

Environmental and Social Impact Assessment for 2X50 MWac /67.5 MWp Solar Power Project in Yarringaligi and Badhanahatti villages, Ballari, Karnataka

Volume 1: Non-Technical Summary

1.0 INTRODUCTION

This document is the Non-Technical Summary (NTS) for the Environmental and Social Impact Assessment (ESIA). The document presents the details of the 2x50 MW_{AC} (67.5 MWp DC) solar plant, activities carried out during the ESIA study, identified environmental, social and ecological sensitivities and summary of impacts. The NTS summarizes the outcome of the ESIA, which is to identify environmental and social impacts that will occur due to construction and operation of the solar project, suggestion of mitigation measures to reduce these impacts and the understanding of residual impacts after implementation of the mitigation measures. The NTS also summarizes the implementation and supervisory framework for the mitigation measures.

1.1 Project Background

AMPYR Renewable Energy Resources Five and Ten Pvt. Ltd. (hereinafter referred to as 'AMPYR') commissioned ERM to undertake Environmental and Social (E&S) Risk Screening (Red Flag) and ESIA Scoping Study (hereinafter referred to as 'E&S Scoping Study') and ESIA for the Project, as required under the AMPYR Energy Environmental and Social Management Systems (ESMS).

ESIA assessed the environmental and social impacts based on the agreed scope of baseline data collection and impact assessment and the outcome of the ESIA is the preparation of an Environmental and Social Management Plan (ESMP). The ESIA and ESMP will include Bird and bat study, SEP-GRM; and GIAP.

Terminology used in the ESIA Report

The 2x50 MWAC (67.5 MWp DC) solar power project has been referred to as 'Project' for the remainder of the document.

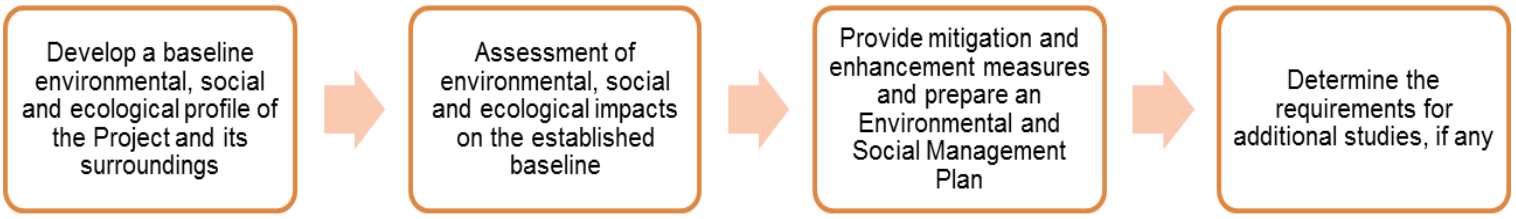
Justification for the ESIA

Solar power projects do not require an Environmental Clearance (EC) in India in accordance to the Environmental Impact Assessment (EIA) Notification, 2016 and further amendments. AMPYR had commissioned an Environmental &Social (E&S) Scoping Study in June 2023 to determine any risks and impacts due to the construction and establishment of the solar plant. The E&S Scoping Study has identified the requirement for a detailed ESIA study. ERM undertook a review of the E&S Scoping Study and developed a work plan for the ESIA that also identified the necessity for a SEP-GRM and GAP.

1.2. Objectives and Scope of work

The main objective of the ESIA is to assess social, environmental and ecological impacts of the proposed solar plant and provide management strategies to comply with the reference framework. The specific objectives are depicted in ***Figure 1***.

Figure 1: Objectives of ESIA



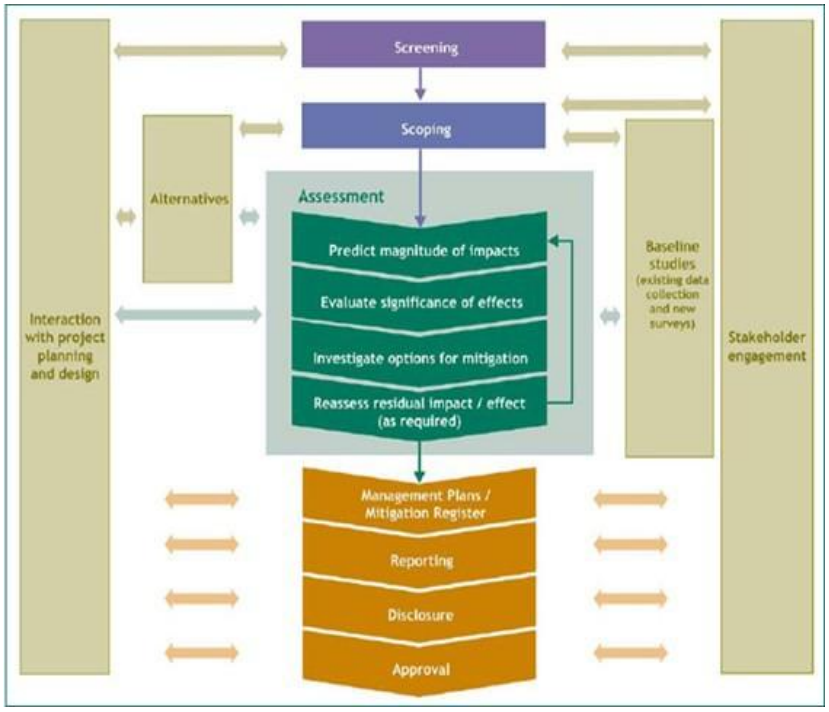


Approach and Methodology for ESIA and Brief on Technical Management Plans

Approach broke down into two work streams:

Work Stream 1: E&S Red flag assessment & Scoping Study

Work Stream 2: ESIA



The **Stakeholder Engagement Plan (SEP) - Grievance Redressal Mechanism (GRM)** is being undertaken to meet AMPYR ESMS to identify modes of continuous engagement with key stakeholders across the Project life cycle

The **Gender Action Plan (GAP)** is being undertaken to meet AMPYR focus on gender-related development as part of its Community Development Framework. The GAP is focused on mainstreaming gender issues and concerns into all aspects of the Project lifecycle and promote participation of women in Project activities.

Work Stream 1

- **Desk-based Review** of key environmental, social and ecological sensitivities.
- **Site Visit** was undertaken in 12 – 15 December 2023 for Peak migration avifaunal survey, 24 – 30 September 2024 for Stakeholder consultations, 14 -16 October 2024 for Environmental baseline sampling by environmental expert and lab technicians from S K Mitra Private Limited and 25 – 26 November 2024 for ESIA biodiversity expert visit
- **E&S Scoping Study** undertaken by ERM between **December 2023 and March 2024** during the planning stage of the Project which summarized the salient features and preliminary categorization of the Project.

Work Stream 2

- A **Document Review** of maps and satellite imagery was undertaken to understand the key environmental, social and ecological sensitivities.
- **Site Surveys and stakeholder consultations** was undertaken 24 – 30 September 2024
- **Peak migration avifaunal survey** was undertaken on 12 – 15 December 2023 and for ESIA **biodiversity expert visit** was undertaken from 25 – 26 November 2024
- **Environmental Baseline Data collection** was undertaken through site survey from 14-16 October 2024
- An **analysis of alternatives** process
- Assessment of **potential impacts** on the various environmental, ecological and social elements.
- An **ESMP** has been developed to summarize the list of mitigation measures recommended to reduce the overall impact on environmental, social and ecological elements.

Area of Influence for the ESIA

Project Footprint Area, *area which is reasonably expected to be physically touched by the Project activities, across all phases.* The area does not have any demarcation or fencing to indicate the footprint boundary.

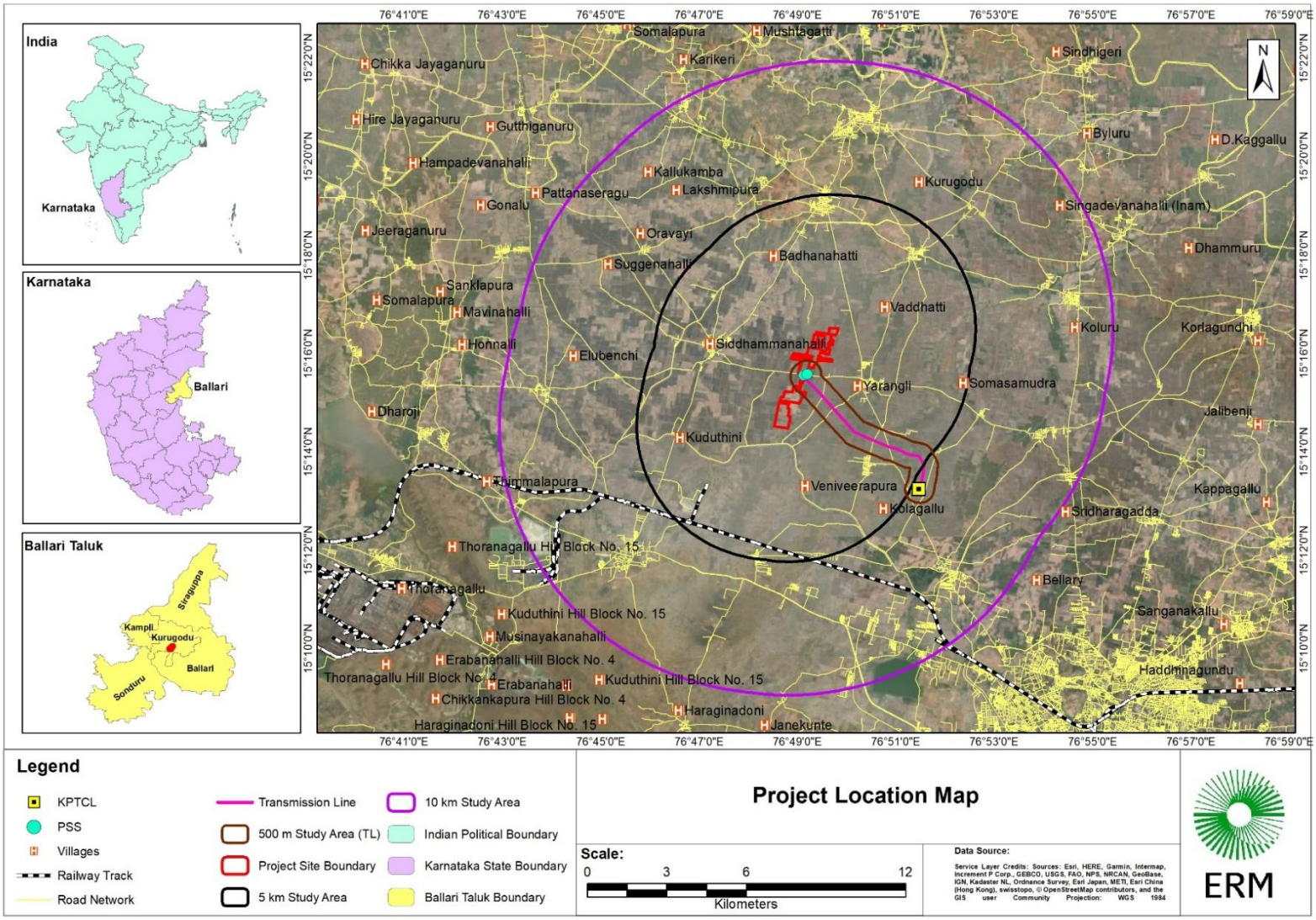
Project Area of Influence, area where the Project and Project activities can affect a particular resource or receptor. The AoI has spatial (distance) and temporal (time) dimensions, the scale of which is dependent on a number of factors.

