind Intensity of Study Area



**Source: Meteoblue.com*

Figure 4-20: Windrose Diagram of Project Study Area

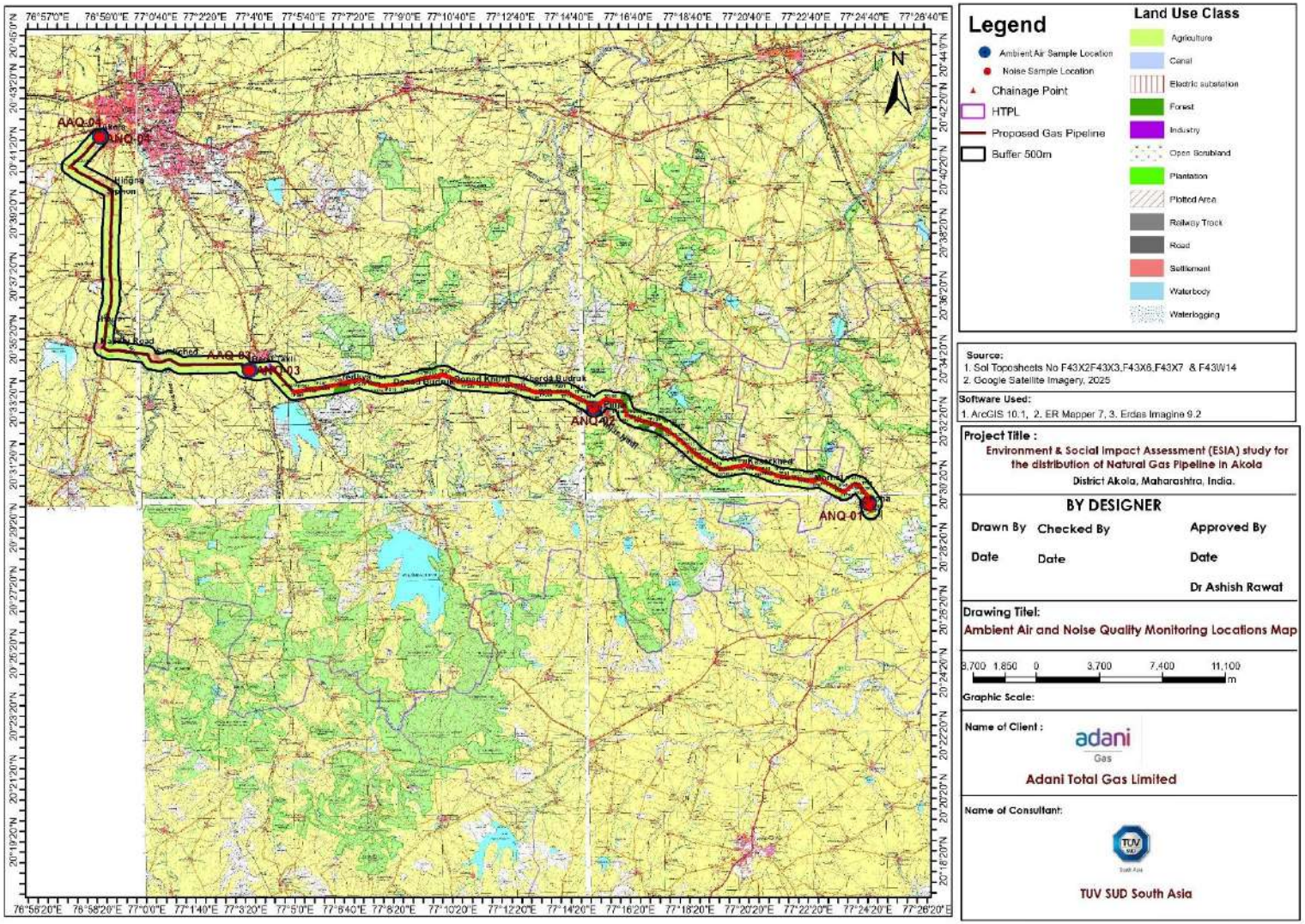
4.6.8 Ambient Air Quality

For the secondary ambient air quality monitoring the locations have been identified for the pipeline stretch route as mentioned in

Table 4-9 and depicted in **Figure 4-21**. The sampling locations for air and noise quality are based on certain meteorological conditions such as wind direction, wind speed, surrounding receptors and in accordance with that, the monitoring sites are identified close to the proposed project activity area. The result of baseline ambient air monitoring is attached in the **Table 4-10**.

Table 4-9: Ambient Air Quality Monitoring Locations

Sl. No.	Location code	Location Name	Coordinates
1.	AAQ-01	Poha Village Near CGS and Chainage CH-0.465	20°29'45.20"N 77°24'33.72"E
2.	AAQ-02	At Pinjar Village near Chainage Ch-19.979	20°32'53.77"N 77°15'18.78"E
3.	AAQ-03	Road Crossing near NH-161A in Basritakli Village	20°34'15.30"N 77° 3'41.55"E
4.	AAQ-04	Road Crossing near Chainage CH-58.180 in Akola Town	20°42'9.65"N 77° 0'12.99"E



Source: TUV SUD GIS Mapping Study

Figure 4-21: Ambient Air and Noise Monitoring Locations within Project AOI

Table 4-10: Air Quality Analysis Result

Sl. No.	Parameter	Unit	AAQ-01	AAQ-02	AAQ-03	AAQ-04	NAAQS Standard
1.	Particulate Matter-10 (PM-10)	µg/m³	73.3	76.2	74.4	69.8	100
2.	Particulate Matter-2.5 (PM- 2.5)	µg/m³	39.2	42.2	40.3	48.2	60
3.	Sulphur Dioxide (SO2)	µg/m³	7.4	7.5	7.62	7.55	80
4.	Nitrogen Dioxide (NO2)	µg/m³	8.6	7.04	7.23	8.44	80
5.	Ozone (O3) -8Hr.	µg/m³	12.2	11.1	13.2	13.0	100
6.	Lead (Pb)	µg/m³	<1.0	<1.0	<1.0	<1.0	1.0
7.	Carbon Mono Oxide (CO)-1.0 Hr.	mg/m³	0.23	0.28	0.24	0.44	4.0
8.	Ammonia (NH3)	µg/m³	< 10	< 10	< 10	< 10	400
9.	Arsenic (As)	ng/m³	<1.0	<1.0	<1.0	<1.0	6
10.	Nickel (Ni)	ng/m³	0.22	0.31	0.29	0.21	20

Analysis of Result:

AAQ monitoring results for all four locations were assessed against NAAQS in 2009. Trace metals such as Pb, As, and Ni were found in negligible concentrations, and Ammonia (NH_3) levels were below detection limits. The concentration of the primary pollutant in the project location is such that:

Particulate Matter (PM10 & PM2.5)

- **PM10**: All stations report PM10 levels between 69.8 µg/m³ and 761.2 µg/m³, which are below the 24-hour NAAQS limit of 100 µg/m³.
- **PM2.5**: The PM2.5 concentrations range from 39.2 µg/m³ to 48.2 µg/m³, well below the 24-hour NAAQS limit of 60 µg/m³.

Gaseous Pollutants

- **Sulphur Dioxide (SO_2)**: Measured levels are between 7.4 µg/m³ and 7.62 µg/m³, significantly lower than the 24-hour NAAQS limit of 80 µg/m³.
- **Nitrogen Dioxide (NO_2)**: Concentrations range from 7.04 µg/m³ to 8.44 µg/m³, well below the 24-hour NAAQS limit of 80 µg/m³.
- **Ozone (O_3)**: The 8-hour average ozone levels are between 11 µg/m³ and 13.2 µg/m³, which are below the 8-hour NAAQS limit of 100 µg/m³.
- **Carbon Monoxide (CO)**: CO concentrations range from 0.23 mg/m³ to 0.44 mg/m³, well within the 8-hour NAAQS limit of 2.0 mg/m³.

The Air Quality Index (AQI) across all locations fell in the "Satisfactory" category (as per CBCB), reflecting a clean air environment with minimal health impact on the general population. Overall, the ambient air quality in the project area is considered safe. The laboratory results of the secondary baseline monitoring is enclosed in the **Annexure 14**.

4.6.9 *Ambient Noise Quality*

To study sound pressure levels (SPL) it will be measured by a sound level meter. Since loudness of sound is important for its effects on people, the dependence of loudness upon frequency must be considered in noise impact assessment. This has been achieved using A-weighting filters in the noise measuring instrument which gives a direct reading of approximate loudness. A-weighted equivalent continuous sound pressure level (Leq) values have been computed from the values of the A-weighted sound pressure level measured with the help of noise meter. Four (04) locations has been identified to carry out the secondary noise monitoring (as mentioned in **Table 4-11** and depicted in **Figure 4-21**) to identify the baseline noise level of the project surrounding areas, so that noise pollution during construction phase can be predicted and cumulative effect of ambient noise can be identified.

Table 4-11: Ambient Noise Quality Monitoring Locations

Sl. No.	Location code	Location Name	Coordinates
1.	ANQ-01	Poha Village Near CGS and Chainage CH-0.465	20°29'45.20"N 77°24'33.72"E
2.	ANQ-02	At Pinjar Village near Chainage Ch-19.979	20°32'53.77"N 77°15'18.78"E
3.	ANQ-03	Road Crossing near NH-161A in Basritakli Village	20°35'3.97"N 77° 3'54.14"E
4.	ANQ-04	Road Crossing near Chainage CH-58.180 in Akola Town	20°42'9.65"N 77° 0'12.99"E

Noise quality monitoring is conducted in each proposed project location for over a period of twenty-four hours (once) to obtain Leq values at uniform time intervals of 1 hour. In each hourly time interval Leq values it will be computed from SPL readings taken at uniform time intervals of 15 minutes. For each location, day and night-time Leq values will then be computed from the hourly Leq values so that comparison could be made with the national ambient noise standards. Day time Leq will be computed from the hourly Leq values between 6.00 a.m. - 10.00 p.m. and night-time Leq from the hourly Leq values between 10.00 p.m. - 6.00 a.m. The baseline ambient noise monitoring result is given in the **Table 4-12**.

Table 4-12: Ambient Noise Quality Monitoring Result

Sl. No.	Location	Location Code	Results in Db(A) Leq	
			Average Day Noise Level	Average Night Noise Level
1	Poha Village Near CGS and Chainage CH-0.465	ANQ-01	51.2	40.76
2	At Pinjar Village near Chainage Ch-19.979	ANQ-02	52.4	44.1
3	Road Crossing near NH-161A in Basritakli Village	ANQ-03	52.16	40.9
4	Road Crossing near Chainage CH-58.180 in Akola Town	ANQ-04	56.4	44.4
Limit for A Per CPCB Guidelines; Leq, dB (A)				
Sl. No.	**Zone**		**Day Time (6.00 AM to 10.00 PM)**	**Nighttime (10.00 PM to 6.00 AM)**
1	Residential area		55	45
2	Commercial area		65	55
3	Industrial area		75	70
4	Silence area		50	40

Ambient noise levels were monitored at four locations along the project corridor. The average daytime noise levels ranged from 50.8 dB(A) to 55.1 dB(A), and the average nighttime levels ranged from 39.22 dB(A) to 40.11 dB(A). All recorded noise levels remained well within the prescribed CPCB limits of 65 dB(A) for daytime and 55 dB(A) for nighttime for industrial or commercial zones. The highest noise levels were observed at ANQ-3 (55.1 dB during the day), which lies Near Eastwood Village, but this still complies with the CPCB threshold. The results indicate that the ambient noise environment in the study area is currently within acceptable limits, posing no significant noise pollution concern. The laboratory results of the secondary baseline monitoring is enclosed in the **Annexure 14.**

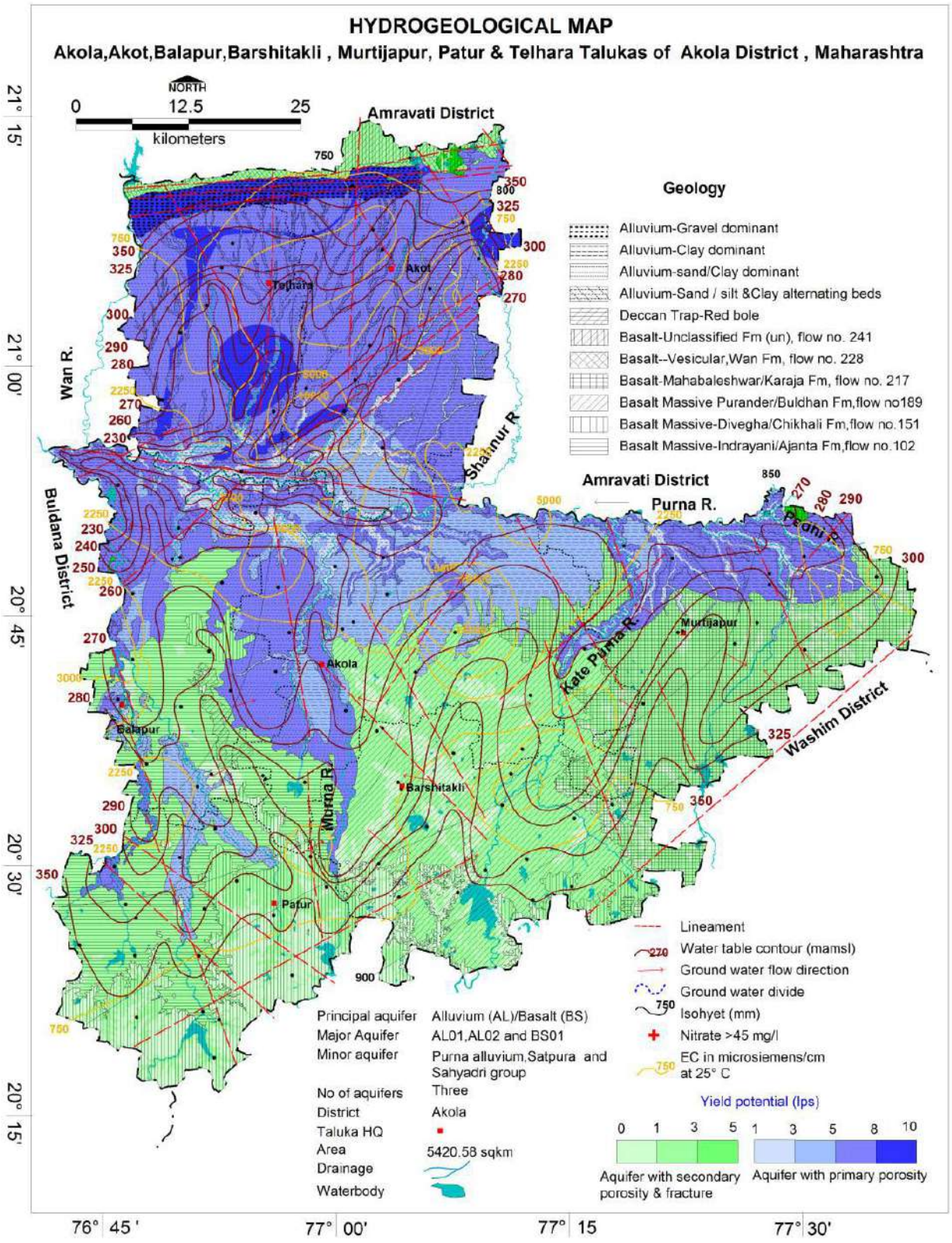
4.6.10 Hydrogeology and Ground Water Quality

4.6.10.1 Hydrogeology

Deccan Trap Basalt of upper Cretaceous to lower Eocene age is the major rock formation in the district covering the southern part, whereas almost entire northern part is underlain by Recent Alluvium. A map depicting hydrogeological features is presented in **Figure 4-22.**

Northern part of the district, covering about 2650 sq km in parts of Akot, Akola and Telhara, Murtijapur blocks is underlain by Purna Alluvium. In Alluvial deposits, inter pore spaces constitutes the potential water bearing zones and prevalence of sand and gravels renders them a high degree of porosity and permeability and make them a potential ground water reservoir. However lithological variation results in variable water yielding capacity depending upon the predominance of sand-clay ratio. Purna Alluvium has a proven thickness of more than 421 meters. Based on studies the entire thickness of Alluvium has been divided into younger Alluvium and older Alluvium. The younger Alluvium consists of comparatively more sand layers and thus forms good aquifer. The older Alluvium, which is more clayey with thin horizons of sand and silt, forms a comparatively lesser potential aquifer. Ground water in Alluvium occurs both under the water table and semi-confined to confined conditions. Shallow Aquifer occurs from 2 to 72 m bgl depth with water levels ranging from 1.3 to 30.3 m bgl. The yield varies from 50-300 m3/day. The deeper Aquifer is tapped by borewells, and it ranges from 11.3 to 421 m bgl, with the water level ranging from 8 to 55 m bgl.

Basalt forms the main aquifers in the Washim district. Based on the existing data and the data generated it is observed that there are two aquifer Systems in Basalt prevailing in the district.

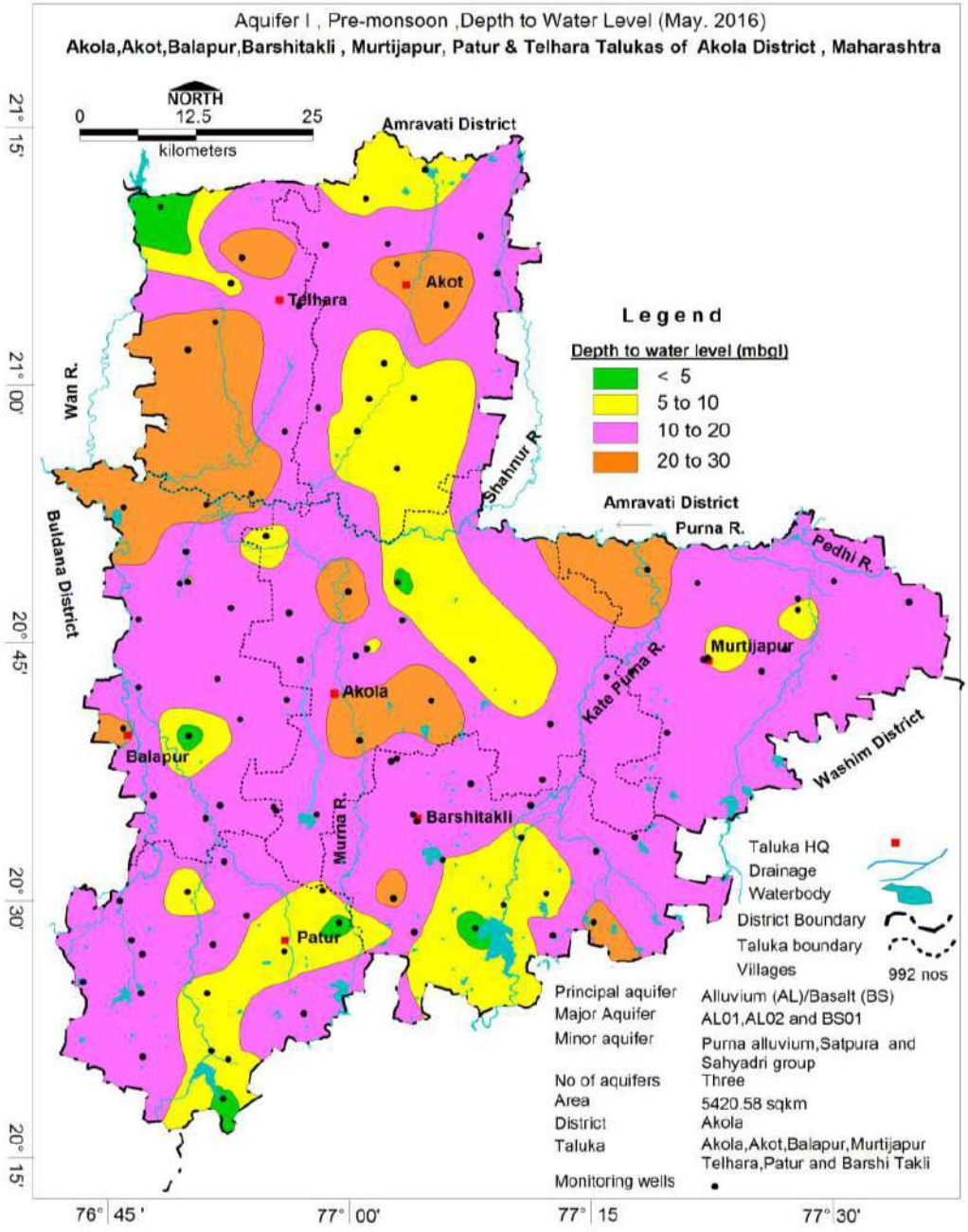


**Source: Aquifer Map and Management Plan, Akola District*

Figure 4-22: Hydrogeological Map of Akola District (Black Circle- Project Study Area)

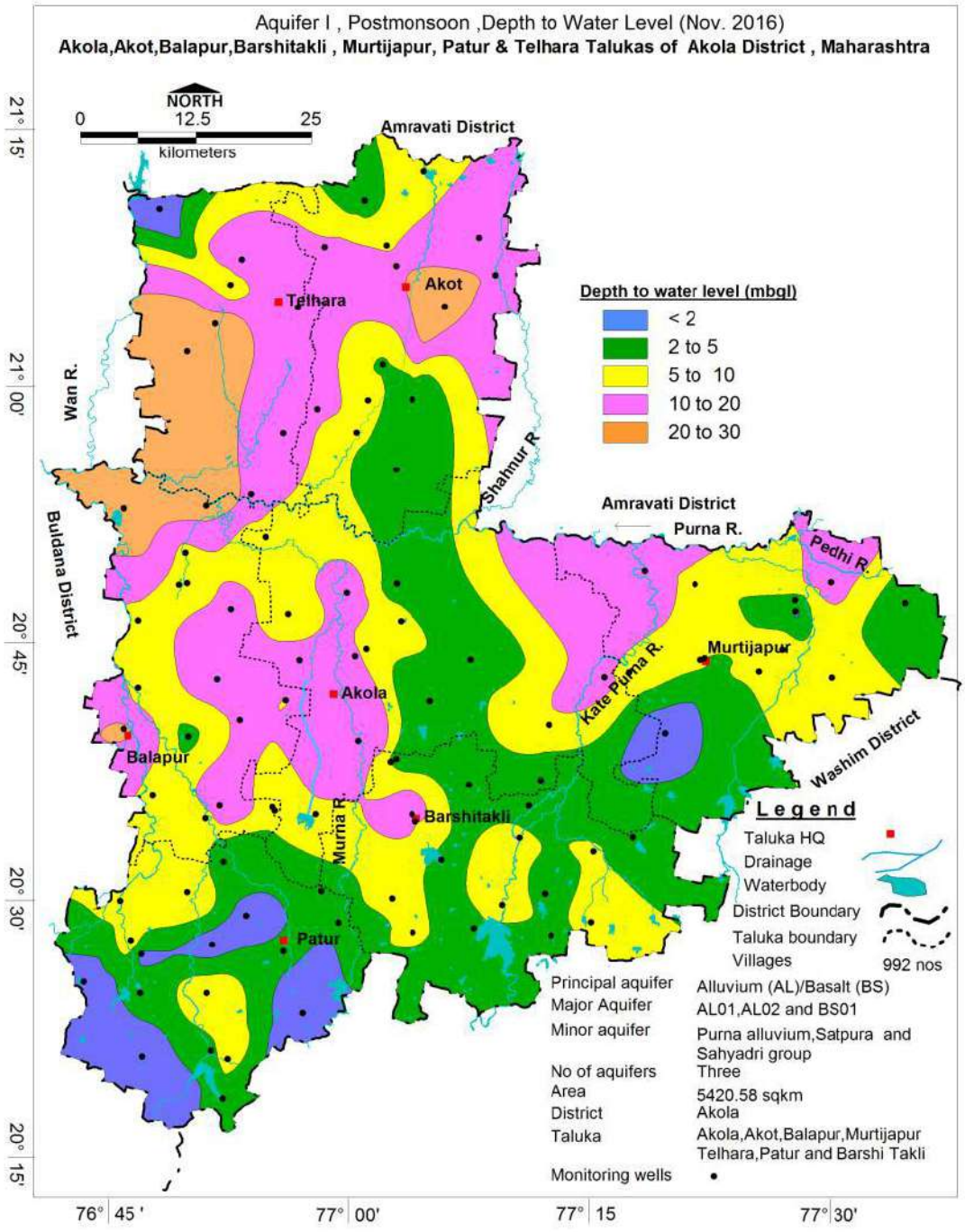
DEPTH TO WATER LEVEL

The depth to water level in the study area that falls within Akola district ranges between 05-30 m bgl during pre-monsoon and 2-20 m bgl for post-monsoon and the study area that falls within the Washim district have depth to water levels between 5 to 10 and 10 to 20 mbgl which is observed in entire district covering all the blocks. Maps indicating depth to water level during pre-monsoon & post-monsoon have been depicted in **Figure 4-23** and **Figure 4-24**:



**Source: Aquifer Map and Management Plan, Akola District*

Figure 4-23: Pre-Monsoon Water Level, Akola District (Project Study Area demarcated with "Black Circle")



Source: Aquifer Map and Management Plan, Akola District

Figure 4-24: Post-Monsoon Water Level, Akola District (Project Study Area demarcated with "Black Circle")

GROUND WATER RESOURCES

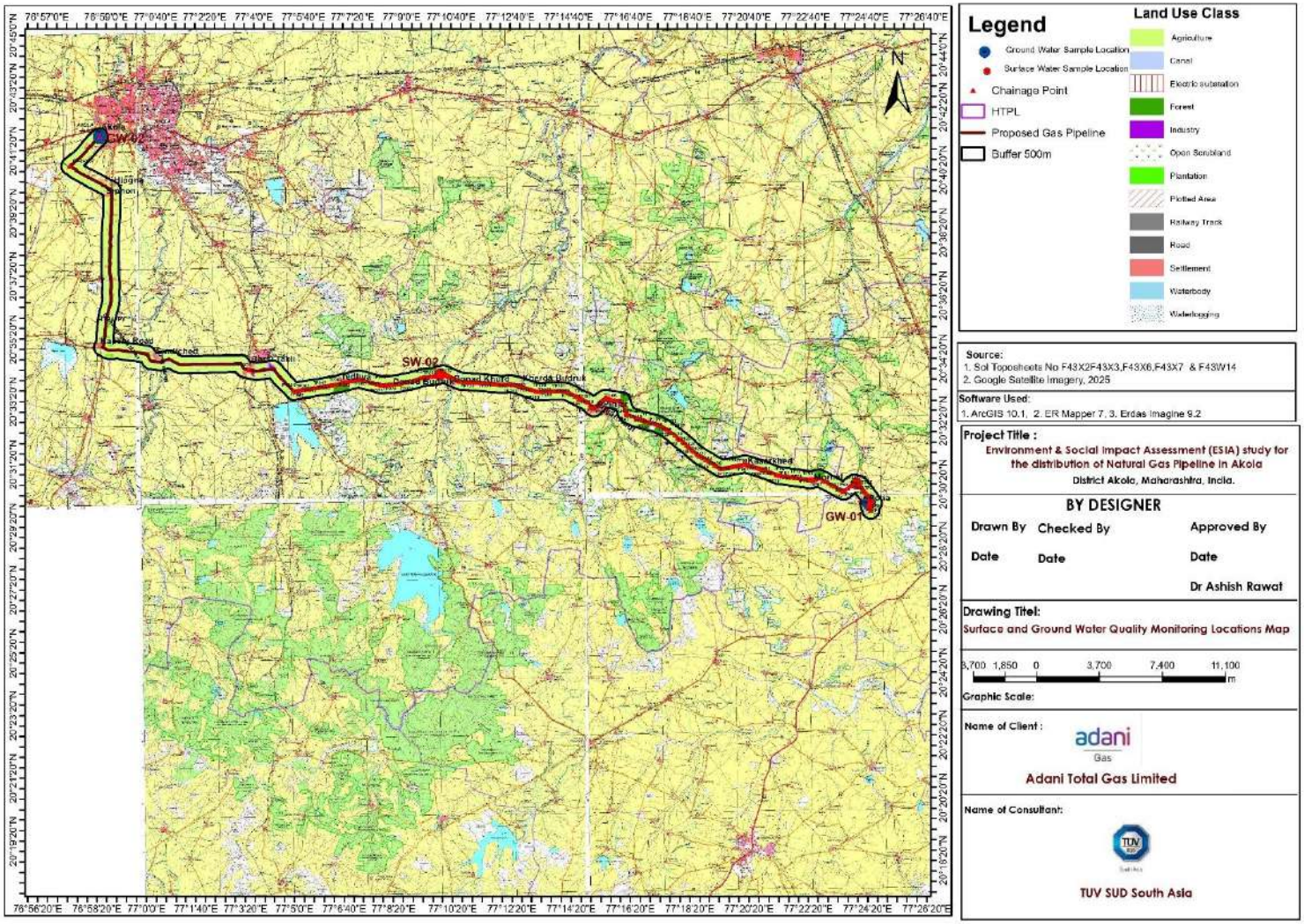
The overall stage of ground water development for the Akola district is 43.44% and for the Washim district is 38.19 % (SAFE Category). Block wise assessments indicate that all the blocks in the district fall under "**Safe**" category.

4.6.10.2 Ground Water Quality

To conduct the ground water monitoring in project study area, two (02) locations have been identified as mentioned in the **Table 4-13** and depicted in **Figure 4-25** below. The ground water quality and ground water situation of the area is studied during baseline monitoring and the ground water monitoring is results is attached in the **Table 4-14.**

Table 4-13: Ground Water Quality Monitoring Locations

Sl. No.	Location code	Location Name	Coordinates
1.	GW-01	Poha Village Near Chainage CH-0.465	20°29'45.20"N 77°24'33.72"E
2.	GW-02	Road Crossing near Chainage CH-58.180 in Akola Town	20°42'9.65"N 77° 0'12.99"E



Source: TUV SUD GIS Mapping Study

Figure 4-25: Surface and Groundwater Quality Monitoring Locations

Table 4-14: Ground Water Quality Monitoring Result

Sl. No.	Parameter	Unit	GWQ-1	GWQ-2	Limits (as per IS:10500-2012)	
					Desirable Limit	Permissible Limit
1	Color	--	0.1	0.1	--	--
2	Odour	-	Agreeable	Agreeable	Agreeable	Agreeable
3	Taste	-	Agreeable	Agreeable	Agreeable	Agreeable
4	Temperature	^oC	20.3	20.4	-	-
5	pH	-	7.22	7.29	6.5-8.5	No Relaxation
6	Electric Conductivity	µhos/cm	808	929	-	-
7	Total Hardness (as $CaCO_3$)	mg/l	240.2	306.1	200	600
8	Iron (as Fe)	mg/l	0.12	0.12	0.3	No Relaxation
9	Chlorides (as Cl)	mg/l	134.4	145.1	250	1000
10	Fluoride (as F)	mg/l	< 0.5	< 0.5	1	1.5
11	TDS	mg/l	490.2	542	500	2000
12	Calcium (as Ca^{2+})	mg/l	46.8	50.7	75	200
13	Magnesium (as Mg^{2+})	mg/l	29.5	42.9	30	100
14	Sulphate (as SO_4)	mg/l	32.3	33.4	200	400
15	Nitrate (as NO_3)	mg/l	24.8	25.2	45	No Relaxation
16	Alkalinity (as $CaCO_3$	mg/l	302.2	316.2	200	600
Bacteriological Parameter						
1	Total Coli form	Cfu/100gm	Not Detected (<2)	Not Detected (<2)	MPN/100ml	Shall Not Be Detectable
2	E. coli	Cfu/100g	Absent .	Absent .	E. coli/100ml	Shall Not Be Detectable

Analysis of Results:

1. **Physical and Chemical Parameters**: Both GWQ-1 and GWQ-2 samples fall within the desirable limits for most parameters. However, some parameters exceed the desirable limits:
   - **Total Hardness**: Both samples exceed the desirable limit of 200 mg/l, with GWQ-1 at 240.2 mg/l and GWQ-2 at 306.1 mg/l. Whereas, the permissible limit is 600 mg/l.
   - **TDS (Total Dissolved Solids)**: Both samples is near the desirable limit of 500 mg/l, with GWQ-1 at 490.2 mg/l and GWQ-2 at 542 mg/l. The permissible limit is 2000 mg/l.
   - **Calcium**: Both samples within the desirable limit of 75 mg/l, with GWQ-1 at 46.8 mg/l and GWQ-2 at 50.7 mg/l. The permissible limit is 200 mg/l.
   - **Magnesium**: For one sample (GWQ-02) exceed the desirable limit of 30 mg/l, with GWQ-1 at 29.5 mg/l and GWQ-2 at 42.9 mg/l. The permissible limit is 100 mg/l.
2. **Bacteriological Parameters**: Both samples meet the desirable and permissible limits for bacteriological parameters, indicating the water is microbiologically safe for consumption.

The laboratory results of the secondary baseline monitoring is enclosed in the **Annexure 14.**

4.6.11 Surface Water Quality

Total Two (02) locations have been identified (as mentioned in the **Table 4-15** and map depicted in **Figure 4-25**. Both the samples were collected from the river and canal that flows within the project study area. The monitoring results are shown in the

Table 4-16.

Table 4-15: Surface Water Quality Monitoring Locations

Sl. No.	Location code	Location Name	Coordinates
1.	SWQ-1	Canal Crossing Near Chainage CH-2.29	20°30'22.17"N 77°24'9.62"E
2.	SWQ-2	Purna River Crossing at CH-29.488 KM	20°34'1.94"N 77°10'8.47"E

Table 4-16: Surface Water Quality Monitoring Result

Sl. No.	Parameter	Unit	Result	
			SWQ-1	SWQ-2
1	Turbidity	NTU	3.1	2.94
2	pH (at 25°C)	-	7.65	7.56
3	Conductivity,	µS/cm	869	907
4	Total Dissolve Solids	mg/l	328	415
5	Total Hardness as $CaCO_3$	mg/l	210	243
6	Calcium as Ca	mg/l	43.5	38.4
7	Magnesium as Mg	mg/l	23.5	36.9
8	Sodium as Na	mg/l	94.2	80.5
9	Potassium as K	mg/l	54.5	62.4
10	Chloride as Cl	mg/l	180.1	189.9
11	Sulphate as SO_4	mg/l	76.6	76.2
12	Nitrate as NO_3	mg/l	36.7	36.8
13	Total Alkalinity as $CaCO_3$	mg/l	212	257.8
14	Fluoride	mg/l	0.14	0.15
15	Cyanide	mg/l	<0.05	<0.05
16	Arsenic	mg/l	<0.01	<0.01
17	Boron as B	mg/l	<0.01	<0.01
18	Cadmium as Cd	mg/l	<0.01	<0.01
19	Chromium, Total	mg/l	<0.01	<0.01
20	Copper as Cu	mg/l	<0.05	<0.05
21	Lead as Pb	mg/l	<0.05	<0.05
22	Manganese as Mn	mg/l	<0.05	<0.05
23	Mercury	mg/l	<0.01	<0.01
24	Nickel as Ni	mg/l	<0.01	<0.01
25	Selenium as Se	mg/l	<0.01	<0.01
26	Zinc	mg/l	0.013	0.013
27	Dissolved Oxygen	mg/l	5.71	5.76
28	Total Suspended Solid	mg/l	14.9	27.5
29	Total Solid	mg/l	443.3	454.4
30	Chemical Oxygen Demand as O_2	mg/l	28.1	26.4
31	BOD, 3 days @27°C as O_2	mg/l	8.0	6.1
32	Oil & Grease	mg/l	<0.01	<0.01
33	Total Coliform	MPN/100 ml	12	10

Analysis of Results:

Both SWQ-1 and SWQ-2 samples meet the physical and chemical quality standards set by IS 10500:2012 for drinking water. However, the presence of total coliforms in both samples suggests potential microbiological contamination, which requires attention. The laboratory results of the secondary baseline monitoring is enclosed in the **Annexure 14.**

4.7 BIOLOGICAL ENVIRONMENT

Ecological studies are one of the important aspects of Environmental Impact Assessment (EIA) with a view to conserving biodiversity. Ecological systems show complex inter-relationships between biotic and abiotic components including dependence, competition, and mutualism. Biotic components comprise of both plant and animal communities, which interact not only within and between themselves but also with the biotic components viz. physical and chemical components of the environment. Generally, biological communities are good indicators of climatic and edaphic factors. Studies on biological aspects of ecosystems are important for the safety of flora and fauna. The biological environment includes terrestrial and aquatic ecosystems.

The observations and assessments of overall ecological scenario presented in this chapter include details of flora, fauna, natural habitats, protected areas, wildlife species and their migration corridors etc. Such baseline information provides a better understanding of the situation and overall ecological importance of the area. This baseline information viewed against industrial activities helps in predicting their impact on wildlife and their habitats in the region.

This section of report describes the methodology adopted for secondary data collection, diversity of higher flora and fauna recorded through primary field studies and the secondary data sourced from published scientific literature, habitat profile and ecosystem services profile and nearest designated areas of the project site.

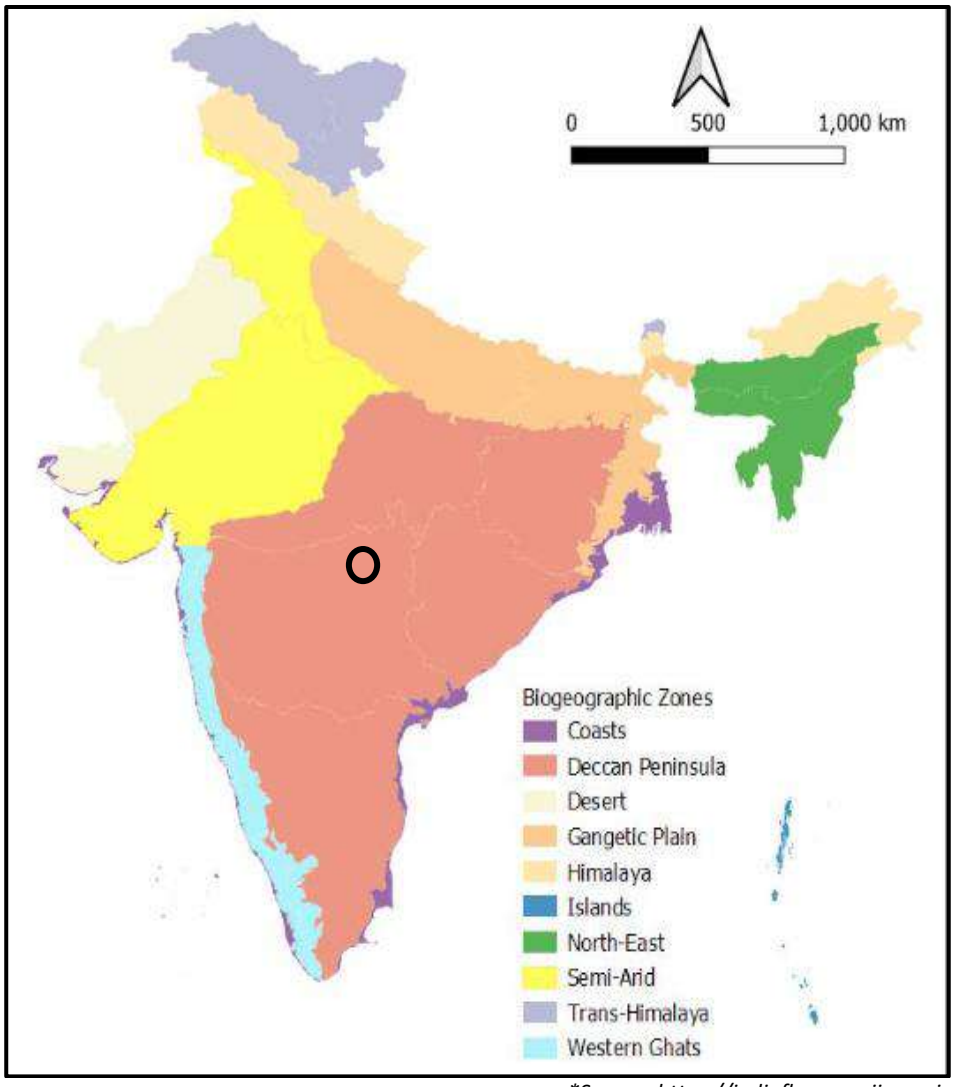
4.7.1 Scope and Objectives

The ecology & biodiversity study carried out at the project study area i.e., includes Project Footprint Area (Pipeline) and surrounding 05 km radius area of buffer zone. Based upon the study and findings, impacts were assessed and subsequently mitigation measures were recommended. Thus, further primary objectives for ecological surveys are elaborated as follows:

- Review and analyze the available literature data related to habitats, flora, and fauna of the site around proposed project and surrounding areas of 05 km radius (Buffer Zone).
- Identification of critical habitats, wildlife corridors, national parks, wildlife sanctuary, and any other areas of ecological significance.
- Identification of native, alien, exotic, rare, threatened, and endangered species (if any).
- Assessment of impacts of the project on ecology during construction and operation phase.
- Identification of any notified area under international conventions, national or local legislation for their ecological, landscape, cultural or other related values within the study site.
- Suggestion of mitigation measures to minimize/avoid adverse impacts on ecology during construction and operation phase.

4.7.2 Biogeographic Description of Study Area

According to the Biogeographic provinces of India published by Wildlife Institute of India (Rodgers, Panwar and Mathur, 2002), the project site falls under the Biogeographic Province: Semi-Arid (**Figure 4-26**).



**Source: https://indiaflora-ces.iisc.ac.in/bio_zones.php*

Figure 4-26: Biogeographic Regions of India

4.7.3 Methodology for Ecological Survey

4.7.3.1 Desktop Review

A desktop review was conducted to determine the land use and land cover (Toposheet, Satellite imagery), Forest type (Champion and Seth, 1962), Bio-geographic provinces and zones (Rodgers, Panwar and Mathur 2000) and floral & faunal assemblage in the study area from published documents/papers etc. To provide representative ecological status for the project, existing critical habitats, scrubs/vegetative cover and water bodies around the project area and other factors were searched/collected and selected for ecological survey in and around such habitats. To conduct the survey, a core and buffer zone was delineated, so that ecological receptors and impacts on them can be established during the EIA process. The core and buffer zone are as follows:

- Project Footprint Area
- Area of Influence and the buffer zone

4.7.3.2 Baseline Survey

Secondary data collection and primary on-site survey were two components of the baseline survey. The secondary baseline survey was carried out to determine the existing ecological conditions and was designed to fill any data gaps, and to facilitate an adequate assessment of the project impacts upon local ecology and the development of appropriate mitigation measures. Prior to that, secondary data regarding sensitive ecological habitat (national park, sanctuary, ecological sensitive area, migratory corridor, habitat of endangered, vulnerable and range restricted species etc.) has been reviewed from desktop study and further flora & fauna in the project area was recorded through undertaking primary baseline phytosociological analysis, public consultation and through referring other authentic published documents to understand the major flora & fauna in the study area, assemblage of birds in the water bodies during peak winter in India, pressure on the local natural resources, presence of any Schedule-I species in the project area.

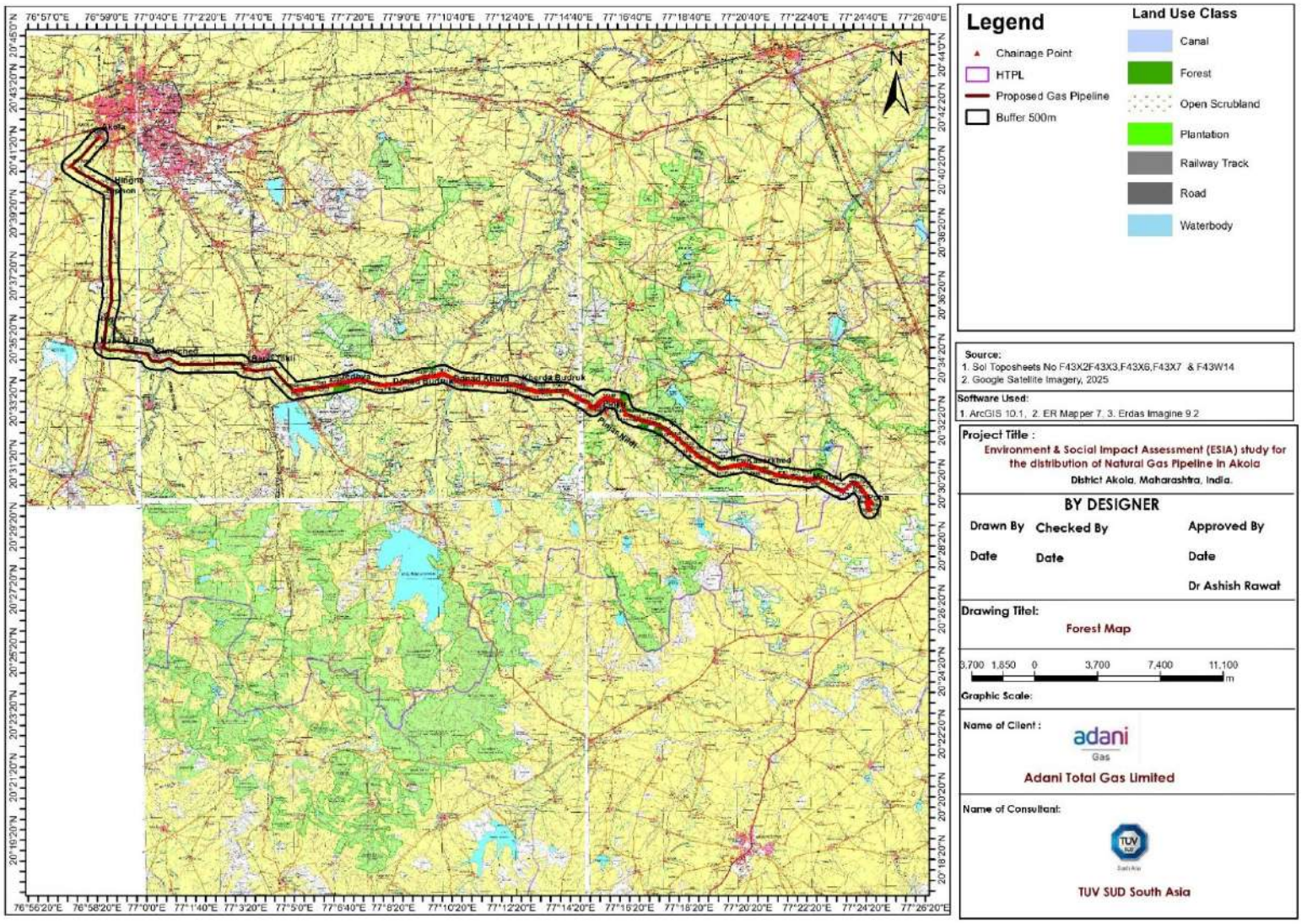
Based on secondary analysis of authenticated documents, inventory of floral and faunal species was made and are elaborated in the following section.

4.7.3.3 Study of Ecological Habitat

4.7.3.3.1 Forests

Forest in Akola region belongs to 'Southern Tropical Dry Deciduous Forests' as classified by Champion and Seth Classification of Forest types (1968). Akola's forest division is part of the Amravati Territorial Circle that includes Amravati, Akola, Melghat and Buldhana Division. Out of total geographical area of 5,676 km^2 around 313.47 km^2 is covered by forest i.e, total 5.52% of the area.[4]

[4] India Forest Survey Report 2023 isfr_book_eng-vol-2_2023.pdf



Source: TUV SUD GIS Mapping Study

Figure 4-27: Forest Map of Project Study Area

4.7.3.3.2 Scrubland

This type of vegetation is extensively found in non-cultivated lands, particularly revenue lands/grazing land located within the study area. Around 14.98 km^2 of the area in the Akola district is occupied by the scrubland. In Akola, Scrubland has been observed to be decreasing over time. This reduction includes both closed and open scrublands, with open scrublands seeing a larger decrease.

4.7.3.3.3 Cropping Pattern of Study Area

The cropping pattern in Akola district has changed notably over time. In the Kharif season, cotton and sorghum were dominant in the 1970s, but by the 2010s, soybean became the leading crop, followed by cotton and pigeonpea. In the Rabi season, wheat was the main crop in the 1970s, but chickpea gradually took over, becoming the most widely grown crop by the 2010s. These changes reflect a shift toward more market-oriented and diverse farming practices.

4.7.3.3.4 Water Bodies

Akola district in Maharashtra features several notable water bodies, including:

1. **Rivers**: Purna River is one of the major rivers flowing through the region, providing essential water resources for agriculture and daily use and its tributaries namely Katepurna, Morna, Nirguna, Uma, Mun, Shahnur, Pedhi, and Wan. The drainage of the Washim district is such that Aran River flows in the south of the block and its tributaries. As depicted in the drainage system of the district in **Figure 4-5.**
2. **Canals:** A significant canal system that supports irrigation and water supply in the district.

The list of water bodies in the study area is provided in the **Table 4-5**.

4.7.3.3.5 Protected Area and Eco-sensitive Areas

The study area comprising of core and buffer zone was assessed for the presence of important wildlife habitats and protected areas, breeding and nesting habitats of fauna, important wetlands, and grassland areas from project locations and pipeline' core and buffer zones. These important areas such as Protected areas (National Park, Wildlife Sanctuaries, Conservation Reserves etc.), Wetlands of national importance, Ramsar sites, Important Bird Areas (IBAs), classified by Birdlife International and Bombay Natural History Society etc. Data collected and gathered information from primary and secondary sources on flora, fauna, protected area, natural habitats, wildlife species etc., were analyzed and results are presented below in **Table 4-17**.

Table 4-17: Details of Eco-sensitive Areas of Project Study Area

Ecological Sensitive Habitat	Description
National Parks/ Wildlife Sanctuary/ Biosphere reserves/ Elephant Reserve/ Any Other Reserves	• Katepurna Wildlife Sactuary (10.374 km, SW) • Karanja Sohol Wildlife Sanctuary (9.462 km, SW)
Important Bird Areas (IBAs)	None within 10 km radius study area The nearest Important Bird Area (IBA) Gurdaspur Bird Sanctuary (75 km, NE)
Ramsar Wetland Site	None within 10 km radius study area
Wildlife Corridors & Routes	Nil

Ecological Sensitive Habitat	Description
Breeding/nesting areas of endangered species	Nil

**Source: BirdLife International (2022) Country profile: India (http://datazone.birdlife.org/country/india)*
https://wiienvis.nic.in/Database/ramsar_wetland_sites_8224.aspx
https://wiienvis.nic.in/Database/IBA_8463.aspx

4.7.3.3.6 Migratory Birds and Migratory Pathway

No Important Bird Area (IBA) is located within 10 km radius of the project site. India lies along the Central Asian Flyway, a global migratory pathway that connects the Palearctic (Europe and Northern Asia) to the Indian subcontinent. The birds that utilize this flyway, travel south to the Indian subcontinent between October-early December depending on the end of the monsoon season and remain in the country till February-March. Bird species travelling along the Central Asian Flyway, utilize several large water bodies across India as congregation sites or rest stops.

4.7.4 Floral Diversity

The present study revealed that 83 tree species, 22 shrub species, 35 herb species, 12 grass species and 1 hydrophytes species were present in both core zone and buffer zone area up to 10 km radius of study area. Secondary data was also considered while listing the species for validation. Since open bare lands and Agri ecosystem are predominant in study areas, this region supports low plant diversity and therefore, not many large trees with sizable canopies were observed.

