

Initial Environmental Examination

Project Number: 51033-001
April 2022

People's Republic of China: Air Quality Improvement
in the Greater Beijing-Tianjin-Hebei Region –
—Green Financing Scale up Project (Anji Clean Air
Bond (CAB) Guaranty Subproject)

Prepared by China National Investment and Guaranty Corporation for the Asian Development Bank

CURRENCY EQUIVALENTS

(as of 1 April 2022)

Currency Unit	–	Chinese Yuan (CNY)
CNY1.00	=	\$ 0.1575
\$1.00	=	CNY 6.3509

ABBREVIATIONS

ADB	Asian Development Bank
AP	Affected Person
AQI	Air Quality Index
EA	Executing Agency
EHS	Environment, Health and Safety
EIA	Environmental Impact Assessment
EMoP	Environmental Monitoring Plan
EMP	Environmental Management Plan
EMS	Environmental Monitoring Station
EEB	Ecology and Environment Bureau
EPL	Environmental Protection Law
FSR	Feasibility Study Report
GDP	Gross Domestic Product
GHG	Green House Gas
GIP	Good International Practice
GRM	Grievance Redress Mechanism
IA	Implementing Agency
IEE	Initial Environmental Examination
I&G	China National Investment and Guaranty Corporation
IT	Interim Target
MAC	Maximum Acceptable Concentration
MEE	Ministry of Ecology and Environment
MEP	Ministry of Environmental Protection
MSW	Municipal Solid Waste
PAM	Project Administration Manual
PCR	Physical Cultural Resources
PPE	Personnel Protective Equipment
PRC	People's Republic of China
SPS	Safeguard Policy Statement, ADB
WHO	World Health Organization
WWTP	Wastewater treatment plant

YRD	Yangtze River Delta
ZALSHG	Zhejiang Anji Liangshan State Holding Group Co. LTD

WEIGHTS AND MEASURES

BOD ₅	Biochemical Oxygen Demand, five days
CaCO ₃	Calcium Carbonate
cm	Centimeter
CO ₂	Carbon Dioxide
COD	Chemical Oxygen Demand
dB(A)	A-weighted sound pressure level in decibels
DO	Dissolved Oxygen
kg	Kilogram
km	Kilometer
kWh	Kilowatt Hour
Leq	Equivalent Continuous Noise Level
m	Meter
m/s	Meters per Second
m ²	Square Meters
m ³	Cubic Meters
mg/l	Milligrams per Liter
mg/m ³	Milligrams per Cubic Meter
µg/m ³	Micrograms per Cubic Meter
NO _x	Nitrogen Oxides
°C	Degrees Celsius
O ₃	Ozone
pH	A measure of the acidity or alkalinity of a solution
PM	Particulate Matter
PM ₁₀	Particulate Matter smaller than 10 micrometers
PM _{2.5}	Particulate Matter smaller than 2.5 micrometers
SO ₂	Sulfur Dioxide
t/h	Tons per Hour
TSP	Total Suspended Particulates

NOTES

- (i) In this report, "\$" refers to US dollars and "€" refers to Euro.
- (ii) This document has been prepared following ADB's Safeguard Policy Statement 2009.

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EXECUTIVE SUMMARY

A. Introduction

1. This Initial Environmental Examination (IEE) report has been prepared for the proposed Anji County Solid Waste Treatment Subproject of the Air Quality Improvement in the Greater Beijing-Tianjin-Hebei Region – Green Financing Scale up Project (the Project) of the People's Republic of China (PRC). The proposed Project is the sixth loan in a multi-year multi-sectoral Asian Development Bank (ADB) support for air quality improvement in the greater Beijing–Tianjin–Hebei (BTH) region.¹

2. The subproject will build a construction waste sorting and disposal center (capacity: 200,000 t/a), ecology restoration of Anji domestic waste landfill after closure and build new landfill including comprehensive landfill area (200,000 m³), emergency landfill area (200,000 m³), fly ash landfill area (100,000 m³), leachate storage tank (30,000 m³) and leachate treatment plant (400 t/d). The subproject will be located at Lujia Village, Dipu Street, Anji County and the site is at north of G235 national Road. The subproject is closed to existing Anji County Municipal Solid Waste (MSW) incineration power plant and Anji County landfill.