Study Area, 100% overlap with the AoI. The study area is broken down into the core zone where majority of impacts are anticipated and buffer zone where induced or indirect impacts are anticipated.

Core Zone is 500m for environment and ecology and 2 km for social. **Buffer Zone** is 5 km for all parameters.

2.0. Project Description

Particular	*Description*
Project Owner	AMPYR Energy Resources Five Pvt. Ltd. & AMPYR Energy Resource Ten Pvt. Ltd.
Location	Yarringaligi and Badhanahatti Villages, Ballari Taluka, Ballari District, Karnataka
Current Status	Planning Stage
Power Evacuation	Power will be evacuated to KPTCL Kolagalu Grid Sub-Station (GSS) which is ~6 km to the south-east of the Project boundary through an overhead 110 kV transmission line.
Total land requirement	~176 ha.
Commissioning	• Ampyr 5 (50 MWac): April 2026 • Ampyr 10 (50 MWac): Aug 2026



Resource Requirements

Land Footprint

S. No	Aspect	Details
1.	Solar Farm (Total)	~176 Ha. (Which includes solar plant-159.57 ha., TL route- 13.2 ha., labour camp-0.4 ha., PSS-0.8 ha., access road-1.2 ha. and storage yard-0.4 ha.)
2.	Type of land	The land procured for the project is private dry agricultural land with low productivity
3.	Villages	Yarringaligi and Badhanahatti Villages, Ballari Taluka, Ballari District, Karnataka
4.	External Transmission Line	Power generated from both SPV will be evacuated through a 110 kV external transmission line to the KPTCL Grid Sub-Station at Kolagalu, located approximately 6 km from the proposed project boundary.

Land-related sensitivities

Landlessness: The project will not lead to landlessness; however, approximately 60% of the land lessors may not have additional agricultural land parcels available for cultivation after leasing the project land. Based on consultations with the land lessors and the village representative, it was understood that most lessors primarily depend on agriculture for their livelihoods and have leased their land to mitigate the risks associated with fluctuating agricultural income, particularly due to variable rainfall. Land leasing is considered a beneficial alternative mode of land use by the lessors, as it is expected to provide a stable and predictable source of income compared to the uncertainties associated with agricultural production. Nevertheless, the potential implications of reduced access to land for agricultural cultivation and the extent to which lessors may continue to pursue other livelihood activities should be considered in the assessment of livelihood-related sensitivities.

Schedule V Area and Tribal Land: The Project area does not fall under a Schedule V area as defined in the Indian Constitution. Of the land lessors consulted, 6 are ST landowners. As confirmed by the village accountant, the relevant land parcels are inherited or privately purchased and were not granted by the government. Therefore, the provisions of the Karnataka Scheduled Castes and Scheduled Tribes (Prohibition of Transfer of Certain Lands) Act, 1978 (PTCL Act) do not apply. The land being procured from ST households is understood to constitute traditional and customary land passed down through generations, prior to the establishment of current land titles. During the consultations in Yarringaligi, it was reported that although the customs and traditions of the tribe did not majorly differ from the other communities, the society in the village area was observed to be segregated. Based on the discussion, it was understood that local community is segregated along the lines of caste and the ST community lives separately, as do other social groups. As per the consultations with the village accountant and the land lessors, it is understood that lessors include ~6 ST households. These ST households in the Project village are from the Nayaka tribe (also called Valmiki) and speak Kannada. They do not have a separate language. It is understood that other than the Nayakas, there are no major tribes in the study area. Since there are ST households among the Project affected households, the Project will follow the process of Informed Consultation and Participation

Forest land: As per the toposheet (2011) and basis discussions with the DFO of the Ballari Forest Division, there is no forest land within 5km radius of the Project Area.

Encroachment: No encroachments on the project land procured till date were reported or were observed during the site visit by ERM team.

Common Property Resources: The Project land identified is all private agriculture land and does not include government land parcels, grazing area or any other common property resource.

Cultural Heritage: No temple or site of cultural heritage is located inside the Project boundary

Resource Requirement

Resource	Construction Phase	Operation Phase
Workforce	Around 300 workers will be required during the peak construction period	2 – 3 permanent employees and 20 O and M staff including housekeeping and security
Water	5100 m^3/ year water is required	2304 m^3/ year water is required
Raw Material	Cement- 1500 T/month; Stone-3000 T/month; Steel-900 T/month; Sand-3000 T/month; Bitumen-60,000 L;	There will not be major requirement of raw materials during operation except for maintenance purpose viz. consumable spares.
Fuel	The on-site fuel requirements during construction will be approx. 1000L litres/ month	NA

3.0. Applicable Reference Framework

The applicable reference framework for the ESIA is provided below:

- Applicable policy and legislation with respect to environment, health, safety, labour, land acquisition, stakeholder engagement and indigenous peoples in India;
- Good International Industry Practice (GIIP) as set out in the World Bank Group Environment, Health and Safety (EHS) Guidelines including both the General EHS Guidelines and sector- specific guidance (EHS Guidelines for Transmission and Distribution);
- IFC Performance Standards (2012);
- IFC Workers' Accommodation: Process and Standards;
- Relevant international treaties applicable to the host country including UN Declaration on the Rights of Indigenous Peoples, UN Guidelines Principles on Business and Human Rights, International Covenant on Economic, Cultural and Social Rights and ILO Core Labour Standards ratified by the host country;
- Agreements with other external stakeholders e.g. community groups and non-governmental organizations;
- Agreements with government authorities.
- ERM will also be referring to the following standards during the ESIA process:
- IFC Utility Scale Solar Photovoltaic Power Plants: A Project Developer's Guide (2015); and
- CFM's Responsible Investment Framework.

Status of Key Permits and Licenses

Permit or license	Status as of August 2026
Environmental Clearance	Not required as per Schedule A of the EIA Notification 2006 for solar projects
Consent to Establish/Operate	Not required in accordance with CPCB 2016 notification for harmonization of industrial categories as solar projects are classified as 'white category'
Hazardous Waste Authorization	Not required in accordance with the Hazardous and Other Wastes Amendment Rules, 2019 for projects that are classified as 'white category'

4.0. Analysis Of Alternatives

1. Project Vs. No Project Scenario
2. Alternate Source for Power Generation
3. Alternate Location for project site

Project vs. No Project Scenario

In the "No Project" scenario for this ESIA report, the solar plant would not be constructed or operated, leading to no environmental or social impact at the site. However, the Project is crucial to India's goal of developing 175 GW of renewable energy by 2022 to meet its Paris Climate Agreement commitments. It also supports Karnataka Renewable Energy Policy for 2022-2027, which aims to develop an additional 10,000 MW of renewable energy capacity by 2027. This includes 1,000 MW of rooftop solar installations Without the Project, the region would face power shortages, hindering economic growth, despite its high solar potential.

Alternative Methods of power generation

India's primary energy use is projected to increase four to five times by 2031-32, according to the Planning Commission. While the country's energy mix includes coal, oil, natural gas, nuclear, hydro, and wind power, coal dominates with around 50% of the share. Solar energy, however, offers an eco-friendly, inexhaustible, and low-impact alternative. It is also a cost-effective source of power with minimal pollution. The CO2 emissions per kWh from coal plants are significantly higher than those from solar plants, whose emissions mainly stem from equipment production and construction but remain much lower overall.

Alternative locations for the site

Solar power projects are green and renewable energy as sources of energy, which are site specific and dependent on the availability of solar irradiance resources. There are 250-300 days of clear sun with an available average radiation of 4 to 6 kWh/sqm over a day. There is a capacity to generate 1.5 million units/MW/year through solar photovoltaic systems and up to 2.5 million units/MW/year through solar thermal systems .