CORE ZONE HABITAT

Tabulated details of flora recorded in the study area have been provided below in **Table 4-18** below:

Table 4-18: List of Floral species in Study Area

S. No	Scientific Name	Common Name	Family	IUCN Status
Trees				
1	Acacia catechu	Black Cutch	Fabaceae	Not Evaluated
2	Acacia leucophloea	White Bark Acacia	Fabaceae	Least Concern
3	Acacia nilotica	Gum Arabic Tree	Fabaceae	Least Concern
4	Adina cordifolia	Haldu	Rubiaceae	Not Evaluated
5	Aegle marmelos	Golden Apple	Rutaceae	Near Threatened
6	Ailanthus excelsa	Indian Tree of Heaven	Simaroubaceae	Not Evaluated
7	Albizia amara	Krishna Siris	Fabaceae	Least Concern
8	Albizia lebbeck	Woman's Tongue	Fabaceae	Least Concern
9	Albizia odoratissima	Black Siris	Fabaceae	Least Concern
10	Albizia procera	White siris	Mimosaceae	Least Concern
11	Alstonia scholaris	Indian Devil Tree	Apocynaceae	Least Concern
12	Annona reticulata	Sugar Apple	Anonaceae	Least Concern
13	Annona squamosa	Custard Apple	Anonaceae	Least Concern
14	Anogeissus latifolia	Axle Wood Tree	Combretaceae	Not Evaluated
15	Araucaria columnaris	Christmas Tree	Araucariaceae	Least Concern
16	Azadiracta indica	Neem	Meliaceae	Not Evaluated
17	Bambusa arundinacea	Bamboo	Poaceae	Not Evaluated
18	Bauhinia purpurea	Purple Orchid Tree	Fabaceae	Least Concern
19	Bauhinia racemosa	Bidi Leaf Tree	Fabaceae	Not Evaluated

S. No	Scientific Name	Common Name	Family	IUCN Status
20	Bombax ceiba	Cotton Tree	Malvaceae	Least Concern
21	Boswellia serrata	Indian Frankincense	Burseraceae	Not Evaluated
22	Bridelia retusa	Spinous Kino Tree	Phyllanthaceae	Least Concern
23	Buchanania lanzan	Cuddapah Almond	Anacardiaceae	Not Evaluated
24	Butea monosperma	Flame Of The Forest	Fabaceae	Least Concern
25	Careya arborea	Wild Guava	Lecythidaceae	Not Evaluated
26	Carica papaya	Papaya	Caricaceae	Data Deficient
27	Cassia fistula	Golden Shower Tree	Caesalpiniaceae	Least Concern
28	Cassine glauca	Ceylon Tea	Celastraceae	Not Evaluated
29	Ceiba pentandra	Kapok Tree	Bombacaceae	Least Concern
30	Chloroxylon swietenia	Ceylon Satinwood	Rutaceae	Vulnerable
31	Cleistanthus collinus	Garari	Phyllanthaceae	Vulnerable
32	Cochlospermum religiosum	Butter Cup Tree	Bixaceae	Not Evaluated
33	Cocos nucifera	Coconut	Arecaceae	Not Evaluated
34	Dalbergia latifolia	East Indian Rosewood	Fabaceae	Vulnerable
35	Dalbergia paniculata	Patri	Fabaceae	Not Evaluated
36	Dalbergia sissoo	Indian Rosewood	Fabaceae	Least Concern
37	Delonix regia	Gulmohar	Caesalpinioideae	Least Concern
38	Diospyros melanoxylon	Coromandel Ebony	Ebenaceae	Not Evaluated
39	Diospyros montana	Vishtendu	Ebenaceae	Not Evaluated
40	Erythrina variegata	Indian Coral Tree	Fabaceae	Least Concern
41	Ficus benghalensis	Indian Banyan	Moraceae	Not Evaluated
42	Ficus hispida	Hairy Fig	Moraceae	Least Concern
43	Ficus religiosa	Sacred Fig	Moraceae	Not Evaluated
44	Flacourtia indica	Governor's Plum	Salicaceae	Least Concern
45	Gardenia latifolia	Indian Boxwood	Rubiaceae	Not Evaluated
46	Gardenia turgida	Karumba	Rubiaceae	Not Evaluated
47	Garuga pinnata	Garuga	Burseraceae	Not Evaluated
48	Gmelina arborea	Gamhar	Verbenaceae	Least Concern
49	Grevillea robusta	Silver Oak	Proteaceae	Least Concern
50	Grewia tiliifolia	Dhaman	Malvaceae	Not Evaluated
51	Helicteres isora	Indian Screw Tree	Malvaceae	Not Evaluated
52	Lagerstroemia parviflora	Small Flowered Crape Myrtle	Lythraceae	Not Evaluated
53	Lannea coromandelica	Indian Ash Tree	Anacardiaceae	Least Concern
54	Leucaena leucocephala	Wild Tamarind	Mimosoideae	Not Evaluated
55	Madhuca indica	Mahua	Sapotaceae	Not Evaluated
56	Mangifera indica	Mango	Anacardiaceae	Data Deficient
57	Manilkara hexandra	Ceylon Iron Wood	Sapotaceae	Not Evaluated
58	Mitragyna parvifolia	Kaim	Rubiaceae	Not Evaluated
59	Moringa oleifera	Drumstick	Moringaceae	Least Concern

S. No	Scientific Name	Common Name	Family	IUCN Status
60	Nyctanthes arbor-tristis	Tree of Sadness	Oleaceae	Least Concern
61	Ougeinia oojeinensis	Sandam	Fabaceae	Not Evaluated
62	Phoenix sylvestris	Silver Date Palm	Arecaceae	Not Evaluated
63	Phyllanthus emblica	Indian Gooseberry	Phyllanthaceae	Least Concern
64	Polyalthia longifolia	False Ashok	Annonaceae	Not Evaluated
65	Pongamia pinnata	Indian Beech Tree	Fabaceae	Least Concern
66	Psidium guajava	Guava	Myrtaceae	Least Concern
67	Pterocarpus marsupium	Indian Kino Tree	Fabaceae	Near Threatened
68	Schleichera oleosa	Ceylon Oak	Sapindaceae	Least Concern
69	Schrebera swietenioides	Weaver's Beam Tree	Oleaceae	Not Evaluated
70	Semecarpus anacardium	Marking Nut	Anacardiaceae	Not Evaluated
71	Soymida febrifuga	Indian Redwood	Meliaceae	Not Evaluated
72	Sterculia urens	Gum Karaya	Malvaceae	Not Evaluated
73	Syzygium cumini	Jamun	Myrtaceae	Least Concern
74	Tamarindus indica	Tamarind	Casalpinaceae	Least Concern
75	Tamilnadia uliginosa	Divine Jasmine	Rubiaceae	Not Evaluated
76	Tectona grandis	Teak	Lamiaceae	Endangered
77	Terminalia arjuna	Arjuna	Combretaceae	Not Evaluated
78	Terminalia bellirica	Baheda	Combretaceae	Not Evaluated
79	Terminalia chebula	Yellow Myrobalan	Combretaceae	Least Concern
80	Vitex negundo	Five-leaved Chaste Tree	Lamiaceae	Least Concern
81	Wrightia tinctoria	Sweet Indrajao	Apocynaceae	Least Concern
82	Ziziphus jujuba	Indian Jujube	Rhamnaceae	Least Concern
83	Ziziphus xylopyrus	Kath Ber	Rhamnaceae	Not Evaluated
Shrubs				
84	Abutilon indicum	Indian Mallow	Malvaceae	Not Evaluated
85	Balanites aegyptiaca	Desert Date	Zygophyllaceae	Not Evaluated
86	Calotropis procera	Giant Milkweed	Apocynaceae	Not Evaluated
87	Carissa carandas	Karonda	Apocynaceae	Not Evaluated
88	Casearia tomentosa	Mojal	Salicaceae	Not Evaluated
89	Cassia auriculata	Avaram	Caesalpinaceae	Not Evaluated
90	Datura metel	Devil's Trumpet	Solanaceae	Not Evaluated
91	Dendrocalamus strictus	Calcutta Bamboo	Poaceae	Not Evaluated
92	Dodonaea viscosa	Hop Bush	Sapindaceae	Least Concern
93	Gardenia gummifera	Gummy Gardenia	Rubiaceae	Least Concern
94	Hibiscus rosa-sinensis	Hibiscus	Malvaceae	Not Evaluated
95	Hygrophila auriculata	Marsh Barbel	Acanthaceae	Least Concern
96	Justicia adhatoda	Malabar Nut	Acanthaceae	Not Evaluated
97	Kydia calycina	Kydia	Malvaceae	Least Concern
98	Lantana camara	Lantana	Verbenaceae	Not Evaluated

S. No	Scientific Name	Common Name	Family	IUCN Status
99	Maytenus emarginata	Baikal	Celastraceae	Not Evaluated
100	Miliusa velutina	Miliusa	Annonaceae	Not Evaluated
101	Mimosa hamata	Hooked Mimosa	Fabaceae	Not Evaluated
102	Nerium oleander	Oleander	Apocynaceae	Least Concern
103	Tephrosia purpurea	Common Tephrosia	Fabaceae	Not Evaluated
104	Xylia xylocarpa	Burma Ironwood	Fabaceae	Least Concern
Herbs				
105	Achyranthes aspera	Prickly Chaff Flower	Amaranthaceae	Not Evaluated
106	Agave americana	Century Plant	Asparagaceae	Least Concern
107	Aloe barbadensis	Aloe Vera	Asphodelaceae	Least Concern
108	Alternanthera sessilis	Sessile Joyweed	Amarantheceae	Not Evaluated
109	Amaranthus spinosus	Spiny Amaranth	Amaranthaceae	Not Evaluated
110	Amaranthus viridis	Slender Amaranth	Amaranthaceae	Not Evaluated
111	Amorphophallus paeoniifolius	Elephant Yam	Araceae	Least Concern
112	Andrographis paniculata	King of Bitters	Acanthaceae	Not Evaluated
113	Argemone mexicana	Mexican Prickly Poppy	Papaveraceae	Not Evaluated
114	Barleria prionitis	Porcupine Flower	Acanthaceae	Least Concern
115	Cajanus scarabaeoides	Showy Pigeonpea	Fabaceae	Least Concern
116	Cassia tora	Stinking Cassia	Fabaceae	Not Evaluated
117	Cleome viscosa	Asian Spider Flower	Cleomaceae	Not Evaluated
118	Croton bonplandianus	Croton	Euphorbiaceae	Not Evaluated
119	Curculigo orchioides	Golden Eye-grass	Hypoxidaceae	Not Evaluated
120	Cyperus rotundus	Java Grass	Cyperaceae	Least Concern
121	Euphorbia hirta	Asthma Weed	Euphorbiaceae	Not Evaluated
122	Grewia hirsuta	Kukurbicha	Tiliaceae	Not Evaluated
123	Hyptis suaveolens	American Mint	Lamiaceae	Not Evaluated
124	Indigofera tinctoria	True Indigo	Fabaceae	Not Evaluated
125	Jatropha gossypiifolia	Bellyache Bush	Euphorbiaceae	Least Concern
126	Martynia annua	Devil's Claw	Martyniaceae	Not Evaluated
127	Mimosa pudica	Touch-me-not	Fabaceae	Least Concern
128	Ocimum basilicum	Sweet Basil	Lamiaceae	Not Evaluated
129	Oxalis corniculata	Creeping Wood Sorrel	Oxalidaceae	Not Evaluated
130	Parthenium hysterophorus	Carrot Weed	Asteraceae	Not Evaluated
131	Phyllanthus niruri	Gale of the Wind	Euphorbiaceae	Not Evaluated
132	Sida acuta	Common Wireweed	Malvaceae	Not Evaluated
133	Solanum xanthocarpum	Yellow-fruit nightshade	Solanaceae	Not Evaluated
134	Stylosanthes hamata	Caribbean Stylo	Fabaceae	Not Evaluated
135	Tribulus terrestris	Puncture Vine	Zygophyllaceae	Least Concern
136	Tridax procumbens	Coat Buttons	Asteraceae	Not Evaluated
137	Typha angustifolia	Narrowleaf Cattail	Typhaceae	Least Concern

S. No	Scientific Name	Common Name	Family	IUCN Status
138	Vanda tessellata	Checkered Vanda	Orchidaceae	Least Concern
139	Woodfordia fruticosa	Fire Flame Bush	Lythraceae	Least Concern
140	Xanthium strumarium	Common Cocklebur	Asteraceae	Not Evaluated
Climbers				
141	Abrus precatorius	Rosary Pea	Fabaceae	Not Evaluated
142	Aristolochia indica	Indian Bithwort	Aristolochiaceae	Not Evaluated
143	Asparagus racemosus	Wild Asparagus	Liliaceae	Not Evaluated
144	Bauhinia vahlii	Maloo Creeper	Fabaceae	Not Evaluated
145	Capparis zeylanica	Ceylon Caper	Capparaceae	Not Evaluated
146	Celastrus paniculatus	Black Oil Plant	Celastraceae	Not Evaluated
147	Cocculus hirsutus	Broom Creeper	Menispermaceae	Not Evaluated
148	Cryptolepis buchananii	Wax Leaved Climber	Apocynaceae	Not Evaluated
149	Cuscuta reflexa	Cuscuta	Convolvulaceae	Not Evaluated
150	Epipremnum aureum	Money Plant	Araceae	Not Evaluated
151	Gloriosa superba	Glory Lily	Colchicaceae	Least Concern
152	Hemidesmus indicus	Indian Sarasaparilla	Apocynaceae	Not Evaluated
153	Mucuna pruriens	Velvet Bean	Fabaceae	Not Evaluated
154	Nyctanthes arbortristis	Night-flowering jasmine	Oleaceae	Not Evaluated
155	Piper betle	Betel Pepper	Piperacae	Not Evaluated
156	Tinospora cordifolia	Heart-leaved Moonseed	Menispermaceae	Not Evaluated
157	Ziziphus oenoplia	Jackal Jujube	Rhamnaceae	Not Evaluated
Grasses				
158	Apluda mutica	Mauritian Grass	Poaceae	Not Evaluated
159	Aristida adscensionis	Common Needle Grass	Poaceae	Not Evaluated
160	Chrysopogon aciculatus	Love Grass	Poaceae	Not Evaluated
161	Chrysopogon fulvus	Reddish-Yellow Beard Grass	Poaceae	Not Evaluated
162	Cynodon dactylon	Bermuda Grass	Poaceae	Not Evaluated
163	Dichanthium annulatum	Marvel Grass	Poaceae	Not Evaluated
164	Eragrostis amabilis	Japanese Love Grass	Poaceae	Not Evaluated
165	Heteropogon contortus	Spear Grass	Poaceae	Not Evaluated
166	Imperata cylindrica	Cogon Grass	Poaceae	Not Evaluated
167	Isilema laxum	Musal Grass	Poaceae	Not Evaluated
168	Themeda quadrivalvis	Grader Grass	Poaceae	Not Evaluated
169	Vetiveria zizanioides	Vetiver	Poaceae	Not Evaluated
Hydrophytes				
170	Ipomoea carnea	Pink Morning Glory	Convolvulaceae	Not Evaluated

**Not Evaluated: species has not yet been assessed for its risk of extinction based on the IUCN's criteria*

***Data Deficient: insufficient information to make a proper conservation status assessment of IUCN criteria*

4.7.5 Faunal Diversity

Diversity of faunal distribution shows the health of ecosystem. In this study area a total of 64 types of faunal species were observed or reported in which 6 species of mammals**,** 118 birds, 7 reptiles and 3 Amphibians were recorded**.**

4.7.5.1 Mammals

Mammals occupy higher tropical levels in many ecosystems and respond quickly to the changes in their habitats, therefore, serve as best indicators of the ecosystem health. Hence, the baseline information on distribution and abundance of mammals is prepared. A qualitative check list of mammals based on their presences and absence using indirect evidence and signs such as footprints, dens, droppings, diggings, scrap marks, etc. in the study area was prepared. The following list of mammal species as presented in **Table 4-19** were predominantly recorded in the project study area.

Table 4-19: List of Mammals Species in Project Study Area

Sl. No.	Scientific Name	Common Name	WPA, 1972	IUCN Conservation Status
1	*Axis axis*	Spotted Deer	III	Least Concern
2	*Bandicota bengalensis*	Lesser Bandicoot Rat	V	Least Concern
3	*Boselaphus tragocamelus*	Nilgai	III	Least Concern
4	*Canis aureus*	Jackal	II	Least Concern
5	*Canis lupus*	Indian Wolf	I	Least Concern
6	*Felis chaus*	Jungle Cat	II	Least Concern
7	*Funambulus palmarum*	Three-striped Palm Squirrel	IV	Least Concern
8	*Hystrix indica*	Indian Porcupine	IV	Least Concern
9	*Lepus nigricollis*	Indian Hare	IV	Least Concern
10	*Macaca mulatta*	Rhesus Macaque	II	Least Concern
11	*Semnopithecus entellus*	Northern Plains Gray Langur	II	Least Concern
12	*Sus scrofa*	Wild Boar	III	Least Concern
13	*Urva edwardsii*	Grey Mongoose	II	Least Concern

**Sources: TUV SUD Primary Survey and secondary data Study*
IUCN-The IUCN Red List of Threatened Species. Version 2023-1.
Schedules I to II: Indian Wildlife (Protection) Act, 2022. LC: Least Concern, IUCN Red List of Threatened Species

4.7.5.2 Herpetofauna

The diversity of amphibian and reptilian species in an ecosystem is cumulatively called Herpetofaunal diversity. Amphibians are fauna which can survive on land as well as in water. They inhabit a wide variety of habitats with most species living within terrestrial, fossorial, arboreal or freshwater aquatic ecosystems. Their presence witnesses the richness of ecosystems. They are omnivorous in feeding habits. The following (**Table 4-20** and **Table 4-21**) species of herpetofauna were observed in the study area.

Table 4-20: Amphibian Species recorded in Project Study Area

S. No	Scientific Name	Common Name	WPA 2022	IUCN Status
Amphibians				
1	*Duttaphrynus melanostictus*	Common Indian Toad	IV	Least Concern
2	*Euphlyctis cyanophlyctis*	Indian Skipper Frog	IV	Least Concern
3	*Hoplobatrachus tigerinus*	Indian Bull Frog	IV	Least Concern

Table 4-21: Reptiles Species recorded in Project Study Area

S. No	Scientific Name	Common Name	WPA 2022	IUCN Status
Reptiles				
1	*Calotes versicolor*	Oriental Garden Lizard	IV	Least Concern
2	*Coelognathus helena*	Trinket Snake	IV	Least Concern
3	*Daboia russelii*	Russell's Viper	II	Least Concern
4	*Eutropis carinata*	Indian Mabuya	IV	Least Concern
5	*Fowlea piscator*	Checkered Keelback	II	Least Concern
6	*Lycodon aulicus*	Indian Wolf Snake	IV	Least Concern
7	*Ptyas mucosa*	Indian Rat Snake	II	Least Concern

**Sources: TUV SUD Primary Survey and secondary data Study*
IUCN-The IUCN Red List of Threatened Species. Version 2023-1.
Schedules I to II: Indian Wildlife (Protection) Act, 2022. LC: Least Concern, IUCN Red List of Threatened Species

4.7.5.3 Avifauna

A total of 86 bird species were observed or reported in Akola district. Also, there is no Important Bird Area (IBA), Bird migratory paths and congregatory birds' locations were observed in study area. The list of avifauna observed or reported in study area is presented in **Table 4-22**[5].

Table 4-22: List of Avifaunal species in Project Study Area

S. No	Scientific Name	Common Name	WPA 2022	IUCN Status
Avifauna				
1	*Accipiter badius*	Shikra	I	Least Concern
2	*Vanellus indicus*	Red-wattled Lapwing	II	Least Concern
3	*Acridotheres tristis*	Common Myna	II	Least Concern
4	*Alcedo atthis*	Common Kingfisher	II	Least Concern
5	*Amandava amandava*	Red Avadavat	II	Least Concern
6	*Upupa epops*	Common Hoopoe	II	Least Concern
7	*Anas acuta*	Northern Pintail	II	Least Concern
8	*Anas crecca*	Common Teal	II	Least Concern
9	*Threskiornis melanocephalus*	Black-headed Ibis	II	Least Concern
10	*Treron phoenicopterus*	Yellow-footed Green Pigeon	II	Least Concern
11	*Tringa glareola*	Wood Sandpiper	II	Least Concern
12	*Argya striata*	Jungle Babbler	II	Least Concern
13	*Anser indicus*	Bar-headed Goose	II	Least Concern
14	*Anthus hodgsoni*	Olive-backed Pipit	II	Least Concern
15	*Recurvirostra avosetta*	Pied Avocet	II	Least Concern
16	*Anthus similis*	Long-billed Pipit	II	Least Concern
17	*Apus affinis*	Little Swift	II	Least Concern
18	*Ardea cinerea*	Grey Heron	II	Least Concern
19	*Saxicoloides fulicata*	Indian Robin	II	Least Concern
20	*Ardea purpurea*	Purple Heron	II	Least Concern
21	*Tadorna ferruginea*	Ruddy Shelduck	II	Least Concern
22	*Argya malcolmi*	Large Grey Babbler	II	Least Concern
23	*Athene brama*	Spotted Owlet	II	Least Concern
24	*Aythya ferina*	Common Pochard	I	Vulnerable
25	*Bubulcus ibis*	Cattle Egret	II	Least Concern

[5] Diversity and conservation status of avifauna in the Surguja region, Chhattisgarh, India

S. No	Scientific Name	Common Name	WPA 2022	IUCN Status
26	*Burhinus indicus*	Indian Thick-knee	II	Least Concern
27	*Sterna aurantia*	River Tern	I	Vulnerable
28	*Ceryle rudis*	Pied Kingfisher	II	Least Concern
29	*Chlidonias hybrida*	Whiskered Tern	II	Least Concern
30	*Chrysomma sinense*	Yellow-eyed Babbler	II	Least Concern
31	*Cinnyris asiaticus*	Purple Sunbird	II	Least Concern
32	*Cisticola juncidis*	Zitting Cisticola	II	Least Concern
33	*Stigmatopelia senegalensis*	Laughing Dove	II	Least Concern
34	*Streptopelia decaocto*	Eurasian Collared-Dove	II	Least Concern
35	*Streptopelia tranquebarica*	Red Collared-Dove	II	Least Concern
36	*Coracias benghalensis*	Indian Roller	II	Least Concern
37	*Corvus splendens*	House Crow	_	Least Concern
38	*Cuculus micropterus*	Indian Cuckoo	II	Least Concern
39	*Dendrocitta vagabunda*	Rufous Treepie	II	Least Concern
40	*Dicrurus macrocercus*	Black Drongo	II	Least Concern
41	*Egretta garzetta*	Little Egret	II	Least Concern
42	*Eudynamys scolopaceus*	Western Koel Koel	II	Least Concern
43	*Euodice malabarica*	Indian Silverbill	II	Least Concern
44	*Falco tinnunculus*	Common Kestrel	II	Least Concern
45	*Fulica atra*	Eurasian Coot	II	Least Concern
46	*Galerida cristata*	Crested Lark	II	Least Concern
47	*Gallinago gallinago*	Common Snipe	II	Least Concern
48	*Gallinula chloropus*	Common Moorhen	II	Least Concern
49	*Gracupica contra*	Indian Pied Starling	II	Least Concern
50	*Halcyon smyrnensis*	White-throated Kingfisher	II	Least Concern
51	*Himantopus himantopus*	Black-winged Stilt	II	Least Concern
52	*Tachybaptus ruficollis*	Little Grebe	II	Least Concern
53	*Hirundo smithii*	Wire-Tailed Swallow	II	Least Concern
54	*Lanius isabellinus*	Isabelline Shrike	II	Least Concern
55	*Lanius schach*	Long-tailed Shrike	II	Least Concern
56	*Lonchura punctulata*	Scaly-breasted Munia	II	Least Concern
57	*Mareca penelope*	Eurasian Wigeon	II	Least Concern
58	*Alexandrinus krameri*	Rose-ringed Parakeet	II	Least Concern
59	*Merops persicus*	Blue-cheeked Bee-eater	II	Least Concern
60	*Merops philippinus*	Blue-tailed Bee-eater	II	Least Concern
61	*Microcarbo niger*	Little Cormorant	II	Least Concern
62	*Milvus migrans*	Black Kite	II	Least Concern
63	*Mirafra erythroptera*	Indian Bushlark	II	Least Concern
64	*Motacilla alba*	White Wagtail	II	Least Concern
65	*Motacilla cinerea*	Grey Wagtail	II	Least Concern
66	*Motacilla citreola*	Citrine Wagtail	II	Least Concern
67	*Motacilla maderaspatensis*	White-browed Wagtail	II	Least Concern
68	*Mycteria leucocephala*	Painted Stork	II	Least Concern
69	*Neophron percnopterus*	Egyptian Vulture	I	Endangered
70	*Ocyceros birostris*	Indian Grey Hornbill	II	Least Concern
71	*Oriolus kundoo*	Indian Golden Oriole	II	Least Concern
72	*Orthotomus sutorius*	Common Tailorbird	II	Least Concern
73	*Passer domesticus*	House Sparrow	II	Least Concern
74	*Pavo cristatus*	Indian Peafowl	I	Least Concern
75	*Pericrocotus cinnamomeus*	Small Minivet	I	Least Concern
76	*Pernis ptilorhynchus*	Oriental Honey-buzzard	II	Least Concern

S. No	Scientific Name	Common Name	WPA 2022	IUCN Status
77	*Petrochelidon fluvicola*	Streak-throated Swallow	II	Least Concern
78	*Phalacrocorax carbo*	Great Cormorant	II	Least Concern
79	*Phylloscopus humei*	Hume's Leaf Warbler	II	Least Concern
80	*Plegadis falcinellus*	Glossy Ibis	II	Least Concern
81	*Ploceus manyar*	Streaked Weaver	II	Least Concern
82	*Ploceus philippinus*	Baya Weaver	II	Least Concern
83	*Prinia inornata*	Plain Prinia	II	Least Concern
84	*Prinia socialis*	Ashy Prinia	II	Least Concern
85	*Himalayapsitta cyanocephala*	Plum-headed Parakeet	II	Least Concern
86	*Psittacula eupatria*	Alexandrine Parakeet	II	Near Threatened

**Sources: TUV SUD Primary Survey and secondary data Study;*
Avifaunal Diversity of the Akola District of Maharashtra
IUCN-The IUCN Red List of Threatened Species. Version 2023-1.
Schedules I to II: Indian Wildlife (Protection) Act, 2022. LC: Least Concern, IUCN Red List of Threatened Species

4.8 SOCIO-ECONOMIC ENVIRONMENT

The primary objective of socio-economic study is to assess the current socio-economic status of the villages and community within the project area and to assess the potential impact of the project on the community in terms of livelihood, health, education, and others. The study is also used to understand the existing issues and concerns of the community based on which mitigation measures and other community development activities are designed.

This section envisages to present the socio-economic baseline of the project influence area and the project footprint area along with the synopsis of the stakeholder consultations conducted on the site.

4.8.1 Methodology

A mixture of both quantitative and qualitative approach has been adopted in the current socio-economic study. The study has been conducted based on primary and secondary data. While primary data has been collected through reconnaissance survey and public consultations/focused group discussions/individual interviews within the villages/towns/district headquarters falling on the proposed project alignment, secondary data has been collected from the Census of India 2011 and district statistical handbook, state and district portal. The details regarding population composition, number of literacies, working population and access to basic facilities and others have been collected from secondary sources and analyzed.

Villages and areas located along 20 to 50 meters aerial distance from the proposed pipeline project have been considered as project impact areas. The pipeline route passes along Somthana, Loni, Mhaispur and Lakhanwada villages in Akola block and Warkhed, Bakharapur, Shindkhed, Ajani Kh., Redhawa, Kherda Bk., Nimbi Bk., Pinjar, Para Bhawani, Kasarkhed and Morhal villages in Barshitakli block of Akola district, out of which Bakharapur village is uninhabited as per Census of India 2011. The pipeline also passes through Lohagaon village in Karanja block of Washim district and the initial stretch of the pipe passes through Poha village from the tap opp point at the CGS located in in Karanja block of Washim district.

Table 4-23: List of Villages, Block, District Falling Within the Proposed Pipeline Route

Sl. No	Village	CD Block	District	Land Categorization
1.	Poha	Karanja	Washim	CGS Start Point and Initial 3.837 km of the stretch of the Pipeline
2.	Lohagaon			Pipeline route
3.	Somthana	Akola	Akola	
4.	Loni			
5.	Mhaispur			
6.	Lakhanwada			
7.	Warkhed	Barshitakli		
8.	Bakharapur			
9.	Shindkhed			
10.	Ajani Kh.			
11.	Redhawa			
12.	Kherda Bk.			
13.	Nimbi Bk.			
14.	Pinjar			
15.	Para Bhawani			
16.	Kasarkhed			
17.	Morhal			

4.8.2 Concept and Definition of Terms Used

a) **Household:** A group of people who normally live together and take their meals from a common kitchen are called a household. People living in a household may be related or unrelated or a mix of both. However, if a group of related or unrelated people live in a house but do not take their meals from the common kitchen, then they are not part of a common household. Each person is treated as a separate household. There may be one member households, two member households or multi-member households.

b) **Density:** is a statistic that tells you how many people live in a certain geographical area. This type of measurement is called arithmetic density and is reported as the total number of people per land area.

c) **Sex Ratio:** Sex ratio is the ratio of females to males in each population. It is expressed as 'number of females per 1000 males'.

d) **Literates:** All persons aged up to 7 years and above who can both read and write with understanding in any language are taken as literate. It is not necessary for a person to have received any formal education or passed any minimum educational standard for being treated as literate. People who are blind but can read in Braille are also treated as literates.

e) **Literacy Rate:** Literacy rate of population is defined as the percentage of literates to the total population aged 7 years and above.

f) **Work:** Work is defined as participation in any economically productive activity with or without compensation, wages, or profit. Such participation may be physical and/or mental in nature. Work involves not only actual work but also includes effective supervision and direction of work. The

work may be part time or full time or unpaid work in a farm, family enterprise or in any other economic activity.

g) **Worker:** All persons engaged in 'work' are defined as workers. Persons who are engaged in cultivation of land or milk production even solely for domestic consumption are also treated as workers.

h) **Main Workers:** Those workers who had worked for a major part of the reference period (i.e., 6 months or more in the case of a year) are termed as Main Workers.

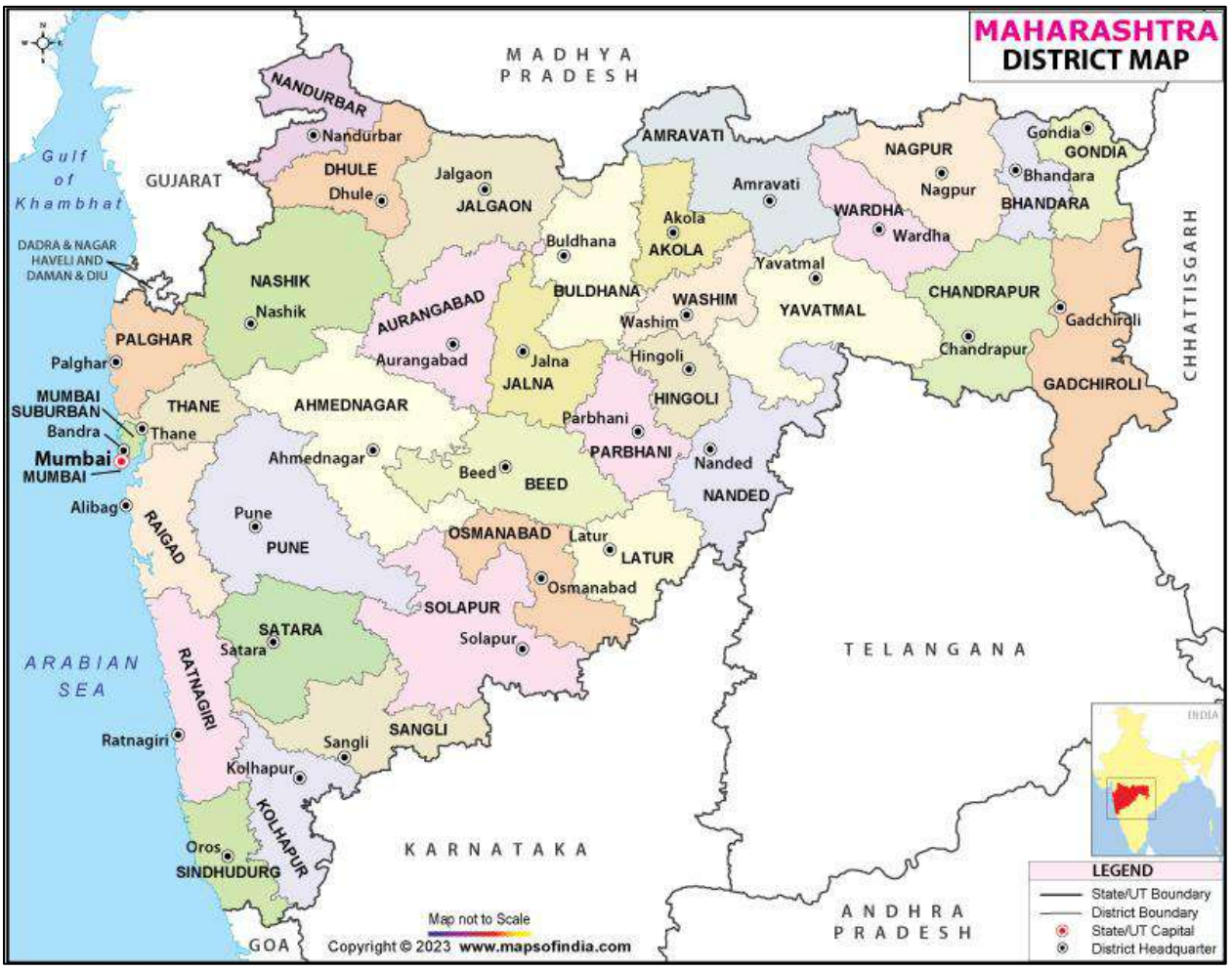
i) **Marginal Workers:** Those workers who did not work for a major part of the reference period (i.e., less than 6 months) are termed as Marginal Workers.

j) **Work Participation Rate (WPR):** The work participation rate is the ratio between the labour force and the overall size of their cohort (national population of the same age range). In the present study the work participation rate is defined as the percentage of total workers (main and marginal) to total population.

4.9 STATE PROFILE (MAHARASHTRA)

Maharashtra is the third largest state of India, with an area of about 3,07,713 square kilometers, occupying approximately 9.36% of the total geographical area of the country. Maharashtra is bounded by the Indian states of Gujarat to the northwest, Madhya Pradesh to the north, Chhattisgarh to the east, Telangana to the southeast, Karnataka to the south, and Goa to the southwest and by the union territory of Dadra and Nagar Haveli and the Arabian Sea to the west. It extends from the Tapi River in the north to the Krishna River in the south.

With a population of 11,23,74,333 persons as specified in the Census of India 2011, the state is second most populated of the country. Maharashtra is divided into 36 districts, which are grouped into six divisions, which also act as administrative divisions. Maharashtra is the world's second-most populous first-level administrative country sub-division. While the number of towns in the state was recorded as 378, the number of villages was 41,000. The sex ratio of the state has been recorded as 929 as against the national figure of 943. The proportion of Scheduled Caste population has been recorded as 1,32,75,898 as per 2011 Census, while the Schedule Tribe population constitutes of 10,510,213 people. As per Census 2011, Hinduism was the most followed religion in the state with 79.83 percent population followed by Muslim population accounting for 11.54 percent and minor proportions of Christians, Sikhs, Jains, Buddhists and others.



Source: Maps of India

Figure 4-28: State Map of Maharashtra

4.9.1 District Profile

Akola

Akola district is situated in the middle east of Maharashtra state. This district is situated between 20°16' and 21°17' and east longitudes 76°38' and 77°38'. Anjangaon, Daryapur and Nandgaon Khandeshwar tehsils of Amravati district and Karanja tehsil of Washim district are on the east. Washim district is on the south side and Buldhana district on the west.

There are 7 tehsils/ census developmental (CD) blocks in Akola District, viz., Akola, Balapur, Patur, Barshitakali, Murtizapur, Akot and Telhara which helps in proper administration of the district.

According to the 2011 Census, Akola district comprises 986 villages, including 122 uninhabited ones. It also includes 6 statutory towns and 6 census towns. The total population of the district was 18,13,906, with 9,32,334 males and 8,81,572 females. While the area of the district accounts for 1.84 percent of the total area of the State, the District population constitutes 1.61 percent of the total population of the State. The district has an area of 5,672.81 sq kms. and the density of population is 320 persons per sq. km. and a sex ratio of 946 females per 1,000 males. Among the 35 Districts of the State, the District ranks 28th in

terms of area, 25 in terms of population and 13 in terms of density. The literacy rate of the district is approximately 88.05 percent. Scheduled Caste (SC) and Scheduled Tribe (ST) population of the district stands at approximately 20.07 percent and 5.53 percent respectively.

The economy of the district is primarily dependent on the agricultural sector. Approximately 67.5 percent of the population is engaged in agricultural activities as of Census of India 2011.

Source: Maps of India

Figure 4-29: District Map of Akola

Washim

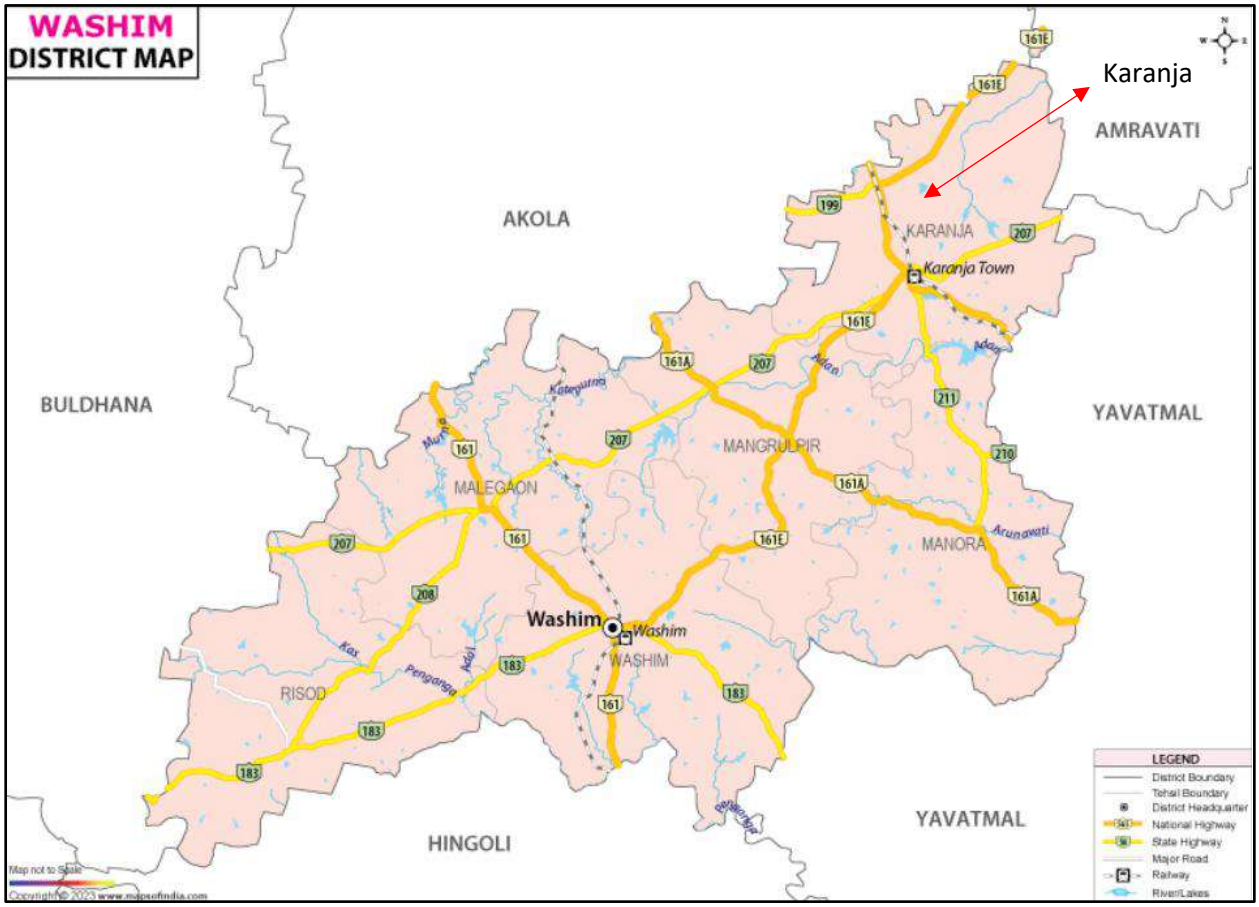
Washim District lies in north central Maharashtra. It is located between 19° 45' and 20° 45' of North latitudes and 76° 30' and 77° 45' of East longitudes. It is surrounded by Akola District to the north, Yavatmal and Amravati Districts to the east, Hingoli District to the south and Buldana District to the west.

Washim district is administratively divided into three subdivisions, namely Washim, Mangrulpir and Karanja which is further sub divided into Washim, Mangrulpir, Karanja, Risod, Malegaon, Manora tehsils/census developmental (CD) blocks for smoother administration.

According to the 2011 Census, Washim district comprises of 789 villages with 91 uninhabited ones. It also includes 4 statutory towns. The district has an area of 4901.19 sq.km., and population of 11,97,160 persons according to Census, 2011 with 6,20,302 males and 5,76,858 females. While the area of the district accounts for 1.59 percent of the total area of the State, the population of the district constitutes 1.07 percent of the total population of the State. Among the 35 Districts of the State, the District ranks 31st in terms of area, 32nd in terms of population and 25th in terms of density.

The district recorded a population density of 244 persons per square kilometer and a sex ratio of 930 females per 1,000 males. The literacy rate stood at 83.25 percent. Scheduled Castes make up about 19.17 percent of the district's population, while Scheduled Tribe population was reported to be about 6.72 percent, as per Census of India 2011.

The economy of the district is primarily dependent on the agricultural sector. More than 80 percent of people are engaged in agricultural activity.



Source: Maps of India

Figure 4-30: District Map of Washim

4.9.2 Block Profile

The land identified for the CGS point is located in Karanja CD Block in Washim district. The planned natural gas (NG) pipeline project passes through two CD blocks: Akola and Barshitakli in Akola district and also through Karanja block in Washim district encompassing both rural and urban areas.

4.9.3 Demography

Table 4-24 provides an overview of the area and demographic characteristics, covering both urban and rural areas of all the blocks as per Census 2011.

In the Akola district, Akola block is the largest amongst the two blocks, Akola Barshitakli, both in terms of both geographical area and population. All of the blocks in Akola district recorded similar proportions male and female populations.

Karanja block in Washim district is spread across approximately 810 square kilometers with a population of 34,538 people as per Census of India 2011.

Scheduled Caste (SC) population is more than Scheduled Tribe (ST) population in all the three blocks, as per Census of India 2011. Literacy Rates for all the blocks were recorded to be considerably high, with Akola block in Akola recording a literacy rate of about 78.61 percent.

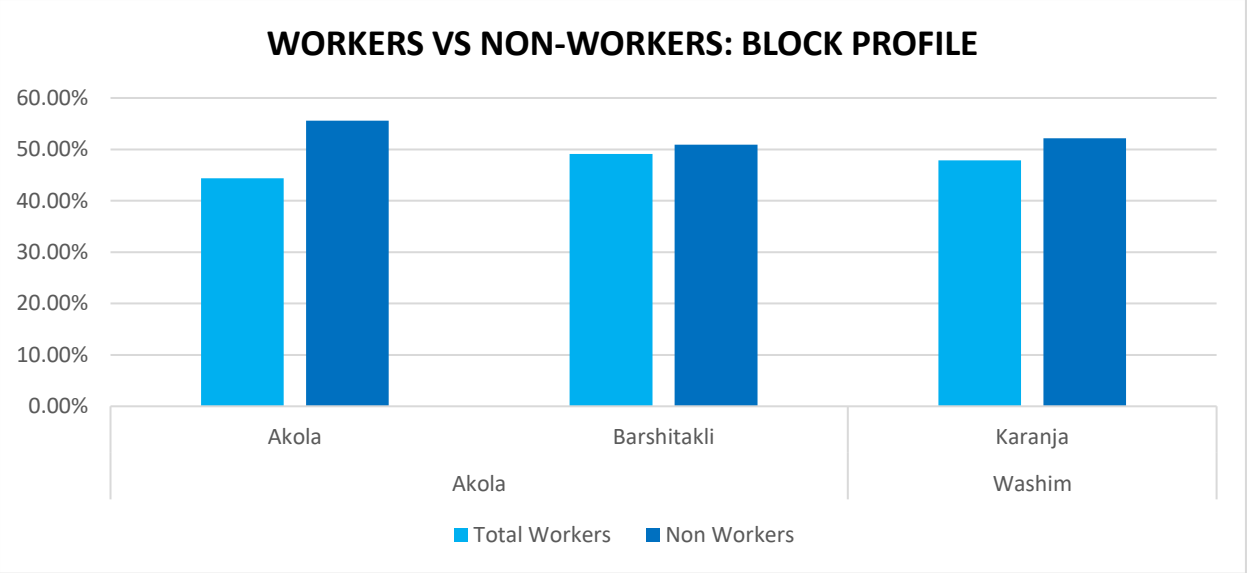
Table 4-24: Demographic Details

Sl. No	CD Block Name	District	Area (in sq. kms)	No. of HH	Total Population	Male %	Female %	SC %	ST %	Literacy Rate
1	Akola	Akola	1117.14	69344	308035	51.63	48.37	25.80	5.85	78.61
2	Barshitakli		812.92	34607	149363	51.67	48.33	17.36	8.09	73.15
3	Karanja	Washim	809.95	34538	145917	51.44	48.56	19.91	3.50	75.61

**Source: Census,2011*

4.9.4 Working Population

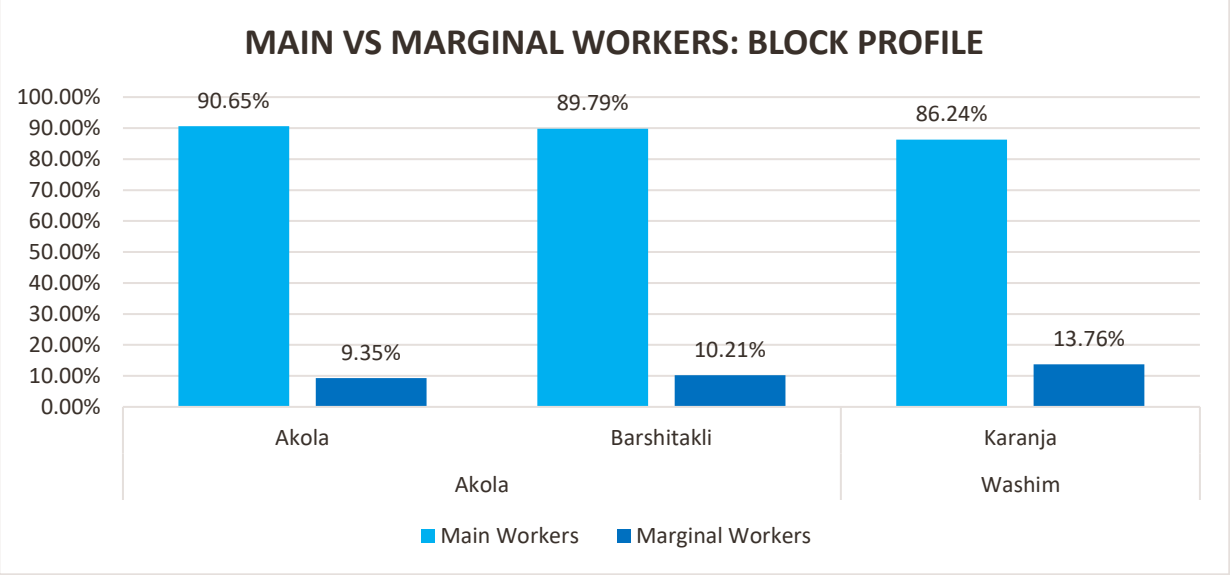
According to the Census 2011 data, total non-working population is comparatively high than the total working population. Barshitakli block in Akola district recorded the highest working population of 49.09 percent while Akola block in Akola district recorded the highest non-working population of 55.61 percent of the total population, as depicted in **Figure 4-31**.



Source: Census,2011

Figure 4-31: Segregation of Workers and Non-Workers (Block Wise)

Figure 4-32 provides graphical representation of the proportion of main and marginal workers for each block. Analysis of data suggests that all the blocks reportedly have more main workers than marginal workers in all the three blocks. The Akola block in Akola district recorded the highest proportion of main workers accounting for approximately 90.65 percent of the working population followed by Barshitakli block of Akola district and Karanja block of Washim district accounting for approximately 89.79 percent and 86.24 percent of the working population.

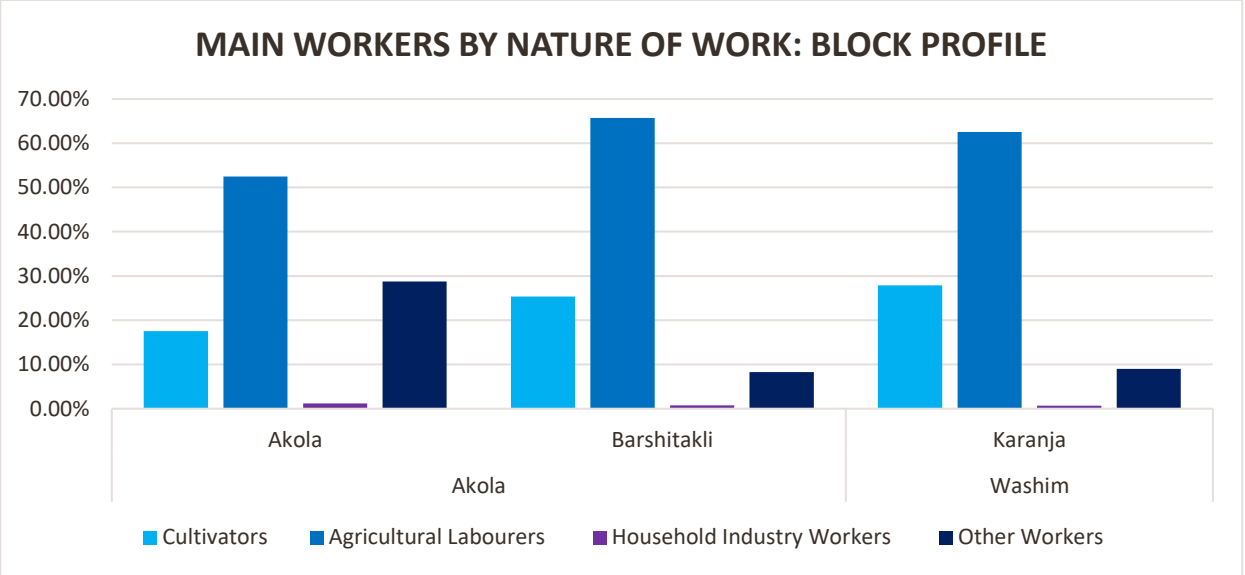


Source: Census,2011

Figure 4-32: Segregation of Main and Marginal Workers (Block Wise)

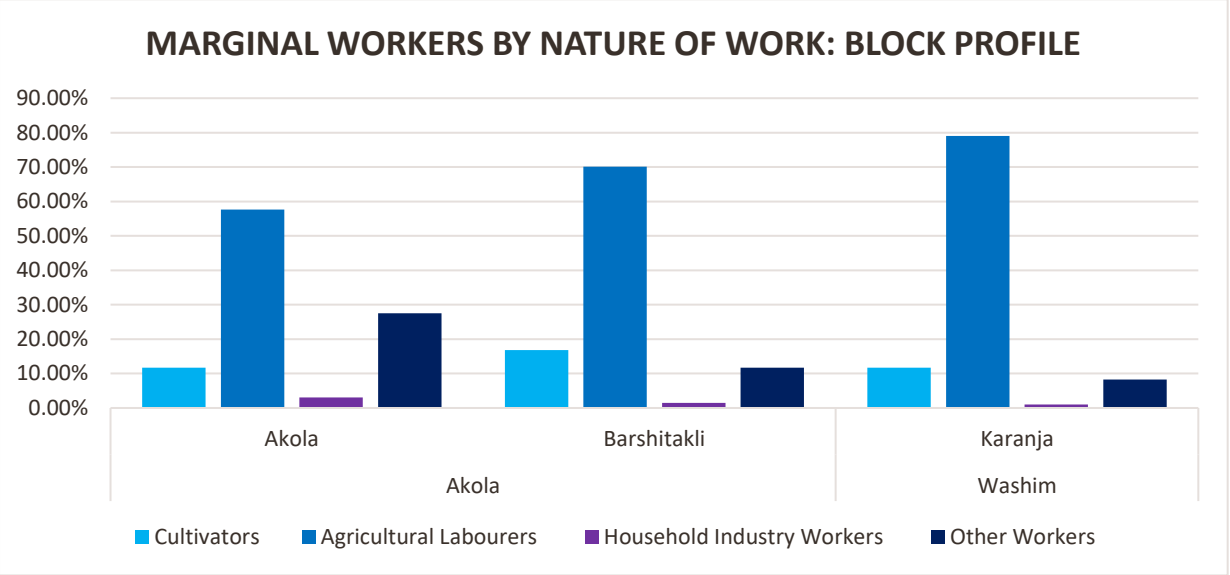
Further segregation of the working and non-working population suggests larger proportion of working population engaged in agriculture and cultivation**. Figure 4-33** and **Figure 4-34** provides a graphical representation of the segregation of workers with respect to the nature of work, where the proportion of main and marginal workers engaged in different occupations has been analyzed as per the data provided

in the Census 2011. The proportion of workers engaged in activities other than household industrial workers agricultural activities in both main and marginal category were reportedly higher.