3. Once operation, the subproject will treat 200,000 t/a construction waste, treat the fly ash from Anji County MSW incineration power plant and domestic waste in emergency (for example, the Anji County MSW incineration power plant is under maintenance or the domestic waste quantity exceeds the capacity of Anji County MSW incineration power plant) by landfill, treat the unrecyclable waste from construction waste sorting and disposal center by landfill and treat the leachate from Anji County MSW incineration power plant and Anji County landfill and domestic waste of the subproject in leachate treatment plant.

4. The subproject will deliver significant positive social and environmental impacts to beneficiaries through annual recycling of 2,000 t waste iron and 15,000 t aggregate. When compared to the equivalent production of iron and aggregate through traditional methods, once operational the subproject will: (i) result in annual energy savings equivalent to 1,414.6 tce, thereby providing a global public good by avoiding the annual emission of 3,860.0 tons of CO₂; and (ii) improve local air quality through the estimated annual reduction of emissions of SO₂ by 7.4 tons, NO_x by 8.3 tons, and PM by 1.5 tons.

5. This report has been prepared based on domestic Feasibility Study Report (FSR); domestic EIA report; additional baseline data collection and analyses undertaken by the domestic EIA institute; site visits and analyses conducted by consultants; and consultations with affected persons and stakeholders.

B. Policy, Legal and Administrative Framework for Environmental Impact Assessment

6. Environmental Impact Assessment (EIA) procedures have been established in the PRC for over 20 years. Domestic EIA studies are required to be undertaken by relevant PRC environmental laws and regulations. National and local legal and institutional frameworks for EIA review and approval ensure that proposed projects are environmentally sound, designed to operate in line with applicable regulatory requirements, and are not likely to cause significant

¹The region includes Beijing and Tianjin municipalities; the Inner Mongolia Autonomous Region; and Hebei, Henan, Liaoning, Shandong, and Shanxi provinces.

environment, health, social, or safety hazards.

7. ADB's environmental safeguard requirements are specified in the Safeguard Policy Statement (SPS, 2009). The subproject has been screened and classified by ADB as Environment Category B, requiring the preparation of an IEE (this report) including an environmental management plan (EMP). The EMP is presented in Appendix I.

C. Implementation Arrangements

8. China National Investment and Guaranty Corporation (I&G) will be the executing agency (EA) and responsible for overall guidance during project preparation and implementation. Zhejiang Anji Liangshan State Holding Group Co. LTD (ZALSHG) will be the implementing agency (IA) and responsible for implementing the subproject and administering and monitoring contractors and suppliers. A project management office (PMO) will be established in ZALSHG and responsible for day-to-day management of the subproject.

9. ZALSHG was founded in April 17, 2017 a registered capital of 5 billion CNY. It is a state-owned holding company. both soleshareholder and actual controller are Anji County Finance Bureau. Its main businesses are services for state owned holding company; human resources services (excluding occupational intermediary activities and labor dispatch services); state-owned capital management and state-owned equity management.

10. ZALSHG is the main body of state-owned capital operation, land consolidation and infrastructure construction in Anji County, the headquarter of the company mainly undertakes the holding function and the business is mainly conducted by its subsidiaries Anji Development and Investment Corporation, Anji Urban Investment and Anji Transportation Investment Co. Ltd. The business mainly includes land consolidation, infrastructure construction, municipal utilities such as public water and public transportation, real estate development and energy sales.

D. Description

11. The project is aligned with the following impact: air quality and public health in the greater BTH and Yangtze River Delta (YRD) regions improved. The project will have the following outcome: air pollutants and greenhouse gas emissions reduced.

12. The proposed project utilizes the existing Green Financing Platform (GFP) established under Loan 3504-PRC: Air Quality Improvement in the Greater BTH—China National Investment and Guaranty Corporation (I&G)'s GFP Project to ensure early and efficient start to implementation², which has already (i) supported 39 subprojects with a total ADB financing of €332 million, and (ii) delivered substantial results in air pollutant emission reduction.