Through solar irradiance mapping, it can be noted that the current site is located in an area where the irradiation is 5.5 - 6.00 kWh/m2/day, hence, the current site was selected is most suitable for the solar power generation

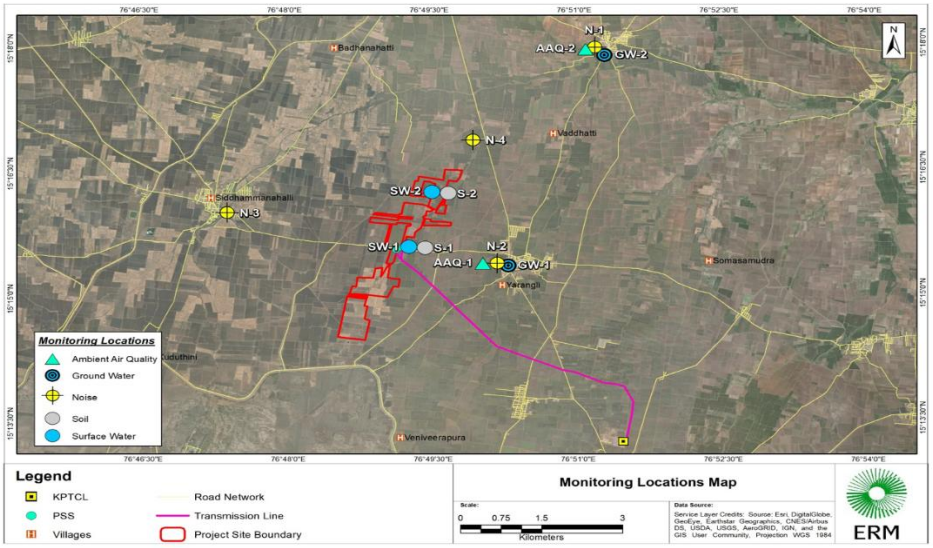
Alternate Project Layout

No alternative site and transmission route assessment has been undertaken by AMPYR for this Project. During discussion with the AMPYR team, it was reported that the following criteria are considered for the site selection for the solar projects:

- To have shortest transmission line route from the Grid Substation;
- Avoiding physical displacement in land procurement process;
- To give preference to fallow land/waste land/single crop land over multiple cropped agriculture land;
- To avoid lease from any ST landowner to prevent landlessness; In such a case where land from an ST owner is avoided, an access route to such a land parcel would be provided by AMPYR;
- Project should not pass through any human settlement;
- Project should not affect any archaeological/ cultural monument;
- Transmission Line route avoiding passing through any protected area such as National Park/ Wildlife Sanctuary; and
- Availability of land and raw materials

5.0. Environmental Baseline

A site visit was undertaken by environmental expert along with NABL accredited laboratory M/s Mitra S K Private Limited from 14th to 16th October 2024 for collection of primary baseline information on ambient noise quality, surface water and ground water quality. ERM social team conducted a site visit from 24 September 2024 to 30 September 2024. A peak migratory season bird survey was conducted from 12th December to 15th December 2023 and from 25th to 26th November 2024, ERM ecology team conducted site visit to understand the ecological constraints within the study area



Air and Water quality

- As per the district ground water brochure published by CGWB, Ballari district falls under 'Safe" Category.
- As per the results from baseline assessment of groundwater, all parameters of two groundwater samples collected are within permissible limits of drinking water standards IS 10500:2012.
- As per the CPCB water quality criteria water quality of all surface water samples falls under class 'C' that is the designated for which the designated best use is drinking water source after conventional treatment and disinfection.
- All monitored parameters at both ambient air quality monitoring stations (AAQ-1 and AAQ-2) are in compliance with the National Ambient Air Quality Standards (NAAQS).

Equivalent Noise Levels Day Time (dB [A])			
Location	**L_{eq} Day**	**CPCB Limit**	**WHO/IFC Limit**
NQ 1	54.2	55	55
NQ 2	53.8		
NQ 3	52		
NQ 4	53.2		
Equivalent Noise Levels Night Time (dB [A])			
Location	**L_{eq} Night**	**CPCB Limit**	**WHO/IFC Limit**
NQ 1	41.9	45	45
NQ 2	43.7		
NQ 3	42.8		
NQ 4	43.2		

Natural Hazards as per BMTPC Vulnerability Atlas (3rd Edition, 2019)

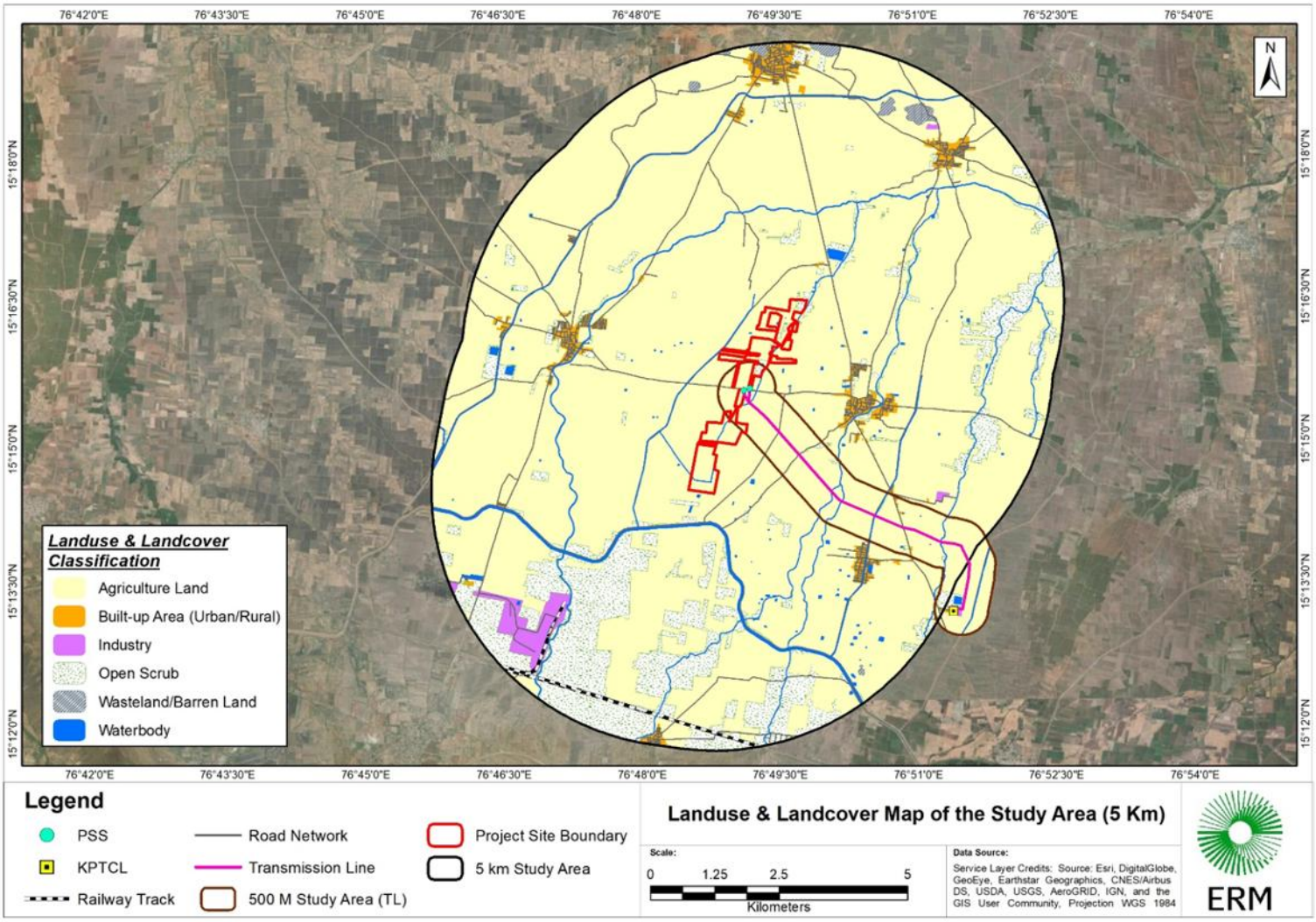
Characteristics	Details
Earthquake	As per Natural Disaster maps published by Building Materials and Technology Promotion Council (BMTPC) of Government of India, the Project site is located in Low Damage Risk Zone (MSK VI).
Wind Hazard	As per Natural Disaster maps published by BMTPC of Government of India, the Project site is located in Low Damage Risk Zone (basic wind speed of 33 m/sec).
Flood	As per Natural Disaster maps published by BMTPC of Government of India, the Project site is not located in proximity to any flood prone area
Land Slide	As per the data released by the BMTPC of Government of India, the Project site is located in an area not prone to landslide incidents.

Noise Monitoring

- Four different locations within the study area were monitored once for ambient noise levels during the study period.
- As per the results, The Leq values at all locations are within the residential limit of daytime 55 dB(A), and nighttime 45 dB(A) indicating that the study area is free from significant noise disturbances and experiences minimal traffic movement

Environmental Baseline (continued)

Land Use of the study area



Local Topographic Features

The Project site is characterized by flat terrain with slightly undulating land at some parts with several small waterbodies and streams. Elevation of the Project site ranges from 422 m amsl to 462 m amsl.

Geomorphology and Hydrology

The Ballari district may be classified as Northern Maidan region with monotonous, treeless, and expansive plateau landscape. The step like landscape, hills and ridges are the general features of the northern maidan region. The Tungabhadra River forms the eastern and northern boundary of the district. The district falls under Krishna basin. The Tungabhadra perennial river forms major drainage system in Ballari district.

Hydrogeologically, the district forms a part of hard rock terrain comprising granitic gneiss, younger granites and schistose formation of Archean age. The alluvium occurring in old river course and in flood plains of granitic and gneissic terrain, which are noticed in Hagari river course in Kudligi, Ballari and Siruguppa taluks.

The soils of the district are derived from Granites, Gneisses and Schistose rocks. The Sandy loam soil mixed with black and grey soils occurs along the stream beds. These originate from gneisses and granites. They are permeable and mildly alkaline in nature. The thickness of the soil varies from 0.2 to 1.00m.

Drainage and waterbodies

The Project Site falls within a seasonal drainage regime associated with the Tungabhadra sub-basin.

Key features include:

- A man-made drainage channel / irrigation channel traverses the Project Site, likely associated with local irrigation conveyance or runoff management.
- Multiple minor seasonal streams (nallahs) are present within and around the Project Site. These channels are narrow, shallow and non-perennial, carrying runoff primarily during the southwest monsoon.
- Water storage structures / irrigation ponds (man-made ponds and surface tanks) are present both within the Project Site and in the surrounding Study Area. These structures serve as rainwater harvesting and agricultural irrigation sources.
- Within the 5-km Study Area, several seasonal waterbodies are observed, which typically impound monsoon runoff and gradually dry up toward the post-monsoon and summer seasons

5.1. Ecological Baseline

The ecology site visits and surveys for the Project are undertaken as below:

- December 2023: 12th December to 15th December: Peak Migration bird and bat survey
- November 2024: 25th November to 26th November:; ESIA site visit

Classification Scheme	Classification
Champion and Seth Classification	Southern Thorn Forest (6A/C1); Southern Thorn Scrub (6A/DS1)
Biogeographical Provinces of India	6D: Deccan Peninsula – Deccan South
Agro Ecological Sub Region (ICAR)	Eastern Ghats, TN uplands and Deccan (Karnataka) Plateau
Agro-Climatic Zone (Planning Commission)	Southern Plateau and Hills Region (X)
Agro-Climatic Zone (NARP)	Scarcity Zone (MH-6)

Habitat Survey

As a part of the site visit, a reconnaissance of the project site and 5 km study area was undertaken to determine the types of habitats that are hosted by the study area. The study area mainly consisted of modified habitats comprising agricultural and fallow lands showing secondary growth from being left fallow, as well as scrub patches. The scrub patches could be classified as natural habitats per the definitions in the IFC PS6, however, the scrub patches have been significantly modified from such anthropogenic activities as rock quarrying, placement of temporary shelters, cattle grazing. These activities have significantly altered the natural vegetation makeup of the scrub patches, leading to their classification as modified habitat.