Source: Census,2011

Figure 4-33: Segregation of Main Working Population by Nature of Work



Source: Census,2011

Figure 4-34: Segregation of Marginal Working Population by Nature of Work

4.10 PROJECT IMPACT AREA

As per the data shared by the project proponent, the pipeline route passes along Somthana, Loni, Mhaispur, Lakhanwada, Warkhed, Bakharapur, Shindkhed, Ajani Kh., Redhawa, Kherda Bk, Nimbi BK, Pinjar, Para Bhawani, Kasarkhed and Morhal villages in Akola district. The pipeline also passes through Lohagaon village in Washim district and the CGS point is located in Poha village of Washim district.

4.10.1 Demography

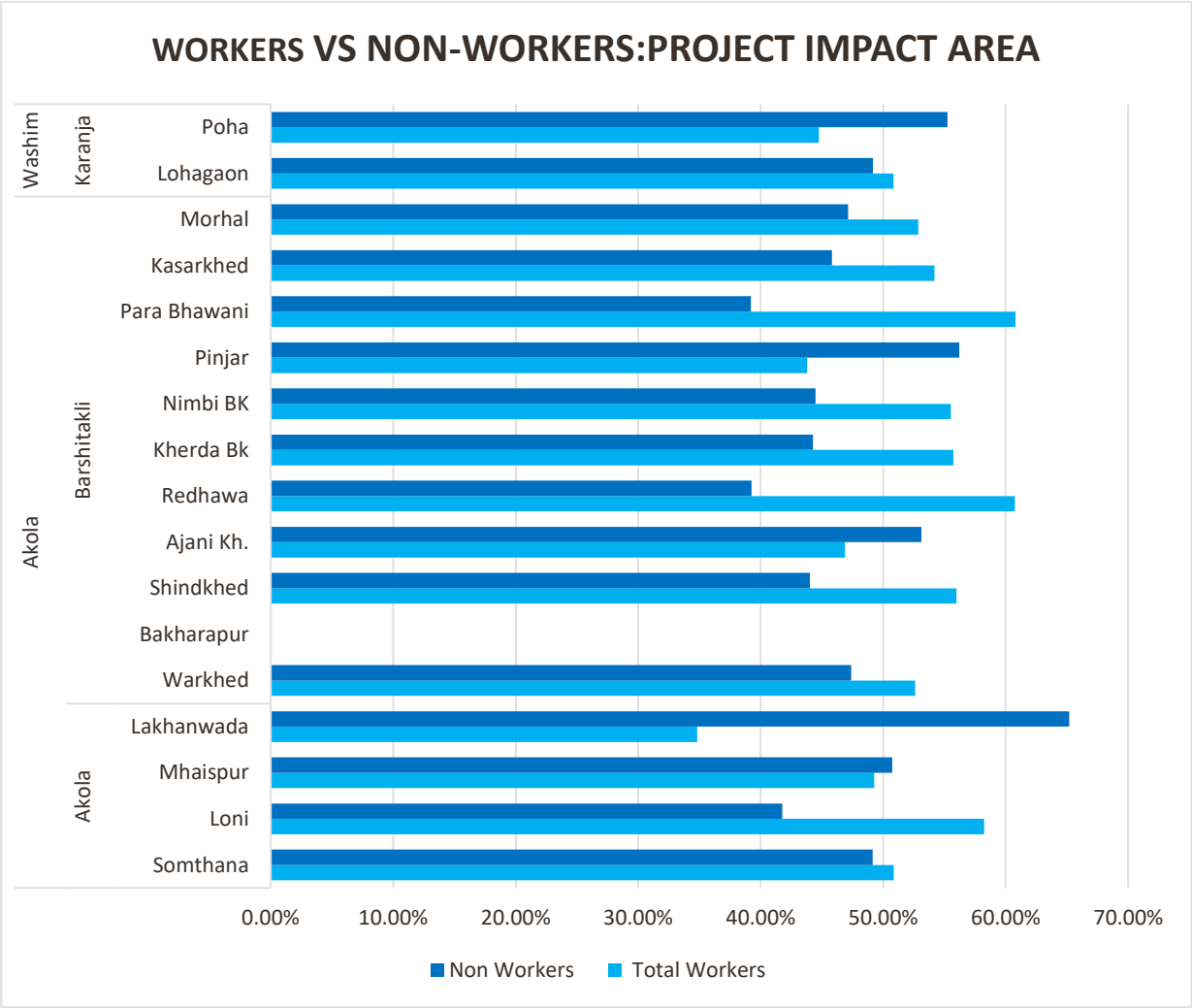
According to Census 2011 data, the demographic details of villages in the impact area highlight variations in area, population, and social composition. Pinjar village in Barshitakli block of Akola district recorded the largest geographical area amongst all villages (in terms of hectares) whereas Poha village of Karanja block of Washim district recorded the highest population with a high population density. Loni village of Akola block in Akola district as well as Warkhed, Ajani Kh., Nimbi BK., Kasarkhed villages of Barshitakli block of Akola district and Lohagaon village of Karanja block of Washim district recorded no Scheduled Tribe (ST) population; whereas overall Scheduled Tribe (ST) population for other villages is very low compared to Scheduled Caste (SC) population, where Warkhed village in Barshitakli block of Akola district records the highest rate of Scheduled Caste (SC) population accounting for about 86.97 percent of its population. Literacy rates were recorded at similar levels with Loni village of Akola block of Akola district recording the highest literacy rates amongst all the villages at about 81.16 percent of population followed by Shindkhed village of Barshitakli block of Akola district recording a literacy rate of 78.67 percent as depicted in **Table 4-25.** Bakharapur village in Barshitakli block of Akola district is the only uninhabited village within the project impact area as per Census of India 2011.

Table 4-25: Demography- Project Impact Area

Sl. No.	District	CD Block	Village Name	Area (in Ha.)	No. of HH	Total Population	Percent Male	Percent Female	Percent SC	Percent ST	Literacy Rate
1	Akola	Akola	Somthana	467.92	210	918	50.87	49.13	16.45	0.54	78.10
2			Loni	516.43	81	467	52.68	47.32	35.55	0.00	81.16
3			Mhaispur	959.56	633	2462	51.46	48.54	27.46	2.03	75.63
4			Lakhanwada	466.1	143	629	50.72	49.28	1.43	4.13	71.54
5		Barshitakli	Warkhed	264.45	95	422	50.71	49.29	86.97	0.00	72.99
6			Bakharapur	164.2	Uninhabited						
7			Shindkhed	1,146.00	770	3239	51.71	48.29	26.03	3.89	78.67
8			Ajani Kh.	306.68	139	546	54.76	45.24	4.76	0.00	78.57
9			Redhawa	656.69	339	1437	52.54	47.46	11.62	3.27	69.52
10			Kherda Bk	573.01	257	1028	52.53	47.47	35.60	13.62	77.72
11			Nimbi BK	213	178	724	49.86	50.14	9.67	0.00	75.14
12			Pinjar	2,253.91	1820	7810	52.50	47.50	9.26	0.95	75.51
13			Para Bhawani	1,004.87	213	852	51.41	48.59	24.53	7.28	69.13
14			Kasarkhed	486.24	142	585	51.79	48.21	0.00	0.00	72.48
15			Morhal	1,205.18	377	1767	51.61	48.39	21.56	0.06	70.40
16	Washim	Karanja	Lohagaon	185.96	203	1007	54.52	45.48	1.19	0.00	73.78
17			Poha	1,889.39	1117	4930	51.85	48.15	9.90	3.10	72.39

4.10.2 Working Population

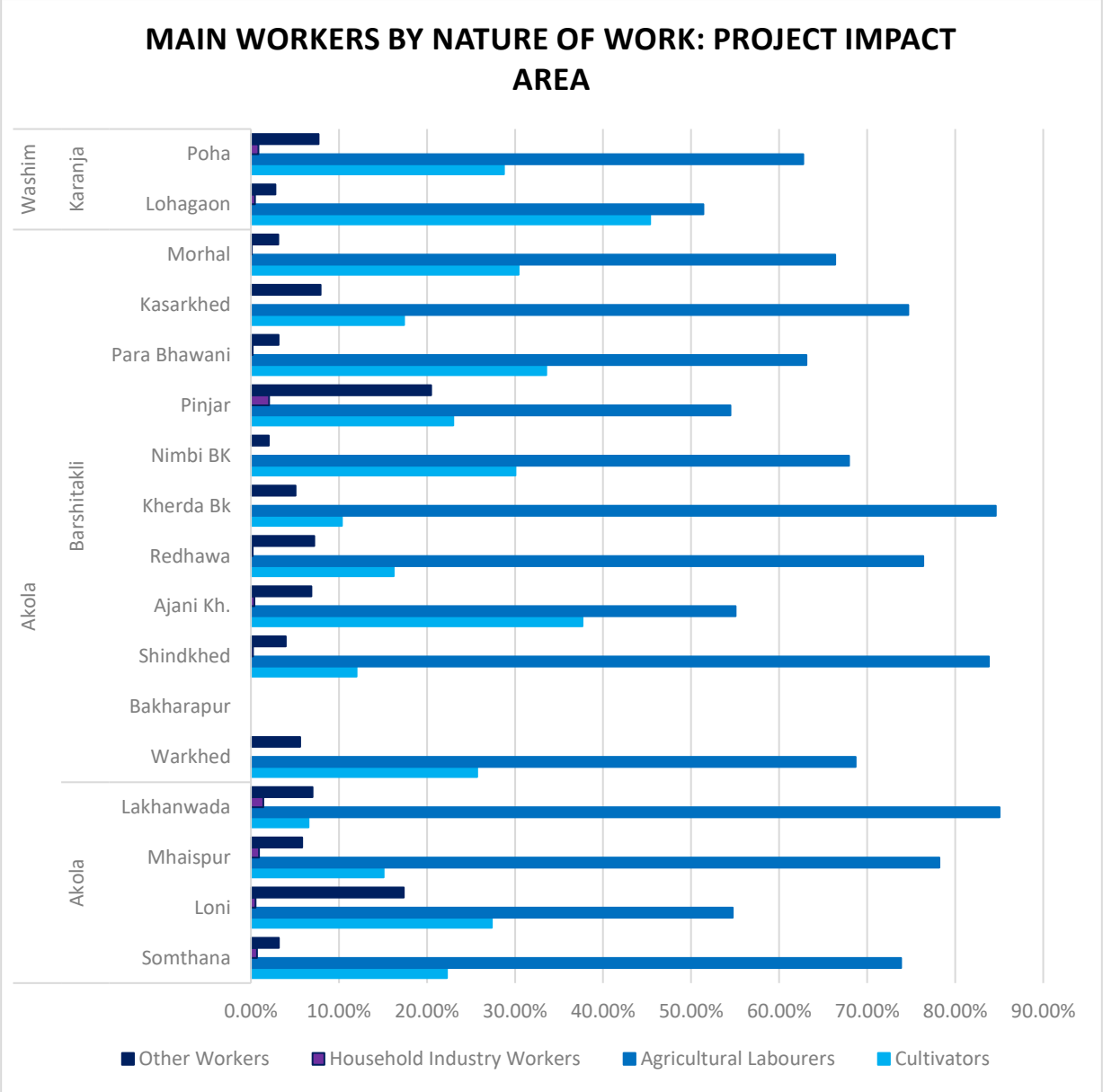
Figure 4-35 provides details of the working and non-working populations in villages within the project impact area, based on Census 2011. Jagral recorded the highest working population accounting for 54.59 percent of its total population, whereas Bhagwanpur recorded the lowest working population at 25.47 percent of total population.



**Source: Census,2011*

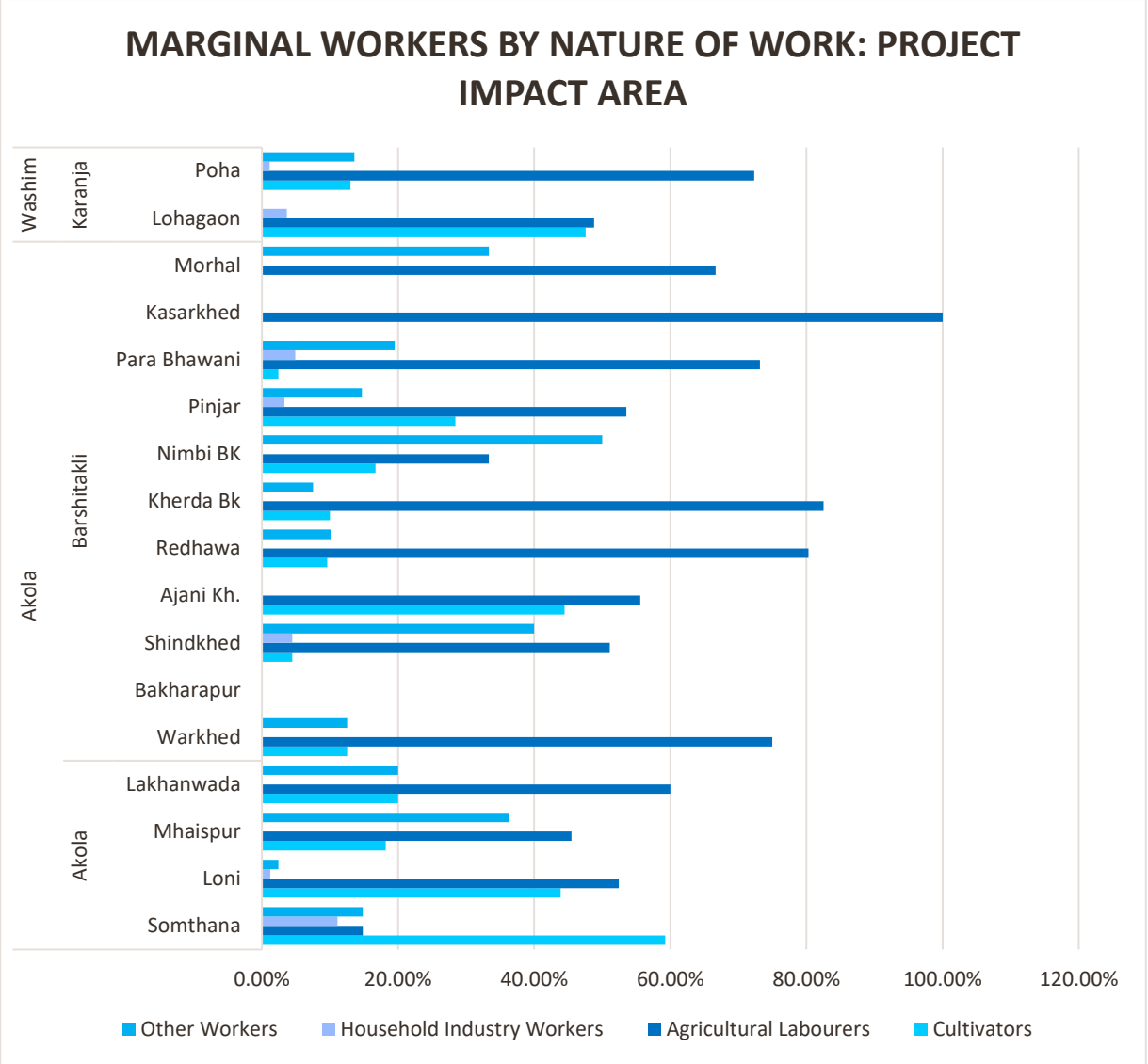
Figure 4-35: Segregation of Working and Non-working Population

Analysis of the working population in the project impact area reveals a higher proportion of main workers as compared to marginal workers. A significant portion of these workers are engaged as agricultural labourers. **Figure 4-36** and **Figure 4-37** provide a snapshot of the further segregation of main and marginal workers with respect to type of occupation. The data indicates a higher proportion of agricultural labourers in both the main and marginal worker category. Bakharapur village in Barshitakli block of Akola district is the only uninhabited village within the project impact area.



**Source: Census,2011*

Figure 4-36: Segregation of Main Workers as per Occupational Activity



**Source: Census,2011*

Figure 4-37: Segregation of Marginal Workers as per Occupational Activity

4.10.3 Education Facilities

Table 4-26 provides details of educational facilities in villages located along the proposed pipeline route. Almost all villages reportedly have primary and pre-primary schools, whereas middle, secondary and senior secondary schools are majorly present within 10 kms distance. Bakharapur village in Barshitakli block of Akola district is the only uninhabited village within the project impact area.

Table 4-26: Educational Facilities- Project Impact Area

Sl. No	District	CD Block	Village Name	Primary	Pre-Primary	Middle	Secondary	Senior Secondary
1	Akola	Akola	Somthana	2	1	Less than 5 km	5-10 km	5-10 km
2			Loni	2	1	5-10 km	5-10 km	5-10 km
3			Mhaispur	3	1	1	1	More than 10 km
4			Lakhanwada	2	1	Less than 5 km	Less than 5 km	5-10 km
5		Barshitakli	Warkhed	2	1	Less than 5 km	Less than 5 km	More than 10 km
6			Bakharapur	Uninhabited				
7			Shindkhed	5	1	1	1	1
8			Ajani Kh.	2	1	Less than 5 km	More than 10 km	More than 10 km
9			Redhawa	2	1	1	5-10 km	5-10 km
10			Kherda Bk	2	1	2	More than 10 km	More than 10 km
11			Nimbi BK	2	1	1	5-10 km	5-10 km
12			Pinjar	8	5	4	4	3
13			Para Bhawani	2	1	1	Less than 5 km	Less than 5 km
14			Kasarkhed	2	1	5-10 km	More than 10 km	More than 10 km
15			Morhal	3	1	3	1	More than 10 km
16	Washim	Karanja	Lohagaon	2	2	2	2	1
17			Poha	5	2	1	1	1

**Source: Census,2011*

4.10.4 Health Facilities

Table 4-27 provides details on the availability of health facilities in villages. Mhaispur of Akola block of Akola district and Shindkhed and Morhal villages of Barshitakli block of Akola district has one primary health sub-center, whereas Pinjar village of Barshitakli block of Akola district and Poha village of Karanja block of Washim district have one primary health centre (PHC), one primary health sub-centre (PHSC) and one maternity & child welfare centre (M&CWC) within their villages. All other villages have healthcare infrastructures majorly within 10 kms of their respective villages. Bakharapur village in Barshitakli block of Akola district is the only uninhabited village within the project impact area.

Table 4-27: Health Facilities- Project Impact Area

Sl. No	District	CD Block	Village Name	Community Health Centre	Primary Health Centre	Primary Health Sub Centre	Maternity and Child Welfare Centre
1	Akola	Akola	Somthana	5-10 kms	5-10 kms	5-10 kms	5-10 kms
2			Loni	5-10 kms	5-10 kms	5-10 kms	5-10 kms
3			Mhaispur	More than 10 kms	Less than 5 kms	1	Less than 5 kms
4			Lakhanwada	More than 10 kms	Less than 5 kms	Less than 5 kms	Less than 5 kms
5		Barshitakli	Warkhed	More than 10 kms	5-10 kms	5-10 kms	5-10 kms
6			Bakharapur	Uninhabited			
7			Shindkhed	5-10 kms	5-10 kms	1	5-10 kms
8			Ajani Kh.	More than 10 kms	More than 10 kms	More than 10 kms	More than 10 kms
9			Redhawa	5-10 kms	5-10 kms	5-10 kms	5-10 kms
10			Kherda Bk	More than 10 kms	More than 10 kms	More than 10 kms	More than 10 kms
11			Nimbi BK	5-10 kms	5-10 kms	5-10 kms	5-10 kms
12			Pinjar	5-10 kms	1	1	1
13			Para Bhawani	5-10 kms	Less than 5 kms	5-10 kms	Less than 5 kms
14			Kasarkhed	5-10 kms	5-10 kms	5-10 kms	5-10 kms
15			Morhal	More than 10 kms	More than 10 kms	1	More than 10 kms
16	Washim	Karanja	Lohagaon	More than 10 kms	5-10 kms	Less than 5 kms	
17			Poha	More than 10 kms	1	1	1

**Source: Census,2011*

4.10.5 Drinking Water Facilities

Table 4-28 provides availability of water sources across the project impact area, which highlights a mix of infrastructure and natural resources. Tap water is accessible in most villages except in Somthana village of Akola block of Akola district, Warkhed, Kherda Bk. and Para Bhawani villages in Barshitakli block of Akola district. All villages in the project impact area reportedly have access to well water facilities except in Lakhanwada block of Akola district and Morhal village of Barshitakli block of Akola district. Bakharapur village in Barshitakli block of Akola district is the only uninhabited village within the project impact area.

Table 4-28: Drinking Water Facilities- Project Impact Area

Sl. No	District	CD Block	Village Name	Tap Water	Well Water	Hand Pump	Spring	River
1	Akola	Akola	Somthana	NA	Available	Available	NA	NA
2			Loni	Available	Available	Available	NA	NA
3			Mhaispur	Available	Available	Available	NA	NA
4			Lakhanwada	Available	Not Available	Available	NA	NA
5		Barshitakli	Warkhed	Not Available	Available	Available	NA	Available

Sl. No	District	CD Block	Village Name	Tap Water	Well Water	Hand Pump	Spring	River
6			Bakharapur	Uninhabited				
7			Shindkhed	Available	Available	Available	NA	Available
8			Ajani Kh.	Available	Available	Not Available	NA	NA
9			Redhawa	Available	Available	Available	NA	NA
10			Kherda Bk	NA	Available	Available	NA	Available
11			Nimbi BK	NA	Available	Available	NA	Available
12			Pinjar	Available	Available	Available	NA	Available
13			Para Bhawani	NA	Available	Available	NA	Available
14			Kasarkhed	Available	Available	Available	NA	NA
15			Morhal	Available	NA	Available	Available	NA
16	Washim	Karanja	Lohagaon	Available	Available	Available	NA	NA
17			Poha	Available	Available	Available	NA	Available

**Source: Census,2011*

4.10.6 Communication Facilities

Table 4-29 provides details of the communication facilities available in the project impact area. Other than Loni village of Akola block of Akola district and Warkhed, Ajani Kh. and Nimbi Bk. of Barshitakli block of Akola district, all other villages have bus services. Villages within the project impact area majorly have railway stations at a distance with more than 10 kms. National highway connectivity is limited, with only Somthana and Loni villages in Akola block of Akola district and Ajani Kh. village of Barshitakli block of Akola district having direct access, while most other villages require traveling more than 10 km. State highway access is also limited, with Loni, Mhaispur and Lakhanwada villages in Akola block of Akola district, Ajani Kh. village of Barshitakli block of Akola district and Poha village of Karanja block in Washim district, whereas other villages remain more than 10 km away. Bakharapur village in Barshitakli block of Akola district is the only uninhabited village within the project impact area.

Table 4-29: Communication Facilities- Project Impact Area

Sl. No	District	CD Block	Village Name	Bus Service	Railway Station	NH	SH
1	Akola	Akola	Somthana	Available	5-10 kms	Available	5-10 kms
2			Loni	Less than 5 kms	5-10 kms	Available	Available
3			Mhaispurs	Available	More than 10 kms	More than 10 kms	Available
4			Lakhanwada	Available	More than 10 kms	More than 10 kms	Available
5		Barshitakli	Warkhed	Less than 5 kms	More than 10 kms	More than 10 kms	More than 10 kms
6			Bakharapur	Uninhabited			
7			Shindkhed	Available	5-10 kms	More than 10 kms	Less than 5 kms
8			Ajani Kh.	Less than 5 kms	More than 10 kms	Available	Available
9			Redhawa	Available	5-10 kms	More than 10 kms	More than 10 kms

Sl. No	District	CD Block	Village Name	Bus Service	Railway Station	NH	SH
10			Kherda Bk	Available	More than 10 kms	More than 10 kms	More than 10 kms
11			Nimbi BK	5-10 kms	More than 10 kms	More than 10 kms	More than 10 kms
12			Pinjar	Available	More than 10 kms	More than 10 kms	More than 10 kms
13			Para Bhawani	Available	More than 10 kms	More than 10 kms	More than 10 kms
14			Kasarkhed	Available	More than 10 kms	More than 10 kms	More than 10 kms
15			Morhal	Available	More than 10 kms	More than 10 kms	More than 10 kms
16	Washim	Karanja	Lohagaon	Available	More than 10 kms	More than 10 kms	More than 10 kms
17			Poha	Available	More than 10 kms	More than 10 kms	Available

**Source: Census,2011*

4.11 SITE VISIT OBSERVATIONS

The social sensitivity analysis for the natural gas pipeline project proposed in single stretch of Akola and nearby Villages part of Akola GA indicates the proposed route of the running parallel to the RoW of the village road, state and national highway. It has also been observed that the route passes through medium traffic areas and some sensitive receptors like rural settlements, cultivable areas, a hospital, school etc. These primary observations during site visit are essential for risk assessment and ensuring that the necessary safety protocols and community engagement measures are implemented throughout the project lifecycle.

While the project is expected to bring long-term benefits such as improved energy access and reduced pollution, short-term impacts during construction (e.g., dust, noise, restricted access) may affect local communities. Early and continuous stakeholder engagement, grievance redress mechanisms, and awareness campaigns will be crucial for maintaining community support.

Key observation for the entire stretches and potential mitigation measures has been elucidated.

Community Profile & Land Use

- The proposed 65.5 km pipeline traverses mostly through the agricultural and rural landscape, intersecting villages such as Poha, Barsi Takli, and other villages within the Akola Geographic Area as mentioned in the **Table 4-25** above. The CGD pipeline follows the ROW of major roads including National Highways (NH-161A, NH-161, NH-53), State Highway (SH-274), Numerous other local roads and cart tracks.
- Observed land uses along the route include cultivable fields, forest patches, small settlements, a primary health centre (Prathmik Arogya Kendra), a primary school (Prabhat Kids School), temples, and petrol pumps that reflects mixed rural livelihoods and public services.

- **Road Crossings & Community Dynamics** The pipeline's alignment along these road corridors means:

- Minimal additional land acquisition, as ROW is already established.
- Construction traffic will be integrated with existing vehicular flows.
- Potential interruption to daily mobility patterns due to partial road closures or diversions during HDD or trenching operations.

River, Canal & Drain Crossings

- These waterbody crossings, as detailed in **Table 2-2**, depicts that the proposed pipeline traverses through several rivers (e.g., Uma, Pinjar, Koyad, Indrupa, Vidrupa, Morna, Purna), unlined irrigation canals and multiple drains and nalas. These features carry cultural, ecological, and livelihood significance, offering irrigation water, serving as social gathering areas, and potentially hosting religious rites. Their sensitivity amplifies both environmental and social risks.

Community Infrastructure & Cultural Sites

- As highlighted in the Photo Plate 2.5 the pipeline passing by Prabhat Kids School, and Plate 2.7 & 2.13 shows that it passes through the alignment with temples, indicating presence of religious and educational infrastructure within the RoW.
- Construction activities may disturb daily movements, site accessibility, and local practices around these facilities.

4.12 POTENTIAL SOCIAL IMPACTS AND MITIGATION MEASURES

Based on the observations made during the site visit, the TUV-SUD team has identified several social impacts and proposed corresponding mitigation measures such as:

Table 4-30: Potential Impact and Mitigation Measures

S. No.	Context	Potential Impacts	Mitigation Measures
1	Land & Livelihood	Risk of Soil compaction on cultivable land in the vicinity of the project area	Soil reinstatement should be adopted
2	Community Facilities/ Cultural access	Restricted access to school, health centre, temples.	Ensure temporary access routes, schedule of construction outside school hours, pause construction during key religious dates identified via consultation.
3	Traffic & Safety	Heavy machinery movement through populated areas	Develop safety management plan; deploy flaggers and dust suppression
4	Public Safety	- Exposed trenches while laying especially near canals and drains present drowning hazards to children and adults. - Disruption of natural drainage could cause waterlogging, vector breeding, and health risks.	- Filling and restoring of open trenches post-crossing should be done within the same day of excavation. - Fence or shroud trenches should be done. - Deployment of warning signages should be adopted.

S. No.	Context	Potential Impacts	Mitigation Measures
			- Flaggers near water sites should be assigned.
5	Stakeholder Relations	Lack of recorded consultations	Initiate community meetings, grievance channels, regular updates.
6	Social Cohesion	Risk of community tension due to workforce influx	Promote local hiring, cultural sensitization training for workers.
7	Water quality	Risk of sedimentation in the canal, river and drains	Implementation of strict sediment control measures; continuous flow monitoring pre- and post-construction using local stakeholder–approved indicators should be adopted.

5 ANTICIPATED ENVIRONMENTAL AND SOCIAL IMPACTS AND MITIGATION MEASURES

5.1 INTRODUCTION

The proposed project may have impact on the environment & social conditions during construction and operation phases. This chapter describes various environmental impacts identified and assessed for during construction and operation phases of the project. The identification of impacts has been done based on review of available project information, discussions with local community and representatives of project proponent and other sector-specific professionals.

During the construction phase, the impacts may be regarded as temporary or short-term, while long term impacts may be observed during the operation stage. The major potential impacts associated with the proposed project are impact on soil, impact on water resources and area drainage, air quality degradation, noise impacts, impact on ecological environment, impact on agriculture, land use changes, impact on health and safety, impact on socio-economic features, impact on community activities, impact on cultural heritage and impact on aesthetics. These impacts can occur at any stage i.e., the construction stage and the operation stage.

The identified impacts due to the proposed project can be mitigated through the incorporation of appropriate measures at different stages of the project. This will ensure the best design with minimal damage to or loss of significant or sensitive features such as roadside vegetation, local water resources, etc.

5.2 IMPACT APPRAISAL CRITERIA

The identification of impacts has been done based on baseline environmental and social survey, review of available project information, discussions with local community and representatives of **ATGL** and other sector specific professionals. The criteria employed to appraise the proposed impacts on various social and environmental components has been presented as **Table 5-1** below.

Table 5-1: Impact Appraisal Criteria

Criteria	Sub-Classification	Defining Limit	Remarks
Spread: refers to area of direct influence from the impact of a particular project activity.	Insignificant/ Local spread	Impact is restricted within the project site.	Except for ecology (which is defined as loss of vegetation and wildlife habitat.
	Medium Spread	Impact is spread from up to 2 km from the boundary of the project.	Except for ecology (which is defined as loss of vegetation and wildlife habitat.
	High Spread	Impact is spread up to 2 km to 5 km from footprint boundary of the project.	Except for ecology (which is defined as loss of vegetation and wildlife habitat.
Duration: based on duration of impact and the time taken	Insignificant/ Short Duration	When impact is likely to be restricted for duration of less than 1 year.	The anticipated recovery of the affected environmental component within 2 years.

Criteria	Sub-Classification	Defining Limit	Remarks
by an environmental component to recover back to current state	Medium Duration	When impact extends up to 3 years.	With an anticipated recovery of the affected environmental component within 6 years.
	Long Duration	When impact extends beyond 3 years.	With anticipated recovery of prevailing condition to happen within 6 years or beyond or upon completion of the project life.
Intensity: defines the magnitude of Impact	Insignificant intensity	When resulting in changes in the environmental baseline conditions is up to 10%.	However, it shall be reconsidered where the baseline values are already high.
	Low intensity	When resulting in changes in the baseline conditions up to 20%.	For ecology it refers to minimal changes in the existing ecology in terms of their reproductive capacity, survival, or habitat change.
	Moderate intensity	When resulting in changes in the baseline conditions for up to 30%.	For ecology, it refers to changes that are expected to be recoverable.
	High intensity	When change resulting in the baseline conditions beyond 30%.	While for ecology, high intensity refers to changes that result in serious destruction to species, productivity, or their habitat.
Nature: refers to whether the effect is considered beneficial or adverse	Beneficial		Useful to Environment and Community.
	Adverse		Harmful to Environment and Community.
Likelihood: refers the possibility of a risk event occurring	Low	Will most likely not occur	Low likelihood refers that the impact will most likely not occur.
	Moderate	Possible to occur	Moderate likelihood refers that the chances of impacts are possible to occur.
	High	Likely to occur	High likelihood refers that a particular risk or impact will likely occur.

Impact identification is a continual process and completes only when the effects of the identified impact are assigned a mitigation strategy. The impacts shall be assessed based on the following criteria:

- Significance of the impact
- Duration of the impact
- Mitigation measures
- Residual impacts

5.3 ASSESSMENT OF IMPACT SIGNIFICANCE

A project specific significance assessment matrix has been developed to assess the impacts based on the appraisal criteria developed above. A reference impact significance matrix is given in **Table 5-2** below.

Table 5-2: Impact Significance Criteria

Spread	Duration	Intensity	Likelihood	Overall Significance	
				Adverse	Beneficial
Local	Short	Low	Low	Insignificant	Insignificant
Local	Short	Moderate	Moderate	Minor	Minor
Local	Medium	Low	Low	Minor	Minor
Local	Medium	Moderate	Moderate	Minor	Minor
Medium	Short	Low	Low	Minor	Minor
Local	Long	Low	Low	Minor	Minor
Local	Long	Low	Moderate	Minor	Minor
Local	Short	High	High	Moderate	Moderate
Local	Short	High	Moderate	Moderate	Moderate
Local	Medium	Moderate	High	Moderate	Moderate
Local	Medium	High	High	Moderate	Moderate
Local	Long	Moderate	Moderate	Moderate	Moderate
Medium	Short	Moderate	Moderate	Moderate	Moderate
Medium	Medium	Low	Low	Moderate	Moderate
Medium	Medium	Moderate	Moderate	Moderate	Moderate
Medium	Medium	Moderate	High	Moderate	Moderate
Medium	Long	Low	Low	Moderate	Moderate
Medium	Long	Moderate	Moderate	Moderate	Moderate
High	Short	Low	Low	Moderate	Moderate
High	Short	Moderate	Moderate	Moderate	Moderate
High	Medium	Low	Low	Moderate	Moderate
High	Medium	Moderate	Moderate	Moderate	Moderate
High	Long	Low	Low	Moderate	Moderate
Local	Long	High	High	Major	Major
Medium	Short	High	High	Major	Major
Medium	Long	High	High	Major	Major
High	Short	High	High	Major	Major
High	Medium	High	High	Major	Major
High	Long	Moderate	Moderate	Major	Major
High	Low	Low	Low	Major	Major
High	Low	High	High	Major	Major

The impacts for the proposed project have been covered under following subsections:

- Construction Phase
- Operational phase

The social impacts associated with construction and operations stages have been assessed qualitatively and, in some cases, quantitatively (subject to availability of data), using professional judgement and based on experience from similar projects.

5.4 IDENTIFICATION OF ENVIRONMENTAL IMPACTS

The identification of impacts has been done based on baseline environmental and social survey, review of available project information, discussions with local community and representatives of **ATGL** and other sector specific professionals. The environmental impacts associated with the proposed project on various environmental components such as air, water, noise, soil, flora, fauna, land, socioeconomic, etc. has been identified using Impact Identification Matrix as depicted in **Table 5-3**:

Table 5-3: Impact Identification Matrix for NG Pipeline Route

Components	Physical				Biological		Socio-Economic		
	Ambient Air Quality	Ground/Surface Water (Qty/Quality)	Ambient Noise Quality	Land (Land use, Topography, drainage, soil)	Flora	Fauna	Livelihood and Occupation	Infrastructure	Health & Safety
AUGMENTATION OF FACILITIES									
CONSTRUCTION PHASE									
Civil and mechanical works	•	•	•	•	•	•	•	•	•
Movement of vehicles	•		•	•	•	•		•	•
Hydro testing									•
Waste generation, handling, and disposal			•	•	•	•			•
OPERATION PHASE									
Operation of pumps and compressors	•	•	•						
Storage of Gas/ Crude	•								•
Cleaning & maintenance									
Movement of vehicles		•		•					
Waste generation, handling, and disposal		•		•	•	•		•	•
Leakage from Pipeline	•	•			•	•			•
LAYING OF NEW PIPELINE									
CONSTRUCTION PHASE									
Preparation of Right of way	•	•	•	•	•	•	•	•	•
Pipe laying	•		•	•	•	•	•	•	•
Chemical use/handling	•	•		•					•
Movement of vehicles	•		•						
Waste generation, handling, and disposal	•	•		•					
OPERATION PHASE									
Operation of compressors	•	•	•						
Cleaning & maintenance	•			•					

5.5 PRE-CONSTRUCTION PHASE IMPACTS

5.5.1 Impact on Land Procurement

Impact- Context and Receptors

No private land will be leased for the project. No permanent land acquisition is involved for the proposed CGD of NG pipeline project; instead, Right of Way (RoW) permissions are required from relevant authorities. No receptors are observed because the land has not been leased by **ATGL** by any of the local community.

ATGL has identified the total 65.5 km Natural Gas Pipeline spanning across Akola and Nearby Villages, in single pipeline stretch.

Impact significance

The significance of this impact has been evaluated to be "**Moderate"**.

Mitigation Measures

- Permission/right of way (ROW) approvals will be required from the National Highway Authority of india (NHAI), from PWD for State Highways, PMGSY and other roads, railways, forest and for WRD some of the permissions have already been received and enclosed in Annexures whereas other required permissions have been applied (as informed by ATGL Akola Team- the detailed list of permission required and received is enclosed in the Table 3-4: Applicability of all acts, laws & rules to Pipeline Project).
- Stakeholder Engagement: **ATGL** must inform local community and stakeholders about the purpose and scope of land use.
- **ATGL** should develop and implement detailed restoration plans for land, roads, and infrastructure affected during construction to ensure full post-project restoration.
- Designing of the overpasses or other infrastructure to cross canals should be such that the effect on water flow or canal operations is minimum.

Residual Impacts

After the implementation of these mitigation measures, the residual impact significance is expected to be **"Low"**.

Table 5-4: Impact Significance on Private/Revenue Land Acquisition

Impact		Impact on Land Procurement				
Impact nature		Negative				
Impact Type		Direct				
Impact Scale		Low				
Impact Magnitude (Without Mitigation		Negative-Moderate				
Aspect	Scenario	Spread	Duration	Intensity	Likelihood	Overall
Land Acquisition	Without Mitigation	Local	Long-term	Moderate	Moderate	Moderate
	With Mitigation	Local	Long-term	Low	Low	Minor

5.6 IMPACTS DURING CONSTRUCTION PHASE

The construction activities shall comprise of following activities that may impact the environmental and social aspects, as described in sections below:

- Site Preparation
- Labour Engagement
- Material Handling and Storage
- Construction Demobilization

5.6.1 Topography, Land use and Drainage

Impact- Context and Receptors

The surrounding area features a mix of flat terrains. Land use is primarily rural followed by semi-urban development with agricultural activities, small settlements and few shops. The drainage system is influenced by the Purna and Morna River and its tributaries, with natural streams helping manage runoff,

Although, the pipeline crosses both the rivers several canals and natural drains (as mentioned in Section 2.2) in its right of way and may affect the surface drainage temporarily.

Laying of natural gas pipeline will be done within depth of 2 m in land while pipeline will be laid as per standard protocols and procedures. There will be limited change in topographic characteristics of project footprint area. The alteration in surface drainage pattern of the area due to construction activities will be limited to smaller areas located in project footprint.

Receptors:

- **Topography**: Minor undulations and natural landforms
- **Land Use**: Urban roads, agricultural fields, forest patches
- **Drainage**: Natural drains, canals, and seasonal watercourses

Embedded/In-Built Control

- Using trenchless construction methods like Horizontal Directional Drilling (HDD) for prominent urban landscape, canal crossings, railway crossings and wherever possible, to avoid direct excavation in the canals and minimize disruption to water flow and the surrounding ecosystem.
- Implement soil erosion control measures like silt fences, sedimentation ponds, and planting grass cover in disturbed areas to minimize soil loss, especially in agricultural fields and forest areas.
- Design and layout the pipeline route to avoid impacting high-value agricultural areas as much as possible.
- Defined RoW to minimize land disturbance
- Temporary restoration of land post-construction
- Stormwater diversion measures during trenching

Impact Magnitude

- There will be very limited change in the topographic character of the project footprint area. The alteration in surface drainage pattern of the area due to construction activities, if not maintained with appropriate control measures is probable. The natural flow of storm water will not be altered on contiguous larger area. Intensity of the effect can be considered as moderate (temporary but noticeable changes in landform and drainage), and duration of the effect would be Medium (during the construction phase) in nature, there is high likelihood of the impact that it may occur. Hence, impact magnitude is assessed to be **Moderate.** However, with controlled and managed construction work in the NH, SH, nearby cultivable areas, water side, railways and forest and settlement, may reduce the impact magnitude to **Minor**.

Impact Significance

- As per the impact significant assessment matrix **(Table 5-2)**, the impact has been assessed as **Moderate**, which can be mitigated, and magnitude of impact can be **Minor** with use of mitigation measures.

Mitigation Measures

- Project shall ensure trenching follows natural contours to minimize disruption to the topography especially during the pre-construction and construction phase
- Anti-buoyancy measures will be adapted during laying out of pipeline within water bodies.
- Ensure topsoil removal and its preservation during construction, so it can be returned to the disturbed area to facilitate faster vegetation regrowth.
- Use mulching and vegetative cover to stabilize disturbed soil and reduce erosion during and after construction.
- If construction duration is less, then the duration of impact can be reduced to short.

Residual Impact Significance

- After implementation of mitigation measures, the significance of residual impacts for construction activities will be **Minor**.

Table 5-5: Impact Significance for Topography and Drainage

Impact		Impact on Topography & Drainage				
Impact nature		Negative				
Impact Type		Indirect				
Impact Scale		Uncontrolled construction work and waste generating from construction site may contaminate drainage of the area				
Impact Magnitude (Without Mitigation)		Negative-Moderate				
Aspect	Scenario	Spread	Duration	Intensity	Likelihood	Overall
Topography and Drainage	Without Mitigation	Medium	Medium	Moderate	High	Moderate
	With Mitigation	Local	Medium	Low	Low	Minor

5.6.2 Water Resources and Availability

Impacts- Context and Receptors

During construction phase, water will be primarily required for domestic activities by staff and to sprinkle for dust suppression. Additionally, the pipeline is crosses two rivers, several canals and drains in its right of way. Freshwater will be sourced from private tankers. There will be generation of sewage by construction workers. There is a possibility that deterioration of water quality during construction phase can occur due to wastewater disposal from the workers camp and sludge generated from construction sites. Inappropriate disposal of fuel & lubricants could also lead to water contamination. Additionally, there is a possibility of contamination of water bodies during laying of NG pipeline in the creeks coming within ROW of the pipeline.

Embedded/In-Built Control

NIL

Impact Magnitude

Water requirement for construction works will be temporary just during construction phase and short-lived while domestic water requirement for construction workers will be needed during the entire construction phase. The construction phase will be duration of 6 to 12 months with peak construction period of 3 to 6 months. Hence, the magnitude of impact is assessed as **medium/ moderate.**

Impact Significance

As per the impact significant assessment matrix **(Table 5-3)**, a combination of medium-term impact duration, moderate intensity, moderate likelihood, and local level spread the impact magnitude has been assessed as **Moderate.**

Mitigation Measures

- Quality of construction wastewater emanating from the construction site will be controlled through suitable drainage system with sediment traps (silting basin as water intercepting ditch) for arresting the silt / sediment load before its disposal into the main natural drainage system around the site.
- The trench shall be excavated only so far in advance of pipe laying that it does not cause increased soil erosion and silting of water bodies.
- The discharge of the trench de-watering pumps shall be conveyed either to drainage channel or to natural drains after passing through a catch pit for settling the silt.
- The trench shall be excavated to the exact gradient specified so that no making of the sub-grade by back filling is required and the concrete bed, where required, may be prepared with greatest ease giving a uniform and continuous bearing and support for the pipe.
- All the construction and preparatory activities to be conducted during dry seasons only.
- Construction materials to be stacked together by fencing it with brick or earth to prevent spillage into the water bodies, also these materials to be stacked away from the water bodies.
- Concrete shall be evaluated in accorder with IS: specification and shall have a minimum compressive strength to avoid pressure on water body.
- Aggregates will be clean and free from injurious amounts of salt, alkali, deleterious substances, or organic impurities as per IS-383 & evaluated as per IS-2386 to avoid contamination of water bodies.
- Proper sanitation facilities to be provided at the construction site to prevent health related problems due to water contamination.
- Waste disposal and sanitation to workers in the construction camp will be properly maintained or taken care off to check their entry into the water bodies like ponds, streams etc.
- Vehicle maintenance and refuelling will be confined to areas near construction camps designed to trap discarded lubricants and fuel spills from entering the water bodies.
- Drinking water supply for the workers in the construction camps to meet the Indian National Standards. Assess the portability of the supplied water to the construction labour camps water quality to be periodically monitored.
- Garbage to be collected in tanks and disposed of daily to check the solid wastes entering the ponds, streams etc.

- Concrete will be placed within 30 minutes from the time of mixing and will be managed in such a way to prevent aggregate segregation and excessive moisture loss. Concrete container will be kept clean and free from hardened or partially hardened concrete.

Residual Impact Significance

- After implementation of mitigation measures, the significance of residual impacts for construction activities will be **Low.**

Table 5-6: Impact Significance on Water Resource and Quality

Impact		Impact on water resource and quality				
Impact nature		Negative				
Impact Type		Direct				
Impact Scale		Uncontrolled construction works and waste generating from construction site may contaminate drainage of the area.				
Impact Magnitude (Without Mitigation		Negative-Moderate				
Aspect	Scenario	Spread	Duration	Intensity	Likelihood	Overall
Impact on Water Resource	Without Mitigation	Local	Short	High	Moderate	Moderate
	With Mitigation	Local	Short	Low	Low	Minor

5.6.3 Ambient Air and Noise Quality

Impacts- Context and Receptors

Air: The air quality along the project stretch may get affected during the construction period. Particulate matter will be the predominant pollutant affecting the air quality during the construction phase as the construction activities are likely to generate dust. Operation of equipment and machineries for pipeline laying and civil works in pipeline ROW & other sites will generate dust that could impact the air quality. Mostly the additional automobile traffic and construction machineries involved during construction activities will generate pollutants like PM, SO_2 & NOx. Therefore, the receptor sensitivity is assessed as **"Moderate"**. However, this will not lead to any tangible effect, as the additional traffic volume related to construction activities will be low.

Noise: During construction phase, noise will be generated due to movement of vehicles, and operation of light and heavy construction machineries including pneumatic tools (hot mixer, dozer, tipper, loader, excavator, grader, scrapper, roller, concrete mixer, generator, pump, vibrator, crane, compressor, HDD etc.). Operation of construction machinery may lead to a rise in noise level in the range between 80-100 dB(A). The magnitude of impact from noise will depend upon types of equipment used, construction methods and on work scheduling. The main sources of noise during construction period are:

- Movement of vehicles during the construction period for procurement of construction material.
- During site preparation, surface preparation, pipeline laying etc.

Noise generated from the sources mentioned above will be mostly during daytime. Moreover, villages / settlements being near to the route, significant impact on local people is apprehended (as a few congested human habitations are along the site), as the noise generated will be a problem. However, the workers are likely to be exposed to high noise levels that may affect them.

Embedded/In-Built Control

- Suppression of fugitive dust emissions by spraying water, wetting of the stockpile.
- Pre-identified proper locations of material stockpiles, especially sand.
- Screening or providing wind breaks for stockpiles, covering of trucks with tarpaulin sheets during transportation of material.
- Normal working hours of the contractor will be defined (preferable 8 am to 6pm). If work needs to be undertaken outside these hours, it would be limited to activities which do not generate noise.
- Avoid unnecessary honking in traffic movement.
- Barricading of project premises to avoid dispersion of dust and noise outside the project premises.

Impact Magnitude

The major source of emissions in the construction phase is fugitive dust emissions & emissions from excavation and other construction activities. In addition, the operation of DG sets will also cause gaseous emissions. There will be some impact due to the plying of vehicles on the access roads which run across settlement area.

The construction activities will occur for maximum 6-12 months whereas dust emitting activities such as site clearing, civil construction etc. will be of short/medium duration for 1-2 peak months. The impact magnitude has been categorized as small because the soil type is alluvial. Thus, dust emission would be restricted to construction phase only for shorter duration.

Impact Significance

As per the impact significant assessment matrix (Table 5-3**)** combination of low impact magnitude with medium receptor sensitivity results in impact significance as Moderate.

Mitigation Measures

- Proper and prior planning, appropriate sequencing and scheduling of all major construction activities will be done, and timely availability of infrastructure supports needed for construction will be ensured to shorten the construction period vis-à-vis reduce pollution.
- Construction materials will be stored in covered godowns or enclosed spaces to prevent the windblown fugitive emissions.
- Concrete will be mixed in a mechanical mixer to ensure thorough mixing of all materials to avoid dispersion of particulate matter into the ambient air. Reinforcements will be placed around the length of pipeline. Night Caps to be provided to both ends of line pipe before starting the work.
- Stringent construction material handling / overhauling procedures shall be followed.
- Adequate dust suppression measures such as regular water sprinkling on unpaved haul roads, at vulnerable areas of construction sites will be undertaken to control fugitive dust during material handling and hauling activities particularly near habitations especially in dry seasons.
- The construction material delivering vehicles will be covered to reduce spills.
- Low emission construction equipment, vehicles and generator sets to will be used.