13. The proposed project uses financial intermediation loan (FIL) modality to address emerging challenges in air quality improvement and GHG emission reduction, and the growing

² Loan 3504-PRC was approved on 12 December 2016 for an amount of €458 million from its ordinary capital resources. This is the second loan under the multiyear lending program for air pollution reduction in the greater BTH region. The loan and project agreements were signed on 25 May 2017, and the project became effective on 14 August 2017. The outcome of the project is air quality improvements and CO₂emission reduction accelerated, and outputs are (i) established GFP and leveraged commercial financing for pollution reduction projects, (ii) lowered barriers and scaled-up financing for small and medium enterprises and energy service company from the GFP, and (iii) strengthened capacity in financial products and to apprise and implement GFPs.

concern over increasing O3 concentrations and HFC emissions in both the greater BTH and YRD regions. The project will also enhance the capacity of domestic clean energy developers to mobilize finance from the domestic market through the issuance of Clean Air Bonds with GFP's credit enhancement support. It will also help further strengthen financial inclusion to promote clean energy investments by introducing (i) Financial Technology (Fin-Tech) for micro, small, and medium-sized enterprise (MSME) and energy service companies (ESCOs), and (ii) gender mainstreaming in GFP operations. The lessons learned and experience from the project are expected to contribute to the knowledge spill-over that would be further disseminated, through ADB organized Asian Clean Energy Forum and BTH air pollution reduction workshops, to other countries facing similar challenges.

14. **Impact and Outcome.** The impact of the proposed project is air quality and public health in the greater BTH and YRD regions improved. The outcome is air pollutant and GHG emission reduction accelerated.

15. The outcome will be achieved through the following outputs:

- (i) **Output 1: Green Financing Platform operation expanded.** The GFP will scale up its operations by (i) expanding regional coverage to the YRD region to accelerate air pollutant and GHG emissions reduction; and (ii) focusing on cutting-edge technologies in renewable energy, clean transport, industrial energy efficiency, and cooling system retrofits. Representative subprojects identified include fast charging stations to support wider uptake of electric vehicles; high-quality biogas and biomass ethanol production plants for industrial, commercial, and residential energy use; high conversion efficiency and low degradation solar photovoltaic power plants; heat, ventilation, and air-conditioning system renovation for industrial energy efficiency; and a cooling system retrofit using water and ice, which will be the first ADB intervention in the cooling sector in the PRC for HFC reduction. As part of scaling up, the GFP will also support strengthening women's leadership in the clean energy sector through networking and training for female managers and employees of the subborrowers.
- (ii) **Output 2: Credit enhancement scheme developed.** The project will establish a credit enhancement scheme in the GFP to diversify green bond instruments with longer maturity. These green bonds will provide a direct funding channel for domestic project sponsors for air quality improvement. The credit enhancement scheme will extend guarantee and investment instruments to improve the creditworthiness of domestic developers to issue clean air bonds (CABs).³ The scheme also supports the issuers in (i) capacity development for environmental and social management system (ESMS) compliance; (ii) arrangement of credible independent review for assessing the bond framework and use of proceeds for green investments; (iii) bond issuance arrangements, including the authority's approval, bond structuring, marketing, and pricing; and (iv) credible tracking and monitoring arrangement for use of proceeds and emission reduction. On successful issuance with full subscription in the market, the CABs will be the first air quality improvement-dedicated green bonds in the PRC.
- (iii) **Output 3: Access to inclusive finance improved.** The project will also further

³ The clean air bond is air quality improvement-dedicated bond that aligns with domestic green bond regulations and international standards. (Climate Bonds Initiative. 2019. Climate Bonds Standard: Version 3.0. London.)

strengthen the GFP's capacity for financial inclusion in air quality improvement and GHG emissions reduction. To improve access to finance by MSMEs, including energy service corporations, and to meet the government's policy on strengthening financial services access for MSMEs, 24 the project will introduce a fintech-powered online lending platform. This will enable simplified loan application, customer-specific risk-based loan pricing by using real-time big data to obtain comprehensive information for each loan application for precise credit risk assessment, and credit risk monitoring and management. The project will also help mainstream gender into project implementation by increasing female staffing in the GFP and supporting involvement of women in clean energy investment.