Floral Assessment

During the survey, a total of 58 floral species have been reported/observed from the region, of which 15 species were observed in the 5 km radius of the project area. Of the reported species, 32 species have not been evaluated by IUCN (v. 2025-2), **one species are categorized as Endangered,** whereas two species are Data Deficient. The remaining 23 species have been categorized as Least Concern. The Indian Teak [*Tectona grandis*; EN (IUCN v. 2025-2)] was found within the 5km study area but was not found within the site boundary. Of the listed species, 24 were trees, 31 were herbs and shrubs, 1 was a grass, whereas 2 were climbers.

Faunal Assessment

Faunal species were recorded based on direct sightings, indirect evidence (dung, droppings, scat, pugmarks, scratch signs, burrow, nests, etc.) and consultations with local communities. The species occurring within the study area were surveyed using the following methodologies:

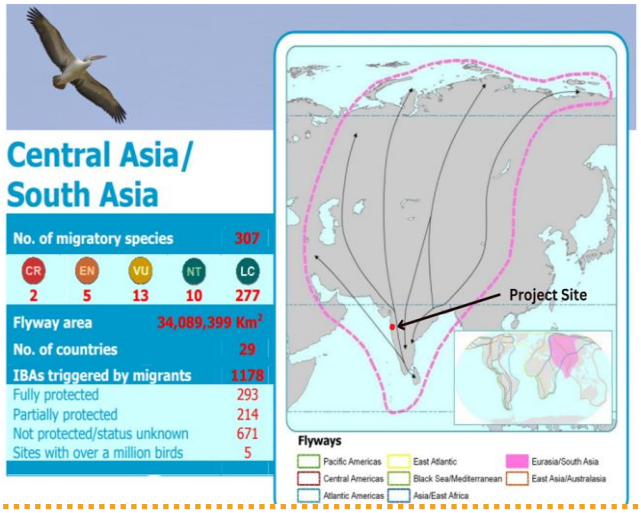
Herpetofauna: A total of 20 species of reptiles and amphibians have been reported from the study area, of which, only two species were observed during the surveys. 18 of the reported species are Least Concern and two are Near Threatened. Six species belong to Schedule I and seven belong to Schedule II.

Avifauna: A total of 161 species of birds have been recorded[23] in the region, of which, 86 species were observed during the ESIA study and 69 during the peak migration study. Out of 161 species 4 are classified as Vulnerable under IUCN v.2026-1 and 43 species are migratory.

Mammals: Fourteen species of mammals are reported/observed from the study area, out of which ten species are protected under Schedule I of the Wildlife Protection Act, 1972; Two species, Bonnet Macaque [Macaca radiata; VU (IUCN v. 2025-2)] and Sloth bear [Melursus ursinus; VU (IUCN v. 2025-2)] are Vulnerable (IUCN v. 2025-2). Four of the fourteen species are observed directly or indirectly during the surveys. The Bonnet Macaque was observed within 1km of transmission line and close to human habitation.

Migratory Routes

The Project site falls within the Central Asian Flyway. Forty-three (43) migratory species viz, Greater Spotted Eagle (*Clanga clanga*) - VU, Common Pochard (*Aythya ferina*) - VU, Bar-headed Goose (*Anser indicus*) - LC Montagu's Harrier (Circus pygargus) -LC, Pallid Harrier (Circus macrourus) – LC, Western Marsh Harrier (Circus aeruginosus), Demoiselle Crane (*Anthropoides virgo*) -LC, Common Sandpiper (Actitis hypoleucos) – LC were also reported or observed from 5 km buffer of the Project site.



5.1. Ecological Baseline (Contd.)

Delineation of Habitats

Habitat Type	Discussion	Conclusion
Open Scrub land (Study area comprising the Project site and 5 km radius)	The common flora species of this habitat are *Prosopis cineraria* (L.) Druce, Neem [*Azadirachta indica*; LC (ICUN v. 2025-2)], *Boswellia serrata* Benth. [NE; IUCN v. 2025-2)], *Senegalia senegal* [NE (IUCN v. 2025-2)], *Calotropis gigantia* [NE (IUCN v. 2025-2)], *Vachellia nilotica* [LC (IUCN v. 2025-2)], *Vachellia leucophloea* [LC (IUCN v. 2025-2)], *Ziziphus mauritiana* [NE (IUCN v. 2025-2)] and *Ziziphus xylopora* [NE (IUCN v. 2025-2)]. The scrublands are not prevalent throughout the study area (covering only ~7%) and are not likely to support high levels of biodiversity. Additionally, these habitats have been degraded over time due to the impacts from grazing, permanent and temporary settlements.	The habitat can thus be considered as **Natural and Modified Habitat** (based on IFC PS6 Habitat Classification)
Agricultural Land (Study area comprising the Project site and 5 km radius)	The crops cultivated include Bydagi chilli [*Capsicum annuum*; LC (IUCN v. 2025-2)], Finger millet [*Eleusine coracana*; NE (IUCN v. 2025-2)], Black gram [*Vigna mungo*; NE (IUCN v. 2025-2)].	The habitat can be considered as **Modified habitat**
Waterbodies (Study area comprising the Project site and 5 km radius)	The waterbodies surveyed were largely manmade canals. The waterbodies were observed to host migratory and/or congregatory bird species, which are subsequently listed.	This habitat can thus be considered as **Natural habitat.**

Critical Habitat Applicability

The Project has no notified protected area within a 5 km radius. The nearest protected area, Daroji Bear Sanctuary, is present about 16 km away from the project site (i.e. the solar plant) in the north-west direction and ~22km from the TL section towards the KPTCL Sub-station. The project site has no Key Biodiversity Areas within 5 km radius. The nearest KBA Tungabhadra Reservoir [IBA Criteria: A1 (Threatened species), A4i (>1% population threshold), A4iii (Congregation of waterbirds)] is present about 51 km away from the project site in the north-west direction.

Secondary data indicated presence of threatened and congregatory species of birds in proximity to the project site, namely, River Tern [*Sterna aurantia*; VU (IUCN v. 2025-2)], Greater Spotted Eagle [*Clanga clanga*; VU (IUCN v. 2025-2)], Common Pochard [*Aythya ferrina*; VU (IUCN v. 2025-2)]. The project site is situated within intensively modified agricultural land with no natural habitat features (e.g., forests, grasslands, or wetlands) present within a 5 km buffer, thereby limiting its ecological suitability for supporting large congregations of birds or sensitive species.

Bonnet Macaques [*Macaca radiata*; VU (IUCN v. 2025-2)] were seen more in the settlement areas and not close to the site. Similarly, Sloth bears [*Melursus ursinus*; VU (IUCN v. 2025-2)] have been rescued around village Kolagallu, within the 5km study area by the forest department. The project site is situated within intensively modified agricultural land with no natural habitat features (e.g., forests, grasslands, or wetlands) present within a 5 km buffer, thereby limiting its ecological suitability for supporting healthy populations of these mammals. A critical habitat assessment is thereby scoped out per IFC PS6.

5.2. Socio-Economic Baseline

This baseline provides an understanding of the administrative set up of the district, the demographic profile of the villages in the Project AoI, the social groups present, the land use patterns in the area, the livelihood profile of the community and the social and physical infrastructure available. The social and physical infrastructure includes education and health infrastructure, the water supply for irrigation and drinking purposes, sanitation facilities and connectivity.

Profile of the Study Area

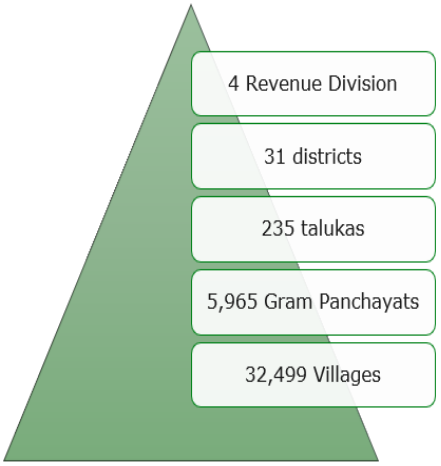
The area up to 2 km from the Project boundary has been considered as the Project direct influence area (core zone) and the area between 2 km and 5 km is considered the buffer Zone.

State: Karnataka is located in southwestern India and is bordered by Maharashtra, Goa, Telangana, Andhra Pradesh, Tamil Nadu and Kerala, with the Arabian Sea along its western coast. The state covers approximately 1.92 lakh sq. km and had a population of 6.11 crore as per the 2011 Census, with a population density of 319 persons per sq. km. Karnataka comprises 30 districts, four administrative divisions, 175 talukas, 6,068 Gram Panchayats, 270 towns and 29,406 villages. Approximately 61.3% of the population resides in rural areas and 38.7% in urban areas. The state's literacy rate is around 75%, reflecting improvement from 67% in 2001. Karnataka has a favourable overall sex ratio of 973 females per 1,000 males, although its child sex ratio remains relatively lower at 948.

District: The Project is located in Ballari District, Karnataka, which borders Raichur, Vijayanagara, Koppal, Chitradurga and Andhra Pradesh. The district comprises five talukas: Ballari, Kampli, Kurugodu, Siruguppa and Sandur.

Study Area for Social Baseline: As per Census 2011, Yarringaligi has a population of 5,119 across 1,055 households, while Badhanahatti has 8,594 people across 1,587 households. Recent consultations estimate populations of approximately 2,000 and 12,000, respectively, reflecting natural growth since the 2011 Census. Yarringaligi has a favourable sex ratio of 1,005 females per 1,000 males, higher than Ballari District (873) and Karnataka (973).

Administrative structure of Karnataka



Social Stratification

The Project study area comprises diverse social groups, including significant SC, ST and OBC populations. SCs constitute approximately 21% and STs 19% of the wider study area, with higher ST representation within parts of the Project footprint. Major communities include Lingayats, Swami and Kuruba (OBC), Madiga (SC) and Nayaka/Valmiki (ST). SC households are predominantly dependent on agriculture, agricultural labour and daily wage employment, with small landholdings and notable landlessness. Site observations indicate that SC settlements are concentrated on village peripheries and continue to experience social exclusion, including restrictions on temple access. ST households are generally small or marginal farmers and agricultural labourers, with comparatively greater social integration, although some exclusion persists. Overall, caste-based social and spatial stratification remains evident across the study area.