- It will be ensured that all construction equipment and vehicles are in good working conditions, finely tuned and maintained to keep emission within the permissible limits and engines tuned off when not in use to reduce pollution.
- Vehicles and machineries will be regularly maintained so that emissions confirm to standards of Central Pollution Control Board (CPCB).
- Construction workers to be provided with appropriate PPEs during construction phase.
- Temporary labour sheds will be located away from the immediate vicinity of construction sites and major road traffic.
- Protective gears such as earplugs, etc. will be provided to construction personnel exposed to high noise levels as preventive measures.
- It will be ensured that all the construction equipment and vehicles used are in good working condition, properly lubricated and maintained to keep noise within the permissible limits and engines tuned off when not in use to reduce noise.
- Construction activities carried out near residential locations will be scheduled to the daytime (i.e. from 10.00 a.m. to 6.00 p.m.) only to have minimum disturbance to the residents.
- Whenever possible static noisy machinery will be placed on vibration isolators or temporary sheeting will be provided to check noise propagation.
- Noise level will be monitored at regular intervals during the construction phase, which will help in taking appropriate action to maintain it within the prescribed limit

Residual Impact Significance

- The significance of residual impact will be **Low** after implementing mitigation measures.

Table 5-7: Impact Significance for Ambient Air & Noise Quality

Impact		Impact on Ambient Air & Noise Quality				
Impact nature		Negative				
Impact Type		Direct				
Impact Scale		Impact due to construction activity and operation of construction vehicles				
Impact Magnitude (Without Mitigation		Negative-Moderate				
Aspect	Scenario	Spread	Duration	Intensity	Likelihood	Overall
Ambient Air & Noise Quality	Without Mitigation	Medium	Short	Moderate	Moderate	Moderate
	With Mitigation	Local	Short	Low	Low	Insignificant

5.6.4 Land and Soil Environment

Impacts- Context and Receptors

Construction activities such as earth moving may lead to reduction in vegetation cover on ground thus leading to soil erosion. During the construction period the movement of heavy vehicles will result in compaction of soil by making it hard and impermeable. The erosion at construction stretches will result in increased sediment load in recipient streams. Any leakage of lubricants in the equipment yard may cause soil contamination. Solid waste disposal along roadside also adds to the impact on the land environment during the construction.

During construction activity for laying pipeline cutting of existing land will be done and the dug material generated will be replaced back after laying of the pipes. Loosening of topsoil and loss of vegetative cover (land clearing) along the route and construction areas due to excavation and back filling which lead to enhance soil erosion.

Embedded/In-Built Control

- Erosion and sediment control measures should be adopted including using silt fences to manage runoff, applying erosion control mats on disturbed soil, hydroseeding for vegetation restoration, and setting up sediment basins to collect runoff.
- In order to do topsoil management, the topsoil should be striped and stockpiled separately before construction, and it should be replaced after construction to restore soil fertility.
- For vegetation and habitat protection land disturbance should be minimization by keeping the construction area narrow and by the usage of controlled clearing methods for vegetation removal.
- To achieve the soil compaction prevention usage of mats or gravel paths for heavy machinery should be adopted.
- Water management and protection involves using trenchless technology for stream, canal and wetland crossings, designing proper drainage systems to prevent erosion, and managing de-watering to avoid soil erosion.
- Contaminant management includes setting up spill prevention and containment measures for fuel or oil spills and conducting soil testing to monitor contamination levels.
- Trench management focuses on stabilizing trenches during construction to prevent collapse and refilling trenches promptly to avoid long-term soil settlement.

Impact Magnitude

The overall magnitude of the land and soil impacts is expected to be **moderate**, in sensitive zones such as Akola due to the combined effects of excavation, soil compaction, removal of topsoil, trenching, and the added vulnerability to seismic and flood events.

Impact Significance

The significance can be **moderate**, particularly in hazard-prone areas where soil stability and erosion risks are elevated.

Mitigation Measures

- During excavation, care will be taken to see that the topsoil and the subsoil are stored separately. Topsoil (50cm) of route pits will be conserved and restored after excavation is over and will be replaced back for filling of the pit areas. Whereas the topsoil (25cm) stripped from the area stacked separately as topsoil dump of not more than 1m in height and the same will be redistributed to the pit after laying of pipeline. During refilling, care will be taken to see that the topsoil is replaced back at the top while refilling after laying of pipeline.
- Back filling shall be carried out immediately after the pipeline has been laid in the trench. On no account shall the topsoil from ROW be used for this purpose. The backfill material shall not

contain any extraneous material and/or hard lumps of the soil. After the initial backfill has been placed into the trench to a level slightly above the surrounding ground, the backfill material shall be compacted.

- When the trench has been dug through driveways or roads all backfills shall be executed with sand or a suitable material and shall be thoroughly compacted.
- Trench excavated in dykes which are the property of the railways, or which is part of main road shall be graded and backfilled in their original profile and condition.
- Also, necessary contour bunding, gully plugging, and staggered trenching shall be carried out wherever required in the pipeline corridor and in areas where excavated soil will be dumped to check soil erosion.
- Stone pitching will be provided at the slopes near the irrigation and natural drainage / rivers to prevent silting of soil into these water bodies.
- In flood-prone areas, temporary bunds and drainage diversion structures will be installed to prevent waterlogging and erosion during monsoon.
- In seismic zones, trench design will incorporate flexible joints and bedding materials that can absorb ground movement without compromising pipeline integrity.
- Concrete shall be tested in accorder with IS: specification and shall have a minimum compressive strength as per concrete grade design and the same will be utilized for construction purposes.
- Approved quality of cement confirming to IS code will be used only OPC 53 grades.
- Concrete coating will be reinforced by a Single layer of steel reinforcement.

Residual Impact Significance

- The significance of residual impact will be **Low** depending upon the effectiveness of mitigation measures.

Table 5-8: Impact Significance for Land and Soil Environment

Impact		Impact on Land and Soil Environment				
Impact nature		Negative				
Impact Type		Direct				
Impact Scale		Erosion, sediment runoff, compaction, habitat loss, disruption of topsoil, Localized, with concentrated effects near water crossings, steep areas, and during trenching.				
Impact Magnitude (Without Mitigation)		Medium				
Aspect	**Scenario**	**Spread**	**Duration**	**Intensity**	**Likelihood**	**Overall**
Land and Soil Environment	Without Mitigation	Medium	Medium	Moderate	Moderate	Moderate
	With Mitigation	Local	Medium	Low	Low	Minor

5.6.5 Ecology and Biodiversity

Impacts- Context and Receptors

The construction works of the NG pipeline route involve clearance of land, including the removal of trees, for which necessary permissions have been obtained from the relevant authorities. While a significant portion of the pipeline route will still be laid along the Right of Way (RoW) of existing roads, certain

segments will require the clearing of trees, shrubs, and herbs. This introduces a moderate ecological impact, particularly in areas with dense vegetation or sensitive habitats.

The removal of trees may lead to:

- Loss of local biodiversity and habitat for birds and small mammals,
- Temporary disruption of ecology of the region,
- Increased vulnerability to soil erosion and microclimatic changes.

Embedded/In-Built Control

- Tree removal will be limited to the minimum required for safe and efficient pipeline installation.
- The design will incorporate buffer zones around ecologically sensitive areas to minimize habitat fragmentation.
- Tree felling will be compensated through afforestation or compensatory plantation as per regulatory guidelines.
- Soil erosion control measures such as silt fences, mulching, and temporary revegetation will be implemented.
- Construction activities will be scheduled to avoid breeding seasons of local fauna where applicable.

Impact Magnitude

The magnitude of the impact on ecology and biodiversity is expected to be moderate, due to the direct removal of trees and associated habitat loss. However, the impact is localized and temporary, with potential for recovery through mitigation and restoration efforts.

Impact Significance

Given the tree removal and associated ecological disturbance, the significance of ecological and biodiversity impacts is considered moderate without mitigation. With proper mitigation, the impact can be reduced to low.

Mitigation Measures

- Tree removal will be carried out only after obtaining all necessary permissions.
- A detailed tree inventory will be maintained, and compensatory plantation will be undertaken at a ratio prescribed by the forest department or relevant authority.
- Native species will be prioritized for replantation to support local biodiversity.
- Construction alignment will be optimized to avoid ecologically sensitive areas and minimize vegetation loss.
- Post-construction ecological restoration will be implemented, including soil stabilization and replanting of native vegetation.

Residual Impact Significance

- The significance of residual impact will be **low** after implementing mitigation and restoration measures.

Table 5-9: Impact Significance for Ecology and Biodiversity

Impact		Impact on Ecology and Biodiversity				
Impact nature		Negative				
Impact Type		Direct				
Impact Scale		Localized to Regional (depending on density of vegetation and ecological sensitivity)				
Impact Magnitude (Without Mitigation)		Medium				
Aspect	Scenario	Spread	Duration	Intensity	Likelihood	Overall
Impact on Ecology and Biodiversity	Without Mitigation	Medium	Medium	Moderate	Moderate	Moderate
	With Mitigation	Medium	Medium	Low	Low	Moderate

5.6.6 Socio-economic Environment

Impacts- Context and Receptors

The project will provide either direct or indirect job opportunities for the local population as far as possible. There will be some migration of skilled labour force from outside the project area during construction phase, which may put some pressure on the local settlements and resources. Local skilled employees will be preferred.

There will be a temporary rise in traffic on nearby roads during the construction phase, both inside and outside the project site, because the pipeline route crosses several major roadways. The transportation of building equipment and raw materials will be the primary cause of this rise. Due to the project's size and nature, there can be inconveniences for the public as well as possible safety hazards. Residents may be at risk for health and safety issues since the pipeline route travels through villages with dense human settlements along the right of way (ROW). This will have minimal affect considering the size and nature of the project.

Impact Significance

The significance of this impact is evaluated to **low**, which can be translated to positive beneficial impacts of the area.

Mitigation Measures

- Implement a traffic management plan to regulate the movement of vehicles and machinery.
- Schedule transportation of raw materials and heavy equipment during off-peak hours to minimize traffic congestion.
- Designate specific routes for construction vehicles to reduce disturbances in residential and high-traffic areas.
- Install appropriate road signage, speed limits, and warning signals to alert commuters and pedestrians.
- Deploy trained personnel for traffic control at critical junctions to ensure smooth vehicle movement and public safety.
- Conduct awareness programs for nearby residents on safety precautions related to pipeline construction.

- Implement strict safety protocols, including barricading construction areas and placing warning signs along the Right of Way (ROW).
- Establish emergency response plans and provide first aid facilities at construction sites.
- Regular monitoring of air and noise pollution levels in residential areas near the construction zone.
- Ensure compliance with occupational health and safety standards to protect both workers and the public.
- Adopt strict measures to prevent spills or leakages of hazardous substances into rivers and water bodies.
- Install silt traps and sedimentation barriers near river crossings to control soil erosion and prevent contamination.
- Conduct water quality monitoring before, during, and after construction to ensure no significant impact on aquatic life.
- Avoid construction activities near riverbanks during peak fishing seasons to minimize disruptions.
- Implement eco-friendly construction techniques to reduce the risk of river pollution and maintain biodiversity.
- Compensation affected individuals for any temporary disruptions to their livelihood due to construction activities.
- Promote local employment opportunities by prioritizing the hiring of skilled and unskilled workers from nearby villages.

Residual Impact Significance

- After the implementation of these mitigation measures, the residual impact significance is expected to be **Positive low to moderately beneficial.**

Table 5-10: Impact Significance for Socio-Economic Condition

Impact		Impact on Socio-economic condition of the study area				
Impact nature		Negative (with mitigation impact would be positive and beneficial)				
Impact Type		Direct				
Impact Scale		Construction activity may impact on public health in proximity of the project foot-print area. However, construction work may create jobs for local population/PAFs, which may convert the impact to beneficial.				
Impact Magnitude (Without Mitigation)		Low				
Aspect	**Scenario**	**Spread**	**Duration**	**Intensity**	**Likelihood**	**Overall**
Socio-economic Impacts	Without Mitigation	Local	Short	Moderate	Moderate	Minor
	With Mitigation	Local	Short	High	High	Moderate-beneficial

5.6.7 Occupational Health and Safety

Impacts- Context and Receptors

The construction and installation activities for the 65.5 km natural gas pipeline involve several occupational health and safety risks. These include:

- Exposure to hazardous materials (e.g., gas, welding fumes, lubricants),
- Operation of heavy machinery and equipment,
- Working in confined spaces,
- Manual handling of pipes and trenching activities,
- Risk of fire, explosion, or gas leaks,
- Heat stress and fatigue during long working hours in open environments.

Workers, contractors, and site personnel are the primary receptors of these risks along with the local people residing/crossing the areas where the laying work will be carried out. The risks are adverse, direct, and likely to occur without proper controls

Embedded/In-Built Control

The project design and execution plan include several embedded safety controls:

- Compliance with national and international safety standards (e.g., OISD, PNGRB, IS codes).
- Mandatory use of PPE (helmets, gloves, safety shoes, flame-resistant clothing).
- Safety induction and training programs for all workers.
- Emergency response plans include fire extinguishers, first aid kits, and evacuation protocols.
- Regular safety audits and inspections.
- Signage and barricading around hazardous zones.
- Permit-to-work systems for high-risk activities (e.g., hot work, confined space entry).
- Health surveillance and medical check-ups for workers.

Impact Magnitude

The magnitude of occupational health and safety impacts is moderate, considering the nature of construction activities and the potential for injury or exposure. However, with embedded controls, the risks can be significantly reduced.

Impact Significance

Based on the appraisal criteria:

- **Spread**: Local (restricted to construction sites),
- **Duration**: Medium (construction phase may last up to 0.5–1 year),
- **Intensity**: Moderate (risk of injury or exposure),
- **Likelihood**: Moderate (possible to occur without controls),

Hence, the **overall significance** is **moderate** without mitigation.

Mitigation Measures

To further reduce risks:

- Strict enforcement of HSE protocols and daily toolbox talks.
- Deployment of trained safety officers at all active sites.
- Installation of gas detection and fire suppression systems at CGS.
- Provision of rest areas, hydration stations, and shaded zones to prevent heat stress.
- Incident reporting and investigation mechanisms to prevent recurrence.
- Coordination with local emergency services for rapid response.

Residual Impact Significance

With effective implementation of mitigation measures, the residual impact on occupational health and safety is expected to be low.

Table 5-11: Impact Significance for Occupational Health and Safety

Impact		Impact on Occupational Health and Safety of the study area				
Impact nature		Adverse				
Impact Type		Direct				
Impact Scale		Local (confined to construction and CGS sites)				
Impact Magnitude (Without Mitigation)		Moderate				
Aspect	Scenario	Spread	Duration	Intensity	Likelihood	Overall
Occupational Health and Safety	Without Mitigation	Local	Medium	Moderate	Moderate	Moderate
	With Mitigation	Local	Medium	Low	Low	Minor

5.7 IMPACT DURING OPERATION STAGE

The impact during the operation phase will be continuous in nature. For a gas-based pipeline, the potential for imparting adverse impacts is not high. However, whatever impact on environment is present will be minimized through incorporation of efficient technologies for pollution control measures.

5.7.1 Air Environment

The pipeline will be 1.5 to 2 m below the ground and would be monitored via SCADA System. Some vehicular emissions during maintenance that will be short-term and temporary in nature. Therefore, there will be no impact on air environment due to operation of NG pipeline.

5.7.2 Noise Environment

The NG pipeline being underground in nature will not lead to noise pollution during its operation. However, noise could be generated during maintenance and repair works that will be temporary in nature.

5.7.3 Water Environment

IMPACTS

There will be no consumption of water during the operation phase of the NG Pipeline. However, there are chances of water contamination due to unprecedented leakage of pipelines within the water bodies located in ROW of the pipeline.

Embedded/In-Built Controls

Nil

Impact Magnitude

The magnitude of potential impacts is also expected to be **low** during the operational phase. The pipeline's construction did not disturb any major water bodies.

Impact Significance

During the operation of the natural gas pipeline project, the impact on the water environment is expected to be minimal.

MITIGATION MEASURES

- Leak Detection and Control System shall be in place.
- Mock Drills shall be conducted at regular intervals in line with the Emergency Response and Disaster Management Plan.
- Edges of the spilled area will be undercut so as to provide a key lock for the repair material. A stiff mixture of cement, water and aggregate will be throttled into & through the reinforcement and built-up until the surface is level with coating around the repair. The pipe will then be carefully laid with the repaired area at the top and will be moist cured for twenty-four (24) hours before further handling.

Table 5-12: Impact Significance for Water Environment

Impact		Impact for Water Environment				
Impact nature		Operation of the pipeline involves minimal disturbance to water bodies.				
Impact Type		Temporary impacts, such as minor risks of water contamination due to accidental leakage or malfunction.				
Impact Scale		Localized to the pipeline's specific route				
Impact Magnitude (Without Mitigation)		Low				
Aspect	**Scenario**	**Spread**	**Duration**	**Intensity**	**Likelihood**	**Overall**
Water Environment	Without Mitigation	Local	Long	Low	Moderate	Minor
	With Mitigation	Local	Long	Low	Low	Minor

5.7.4 Environment, Health, and Safety

There could be impacts on environment, health, and safety due to leakage from pipelines from likely external physical forces (Floods & Earthquake). Natural Gas being inflammable in nature could lead to fire hazards. Since the pipeline route passes through the several areas with the heavy settlements, canals,

drains, railway crossing and heavy traffic areas. Ensuring the safety of workers during the construction phase, especially in highways and high-traffic areas along the pipeline route, requires the implementation of strict safety protocols and a comprehensive monitoring system. These precautions are essential to minimize risks related to natural gas leakage and to protect both workers and the surrounding community from potential hazards and accidents.

Embedded/In-Built Controls

- Project specific Health and Safety Management Plan will be put in place.
- Personal Protective Equipment (PPEs) including safety shoes, helmet, goggles, earmuffs, face shield, insulating (rubber) gloves with leather protectors, insulating sleeves, and flame-resistant (FR) clothing and face masks.
- Use of permit to work system
- Cranes and other lifting equipment are operated by trained and authorised persons.
- An up to date first aid box should be provided at all construction sites and a trained person should be appointed to manage it.

Impact Magnitude

As mentioned above, the O&M activities will be carried out by qualified team. With above embedded controls, the magnitude of impacts will be **Low**.

Impact Significance

As per the impact significant assessment matrix (**Table 5-3**) a combination of small impactmagnitude with medium receptor sensitivity results in impact significance as **Low**

MITIGATION MEASURES

- Leak Detection and Control System shall be in place.
- SCADA monitoring shall be carried out.
- Mock Drills shall be conducted at regular intervals in line with the Emergency Response and Disaster Management Plan.
- Continuous metering will be done to provide a comparison between input and output for leak detection.
- Periodic audits of pipeline and its control measures will be conducted regularly.
- Demarcation of Hazard Zones and pipeline chainage will be done.

Residual Impact Significance

- Residual significance of impacts during operation phase will be **Low to Insignificant.**

Table 5-13: Impact Significance for Environment, Health, and Safety

Impact	Impact for Environmental Health and Safety
Impact nature	Negative
Impact Type	Direct
Impact Duration	Long-term

Impact Extent		Local				
Impact Scale		Operational activity may impact occasionally on health & Safety of operational work force				
Impact Magnitude (Without Mitigation)		Negative-Low				
Aspect	**Scenario**	**Spread**	**Duration**	**Intensity**	**Likelihood**	**Overall**
Environmental Health and Safety	Without Mitigation	Local	Long	Low	Moderate	Moderate
	With Mitigation	Local	Long	Low	Low	Minor

5.8 SUMMARY OF PRE AND POST MITIGATION IMPACT SIGNIFICANCE

Table 5-14 below presents the summary outcome of the comprehensive assessment of identified impacts pre and post mitigation during various phases of the project. During impact assessment study, significant impacts have been considered, and mitigation plans have been developed in accordance to mitigate the impacts.

Table 5-14: Summary of Impacts

Category	Impact Significance (without mitigation measures)	Impact Significance (post-mitigation)
Planning Phase		
Impact due to Land Procurement	Moderate	Minor
Construction Phase		
Topography and Drainage	Moderate	Minor
Water resources and availability	Moderate	Minor
Ambient air and noise quality	Moderate	Insignificant
Land and Soil Environment	Moderate	Minor
Ecology and Biodiversity	Moderate	Moderate
Socio-economic Impacts	Low	Moderate-beneficial
Occupational Health and Safety	Moderate	Minor
Operational Phase		
Water Environment	Minor	Minor
Environmental Health & Safety	Moderate	Minor

6 ANALYSIS OF ALTERNATIVES

Route selection is a process of identifying constraints, avoiding undesirable areas and maintaining the economic feasibility of the pipeline. Diversion of pipeline around obstacles can be very costly. The ideal route, of course, would be a straight line from the origin to the terminal point. However, physiographic, environmental, design and construction constraints usually alter the route

The pipeline route should be optimized based on the following considerations:

- Safety of public lives and property and safety of the pipeline from engineering and other considerations.
- Shortest pipeline length.
- Easy and favorable terrain condition free of large water bodies, low lying marshy lands, obstacles like ravines, depressions and unstable grounds, meandering rivers, etc.
- Ground profile for pipeline hydraulics and avoidance of steep rising and falling ground, hills and valleys having sloping right of way.
- Availability of infrastructure and access to the pipeline route during construction and maintenance.
- Environmental impact and avoidance of environmentally sensitive lands, such as reserved forests, marine parks, built-up areas, places of worship, burial and public events.
- Minimum crossing of existing pipelines, transmission lines, parallel alignment, etc.
- Minimum road, rail, river and canal crossings.
- Avoidance of rugged and intricate grounds with hard strata, exposed rocks, boulders and quarries.
- Existing and future developments in the region, such as roads, rail lines, canal network, reservoirs, townships, industrial units, etc.
- Scope for future expansion of the pipeline.

a) The Petroleum and Natural Gas Regulatory Board (PNGRB) was constituted under The Petroleum and Natural Gas Regulatory Board Act, 2006 (NO. 19 OF 2006) notified via Gazette Notification dated 31st March 2006. The Act provides for the establishment of Petroleum and Natural Gas Regulatory Board to protect the interests of consumers and entities engaged in specified activities relating to petroleum, petroleum products and natural gas and to promote competitive markets and for matters connected therewith or incidental thereto.

b) Further as enshrined in the act, the board has also been mandated to regulate the refining, processing, storage, transportation, distribution, marketing and sale of petroleum, petroleum products and natural gas excluding production of crude oil so as to ensure uninterrupted and adequate supply of petroleum, petroleum products and natural gas in all parts of the country. Hence the project was acquired through the bidding process and the area, number of customers, total CNG stations were already mentioned in it. So, the route selection was done within the allotted area.

Since all the requirements in the projects were predefined, scope for alternate analysis was quite slim, as to which the route passes through mix and heavily populated area, forest areas, and mostly through the RoW of the road where the movement of heavy traffic is being observed and hence depending upon the technical and economic feasibility the proposed pipeline routes were selected.

7 ADDITIONAL STUDIES

7.1 Quantitative Risk Assessment

Quantitative Risk Assessment (QRA) study should be undertaken for the proposed 12" diameter underground pipeline for the transfer of natural gas. The aim of QRA study will be to identify potential hazards, assess the consequences and frequency of hazards and evaluate the risk to personnel, property and public. To assess the relative level of risk posed by the proposed project, a comparison will be made with risk criteria that are considered tolerable (ALARP) for similar operations.

The overall approach and methodology employed for the study will be based on the guidelines given in IS 15656: 2006, Indian Standard – Hazard Identification and Risk Analysis – Code of Practice, May 2006, using PHAST Software/Correlations.

The pipeline system will be provided with state-of-the-art safety systems like protection system, SCADA, leak detection system / pipeline application software, Fire and gas detection systems, etc. The proposed transfer of gas will be examined for inherent hazards or the potential to result in an unplanned event or sequence of events at different sections along the pipeline route. Several hazards that can cause failure of pipelines will be identified. This included loss of integrity/ damage due to interference from third parties, corrosion, accidents, human error, sabotage, etc., during normal operation. Analysis of past accidents are to be used to establish the credibility of accident scenarios.

7.2 Guidelines for Emergency Response Plan

An emergency response plan will be developed with the resources available within the company. The important stages of the response plan are declaration of an emergency, identification of resources & manpower, ending of an emergency and rehearsal of the plan. Declaration of an emergency would involve recognizing a leak and reporting to the Station in charge of the nearest compressor station.

Other features are summarized below:

Emergency Response Structure: An emergency response structure will be developed for effective response to the emergency. The structure defines the main functions of the decision makers and the individual roles as well.

Roles & Responsibilities of Team: Emergency response team (ERT) to respond to fire, accidents and technical emergencies will be constituted from operations personnel, who can be called upon 24 hours a day, supported by senior management field personnel as and when required. The ERT will receive specific training for their roles and exercised on a regular basis. The proposed functions of employees that are planned to be deployed will be finalized prior to commissioning.

Operations Control: The pipeline operation will be monitored and controlled through Local control system and POC in command which will have the provision for emergency shut down or isolation of Pipeline. Security: Surveillance of the entire pipeline will be held periodically through ground patrolling. Using operators with knowledge of the local area will be deployed for ground patrolling of the pipeline route.

Medical and First Aid: All arrangements will be made available at site offices and camps for medical and first aid. First–Aid facility will be provided at compressor stations, master pipeline operation center/ local control center, MLVs and M&Rs. Adequate first-aid training will be provided for employees at these locations.

Communication: Responsibility for external and internal communication will be assigned at each station. Dedicated fiber optic cable-based communication system will be provided for quick communication between the control stations, dispatch and delivery station(s) of the pipeline. The backup system will consist of an appropriate combination of fixed telephone lines/data-bandwidth of the local service provider, mobile phones, VHF sets etc.

Emergency control room: A safe location will be designated as an emergency control room (ECR) within the compressor stations.

Emergency Procedures: PP will evolve easy-to-follow procedures for responding to the identified situation. The plan will be rehearsed once in three months.

Ending of an emergency: After controlling an emergency, the site ERT Leader will declare as “All Clear”. The siren will be sounded for 2 minutes to indicate that the Emergency is over.

The basic elements for an effective plan have been included in the development. Prior to the commissioning of the project, copies of the plan are to be given to the authorities.

8 PROJECT BENEFITS

8.1 CONTRIBUTION TO NATIONAL ENERGY SECURITY

Energy is the key input for economic growth and Indian Energy sector play a vital role in country's Economy. Energy is a key input to the production processes that transform inputs into goods and services. India became the third largest energy consumer in the world after United States and China. Key drivers for increasing energy demand in India are population growth, industrialization, and urbanization. Energy security and sustainability are interdependent because emissions from energy consumption contribute to climate change in greater extent globally. Indian government is also committed to increase the share of natural gas in country's energy mix up to 15% by 2030 and Ministry of Petroleum and Natural Gas intervening with policy reforms in natural gas sector. India requires a sustained supply of energy to support its ambitious growth and welfare targets for the coming years. In a survey by NITI Aayog, it was noted that India's energy consumption will reach 2,300 million tons of oil equivalent by 2047 out of which natural gas will contribute 173 million tons of oil equivalent under the determined effect scenario.

According to the International Energy Agency (IEA), Indian gas market is considered one of the most growing energy markets in the world, the Agency expected that Indian gas demand will increase in the coming decades at 5.4% per annum over 2007-30 (IEA ,2009) reaching 132 BCM by 2030. With the growing need for oil and gas in India since the nineties of the last century, the Indian government has worked to develop the oil and gas sector through the development of mechanisms of action and the issuance of new regulatory laws, 1993, private investors have been allowed to import and market liquefied petroleum gas (LPG) and kerosene freely, private investment is also allowed in lubricants, which are not subject to price controls. In the 11th Five Year Plan, the Indian government has focused on the energy sector to self-reliance for energy resources, particularly oil and gas by encouraging of exploration and extraction operations and reduce dependence on overseas.

8.2 REDUCED RISKS AND COSTS

The natural gas pipeline has been regarded as the most cost effective and safest channel of gas transportation and has extraordinary strategic significance for the country. Pipeline is regarded as the most cost-effective and safest channel to transport the oil and gas from upstream oil field or port to downstream users or refineries. Gas is significantly replaced by oil in all sectors i.e. power generation, domestic and transportation due to price hike in oil prices globally and cheaper availability of natural gas. During the last five years the oil imports have reduced by 8 %. The other reason for that may be the availability of cheaper, safe, and durable modes of gas transportation system (main and distribution network of pipeline), which is continuously expanding.

The gas pipeline projects help in reducing the travel cost in comparison to other resources and it is also very safe and cheaper for domestic, commercial, and industrial uses. The proposed pipeline project would be very feasible and cost effective as it is totally underground and there will be continuous access to the gas for use.

8.3 SOCIO-ECONOMIC DEVELOPMENT

The proposed project will create socio-economic development across the pipeline route and in the near vicinity as well. The project will provide employment during construction and operation phase to the local labours. Natural gas pipelines provide a reliable mode for transportation, reducing dependence on less stable energy supplies. Access to natural gas will decrease heating and electricity costs for residents and businesses. Usage of gas in domestic households and other commercial activities will reduce consumption of fossil fuels that would lead to a reduction in pollution.

9 ENVIRONMENTAL, SOCIAL AND BIODIVERSITY MANAGEMENT & MONITORING PLAN

9.1 BACKGROUND

The Environmental Social and Biodiversity Management Plan (ESBMP) provides an essential link between predicted impacts and mitigation measures during implementation and operational activities. ESBMP outlines the mitigation, monitoring and institutional measures to be taken during project implementation and operation to avoid or mitigate adverse environmental impacts, and the actions needed to implement these measures. The likely impacts on various components of environment due to the project during developmental activities have been identified and measures for their mitigation are suggested. The ESBMP lists all the requirements to ensure effective mitigation of every potential biophysical and socio-economic impact identified in the EIA. For each attribute, or operation, which could otherwise give rise to impact, the following information is presented:

- A comprehensive listing of the mitigation measures
- Parameters that will be monitored to ensure effective implementation of the action.
- Timing for implementation of the action to ensure that the objectives of mitigation are fully met.

The ESBMP comprises a series of components covering direct mitigation and environmental monitoring, an outline waste management plan, and a project site restoration plan. Therefore, an environmental management plan has been prepared for each of the above developmental activities.

9.2 ENVIRONMENT, HEALTH & SAFETY POLICY

ATGL believes that Environment, Health, Safety and Quality (EHS&Q) is an integral part of their business. By embracing the best principles EHS&Q, the company sincerely attempts to have all overall positive impact on the environment and communities where they operate. **ATGL** is committed to continually improving their EHS&Q performance by including the points below: The EHS&Q Policy of **ATGL** emphasizes the following objectives:

- Implement high standards of Environment, Health, Safety & Quality in planning, construction, operations, and maintenance of projects throughout their lifecycle to provide a safe and conducive working environment to its employees.
- Identify, eliminate, or mitigate potential EHS&Q risks associated with our business by implementing robust due diligence and monitoring mechanism.
- Evaluate and comply with applicable regulations related to EHS&Q.
- Provide adequate training & resources for its employees to achieve its EHS&Q targets.
- Voluntarily adopt to an integrated Management Systems, compliant with international standards ISO 14001, ISO 45001, and ISO 9001 for EHS&Q respectively.

This EHS&Q policy is applicable for **ATGL**'s business and project related activities and its subsidiaries. All employees and contractors of **ATGL** are required to adhere to this policy.

The HSE policy further ensures adherence of health and safety norms by hired contractors. The specific provisions to be followed include the following:

- The contractor shall in its performance of the contract and carrying out of the work to ascertain and comply with all the relevant statutory laws and directives act as applicable.
- The contractor shall provide detail of EPF, ESIC, Labour License, medical fitness of workmen, valid photo id of workmen, undertaking letter mentioning workmen criminal record and other documents as applicable.
- All required safety items shall be supplied by contractor and any accident occurs during the contract period shall be to the contractor's account and **ATGL** will not be responsible for the minor/major accident/incident legally or financially.
- Workmen compensation policy must be obtained and kept in force.
- If contractor assigning the whole or partial work to third party should be intimated to **ATGL** in written with all required documents.
- Daily manpower and man-hour shall be reported by contractor.
- The contractor shall provide Attendance Register, Wages Register, EPF Remittance Challans, ESIC remittance challans every month or as on when required. This is also required for release of payment.

- The contractor shall make provisions for potable and domestic water for manpower, proper sanitary requirements with sufficient toilets and wastewater management for workmen which will be deployed for all ongoing work.
- Dedicated safety supervisor/officer should be available at site all the time during work execution.
- Mandatory PPE. (All PPE's Should be of IS standards)
    - ✓ Safety Helmet / Hard Hat.
    - ✓ Safety Shoes.
    - ✓ Safety Goggle.
    - ✓ Safety Jacket.
    - ✓ Safety Hand gloves.
- Job Specific PPE's

    a. Welding Work (Basic)

    - ✓ Safety Goggle / Welding Shield.
    - ✓ Leather Hand Gloves.
    - ✓ Leather apron.
    - ✓ Full Sleeved shirt
    - ✓ Pants that covers the top of shoe.

    b. Drilling Work (basic)

    - ✓ Safety Goggle
    - ✓ Nose mask.
    - ✓ Hand Gloves.
    - ✓ Ear Plug (as per requirement)

    c. Electrical

    - ✓ Insulating (rubber) gloves.
    - ✓ Insulated tools.
    - ✓ All electrical extension boards should have industrial plugs wherever required.
    - ✓ All electrical extension boards should have 30mA ELCB MCB.

    d. Civil Work

    - ✓ Gum Boot with steel toe.
    - ✓ Rubber Gloves.

- ✓ Nose mask.
- ✓ Safety Goggles.
- ✓ Ear plug if working in high noise area.

- Any other specific PPE required that will be intimated time to time.
- All required safety training will be provided by **ATGL** time to time.

The contractor should adhere to all the **ATGL** & end customer safety norms. Failing to adhere may result in suspension of work or penalty will be applicable.

9.3 ORGANIZATION STRUCTURE

The overall management and coordination of the project will be managed through Chief Executive Officer (ATGL) who will be supported by the Plant Manager and Head (EHS&S). The Head- EHS&S /ESG will overview, monitor and control the activities of Site Manger and Safety officer. The contractors will be controlled by the site manager during construction phase. The construction contractor shall have a Health, Safety and Environment supervisor in their team who shall work in coordination with the EHS officer.

The primary responsibility of management of EHS&S functions within **ATGL** lies with the head quality control and EHS&S Officer. For management of land related issues, the responsibility rests directly with the land procurement personnel and HR related issues is managed by dedicated HR team. CSR is managed by a separate team and is responsible for overlooking all assets operated by **ATGL.**

9.3.1 Roles and Responsibilities

Head EHS

The Head of EHS should be the designated EHS&S head at **ATGL**. The key Roles and Responsibilities are as follows:

- The overall responsibility for implementation and communication of the EHS&S and associated policies and meeting ESMS performance objectives for the organization with respect to project.
- Ensuring adherence of EHS&S Policy and procedures and Safety compliance by Contractors.
- Ensuring compliance with existing and future operations with respect to the applicable national laws, rules and regulations, permits pertaining to Environmental, Safety, Health and Social as well as international best practices including reference frameworks such as IFC Performance Standards.
- Communication of EHS&S related issues and concerns with the CEOs office and project heads as well as guiding them on Go and No-Go decisions for projects with serious EHS&S risks and issues.
- Decision on internal risk categorization and rating lies with the ESHS head.
- Approvals for commissioning of ESIA studies, Resettlement Action Plans etc.
- Responsible for recommendation and appointment of EHS&S personals.
- Responsible for taking up monitoring reports and audit reports with the CEO's office.

- Changes in this ESMS manual must be sanctioned by the EHS&S head and formalized by the ESMS head.
- Responsible for decisions on higher level EHS&S non-compliance by external stakeholders such as contractors and vendors with respect to fines and associated penalties.

Corporate EHS&S Officer

The EHS&S Manager at the corporate level will be responsible for the following:

- Overseeing successful EHS&S screening, audit and impact assessment of assets either internally or through external agencies as the case maybe.
- Overseeing the implementation of the systems, protocols and checklists of the ESMS at the corporate level and where necessary, transferring information and expertise at the site level.
- Interaction with other teams such as project team, land, procurement, HR etc. for handling and resolution of EHS&S issues and risks.
- Ensuring implementation of training and capacity building exercises at the corporate levels and project levels.
- Documentation and control of ESMS related documents.
- Development of processes with respect to EHS&S. Also includes internal updates of existing systems pertaining to EHS&S wherever feasible and technically possible.

Functions of HR Department

The HR department is responsible only for the management of HR relations for internal employees within ATGL. Some of the primary roles and responsibilities undertaken by HR department are as follows:

- Responsible for implementation of the corporate HR Policy, manual and practices.
- Planning and recruitment of new employees as aligned with the business plan.
- Management of performance appraisal & review process.
- Implementation of desired employee engagement programs & practices.
- Management of any internal Human Resources Information System.
- Assessing and evaluation of competencies of existing employees.
- Carrying out of training programs and orientation of new employees.
- Liaise with law enforcement agencies whenever necessary.
- Manage harmonious industrial relations.
- Handling and management of employee grievances.

CSR Team

The CSR department established at the corporate level primarily has the following roles and responsibilities:

- Conducting need-based assessment studies (internal or external) for project relevant CSR programs and activities.
- Undertaking stakeholder identification, profiling, analysis, and influence impact matrix.
- Defining and developing strategies which underpin the company's CSR objectives in the aspects defined under the central CSR policy.
- Developing site specific CSR engagement plan.
- Liaison and maintaining good rapport with government, educational institutions & community-based organization & engaging them for CSR activities.
- Developing evaluation and monitoring indicators for implementation across locations & conducting review meetings at regular intervals.
- Establishing effective ways of measuring and articulating ATGL impact in social development through the various CSR programs.
- Disclosure of the impacts and other aspects of the project including emergency response plan for the community.
- Ensuring sharing of project benefits the local community.
- Visit project sites on a regular basis, monitor program progress and resolve implementation obstacles to ensure the programs are being implemented in accordance with plans and agreements.

Legal Team

Broadly the key functions of the legal team at the corporate office of ATGL are as follows:

- Managing compliance and statutory requirements and records applicable to ATGL businesses including necessary licenses and permits.
- Providing legal support to land, assets, contractual transactions.
- Ensuring legal compliance of contractors and vendors to established terms and conditions.
- Government sanction/approvals.
- Checking, proofing and validation of legal documentation.
- Addressing legal disputes and litigation.
- Maintenance of legal records.
- Review contractor/ supply chain engagement with compliance of all legal requirements related to EHS&S and HR provisions.

SITE LEVEL

Site Manager/ EHS&S Officer

The Project Manager/ EHS&S Officer are responsible for overall management of the project and ESMP implementation. The following tasks will fall within his/her responsibilities:

- Monitor site activities daily for compliance.
- Conduct internal audits of the construction site against the ESMP.
- Confine the construction site to the demarcated area.
- Reporting EHS&S related issues & incidents in respective areas to Head-Solar Vertical.

Project Manager

- Responsible for the overall implementation of the EHS&S plan.
- He/ She shall establish an EHS&S organization for the effective implementation of this plan.
- He/ She shall provide all resources to effectively implement the EHS&S plan.
- He/ She shall initiate disciplinary actions for any violations of the EHS&S plan.
- He/ She shall ensure the project EHS&S plan is integrated with customer requirements and ensure its compliance.
- Communicate all kinds of events to customers and regulatory agencies as appropriate.
- He/ She Shall act as the highest authority in taking any decisions related to EHS&S violations.

EHS&S Officer

The EHS&S Officer will have the following responsibilities:

- Ensuring availability of resources and appropriate institutional arrangements for implementation of ESMP.
- Role may be combined with Project Security Manager's role.
- Ensuring this plan requirement is communicated to all sub-contractors and their contractors, employees, customers and visitors.
- Sub-Contractor shall take conduct periodic inspections to ensure compliance with the requirements of this plan.
- Provide support to implement the procedures of this plan for the respective project site.
- Ensuring that Identification Badges and Helmet Badges is not issued to his Employees, Visitors, Sub-Contractors and their contractors without undergoing the orientation training.
- Ensuring compliance with legislative, IFC's and other lender's requirements.
- Carrying out audits, and inspection of all the project activities at regular intervals and rectify non-compliances if any.

- Preparation of necessary documents and record keeping system.
- Reviewing and updating of ESMP for its effective implementation.
- Acting as a point of contact for residents and community members.
- The contractor should develop a code of conduct to guide the employees on how to behave with the community to avoid conflicts.
- Develop a Grievance Redressal Mechanism in line with informing the local community about the Grievance Redressal Mechanism and ensuring effective implementation; and
- Conducting periodic meetings with the local community to understand their grievances and outcomes of the CSR activities; and
- Address training needs of contractors and other employees for social and community issues.

Sub-Contractors/ Labour Contractors

- The sub-contractors / labour contractors working for ATGL is hereby responsible for complying with the guidelines of this plan.
- Sub-Contractor shall provide all resources to implement the requirements of this plan in their respective work area.
- Sub-Contractor is responsible to communicate the requirements of the plan to all their sub-contractors and their contractors, their employees and visitors.
- Sub-Contractor shall take disciplinary actions for any violations of this plan as required.
- Sub-Contractor shall not issue Identification Badges and Helmet Badges to his employees, his Sub-Contractors and their contractors without undergoing the orientation training on the plan.
- Sub-contractors shall ensure commitment and compliance for no child/forced labour involvement in the project.

Training and capacity building

Training is one common method of supplying individuals with additional skills and knowledge. To be successful in EHS&S management, training programs need to be thought out carefully and systematically. A robust social and environmental, health and safety training plan is important for effective implementation of ESMS.

The Corporate EHS&S head at ATGL along with recommendations from EHS&S officers will ensure that the job specific training and EHS&S induction training needs are identified based on the specific requirements of the ESMS and existing capacity of site and project personnel (including the Contractors and Sub-contractors) to undertake the required actions and monitoring activities. Some of the specific trainings that will be carried out on a routine basis are as follows:

- ESMS Checklists and procedural guidance
- Occupational Health & Safety

- Fire Safety and Prevention
- Emergency Response Preparedness
- Operational Training
- HR Induction Training
- PPE Training
- Driver Safety
- Implementation of Environmental and Social Management/Action plans

The above listed training courses are the preliminary training courses which will be undertaken at the inception stage once the employee/worker joins the company and/or Project. Post that monthly refresher training will be undertaken, especially for the workers. Other training will be identified and implemented during the project lifecycle as per the need assessment, as part of mitigation measure and also capacity building of the staff.

An environmental and social management training program will be conducted to ensure effective implementation of the management and control measures during construction and operation of the project. The training program will ensure that all concerned members of the team understand the following aspects:

- Purpose of action plan for the project activities.
- Requirements of specific Action Plans.
- Understanding of the sensitive environmental and social features within and surrounding the project areas.
- Aware of the potential risks from the project activities.

In case of contractors or turnkey contractors having sufficiently well-developed standards on EHS&S management, the training can be sub-let to the same for their respective employees and ATGL will monitor the completion and sufficiency status of these programs. In case of subcontractors, the training and capacity building will be done by the site level EHS&S's officers along with the contractor's EHS&S manager to ensure such trainings of the contracted staffs either directly or through trainers of **ATGL**. Subsequently the responsibility can be passed on to the sub-contractors for all future training programs.

It is further advised that **ATGL** shall consider engaging a third party EHS&S audit to monitor and evaluate the EHS compliance during the construction phase. The EHS&S officer shall be responsible for checking compliance of the contractor(s) with the requirements of this ESMP and any other relevant environmental legislation for all activities associated with the contract. The general duties of the EHS&S officer will be as follows:

- Third Party EHS&S Officer will be responsible for conducting an EHS&S audit during the construction phase of the project according to the provisions of the Environmental Management Plan.

- Conduct independent environmental audits.
- Submit audit reports to the EHS&S Specialist/ Head EHS&S and if required, relevant authority.

9.4 CONTRACTORS MANAGEMENT PLAN

The overall responsibility of the project will be **ATGL.** It shall thus ensure that the ESMP is implemented by its contracts through contractual arrangements. **ATGL** has developed a Vendor's Code of Conduct which requires that all service providers and their directors, employees, agents, suppliers, and subcontractors (collectively Service Providers' representatives) always conduct themselves with integrity and in full compliance with this Code of Conduct and applicable laws, rules and regulations that govern their business activities. All **ATGL** service providers will be required to educate and, when appropriate, train their representatives to ensure they understand and comply with this Code of Conduct. The code of conduct principles of **ATGL** are as follows:

- Corruption & Prohibited Business Practices
- Health and Safety
- Environment
- Labor Standards
- Acting in Concert
- Mirroring of Contractual Requirements towards sub-suppliers
- Human Rights

The EHS norms in the code of conduct cover the following elements:

- The service provider should ensure that its workers are provided with a healthy and safe working environment in accordance with recognized standards. The Service Provider shall do its utmost to control hazards and take necessary precautionary measures against accidents and occupational diseases. The Service Provider shall ensure compliance with the provisions of Building and other Construction Workers (Regulation of Employment & Conditions of Service) Act, 1976. Whenever necessary the workers are to be provided with, and instructed to use, appropriate personal protective equipment, and are adequately & regularly trained to ensure that they are adequately educated on health and safety issues.
- Compliance with labour laws and legislations i.e. the Contract Labour (Regulation and Abolition) Act, 1970, Employees State Insurance Company Act, 1948, Employees' Provident Funds and (Misc. Provisions) Act 1952, Payment of Bonus Act 1965, Payment of Gratuity Act, 1972, Equal Remuneration Act, 1976, Maternity Benefit Act, 1961, Labour Welfare Fund Laws, Minimum Wages Act, 1948, Payment of Wages Act, 1936, Shops and Establishment Act and Inter-State migrant workmen (Regulation of Employment) and (Conditions of service) Act, 1979.
- Non-engagement of child labour and bonded labour.
- Non-discrimination based on caste, creed, religion, or sex.

- Ensuring that women employees of Service Provider are given full protection from sexual harassment as per guidelines laid down by the Supreme Court of India.
- Ensuring adherence of EHS policies and procedures by Contract Agreement in order to ensure that its own suppliers', sub-supplier's, business partners and other third parties directly or indirectly used by the Service Provider in the provisioning of services to accept and adhere to the EHS requirements.

General environmental awareness will be increased among the project's team to encourage the implementation of environmentally sound practices and compliance requirements of the project activities. The same level of awareness and commitment will be imparted to the contractors and subcontractors prior to the commencement of the project through an EHS Management Plan prepared for Project and Contractors engaged for the project. It shall ensure compliance with **ATGL**'s Environmental Performance Guidelines for New Projects and Developments, minimizing the safety hazards through good engineering design through the implementation of the Group Integrity Management Standard, and achieving a record of 'zero' Lost Workday Case (LWDC) injuries and incidents on the Project. Itcomprises of the following aspects:

- Project Management Plan Deliverables Register
- Project Contractor Requirements
- Project Risk Management Plan
- Project Training Matrices
- Project Reward & Recognition Program
- Project Safe Work Practices
- Project Document Management Procedure
- Project Records Management Procedure
- Project Communications Table
- Project Audit Program
- Project Emergency Response Plan

ATGL shall ensure that the job specific training and EHS Induction Training needs are identified based on the specific requirements of ESMP and existing capacity of site and project personnel (including the Contractors and Sub-contractors) to undertake the required actions and monitoring activities. Special emphasis will be placed on traffic management and operation of Cranes.

An environmental and social management training program will be conducted to ensure effective implementation of the management and control measures during construction and operation of the project. The training program will ensure that all concerned members of the team understand the following aspects:

- Purpose of action plan for the project activities.

- Requirements of the specific action plans.
- Understanding of the sensitive environmental and social features within and surrounding the project areas; and
- Aware of the potential risks from the project activities.

A basic occupational training program and specialty courses should be provided, as needed, to ensure that workers are oriented to the specific hazards of individual work assignments. Training shall be provided to management, supervisors, workers, and occasional visitors to areas of risks and hazards. Workers with rescue and first-aid duties shall receive dedicated training so as not to inadvertently aggravate exposures and health hazards to themselves or their co-workers.

Through appropriate contract specifications and monitoring, the employer should ensure that service providers, as well as contracted and subcontracted labour, are trained adequately before assignments begin.

9.5 COMMUNITY/ STAKEHOLDERS ENGAGEMENT PLAN (SEP)

ATGL shall adhere to Stakeholder Engagement Plan (SEP) for engagement with community, government bodies during the lifecycle of the project and to assess the efficiency of the communication process in meeting the objectives of the SEP and ensuring the projects' 'social license to operate.

Table 9-1: Stakeholder Group Categorization

Stakeholder Groups	Primary Stakeholders	Secondary Stakeholders
Community	Sub-contractors, local labours	Local community, agricultural labour, vulnerable communities
Institutional Stakeholders	Gram Panchayat, Project Investors	Village Institutions, (schools, health centers etc.)
Government Bodies	Regulatory Authorities, District Administrations	-
Other Groups	-	Media, other industries, projects

9.5.1 Aims and Objectives of SEP

The engagement plan is to guide all the stakeholders' engagement during construction phase and operations phase. The objectives of the SEP are:

- Enable management to develop effective stakeholder management strategies for various projects to build long term relationship so as to ensure smooth functioning of the projects.
- To define and standardize the process that the project will use to communicate with respective stakeholders.
- To ensure regular and timely sharing of information with project team to spruce up their understanding and skills of engaging with the stakeholders.
- Ensuring coordination in approach and message to be shared with the community regarding the company and the projects.

- To assess the efficiency of the communication process in meeting the objectives of the SEP and ensuring the projects' 'social license to operate.'

The community engagement process is informally managed by the QHSE Head and is limited to liaison with local authorities and the panchayat. To ensure the implementation of the ESMP and engage all the stakeholders identified, this process will need to be formalized through the social officer defined as above.

The two important elements of community engagement will be disclosure and consultation. This implies that as a first step, the findings of the ESIA, especially the ESMP will have to be disclosed to the community. The ESMP should be finalized through consultation with the community and an action plan shall be developed. Further, the community should be regularly updated about the implementation of the ESMP and all other relevant information pertaining to the construction phase, activities, health, and safety risks etc. The community shall also be made aware of the available job opportunities from time to time.

The project will engage with the affected people to understand the stakeholders on the common property resources (roads, grazing areas etc.) which would be impacted. It shall work closely with the Panchayat and local administration to identify and develop alternate areas for common resources (fodder,) if required.

To understand community expectations and manage any local concerns, **ATGL** will constitute a Grievance Redressal Mechanism to be managed by the Social Officer. This grievance mechanism will respond to the concerns and grievances of local communities, NGOs, Panchayats and any other aggrieved party or stakeholder. The project will share information about these mechanisms to the stakeholders through locally appropriate communication tools.

The Grievance Redressal Procedure will also outline the process and steps to be taken and the time limit within which the issue would need to be resolved to the satisfaction of the complainant. The project will endeavor to get all complaints recorded and addressed in a uniform and consistent manner. For disputes that cannot be internally resolved, the project will set up an independent mechanism with representation from community, Panchayats, and locally respected citizens of the area to sort these conflicts. If it has a legal implication the district administration will be approached.

9.6 ESMP REVIEW & AMENDMENT

ESMP is a social and environment management tool which shall be reviewed periodically (at least once in 2 years or earlier) to address changes in the project design, life cycle processes and activities, organization, and regulatory requirements.

9.6.1 Inspection, Monitoring & Audit

To implement the ESMP, the on-site team will develop a time-bound and action- oriented Environmental and Social Action Plan to implement the mitigation measures provided for each of the identified environmental and social impacts. This ESMP will have to be monitored on a regular basis, quarterly or half-yearly and all outcomes would need to be audited in accordance with existing EHS commitments.

The monitoring process will cover all stakeholders including contractors, labourers, suppliers, and the local community impacted by the project activities and associated facilities. Inspection and monitoring of the environmental and social impacts of construction and operation phase activities will increase the effectiveness of suggested mitigations. Through the process of inspection, audit, and monitoring, the company will ensure that all the contractors comply with the requirements of conditions for all applicable permits including suggested action plans. The inspections and audits will be done by **ATGL** 's trained team and external agencies/experts. The entire process of inspections and audits will be documented. The inspection and audit findings will be implemented by the contractors in their respective areas.