16. The subproject scope includes: (i) a construction waste sorting and disposal center (200,000 t/a); (ii) ecology restoration of Anji domestic waste landfill after closure; and (iii) new landfill including comprehensive landfill area (200,000 m³), emergency landfill area (200,000 m³), fly ash landfill area (100,000 m³), leachate storage tank (30,000 m³) and leachate treatment plant (400 t/d). Once operation, the subproject will treat 200,000 t/a construction waste, treat the fly ash from Anji County MSW incineration power plant and domestic waste in emergency situation by landfill, treat the unrecyclable waste from construction waste sorting and disposal center by landfill and treat the leachate from Anji County MSW incineration power plant and Anji County landfill and domestic waste of the subproject in leachate treatment plant.

E. Construction Schedule

17. The total construction period for the subproject will be approximately 2 years.

F. Anticipated Impacts and Mitigation Measures

18. Anticipated positive and negative environmental impacts of the proposed subproject were assessed based on the domestic Feasibility Study Report (FSR), domestic EIA report; public consultations led by IA and assisted by environmental consultants; and site visits, surveys and consultations undertaken by consultants.

19. Pre-construction, construction and operation phases were considered separately. The results of the assessment indicate that during the pre-construction phase environmental issues are very limited and are mostly associated with ensuring appropriate incorporation of mitigation measures into the project design.

20. Potential negative construction phase environmental impacts are short-term and localized, and are associated with fugitive dust, construction noise, potential water quality degradation, wastewater, solid waste, disruption of traffic, and risks to worker and community health and safety. These impacts will be effectively mitigated through good construction and health and safety practices, including construction soil and spoil management; dust controls including site watering and the use of ready-mix concrete; noise controls including limiting times and seasons when noisy activities can occur, selecting low noise equipment and scheduling materials delivery to avoid densely populated or sensitive areas; water quality protection measures including managing site runoff, provision of worker sanitary facilities to reduce the impacts to the nearby surface water body; good solid and hazardous waste management practices; and good health, safety and emergency response procedures. Construction will not affect any parks, protected areas or rare or threatened flora or fauna species.

21. Potential negative operation phase impacts include waste, wastewater, odor; domestic wastewater; noise; and potential safety risks. These impacts will be effectively mitigated through good design, including, for example, good landfill management; noise control measures; and good waste and health and safety management practices and plans.

22. The subproject will deliver significant positive social and environmental impacts to beneficiaries through annual recycling of 2,000 t waste iron and 15,000 t aggregate. When compared to the equivalent production of iron and aggregate through traditional methods, once operational the subproject will: (i) result in annual energy savings equivalent to 1,414.6 tce, thereby providing a global public good by avoiding the annual emission of 3,860.0 tons of CO₂; and (ii) improve local air quality through the estimated annual reduction of emissions of SO₂ by 7.4 tons, NO_x by 8.3 tons, and PM by 1.5 tons.

G. Information Disclosure and Public Consultations

23. Domestic EIA (in Chinese) covering the subproject components will be available on request at the PMO after the draft EIA is completed, and will be disclosed on the Anji Environment and Ecology Bureau (EEB) website. The information disclosure will be undertaken by PMO and the domestic EIA Institute with the assistance from the consultants.

24. Public consultations were conducted in March 2022 in the subproject sites by the IA and PMO with the assistance from the consultants. The meetings were organized by the Sub-PMO and were held after the first information disclosure. There was one meeting with village head and questionnaire survey with 38 participants. 100% of the respondents indicated that the subproject would improve local economic development; and 100% indicated that they support the proposed subproject.

25. Meaningful consultation will continue throughout detailed design, construction and operation phases, including information disclosure by the subproject proponent, posting of project information on community notice boards, and public consultations.

H. Grievance Redress Mechanism

26. A subproject-level grievance redress mechanism (GRM) has been established to receive and facilitate resolution of complaints during the construction and operation phases. The GRM includes procedures for receiving grievances, recording/documenting key information, and evaluating and responding to the complainants in a reasonable timeframe. Any concerns raised through the GRM will be addressed quickly and transparently, and without retribution to the affected persons.