LITERACY PROFILE

The demographic profile indicates disparities in literacy across the study area, particularly between males and females. The overall literacy rate is 58%, with male literacy at 68% and female literacy at 47%, reflecting a gender gap of 21 percentage points. Within the project footprint, the overall literacy rate is 51%, with male literacy at 62% and female literacy at 41%. Badhanahatti records the lowest overall literacy rate (39%), followed by Kolagallu (57%) and Yarangligi (59%). Across the Area of Influence (AoI), the overall literacy rate is 60%, with male and female literacy rates of 71% and 49%, respectively. Based on the Village Directory, 2011, all nine villages have primary schools, four have senior secondary schools, and two have degree colleges. No engineering or medical colleges, management institutes, or polytechnic institutes are available locally. Consultations in Yarangligi and Badhanahatti indicated that approximately 30% of students, predominantly girls, discontinue education after Class 10. Reported barriers include household financial constraints, agricultural responsibilities, long travel distances to educational institutions, and parental concerns regarding girls' safety. Teachers also reported attendance challenges among students in Classes 5–10, partly attributed to limited parental awareness of the importance of regular education. Inadequate access to safe drinking water and unreliable electricity were additional school infrastructure constraints.

Social Baseline (continued)

Land Use Pattern

Land use in the study area is predominantly agricultural, accounting for 88% of the total area, followed by open scrub (7%), built-up areas (2%), drainage channels (2%) and boulders (1%). Based on the 2011 Village Directory, approximately 73% of the Study Area and 66% of the Project Footprint comprise net-sown area, with current fallows accounting for 3% in both areas. Other land uses include barren and uncultivable land (10%), non-agricultural uses (9%), permanent pastures and grazing land (4%), and culturable waste (2%). Forest cover is negligible, comprising approximately 112 ha of the 22,665-ha Study Area. Overall, the land use pattern reflects a strong dependence on agriculture and limited forest resources within the study area.

Occupation and Livelihood

Livelihoods in the study area remain primarily dependent on agriculture and allied activities. Census 2011 data indicates that 27% of workers are cultivators and 46% are agricultural labourers, with approximately 76% of land under cultivation. However, consultations indicate a gradual shift among younger generations towards non-farm employment, including daily wage labour, small businesses, teaching, government services and migration. Canal irrigation is critical to agricultural productivity, with paddy and chilli being the main crops; however, irrigation availability is largely seasonal. Both men and women participate in agricultural labour, with women earning comparatively lower daily wages. Sharecropping and land leasing are common, particularly among ST households. Non-farm employment includes construction, factory and mining-related work, while MGNREGA provides additional livelihood opportunities. Livestock rearing is also important, particularly among Kuruba households, with cattle, goats and sheep providing supplementary income.

Gender

Gender roles remain strongly influenced by traditional norms across social groups. Women are primarily responsible for household chores, livestock care and agricultural labour, while men typically undertake livestock grazing and wage labour. Dowry remains prevalent, and women generally marry between 18 and 20 years. Girls from SC and ST communities reportedly face greater barriers to higher education, with many leaving schools after Class 10 due to financial constraints, household responsibilities and mobility restrictions. Women from SC and ST communities are also generally landless, while women from General and OBC groups may own inherited or jointly held land. Consultations with female landowners indicated limited awareness of land market rates and lease processes, with decision-making often dependent on male family members. Stakeholder consultations conducted during September 2024 included communities, land lessors, local representatives, government officials, teachers, frontline workers, land aggregators and the Project's land team.

Social and Physical Infrastructure

Water and Sanitation: All villages in the study area have access to potable water, primarily through canal sources. In Yarringaligi, households receive piped water under the Jal Jeevan Mission for approximately two hours daily. While three private RO plants are available, SC households reportedly have limited access and often rely on unfiltered water. Badhanahatti has eight RO plants, including four government-operated facilities. Around 80% of Yarringaligi households have toilets, although only 10% of SC households reportedly have access. Toilet coverage is higher in Badhanahatti and Kolagallu. Despite availability, nearly half of households in Yarringaligi and Badhanahatti reportedly practice open defecation, attributed mainly to limited awareness and established habits, particularly among older men.

Healthcare and health-seeking behaviour: Healthcare access in the study area is supported by Primary Health Sub-Centres (PHS) in all villages, with one Community Health Centre and two Primary Health Centres reported in the wider study area. Yarringaligi has a PHS and an ambulance provided by the local temple trust. For emergency care, residents primarily travel to the government hospital in Ballari, approximately 15 km away, using private vehicles, auto-rickshaws or ambulances. Government NCD camps are organised monthly in the villages for general health check-ups. Consultations with communities and ASHA workers identified anaemia among pregnant women and children as the most prevalent health concern. Other reported health issues include tuberculosis and malnutrition, although these occur less frequently. Overall, access to emergency and specialised healthcare remains dependent on nearby urban centres.

Electricity: All the Project village households have an electricity connection, though not all the households have a formal connection of electricity supplied by the government. The households with an informal connection get electricity from neighbors with a formal connection. It was reported that power outages are common in the area and households experiencing up to 4-5 hours of power cuts daily on average.

6.0. Impact Assessment

The impact assessment section below presents a summary of the IA carried out for the Project. For each of the scoped-in impacts in the ESIA, the table identifies the impact nature (positive/negative), impact significance, mitigation measures and residual impact significance after implementation of the mitigation measures.

Pre-Construction Phase

Impact Description	Impact Nature	Impact Significance		
		Without Mitigation	Mitigation Measure	With Mitigation
Loss Of Land-Based Livelihood From Agriculture For Title-Holders	Negative	**Minor to Moderate**	• Prepare a Livelihood Restoration Plan (LRP) targeting the land lessors who will functionally be landless after leasing their land to mitigate the loss of primary livelihood. The LRP should assess the number of affected people (working aged men and women) the extent of the impacts, availability of alternatives and the extent of interim support required to help restore livelihoods or support skill development for alternate areas of employment. • The Project's GRM shall be disclosed to each land lessor prior to leasing land and commencement of any activities that may lead to impact, allowing affected stakeholders adequate time to raise concerns. Grievances should be documented and maintained at site. • Stakeholder engagement must be conducted throughout the project lifecycle, with a particular focus on prior engagement before the land is taken on lease. Records of consultations—including participants, concerns raised, and how these were addressed must be documented. • Project-related information must be disclosed in a timely manner, before any potential impact occurs, and with adequate notice.	**Minor**
Functional reduction in cultivated land that will come under tower bases	Negative	**Moderate**	• If additional land is required to be cleared on a temporary basis, outside of RoW (e.g., stringing along angle towers), the Project needs to compensate the landowners for crop damage or other damage at full replacement cost, if applicable. • The Project's GRM shall be disclosed to each transmission line (TL) landowner prior to the commencement of any activities that may lead to impact, allowing affected stakeholders adequate time to raise concerns. Grievances should be documented and maintained at site. • Stakeholder engagement must be conducted throughout the project lifecycle, with a particular focus on prior engagement before any land is taken on lease, site clearance, or construction activities begin. Records of consultations—including participants, concerns raised, and how these were addressed must be documented. • Project-related information must be disclosed in a timely manner, before any potential impact occurs, and with adequate notice.	**Moderate**
Land Users (Sharecroppers)	Negative	**Moderate**	• Prepare a Livelihood Restoration Plan (LRP) targeting the sharecroppers. The LRP should assess the number of affected people (men and women) the extent of the impacts, availability of alternatives and the extent of interim support required to help restore incomes and livelihoods. The LRP should also focus on the landless households impacted by the Project to assess the extent of impacts and support required for them; • Provide financial literacy training as part of the LRP; • The Project's GRM shall be disclosed to the land users as part of wider community disclosure. Grievances should be documented and maintained at site; • Stakeholder engagement must be conducted throughout the project lifecycle, with a particular focus on prior engagement before any land is taken on lease, site clearance, or construction activities begin. Records of consultations—including participants, concerns raised, and how these were addressed must be documented; and • Project-related information must be disclosed in a timely manner, before any potential impact occurs, and with adequate notice.	**Negligible**

Land Users (Agricultural Labourers)	Negative	**Minor**	• Impacted agricultural labourers can be prioritized for incidental labour work during construction and operations; • The Project's GRM shall be disclosed to the land users as part of wider community disclosure. Grievances should be documented and maintained at site. • Stakeholder engagement must be conducted throughout the project lifecycle, with a particular focus on prior engagement before any the land is taken on lease, site clearance, or construction activities begin. Records of consultations—including participants, concerns raised, and how these were addressed must be documented. • Project-related information must be disclosed in a timely manner, before any potential impact occurs, and with adequate notice.	**Negligible**
Gender Differentiated Impacts	Negative	**Major**	• A social audit should be undertaken to assess whether the land lease process has been undertaken transparently and fairly, especially focusing on women land lessors. • The entire negotiation process and compensation amount shall be specifically disclosed and explained to the women members in the family, with the involvement of a consultant. • Household level financial literacy training and joint consultations between male and female members in the family can be undertaken at the time of lease deed signing with the help of a local NGO to develop a plan on utilization of the amount received. • GBV prevention-related sensitization along with disclosure of GRM and how it can be accessed by women.	**Minor**
Scheduled Tribes	Negative	**Moderate**	• Provision of preference for employment during the construction phase of the Project to the agricultural labourers particularly belonging to vulnerable groups and ST along with landowning households; • The LRP prepared for the economically displaced users and others should focus on all PAHs. • Provide financial literacy training as part of the LRP.	**Negligible**