9.6.2 Reporting and Review

ATGL will develop and implement a program of reporting through all stages of the project viz., construction and commissioning, operation, and decommissioning. Contractors will be required to fully comply with the reporting requirements in terms of timely report submission with acceptable level of details. Reporting will be done in form of environmental, health, safety and social check list, incident record register, environmental, health, safety, and social performance reports (weekly, monthly, quarterly, half yearly, yearly etc.).

9.6.3 External Reporting and Communication

All complaints and enquiries are to be appropriately dealt with, and records be maintained in a Complaint/Enquiry Register by QHSE Head or other delegated staff.

9.6.4 Internal Reporting and Communication

Inspection and audit observations along with their improvement program are to be regularly reported to the senior management for their consideration. The same are also to be communicated within the staff working on the project. To maintain open communication between the staff and management on EHS&S issues the following shall be used:

- Team Briefings,
- On-site work group meetings.
- Key Incidents/accidents and lessons learnt.
- Work Specific Instructions; and
- Meeting with stakeholders.

9.7 DOCUMENT & RECORD KEEPING

Documentation and record keeping system must be established to ensure updating and recording of requirements specified in ESMP. Responsibilities must be assigned to relevant personnel for ensuring that the ESMP documentation system is maintained, and that document control is ensured through access by and distribution to identified personnel in form of the following:

- Documented Environment management system.
- Legal Register.

- Operation control procedures.
- Work instructions.
- Incident reports.
- Emergency preparedness and response procedures.
- Training records.
- Monitoring reports.
- Auditing reports; and
- Complaints register and issues attended/closed.

The following table provides a sample summary of engagements which are required in a typical project lifecycle. It indicates the methodology on how these stakeholder consultations are accomplished.

Table 9-2: Methods of Consultations and Engagement

Stakeholder	Stakeholder Category	Objective of Engagement	Stakeholder Influence	Methods of Consultation and Engagement	Frequency of Consultations and Engagement
Sub- contractors/ Labours/Employees	Primary Stakeholder	To appraise labour working conditions and EHS compliance	Medium	Periodic Meetings (for the purpose of information dissemination, including information regarding labour laws, safety measures and discussions of grievances) as per the working duration, Information dissemination regarding welfare provisions for Labourers Information dissemination regarding welfare provisions for Labourers, employment opportunities, grievances, EHS and CSR activities through notice board and display of key messages on billboard.	Meetings and periodic reporting in the operation phase
Gram Panchayats And Village institutions	Primary Stakeholder	For necessary information disclosure of SEP. As Part of GRM Ensured involvement in CSR activities and local procurement if required	High	Consultations, meetings (FGD and individual interview) and Discussions; Sharing of documents, if required, as part of the disclosure mechanism; Meetings as a part of the Grievance Redressal mechanism, if required; Attendance at Panchayat meetings and participation in CSR activities and agreements with communities documented in minutes of meetings	• As and when required; and • As per the regulatory requirements
Regulatory Authorities	Primary Stakeholder		High	Meetings and Discussions	• As per the regulatory requirements • As and when required
District Administration (Tehsildar, SDO, Patwari)	Primary Stakeholder	Regular engagement Participation in CSR Activities	High	Regular meetings and participation in CSR events	• Regular Meetings; or • Monthly or as & when required
Landowner	Primary Stakeholder	Discussion on land purchase modalities.	Very Low	Discussion during various festivals and other relevant occasions.	• As and when required.
Community	Primary Stakeholder	Managing and ensuring participation in CSR	Low	• Open Meetings,	• As and when required

Stakeholder	Stakeholder Category	Objective of Engagement	Stakeholder Influence	Methods of Consultation and Engagement	Frequency of Consultations and Engagement
		activities. As part of GRM.		• Interactions with community at Gram Panchayat, • Discussion on CSR programs	

9.8 GRIVANCE REDRESSAL MECHANISM (GRM)

ATGL has a well-defined Grievance Redressal Mechanism (GRM) procedure. This GRM serves as one of the components of **ATGL** 's Environmental and Social Management for managing the overall performance of its projects as well as providing more accountability to its stakeholders. The GRM, which caters to both internal and external grievances, is based on four (4) guiding principles of the company which include:

- Transparency
- Fairness
- Respect
- Accountability

9.8.1 *Internal Grievances*

Employee Grievance: These include the employees hired specifically for the site.

9.8.2 *External Grievances*

Contractor and labour related grievances (directly /indirectly controlled by **ATGL**). Community grievances including those on land and resettlement issues, project activities, CSR intervention, employee/worker-community conflicts, and other project related issues (Directly/Indirectly controlled by **ATGL**).

This grievance mechanism shall respond to the concerns and grievances of local communities, NGOs, Panchayats and any other aggrieved party or stakeholder. The project shall share information about these mechanisms to the stakeholders through locally appropriate communication tools.

In case the contractors have their own GRM, **ATGL** should ensure that it is functioning effectively and even review the grievance records. However, if the contractors lack GRM in the first place, **ATGL** should ensure that the workers are linked to their GRM process.

The project shall endeavor to get all complaints recorded and addressed in a uniform and consistent manner. For disputes that cannot be internally resolved, the project shall set up an independent mechanism with representation from the community, panchayats, and locally respected citizens of the area to sort out these conflicts. If it has a legal implication the district administration shall be approached.

ATGL has developed procedures for handling grievances, reviewing, and investigating grievances, grievance closure, monitoring, and review procedures.

A grievance body, led by designated Grievance officer is proposed for effective implementation of GRM and coordinating day to day functions. The grievance body would be reporting back to the appropriate authority including functional areas such as HR, Project, O&M, BD/Land, CSR, EHS etc. as per requirement. The mandate of this cell would be managed as part of the ESG forum. **ATGL** should ensure appropriate budget allocation in coordination with **ATGL** to deal with grievance tracking and handling with consent of appropriate authority. Awareness shall be provided in the company's policy and practices for both employee and appropriate stakeholder grievance mechanisms, relevant to their exposure and responsibilities

9.9 CORPORATE SOCIAL RESPONSIBILITY (CSR) POLICY

ATGL will focus on the following areas for CSR projects from amongst the activities specified under Schedule VII of the Companies Act, 2013 and the Rules made thereunder including but not limited to Education, Empowerment, Environment and Health:

- Promoting gender equality & empowering women
- Employment enhancing vocational skills and livelihood enhancement programs
- Rural Infrastructure Development Projects

CSR committee may recommend to the Board of Directors additional CSR initiatives, based on specific merit, provided that these projects fall under the scope of schedule VII of the Companies Act, 2013, as may be amended from time to time.

As part of its devising and planning for CSR activities and programs, prior to the commencement of projects, ATGL carried out impact assessment studies or need based assessment studies within the proposed project footprint area in order to understand the basic needs, problems and requirements where interventions/intervention activities can be implemented in.

The study encompasses various parameters such as-health indicators, access to infrastructure, vulnerability, literacy levels, workforce participation, employment opportunities, sustainable livelihood options, and demographic profile including population data –below the poverty line and above the poverty line, state of infrastructure. From the data generated, project specific CSR plans are developed for implementation. CSR programs and activities can also be reactive in nature where the need and requirement for the same may arise even outside the purview of the impact assessment or the need-based assessment or may be entirely disassociated with any project implementation. Proper budgeting and scheduling are carried out for the programs.

ATGL will seek to identify suitable projects/programs for implementation in line with the CSR policy of the Company.

By and large, it may be endeavored to execute most of the CSR programs/ activities forming part of defined scope in and around the areas adjoining projects.

The medium of implementation of CSR programs would be directly by the CSR department or company's own foundation or collaboration/ tie-ups with Trust/ Society/ Section 8 Company/ NGOs as per the decision taken by the CSR committee.

Monitoring And Reporting

The CSR department will be responsible for regular monitoring & reporting of the CSR programs and provide regular progress reports to the CSR Committee of the Board. This report would indicate:

- Achievement of the year-to-date in terms of coverage compared to the target, reason for variance, plans to overcome shortfalls if any and support required from the CSR Committee/Board to overcome the shortfalls.
- Actual year-to-date spending compared to the budget and reasons for variance.

- In respect of activities undertaken through outside Trust/Society/NGO's/Government recognized funds, etc. there will be a mechanism of reporting of progress on each such activities and the amount incurred thereon at the subsequent CSR Committee Meeting.
- The Board shall seek a progress report from the CSR Committee at least twice a year.

9.10 LABOUR MANAGEMENT PLAN

The construction of the project has not yet started, and locals have proposed to be hired for the project during construction phase. However, in case of hiring migrant labour, **ATGL** needs to adhere to implementation of *Labour Camp Management Plan Guidelines* as provided under "*Worker's Accommodation Processes and Standards: A Guidance Note by IFC and EBRD*[6]" and ensure that the worker's accommodation should be at clean, safe place and, at the minimum, should meet the basic requirements of workers. In particular, the provision of accommodation should meet national legislation and good international practices in relations, but not restrict to the following:

- Practice for charging accommodation.
- Provision of minimum amounts of space for each worker.
- Provision of sanitary, laundry and cooking facilities and potable water.
- Location of accommodation in relation to the workplace.
- Any health, fire safety or other hazards or disturbances and local facilities.
- Provision of first aid and medical facilities; and heating and ventilation.
- Workers' freedom of movement to and from employer-provided accommodation should not be unduly restricted.

9.10.1 Drinking Water Resources and Monitoring Water Quality

- Access to an adequate & convenient supply of free potable water should be always available to workers.
- Depending on climate, weather conditions and accommodation standards, 80 to 180 liters per person per day are available.
- Drinking water should meet national/local or WHO drinking water standards.
- All tanks used for the storage of drinking water should be constructed and covered as to prevent water stored therein from becoming polluted or contaminated.
- Drinking water quality should be regularly monitored.

9.10.2 *Wastewater and Solid Waste*

- Arrangements for discharge of wastewater, sewage, and disposal of food, kitchen waste and any other waste materials should be made without causing any impact on the biophysical environment or surrounding communities.

[6] https://www.ifc.org/wps/wcm/connect/60593977-91c6-4140-84d3-737d0e203475/workers_accomodation.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-60593977-91c6-4140-84d3-737d0e203475-jqetNIh

- Specific containers for rubbish collection should be provided and emptied on a regular basis.
- Adequate number of rubbish containers provide leak proof, non-absorbent, rust and corrosion-resistant containers protected from insects and rodents needs to be provided.
- The garbage/rubbish containers should be 30 meters from each shelter on a wooden, metal, or concrete stand. Such containers must be emptied at regular intervals (to be determined based on temperatures and volumes generated) to avoid unpleasant odors associated with decaying organic materials.
- Pest extermination, vector control and disinfection should be carried out throughout the living facilities in compliance with local requirements and/or good practice. Where warranted, pest and vector monitoring should be conducted on a regular basis.

9.10.3 *Labour Camp Room/ Dormitory Facilities*

- Rooms/dormitories should be kept in good condition.
- Rooms/dormitories should be aired and cleaned at regular intervals.
- Rooms/dormitories are built with easily cleanable flooring material.
- Sanitary facilities should be located within the same buildings and provided separately for men and women. Usual standards range from 10 to 12.5 cubic meters (volume) or 4 to 5.5 square meters (surface).
- A minimum ceiling height of 2.10 meters is provided.
- In collective rooms, which are minimized, to provide workers with some privacy, only a reasonable number of workers are allowed to share the same room. Standards range from 2 to 8 workers.
- All doors and windows should be locked and provided with mosquito screens where conditions warrant.
- There should be mobile partitions or curtains to ensure privacy.
- Every resident should be provided with adequate furniture such as a table, a chair, a mirror, and a bedside light.
- Separate sleeping areas should be provided for men and women, except in family accommodation.

9.10.4 Bed Arrangements and Storage Facilities

- A separate bed for each worker should be provided. The practice of “hot bedding” should be avoided.
- There should be a minimum space between beds of 1 meter.
- Double deck bunks are not advisable for fire safety and hygiene reasons, and their use is minimized. Where they are used, there must be enough clear space between the lower and upper bunk of the bed. Standards range from 0.7 to 1.10 meters.

- Each worker should be provided with a comfortable mattress, pillow, cover, and clean bedding.
- Bed linen should be washed frequently and applied with repellents and disinfectantswhere conditions warrant (malaria).
- Facilities for the storage of personal belongings for workers should be provided.
- Separate storage for work boots and other personal protection equipment needs to be provided.

9.10.5 Sanitary and Toilet Facilities

- Sanitary and toilet facilities should be constructed of materials that are easily cleanable.
- Sanitary and toilet facilities should be cleaned frequently and kept in working condition.
- Sanitary and toilet facilities should be designed to provide workers with adequate privacy, including ceiling to floor partitions and lockable doors.
- Sanitary and toilet facilities should not be shared between men and women, except in family accommodation.
- An adequate number of toilets should be provided for workers. Standards range from 1 unit to 15 people to 1 unit per 6 people. For urinals, the usual standards are 1 unit to 15 persons.
- Toilet facilities should be conveniently located and easily accessible. Standards range from 30 to 60 meters from rooms/dormitories. Toilet rooms shall be located to be accessible without any individual passing through any sleeping room. In addition, all toilet rooms should be well lit, have good ventilation or external windows, have sufficient hand wash basins, and be conveniently located.

9.10.6 Showers/Bathrooms and Other Sanitary Facilities

- Shower/bathroom flooring should be made of anti-slip hard washable materials.
- An adequate number of handwash facilities should be provided for workers. Standards range from 1 unit for each 15 persons to 1 unit per 6 workers. Handwash facilities should consist of a tap and a basin, soap, and hygienic means of drying hands.
- An adequate number of shower/bathroom facilities need to be provided for workers. Standards range from 1 unit to 15 people to 1 unit per 6 people.
- Showers/bathrooms should be conveniently located.
- Shower/bathroom facilities should be provided with an adequate supply of cold and hot running water.

9.10.7 Cooking Facilities

- Places for food preparation should permit good food hygiene practices, including protection against contamination between and during food preparation.

- Kitchens should be provided with facilities to maintain adequate personal hygiene including sufficient washbasins designated for cleaning hands with clean, running water and materials for hygienic drying.
- Wall surfaces adjacent to cooking areas should be made of fire-resistant materials. Food preparation tables are also equipped with a smooth durable washable surface. Further, to enable easy cleaning, it is good practice that stoves are not sealed against a wall, benches and fixtures are not built into the floor, and all cupboards and other fixtures and all walls and ceilings have a smooth durable washable surface.
- All kitchen floors, ceiling and wall surfaces adjacent to, or above food preparation and cooking areas are built using durable, non-absorbent, easily cleanable, non-toxic materials.
- Wall surfaces adjacent to cooking areas should be made of fire-resistant materials. Food preparation tables are equipped with a smooth, durable, easily cleanable, non-corrosive surface made of non-toxic materials. Further, to enable easy cleaning, it is good practice that stoves are not sealed against a wall, benches and fixtures are not built into the floor, and all cupboards and other fixtures have a smooth, durable, and washable surface.
- Adequate facilities for cleaning, disinfecting and storage cooking utensils and equipment should be provided.
- Food waste and other refuse are to be adequately deposited in sealable containers and removed from the kitchen frequently to avoid accumulation.

9.10.8 Medical Facilities

- A number of first aid kits adequate to the number of residents should be available.
- First aid kits should be adequately stocked.
- An adequate number of staff/workers (1 first aider for every 50 persons) should be trained to provide first aid.
- Where possible and depending on the medical infrastructure existing in the community, other medical facilities should be provided (nurse rooms, dental care, minor surgery).

9.10.9 Leisure, And Social Facilities

- Basic collective social/rest spaces should be provided for workers. Standards range from providing workers multipurpose halls to providing designated areas for radio, TV, cinema.
- Recreational facilities should be provided for the workers.

9.10.10 Security of Workers' Accommodation

- A security plan including clear measures to protect workers against theft and attack should be implemented.
- Security staff should be checked to ensure that they have not been implicated in any previous crimes or abuse. Where appropriate, security staff from both genders should be recruited.

- Security staff should have a clear mandate and have received clear instruction abouttheir duties and responsibilities, in particular their duties not to harass, intimidate, discipline, or discriminate against workers.
- Security staff should have received adequate training in dealing with domestic violence and the use of force.
- Security staff should have a good understanding of the importance of respecting workers' rights and the rights of the communities.
- Workers and the locals residing in nearby areas in villages should have specific means to raise concerns about security arrangement and staff.
- **ATGL** should also adhere to Standard Operating Procedure for Work Resumption after Lockdown prepared by **ATGL** and ensure compliance with respect to the following measures:
- Maintaining Social Distancing in Labour Accommodation (2 meters)
- Soap solutions / hand sanitizers to be placed in all quarters / washroom's places wherever required and replenished periodically.
- Ensuring that all doors / windows/fittings are sanitized frequently.
- Special attention to be given for the washrooms / toilets by periodical cleaning, Swabbing, disinfecting, and maintaining dry.
- Emergency Facilities to be available for 24 X 7 and displayed emergency key contacts.
- Soap solutions / hand sanitizers to be placed in all quarters / washroom's places wherever required and replenished periodically.
- To ensure that all the workers who are coming to work are healthy and not having any symptoms of COVID-19 (Fever, Dry cough, breathing problem).
- Arrangements to be made to supply all essential items like rice, wheat, groceries, water, etc. to colony itself so as to restrict movements of Labourers.
- Appropriate masks to be distributed to all Labourers.
- All labour engaged at site shall be advised to wear masks while at colony, movement outside and during duty timings.
- Always ensuring availability of the following

    1. Sanitizer
    2. Face mask
    3. Hand gloves
    4. Hand Wash
    5. Dettol
    6. Soap
    7. Thermometer

8. BP checking machine
9. First Aid Box

- The nearest Hospital/COVID-19 Rescue Team shall be made for getting medical examination of all people for any Covid-19 symptoms.
- Quarantine hall or room shall be established in labour colony for the said purpose.
- Contractors shall display precautions measures - dos and don'ts at colony premises in all languages spoken by the workers.
- Vehicles shall be kept ready or tip up for vehicles shall be made for emergency purpose.
- Minimum social distancing shall be ensured in keeping occupants in a single room.
- Disinfecting spray is done at all the areas of colony after workers are left for work daily.
- A team comprising **ATGL** Admin, **ATGL** HSE and Contractor site in charge shall visit labour colony daily to ensure availability of essential things and regarding no off occupants, cleanliness, sanitization status, etc. and submit a report to the Construction Manager and Project Manager.
- Feedback in written form or through personal interaction regarding labour colony requirements shall be obtained from contract labours on weekly basis.

9.11 WASTE MANAGEMENT PLAN

The proposed project should handle all incoming waste materials, all waste generated on site and both the disposal, and potential recycling of such materials. The exact quantities need to be detailed once agreed packaging and quantities of incoming material is identified. The project waste is primarily related to civil works, and packaging of incoming materials. The following principles are put in place to reduce the amount of waste generated:

- Packaging will be optimized to reduce non-recyclable content.
- Orders of cables and other consumables will be kept to a minimum.
- The amount of earth works is kept to a minimum, including optimized road works to reduce required import of material to site.

Registered vendors are appointed by **ATGL** for collection of waste generated from their natural gas pipeline projects.

9.12 DISASTER MANAGEMENT PLAN

The district of Raigarh is prone to natural and man-made disasters. The study area falls in Low Damage Risk Zone II (MSK VI or less) in accordance with the Earthquake Hazard map of India, Vulnerability Atlas of, 3rd edition, 2019 prepared by BMTPC. Both Raigarh and Tamnar Block has no recorded history of flooding, and the entire district falls within a low-damage risk zone.

During the construction of the site the site will at times consist of loose and/or un-compacted soil and removed or destroyed vegetative cover. During this phase temporary drainage system will have to be installed. This will consist of landforms, both trenches, and deep pits to collect and dissipate water. The

temporary drainage will either be converted into permanent drainage with masonry (where co-located) or closed off after completion of the planned system.

9.13 TRAFFIC MANAGEMENT PLAN

9.13.1 Introduction

The Traffic Management Plan (TMP) is designed to ensure the safe and efficient movement of vehicle and pedestrian traffic through and around construction zones. It also aims to safeguard workers and minimize disruptions to the public. This plan outlines the procedures, safety measures, and control devices to be implemented during road construction activities.

This TMP has been developed based on the preliminary site survey conducted during the Environmental and Social Impact Assessment (ESIA) phase. As such, it reflects the anticipated traffic conditions and construction impacts identified at that stage. However, recognizing that actual site conditions may vary during implementation, the TMP will be reviewed and updated by the contractor during the construction phase to ensure it remains responsive to real-time requirements and evolving site-specific challenges.

9.13.2 Objectives

The primary objectives of the TMP are:

- To ensure the safety of road users and construction workers.
- To maintain efficient traffic flow during construction.
- To provide clear and timely information to road users.
- To minimize environmental and social impacts due to traffic disruptions.

9.13.3 Key Principles

- **Warning Sign**: Inform road users well in advance of any changes or hazards.
- **Safe Guidance**: Provide clearly marked and safe lanes for traffic.
- **Work Zone Protection**: Establish buffer zones and barriers to protect workers.
- **Driver Behavior Control**: Use signage and devices to influence safe driving behavior.

9.13.4 Planning Considerations

Traffic control plans will be tailored to specific site conditions, considering:

- **Traffic Volume**: Peak and non-peak hour densities.
- **Lane Requirements**: Width and number of lanes needed for construction.
- **Junction Complexity**: Number and type of intersections.
- **Pedestrian Infrastructure**: Availability and condition of footpaths.
- **Speed Limits**: Regulatory and advisory limits in the area.
- **Lane Geometry**: Changes in lane width or alignment.

9.13.5 Construction Zone Layout

Construction Zone is an integral part of any road construction system. The safety practices in construction will, therefore, be oriented towards reducing conditions, which lead to such hazards and consequent stress whereby the risk of accident increases.

Safety measures will be aimed at avoiding hazardous conditions, especially in work sub-zones where major construction activities are going on.

The construction zone is divided into four sub-zones:

i. **Advance Warning Sub-zone**
   - **Purpose:** Alert drivers to upcoming construction. The warning system should educate the driver well in advance by providing information regarding distance, extent and type of hazard ahead so that he can gradually reduce the speed of his vehicle.
   - **Features:** Warning signs placed ~60m before the work zone.
   - **Devices:** Retro-reflective signage, flashing beacons.

ii. **Transition Sub-zone**
   - **Purpose**: Guide traffic into the diversion path. This is the most crucial sub-zone from safety point of view since most of the movements are turning movements.
   - **Features:** Begins ~30m before the work zone.
   - **Devices:** Barricades, channelizers, directional signs.

iii. **Work Sub-zone**
   - **Purpose:** Area of active construction, and therefore the safety of the Project workers / pedestrians / members of the road are the major concern at site from the plying traffic.
   - **Features:** The path of the traffic must be clearly delineated to prevent vehicle intrusion.
   - **Devices:** Cones, barriers, safety signage, flagmen.

iv. **Terminal Sub-zone**
   - **Purpose:** Indicate the end of the construction zone.
   - **Features:** “End of Work Zone” signage.
   - **Devices:** Informational signs, speed normalization signs.

Other Aspects: Following sections are from guidelines for Safety Construction, Indian Road Congress, IRC: SP: 55: 2001.

The pictorial representation of the sub-zones is depicted in **Figure 9-1** and the recommended length of traffic control zones are shown in the **Table 9-3**.

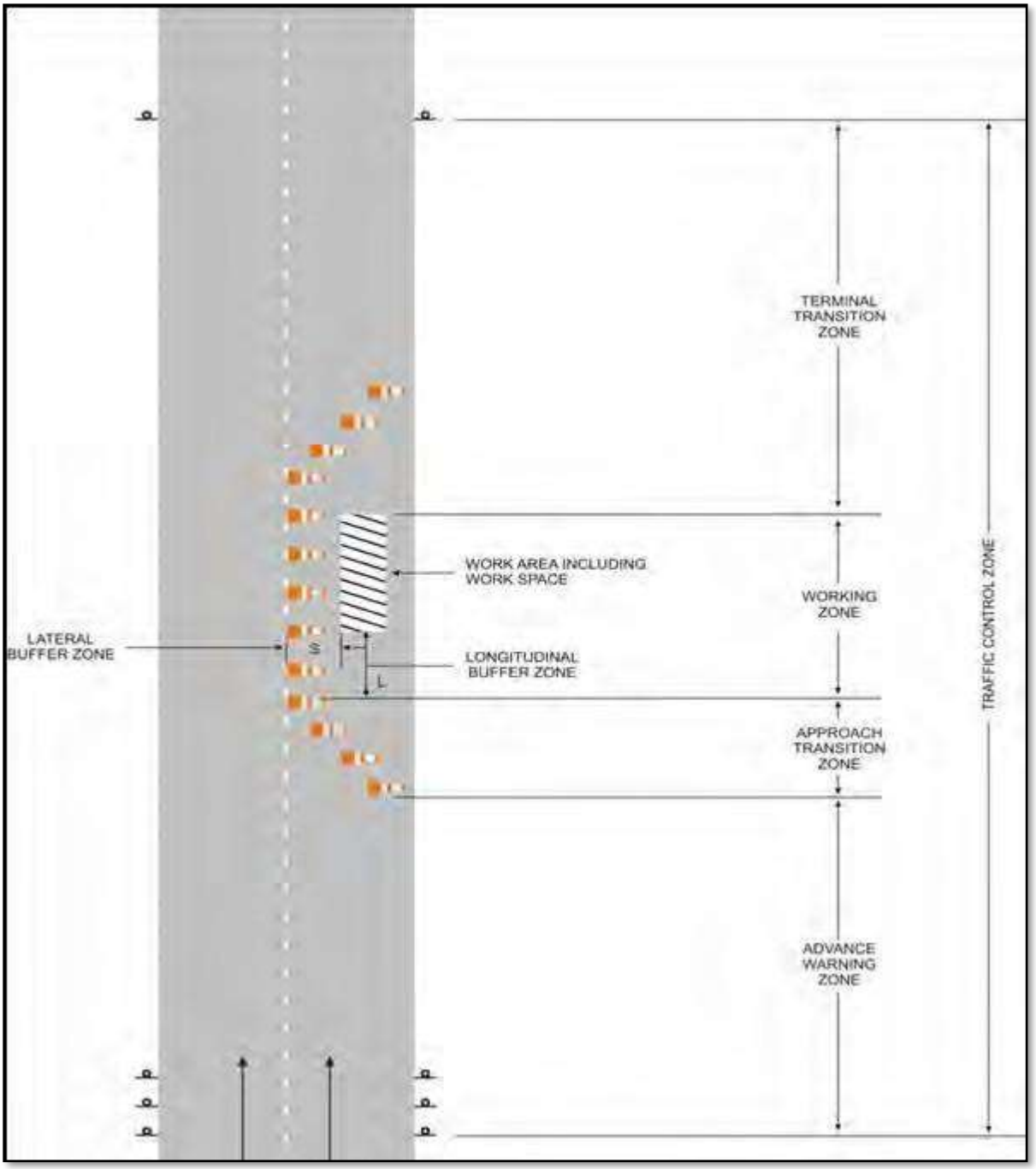


Figure 9-1: Recommended length for Construction Zones as per IRC: SP:55-2001

Table 9-3: Recommended Lengths of Traffic Control Zones

Average Approach Speed (Km/h)	Length of advance warning Zone (M)	Length Approach Transition Zone(M)	Length of working Zone(M)
50 or less	100	50	Varies
51-80	100-300	50-100	
81-100	300-500	100-200	
Over 100	1000	200-300	

9.13.6 Traffic Control Devices

Traffic control devices are essential components of a safe and effective traffic management system within construction zones. These devices serve the critical functions of warning, informing, guiding, and protecting both road users and construction personnel. Their proper deployment ensures smooth vehicular movement, minimizes confusion, and significantly reduces the risk of accidents.

This section is prepared in accordance with the Indian Roads Congress (IRC) Guidelines for Safety in Construction Zones (IRC: SP: 55-2001) and other relevant standards.

9.13.6.1 Purpose and Function

Traffic control devices are strategically installed across all sub-zones of the construction area to:

- Alert drivers to upcoming changes in road conditions.
- Provide clear guidance on lane usage and diversions.
- Protect workers and pedestrians from vehicular intrusion.
- Ensure safe passage for vehicles through or around the work zone.

These devices must be:

- Easily understandable and unambiguous.
- Clearly visible during both day and night.
- Stable under adverse weather conditions.
- Easy to install, maintain, and remove.

As per Specification 112.4, the use of barricades, signs, markings, flags, lights, and flagmen is mandatory for the safety and information of traffic approaching or passing through construction or maintenance zones.

9.13.6.2 Types of Traffic Control Devices

1. Regulatory Signs

These signs impose legal restrictions and must be installed in consultation with local traffic authorities. Common regulatory signs used in construction zones include:

- Do Not Enter

- Road Closed
- Give Way to Pedestrians
- Speed Limit

2. Warning Signs

Warning signs alert drivers to potential hazards ahead. Typical examples include:

- Lane Closed
- Diversion to Other Carriageway
- Divided Carriageway Starts/Ends
- Two-Way Traffic

These signs may be supplemented with rectangular definition plates placed 0.15 m below the warning triangle for added clarity.

3. Directional (Guide) Signs

Guide signs provide navigational information and differ in appearance from standard informatory signs. As per IRC: 67-1977, construction zone guide signs should have: Black text and arrows on a Traffic Yellow (IS: 5-1978) background.

Common examples include:

- Diversion
- Road Ahead Closed
- Sharp Deviation of Route

4. Delineators and Channelizing Devices

Delineators help guide traffic safely through the construction zone. As per IRC: 79-1981, these include:

Traffic Cones: Typically, 0.5–0.75 m high and 0.3–0.4 m in diameter, made of plastic or rubber with red and white retro-reflective bands. Cones should be anchored securely and spaced 3–9 m apart, depending on speed and visibility requirements.

Traffic Cylinders and Tapes: Used for lane separation and guidance.

Drums: Metal or plastic drums (0.8–1 m high, 0.3 m diameter) painted with alternating black and white circumferential stripes. Metal drums offer high visibility and psychological deterrence, while plastic drums are lightweight and easier to handle.

5. Barricades

In urban construction zones, barricades are used to restrict unauthorized access and protect traffic from hazards such as excavated areas. These are typically constructed using MS frames and reinforced with horizontal bamboo or wooden posts to maintain continuity. Openings are provided only at designated access points such as shop entrances or residential driveways.

6. Flagmen

Flagmen play a vital role in ensuring on-site safety. Their responsibilities include:

- Controlling vehicle speed and movement near active work areas.
- Providing visual signals to drivers.
- Assisting in the safe movement of construction equipment such as cranes and excavators.

Flagmen must be properly trained, clearly visible to drivers, and equipped with appropriate signalling tools.

7. Vehicle Parking

A designated parking area will be developed to accommodate all work-related vehicles. This area will be:

- Firm and leveled to prevent vehicle instability.
- Free from obstructions to allow safe maneuvering.
- Clearly marked and labeled for easy identification.
- Located away from pedestrian pathways to avoid conflicts.
- Equipped with safety protocols requiring all raised parts of equipment (e.g., booms, backhoe buckets) to be fully lowered to the ground when parked.

Safe Parking Protocols

To ensure safety during vehicle parking, the following measures will be strictly enforced:

- The vehicle engine must be turned off.
- Keys must be removed from the ignition.
- Hand brakes must be applied.
- Wheel chocks must be used when parking on slopes.

8. Material Transportation

All construction materials will be transported to the site using suitable trucks or other appropriate vehicles. The following precautions will be taken:

- Materials will be securely fastened to prevent shifting or falling during transit.
- Wooden blocks or padding will be used between the load and vehicle body to ensure stability and minimize damage.
- Unloading and storage of materials will be done in a manner that does not obstruct traffic or cause congestion.

9. Speed Control

To maintain safety within the construction site:

- The maximum vehicle speed limit will be restricted to 20 km/h, except for emergency vehicles

during critical situations.

- Speed limit signs will be prominently displayed at strategic locations across the site.
- In areas with high pedestrian activity, reduced speed limits will be enforced and clearly indicated.

Speed Limit Violations

Violations of the prescribed speed limits will be treated with strict disciplinary action, including:

- Temporary suspension of the vehicle operator.
- Permanent removal from the site in cases of repeated or severe violations.

10. Personnel Safety

To ensure the safety of all personnel working near or on the roadway:

- All workers will always wear high-visibility reflective jackets.
- Additional personal protective equipment (PPE) such as helmets, safety shoes, and protective goggles will be mandatory based on the nature of the task.
- Site engineers and supervisors will be responsible for monitoring compliance and enforcing the use of PPE.

11. Signage and Visual Aids

The following standard traffic signs will be used throughout the construction site to guide and inform both workers and road users:

- Regulatory Signs: Stop, Entry Prohibited, Parking Prohibited, Speed Limit, Heavy Vehicle Prohibition.
- Warning Signs: Go Slow, Men at Work, Pedestrian Prohibited.
- Informational Signs: Parking Area, Pedestrian Only, Diversion.

All signs will be:

- Retro-reflective for night visibility.
- Mounted at appropriate heights and locations.
- Maintained regularly to ensure legibility and effectiveness.

For Sensitive Receptors no honking board should be provided with the minimal construction activity during the daytime.

		
Stop Sign	Entry Prohibited	Parking Prohibited
		
Pedestrian Prohibited	Speed Limit	Heavy Vehicle Prohibition
		
Go Slow	Parking Area	Pedestrian Only
		
Diversion	Diversion	Men at Work

Figure 9-2: Traffic Regulatory Signs

9.13.7 Traffic Diversion Planning

During the construction phase, traffic diversions will be implemented based on actual site conditions to ensure minimal disruption and maximum safety for road users and workers. The diversion routes will be designed in accordance with the Indian Roads Congress (IRC) guidelines and will be finalized in coordination with local traffic authorities.

A detailed Traffic Diversion Plan will be prepared for each affected road segment, considering factors such as pipe diameter, road width, junction complexity, and availability of alternative routes. The plan will be updated dynamically as construction progresses as depicted in the **Table 9-4.**

Note: This table should be prepared during the construction phase by the client, depending upon the construction plan for entire stretch and its proposed diversions

Figure 9-3**, Figure 9-4** and **Figure 9-5)** to illustrate :

- Traffic management during survey activities.
- Traffic control during active work zone operations.
- Diversion plans during full or partial road closures.

Table 9-4: Sample Table for the Details of Traffic Diversion Plan

S. No.	Road/Location	Dia of Pipe	Chainage	Total Length	Road Blockage	Alternative Route	Available Road Width	Type of Road
1.								
2.								
3.								
4.								
5.								
6.								

Note: This table should be prepared during the construction phase by the client, depending upon the construction plan for entire stretch and its proposed diversions

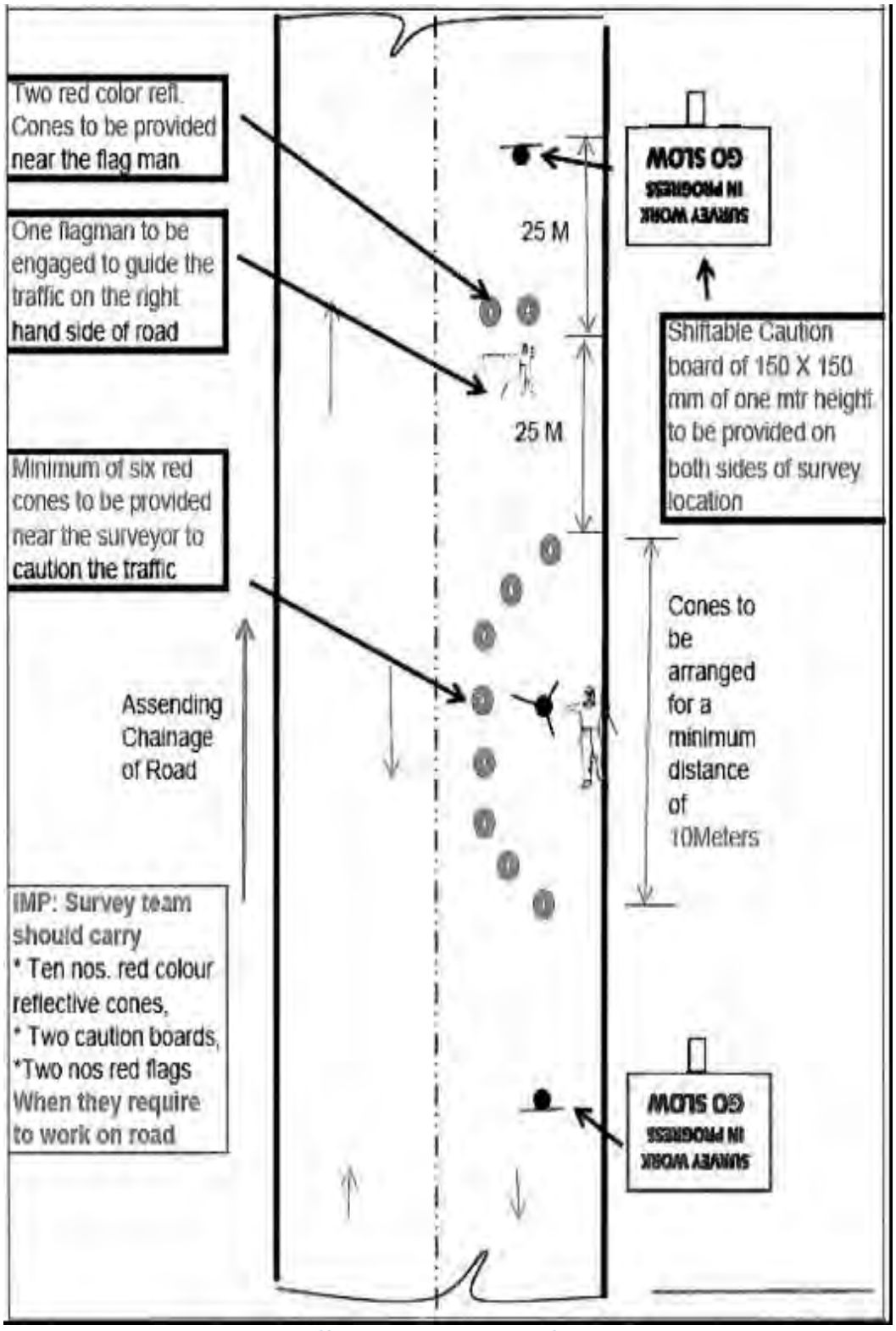


Figure 9-3: Traffic Management Plan for doing Survey

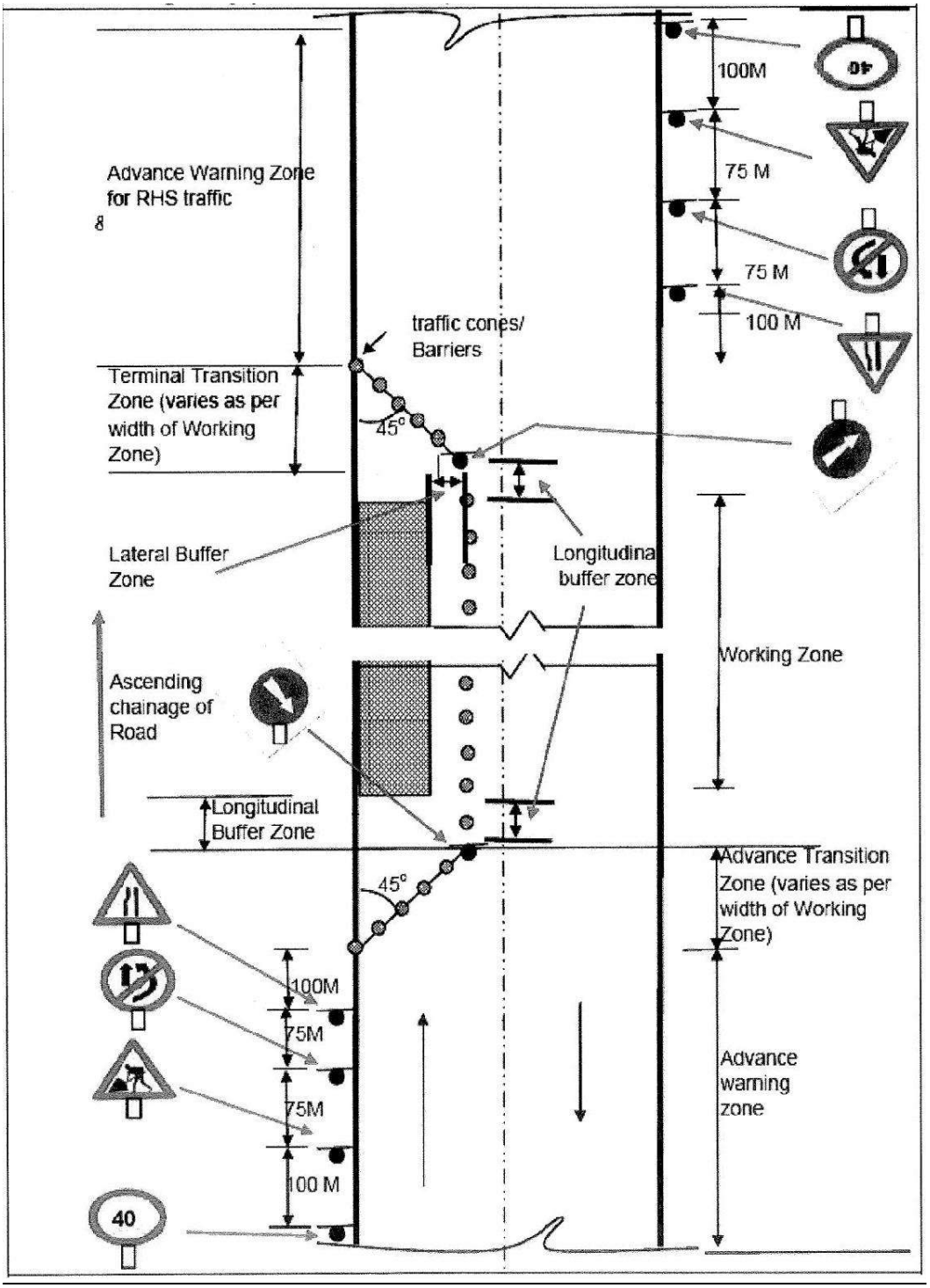


Figure 9-4: Traffic Management Plan for Working Zone

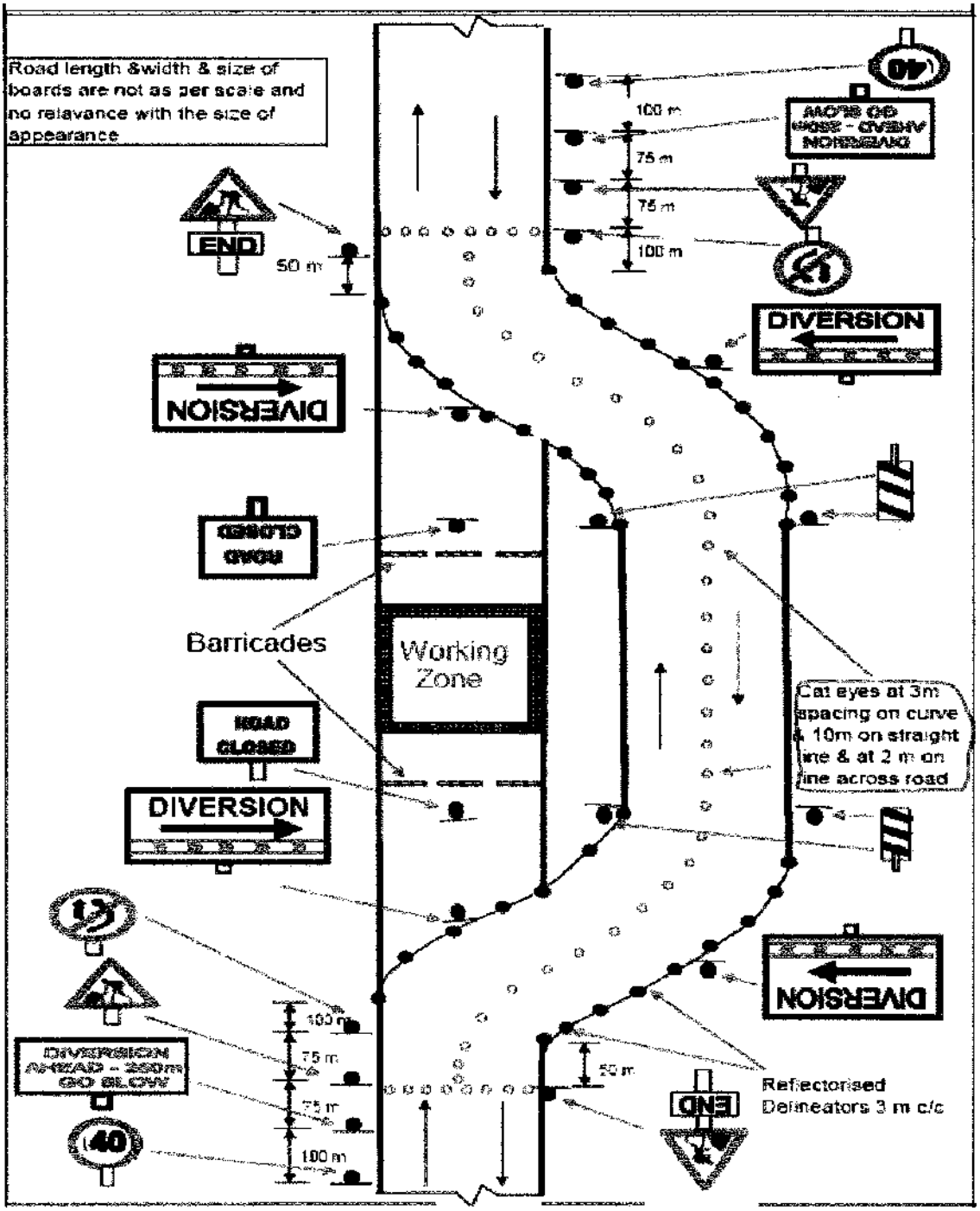


Figure 9-5: Traffic Management Plan for Diverting the Traffic

9.13.8 *Traffic Management Practices*

The implementation of traffic management during construction will be guided by the following operational principles:

- **Optimal Use of Existing Lanes**: Existing carriageways will be utilized to the maximum extent possible to minimize the need for diversions.
- **Intersection Management**: At major intersections, turning movements will be maintained wherever feasible to reduce congestion.
- **Lane Bifurcation**: In constrained areas, two-way traffic may be temporarily accommodated on a single carriageway with appropriate signage and barriers.
- **Speed Control**: Vehicle speeds through construction zones will be reduced using speed breakers, warning signs, and visual cues.
- **Standardized Signage**: All advance warning and information signs will comply with IRC standards for visibility, placement, and content.
- **Equipment Placement**: Construction materials, machinery, and equipment will be stored away from berms and pedestrian paths, within the available road land.
- **Safe Machinery Parking**: All parked machinery will be clearly marked with red flags and red lights. Only the minimum quantity of material required for immediate operations will be stored at the work site.
- **Wildlife Safety**: In areas with dense vegetation, precautions will be taken to prevent snake encounters. This includes clearing bushes, applying carbolic acid, and mandating the use of gumboots.
- **Heat Stress Prevention**: During summer months, workers will be provided with adequate rest intervals to prevent heat-related illnesses such as sunstroke.

9.14 PROPOSED ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

An Environment and Social Management Plan has been developed following the delineation of impacts and mitigation measures. These measures will be adopted by the project proponent and imposed as conditions of contract of the sub-contractor employed for respective phases of the power project. The mitigation measures suggested during operation will be made part of the regular maintenance and monitoring schedule.

The ESMP includes the following:

- Investigations suggested adverse environmental and social impacts and associated risks.
- Institutional arrangement - management tools and techniques for the implementation of environmental impacts and risk mitigations.
- Monitoring and reporting of requirements and mechanisms for the effective implementation of the suggested mitigations.

- Monitoring arrangements for effective implementation of suggested mitigations for the proposed project; and
- Reporting requirement to the regulatory agencies and funding institutes.

Table 9-5: Environment and Social Management Plan

Impact Identified	Suggested Mitigation	Monitoring/ Training	Management Responsibility	Timeline
Planning Phase				
• Land Acquisition	• Land procured for the project is prominently in RoW of government land. Permission must be obtained from the respective government or private authorities wherever the pipeline route crosses their jurisdiction.	• As per land acquisition policy	• **ATGL**	• Pre-Construction
Construction Phase				
Soil Characteristics				
• Erosion and compaction	• Loose soil to be protected from wind and runoff by covering / watering / other means of covering. • Existing roads to be used for transport of material to extent possible. • All construction materials should be kept within the project footprint area. • Re-fueling of machinery at site should be undertaken over paved surface. • In case of any accidental spill, soil should be cut and stored securely for disposal with waste.	• Project representative to make observations on storage and handling of construction material. • Drivers should be instructed about use of dedicated tracks within the site workers to be trained on handling and storage of waste by contractor. • Workers handling activity to be briefed about the need to prevent contamination. • Inspection/Monitoring to conduct construction activities within the site boundary only. • Soil monitoring for physical properties to be at least once during construction phase.	• EPC contractor/Site supervisor/ Project Director to make observations and convey it to the contractors. • EHS Personnel/ Project Director should monitor implementation of ESMP.	Throughout project cycle
Waste Disposal				
• Accumulation of construction waste	• Construction debris should be utilised for levelling of land and unused debris shall be disposed-off to C&D Disposal Site.	• **ATGL** representative should brief specific needs as per country's requirement for further execution, as and when required.	• Contractors will be abided with Hazardous Waste (Management, Handling and	• Should be incorporated as part of project budget, no additional cost is envisaged.