Construction Phase

Impact Description	Impact Nature	Impact Significance		
		Without Mitigation	Mitigation Measure	With Mitigation
Change in land use	Negative	**Moderate**	• Construction activity to be restricted to designated areas • On completion of the construction activities, land used for temporary facilities to be restored to the extent possible and handed over to the owners • The land use around the permanent Project facilities is not to be disturbed	**Minor**
Topography and Drainage	Negative	**Minor**	• Project shall ensure to avoid changes in the topography by unnecessary clearing of land and levelling, especially during the preconstruction and construction phase • The Project shall develop a storm water drainage system, to ensure that water collected in the site flows out the site through said drainage system constructed within the plant boundary • Existing wells should be used as rainwater harvesting structure	**Negligible**
Soil erosion, compaction	Negative	**Minor**	• The top-soil present shall be removed and stockpiled in separate areas. • The stockpile should be protected from natural elements to prevent erosion and also degradation • Topsoil to be reused on site for landscaping purposes • Defined routes for transportation and construction vehicles, workers etc. to minimize soil compaction • Maintenance of natural drainage and good cross drainage as per the natural slope condition should be provided to reduce surface runoff and associated erosion • Back filling and revegetation of the area disturbed will be undertaken phase wise immediately after the completion • Site clearance, piling, excavation and access road development will not be carried out during the monsoon season to minimize erosion and run-off	**Negligible**
Soil Contamination	Negative	**Moderate**	• Designated areas should be provided for Municipal Solid Waste (MSW) and daily collection and periodic disposal should be ensured • Construction and Demolition Waste should be stored separately and be periodically collected by an authorized treatment and storage facility • All waste should be stored in a shed that is protected from the elements (wind, rain, storms, etc.) and away from natural drainage channels • EPC/decommissioning contractor should ensure that no unauthorized dumping of used oil and other hazardous waste is undertaken at the site • A log book should be maintained for quantity and type of hazardous waste generated • In case of accidental/unintended spillage, the contaminated soil should be immediately collected and stored as hazardous waste • Ensure hazardous waste containers are properly labelled and stored onsite provided with impervious surface, shed and secondary containment system awaiting handling and disposal by an authorised vendor (authorised by the MPCB and as per the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016, as amended) • E waste, used discarded batteries shall be disposed of in accordance to e-waste management rules and batteries management and handling rules • Use of spill control kits to contain and clean minor spills and leaks • The guidelines and procedures shall be prepared and followed for immediate clean-up actions following any spillages • Unloading and loading protocols should be prepared for diesel, oil and used oil respectively and workers trained to prevent/contain spills and leaks	**Minor**

Impact Description	Impact Nature	Impact Significance		
		Without Mitigation	Mitigation Measure	With Mitigation
Water Resources	Negative	**Moderate**	• Construction labour deputed onsite to be sensitized about water conservation and encouraged for optimal use of water • Wells present within the site should be protected through barricading; • Wells also should be used as recharging structure; • Dumping waste or construction material within wells should be avoided; • Alternate sources of water supply to be evaluated and ground water abstraction to be minimized to the extent possible • Regular inspection for identification of water leakages and preventing wastage of water from water supply tankers is necessary for efficient utilization of water; • Blending of low-quality water with fresh water for construction uses to ensure efficient use of natural resources (if any treated water available from nearest city or town); • Groundwater recharge measures to be undertaken in the form rainwater harvesting through recharge pits; and • Recycling/reusing to the extent possible.	**Minor**
Water Quality	Negative	**Minor**	• Ensure proper cover and stacking of loose construction material at site to prevent surface runoff and contamination of receiving water body • Provision of number of toilets across easily accessible locations at the Project site • Avoid disturbing soil layers at the edges of the hillock • Open defecation and random disposal of sewage will be strictly restricted • Planning of toilets, soak pits and septic tanks, waste collection areas away from natural drainage channels • Use of licensed contractors for management and disposal of waste and sludge • Laborers will be given training towards proactive use of designated areas/bins for waste disposal and encouraged for use of toilets • Provision for impervious storage area, especially for fuel & lubricant, hazardous waste, etc. will be made onsite • Spill/ leakage clearance plan to be adopted for immediate cleaning of spills and leakages	**Negligible**
Ambient Air quality	Negative	**Minor**	• Preventive measures such as storage of construction material in sheds, covering of construction materials during transportation will be undertaken, for reducing dust as part of the embedded controls; • The construction site to be barricaded; • Keeping areas of open excavation to a minimum; • Minimize stockpiling by coordinating excavations, spreading, re-grading and compaction activities; • Speed of vehicles on site to be limited to 10-15 kmph which will help in minimizing fugitive dust emissions due to vehicular movement; • Emissions from the D.G. set and other stationary machines to be controlled by ensuring that the engines are always properly tuned and maintained; • D.G. sets to be provided with adequate stack height; • Cease or phase down work if excess fugitive dust is observed. Investigate the source of dust and ensure proper suppression measures; • Proper maintenance of engines and use of vehicles with Pollution Under Control (PUC) Certificate; and • Idling of vehicles and equipment will be prevented • Sprinkling of water at regular intervals during high fugitive dust emission; • Ensuring regular engagement with communities near to the Project site to address their concerns.	**Negligible**

Impact Description	Impact Nature	Impact Significance		
		Without Mitigation	Mitigation Measure	With Mitigation
Noise Quality	Negative	**Minor**	• Only well-maintained equipment to be operated on-site • If it is noticed that any particular equipment is generating too much noise then lubricating moving parts, tightening loose parts and replacing worn out components to be carried out to bring down the noise • Machinery and construction equipment that may be in intermittent use to be shut down or throttled down during non-work periods • Low noise equipment shall be used as far as practicable • The number of equipment operating simultaneously shall be reduced as far as practicable • DG set with acoustic enclosures shall be used • Vehicular movement through village roads should be planned to avoid traffic jam and inconvenience to local residents • Equipment noise should be 85 dB (A) at 1 m from the source in line with WB/ IFC EHS guidelines • Minimal use of vehicle horns needs to be encouraged • Limit construction related activities to day time in order to restrict the noise related issues at night, where permissible noise threshold is lesser • Noise monitoring should be undertaken periodically during the construction phase at any receptors or in the direction of receptors • Vehicles and equipment used for the Project should be well maintained and oiled to prevent excess noise during construction	**Negligible to minor**
Occupational Health and Safety	Negative	**Moderate**	• Manual lifting by adult men to be less than 55 kg and for women it is to be less than 30 kg • Erection of steel structures to be carried out by experienced workers and they are to use safety harness, lifelines, catchment etc. • Obtain and check contractor's safety method statements • Monitor health and safety performance and have an operating audit system • Permitting system to be implemented to ensure that cranes and lifting equipment is operated by trained and authorized persons only • Appropriate safety harnesses and lowering/raising tools to be used for working at heights • All equipment to be turned off and checked when not in use • Emergency contact numbers and route to the nearest hospital to be displayed at the construction site • Site specific safety or emergency response plan should be in place to account for natural disasters, accidents and any emergency situations • Site specific/ activity specific Hazards Identification and Risk Assessment (HIRA) to be developed prior to start of the activities at site • Provide H&S achievement information to employees • Safe drinking water supply to be provided for the workers • Excavated areas to be temporarily fenced to avoid access to outsiders and wildlife • Security to be deputed at potential accident sites to restrict entry and prevent near miss or fatal incidents • An up to date first aid box as per checklist (inventory & expiry date) to be provided at construction and a trained person to be appointed to manage it • All equipment to be turned off and checked when not in use • The local/ host community to be kept at safe distance from construction site • At a minimum, implement all COVID-19 related safety and emergency response measures, as relevant and as prescribed by the government	**Minor**

Impact Description	Impact Nature	Impact Significance		
		Without Mitigation	Mitigation Measure	With Mitigation
Community Health and Safety	Negative	**Minor to Moderate**	• Several recommendations including defensive driver training, management of traffic flows, liaising with local authorities and seeking stakeholder feedback can be implemented to further reduce the impact on community health and safety; • Provide the local community an understanding of the Project activities and the potential H&S risks and the grievance redressal mechanism as part of the stakeholder engagement process; • Risks to general public during operation will be reduced by public awareness and education and physical measures by attaching an appropriate warning sign on all faces of the tower; • Once the stringing work is complete, notices and permanent anti climbing devices to be installed on the tower. The operational start date for electricity transmission and safety implications to be publicized locally in advance. • The SOP for preventive maintenance and repairing of vehicle, machineries and equipment's fault to be defined and followed; • Fire-fighting measures to be maintained at substation; • Provide the local community an understanding of the Project activities and the potential H&S risks and the grievance redressal mechanism as part of the stakeholder engagement process;	**Minor**
Influx of Labour	Negative	**Moderate**	• Measures to ensure that the worker accommodation during the construction phase is not located in close proximity to settlements and if they are, then controls for hygiene will have to be put in place; • Ensure that the labor requirements are sourced from the neighboring villages for highly skilled and semi-skilled work; • Extending provisions for hygiene at the Work Site, in terms of adequate lighting, sanitation facilities, proper drinking water facilities and monitoring of drinking water quality, proper disposal of waste, etc.; and • Access to healthcare services and emergency medical care. • Assessment of the type and number of workers who will be requiring accommodation facility; • Identify applicable regulatory requirements on establishment of workers' accommodation; and • Determining the standards to apply to the location of facilities, the construction of housing and provision of facilities. • Mandatory and regular training and awareness raising for the workforce about refraining from unacceptable conduct toward local community members, specifically women; • Informing workers about national laws that make sexual harassment and gender-based violence a punishable offence which is prosecuted and, declaring a zero-tolerance policy for such incidents, making it a fireable offence; • Introducing a Worker Code of Conduct as part of the employment contract, and including sanctions for non-compliance (e.g., termination, and adequate monitoring of contractors, with agreed punitive measures for repeat offences and non-compliance); • Contractors adopting a policy to cooperate with law enforcement agencies in investigating complaints about gender-based violence; • Establish an accessible grievance mechanism for workers and local communities, including a grievance box at the camp, with procedures for confidential, retaliation-free complaints. • Assess the need for camp security personnel based on identified risks and ensure appropriate training on respectful conduct and the prevention of harassment and gender-based violence. • Local community to be made aware of the grievance mechanism and provide access to the local community and labourers to the grievance redress mechanism for the Project;	**Minor**

Impact Description	Impact Nature	Impact Significance		
		Without Mitigation	Mitigation Measure	With Mitigation
Economy and Employment	Positive	Positive	• Sourcing local labour wherever possible shall be made obligatory for the contractors and in all major procurement activities. • AMPYR should establish a mechanism to audit subcontractors and suppliers with respect to compliance of utilizing local labour and resources; • Give preference to young adults of landowner families from Yarringaligi. • It shall be clearly communicated to the workers during the construction period that the employment will be short-term and the duration shall be communicated upfront; • Information on local employment shall be communicated to the Gram Panchayats and information on availability of employment opportunities shall be displayed at the Gram Panchayat office (in the local language) in consultation with the Sarpanch; and The Grievance Redressal Mechanism of the Project shall be applicable to the contractual workforce engaged throughout the Project lifecycle.	
Gender differentiated impacts	Negative	**Moderate**	• Mandatory and repeated training and awareness raising for the workforce about refraining from unacceptable conduct toward local community members, specifically women; • Informing workers about national laws that make sexual harassment and gender-based violence a punishable offence which is prosecuted; • Introducing a Worker Code of Conduct as part of the employment contract, and including sanctions for non-compliance (e.g., termination, and adequate monitoring of contractors, with agreed punitive measures for repeat offences and non-compliance); • Contractors adopting a policy to cooperate with law enforcement agencies in investigating complaints about gender-based violence; • Communication to local community, shops and vendors prior to the start of the construction; • Local community to be made aware of the grievance mechanism and provide access to the local community and labourers to the grievance redress mechanism for the Project; • Labour Camp is planned to be located away from nearby settlement, with entry control, if located near an existing settlement/residential area; • Restricted access from local persons in the labour camp; and • Movement of migrant labourers within the residential areas in the proximity of camps shall be restricted. • Coordinate with local police to facilitate timely response to complaints, including gender-based violence (GBV), and request support, where necessary, for awareness sessions, accessible complaint reporting, and deployment of female officers to the project area where feasible, Ensuring that complaints about gender-based violence are taken seriously by local law enforcement, which may be supported by deploying female officers to the Project area, and participating in preventive training with workers to demonstrate the presence of government authority in the Project area	**Minor**

Impact Description	Impact Nature	Impact Significance		
		Without Mitigation	Mitigation Measure	With Mitigation
Habitat Modification and Loss	Negative	**Negligible**	• Vegetation disturbance, clearance and construction activities should be restricted to the project activity area - labour camp and storage areas. • Areas around waterbodies should be avoided to the extent possible during the planning of access/internal roads, storage areas, labour camps and ancillary facilities. • Unnecessary disturbance of neighbouring vegetation due to off-road vehicular movement, fuel wood procurement, needless expansion of labour camp and destruction of floral resources should be prohibited. • Strict prohibition on use of fuel wood and shrubs from nearby areas as kitchen fuel.	**Negligible**
Impact due to other construction activities	Negative	**Minor**	• Construction and transportation activities should be avoided at night (18:00 to 6:00) and should particularly avoid high faunal activity areas like locations near cliffs and/or rock quarries or water bodies during dawn (6:00 to 7:30) and dusk (17:00 to 18:30). • Areas with pre-existing burrows or ground roosting sites of birds should be avoided where possible. • Temporary barriers should be installed at excavated areas. • Hazardous materials should not be stored near reservoir, and drainage channels. • Simultaneous revegetation on outskirts of Project activity area should be practiced for areas that have loose or unstable soil to avoid erosion and sedimentation. • Waste materials should be cleared in a timely manner and the use of artificial lights should be minimized to not attract wildlife. • Good housekeeping should be followed for construction activities; waste packaging material should be properly disposed. Waste food dumped near the project site or labour camps attracts wild animals, which may lead to instances of human-wildlife conflict. • Labour, contractors and other project personnel should be sensitized towards wildlife. They must be made aware of the provisions of the Wildlife (Protection) Act, 1972, and the consequences of hunting or trapping a Schedule I species. The personnel must be made aware of the species that are protected under the Schedule I of the WPAA, 2022. • Labour movement should be restricted between construction camps and construction sites. • General awareness regarding fauna should be enhanced through trainings, posters, etc. among the staff and labourers.	**Negligible**

Operation and Maintenance Phase

Impact Description	Impact Nature	Impact Significance		
		Without Mitigation	Mitigation Measure	With Mitigation
Soil compaction and erosion	Negative	**Minor**	• Vehicles will utilize the existing access road to undertake maintenance activities at the solar plant therefore no further mitigation measures are suggested to reduce the impact on soil environment	**Negligible**
Waste Disposal / Generation	Negative	**Minor**	• Municipal domestic waste generated at site to be segregated onsite • Daily collection and disposal of waste to be ensured • The municipal waste will be routed through proper collection and handover to local municipal body for further disposal • Ensure oil/ lubricants are stored on impervious floor in the storage area having secondary containment • Use of spill control kits to contain and clean small spills and leaks during O&M activities • The guidelines and procedures shall be prepared and followed for immediate clean-up actions following any spillages • Ensure hazardous waste is properly labelled, stored onsite at a location provided with impervious surface, shed and secondary containment system as per in accordance to Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016	**Negligible**
Water environment	Negative	**Negligible**	• Optimize water usage in the MCR room by application of water conservation measures. • Ensure proper cover and stacking of loose waste material to prevent surface runoff and contamination of receiving water body. • Laborers will be given training towards proactive use of designated areas/bins for waste disposal and encouraged for use of toilets. Open defecation and random disposal of sewage shall be strictly restricted. • Regular inspection for identification of water leakages and preventing wastage of water from water tanks.	**Negligible**
Landscape and Visual	Negative	**Minor**	• Signage related to the Solar Farm must be distinct and confined to entrance gates. No other corporate or advertising signage, particularly billboards to be displayed on site • The footprint of the operations and maintenance facilities, as well as parking and vehicular circulation, should be clearly defined, and not be allowed to spill over into other areas of the site. • Plantations near settlements which can buffer or screen the view to a certain extent. • Landscape development around the solar farm site with the participation of the local community.	**Negligible**
Economy and Employment	**Positive**		• Sourcing local labour wherever possible should be made obligatory for the sub-contractors and in all major O&M activities. AMPYR should establish a mechanism to audit subcontractors with respect to compliance of utilizing local labour and resources; • The contractor should inform the workers and local community about the duration of work;	**Positive**

Impact Description	Impact Nature	Impact Significance		
		Without Mitigation	Mitigation Measure	With Mitigation
Electrocution and collision with transmission line components	Negative	**Minor**	• Regular checking of the vacuums or holes in the towers to avoid nesting by any of the birds. • Insulation[43]: Poles with suspended insulators should maintain a distance of at least 60 cm between a likely perch (cross-arm) to the energized parts (conductors). In instances where the conductors run above or too close to the cross-arm, tubing should be used. Insulating chains of at least 152 cm in length (determined based on the average wingspan of common avifauna) should be used for bird-safe strain poles. • Perch management[44]: Cross-arms, insulators and other parts of the power lines can be constructed so that there is no space for birds to perch where they can be close to energized wires. This is often done by using exclusion devices, or perch deterrents (ref. **Figure 1-3**). If cross arms are fitted with deterrents but pole-tops and insulators remain exposed, perching is likely to continue unabated. • Overhead cables should be marked with bird diverters to reduce the risk of collisions (ref. **Figure 1-4**). Line markers should be as large as possible and increase the visible thickness of the line by at least 20 cm, for a length of at least 10-20 cm. The spacing of each device should not be more than 5-10 m apart. The line markers must incorporate as much contrast with relevant backgrounds as possible[45]. The technical specifications for bird flight diverter[46], in consultation with Central Electricity Authority, India should be followed. • Organic wastes from the villages and from the project should not be disposed close to transmission lines to attract the raptors or their prey. • The Operation and Maintenance team of the Solar plant be more vigilant and look for carcasses during regular maintenance activities. Presence of high occurrences of carcasses should be flagged to the EHS manager	**Negligible**
Labour Influx/Migrant Workforce	Negative	Minor	• AMPYR should ensure a monthly monitoring and regular auditing mechanism for monitoring the sub-contractors and suppliers with respect to compliance to the applicable reference framework, in terms of resources, child labour and forced labour, health and safety, payment of wages etc. • A grievance redressal mechanism shall be in place, to allow for the employees and workers to report any concern or grievance related to work activities. • Mandatory and repeated training and awareness raising for the workforce about refraining from unacceptable conduct toward local community members, specifically women; • Informing workers about national laws that make sexual harassment and gender-based violence a punishable offence which is prosecuted; • Introducing a Worker Code of Conduct as part of the employment contract, and including sanctions for non-compliance (e.g., termination, and adequate monitoring of contractors, with agreed punitive measures for repeat offences and non-compliance); and • Contractors adopting a policy to cooperate with law enforcement agencies in investigating complaints about gender-based violence.	**Negligible**

Impact Description	Impact Nature	Impact Significance		
		Without Mitigation	Mitigation Measure	With Mitigation
Community health and safety impacts	Negative	Minor	• Where community residential clusters are close to the Project boundary, keep a safety setback (as relevant) to mitigate the heat island effect; • Community sensitization sessions shall be re-organized at the beginning of Operation phase, in order to mention about the new developments in the area and provide an understanding of the precautions to be taken for safety; • Project's Grievance Redressal Mechanism for the community shall still be in implementation to deal with any concerns of community health and safety, being raised by the local community. • At the substation, SOPs to be prepared for all O&M activities; • The lock in-lock out system to be followed during maintenance/ repair activities at substation and transmission line; • Records of incident/ accidents shall be maintained; • Root cause analysis shall be carried out for any incident/ accident; and • Provide the local community an understanding of the Project activities and the potential H&S risks and the grievance redressal mechanism as part of the stakeholder engagement process.	**Negligible**