Impact Identified	Suggested Mitigation	Monitoring/ Training	Management Responsibility	Timeline
• Unhygienic conditions for labours. • Hazardous waste from machinery, generators etc. • Soil and land contamination due to accidental leakage. • Run off into rainwater channels.	• Proper sanitation and sewage facility in terms of septic tank with soak pit should be provided. • Nearby municipality should also be contacted for regular disposal of the labour camp waste. • Other wastes like packaging material, metal, jute, etc. to be sold to scrap dealers/ buyers. • Random stocking of raw material, storage of debris, piling of loose soil etc. should be strictly controlled. • Portable toilets/ suitable arrangements with septic tank-soak pit arrangement should be provided for workers.	• Workers should be instructed to maintain neat, clean & hygiene at facilities. • Contractors should be briefed about need for proper storage and disposal of construction waste.	Transboundary Movement) Rules, 2023. • Site Engineer to make observations and convey it to the contractors. • Monthly report of EHS Officer to include the compliance and observations if any.	• During Construction Phase
Water Resource and Quality				
• Run off into rainwater channels and drains passing through the site and ultimately into nearby surface water body. • Wastage of water and sewage discharge from labour camp	• Water for construction and consumption to be arranged by suitable local contractors through authorized tanker water suppliers. • Arrangement for storm water management in construction area should be made to avoid sediment run off. • Storm water flow during monsoon should be directed to existing drains. • Natural flow and topography of the drains as flowing inside the project boundary should be maintained. • Septic tank with soak pits should be provided at site to facilitate the sewage generated from labour area.	• Daily consumption of water should be recorded. • Storm water arrangements should be monitored. • Performance parameters are EC, TSS, TDS, Oil & Grease, Total Coliforms, BOD, etc. • Workers should be instructed about optimal use of water	• Conditions should be the part of contract with the EPC contractor. • Project Director or EHS personnel should make observations and convey it to the contractors. Report of Project Director/ Site EHS Officer should be sent to EHS head.	Construction Phase
Ecology				

Impact Identified	Suggested Mitigation	Monitoring/ Training	Management Responsibility	Timeline
• Clearance of vegetation	• Tree cutting or shrub clearance should be limited to those patches directly affecting solar panel exposure. • Workforce should be instructed to avoid any other activity likely to affect the local flora & fauna. • Movement of construction & transport vehicles should follow dedicated paths to avoid any injury/mortality to the wildlife.	• Visual damage loss inspection should be undertaken by Site Engineer • Construction contractor should instruct and inform workers to refrain from activities that may adversely affect the ecology in near vicinity of the project.	Project Director/EPC Contractor	Construction Phase
Traffic and Transport				
• Break-down and Improper halt of vehicles. • Discomfort due to air and noise pollution due to raw materials transportation. • Damage to road and related structure from heavy vehicles.	• Vehicle movement and parking within the project premises should be managed properly to avoid accidents. • Routes for use by construction traffic should be planned to minimize impact on adjoining activities. • Dedicated path within the site for exclusive entry and exit of construction vehicles should be provided. • Only PUC certified vehicle should be deployed. • Construction material should be transported in covered trucks. • Transportation should be undertaken along pre-identified paths only. • High noise generating activities should be restricted to daytime with proper mitigation measures.	• Necessary training to the driver of construction vehicles for speed restrictions. • Drivers should be assessed for their knowledge on traffic rules before engagement. • During the construction phase, number of vehicles as well as any incidents and accidents need to be reported, and their outcomes should be monitored.	• Project Director/ site EHS person should provide the training. • Should be mentioned in the contract with the construction contractor.	• Regular maintenance of vehicle and upkeep of roads should be included in O&M budget. • For all construction related activities during construction and operation phases.
Air Quality				
• Fugitive dust	• Regular water sprinkling while undertaking dust generation activities.	• Awareness should be developed among the site workers for fugitive dust management.	• Project Director should regularly coordinate and supervise work.	Water sprinkling will be done throughout construction phase.

Impact Identified	Suggested Mitigation	Monitoring/ Training	Management Responsibility	Timeline
• Emissions from diesel engines/ vehicles	• Construction activities should be avoided during high wind speed time. • Construction material should be covered to prevent any fugitive dust from these areas. • Regular maintenance of construction machineries. • Deployment of only PUC certified vehicles. • Flyable Construction material should be transported in covered trucks only. • Vehicle speed should be restricted to 30km/hour at site to minimize potential for dust emission in the surroundings.	• Air Quality monitoring specifically for particulate matter in nearby settlement areas once during construction for compliance to NAAQ Standards.	• Monitoring agency should take out the monitoring work. • Should be incorporated in the contract with contractor	
Noise and Vibration				
• Disturbance to habitations • Occupational Hazard	• Only well-maintained equipment should be operated on site. • DG sets should only be used for emergency power/ backup. • Scheduling of the construction activities should be done. • Loud, sudden noise emissions to be avoided wherever possible.	• Arrangements/facilities for noise reduction should be monitored as and when required. • Personal protective devices for site workers working near high noise equipment. • Schedule of activities should be discussed and finalized between site manager and the contractor. • Noise monitoring in nearby settlement areas once during construction period to ensure compliance with Noise Rules	• Project Director should take care of the compliance of ESMP. • External training on use of PPE should be the responsibility of EPC Contractor	Throughout construction phase
Cultural				
Cultural differences amongst workers	To the extent possible sourcing of construction labour should be done from local region by contractor for unskilled activities.	Workers should be briefed about need for cooperation and harmony with the community.	EPC Contractor	Normal Practice
Health and Safety				

Impact Identified	Suggested Mitigation	Monitoring/ Training	Management Responsibility	Timeline
• Operation of heavy machinery • Accidents leading to injuries fatalities. • Occupational health hazards	• Operation of loading–unloading equipment should be undertaken under the guidance / supervision of trained professional. • Sufficiently competent person should be engaged in driving or operating construction machineries. • Should ensure personal protective equipment for all personnel present at site are made available during Construction period. • Arrangement for fire control measures • Display of Emergency phone numbers at site.	• Proper training of the workers regarding health and safety procedures. • Workers should be trained through sub-contractors regarding use of Personal protection equipment and its importance. • Operation of Cranes shall normally be limited for transmission line as per requirement. Crane (If required) should be operated as per contractor's Crane Safety Plan only.	• Project Director should ensure compliance of safety guidelines. • Safety Officer of contractor should be responsible for implementation of safety guidelines. • To form part of the contractor's contract	Training of workers shall mostly be given by internal resources during Construction phase
Social				
Expectations for infrastructure development benefits	• Project officials should communicate and discuss with the community in a transparent manner on a regular basis and demonstrate their concerns. • Consultation with women 's groups should also be held during construction and operation phases to listen to their issues and concerns regarding labour, health, and safety etc. as well as to solicit their ideas on various community initiatives.	• Project officials should hold regular consultations with appropriate stakeholders. • All concerns must be addressed through systematic process.	Project Director	Normal Practice
Local Employment	• Assess the exact number of workers should be required at each stage through contractor/ own resource in the construction period. • Should ensure priority is given to local people for short term/long term employment opportunities, based on required skill and education level.	• Explore possibilities of training and capacity building to enable the community to be able to secure the available jobs and contracts, as per the applicability and requirement of the business.	EPC contractor in discussion with project director should assess potential for engagement of local community and for women.	Normal Practice

Impact Identified	Suggested Mitigation	Monitoring/ Training	Management Responsibility	Timeline
Demands for materials	Should ensure local contracting and vendor opportunities aligned with the scope and demand as far as possible.	-	Project proponent/Contractor	Normal Practice
Livelihood of roadside vendor might be impacted during to construction period at daytime.	• Construction time should be selected in such a manner that minimum livelihood loss occurs due to construction and other project related activities. • Compensation paid to roadside vendor if inconvenience caused due to construction of pipeline project.	Fair Compensation Policy	Land Team	Normal Practice
• Excess load on existing resources	• Local labour should be preferred for unskilled work. • Awareness camp for communicable disease understanding. • Medical camp as part of CSR activities	Awareness training for applicable regulatory regulations.	Project Director through EPC Contractor	During Construction Phase
Operation Phase				
Waste Generation				
Construction waste	• Should earmark designated areas for storage of waste separately. • Waste should be given to approved recyclers.	Training and briefing of the staff involved in waste management.	Project Director	Normal Process
Ecological Impact				
Impacts on existing flora and fauna	• A monitoring of bird and bat species within the project study area should be undertaken that may help understand the presence of threatened species inside the project area and their movement. This will further help in assessing the site-specific impacts and updating the mitigation measures.	Training and briefing of the staff involved for record keeping for any electrocution or carcass incident.	Plant EHS or Safety Officer	On regular basis

Impact Identified	Suggested Mitigation	Monitoring/ Training	Management Responsibility	Timeline
	• Any dead animals/carcass shall be removed in time from the site so that it does not attract movement of raptors. • General awareness regarding wildlife shall be enhanced through trainings, posters, etc. among the staff and labourers.			
Water Resources				
surface water body located across pipeline route.	• Natural slope of the site shall be maintained laying of pipeline structures require very less topographical correction. • Used oil and Waste should be stored in separate designated areas to avoid any contamination due to run-off. • Avoidance of water wastage to the maximum extent • Proper storm water facility	• Regular check on water use quantity • Awareness campaign for effective use of water	Plant EHS or Safety Officer	-
Soil Quality Degradation				
Soil quality might be impacted due to construction work	• Topsoil Preservation: Strip and store topsoil separately before excavation to facilitate land restoration after construction. • Soil Stabilization: Use geotextiles, mulch, or temporary vegetation cover to prevent soil erosion. • Controlled Excavation: Minimize the area of disturbance by restricting excavation to designated work zones.	Regular record management of waste materials.	Plant EHS or Safety Officer	-
Health and Safety				

Impact Identified	Suggested Mitigation	Monitoring/ Training	Management Responsibility	Timeline
• Accidents leading to Injury / fatality. • Fire Risk	• Schedule high-risk work (such as excavation and pipe laying) during non-peak traffic hours to minimize risks. • install warning signs, barricades, and reflective cones well in advance of the worksite. • Fire extinguisher in accident prone areas. • High-visibility safety jackets, hard hats, safety boots, gloves, Protective Eye Wear.	• Health and safety awareness training on regular interval • Safety incidents should be recorded and monitored with an aim that numbers are never significant, and gradually reduce.	Plant EHS or Safety Officer	-
Social Aspects				
• Local Economy • Upgradation of infrastructure	• Should boost the local economy though local contracting to the extent possible. • Infrastructure upgradation as part of CSR	-	CSR Team	Continuous improvement
Decommissioning Phase				
• Impacts due to disposal of material after construction work, • Contamination of soil	• Segregate waste into recyclable (metal scraps, plastic, wood) and non-recyclable (hazardous, non-biodegradable) materials. • Reuse excavated soil for backfilling and land restoration. • Recycle metal pipes, concrete debris, and plastic materials wherever possible.	-	Plant EHS or Safety Officer	-

9.14.1 On-Site Emergency Management Plan

The probability of inevitable residual risk arising out of operations, capable of causing emergencies cannot be ruled out no matter how well a process is being controlled or safeguarded by instruments and process safety procedures. Such emergencies could be the result of malfunction, ignorance, non-observance of operating instructions or be the consequence of acts outside the control of people.

Hence, they need to prepare an **ON-SITE EMERGENCY PLAN (OSEP)** for dealing with accidents and natural calamities which may still occur and are likely to affect health, safety, life, property, and environment both at site and in the immediate neighborhood. An OSEP mitigates the effects of a major accident/emergency when these effects are contained within the boundary of the site.

This plan is guideline for employees, workers, contractors, sub-contractors, visitors etc., informing about prompt rescue operations, medical treatment, coordination, and communication among various internal & external members. The plan should be proactive to avoid any confusion/panic and should direct to handle the emergency with clear instructions.

Purpose

ATGL has prepared an Emergency Management Plan for implementation at the project site in the event of an emergency so that the loss of life and damage to the properties and natural resources are minimized.

Objective

The overall objective of a good emergency preparedness plan is for what to do and what not during an emergency. The following aspects shall be included in emergency preparedness plan: -

- To assess what dangers could arise to people on and offsite as a result of these foreseeable emergencies and what the effects could it pose on the environment.
- To contain and control incidents.
- To assess the risk involved, and to mitigate the same by pre-planned remedial and rescue measures using, when necessary, the combined resources of the organization concerned and the public emergency services.
- To safeguard residents, employees and any one nearby who might be affected and to minimize the damage to property or the environment.
- The training of the individual personnel with duties under the plans will be familiarizing on site personnel with their roles, their equipment, and the details of the plans.
- The onsite emergency plan should be based on the specific needs of each particular site for dealing with those emergencies which it is for seen may arise.
- For an emergency plan to be successful, it should be tested, when first devised and thereafter to be rehearsed at suitable intervals.

9.14.2 Environmental Monitoring Plan

Environmental monitoring is an effective tool in making necessary recommendations and adopt suitable control strategies so that menace of rising environmental pollution could be minimized, and a relief be

extended to the people including labours in case of any damage caused under occupational health hazards. Monitoring is necessary for the following reasons:

- To verify the results of the impact assessment study.
- To assess what impacts have occurred.
- To evaluate the performance of mitigation measures proposed in the ESMP.
- To ensure that the conditions of necessary consent and approvals are adhered.
- To suggest improvements in management plan, if required.
- To ensure that any additional parameters, other than those identified in the impact, do not become critical after the commissioning of proposed project.
- Considering the short duration of construction phase (around 6-12 months), environmental monitoring can be considered on yearly basis during operation phase only. However, other mitigation measures suggested for construction phase shall be maintained for env. protection.

The proposed environmental monitoring program during both construction and operation phases of the project are given in **Table 9-6** below:

Table 9-6: Environment Monitoring Program- Construction & Operation Phase

Sl. No.	Component	Location	Parameters	Frequency
Construction Phase				
1	Stack emission characteristics	Stacks attached to emission sources (e.g. DG set)	Stack monitoring for PM, SOx, NOx and HC	Once a month
2	Ambient air quality	Nearest Residential Areas, and busy commercial locations	Ambient air quality parameters as per NAAQS viz. PM10, PM2.5, SOx, NOx, CO	Once a month
3	Ground water quality (used as source of domestic water)	Point used for drinking water	Parameters listed in ISO:10500	Once a month
4	Effluent quality	Discharge header of hydrotested pipeline/ tank	According to general discharge standards	As per requirement
5	Waste (including hazardous)	Construction sites and camps	Quantity/ volume generated and disposed	Once in a day
6	Equipment noise levels	1 m from DG set	dB(A)	Once a month
7	Ambient noise levels	Nearest residential areas/ Silent zones etc.	Ambient noise levels (Leq Day & Leq Night)	Once a month
Operation Phase				
8	Greenbelt development	Along the ROW of pipeline	Plant density, health, growth, and survival rate	Once in 6 months
9	Waste (including hazardous)	Along the ROW of pipeline	Quantity/ volume generated and disposed of.	Once in a month
10	Effluent quality	Along the ROW of pipeline	According to general discharge standards	Once in 6 months

10 SUMMARY AND CONCLUSION

10.1 SUMMARY OF IMPACTS

The environmental impacts of the proposed 65.5 km Natural Gas Pipeline Project in Akola GA have been assessed across its construction and operational phases. Given the temporary nature of construction activities, most impacts are expected to be short-term, localized, and reversible. The project has been designed with a strong emphasis on minimizing ecological disruption and ensuring compliance with environmental regulations.

10.2 IMPACT DUE TO PIPELINE ROUTE SELECTION

The pipeline route has been carefully selected to minimize environmental and social impacts while ensuring technical and economic feasibility. Key considerations include:

- Shortest and most efficient routing between source and destination points
- Avoidance of sensitive areas such as national parks, sanctuaries, and wildlife corridors
- Minimum impact to reserve forests and other sensitive areas.
- Minimization of water crossings and disruption to aquatic ecosystems.
- Accessibility for construction and maintenance, reducing the need for additional infrastructure.
- Reduced impact on land use and local communities through alignment along existing roads and utility corridors where feasible.

10.3 IMPACTS DUE TO THE CONSTRUCTION OF PIPELINE

- The city gas distribution of natural gas pipeline project covers a total length of 65.5 km that passes through several villages
- The pipeline traverses rural and semi urban landscapes including reserved forests, national highways, SH- PWD roads, PMGSY roads, railway lines, river, canals, and drains. The details of major environmental and infrastructural crossings are such that:

    i. **Forests:** The pipeline passes through the reserved forest area and that requires the tree cutting permission which has been obtained and the copy of permission letter is enclosed in Annexure 4: NOC **Annexure 12** and **Annexure 13**.

    ii. **Roads and Highways:** Crossings include NH-161, NH-161A, NH-53, SH-274, SH-287, Rural Road that comes under PMGSY. The permission from the PWD for state highways and rural road has been obtained (as enclosed in **Annexure 3** to **Annexure 9**)whereas the permission for national highway is still pending.

    iii. **Railways:** The proposed route passes through a railway crossing and permission for the same is pending.

    iv. **River, Canals and Drains**: Purna and Morna river crosses the pipeline route along with the several canals and drains the permissions to lay NG pipeline across these water

bodies has been attained from the relevant authority and the permission letter/NOC has been enclosed in the **Annexure 1** and **Annexure 2**.

v. **Sensitive Receptors:** The pipeline passes near cultivable areas schools, hospitals, rural residential areas, markets etc. These areas will require special attention during construction to minimize disruption.

- Earthwork excavation, transportation of materials, handling, laying, and jointing of pipelines will result in a temporary increase in dust and suspended particulate matter in the ambient air. These impacts will be localized and short-term and will be mitigated through dust suppression measures and proper handling of materials. For major crossings such as canals the pipeline should be buried at least 4m below the canal bed.
- Movement of vehicles for transportation of construction material could lead to PM and other air emissions. However, the impact shall be short-term & temporary in nature.
- Workers may face hazards from machinery, hazardous materials, confined spaces, and environmental exposure.
- There will be no abstraction of ground water from the project as freshwater for domestic purposes will be supplied by private tankers. Domestic sewage will be disposed of to the septic tanks with soak pits.
- Water consumption during hydro-testing of pipeline - Efficient use of water will be made to reuse test water in different test sections. Water will be tapped from different sources along the pipeline route, without unduly disturbing its normal users.
- In the project around 40% laying will be done via Horizontal Directional Drilling (HDD) method so there will be no disturbance to the natural water flow or cause any pollution to the water body. Hence there will not be any obstruction/damage to fishing, recreational and navigation activities.
- The pipeline will be buried all along its length hence impact on land use pattern will be marginal and reversible. Appropriate reinforcements will be made to avoid contamination.
- Some quantity of earth excavated for pipeline laying will become surplus after installation of the pipeline and may be required for disposal. However, as this excess of earth will be taken to low lying area for filling purpose, the aesthetics of the pipeline and soil quality will not be affected.
- Noise Generation – Near the human settlements' area along the pipeline route where the noise levels due to construction activities can be estimated to be around 70-90 dB(A). Such one-time exposure is not expected to last for more than a few weeks and shall not exceed the stipulated standards. The pipeline laying work would be done at night only as there is lots of traffic in the daytime and it creates disturbance to the locals.
- Selection of the pipeline route has been done in such a way that eco-sensitive areas which may be affected during the construction of the pipeline are minimized.

10.4 IMPACTS DURING OPERATION OF PIPELINE

- No impact on any ecological sensitive area is envisaged during operation.
- No air emissions will be generated during the operation phase except during maintenance that could be temporary in nature.
- There will be no significant impact on the ecological environment during the operational phase of the project.
- The probability of leakage will be significantly reduced by adoption of appropriate safety measures and SCADA system.
- The probability of leaking from a pipeline is remote. The pipeline will be buried at a minimum of 1.5 m at major crossings.

10.5 MITIGATION AND ENVIRONMENTAL MANAGEMENT PLAN

10.5.1 General

The mitigation measures to reduce environmental impacts, described in this ESIA, can be divided into the following categories:

- Project decisions taken by **ATGL** with environmental protection in mind.
- Such measures are designed to avoid, eliminate, or reduce potential impacts that may occur to the environment during the proposed activities.
- Mock Drills shall be conducted at regular intervals in line with the Emergency Response and Disaster Management Plan.

10.5.2 Post-Monitoring Program

The implementation of mitigation measures during construction and operation phases will be monitored. The monitoring plan would provide for periodic revision, if necessary, considering the baseline status to indicate progress in project implementation and changing environmental conditions to provide a basis for evaluation of project impacts. The post monitoring program would include the following:

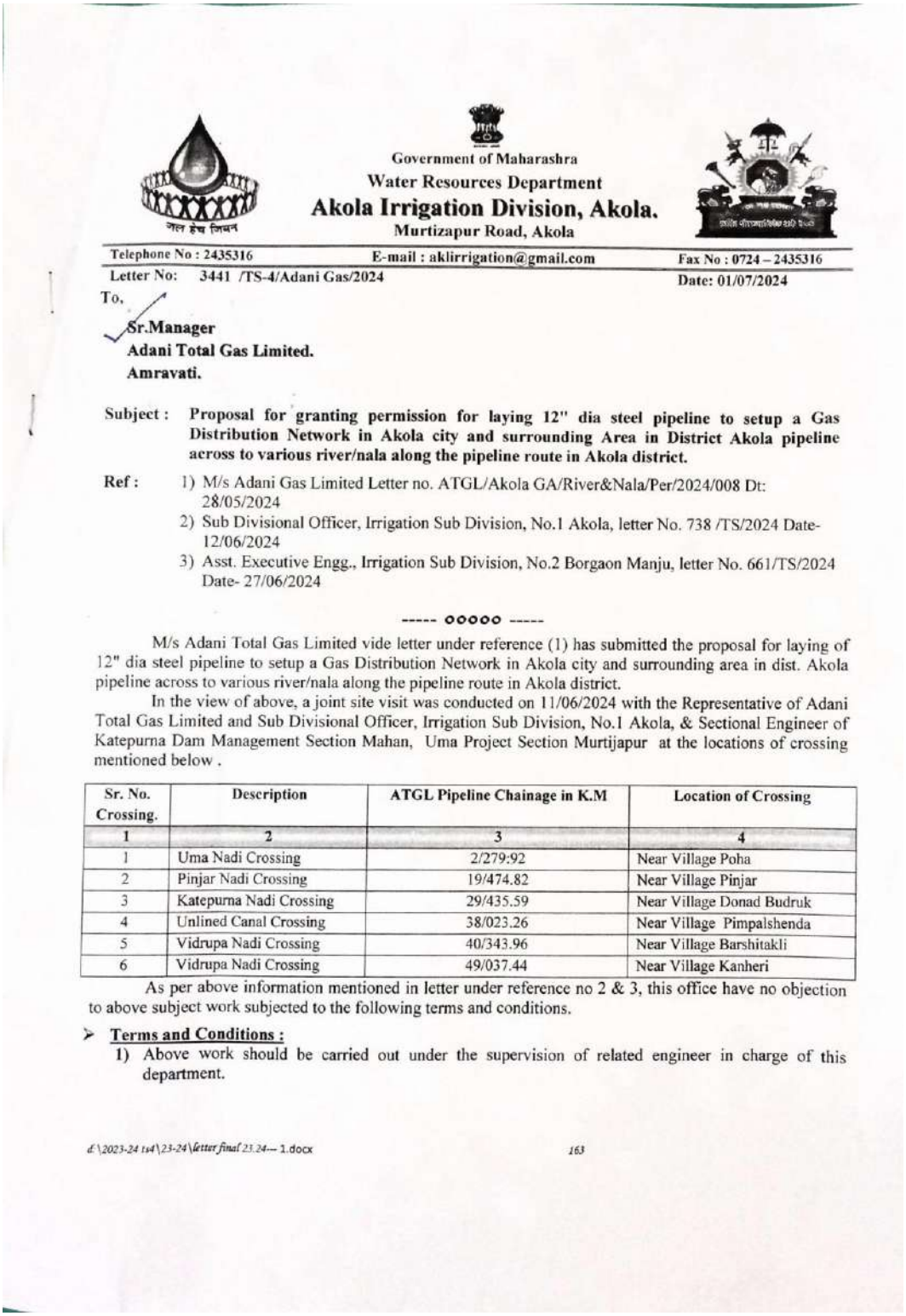
- Approved means of leak detection would be employed as per the provisions of Schedule I -E of PNGRB Regulations, 2008 and as per ASME B 31.8, Appendix - M.
- Regular and adequate patrolling of pipelines particularly at crossing locations and settlements.
- Monitoring of pressure, coating conditions and cathodic protection

10.6 CONCLUSION

The Akola Natural Gas Pipeline Project is poised to deliver substantial benefits, including enhanced energy access, industrial growth, and employment generation. With comprehensive mitigation strategies and a robust Environmental and Social Management Plan (ESMP), the project's environmental impact will be minimal and well-managed. The project also aligns sustainable development goals and will contribute positively to the regional and national economy.

ANNEXURES

Annexure 1: Permission for River and Canal Crossings from Akola Irrigation Department



Government of Maharashtra
Water Resources Department
Akola Irrigation Division, Akola.
Murtizapur Road, Akola

Telephone No : 2435316 | E-mail : aklirrigation@gmail.com | Fax No : 0724 – 2435316

Letter No: 3441 /TS-4/Adani Gas/2024 | Date: 01/07/2024

To,
Sr.Manager
Adani Total Gas Limited.
Amravati.

Subject : **Proposal for granting permission for laying 12" dia steel pipeline to setup a Gas Distribution Network in Akola city and surrounding Area in District Akola pipeline across to various river/nala along the pipeline route in Akola district.**

Ref :
1) M/s Adani Gas Limited Letter no. ATGL/Akola GA/River&Nala/Per/2024/008 Dt: 28/05/2024
2) Sub Divisional Officer, Irrigation Sub Division, No.1 Akola, letter No. 738 /TS/2024 Date- 12/06/2024
3) Asst. Executive Engg., Irrigation Sub Division, No.2 Borgaon Manju, letter No. 661/TS/2024 Date- 27/06/2024

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M/s Adani Total Gas Limited vide letter under reference (1) has submitted the proposal for laying of 12" dia steel pipeline to setup a Gas Distribution Network in Akola city and surrounding area in dist. Akola pipeline across to various river/nala along the pipeline route in Akola district.

In the view of above, a joint site visit was conducted on 11/06/2024 with the Representative of Adani Total Gas Limited and Sub Divisional Officer, Irrigation Sub Division, No.1 Akola, & Sectional Engineer of Katepurna Dam Management Section Mahan, Uma Project Section Murtijapur at the locations of crossing mentioned below .

Sr. No. Crossing.	Description	ATGL Pipeline Chainage in K.M	Location of Crossing
1	2	3	4
1	Uma Nadi Crossing	2/279:92	Near Village Poha
2	Pinjar Nadi Crossing	19/474.82	Near Village Pinjar
3	Katepurna Nadi Crossing	29/435.59	Near Village Donad Budruk
4	Unlined Canal Crossing	38/023.26	Near Village Pimpalshenda
5	Vidrupa Nadi Crossing	40/343.96	Near Village Barshitakli
6	Vidrupa Nadi Crossing	49/037.44	Near Village Kanheri

As per above information mentioned in letter under reference no 2 & 3, this office have no objection to above subject work subjected to the following terms and conditions.

➢ **Terms and Conditions :**
1) Above work should be carried out under the supervision of related engineer in charge of this department.

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2) The pipeline should be laid atleast 3.5 m below the scoured bed level/existing bed level whichever is more of the above said rivers.
3) During / after complition of work natural flow/ functioning of river and canal should not be obstructed, Canal cross section should be restored as per design.
4) The Water Resources Department will not be held responsible for any loss of life and property if any accident occurs due to laying of gas pipeline.
5) In case of any complaint or court matter, this office will not be held responsible.

(A.K.Wasulkar)
Executive Engineer
Akola Irrigation Division
Akola

Copy To : 1) Sub Divisional Officer, Irrigation Sub Division, No.1 Akola,vide letter No. 738/TS/2024 Date- 12/06/2024
2) Asst. Executive Engg., Irrigation Sub Division, No.2 Borgaon Manju, vide letter No. 661/TS/2024 Date- 27/06/2024
forwarded for carrying out the above work under your supervision.

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Annexure 2: NOC for Nala Crossing and One River Crossing from Soil and Water Conservation Department Akola

आजादी का अमृत महोत्सव

महाराष्ट्र शासन

जिल्हा जलसंधारण अधिकारी, मृद व जलसंधारण विभाग, अकोला.

नेहरू पार्क चौक, पाण्याच्या टाकी जवळ, मुर्तीजापुर रोड अकोला

दुरध्वनी क्र.०७२४-२४४३९२७ Email ID: comilsdnakola@rediffmail.com

जा.क्र./ २१७३ / तांशा / २०२४ दि. ५ / DE /२०२४

To,

Sr.Manager
Adani Total Gas Limited.
Amravati.

Subject : Proposal for granting permission for laying 12" dia steel pipeline to setup a Gas Distribution Network in Akola city and surrounding Area in District Akola pipeline across to various River / Nala along the pipeline route in Akola district.

Ref :1) M/s Adani Gas Limited Letter no. ATGL/Akola GA/River&Nala/Per/2024/008 Dt:06/08/2024
2) Sub Divisional Water conservation officer Soil & water conservation Sub Division Akola, letter No.504/2024 Date- 30/08/2024

M/s Adani Total Gas Limited vide letter under reference (1) has submitted the proposal for laying of 12" dia steel pipeline to setup a Gas Distribution Network in Akola city and surrounding area in dist.Akola pipeline across to various river/nala along the pipeline route in Akola district.

In the view of above, a joint site visit was conducted on 28/08/2024 with the Representative of Adani Total Gas Limited and Sub Divisional Water conservation officer Soil & water conservation Sub Division Akola at the locations of crossing mentioned below.

Sr. No. Crossing.	Description	ATGL Pipeline Chainage in K.M	Location of Crossing
1	2	3	4
1	Nala Crossing	4/945.68	Near Village Morhal
2	Nala Crossing	6/350.92	Near Village Morhal
3	Nala Crossing	9/482.13	Near Village Kasarkhed
4	Nala Crossing	9/576.94	Near Village Kasarkhed
5	Nala Crossing	10/094.54	Near Village Kasarkhed
6	Nala Crossing	10/990.78	Near Village Parabhavani
7	Nala Crossing	18/783.88	Near Village Pinjar
8	Nala Crossing	21/075.29	Near Village Manmatkhed
9	Nala Crossing	21/250.43	Near Village Manmatkhed

10	Across to Chambuka Nala	23/461.75	Near Village Kardu
11	Across to Ambildera Nala	24/810.83	Near Village Kherda Budruk
12	Nala Crossing	25/829.42	Near Village Kherda Budruk
13	Nala Crossing	26/442.58	Near Village Kherda Budruk
14	Koyad Nadi Crossing	28/028.37	Near Village Donad Khurd
15	Nala Crossing	30/011.48	Near Village Donad Budruk
16	Nala Crossing	32/540.60	Near Village Varkhed
17	Nala Crossing	34/632.26	Near Village Redwa
18	Nala Crossing	36/910.24	Near Village Redwa
19	Nala Crossing	50/491.38	Near Village Kanheri
20	Nala Crossing	51/566.72	Near Village Shivapur
21	Nala Crossing	51/950.75	Near Village Shivapur
22	Nala Crossing	53/969.83	Near Village Akola

As per above information mentioned in letter under reference no 2, this office have no objection to above subject work subjected to the following terms and conditions.

➢ **Terms and Conditions :**

1) Above work should be carried out under the supervision of related engineer in charge of this department.
2) The pipeline should be laid atleast 2.5 m below the scoured bed level/existing bed level whichever is more of the above said Nala.
3) During / after complition of work natural flow/ functioning of river and Nala should not be obstructed, Nala cross section should be restored as per design.
4) The Soil and Water conservation Department will not be held responsible for any loss of life and property if any accident occurs due to laying of gas pipeline.
5) In case of any complaint or court matter, this office will not be held responsible.

(Sachin Wamare)
District Water Conservation officer
Soil & Water Consevation Division.Akola

Copy To : 1) Sub Divisional Water conservation officer Soil & water conservation Sub Division Akola, for carrying out the above work under your supervision.

Annexure 3: NOC for SH-287 from PWD Washim District

E:\ADM-HOPC cable permission ltr. dt.28.12.17\HDD method Online OFC cable permission letter dt.26.06.2018.docx

महाराष्ट्र शासन
कार्यकारी अभियंता यांचे कार्यालय
सार्वजनिक बांधकाम विभाग, वाशिम

ई -: मेल-washim.ee@mahapwd.gov.in दूरध्वनी क्र .०७२५२ २३२३३४

जा.क्र. ८३५४ /चिशा/२०२४ दि. ०८/१०/२०२४

प्रति,
व्यवस्थापक,
अदानी टोटल गॅस लि.अहमदाबाद
केस्ट-4-5 इनस्पायर बिजनेस पार्क शांतीग्राम
वैष्णवदेवी सर्कल एस.जी.हायवे अहमदाबाद- 382422
गुजरात भारत

विषय :- पिंजर पोहा कारंजा मानोरा रस्ता राज्यमार्ग क्र. 287 सा.क्र.14/110 ते 17/205 (लांबी 3.095 किमी.) मध्ये रस्त्यास समांतर गॅस पाईप लाईन टाकण्याची परवानगी मिळणेबाबत.

संदर्भ : 1) आपले पत्र क्र.ATGL/Akola GA/P.W.D-Roads/Per/2024/003 दि.28/05/2024
2) सहाय्यक कार्यकारी अभियंता सा.बां.उपविभाग कारंजा यांचे पत्र क्र.587/2024 दि.23/07/2024.
3) सा.बां.विभाग मंत्रालय मुंबई शासन निर्णय क्र. संकीर्ण-2017/प्रक्र-246/रस्ते-7 दि 30.05.2017.
4)सा.बां.विभाग मंत्रालय मुंबई शासन निर्णय क्र.संकीर्ण-2016/प्र.क्र-246/भाग-1/रस्ते-7 दि12.01.2018.
5) सा.बां.विभाग मंत्रालय मुंबई शासन निर्णय क्र.ओएफसी-2023/प्र.क्र.165/रस्ते-7 दि.15.09.2023

उपरोक्त विषयास अनुसरुन संदर्भ क्र.1 अन्वये पिंजर पोहा कारंजा मानोरा रस्ता राज्यमार्ग क्र. 287 सा.क्र.14/110 ते 17/205 (लाबी 3.095 किमी.) मध्ये रस्त्याच्या उजव्या बाजुला रस्त्यास समांतर गॅस पाईप लाईन टाकणे करीता परवानगी मिळणे बाबतचा प्रस्ताव या कार्यालयास प्राप्त झालेला आहे. त्याअनुषंगाने खालील अटी व शर्तीच्या अधीन राहुन आपणास उक्त रस्त्याच्या नमुद साखळी क्रमांकावर रस्त्यास समांतर गॅस पाईप लाईन टाकण्याची परवानगी देण्यात येत आहे.

अटी व शर्ती

1. कामाल सुरुवात करण्याच्या आधी कार्यकारी अभियंता / त्याचे प्रतिनीधी यांचेशी विचार विनीमय करुन मार्गरेखा निश्चित करुन घेऊन उक्त जमिनीखालील गॅस पाईप रस्त्याच्या पातळीपासून गॅस पाईप या बाबतीत किमान 1.20 मीटर च्या खाली बसविण्यात येतील. तसेच राज्यमार्ग क्र.287 रस्त्याच्या साखळी क्रमांक 14/110 ते सा. क्र. 17/205 (एकुण लांबी 3.095 किमी) मध्येच रस्त्यास समांतर गॅस पाईप टाकण्यात यावी.
2. जेथे गॅस पाईप रस्त्याखाली आडव्या जात असतील तेथे बसविणे /दुरुस्त करण्याचे काम, अंतिमरित्या काढून टाकण्याचे वाहतुकीची सोय व सुरक्षा या विषयी योग्य ती काळजी घेऊन, रस्त्याच्या रुंदीच्या अर्ध्या

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भागात पार पाडण्यात येईल. रस्त्याचा अर्धा भाग वाहतुकीसाठी योग्य करण्यात आल्या शिवाय रस्त्याचा दुसरा अर्धा भाग खोदण्यात येणार नाही. दिवसा योग्य प्रकारचे कुंपन व रात्री कुंपन व लपलपनारे दिवे यांची तरतुद करुन अपघात टाळण्याकरीता आवश्यक ती सर्व प्रकारची खबरदारी घेण्यात यावी.

3. रस्ता / रस्त्यालगतची जागा याचा जो भाग गॅस पाईप बसविण्यासाठी किंवा काढून टाकण्यासाठी किंवा त्याच्या दुरुस्त्या करण्याकरीता खोदकाम करण्यात येईल, तो अनुज्ञप्ती धारकाच्या खर्चाने पुर्ववत करुन देण्यात येईल.
4. रस्त्याखालील/रस्त्यालगत जागा यांचा खोदावयाचा पृष्ठभाग, डांबर, सिमेंट, काँक्रीट ईत्यादी सारख्या उच्च प्रतीच्या सामुग्रीचा असेल त्याबाबतीत तो खोदण्याचे आणि पुर्ववत करुन देण्याचे काम संपूर्णत: अनुज्ञप्ती धारकाच्या खर्चाने पार पाडण्यात येईल आणि तसे न केल्यास शासनाकडून धारकाच्या खर्चाने पार पाडण्यात येईल व अनुज्ञप्ती धारकास मागणी केल्यास तात्काळ त्या खर्चाच्या रक्कमेची भरपाई अनुज्ञप्ती धारकास करील आणि ती न केल्यास जमिन महसुलाची थकबाकी म्हणून तो वसूल करण्यात येईल. करण्यात आलेल्या खर्चाचा रक्कमे बाबतीत कार्यकारी अभियंता, यांनी दिलेला निर्णय अंतिम असेल जेथे असा पृष्ठभाग वर नमुद केलेल्या उच्च प्रति व्यतीरीक्त अन्य प्रकाराचा केलेला असेल तेथे ते काम कार्यकारी अभियंता किंवा त्यांचा प्रतिनीधी यांचे संपूर्णपणे समाधान होईल अशा प्रकारे अनुज्ञप्ती धारकाकडून स्वत:च्या खर्चाने करुन घेण्यात येईल.
5. अनुज्ञप्ती धारकास हा करार अंमलात असण्याच्या मुदतीत जमिनीखालील गॅस पाईप यावर आवश्यक ती कामे करण्याच्या प्रयोजनासाठी उक्त रस्त्याच्या /रस्त्यालगतच्या जमिनीच्या जागेत प्रवेश करण्याचीच केवळ अनुज्ञप्ती असेल, त्या व्यतीरीक्त त्यास त्यामध्ये कोणताही हक्क किंवा हितसंबध असणार नाही.
6. शासन अनुज्ञपप्ती धारकाच्या मालमत्तेचे हानी पासून रक्षण करण्याची हमी देत नाही.
7. उक्त कोणत्याही गॅस पाईप मध्ये राहिलेला कोणताही दोष किंवा त्याच्या दुरुस्त्याच्या अभाव, यामुळे किंवा उक्त गॅस पाईप बसवितांना /दुरुस्ती करतांना किंवा अंतिम रित्या काढून टाकत असतांना त्याच्या कडुन / त्याच्या कर्मचाऱ्याकडून झालेला निष्काळजीपणा /हयगय किंवा गैरवर्तणूक यामुळे कोणत्याही व्यक्तीस, जी काही हानी किंवा इजा होईल त्यास संपूर्णत: अनुज्ञप्ती धारक कंपनी जबाबदार असेल आणि या बाबतीत करण्यात आलेल्या दाव्यामुळे शासनावर जे सर्व दावे /मागण्या आणि दायित्वे व खर्च यांचा भार पडेल, त्या दाखल अनुज्ञप्ती धारक कंपनी शासनाची क्षतीपूर्ती करील.
8. अनुज्ञप्ती धारक कंपनी स्वत:च्या खर्चाने उक्त गॅस पाईप यांची दुरुस्ती करुन ते चांगल्या स्थितीत ठेवील आणि गळतीमुळे किंवा अन्य प्रकारच्या कोणत्याही कारणामुळे रस्त्याच्या /रस्त्यालगतच्या जमीनीच्या पृष्ठभागाची किंवा शासनाच्या इतर मालमत्तेची जी कोणतीही हानी होईल. त्याची कार्यकारी अभियंता किंवा त्याचा प्रतिनीधी यांचे संपूर्णत: समाधान होईल अशा प्रकारे ताबडतोब दुरुस्ती करुन देईल.
9. गॅस पाईप लाईन काढून टाकणे आणि पुन्हा बसविणे आवश्यक असले, अशा प्रकारे रस्त्यामध्ये किंवा इतर जमिनीमध्ये कोणतेही फेरफार करण्याची आवश्यकता आहे असे कोणत्याही वेळी आढळून आल्यास, अशा प्रकारे ते काढून टाकण्याच्या आणि पुन्हा बसविण्याचा खर्च अनुज्ञप्ती धारक कंपनीला सोसावा लागेल.
10. अनुज्ञप्ती धारक कंपनीने या करारातील कोणत्याही अटीचे पालन न केल्यास, कार्यकारी अभियंत्याला हा करार रद्द करण्याचा आणि आवश्यक वाटल्यास उक्त गॅस पाईप एक महिन्याच्या नोटीशीची मुदत संपल्यानंतर काढून टाकण्याची मोकळीक असेल आणि कार्यकारी अभियंता यांचेव्दारा करण्यात आलेल्या खर्चास अनुज्ञप्ती धारक कंपनी जबाबदार असेल.
11. शासनाला तशा अर्थाची नोटीस देऊन, हा करार समाप्त करण्याची मोकळीक असे व त्या बाबतीत करार समाप्त करण्यात आल्यामुळे अनुज्ञप्ती धारकाला कोणतीही भरपाई मिळण्याचा हक्क असणार नाही.

12. कार्यकारी अभियंता यांची लेखी परवानगी घेतल्याशिवाय अनुज्ञप्ती धारकास गॅस पाईप बसविण्याचे काम किंवा त्यानंतरचे इतर कोणतेही काम सुरु करता येणार नाही.
13. अनुज्ञप्ती धारक कंपनी गॅस पाईप बसविण्याचे काम कार्यकारी अभियंता किंवा त्यांचा प्रतिनीधी यांचे समाधान होईल अशा प्रकारे वरील पैकी कोणत्याही अटीचे पालन करण्यात आलेले नाही असे कार्यकारी अभियंता यांचे मत झाल्यास संपूर्ण अनामत रक्कम किंवा तिचा काही भाग सरकार जमा करण्यात येईल.
14. खोदकाम चालु असतांनर रस्त्याच्या कडेची झाडे तोडणे अनिवार्य असल्यास अनुज्ञप्तीधारक कंपनीने संबंधीत सक्षम प्राधिकरणाची परवानगी मिळवावी. तसेच पर्यावरणाचा समतोल राखण्यासाठी मुख्य अभियंता यांनी ठरवून दिलेले वृक्ष लागवड व रक्षणाचे उद्दीष्ट साध्य करावे.
15. विषयांकित रस्त्याच्या मध्यापासून 12.00 मीटर अंतरावर किंवा जेथे प्रत्यक्ष रस्त्यांची शासकीय हद्द अस्थित्वात आहे त्या ठिकाणी रस्त्याचे हद्दीलगत रस्ता हद्दीला खेटून टाकून काम करण्यात यावे
16. गॅस पाईप टाकतांना अस्थित्वातील इतर कोणत्याही केबल अथवा जलवाहीनीस अथवा विद्युत वाहीनीस किंवा गॅस वाहीनीस इजा पोहचता कामा नये. इजा झाल्यास त्याची संपूर्ण भरपाई अनुज्ञप्ती धारक कंपनी यांना भरावी लागेल व होणा-या नुकसानास हे खाते जबाबदार राहणार नाही.
17. या करारानुसार अनुज्ञप्ती धारक कंपनीकडून देय असलेल्या रक्कमेचा काही भागाची थकबाकी राहीली असेल तर ती शासनाला ज्या इतर कोणत्याही उपाय योजना करण्याची मोकळीक असेल त्यास बाधा न आणता, जमिन महसुलाची थकबाकी म्हणून वसूल करता येईल.
18. हा करार तयार करणे त्याचे मुद्रांकन आणि निष्पादन करणे यासंबधीचा खर्च अनुज्ञप्ती धारक करील.
19. या कराराच्या बाबतीत कार्यकारी अभियंता व अनुज्ञप्ती धारक कंपनी यांचे मध्ये मतभिन्नता निर्माण झाल्यास, त्याबाबत मुख्य अभियंता, यांचेकडे निर्देश करण्यात येईल आणि त्या बाबतीतील त्यांचा निर्णय अंतिम व अनुज्ञप्ती धारकास बंधनकारक राहील.
20. अनुज्ञप्ती धारकाला द्यावयाची किंवा त्यांच्यावर बजावण्यात यावयाची कोणतीही नोटीस किंवा अन्य कागदपत्रे शासनाच्या वतीने कार्यकारी अभियंताव्दारे देता येतील किंवा बजावता येतील आणि अशी कोणतीही नोटीस किंवा कागदपत्रे अनुज्ञप्ती धारकाच्या ज्ञात असलेल्या शेवटच्या पत्त्यावर बजावण्यात आली असतील किंवा पत्त्यावर नोंदणीकृत डाकेने पाठविण्यात आलेली असतील तर ती त्यास रितसर देण्यात आलेली आहेत किंवा त्याच्यावर ती रितसर बजावण्यात आलेली आहे असे मानण्यात येईल.

वरीलअटी व शर्तींचे उल्लंघन झाल्यास, आपली परवानगी रद्द समजण्यात येईल, याची कृपया नोंद घ्यावी.

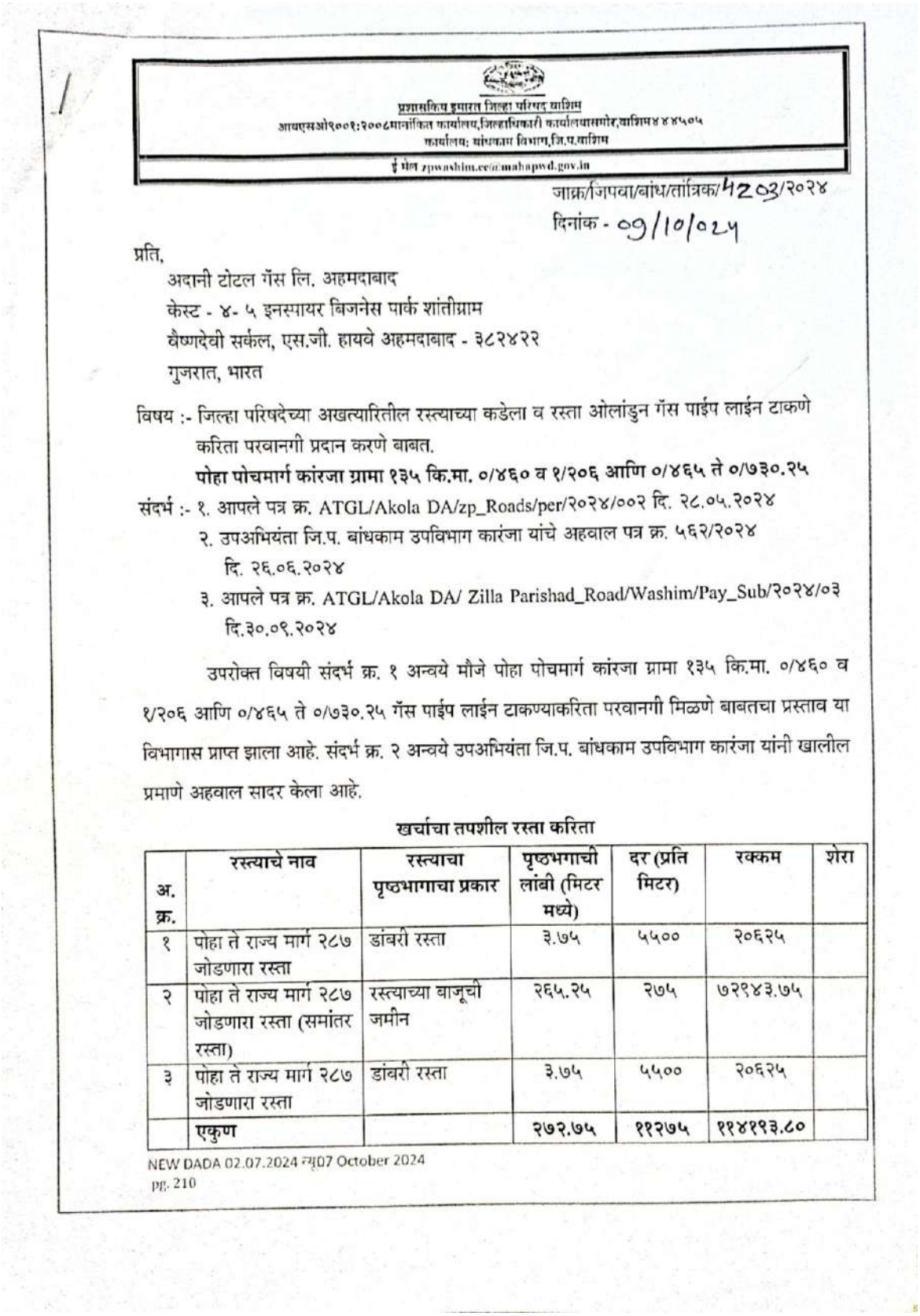
आपले माहिती करीता अग्रेषीत

सहपत्र :- निरंक

कार्यकारी अभियंता
सा.बां.विभाग, वाशिम

प्रतिलीपी :- उपविभागीय अभियंता, सा.बां.उपविभाग, कारंजा यांना माहितीस्तव अग्रेषीत. सदर गॅस पाईप लाईन टाकण्याचे काम आपल्या देखरेखी खाली नियम व अटीनुसार करुन घेण्यात यावे व काम पुर्ण झाल्याबाबतचा अहवाल या कार्यालयास विनाविलंब सादर करावा.

Annexure 4: NOC for Road Crossings from PWD Washim District



प्रशासकिय इमारत जिल्हा परिषद वाशिम
आयएसओ९००१:२००८मानांकित कार्यालय,जिल्हाधिकारी कार्यालयासमोर,वाशिम४४५५०५
कार्यालय: बांधकाम विभाग,जि.प.वाशिम
ई मेल zpwashim.ee@mahapwd.gov.in

जाक्र/जिपवा/बांध/तांत्रिक/4203/२०२४
दिनांक - 09/10/२५

प्रति,
अदानी टोटल गॅस लि. अहमदाबाद
केस्ट - ४- ५ इनस्पायर बिजनेस पार्क शांतीग्राम
वैष्णदेवी सर्कल, एस.जी. हायवे अहमदाबाद - ३८२४२२
गुजरात, भारत

विषय :- जिल्हा परिषदेच्या अखत्यारितील रस्त्याच्या कडेला व रस्ता ओलांडुन गॅस पाईप लाईन टाकणे करिता परवानगी प्रदान करणे बाबत.
पोहा पोचमार्ग कांरजा ग्रामा १३५ कि.मा. ०/४६० व १/२०६ आणि ०/४६५ ते ०/७३०.२५

संदर्भ :- १. आपले पत्र क्र. ATGL/Akola DA/zp_Roads/per/२०२४/००२ दि. २८.०५.२०२४
२. उपअभियंता जि.प. बांधकाम उपविभाग कारंजा यांचे अहवाल पत्र क्र. ५६२/२०२४ दि. २६.०६.२०२४
३. आपले पत्र क्र. ATGL/Akola DA/ Zilla Parishad_Road/Washim/Pay_Sub/२०२४/०३ दि.३०.०९.२०२४

उपरोक्त विषयी संदर्भ क्र. १ अन्वये मौजे पोहा पोचमार्ग कांरजा ग्रामा १३५ कि.मा. ०/४६० व १/२०६ आणि ०/४६५ ते ०/७३०.२५ गॅस पाईप लाईन टाकण्याकरिता परवानगी मिळणे बाबतचा प्रस्ताव या विभागास प्राप्त झाला आहे. संदर्भ क्र. २ अन्वये उपअभियंता जि.प. बांधकाम उपविभाग कारंजा यांनी खालील प्रमाणे अहवाल सादर केला आहे.

खर्चाचा तपशील रस्ता करिता

अ. क्र.	रस्त्याचे नाव	रस्त्याचा पृष्ठभागाचा प्रकार	पृष्ठभगाची लांबी (मिटर मध्ये)	दर (प्रति मिटर)	रक्कम	शेरा
१	पोहा ते राज्य मार्ग २८७ जोडणारा रस्ता	डांबरी रस्ता	३.७५	५५००	२०६२५	
२	पोहा ते राज्य मार्ग २८७ जोडणारा रस्ता (समांतर रस्ता)	रस्त्याच्या बाजूची जमीन	२६५.२५	२७५	७२९४३.७५	
३	पोहा ते राज्य मार्ग २८७ जोडणारा रस्ता	डांबरी रस्ता	३.७५	५५००	२०६२५	
	एकुण		**२७२.७५**	**११२७५**	**११४१९३.८०**	

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खर्चाचा तपशील बँक गॅरंटी करिता

रस्ता पुर्ववत करण्याकरिता २५% अतिरीक्त अनामत रक्कम	२७२.७५	२५%	२८५४८.४५
एकुण	२७२.७५	२५%	२८५४८.४५

शासन निर्णय क्र. जमिन/१०/२०००/प्र.क्र.९१/ज-१/ दि. २७.०४.२००० महसुल व वन विभाग मंत्रालय मुंबई -३२ मधील तरतुदी नुसार एकुण मुल्यांकन रू. ११४१९३.८०/- आहे. अदानी टोटल गॅस लि. अहमदाबाद या कंपनीन यांनी सदंर्भ क्र. ३ अन्वये आर.टी.जी.एस. क्र. CMS4494120782 व्दारे देय असलेली रक्कम भरणा केलेली आहे. व DBS Bank India Limited बँक शाखा अहमदाबाद रू. २,८५,४८.४५/- इतक्या रक्कमेची बँक गॅरंटी या विभागाकडे सादर केली आहे.