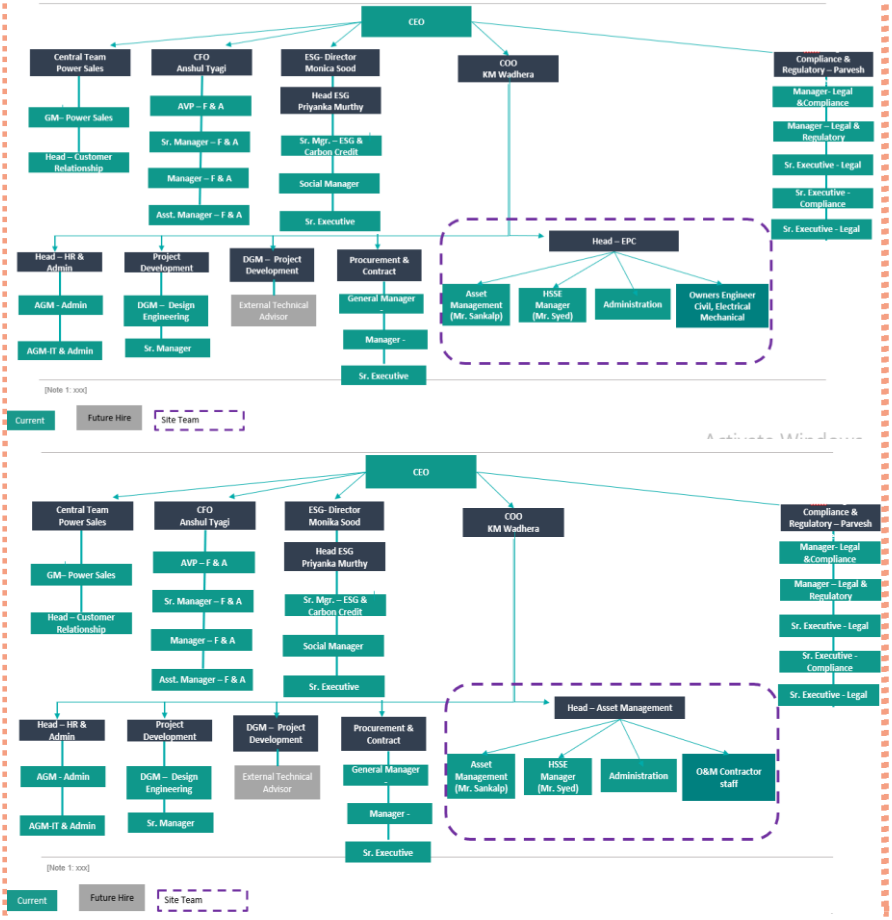
Decommissioning Phase

Impact Description	Impact Nature	Impact Significance		
		Without Mitigation	Mitigation Measure	With Mitigation
Soil erosion and compaction	Negative	**Minor**	Same as construction phase	**Negligible**
Water Availability	Negative	**Minor**	Same as construction phase	**Negligible**
Waste Disposal /Generation	Negative	**Moderate**	Same as construction phase	**Negligible**
Soil Contamination	Negative	**Minor**	Same as construction phase	**Negligible**
Air Quality	Negative	**Minor**	Same as construction phase	**Negligible**
Noise Quality	Negative	**Moderate**	Same as construction phase	**Negligible**
Impact on Economy and Employment	Negative	**Minor**	• The Client should ensure that retrenchment packages comply with the provisions of the Industrial Relations Code, 2020 and are provided to all staff who stand to lose their jobs when the plant is decommissioned. • The contractor should inform the workers and local community about the duration of work; • Reduction of workers will be done phase wise and corresponding to completion of each activity; and • All waste generated from demobilization shall be collected and disposed off at the nearest municipal disposal site. • The Grievance Redressal Mechanism of the Project shall be applicable to the contractual workforce engaged throughout the Project lifecycle. • The Project should provide the local community an understanding of the decommissioning activities and the potential H&S risks and the grievance redressal mechanism as part of the stakeholder engagement process.	**Negligible**

7.0 Environmental and Social Management Plan (ESMP)

The purpose of this ESMP is to specify the standards and controls required to manage and monitor environmental and social impacts during different phase of project life cycle, i.e. construction, operation and decommissioning phases. To achieve this, the ESMP identifies potential adverse impacts from the planned activities and outlines mitigation measures required to reduce the likely negative effects on the physical, natural and social environment. This is in accordance to IFC Performance Standards 1 that emphasizes the importance of managing social and environmental performance through the lifecycle of the Project. This section therefore identifies the implementation mechanism, supervisory responsibilities and key outcomes of the recommended mitigation measures.

Organizational Structure (Construction and Operation Phase)



Implementation

The SPV will have ultimate responsibility for implementing the provisions of the ESMP. This role will include the on-going management of environmental and social impacts, monitoring of contractor performance as well as development of mechanisms for dealing with environmental and social problems.
SPV will also ensure that the activities of its contractors (both during construction and operation phase) are conducted in accordance with good practice measures, implementation of which will be required through contractual documentation.

The overall management and coordination of the Project will be the responsibility of Project Manager of SPV. SPV will engage EPC contractor to undertake construction activities including installation of solar modules, site office, etc. At project level, implementation of management plans and corrective actions are the responsibilities of HSE Engineer of EPC Contractor. In construction and operational phase, HSE Manager of AMPYR/ Project Manager will supervise the Contractor HSE Engineer's performance to implement the management action plans.

EHS Department

Environment, health and safety department shall be responsible for monitoring of the implementation executed by the agencies specified in the ESMP

Stakeholder Engagement and Grievance Management

AMPYR needs to establish a community disclosure and grievance redressal system that will be a part of the stakeholder engagement plan

The Gender Action Plan (GAP)

GAP Will aim to assess the implications of livelihoods and other Socio-economic parameters on gender in the study area. In particular women and effects on them

Inspection, Audit and Monitoring

Through the process of inspection and auditing, the SPV will ensure that the conditions stipulated in various permits are compiled with the entire process

Reporting and documentation

The SPV will develop and implement a programme of regular reporting through the stages of the Project lifecycle

ESMP Review and Amendments

The ESMP acts as an environment and social management tool which needs to be periodically reviewed to address changes in the organization, process or regulatory requirements.

8.0. Stakeholder Engagement and Grievance Redressal

Stakeholder mapping refers to the process of identifying individuals or groups having influence over a project and assessing the effects of their actions on the project. It helps in identifying the different stakeholders as primary or secondary based on the degree of influence on a project and by analyzing the stakes or interest each of them has in the project and the manner in which both the stakeholder group as well as the project can benefit from each other.

Stakeholder Group categorization

Stakeholder Groups	*Primary Stakeholders*	*Secondary Stakeholders*
Community	• Land lessors from Yarringaligi and Badhanahatti • Land Users such as agricultural labourers, sharecroppers, and livestock herders • Local Community in Project footprint • Local Labourers (female and male workers and labourers) • Vulnerable Groups such as women headed households, SC, ST and landless households (this category includes those households who will lease all their land to the project and will have no remaining land after the lease)	• Neighboring villages
Institutional Stakeholders	• Gram Panchayat – Yarringaligi • Government School Teachers • ASHA and Anganwadi Workers	• Civil Society/ NGOs
Government Bodies	• Regulatory Authorities • District and Taluka Administration • Karnataka Power Transmission Corporation Limited (KPTCL) • Village Accountant (Local Revenue Officer at village level)	
Other Groups	• Ampyr • Land Aggregator • EPC and O&M Contractors • Migrant Workforce	• Solar panels and equipment suppliers

Summary of overall stakeholder influence

Stakeholder Category	Stakeholder group	Impact/ influence of the Project on this stakeholder group	Impact/ influence of the stakeholder group on the Project	Overall rating of Stakeholder influence
Primary	Land lessers	Medium	High	High
	Land Users	Large	Low	Moderate
	Sharecroppers	Large	Low	Moderate
	Agricultural Labourers	Small	Low	Negligible
	Livestock herders	Small	Low	Negligible
	Land Aggregator	Medium	High	High
	Developers and EPC Contractors	Medium	High	High
	Female Workers and Labourers	Small	Low	Negligible
	Gram Panchayat	Medium	Medium	Moderate
	Migrant workforce	Small	Medium	Minor
	Regulatory Authorities	Small	High	Moderate
	Karnataka Power Transmission Corporation Limited (KPTCL)	Small	High	Moderate
	AMPYR	High	High	High
	Local laborers engaged by contractors	Small	Medium	Minor
	District/Taluk Administration	Negligible	Low	Negligible
	Local Community in Project footprint	Small	Medium	Minor
	Vulnerable Groups such as women headed households, SC, ST and Landless households	Small	Low	Negligible
	Equipment Suppliers	Medium	Medium	Moderate

9.0 SEP-GRM (Contd.)

The types of grievances that would be taken into consideration by the project under the ambit of this GRM are as follows:

- Grievances pertaining to any adverse impacts from project operations on community members, their assets or resources such as impacts on community's water supply system, damage to crops and livestock, damage to any private property or village structures from movement of vehicles, amongst others.
- Grievances due to project activities from construction and operations phase including noise and dust complaints during the construction and project related traffic blockages, etc.
- Grievances arising from land-based disputes including irregularities on payment of dues or differential land prices, land procured through unfair means, unauthorized encroachment by the project for storage of parts and materials or parking bays, amongst other issues.
- Conflict between any workers or labourers engaged under project operations and local community. Grievances pertaining to any misbehavior, alcohol abuse, misconduct with any community member especially women, children, the elderly and people with disabilities, etc.
- Any other issues relevant to project operations.

Stages of GRM



In order to manage its engagements with the project stakeholders and meet the objectives of SEP-GRM processes, AMPYR is required to ensure that this engagement process is given as much importance as the other project activities as well as guarantee the availability of certain resources. For the management of the E&S aspects of the Project, three entities will be responsible for various activities linked with the Construction and Operations phases of the project, viz., AMPYR, appointed EPC contractor and O&M team. However, the overall responsibility of implementation of the GRM lies with AMPYR, in close coordination with appointed EPC contractor and O&M team, during the construction and operations phases. Additionally, the project team at site shall be trained on aspects of engagement with various key stakeholders and the staff deputed/ identified for SEP and GRM implementation shall be assigned the responsibility of documenting and maintaining records of all stakeholder engagement activities undertaken during the project lifecycle and providing updates to the corporate on the same.

LAYOUT OF THE ESIA-ESMP

Volume	Volume Name	Details
1	Volume 1: Non-technical Summary (NTS)	A concise summary of the ESIA process and key findings that can be easily read and understood by the general public.
2	Volume 2: ESIA Introduction, Project Context and Summary of Scoping Report (*this report*)	• Introduction • Project Description • Policy, Legal and Administrative Framework • Summary of ESIA Scoping Process • Analysis of Alternatives
3	Volume 3: Environmental and Social Baseline and Impact Assessment	• Environmental, Social and Ecological Baseline • Stakeholder Engagement
4	Volume 4: Impact assessment	• Impact Assessment (Environmental, Social and Ecology)
5	Volume 5: Environmental and social management plan	• Summary of impacts identified during pre-construction, construction, operations and de-commissioning stages; and • Complete ESMP summarizing recommendations across the ESIA
6	Volume 6: Technical Annexures	• Stakeholder Engagement Plan (SEP) and Grievance Redressal Mechanism (GRM); • Stakeholder records (summary of discussions, commitments, dates and locations); • Landownership details with due regards for confidentiality in view of potential disclosure; • Summary of consultations with land sellers and aggregators; and • Summary of Focused Group Discussions