सबब खालील अटी व शर्तीचे अधिन राहुन जिल्हा परिषद वाशिमचे अखत्यारितील मौजे पोहा पोचमार्ग कारंजा ग्रामा १३५ कि.मा. ०/४६० व १/२०६ आणि ०/४६५ ते ०/७३०.२५ या लांबी मध्ये गॅस पाईप लाईन टाकण्या करिता परवानगी प्रदान करण्यात येत आहे.

अटी व शर्ती :

१. गॅस पाईप लाईन रस्त्याच्या सिमारेषेला लागुन टाकावी. गॅस पाईप लाईनचे खोदकामामधुन निघालेली माती व मुरुम रस्त्यावर येणार नाही व वाहतुकीस अडढळा होणार नाही तसेच रस्त्यालगतच्या नाल्या बुजणार नाही याची दक्षता अदानी टोटल गॅस लि. अहमदाबाद या कंपनीने घ्यावी. खोदकामामधुन निघालेली माती व मुरुम यांची योग्य विल्हेवाट लावावी.

२. खोदकामातील माती व मुरूमामुळे रस्ते नादुरुस्त झाल्यास तसेच खोदकामासाठी वापरण्यात आलेल्या अवजड वाहनामुळे जि.प. अखत्यारितील रस्ता / नाली नादुरुस्त झाल्यास रस्ता व नाली पुर्ववत करण्याची जबाबदारी अदानी टोटल गॅस लि. अहमदाबाद या कंपनीची राहील.

३. या संबंधित सार्वजनिक बांधकाम नियमावली परिशिष्ठ २३ व परिच्छेद ३२९ येथील सर्व तरतुदी लागु राहतील.

४. प्रत्याक्षात काम करतांना मंजुरी दिलेल्या लांबीपेक्षा जास्त रस्त्यावर पाईप लाईनचे काम केल्यास त्यासाठीचे अतिरिक्त शुल्क भरावा लागेल.

५. रस्ता क्रासींग करणेसाठी पुर्व सुचना जिल्हा परिषद बांधकाम उपविभाग कारंजा यांना देण्यात यावी.

६. काम पुर्ण करावयाचा कालावधी फक्त १ वर्षापर्यंत वैद्य राहील.

७. खोदकाम करतांना अपघात झालास त्याची संपुर्ण जबाबदारी अदानी टोटल गॅस लि. अहमदाबाद यांची राहील

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Annexure 5: NOC for SH-274 from PWD Akola

कार्यकारी अभियंता
सार्वजनिक बांधकाम विभाग अकोला
बांधकाम विभाग परिसर सर्वोपचार रुग्णालय जवळ अकोला, ४४४००१
akola.ee@mahapwd.gov.in www.mahapwd.gov.in

जावक क्र. २७०७ / चिशा /२०२५ दिनांक २५/०३/२०२५

प्रति,
प्रकल्प अधिकारी
अदानी टोटल गस लिमिटेड,अमरावती

विषय :- गस पाईप लाईन ता.बार्शिटाकली राज्यमार्ग २७४ रस्त्यास समांतर व प्रजीमा १८ रस्त्यास छेदून पाईप लाईन टाकण्याची परवानगी मिळणे बाबत.(अडाणी गस प्रकल्प)

संदर्भ —१)आपले प्रस्ताव पत्र क्र. ATGL/AKOLAGA/PWD/ROADS/PER/2024/019 Date.15/07/2024
२)उपविभागीय अभियंता सा.बा.उपविभाग मुर्तिजापूर पत्र क्र ८८९/ तां / दि.१२.०९.२०२४
३) या कार्या. पत्र क्र. ६२८८ / चीशा /२०२४ दि. १३ / ९ / २०२४
४) आपले कार्या. पत्र क्र. ATGL/Akola/GA/P.W.D.Road/Pay Sub/ /२०२५/ दि.१८/०३/२०२५

उपरोक्त पत्राच्या अनुषगाने आपण अकोला सिटी आणि सभोवतील परिसरात **गॅस** वितरण करण्याकरिता १२ इंची **गॅस** पाईप लाईन प्रजीमा १८ रस्त्यास छेदून टाकण्याची परवानगीच्या अनुषगाने उपविभागीय अभियंता सा.बा.उपविभाग मुर्तिजापूर यांनी संदर्भ क्र.२ नुसार प्राप्त अहवाल नुसार क्षेत्रीय अभियंता व संबधित प्रतिनिधी यांनी सोबत रस्त्याची प्रत्यक्ष पाहणी केली असता ठिकाणी डांबरी रस्ता (५.५मीटर) मुरमी (४ मीटर) ओलांडून (HDD BORE)द्वारे **गॅस** पाईपलाईन साठी परवानगी करीता रस्ता पूर्ववत करण्याच्या कामासाठी रु. **४३५६२/-(अक्षरी रुपये त्रेचाळीस हजार पाचशे बासष्ट फक्त)** चा भरणा करिता आपणास संदर्भीय पत्र क्र.३ अन्वये रस्ता क्रॉसिंग करण्याकरिता शासन परिपत्रक क्र.ओफसी-२१२/प्र.क्र.२०९/रस्ते-७/मंत्रालयमुंबई / दि. ७/४/२०१४ नुसार डाबरी रस्ता खोदुन पिण्याची पाईपलाईन टाकण्यासाठी शासन नियमानुसार मागणीपत्र पुरविण्यात आले आहे.

त्या अनुषगाने संदर्भ क्र. ४ नुसार आपण पत्र क्र. अन्वये डी.डी.क्र.०१७६८० रु.४३५६२/- दि.१५/३/२०२५ चा धनाकर्ष या कार्यालयास जमा केला आहे.करिता वरील रस्त्यावर गॅस पाईप लाईन टाकण्यासाठी खालील अटी व शर्तीच्या अधीन राहुन परवानगी देण्यात येत आहे.

अटी व शर्ती

१) सार्वजनिक बांधकाम उपविभाग मुर्तिजापूर येथील क्षेत्रीय अधिकारी यांचे देखरेखीखाली त्यांचे निर्देशानुसार खोदकाम करावे.
२) रस्त्यावर खोदकाम करतेवेळी रस्त्यावरील वाहतुकीस अडथळा निर्माण होवून मोक्याच्या ठिकाणी अपघात होवून प्राणहानी अगर वित्तहानी झाल्यास त्याची संपुर्ण जबाबदारी आपली राहिल.

४) प्रजीमा १८ रस्ता ओलांडून (HDD BORE) द्वारे खोदण्यात येणाऱ्या डांबरी पृष्ठभागा खाली रुंदी ०.६० मी. घ्यावी आणि ड्रेनेज पाईप लाईन डांबरी पृष्ठभागापासून १.८० मी. खोलीवर टाकण्यात यावी.

५) रस्त्याच्या पृष्ठभागाखाली गॅस पाईप लाईन टाकण्यापुर्वी त्याच्या पेक्षा मोठ्या व्यासाची जि.आय. अथवा काँक्रीट पाईप रस्त्याच्या रुंदीमध्ये टाकण्यात यावी.

६) HDD BOREद्वारे खोदलेल्या चरात पाईप व केसींग पाईप टाकल्यानंतर तो चर मोठ्या व लहान खडीने भरण्यात यावा, त्यात मातीचा वापर करु नये, तसेच चर उघडा राहणार नाही, त्याची दक्षता घ्यावी लागेल.

७) HDD BOREद्वारे खोदलेल्या चरात गॅस पाईप लाईन टाकल्यानंतर रस्ता पूर्ववत वाहतुकीस करून देण्याची संपूर्ण जबाबदारी आपली राहील.

८) रस्ता रुंदीकरण सुधारणा करतेवेळी आपणास स्वखर्चाने गॅस पाईप लाईन स्थलांतरीत करावी लागेल, गॅस पाईप लाईन स्थलांतरीत करते वेळी गॅस पाईप लाईन नादुरुस्त झाल्यास त्याची दुरुस्ती आपणास स्वखर्चाने करावी लागेल, त्याबाबत हे खाते जबाबदार राहणार नाही.

९) भविष्यात सदर ठिकाणी गॅस पाईप लाईन लिकेज झाल्यास दुरुस्ती रितसर पुन:श्च परवानगी घेवून काम करुन घ्यावे लागेल,विना परवानगीने रस्त्यावर किंवा शासकिय जागेत खोदकाम केल्यास आपण कायदेशीर कार्यवाहीस पात्र राहाल, इतर संबंधित विभागाच्या क्षेत्रातून गॅस पाईप जात असल्यास सबंधित विभागाची वेगळी परवानगी घेण्यात यावी. वृक्ष तोड तसेच खात्याच्या मालमत्तेस हानी पोहचत असल्यास पूर्व कल्पना क्षेत्रीय अधिकारी यांना देऊन रीतसर परवानगी घेण्यात यावी तदनंतर कामकाज करण्यात यावे. कृपया याची नोंद घ्यावी .

१०) सदर करारनामा १०० बॉण्ड पेपर वर करून घेण्यात यावा. तदनंतर कामास सुरुवात करण्यात यावी.

सहपत्र:- निरंक

(प्र.प्र.पाटील)
कार्यकारी अभियंता
सा.बां.विभाग,अकोला

प्रतिलिपी :- उपविभागीय अभियंता, सा.बां. उपविभाग मुर्तिजापूर यांना माहिती करीता अग्रेषित.

Annexure 6: NOC for SH-287 from PWD Akola

E:\ADM-II\OFC cable permission ltr. dt.28.12.17\HDD method Online OFC cable permission letter dt.26.06.2018.docx

महाराष्ट्र शासन
कार्यकारी अभियंता यांचे कार्यालय
सार्वजनिक बांधकाम विभाग, वाशिम

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जा.क्र. 3176 /चिशा/2025 दि. 06/05/2025

प्रति,
व्यवस्थापक,
अदानी टोटल गॅस लि.अहमदाबाद
केस्ट-4-5 इनस्पायर बिजनेस पार्क शांतीग्राम
वैष्णवदेवी सर्कल एस.जी.हायवे अहमदाबाद-
382422 गुजरात भारत

विषय :- पिंजर पोहा कारंजा मानोरा रस्ता राज्यमार्ग क्र. 287 सा.क्र.16/607 ते 17/205 (लांबी 0.598 किमी.) मध्ये रस्त्यास समांतर व सा.क्र 16/607 आणि 17/205 वर रस्ता ओलांडुन गॅस पाईप लाईन टाकण्याची परवानगी मिळणेबाबत.

संदर्भ:- 1) या कार्यालयाचे पत्र क्र.8354/चिशा/2024 दि.09/10/2024
2) आपले पत्र क्र.ATGL/Akola GA/P.W.D-Roads/Per/Washim/2025/001 दि.10/02/2025
3) सहाय्यक कार्यकारी अभियंता सा.बां.उपविभाग कारंजा यांचे पत्र क्र.270 दि.17/02/2025
4) सा.बां.विभाग मंत्रालय मुंबई शासन निर्णय क्र. संकीर्ण-2017/प्रक्र-246/रस्ते-7 दि 30.05.2017.
5) सा.बां.विभाग मंत्रालय मुंबई शासन निर्णय क्र.संकीर्ण-2016/प्र.क्र-246/भाग-1/रस्ते-7 दि12.01.2018.
6) सा.बां.विभाग मंत्रालय मुंबई शासन निर्णय क्र.ओएफसी-2023/प्र.क्र.165/रस्ते-7 दि.15.09.2023

उपरोक्त विषयास अनुसरुन संदर्भ क्र.1 अन्वये या कार्यालयाकडुन पिंजर पोहा कारंजा मानोरा रस्ता राज्यमार्ग क्र. 287 सा.क्र.14/110 ते 17/205 (लाबी 3.095 किमी.) मध्ये रस्त्याच्या उजव्या बाजुला रस्त्यास समांतर गॅस पाईप लाईन टाकणे करीता परवानगी देण्यात आली होती. परंतु संदर्भ क्र. 2 अन्वये सदर परवानगीमध्ये अंशत: बदल करून सा.क्र. 16/607 ते 17/205 या लांबीमध्ये डाव्या बाजुने तसेच सा.क्र.16/607 व 17/205 मध्ये रस्त्याच्या खालून खालील अटी व शर्तीच्या अधीन राहुन आपणास गॅस पाईप लाईन टाकण्याची परवानगी देण्यात येत आहे.

अटी व शर्ती

1) कामाल सुरुवात करण्याच्या आधी कार्यकारी अभियंता / त्याचे प्रतिनीधी यांचेशी विचार विनीमय करुन मार्गरेखा निश्चित करुन घेऊन उक्त जमिनीखालील गॅस पाईप रस्त्याच्या पातळीपासून गॅस पाईप या बाबतीत रस्त्याच्या समांतर जागेत किमान 1.20 मीटर च्या खाली तसेच जेथे रस्ता ओलांडुन जात आहे तेथे रस्त्याच्या पृष्ठभागाचे किमान 3.00 मिटर चे खाली बसविण्यात याव्यात.
2.) जेथे गॅस पाईप रस्त्याखाली आडव्या जात असतील तेथे HDD (आडवा बोर) पध्दतीने काम करण्यात यावे. तसेच दुरुस्त करण्याचे काम, अंतिमरित्या काढून टाकण्याचे काम हे वाहतुकीची सोय व सुरक्षा या विषयी योग्य ती काळजी घेऊन, रस्त्याच्या रुंदीच्या अर्ध्या भागात पार पाडण्यात येईल. रस्त्याचा अर्धा भाग वाहतुकीसाठी योग्य करण्यात आल्या शिवाय रस्त्याचा दुसरा अर्धा भाग खोदण्यात येऊ नये. दिवसा योग्य प्रकारचे कुंपन व रात्री कुंपन व लपलपनारे दिवे यांची तरतुद करुन अपघात टाळण्याकरीता आवश्यक ती सर्व

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प्रकारची खबरदारी घेण्यात यावी.

3) रस्ता / रस्त्यालगतची जागा याचा जो भाग गॅस पाईप बसविण्यासाठी किंवा काढून टाकण्यासाठी किंवा त्याच्या दुरुस्त्या करण्याकरीता खोदकाम करण्यात येईल, तो अनुज्ञप्ती धारकाच्या खर्चाने पुर्ववत करुन देण्यात येईल.

4) रस्त्याखालील/रस्त्यालगत जागा यांचा खोदावयाचा पृष्ठभाग, डांबर, सिमेंट, काँक्रीट ईत्यादी सारख्या उच्च प्रतीच्या सामुग्रीचा असेल त्याबाबतीत तो खोदण्याचे आणि पुर्ववत करुन देण्याचे काम संपूर्णत: अनुज्ञप्ती धारकाच्या खर्चाने पार पाडण्यात येईल आणि तसे न केल्यास शासनाकडून अनुज्ञप्ती धारकाच्या खर्चाने पार पाडण्यात येईल व अनुज्ञप्ती धारकास मागणी केल्यास तात्काळ त्या खर्चाच्या रक्कमेची भरपाई अनुज्ञप्ती धारक करील आणि ती न केल्यास जमिन महसुलाची थकबाकी म्हणून तो वसूल करण्यात येईल. करण्यात आलेल्या खर्चाच्या रक्कमे बाबतीत कार्यकारी अभियंता, यांनी दिलेला निर्णय अंतिम असेल. जेथे असा पृष्ठभाग वर नमुद केलेल्या उच्च प्रति व्यतीरीक्त अन्य प्रकाराचा केलेला असेल तेथे ते काम कार्यकारी अभियंता किंवा त्यांचा प्रतिनीधी यांचे संपूर्णपणे समाधान होईल अशा प्रकारे अनुज्ञप्ती धारकाकडून स्वत:च्या खर्चाने करुन घेण्यात येईल.

5) अनुज्ञप्ती धारकास हा करार अंमलात असण्याच्या मुदतीत जमिनीखालील गॅस पाईप यावर आवश्यक ती कामे करण्याच्या प्रयोजनासाठी उक्त रस्त्याच्या /रस्त्यालगतच्या जमिनीच्या जागेत प्रवेश करण्याचीच केवळ अनुज्ञप्ती असेल, त्या व्यतीरीक्त त्यास त्यामध्ये कोणताही हक्क किंवा हितसंबध असणार नाही.

6) शासन अनुज्ञपप्ती धारकाच्या मालमत्तेचे हानी पासून रक्षण करण्याची हमी देत नाही.

7) उक्त कोणत्याही गॅस पाईप मध्ये राहिलेला कोणताही दोष किंवा त्याच्या दुरुस्त्याच्या अभाव, यामुळे किंवा उक्त गॅस पाईप बसवितांना /दुरुस्ती करतांना किंवा अंतिम रित्या काढून टाकत असतांना त्याच्या कडुन / त्याच्या कर्मचाऱ्याकडून झालेला निष्काळजीपणा /हयगय किंवा गैरवर्तणूक यामुळे कोणत्याही व्यक्तीस, जी काही हानी किंवा इजा होईल त्यास संपूर्णत: अनुज्ञप्ती धारक कंपनी जबाबदार असेल आणि या बाबतीत करण्यात आलेल्या दाव्यामुळे शासनावर जे सर्व दावे /मागण्या आणि दायित्वे व खर्च यांचा भार पडेल, त्या दाखल अनुज्ञप्ती धारक कंपनी शासनाची क्षतीपूर्ती करील.

8) अनुज्ञप्ती धारक कंपनी स्वत:च्या खर्चाने उक्त गॅस पाईप यांची दुरुस्ती करुन ते चांगल्या स्थितीत ठेवील आणि गळतीमुळे किंवा अन्य प्रकारच्या कोणत्याही कारणामुळे रस्त्याच्या /रस्त्यालगतच्या जमीनीच्या पृष्ठभागाची किंवा शासनाच्या इतर मालमत्तेची जी कोणतीही हानी होईल. त्याची कार्यकारी अभियंता किंवा त्याचा प्रतिनीधी यांचे संपूर्णत: समाधान होईल अशा प्रकारे ताबडतोब दुरुस्ती करुन देईल.

9) गॅस पाईप लाईन काढून टाकणे आणि पुन्हा बसविणे आवश्यक असले, अशा प्रकारे रस्त्यामध्ये किंवा इतर जमिनीमध्ये कोणतेही फेरफार करण्याची आवश्यकता आहे असे कोणत्याही वेळी आढळून आल्यास, अशा प्रकारे ते काढून टाकण्याच्या आणि पुन्हा बसविण्याचा खर्च अनुज्ञप्ती धारक कंपनीला सोसावा लागेल.

10) अनुज्ञप्ती धारक कंपनीने या करारातील कोणत्याही अटीचे पालन न केल्यास, कार्यकारी अभियंत्याला हा करार रद्द करण्याचा आणि आवश्यक वाटल्यास उक्त गॅस पाईप एक महिन्याच्या नोटीशीची मुदत संपल्यानंतर काढून टाकण्याची मोकळीक असेल आणि कार्यकारी अभियंता यांचेव्दारा करण्यात आलेल्या खर्चास अनुज्ञप्ती धारक कंपनी जबाबदार असेल.

11) शासनाला तशा अर्थाची नोटीस देऊन, हा करार समाप्त करण्याची मोकळीक असे व त्या बाबतीत करार समाप्त करण्यात आल्यामुळे अनुज्ञप्ती धारकाला कोणतीही भरपाई मिळण्याचा हक्क असणार नाही.

12) कार्यकारी अभियंता यांची लेखी परवानगी घेतल्याशिवाय अनुज्ञप्ती धारकास गॅस पाईप बसविण्याचे काम किंवा त्यानंतरचे इतर कोणतेही काम सुरु करता येणार नाही.

13) अनुज्ञप्ती धारक कंपनी गॅस पाईप बसविण्याचे काम कार्यकारी अभियंता किंवा त्यांचा प्रतिनीधी यांचे समाधान होईल अशा प्रकारे वरील पैकी कोणत्याही अटीचे पालन करण्यात आलेले नाही असे कार्यकारी अभियंता यांचे मत झाल्यास संपूर्ण अनामत रक्कम किंवा तिचा काही भाग सरकार जमा करण्यात येईल.

14) खोदकाम चालु असतांना रस्त्याच्या कडेची झाडे तोडणे अनिवार्य असल्यास अनुज्ञप्तीधारक कंपनीने संबंधीत सक्षम प्राधिकरणाची परवानगी मिळवावी. तसेच पर्यावरणाचा समतोल राखण्यासाठी मुख्य अभियंता यांनी ठरवून दिलेले वृक्ष लागवड व रक्षणाचे उद्दीष्ट साध्य करावे.

15) विषयांकित रस्त्याच्या मध्यापासून 12.00 मीटर अंतरावर किंवा जेथे प्रत्यक्ष रस्त्यांची शासकीय हद्द अस्थित्वात आहे त्या ठिकाणी रस्त्याचे हद्दीलगत रस्ता हद्दीला खेटून टाकून काम करण्यात यावे

16) गॅस पाईप टाकतांना अस्थित्वातील इतर कोणत्याही केबल अथवा जलवाहीनीस अथवा विद्युत वाहीनीस किंवा गॅस वाहीनीस इजा पोहचता कामा नये. इजा झाल्यास त्याची संपूर्ण भरपाई अनुज्ञप्ती धारक कंपनी यांना भरावी लागेल व होणा-या नुकसानास हे खाते जबाबदार राहणार नाही.

17) या करारानुसार अनुज्ञप्ती धारक कंपनीकडून देय असलेल्या रक्कमेचा काही भागाची थकबाकी राहीली असेल तर ती शासनाला ज्या इतर कोणत्याही उपाय योजना करण्याची मोकळीक असेल त्यास बाधा न आणता, जमिन महसुलाची थकबाकी म्हणून वसूल करता येईल.

18) हा करार तयार करणे त्याचे मुद्रांकन आणि निष्पादन करणे यासंबधीचा खर्च अनुज्ञप्ती धारक करील.

19) या कराराच्या बाबतीत कार्यकारी अभियंता व अनुज्ञप्ती धारक कंपनी यांचे मध्ये मतभिन्नता निर्माण झाल्यास, त्याबाबत मुख्य अभियंता, यांचेकडे निर्देश करण्यात येईल आणि त्या बाबतीतील त्यांचा निर्णय अंतिम व अनुज्ञप्ती धारकास बंधनकारक राहील.

20) अनुज्ञप्ती धारकाला द्यावयाची किंवा त्यांच्यावर बजावण्यात यावयाची कोणतीही नोटीस किंवा अन्य कागदपत्रे शासनाच्या वतीने कार्यकारी अभियंताव्दारे देता येतील किंवा बजावता येतील आणि अशी कोणतीही नोटीस किंवा कागदपत्रे अनुज्ञप्ती धारकाच्या ज्ञात असलेल्या शेवटच्या पत्त्यावर बजावण्यात आली असतील किंवा पत्त्यावर नोंदणीकृत डाकेने पाठविण्यात आलेली असतील तर ती त्यास रितसर देण्यात आलेली आहे किंवा त्याच्यावर ती रितसर बजावण्यात आलेली आहे असे मानण्यात येईल.

वरीलअटी व शर्तीचे उल्लंघन झाल्यास, आपली परवानगी रद्द समजण्यात येईल, याची कृपया नोंद घ्यावी.

आपले माहिती करीता अग्रेषीत

सहपत्र :- निरंक

कार्यकारी अभियंता
सा.बां.विभाग, वाशिम

प्रतिलीपी :- सहायक कार्यकारी अभियंता, सा.बां.उपविभाग, कारंजा यांना माहितीस्तव अग्रेषीत. सदर गॅस पाईप लाईन टाकण्याचे काम आपल्या देखरेखी खाली नियम व अटीनुसार करुन घेण्यात यावे व काम पुर्ण झाल्याबाबतचा अहवाल या कार्यालयास विनाविलंब सादर करावा.

Annexure 7: NOC for SH-274 and SH-287 from PWD Akola

कार्यकारी अभियंता
सार्वजनिक बांधकाम विभाग अकोला
बांधकाम विभाग परिसर सर्वोपचार रुग्णालय जवळ अकोला, ४४४००१
akola.ee@mahapwd.gov.in www.mahapwd.gov.in

जावक क्र. ६५५७ / चिशा /२०२४ दिनांक २९/९/२०२४

प्रति,
प्रकल्प अधिकारी
अदानी टोटल गॅस लिमिटेड,अमरावती

विषय :- गॅस पाईप लाईन ता.बार्शिटाकली राज्यमार्ग २७४ व राज्यमार्ग २८७ रस्त्यास क्रॉसिंग व समांतर पाईप लाईन टाकण्याची परवानगी मिळणे बाबत.(अडाणी गॅस प्रकल्प)

संदर्भ – १)आपले प्रस्ताव पत्र क्र.ATGL/AKOLAGA/PWD/ROADS/PER/2024/004Date.28/05/2024
२) उपविभागीय अभियंता सा.बा.उपविभाग मुर्तिजापूर पत्र क्र ६२१/ तां /दि.२७.०६.२०२४
३) या कार्या. पत्र क्र. ४४९३ / चीशा /२०२४ दि. २७ / ६ / २०२४
४) आपले कार्या. पत्र क्र. ATGL/Akola/GA/P.W.D.Road/Pay Sub/ /२०२४/ दि.१७/०९/२०२४

उपरोक्त पत्राच्या अनुषगाने आपण अकोला सिटी आणि सभोवतील परिसरात गॅस वितरण करण्याकरिता १२ इंची गॅस पाईप लाईन राज्यमार्ग २७४ व राज्यमार्ग २८७ रस्त्यास क्रॉसिंग व समांतर टाकण्याची परवानगीच्या अनुषगाने उपविभागीय अभियंता सा.बा.उपविभाग मुर्तिजापूर यांनी संदर्भ क्र.२ नुसार प्राप्त अहवाल नुसार क्षेत्रीय अभियंता व संबधित प्रतिनिधी यांनी सोबत रस्त्याची प्रत्यक्ष पाहणी केली असता रामा २७४ रस्त्याच्या बार्शिटाकली वरून पिंजर कडे जाताना डाव्या बाजुस किमी ११२/६०० ते ३१/४४१ (२०१८१मीटर)समांतर आणि ओलांडून राज्यमार्ग २८७ रस्त्यास पिंजर वरून कारंजा कडे जाताना उजव्या बाजूस समांतर किमी ०/०० ते १/५५७ नंतर ओलांडून डाव्या बाजुस १/५५७ ते ३/५०४(१९४७मीटर) समांतर नंतर ओलांडून ३/५०४ते १४/५५० (११०४६ मीटर) पर्यंत समांतर उजव्या बाजूस गॅस पाईप लाईन टाकत आहेत. त्यानुसार सदर राज्य मार्गास या विभागाच्या क्षेत्रांतर्गत येणाऱ्या ३४३७१ मीटर लांबीत समांतर आणि ३ ठिकाणी तसेच प्रजीमा २० व प्रजीमा २८ असे एकूण ५ ठिकाणी डांबरी रस्ता (३९ मीटर) मुरमी (२० मीटर) मातीकाम (५६मीटर) ओलांडून (HDD BORE)द्वारे गॅस पाईपलाईन साठी परवानगी करीता रस्ता पूर्ववत करण्याच्या कामासाठी रु. **१,२१,३१,१५६/- (अक्षरी रुपये एक करोड एकवीस लक्ष ऐकतीस हजार एकशे छप्पन फक्त)** चा भरणा करिता आपणास संदर्भीय पत्र क्र.३ अन्वये रस्ता क्रॉसिंग करण्याकरिता शासन परिपत्रक क्र.ओफसी-२१२/ प्र.क्र.२०९ / रस्ते - ७/मंत्रालय मुंबई / दि. ७/४/२०१४ नुसार डाबरी रस्ता खोदुन पिण्याची पाईपलाईन टाकण्यासाठी शासन नियमानुसार मागणीपत्र पुरविण्यात आले आहे.

त्या अनुषगाने संदर्भ क्र. ४ नुसार आपण पत्र क्र.ATGL/Akola/GA/P.W.D.Road/Pay Sub/ /२०२४/ दि.१७/०९/२०२४ अन्वये डी.डी.क्र.०१७५२४ रु. १,२१,३१,१५६ /-दि.१२/९/२०२४ चा धनाकर्ष या कार्यालयास जमा केला आहे.करिता वरील रस्त्यावर गॅस पाईप लाईन टाकण्यासाठी खालील अटी व शर्तीच्या अधीन राहुन परवानगी देण्यात येत आहे.

अटी व शर्ती

१) सार्वजनिक बांधकाम उपविभाग मुर्तिजापूर येथील क्षेत्रीय अधिकारी यांचे देखरेखीखाली त्यांचे निर्देशानुसार खोदकाम करावे.

२) रस्त्यावर खोदकाम करतेवेळी रस्त्यावरील वाहतुकीस अडथळा निर्माण होवून मोक्याच्या ठिकाणी अपघात होवून प्राणहानी अगर वित्तहानी झाल्यास त्याची संपुर्ण जबाबदारी आपली राहिल.

३) सदर पाईपलाईन रस्त्याच्या मध्यापासून १२.०० मीटर (R.O.W) अंतरावर ड्रेनेजच्या पलीकडे टाकण्यात यावी तसेच रस्त्यावर खोदकाम करतेवेळी दिवसा लाल झेंड्या व रात्रीचे वेळी लाल कंदिल लावण्यात यावे.

४) रस्ता ओलांडून (HDD BORE)द्वारे खोदण्यात येणाऱ्या डांबरी पृष्ठभागाची रुंदी ०.६० मी. घ्यावी आणि ड्रेनेज पाईप लाईन डांबरी पृष्ठभागापासून १.८० मी. खोलीवर टाकण्यात यावी. रस्त्याच्या पृष्ठभागाखाली गॅस पाईप लाईन टाकण्यापुर्वी त्याच्या पेक्षा मोठ्या व्यासाची जि.आय. अथवा काँक्रीट पाईप रस्त्याच्या रुंदीमध्ये टाकण्यात यावा.

५) रस्त्याच्या पृष्ठभागाखाली गॅस पाईप लाईन टाकण्यापुर्वी त्याच्या पेक्षा मोठ्या व्यासाची जि.आय. अथवा काँक्रीट पाईप रस्त्याच्या रुंदीमध्ये टाकण्यात यावी.

६) खोदलेल्या चरात पाईप व केसींग पाईप टाकल्यानंतर तो चर मोठ्या व लहान खडीने भरण्यात यावा, त्यात मातीचा वापर करु नये, तसेच चर उघडा राहणार नाही, त्याची दक्षता घ्यावी लागेल.

७) खोदलेल्या चरात गॅस पाईप लाईन टाकल्यानंतर रस्ता पूर्ववत वाहतुकीस करून देण्याची संपूर्ण जबाबदारी आपली राहील.

८) रस्ता रुंदीकरण सुधारणा करतेवेळी आपणास स्वखर्चाने गॅस पाईप लाईन स्थलांतरीत करावी लागेल, गॅस पाईप लाईन स्थलांतरीत करते वेळी गॅस पाईप लाईन नादुरुस्त झाल्यास त्याची दुरुस्ती आपणास स्वखर्चाने करावी लागेल, त्याबाबत हे खाते जबाबदार राहणार नाही.

९) भविष्यात सदर ठिकाणी गॅस पाईप लाईन लिकेज झाल्यास दुरुस्ती रितसर पुन:श्च परवानगी घेवून काम करुन घ्यावे लागेल,विना परवानगीने रस्त्यावर किंवा शासकिय जागेत खोदकाम केल्यास आपण कायदेशीर कार्यवाहीस पात्र राहाल, कृपया याची नोंद घ्यावी.

१०) सदर करारनामा १०० बॉण्ड पेपर वर करून घेण्यात यावा. तदनंतर कामास सुरुवात करण्यात यावी.

सहपत्र:- निरंक

(प्र.रा.सरनाईक)
कार्यकारी अभियंता
सा.बां.विभाग,अकोला

प्रतिलिपी :- उपविभागीय अभियंता, सा.बां. उपविभाग मुर्तिजापूर यांना माहिती करीता अग्रेषित.

त्या अनुषगाने संदर्भ क्र. ४ नुसार आपण पत्र क्र.ATGL/Akola/GA/P.W.D.Road/Pay Sub/ /२०२४/ दि.१७/०९/२०२४ अन्वये डी.डी.क्र.०१७५२४ रु. १,२१,३१,१५६ /-दि.१२/९/२०२४ चा धनाकर्ष या कार्यालयास जमा केला आहे.करिता वरील रस्त्यावर गॅस पाईप लाईन टाकण्यासाठी खालील अटी व शर्तीच्या अधीन राहुन परवानगी देण्यात येत आहे.

अटी व शर्ती

१) सार्वजनिक बांधकाम उपविभाग मुर्तिजापूर येथील क्षेत्रीय अधिकारी यांचे देखरेखीखाली त्यांचे निर्देशानुसार खोदकाम करावे.

२) रस्त्यावर खोदकाम करतेवेळी रस्त्यावरील वाहतुकीस अडथळा निर्माण होवून मोक्याच्या ठिकाणी अपघात होवून प्राणहानी अगर वित्तहानी झाल्यास त्याची संपुर्ण जबाबदारी आपली राहिल.

३) सदर पाईपलाईन रस्त्याच्या मध्यापासून १२.०० मीटर (R.O.W) अंतरावर ड्रेनेजच्या पलीकडे टाकण्यात यावी तसेच रस्त्यावर खोदकाम करतेवेळी दिवसा लाल झेंड्या व रात्रीचे वेळी लाल कंदिल लावण्यात यावे.

४) रस्ता ओलांडून (HDD BORE)द्वारे खोदण्यात येणाऱ्या डांबरी पृष्ठभागाची रुंदी ०.६० मी. घ्यावी आणि गॅस पाईप लाईन डांबरी पृष्ठभागापासून १.८० मी. खोलीवर टाकण्यात यावी. रस्त्याच्या पृष्ठभागाखाली गॅस पाईप लाईन टाकण्यापुर्वी त्याच्या पेक्षा मोठ्या व्यासाची जि.आय. अथवा काँक्रीट पाईप रस्त्याच्या रुंदीमध्ये टाकण्यात यावा.

५) रस्त्याच्या पृष्ठभागाखाली गॅस पाईप लाईन टाकण्यापुर्वी त्याच्या पेक्षा मोठ्या व्यासाची जि.आय. अथवा काँक्रीट पाईप रस्त्याच्या रुंदीमध्ये टाकण्यात यावी.

६) खोदलेल्या चरात पाईप व केसींग पाईप टाकल्यानंतर तो चर मोठ्या व लहान खडीने भरण्यात यावा, त्यात मातीचा वापर करु नये, तसेच चर उघडा राहणार नाही, त्याची दक्षता घ्यावी लागेल.

७) खोदलेल्या चरात गॅस पाईप लाईन टाकल्यानंतर रस्ता पूर्ववत वाहतुकीस करून देण्याची संपूर्ण जबाबदारी आपली राहील.

८) रस्ता रुंदीकरण सुधारणा करतेवेळी आपणास स्वखर्चाने गॅस पाईप लाईन स्थलांतरीत करावी लागेल, गॅस पाईप लाईन स्थलांतरीत करते वेळी गॅस पाईप लाईन नादुरुस्त झाल्यास त्याची दुरुस्ती आपणास स्वखर्चाने करावी लागेल, त्याबाबत हे खाते जबाबदार राहणार नाही.

९) भविष्यात सदर ठिकाणी गॅस पाईप लाईन लिकेज झाल्यास दुरुस्ती रितसर पुनःश्च परवानगी घेवून काम करुन घ्यावे लागेल,विना परवानगीने रस्त्यावर किंवा शासकिय जागेत खोदकाम केल्यास आपण कायदेशीर कार्यवाहीस पात्र राहाल, कृपया याची नोंद घ्यावी.

१०) सदर करारनामा १०० बॉण्ड पेपर वर करून घेण्यात यावा. तदनंतर कामास सुरुवात करण्यात यावी.

सहपत्र:- निरंक

(प्र.रा.सरनाईक)
कार्यकारी अभियंता
सा.बां.विभाग,अकोला

प्रतिलिपी :- उपविभागीय अभियंता, सा.बां. उपविभाग मुर्तिजापूर यांना माहिती करीता अग्रेषित.

Annexure 8: NOC for Road Crossings from PWD Akola District

जा.क्र./जि.प./बांधवि/ २२९९ /२०२५
कार्यालय : बांधकाम विभाग जि.प.अकोला
दिनांक : ०५ /०५/२०२५

प्रति,

व्यवस्थापक,
अदानी टोटल गॅस लि. अहमदाबाद
केस्ट 4-5 इनस्पायर बिजनेस पार्क शांतीग्राम
वैष्णवदेवी सर्कल, एस.जी.हायवे अहमदाबाद-382422
गुजरात , भारत.

विषय : Akola Connectivity (IP-5 Poha Village to Akola Bus Depot) : Requestfor granting permission for laying 12" dia steel pipeline to set up a Gas Distribution Network in Akola City and surrounding area in District Akola – **Pipeline laying across to various Asphalted Roads along the pipeline route in Akola District.**

संदर्भ :- १) Sr. Manager Projects Adani Total gas Limited यांचे पत्र जा. क्र. /ATGL/ AkolaGA /ZP_Roads /Per/2024/006 दि. 28/05/2024
२) या कार्यालयाचे पु.पत्र जा.क्र.२४३६ दिनांक ६.६.२०२४
३) उप अभियंता जि.प.बांधकाम उप विभाग मुर्तीजापुर यांचे पत्र जा.क्र.५०५ दि.१४.८.२०२४
४) या कार्यालयाचे पत्र जा.क्र.४२८० दिनांक ०६.०९.२०२४
५) उप अभियंता जि.प.बांधकाम उप विभाग मुर्तीजापुर यांचे पत्र जा.क्र.७१५ दि.१८.१०.२०२४
६) Sr. Manager Projects Adani Total gas Limited यांचे पत्र जा. क्र. /ATGL/ AkolaGA /ZP_Roads /Revised Demand/Request /2025 दि. 10.01.2025
७) उप अभियंता जि.प.बांधकाम उप विभाग मुर्तीजापुर यांचे पत्र जा.क्र.४५ दि.१६.०१.२०२५
८) या कार्यालयाचे पत्र जा.क्र.६२४ /२०२५ दिनांक ०३.०२.२०२५
९) आपले पत्र जा.क्र. /ATGL/Akola-GA /ZP_Road/Akola/Pay-Sub/2025/006 दि. 08/04/2025
१०) शासन परिपत्रक क्र.ओएफसी-२०१२/प्र.क्र.२०९/रस्ते-७ दिनांक ०७.०४.२०१४
११) शासन निर्णय क्र.ओएफसी-२०२३/प्र.क्र.१६५/रस्ते-७ दिनांक १५ सप्टेंबर २०२३

उपरोक्त संदर्भीय विषयास अनुसरुन संदर्भीय पत्र क्र. १ व ५ नुसार जि.प. बांधकाम उपविभाग मुर्तीजापुर यांच्या कार्यक्षेत्रातील रस्ते क्रॉसिंग करुन भूमिगत गॅस पाईप लाईन टाकण्याबाबत परवानगी देण्याबाबत संदर्भीय पत्र या विभागास प्राप्त झाले होते.तथा संदर्भीय पत्र क्र.६ नुसार सदर रसत्याचा सुधारीत प्रस्ताव सादर करण्याबाबत पत्र प्राप्त झाले आहे

सदर प्रस्तावास उप विभागाच्या अहवालानुसार या कार्यालयाचे पत्र क्र.८ नुसार डिमांड नोट नुसार आपले संदर्भीय पत्र क्र.९ नुसार **रुपये १,८०,५७९/-** (अक्षरी रुपये एक लक्ष ऐशी हजार पाचशे ऐकोनऐशी फक्त) रक्कमेचा चा भरणा धनाकर्ष क्र.०१७६९१ दिनांक २६.०३.२०२५ रु.१,८०,५७९/- द्वारे भरणा केला आहे.तसेच रस्ता पुर्वव्रत करण्याकरीता २५ % अतिरीक्त अमानत रक्कम (बँक गॅरंटी) **क्र.0024NDLG00471325 Date 28.03.2025 रु.४५,१४५/-** सादर केली आहे.

अ. क्र.	रस्त्याचे नाव	रस्त्याचा पृष्ठभागाचा प्रकार	पृष्ठभागाची लांबी (मीटरमध्ये)	दर (प्रती मीटर)	रक्कम	शेरा
1	मोऱ्हळ लोहारा शेत रस्ता ग्रा.मा. 36	डांबरी रस्ता				
		खडीचा रस्ता	3.00	2760	8280	
		मुरूम साईड पट्टया	2x1.20	1150	2760	
		रस्त्याच्या बाजूची जमीन	2x1.80	275	990	
		एकूण			**12030**	
2	चीचखेड पोहोच रस्ता ग्रा.मा. 34	डांबरी रस्ता	3.00	5500	16500	
		खडीचा रस्ता				
		मुरूम साईड पट्टया	2x1.20	1150	2760	
		रस्त्याच्या बाजूची जमीन	2x1.80	275	990	
		एकूण			**20250**	

3	कासारखेड पोहोच रस्ता ग्रा.मा. 64	डांबरी रस्ता	3.00	5500	16500	
		खडीचा रस्ता				
		मुरूम साईड पट्टया	2x1.20	1150	2760	
		रस्त्याच्या बाजूची जमीन	2x1.80	275	990	
		एकूण			**20250**	
4	घोटा पाराभवानी निहीदा जमकेश्वर पिंपळगाव हांडे इ.जि.मा. 59	डांबरी रस्ता	3.75	5500	20625	
		खडीचा रस्ता				
		मुरूम साईड पट्टया	2x1.20	1150	2760	
		रस्त्याच्या बाजूची जमीन	2x3.25	275	1788	
		एकूण			**25173**	
5	पाडी मोझरी बु वडगाव पिजर बहिरखेड निहीदा इ.जि.मा. ३३	डांबरी रस्ता	3.75	5500	20625	
		खडीचा रस्ता				
		मुरूम साईड पट्टया	2x1.20	1150	2760	
		रस्त्याच्या बाजूची जमीन	2x3.25	275	1788	
		एकूण			**25173**	
6	दोनद निंबी रस्ता ग्रा.मा. 134	डांबरी रस्ता	3.00	5500	16500	
		खडीचा रस्ता				
		मुरूम साईड पट्टया	2x1.20	1150	2760	
		रस्त्याच्या बाजूची जमीन	2x1.80	275	990	
		एकूण			**20250**	
7	अजनी खु. पोहोच रस्ता ते राज्य मार्ग 199 ला जोडणारा रस्ता ग्रा.मा. 54	डांबरी रस्ता	3.00	5500	16500	
		खडीचा रस्ता				
		मुरूम साईड पट्टया	2x1.20	1150	2760	
		रस्त्याच्या बाजूची जमीन	2x1.80	275	990	
		एकूण			**20250**	
8	भरतपूर पोहोच रस्ता ग्रा.मा. 30	डांबरी रस्ता				
		खडीचा रस्ता	3.00	2760	8280	
		मुरूम साईड पट्टया	2x1.20	1150	2760	
		रस्त्याच्या बाजूची जमीन	2x1.80	275	990	
		एकूण			**12030**	
			अ.क्र.१ ते ८	**एकूण शुल्क**	**1,55,406/-**	

9	निंबी बु खेर्डा बु भेंडी महाल ते जनुना रस्ता इ.जि.मा. 35	डांबरी रस्ता	3.75	5500	20625	
		खडीचा रस्ता				
		मुरूम साईड पट्टया	2x1.20	1150	2760	
		रस्त्याच्या बाजूची जमीन	2x3.25	275	1788	
		एकूण			**25,173**	
			अ.क्र.१ ते ९	**एकूण शुल्क**	**1,80,579/-**	

उपविभागाने सादर केलेल्या अहवालानुसार, त्याच प्रमाणे शासनाने वेळोवेळी निर्गमित केलेल्या शासन परिपत्रक, संदर्भीय शासन निर्णय तसेच खालील अटीच्या अधिन राहुन आपणास वरील मार्गावर जि.प. बांधकाम उपविभाग मुर्तीजापुर यांच्या कार्यक्षेत्रातील त्याच्या देखरेखीखाली रस्ते क्रॉसिंग करुन भूमिगत गॅस पाईप लाईन टाकण्याबाबत परवानगी परवानगी देण्यात येत आहे.

सदर काम करण्याकरीता खालील अटीचे पालन करणे बंधनकारक राहील.

अटी व शर्ती :-

1) सदर पाईप लाईन हि रस्त्याच्या पृष्ठभागाच्या 0.60 मी. पेक्षा जास्त (जमिनीच्या आत) खाली असावी.
2) रस्त्या खाली पाईपलाईन टाकण्यापुर्वी त्यापेक्षा मोठ्या व्यासाचा कॉंक्रीट अगर आवश्यक वाटल्यास स्टील इन केसिंग पाईप टाकावा.
3) खोदलेल्या चरात पाईप व इन केसिंग पाईप टाकल्यानंतर तो चर मोठ्या अगर लहान खडीनेच भरण्यात यावा व त्यात माती वापरण्यात येऊ नये.
4) रस्त्या खाली पाईपलाईन टाकतांना व टाकण्यापुर्वी सुरक्षात्मकरीत्या आवश्यक काम उपाययोजना करण्यात याव्या.
5) खोदकामातून निघालेली माती मुरुम इत्यादी रस्त्यावर येणार नाही व वाहतुकीस अडथळा होणार नाही तसेच रस्त्याच्या लगतच्या नाल्या बुजणार नाही याची अदानी टोटल गॅस लिमीटेड कंपनी यांनी दक्षता घ्यावी. खोदकामातून निघालेल्या माती / मुरुमाची योग्य विल्हेवाट लावावी.
6) खोदकामातील माती / मुरुमामुळे रस्ते नादुरुस्त झाल्यास तसेच खोदकामासाठी वापरण्यात आलेल्या अवजड वाहनामुळे जि.प. अखत्यारीतील रस्ते व नाली नादुरुस्त झाल्यास सदर रस्ता व नाली पूर्ववत करण्याची जबाबदारी अदानी टोटल गॅस लिमीटेड कंपनी यांची राहील.
7) या सबंधी शासन परिपत्रक क्र. ओएफसी - 2012/प्र.क्र.209/रस्ते-07 मंत्रालय मुंबई 4000032 दिनांक 7/4/2014 मध्ये नमूद सार्वजनिक बांधकाम नियमावलीतील परिशिष्ट 23 व परिच्छेद 329 येथील सर्व तरतुदी लागु राहतील.
8) प्रत्यक्षात काम करतांना मंजुरी दिलेल्या लांबीपेक्षा जास्त रस्त्यावर पाईप लाईनचे काम केल्यास त्यासाठीचे अतिरिक्त शुल्क भरावे लागेल.
9) रस्त्याच्या दुतर्फा असलेली मोठी झाडे तुटणार नाहीत याची दक्षता घेण्यात यावी झाडे तोडल्याचे आढळुन आल्यास दंडात्मक कार्यवाही करण्यात येईल तसेच तोडलेल्या झाडाच्या प्रमाणात नव्याने वृक्ष लागवड करावी
10) रस्ता क्रॉसिंग काम करण्याची पुर्वसुचना जिल्हा परिषद बांधकाम उपविभाग मुर्तीजापुर यांना देण्यात यावी.
11) खोदकाम करतांना अपघात झाल्यास त्याची संपुर्ण जबाबदारी अदानी टोटल गॅस लिमीटेड कंपनी यांची राहील.
12) भरणा करण्यात आलेले शुल्क हे नापरतावा राहील.
13) काम करत असतांना रस्त्याच्या मध्य-पृष्ठभागापासुन ७ मीटर अंतराच्या आतमध्ये पाईप लाईन टाकायची असल्यास जिल्हा परिषदेची पुर्व परवानगी घेणे आवश्यक राहील.
14) भविष्यात सदर ठिकाणी पाईप लाईन लिकेज झाल्यास दुरुस्ती रितसर पुन:श्च परवानगी घेऊन करुन घ्यावी लागेल. विना परवानगी रस्त्यावर किंवा शासकीय जागेवर खोदकाम केल्यास आपण कायदेशीर कार्यवाहीस पात्र राहाल, याची नोंद घ्यावी.
15) अभिकर्ता कंपनी आणि संबंधित कार्यकारी अभियंता यांच्या मध्ये पाईप लाईन टाकतांना कोणत्याही प्रकारची तक्रार किंवा वाद निर्माण झाल्यास त्याचे निवारण करण्यासाठी संबंधीत मुख्य अभियंता हे सक्षम असतील व त्यांनी दिलेला निर्णय हा अंतिम असेल व दोघांनाही बंधनकारक असेल
16) महाराष्ट्र सरकार व केंद्रीय जल भुतल परिवहन मंत्रालयाने भविष्यात नविन नियम, अटी / शर्ती प्रस्तृत केल्यास त्या अनुज्ञप्ती धारक कंपनीस बंधनकारक राहतील.
17) रस्ता रुंदीकरणाच्या वेळी रुंदीकरणाच्या वाढीव हद्दीपलीकडे, बांधकाम विभागाने दिलेल्या सुचनाप्रमाणे कंपनीस पाईप लाईन स्वखर्चाने हलवावी लागेल. या करीता बांधकाम विभागाकडुन आगाऊ 30 दिवसाची नोटीस दिली जाईल. नोटीस दिल्यानंतर 30 दिवसाच्या आत ही पाईप लाईन काढुन न टाकल्यास बांधकाम विभागाकडुन पाईप लाईन काढुन टाकण्यात येईल अथवा रस्ता रुंदीकरणाचे काम सुरु करण्यात येईल. प्रवर्तकास नविन पाईप लाईन रस्त्याच्या वाढीव हद्दीपलीकडे बांधकाम विभागाच्या पुर्व परवानगीने स्वखर्चाने टाकावी लागेल.

18) पाईप लाईन टाकतांना अस्तीत्वातील इतर कोणत्याही केबल अथवा जलवाहनीस अथवा विद्युत वाहनीस किंवा गॅस वाहनीस इजा पोहचता कामा नये. इजा झाल्यास त्याची संपुर्ण भरपाई अदानी टोटल गॅस लिमीटेड कंपनी यांना भरावी लागेल व होणाऱ्या नुकसानास हे खाते जबाबदार राहणार नाही.

19) रस्त्याखालून पाईप लाईन टाकण्याचे कामास सुरुवात करण्यापुर्वी कामाच्या ठिकाणापासून दोन्ही दिशेला 100 मीटर अंतरावर सुवधानतेच्या इशाऱ्याचे फलक रिफ्लेक्टीव स्ट्रीपचा वापर करुन लावण्यात यावेत. तसेच रात्रीच्या वेळी काम सुरुअथवा अपुर्ण राहिल्यास माहितीगार तंत्रज्ञानासह रात्रभर तेवत राहणारा लाल प्रकाशझोताचा दिवा लावण्याची वा तत्सम व्यवस्था अदानी टोटल गॅस लिमीटेड कंपनी यांनी करावी.

20) अदानी टोटल गॅस लिमीटेड कंपनी यांच्या मालमत्तेचे हानी पासुन संरक्षण करण्याची हमी शासन देत नाही.

21) सदर रस्त्याच्या लांबीमध्ये शेतकरी, संस्था व इतर खाजगी कंपनी अथवा इतर खात्याची व इतर कोणाच्या ही हक्कांची जमिन येत असल्यास पाईप लाईन टाकणे करीता त्यांची स्वतंत्र परवानगी घेणे आवश्यक आहे व त्यांच्या सहमतीने पाईप लाईन टाकण्याचे काम करण्यात यावे. अन्यथा काही तक्रारी उद्भवल्यास सा.बां. खाते जबाबदार राहणार नाही.

22) सदर पाईप लाईन प्रकरणीचे प्रस्तावांतर्गत संबंधीतानी पुरविलेले कागदपत्रे खोटे अगर दिशाभुल करणारी आढळून आल्यास देण्यात येणारी परवानगी तात्काळ रद्द करण्यात येईल.

23) वनक्षेत्रातुन रस्ता जात असल्यास पाईप लाईन खोदाईसाठी वनविभागाची स्वतंत्रपणे परवानगी घेणे बंधनकारक राहील.

24) रेल्वे विभागाच्या कार्यक्षेत्रातुन रस्ता जात असल्यास पाईप लाईन खोदाईसाठी रेल्वे विभागाची स्वतंत्रपणे परवानगी घेणे बंधनकारक राहील.

25) सदर परवानगी हि फक्त एकच पाईप लाईन टाकणे करीता मर्यादित राहील,तसेच वरील मार्गाकरिता परवानगी असुन इतर मार्गाकरिता वेगळ्याने प्रस्ताव सादर करावा.

26) वरील शर्ती व अटीचे नियमांचे उलंघन झाल्यास देण्यात आलेली परवानगी रद्द करण्याचे अधिकार कार्यकारी अभियंता बांधकाम विभाग जि.प.अकोला यांना राहील.

कार्यकारी अभियंता
जि.प.बांधकाम विभाग अकोला.

प्रतिलिपी :- १) मा.अधिक्षकअभियंता सार्वजनिक बांधकाम मंडळ अकोला यांना माहिती करीता सविनय सादर
२) मा. मुख्य कार्यकारी अधिकारी, जि.प.अकोला यांना माहितीस्तव सविनय सादर.
३) मा.अति.मुख्य कार्यकारी अधिकारी, जि.प.अकोला यांना माहितीस्तव सविनय सादर.
४) उपविभागीय अभियंता,जि.प.बांधकाम उपविभाग,मुर्तीजापुर यांना माहिती व योग्य कार्यवाही करीता रवाना

कार्यकारी अभियंता
जि.प.बांधकाम विभाग अकोला.

Annexure 9: NOC from the Gram Panchayat Poha

ग्रामपंचायत पोहा

ता. कारंजा,जि. वाशिम

सरपंच	सचिव	उपसरपंच
सौ. शितल मंगेश मसने	श्री.के.आर.वडाळ	श्री. रमेश सहदेवराव पवार

जा.क.
दि. /11/2024

ग्रामपंचायत कार्यालय पोहा
जा.क. ५५
दि. 28/11/2024
ता. कारंजा जि. वाशिम

ना हरकत प्रमाणपत्र

प्रती,
योगेशकुमार पारधी,
सिनियर मॅनेजर,
अदानी टोटल गॅस लिमीटेड,
अहमदाबाद पिन- ३८२४२१ (गुजरात)

विषय- **Proposal for granting permission for laying 12" dia steel pipeline to setup a Gas Distribution Network in Akola city and surrounding Area in District Akola-Pipeline Laying across to various RCC Road / Murram Road along the pipeline route in Poha Village in [Tehsil- Karanja of Washim district.**

संदर्भ- 1) M/s Adani Gas Limited Letter no. ATGL/Akola GA/GP_Poha/Per/2024/005Dt:28/05/2024

महोदय,

शहर आणि जिल्हातील परिसरात गॅस वितरण नेटवर्क उभारण्यासाठी १२" व्यासाची स्टील पाईपलाईन टाकण्यासाठी परवानगी देण्याचा प्रस्ताव सादर केला आहे. गॅस पाईपलाईन वाशिम जिल्ह्यातील कारंजा तहसीलमधील पोहा गावातील विविध आरसीसी रोड / मुरूम रोड ला क्रॉस करते.

वरील दृष्टीने खाली नमूद केलेल्या क्रॉसिंग च्या ठिकाणी मेमर्स अदाणी गॅसचे सदस्य आणि सरपंच पोहा यांनी दि.३०/०७/२०२४ रोजी संयुक्त साईट परीक्षण केले.

संदर्भ क्र.१ अंतर्गत पत्रात नमूद केलेल्या वरील माहितीनुसार या कार्यालयाला खालील दर्शिवलेल्या अटी व शर्तीच्या आधीन राहुन वरील विषयात दर्शिवलेल्या कामास कोणतीच अडचण नाही.

पाईप लाईन क्रॉस करून जात असलेल्या रस्त्याची माहिती खालील प्रमाणे दिली आहे.

Sr. No.	Description	ATGL Pipeline Chainage in Km.	Location of Crossing
1	Crossing of RCC Road (Poha to Asphalted Road)	0/322.63	In Village Poha
2	Crossing of RCC Road (Poha to Asphalted Road)	0/565.36	In Village Poha
3	Crossing of RCC Road (Poha to SH-287)	0/922.41	In Village Poha
4	Crossing of RCC Road (Poha to SH-287)	0/983.16	In Village Poha
5	Crossing of Murram Road (Poha to SH-287)	1/062.16	In Village Poha

नियम व अटी :-

१) वरील दर्शिवलेल्या कामासंबंधी अभियंता व सरपंच पोहा यांच्या देखरेखीखाली केले जावे.

सौ.शितल मंगेशराव मसने
सरपंच
ग्रा.पं.पोहा पं.स.कारंजा

28/11/24
श्री किसन रामदास वडाळ
ग्रामविकास अधिकारी,
ग्रा. पं. पोहा, पं. स. कारंजा, जि. वाशिम

२) पाईपलाईन जमिनीच्या पातळी पासून १.२ मीटर इतकी खाली टाकावी.

३) कामाच्या दरम्यान नादुरस्त झालेल्या पाण्याच्या पाईप लाईन व इतर मालमत्ता रस्त्याची/स्तिथी मूळ स्थिती सारखी करून देणे अनिवार्य राहील.

४) पाईप लाईन बांधकामाच्या दरम्यान कोणताही अपघात किंवा जीवित हानी झाल्यास ग्रामपंचायत पोहा जबाबदार राहणार नाही.

५) सदर पाईप लाईन भविष्यात गळणी झाल्यास व काही अनुचित घटना घडल्यास त्यास अदाणी टोटल गॅस लिमीटेड जबाबदार राहील.

सदर अटी व शर्ती च्या अधीन राहून ग्रामपंचायत पोहा ठराव क्र.३५ दि.०१/०८/२०२४ नुसार गॅस पाईप लाईन नकाशा प्रमाणे नाहरकत प्रमाणपत्र देण्यात येत आहे.

सौ.शितल मंगेशराव मसने
सरपंच
ग्रा.पं.पोहा पं.स.कारंजा

श्री किसन रामदास वडाळ
ग्रामविकास अधिकारी,
ग्रा. पं. पोहा, पं. स. कारंजा, जि. वाशिम

Annexure 10: Permission Letter for Utility Crossing from Maharashtra Jeevan Pradhikaran Akola

MAHARASHTRA JEEVAN PRADHIKARAN

MAHARASHTRA JEEVAN PRADHIKARAN DIVISION, AKOLA

Murtizapur Road,
Akola ४४४००१

Ph.No. (०७२४) २४३१२४८
E-Mail : eemjpda@rediffmail.com
eemjpdn@gmail.com

No/MJPDA/TB/ 3097 /2024
Date : 22/11/2024

To,

Sr. Manager,
Adani Total Gas Limited.
Amravati

Subject :- **Proposal for granting permission for laying 12" dia steel pipeline to setup a Gas Distribution Network in Akola City and surrounding Area in District Akola – pipeline laying across to various Water pipeline along the pipeline route in Akola district**

Reference :-
1) M/s. Adani Gas Limited Letter No. ATGL/Akola GA/ MJP_WPL/per/2024/014, Date 31/05/2024
2) Sub division officer, MJP Sub division, Murtizapur, Letter No.TB/490/2024 Date 09/09/2024
3) This office letter No. /TB/2751/2024 Date 18/10/2024
4) Payment submission letter no. ATGL/Akola GA/MJPDA/ Water Pipeline/PAY/2024/014 Date 18/11/2024.

M/s. Adani Total Gas Limited vide letter under reference (1) has submitted the proposal for laying of 12" dia steel pipeline to setup a Gas Distribution Network in Akola City and Surrounding Area in district Akola for pipeline laying across to various Water pipeline along the pipeline route in Akola district.

In the view of above, a joint site visit was conducted on 04/09/2024 with the Representative of Adani Total Gas Limited and Junior Engineer, MJP Sub Division Murtizapur at the locations of crossing mentioned below.

Sr.No. Crossing	Description	ATGL Pipeline Chainage in Km	Location of Crossing
1	2	3	4
1	Crossing of Water pipeline 250 mm dia DI K-7	18/072.74	Near SH-287 & SH-274 Junction in Village pinjar
2	Crossing of Water pipeline 75 mm dia HDPE 6Kg/cm2	19/842.47	In Village Pinjar
3	Crossing of Water pipeline 75 mm dia HDPE 6Kg/cm2	19/861.10	In Village Pinjar
4	Crossing of Water pipeline 75 mm dia HDPE 6Kg/cm2	19/886.50	In Village Pinjar

https://d.docs.live.net/885984fe0785bf9c/Documents/Tech. ltr 6.docx (पाणी हे जीवन आहे। पाण्याची बचत करा।) 164

Sr.No. Crossing	Description	ATGL Pipeline Chainage in Km	Location of Crossing
1	2	3	4
5	Crossing of Water pipeline 75 mm dia HDPE 6Kg/cm2	19/914.00	In Village Pinjar
6	Crossing of Water pipeline 75 mm dia HDPE 6Kg/cm2	19/943.50	In Village Pinjar

Payment has been deposited by M/s ATGL vide ICICI Bank's Bank Guarantee No.0024NDLG00251825, dated 07.11.2024 of Rs. 4,62,681/- (Four Lakh Sixty-two thousand six hundred eighty-one rupees) for the above subject works.

As per above information mentioned in letter under reference no. 2 & 3, this office has no objection to above subject work subjected to this following terms and conditions.

Terms and conditions:-

1) The proposed pipeline shall be laid at a depth of more than 1.0 m from the existing water pipeline.
2) After laying the gas pipeline the excavated strata shall be backfilled with soil upto the ground level in its original conditions.
3) Before starting the construction, activity intimation should be given in advance (1 week) and the above work should be carried out under the supervision of related engineer in charge of this department.
4) In case in any damage to the water pipeline during the work, it shall be repaired immediately by ATGL.
5) The Maharashtra Jeevan Pradhikaran Department will not be held responsible for any loss of life and property if any accident occurs due to laying of gas pipeline.
6) Any lose to Maharashtra Jeevan Pradhikaran Water Pipeline/Property shall be responsibility of the executing agency / ATGL.
7) In case of any complaint or court matter, this office will not be held responsible.

DA :- Nil.

(N.M. Rathod)
Executive Engineer
MJP Division, Akola

Copy- Sub division officer, MJP Sub division, Murtizapur for information.

Annexure 11: Permission Letter for PMGSY from Maharashtra Rural Road Development Association

महाराष्ट्र ग्रामीण रस्ते विकास संस्था कार्यालय कार्यकारी अभियंता, प्रधानमंत्री ग्राम सडक योजना, वाशिम जुनी जिल्हा परिषद, परिसर वाशिम वाशिम-४४४५०५		Maharashtra Rural Roads Development Association Office of Pradhan Mantri Gram Sadak Yojana. Washim. Old Z.P.Campus, Washim- ४४४५०५ E-mail:– mh-was@pmgsy.nic.in
जावक क्रमांक /तांत्रिक/लेखा/ 781/ 2024		दिनांक: 11 / 12 /2024

प्रति,
योगेशकुमार पारधी,
सिनियर मॅनेजर,
अदानी टोटल गॅस लिमीटेड अहमदाबाद (गुजरात)

विषय :- मुख्यमंत्री ग्राम सडक योजने अंतर्गत पोहा ते कोळी रस्ता तालुका. कारंजा रस्त्यावरील साईड पट्टी (Row) मधून नॅचरल गॅस पाईप लाईन करिता परवानगी मिळणे बाबत.

संदर्भ :-१. आपले पत्र क्र. ATGL/Akola GA/PMGSY_Roads/Per/२०२४/०१ दि. २८.०५.२०२४
२. या कार्यालयाचे पत्र जावक क्रमांक/ तांत्रिक / लेखा / २८३ / २०२४ दिनांक ०२.०६.२०२४
३. आपले पत्र क्र, ATGL/Akola GA/ PMGSY_Road/ Washim / Pay_Sub /२०२४ दि.०४.१२.२०२४

उपरोक्त विषयी संदर्भ क्र. १ अन्वये मुख्यमंत्री ग्राम सडक योजने अंतर्गत पोहा ते कोळी रस्ता तालुका. कारंजा गॅस पाईप लाईन टाकण्याकरिता परवानगी मिळणे बाबतचा प्रस्ताव या विभागास प्राप्त झाला आहे. संदर्भ क्र. २ अन्वये यांनी खालील प्रमाणे अहवाल सादर केला आहे.

खर्चाचा तपशील रस्ता करिता

१) डांबरी पृष्ठभागाच्या बाजुला (Row) ४५६.०१ मीटर, रु. २५०/- मिटर - १,१४,००३.००

एकूण -१,१४,००३.००

शासकीय परिपत्रक महाराष्ट्र शासन, सार्वजनिक बांधकाम विभाग शासन परिपत्रक क्र. संकीर्ण २०६९६/प्र.क्र. १५७/रस्से-१ दि. २३.०३.२००० नुसार रकमेचा भरणा शासनाच्या परिपत्रकानुसार रु.१,१४,००३/- आहे. अदानी टोटल गॅस लि, अहमदाबाद या कंपनीन यांनी सदर्भ क्र. ३ अन्वये आर.टी.जी.एस. क्र. CMS4676946955 व्दारे देय असलेली रक्कम भरणा केलेली आहे.

सबब खालील अटी व शर्तीचे अधिन राहुन मुख्यमंत्री ग्राम सडक योजने अखत्यारितील पोहा ते कोळी रस्ता तालुका. कारंजा कि.मा. ०/०० व ०/४५६.०१ या लांबी मध्ये गॅस पाईप लाईन टाकण्या करिता परवानगी प्रदान करण्यात येत आहे.

१. गॅस पाईप लाईन रस्त्याच्या सिमारेषेला लागुन टाकावी. गॅस पाईप लाईनचे खोदकामामधुन निघालेली माती व मुरुम रस्त्यावर येणार नाही व वाहतुकीस अडढळा होणार नाही तसेच रस्त्यालगतच्या नाल्या बुजणार नाही याची दक्षता

अदानी टोटल गॅस लि. अहमदाबाद या कंपनीने घ्यावी. खोदकामामधुन निघालेली माती व मुरुम यांची योग्य विल्हेवाट लावावी.

२. खोदकामातील माती व मुरूमामुळे रस्ते नादुरुस्त झाल्यास तसेच खोदकामासाठी वापरण्यात आलेल्या अवजड वाहनामुळे प्र.म.ग्रा. सडक योजना, अखत्यारितील रस्ता / नाली नादुरुस्त झाल्यास रस्ता व नाली पुर्ववत करण्याची जवाबदारी अदानी टोटल गॅस लि. अहमदाबाद या कंपनीची राहील.

३. या संबंधित सार्वजनिक बांधकाम नियमावली परिशिष्ठ २३ व परिच्छेद ३२९ येथील सर्व तरतुदी लागू राहतील.

४. प्रत्याक्षात काम करतांना मंजुरी दिलेल्या लांबीपेक्षा जास्त रस्त्यावर पाईप लाईनचे काम केल्यास त्यागाटीचे अतिरिक्त शुल्क भरावा लागेल,

५. रस्ता क्रॉसिंग करणेसाठी पूर्व सुचना उप अभियंता, प्र.म.ग्रा. सडक योजना, वाशिम यांना देण्यात यावी.

६. काम पूर्ण करायाचा कालावधी फक्त १ वर्षापर्यंत वैध राहील.

७. खोदकाम करतांना अपघात झालास त्याची संपुर्ण जबाबदारी अदानी टोटल गॅस लि. अहमदाबाद यांची राहील.

८. वरील शर्तो व अटीचे नियमाचे उलंघन झाल्यास देण्यात आलेली परवानगी रदद करण्याचे अधिकार कार्यकारी अभियंता प्र.म.ग्रा. सडक योजना, वाशिम यांना राहील.

कार्यकारी अभियंता
प्र.म.ग्रा. सडक योजना,
महाराष्ट्र ग्रामीण रस्ते विकास संस्था,
वाशिम

प्रत -

१.उपअभियंता, प्र.म.ग्रा. सडक योजना, वाशिम यांना महिती व आवश्यक कार्यवाहीस्त.
२. कनिष्ठ अभियंता, प्र.म.ग्रा. सडक योजना, ता. कारंजा यांना महिती व आवश्यक कार्यवाहीस्त.

Annexure 12: Permission Letter for Tree Cutting from

कार्यकारी अभियंता

सार्वजनिक बांधकाम विभाग अकोला

बांधकाम विभाग परिसर सर्वोपचार रुग्णालय जवळ अकोला, ४४४००१

akola.ee@mahapwd.gov.in www.mahapwd.gov.in

जावक क्र.6/ee6 चिशा /२०२५	दिनांक २३/०६/२०२५

प्रति,

प्रकल्प अधिकारी

अदानी टोटल गस लिमिटेड,अमरावती

विषय :- गॅस पाईप लाईन ता.बार्शिटाकली राज्यमार्ग २७४ रस्त्यालगत गस पाईप लाईन आच्छादित करतांना सा.बां.विभाग हद्दीतील मधात येणाऱ्या झाडाचे मुल्याकन करून तोडण्याची परवानगी मिळणे बाबत.(अडाणी गस प्रकल्प)

संदर्भ —१) आपले प्रस्ताव पत्र क्र. ATGL/AKOLAGA/PWD/ROADS/PER/202५/0O1 Date.22/01/2025

२) उपविभागीय अभियंता सा.बा.उपविभाग मुर्तिजापूर पत्र क्र 285/ तां / दि.२५.०४.२०२५

३) उपवनसंरक्षक अकोला यांचे कार्या.पत्र क्र.कक्ष १/सर्व्हे /2665/2025 दि.२८/३/२०२५

४) आपले कार्या. पत्र क्र. ATGL/Akola/GA/P.W.D.Road/Pay Sub/२०२५/ दि.१८/०६/२०२५

उपरोक्त पत्राच्या अनुषगाने आपण गस पाईप लाईन ता.बार्शिटाकली राज्यमार्ग २७४ रस्त्यालगत गस पाईप लाईन आच्छादित करतांना सा.बां.विभाग हद्दीतील मधात येणाऱ्या झाडाचे मुल्याकन करून तोडण्याची परवानगी मिळणे बाबत.

उपविभागीय अभियंता सा.बा.उपविभाग मुर्तिजापूर यांनी संदर्भ क्र.२ नुसार प्राप्त अहवाल नुसार क्षेत्रीय अभियंता, उपवनसंरक्षक अकोला व संबधित प्रतिनिधी यांनी सोबत रस्त्याची प्रत्यक्ष पाहणी केली असता मधात येणाऱ्या झाडाचे मुल्याकन संदर्भ क्र ३ नुसार रु. ४८६७२०/-(अक्षरी रुपये चार लक्ष शहाशी हजार सातशे वीस फक्त) चा भरणा करिता आपणास संदर्भीय पत्र क्र.२ अन्वये मागणीपत्र पुरविण्यात आले आहे.

संदर्भ क्र.४ नुसार सदर मुल्याकन चा भरणा डिमांड ड्राफ्ट ICICI BANK क्र.017748 दि.१७/०५/२०२५ नुसार आपणाकडून प्राप्त झाला आहे. उपवनसंरक्षक अकोला हयांनी मुल्याकन करून देण्यात आलेली मधात येणारी झाडे तोडण्यास खालील अटी व शर्तीच्या आधारे परवानगी देण्यात येत आहे.

अटी व शर्ती

१) सार्वजनिक बांधकाम उपविभाग मुर्तिजापूर येथील क्षेत्रीय अधिकारी यांचे देखरेखीखाली त्यांचे निर्देशानुसार काम करावे.

२) रस्त्यावर झाडे तोडते वेळी रस्त्यावरील वाहतुकीस अडथळा निर्माण होवून मोक्याच्या ठिकाणी अपघात होवून प्राणहानी अगर वित्तहानी झाल्यास त्याची संपुर्ण जबाबदारी आपली राहिल.

३) रस्त्यावरील झाडे तोडण्यात आल्याने पर्यावरणाचा समतोल राखण्याकरिता आपण सदर ठिकाणी नव्याने वृक्षलागवड 2000 झाडे लावण्यात यावीत.

४) वृक्ष तोडताना रस्त्यास सरकारी व खाजगी मालमत्तेस काहीही इजा पोहचणार नाही याची खबरदारी घेण्यात यावी.

५) सदर करारनामा १०० बॉण्ड पेपर वर करून घेण्यात यावा. तदनंतर कामास सुरुवात करण्यात यावी.

सहपत्र:- निरंक

(प्र.पा.पाटील)
कार्यकारी अभियंता
सा.बां.विभाग,अकोला

प्रतिलिपी :- उपविभागीय अभियंता, सा.बां. उपविभाग मुर्तिजापूर यांना माहिती करीता अग्रेषित.

Annexure 13: Permission for Reserved Forest in Akola District

OFFICE OF THE PRINCIPAL CHIEF CONSERVATOR OF FORESTS (HEAD OF FOREST FORCE), MAHARASHTRA STATE, NAGPUR

ADDITIONAL PRINCIPAL CHIEF CONSERVATOR OF FORESTS AND NODAL OFFICER, MAHARASHTRA STATE, NAGPUR.

First Floor, 'B' Wing, Van Bhavan, Civil Lines, Nagpur-440001.

Tel no. (0712) 2530166, 2556916, Fax no. (0712) 2550675 E-mail- apccfnodal@mahaforest.gov.in

Sub:-Proposal for diversion of 0.0794 ha. Reserved Forest land for laying underground 12" dia steel natural Gas Pipeline to set up a Gas Distribution Netwoek in Akola City from IP-5 Poha village to Akola Village Pinjar and Redwa. Tq. Barshitakli Dist. Akola in the State of Maharashtra.

No.: Desk-17/Nodal/S1/PID-486661/Amravati/397/25-26
Nagpur – 440 001. Date:- 21/05/2025

To,
The Additional Chief Secretary (Forests),
Revenue and Forest Department,
Mantralaya, Mumbai -32.

Adani Total Gas Limited (ATGL) Ahemdabad has submitted a proposal for the diversion of 0.0794 ha. forest land on Parivesh Proposal Number FP/MH/Pipeline /486661/2024 on 09/07/2024 through Form-A (Part-I) on the Parivesh Portal. The utility of the project is to supply natural gas to Akola City and its surrounding areas to provide natural gas to en route industries/consumers in Akola District of Maharashtra. **(PPN/49).** The Project Note submitted by the User Agency is enclosed in the proposal on page 61 to 62. The User Agency has provided a justification for locating the project in forest area through this Project Note **(PPN/63).**

The project site was inspected by the Deputy Conservator of Forests, Akola Division, Akola on 16/07/2024. The Site Inspection Report is enclosed on **(PPN/47 to 51).**

1. **Justification of Site Specificity:**

It is to provided 12" dia steel natural Gas pipeline supply from infrastructure development and in Akola District public use. Moreover the Gas pipeline is laid along the RoW of the existing road. Hence the project is site specific. **(PPN/9)**

2. **Forest land involved:**

The details of the forest land proposed for diversion are as under :- **(PPN/64)**

Sr.No	Item of Work	Village Name	Compt No.	Gut No/ Sury No.	Length (mtr.)	Width (mit.)	Area in sq.mtr	Area in ha.	Legal status
1	12"dia steel natural gas pipeline (IP-Spoha village to Akola city)	Morhal	C-78	65	100	0.8	80.00	0.0080	RF
2		Pinjar	C-26	11	300	0.8	240.00	0.0240	RF
				13	302	0.8	241.00	0.0242	RF
3		Redwa	399	G.N.164 (S.N.43)	290	0.08	232.00	0.0232	RF
		Total			992		793.60	0.0794	

The proposed area does not include in the area of any National Park/ Wildlife Sanctuary or Nature Reserve. **(PPN/15).** The proposed project is beyond 11.5 Kms of Boundary of the Protected Area Sanctuary and National Park (Katrpurna Wildlife Sanctuary) **(PPN/16).** The Area Statement signed by the Deputy Conservator of Forests, Akola Division, Akola is enclosed **(PPN/64)** and the User Agency is enclosed **(PPN/65).**

3. **Flora & Fauna**

In the Site Inspection report of the Deputy Conservator of Forests, Akola Division, Akola, the forest land proposed for diversion has been put under Eco-Value Class-III comes under tropical Dry deciduous forests with the density of vegetation is below 0.1 **(PPN/47 &49)**. The number of trees to be felled below 60 cm and above 60 cm girth is 02 and 01 respectively **(PPN/ 35 & 48)**. As per the enumeration, the felling of 03 numbers of trees is involved in this project **(PPN/34)**.The girth-wise tree enumeration details are as follows: **(PPN/35)**

Girth Class (in cm)										
15-30	31-45	46-60	61-75	76-90	91-105	106-120	121-135	136-150	Above 150	Total
0	1	1	0	1	0	0	0	0	0	3

4. **Compensatory Afforestation (CA)**

Three trees need to be felled in the proposed project. Compensatory Afforestation is not applicable to this proposal. In terms of Rules (13)(5)(b) of Van (Sanrakshan evam Samvardhan) Adhiniyam Rules, 2023 issued vide notification dated 29/11/2023, the proposal for diversion forest land up to one hectare, cost of plantation of ten times the numbers of trees likely to be felled or specified number of trees as may be specified in the order for diversion of forest land (Subject to a minimum no. of 100 plant), shall be levied from the user agency towards compensatory afforestation. **(PPN/36)**

5. **Net Present Value (NPV)**

The Deputy Conservator of Forests, Akola Division, Akola has certified that the amount of Net Present Value calculated (@ Rs. 9,57,780/- per ha. X 0.0794 ha.)== Rs.76,048/- (Rupees Seventy Six Thousand Fourty Eight only) is exactly calculated as per the rate and calculation prescribed vide Government of India, Ministry of Environment, Forest and Climate Change (Forest Conservation Division), New Delhi letter File No.5-3/2011-FC(Vol-I) dated 6th January, 2022. **(PPN/33)**

6. **No violation**

The Deputy Conservator of Forests, Akola Division, Akola has certified that the proposed work has not been started in Forest Land as well as in Non-Forest Land, and No Violation of Forest Conservation Act, 1980 and/or its guidelines have been committed.

The work in Forest Land will be started only after Govt. of India accords permission. **(PPN/18)**

7. **Maps & KML file**

Toposheet maps, Geo Digital maps/ DGPS maps, Village map illustrating the forest land involved in this project have been submitted **(PPN/1-6)**. Additionally, a KML file in CD showing the area involved in this project has been attached to the proposal file.

Map in suitable scale showing the distance of 'Protected Area' from area proposed for diversion, (in Km) indicating boundary of PA, Boundary of ESZ of PA and proposed area for diversion **(PPN/5-6)**. Google map of proposed area **(PPN/4)**.

8. **Others**

The Deputy Conservator of Forests, Akola Division, Akola has certified that the proposed work is not likely to affect any monument site of cultural, historical, religious, archaeological or recreational importance, including wildlife sanctuary and national park. **(PPN/15&17)**

9. **The User Agency has submitted the following undertaking / document:-**

i) The User Agency has furnished an undertaking to defray the cost of Net Present Value. **(PPN/71)**

ii) The User Agency has furnished an undertaking to deposit the necessary cost of Compensatory Afforestation. **(PPN/72)**

iii) The User Agency has submitted an undertaking regarding the necessary certificate of the District Collector under the FRA 2006 is under process and will be submitted to the Forest Department before obtaining formal permission. **(PPN/74)**

iv) The User Agency certified that Environmental clearance is not required for this project. **(PPN/78)**

v) The approval accorded by the Petroleum and Natural Gas Regulatory Board permission for laying expanding the city gas distribution (CGD) network in GA-11.30 Akola, Hingoli an Washim districts in the State of Maharashtra dated 09/03/2022. **(PPN-86 to 90)**

10. **Recommendations of the Deputy Conservator of Forests, Akola Division, Akola along with detailed reasons. (PPN/49)**

The project is for infrastructure development and public use and which required less than 1.00 hector Forest land project proponent is ready to bear all the Government levies hence the proposal is recommended for acceptance under Section 2 of Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980.

11. **Recommendations of the Chief Conservator of Forests (T), Amravati Forest Division, Amravati along with the detailed reasons.**

The Chief Conservator of Forest (T), Amravati vide letter No Desk-4/Land/C.No.(1)/24-25/56/2025-26 dated 25/04/2025 has recommended this proposal for diversion of 0.0714 ha. Reserved Forest land for laying underground 12" dia steel natural Gas Pipeline to set up a Gas Distribution Network in Akola City from IP-5 Poha village to Akola Village Pinjar and Redwa, Tq. Barshitakli Dist. Akola in the State of Maharashtra.

12. **Considering the importance and requirement of the project, the proposal may be considered under Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980,subject to the following conditions:-**

i) The legal status of the land shall remain unchanged.

ii) The User Agency shall pay the cost of CA & NPV.

iii) The forest land shall not be used for any purpose other than specified in the proposal.

iv) The layout plan of the proposal shall not be changed without prior approval of the State Government.

v) All other conditions as may be mandatory under relevant Acts, Rules and Guidelines shall be complied by the User Agency.

vi) All necessary approvals required for the project as per the prevailing laws of the land would be obtained by the User Agency.

vii) Any breach of the conditions by the User Agency will be treated as violation of the provisions of the Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980.

Recommendation

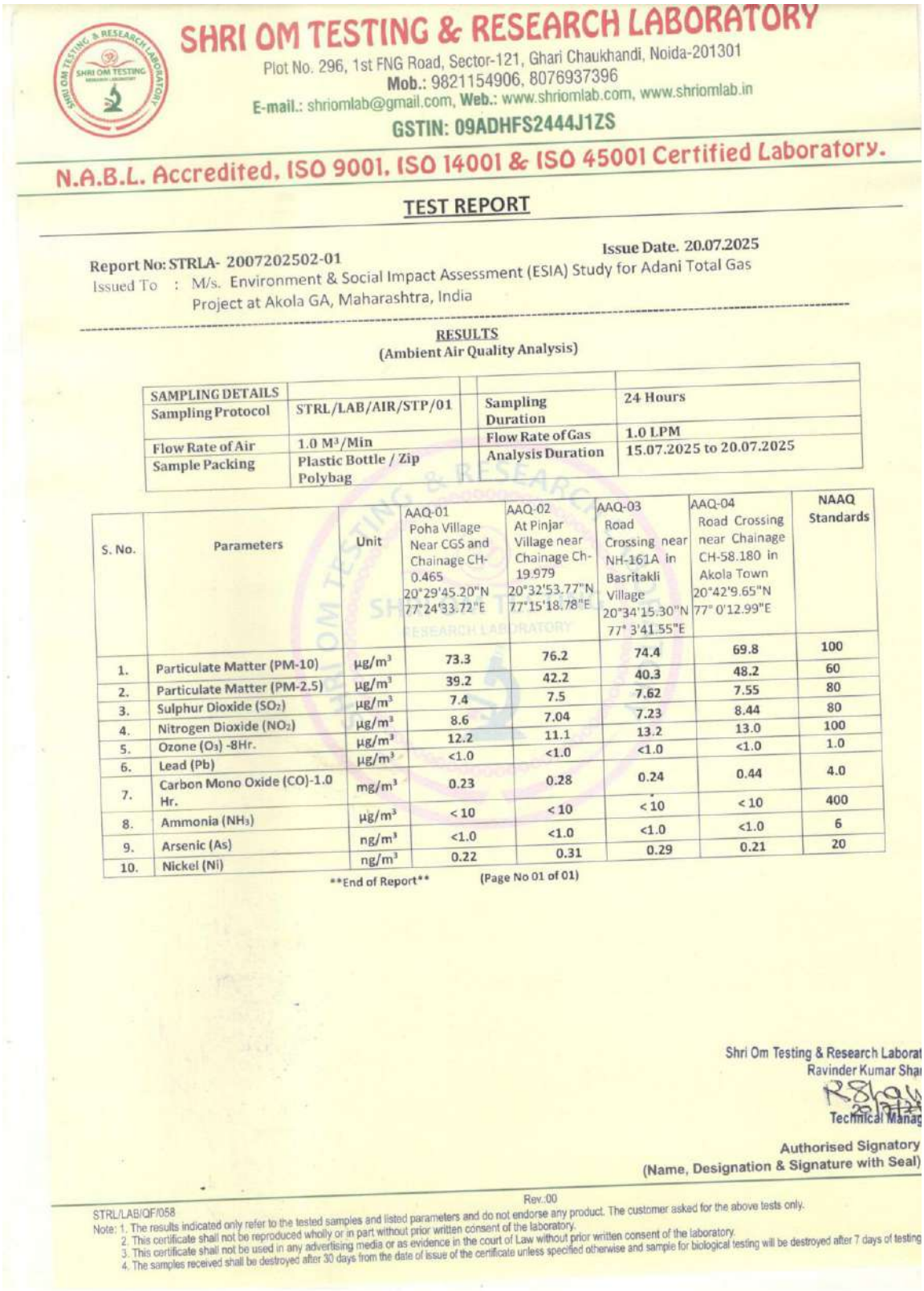
On the basis of above facts and subject to above mentioned conditions, the proposal for diversion of 0.0794 ha. Reserved forest land for laying of 12" dia steel natural gas pipeline under Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980 for laying 12" dia steel natural gas pipeline to set up a gas distribution network in Akola city & surrounding area in district Akola pipeline laying through reserved forest land in Village Morhal, Pinjar & Redwa, Tehsil-Barshitakli of Akola District in Maharashtra State is being recommended for approval.

21/5/25

(Naresh Zurmure)
Addl. Principal Chief Conservator of Forests
& Nodal Officer

Copy to- The Chief Conservator of Forests (T), Amravati for information.
Copy to- The Deputy Conservator of Forests, Akola Forest Division, Akola for information.
Copy to- Adani Total Gas Limited, Crest 4-5, inspire Business Park, Shantigram, Nr. Vaishnodevi Circle, S.G. Highway, Ahmedabad Nagpur for information.

Annexure 14: Baseline Monitoring Results



SHRI OM TESTING & RESEARCH LABORATORY

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TEST REPORT

Report No: STRLA- 2007202502-01 Issue Date. 20.07.2025

Issued To : M/s. Environment & Social Impact Assessment (ESIA) Study for Adani Total Gas Project at Akola GA, Maharashtra, India

RESULTS
(Ambient Air Quality Analysis)

SAMPLING DETAILS			
Sampling Protocol	STRL/LAB/AIR/STP/01	Sampling Duration	24 Hours
Flow Rate of Air	1.0 M³/Min	Flow Rate of Gas	1.0 LPM
Sample Packing	Plastic Bottle / Zip Polybag	Analysis Duration	15.07.2025 to 20.07.2025

S. No.	Parameters	Unit	AAQ-01 Poha Village Near CGS and Chainage CH-0.465 20°29'45.20"N 77°24'33.72"E	AAQ-02 At Pinjar Village near Chainage Ch-19.979 20°32'53.77"N 77°15'18.78"E	AAQ-03 Road Crossing near NH-161A in Basritakli Village 20°34'15.30"N 77° 3'41.55"E	AAQ-04 Road Crossing near Chainage CH-58.180 in Akola Town 20°42'9.65"N 77° 0'12.99"E	NAAQ Standards
1.	Particulate Matter (PM-10)	µg/m³	73.3	76.2	74.4	69.8	100
2.	Particulate Matter (PM-2.5)	µg/m³	39.2	42.2	40.3	48.2	60
3.	Sulphur Dioxide (SO_2)	µg/m³	7.4	7.5	7.62	7.55	80
4.	Nitrogen Dioxide (NO_2)	µg/m³	8.6	7.04	7.23	8.44	80
5.	Ozone (O_3) -8Hr.	µg/m³	12.2	11.1	13.2	13.0	100
6.	Lead (Pb)	µg/m³	<1.0	<1.0	<1.0	<1.0	1.0
7.	Carbon Mono Oxide (CO)-1.0 Hr.	mg/m³	0.23	0.28	0.24	0.44	4.0
8.	Ammonia (NH_3)	µg/m³	< 10	< 10	< 10	< 10	400
9.	Arsenic (As)	ng/m³	<1.0	<1.0	<1.0	<1.0	6
10.	Nickel (Ni)	ng/m³	0.22	0.31	0.29	0.21	20

End of Report (Page No 01 of 01)

Shri Om Testing & Research Laborat
Ravinder Kumar Sha
Technical Manag

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TEST REPORT

Report No: STRLA- 2007202502-02 **Issue Date. 20.07.2025**

Issued To : M/s. Environment & Social Impact Assessment (ESIA) Study for Adani Total Gas Project at Akola GA, Maharashtra, India

RESULTS
(Ambient Noise Quality Analysis)

SAMPLING DETAILS

Sample Description : Ambient Noise
Sample Collected by : STRL STAFF
Monitoring Protocol : IS- 9989: 1981
Monitoring Duration : 24 Hours

Sl. No.	Location	Location Code	Results in Db(A) Leq	
			Average Day Noise Level	Average Night Noise Level
1	Poha Village Near CGS and Chainage CH-0.46520°29'45.20"N 77°24'33.72"E	ANQ-01	51.2	40.76
2	At Pinjar Village near Chainage Ch-19.979 20°32'53.77"N 77°15'18.78"E	ANQ-02	52.4	44.1
3	Road Crossing near NH-161A in Basritakli Village 20°35'3.97"N 77° 3'54.14"E	ANQ-03	52.16	40.9
4	Road Crossing near Chainage CH-58.180 in Akola Town 20°42'9.65"N 77° 0'12.99"E	ANQ-04	56.4	44.4

Limit for A Per CPCB Guidelines; Leq, dB (A)

Sl. No.	Zone	Day Time (6.00 AM to 10.00 PM)	Nighttime (10.00 PM to 6.00 AM)
1	Residential area	55	45
2	Commercial area	65	55
3	Industrial area	75	70
4	Silence area	50	40

* Day Time	6.00 a.m. to 10.00 p.m	**Night Time	10.00 p.m. to 6.00 a.m

** END OF REPORT**

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Technical Manager

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TEST REPORT

Report No: STRLA- 2007202502-03 Issue Date. 20.07.2025

Issued To : M/s. Environment & Social Impact Assessment (ESIA) Study for Adani Total Gas Project at Akola GA, Maharashtra, India

Sample Description: Ground Water

RESULTS
(Water Quality Analysis)

SAMPLING DETAILS

Sample Collected by : STRL STAFF
Sampling Protocol : IS-3025(P-1)1987
Weather Condition : Clear Sky
Sampling Quantity : 5L+500ml
Sample Packing : Plastic/Glass Bottle
Analysis Duration : 15.07.2025 to 20.07.2025

S. No.	Parameters	Limits (as per IS:10500-2012)		Results GW-01 Poha Village Near Chainage CH-0.465 20°29'45.20"N 77°24'33.72"E	Results GW-02 Road Crossing near Chainage CH-58.180 in Akola Town 20°42'9.65"N 77° 0'12.99"E	Test Methods
		Desirable Limit	Permissible Limit			
1	Color	--	--	0.1	0.1	IS : 3025(Pt-4) 1983, Reaff. 2017
2	Odour	Agreeable	Agreeable	Agreeable	Agreeable	IS : 3025(Pt-5) 1983, Reaff. 2017
3	Taste	Agreeable	Agreeable	Agreeable	Agreeable	IS : 3025(Pt-8)-1984, Reaff. 2017
4	Temperature	-	-	20.3	20.4	IS: 3025(Pt-9)1984 Reaff 2002
5	pH	6.5-8.5	No Relaxation	7.22	7.29	IS : 3025(Pt-11)1983, Reaff. 2017
6	Electric Conductivity	-	-	808	929	IS : 3025 (Pt-14)-2013
7	Total Hardness (as $CaCO_3$)	200	600	240.2	306.1	IS : 3025(Pt-21)1983, Reaff. 2014
8	Iron (as Fe)	0.3	No Relaxation	0.12	0.12	APHA 22nd Ed., 3120B (3111B (AAS),
9	Chlorides (as Cl)	250	1000	134.4	145.1	IS : 3025(Pt-32)1988, Reaff. 2014
10	Fluoride (as F)	1	1.5	< 0.5	< 0.5	APHA 22nd Ed., 4500F(D)
11	TDS	500	2000	490.2	542	IS: 3025(Pt-16)1984, Reaff. 2017
12	Calcium (as Ca^{2+})	75	200	46.8	50.7	IS :3025(Pt-40)1991, Reaff. 2014
13	Magnesium (as Mg^{2+})	30	100	29.5	42.9	APHA 22nd Ed., 3500-Mg (B)
14	Sulphate (as SO_4)	200	400	32.3	33.4	IS : 3025(Pt-24)1986, Reaff. 2014
15	Nitrate(as NO_3)	45	No Relaxation	24.8	25.2	IS : 3025(Pt-34)1988, Reaff. 2014
16	Alkalinity (as $CaCO_3$	200	600	302.2	316.2	IS: 3025(Pt-23)1986, Reaff. 2014
	Bacteriological Parameters					
1	Total Coli form	MPN/100ml	Shall Not Be Detectable	Not Detected (<2)	Not Detected (<2)	IS : 1622-1981 (Reaff.2003)
2	E.coli	E.coli/100ml	Shall Not Be Detectable	Absent	Absent	IS : 1622-1981 (Reaff-2003)

*END OF REPORT *** Page (01 of 01)

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TEST REPORT

Report No: STRLSW- 2007202502-04 **Issue Date. 20.07.2025**

Issued To : M/s. Environment & Social Impact Assessment (ESIA) Study for Adani Total Gas Project at Akola GA, Maharashtra, India

Sample Description: Surface Water

RESULTS
(Water Quality Analysis)

SAMPLING DETAILS

Date of Sampling	: 13.07.2025
Sample Collected by	: STRL Staff
Sampling Protocol	: IS-3025(P-1)1987
Sampling Quantity	: 5L+500ml
Analysis Duration	: 15.07.2025 to 20.07.2025

S.NO	Parameter	Unit	Result SW-01 Canal Crossing Near Chainage CH-2.29 20°30'22.17"N 77°24'9.62"E	Result SW-02 Purna River Crossing at CH-29.488 KM 20°34'1.94"N 77°10'8.47"E
1	Turbidity	NTU	3.1	2.94
2	pH (at 25°C)	-	7.65	7.56
3	EC	µS/cm	869	907
4	Total Dissolve Solids	mg/l	328	415
5	Total Hardness as $CaCO_3$	mg/l	210	243
6	Calcium as Ca	mg/l	43.5	38.4
7	Magnesium as Mg	mg/l	23.5	36.9
8	Sodium as Na	mg/l	94.2	80.5
9	Potassium as K	mg/l	54.5	62.4
10	Chloride as Cl	mg/l	180.1	189.9
11	Sulphate as SO_4	mg/l	76.6	76.2
12	Nitrate as NO_3	mg/l	36.7	36.8
13	Total Alaklinity as $CaCO_3$	mg/l	212	257.8
14	Fluoride	mg/l	0.14	0.15

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20/7/25
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TEST REPORT

Report No: STRLA- 2007202502-04

S.NO	Parameter	Unit	Result Line Route 2 SWQ-2.1 U/S of Canal near Chainage 16764.06 m (TP 253) 21°55'16.26"N 83°22'6.65"E	Result Line Route 2 SWQ-2.2 D/S of Canal near Chainage 16764.06 m (TP 253) 21°55'12.09"N 83°22'6.12"E
15	Cyanide	mg/l	<0.05	<0.05
16	Arsenic	mg/l	<0.01	<0.01
17	Boron as B	mg/l	<0.01	<0.01
18	Cadmium as Cd	mg/l	<0.01	<0.01
19	Chromium, Total	mg/l	<0.01	<0.01
20	Copper as Cu	mg/l	<0.05	<0.05
21	Lead as Pb	mg/l	<0.05	<0.05
22	Manganese as Mn	mg/l	<0.05	<0.05
23	Mercury	mg/l	<0.01	<0.01
24	Nickel as Ni	mg/l	<0.01	<0.01
25	Selenium as Se	mg/l	<0.01	<0.01
26	Zinc	mg/l	0.013	0.022
27	Dissolved Oxygen	mg/l	5.71	5.76
28	Total Suspended Solid	mg/l	14.9	27.5
29	Total Solid	mg/l	443.3	454.4
30	Chemical Oxygen Demand as O_2	mg/l	28.1	26.4
31	BOD, 3 days @27°C as O_2	mg/l	8.0	6.1
32	Oil & Grease	mg/l	<0.01	<0.01
33	Total Coliform	MPN /100 ml	12	10

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TEST REPORT

Report No: STRLA- 2007202502-05 Issue Date. 20.07.2025
Issued To : M/s. Environment & Social Impact Assessment (ESIA) Study for Adani Total Gas Project at Akola GA, Maharashtra, India

Sample Description: Soil

RESULTS
(Soil Quality Analysis)

SAMPLING DETAILS
Date of Sampling : 13.07.2025
Sample Collected by : STRL Staff Sampling
Protocol : STRL/STP/SOIL/01
Sampling Quantity : *5 kg*
Analysis Duration : 15.07.2025 to 20.07.2025

S.No	PARAMETERS	UNIT	RESULTS	TEST PROTOCOL
			SQ-01 Road Crossing near Chainage CH-58.180 in Akola Town 20°42'9.65"N 77° 0'12.99"E	
1.	Texture		Sandy clay Loam	IS: 2720 (part-4), 1985 Reaff:2015)
2.	Sand	%	44.4	IS: 2720 (part-4), 1985,(Reaff:2015)
3.	Silt		26.6	IS: 2720 (part-4), 1985,(Reaff:2015)
4	Clay		29.0	IS: 2720 (part-4), 1985,(Reaff:2015)
5	Porosity	%	49.1	STRL /STP/SOIL/01,
6.	Bulk Density	g/cc	1.23	STRL /STP/SOIL/01
7.	pH	....	7.52	STRL /STP/SOIL/01
8.	E. Conductivity	µs/cm	0.48	STRL /STP/SOIL/01
9.	Magnesium	mg/kg	42.3	STRL /STP/SOIL/01
10.	Calcium	mg/kg	210.2	STRL /STP/SOIL/01
11.	Chlorides	mg/kg	58.2	STRL /STP/SOIL/01
12.	Sodium	mg/kg	80.1	STRL /STP/SOIL/01
13.	Potassium	mg/kg	54.9	STRL /STP/SOIL/01
14	Organic Carbon	%	0.28	IS : 2720 (Part-24)-1976(R-2015)
15	Organic matter	%	0.16	IS : 2720 (Part-24)-1976(R..2015)
16.	Phosphorous	mg/kg	57.5	IS: 2720 (part-26),1987. (R:2011)
17.	SAR	meq	1.48	STRL /STP/SOIL/01
18.	Nitrogen (as N)	mg/kg	0.10	STRL /STP/SOIL/01
19.	Salinity (as NaCl)	%	0.31	STRL /STP/SOIL/01

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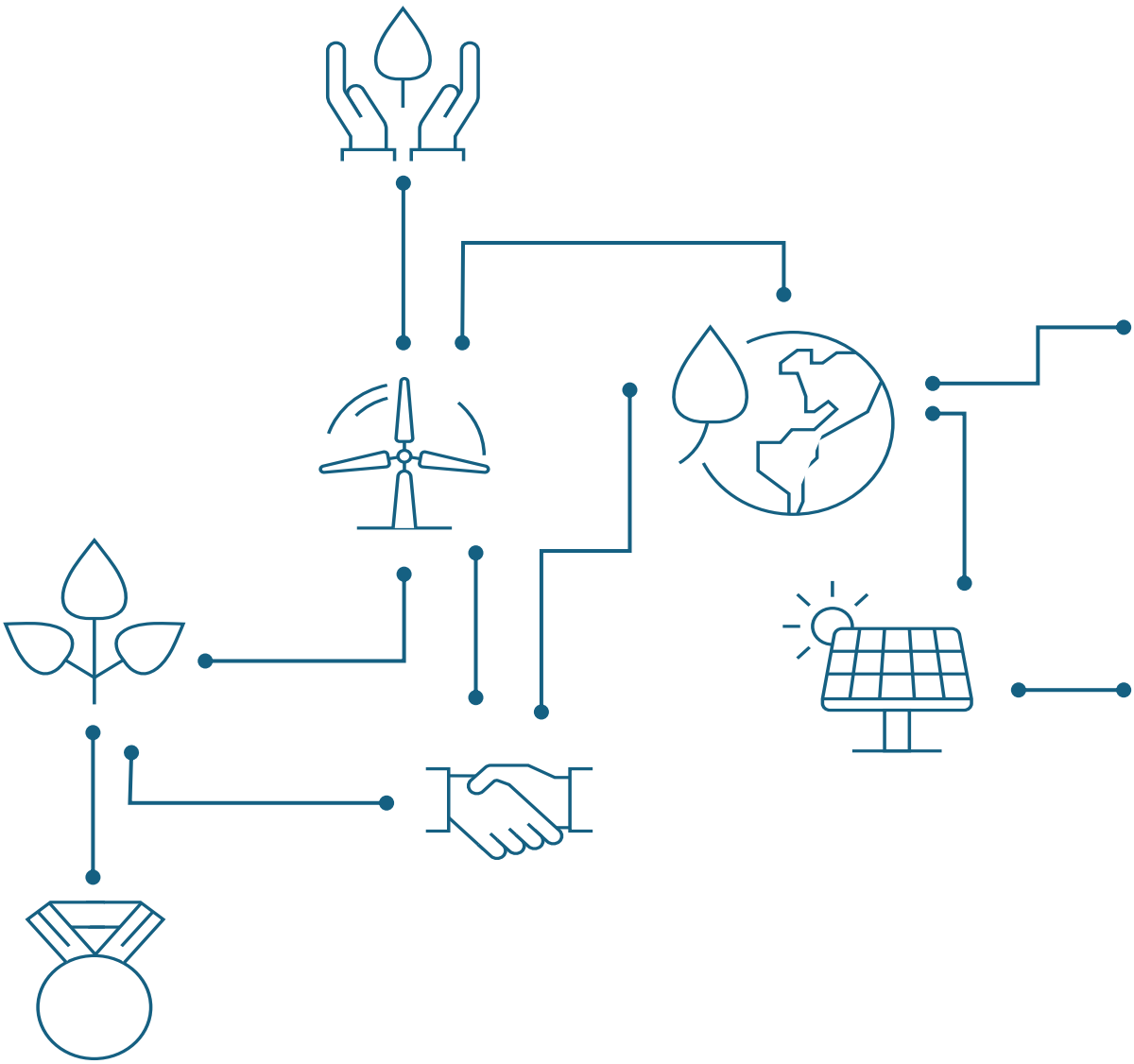

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