I. Environmental Management Plan (EMP)

27. A comprehensive EMP has been developed to ensure: (i) implementation of identified mitigation and management measures to avoid, reduce, mitigate, and compensate for anticipated adverse environment impacts; (ii) implementation of monitoring and reporting against the performance indicators; and (iii) compliance with the PRC's relevant environmental laws, standards and regulations and the ADB's SPS 2009. The EMP includes an environment monitoring plan (EMoP) to monitor the environmental impacts of the subproject and assess the effectiveness of mitigation measures, and a capacity building and training program focused on health, safety and environment. Organizational responsibilities and budgets are clearly identified for implementation, monitoring and reporting. The EMP is presented in Appendix I.

J. Risks and Key Assurances

28. The IA and PMO has limited experience in ADB's projects and have low institutional capacity for environmental management. This may result in limited implementation of the project EMP and inadequate operation of the project facilities. To support effective implementation of the project EMP, (i) a full-time Environment and Social Officer will be appointed in the PMO; (ii) a part-time loan implementation environmental consultant (LIEC) will be recruited to support the PMO; (iii) recruitment of an environmental monitoring agency to lead the external monitoring specified in the EMP; (iv) clear roles and responsibilities of all relevant agencies for EMP implementation, including contractors and construction supervision companies; and (v) capacity building for EMP implementation.

K. Conclusion

29. Through the environmental assessment process, it is concluded that the subproject has: (i) selected appropriate technologies to improve energy structure and reduce the emission of pollutants; (ii) identified potential negative environment impacts and established mitigation measures; (iii) received public support from the subproject beneficiaries and affected people; (iv) established project-level GRM procedures; and (v) prepared a comprehensive EMP including environmental management and supervision structure, environmental mitigation and monitoring plans, and capacity building and training.

30. Overall, any minimal adverse environmental impacts associated with the subproject can be prevented, reduced, or minimized through the appropriate application of mitigation measures.

I. INTRODUCTION

A. The Project

1. This Initial Environmental Examination (IEE) report is prepared for the proposed Anji County solid waste treatment subproject of the Air Quality Improvement in the Greater Beijing-Tianjin-Hebei Region – China National Investment and Guaranty Corporation’s Green Financing Platform Project (the Project) of the People’s Republic of China (PRC). (**Figure I-1**). The proposed project is the six loan in a multi-year multi-sectoral Asian Development Bank (ADB) support for air quality improvement in the greater Beijing–Tianjin–Hebei (BTH) region.

2. The Asian Development Bank (ADB) and the Government of the People’s Republic of China (PRC) agreed in 2015 establish a multiyear lending program during 2015–2020 to mutually reinforce government actions for reducing air pollution in the greater Beijing–Tianjin–Hebei (BTH) region. Since 2015, under the multiyear lending program, ADB has approved about \$2 billion in loans that have been implemented successfully. In 2015, ADB approved the first policy-based loan in the PRC under the program, which focused on policy reforms and regulatory capacity strengthening to improve air quality in Hebei Province.⁴ In 2016, the second loan was approved to establish a green financing platform (GFP) for developing air pollution reduction projects in the region by enabling better access to finance.⁵ In 2017, the third loan was approved to support the adoption of high-level technologies by major polluting entities across key sectors in the region.⁶ In 2018, the fourth loan was approved to help Shandong Province adopt more efficient and advanced technologies for heat production and refrigeration by replacing coal with cleaner energy sources such as natural gas, renewable energy, and waste heat recovery.⁷ In 2019, the fifth loan was approved to accelerate a switch from coal to natural gas and biogas for residential, commercial, and industrial uses to improve air quality in Henan Province.⁸ The proposed project will be the sixth loan under the air quality improvement program.⁹

3. The project is aligned with the following impact: air quality and public health in the greater BTH and YRD regions improved. The project will have the following outcome: air pollutants and

⁴ ADB. 2015. Report and Recommendation of the President to the Board of Directors: Proposed Policy-Based Loan to the People’s Republic of China for the Beijing–Tianjin–Hebei Air Quality Improvement—Hebei Policy Reforms Program. Manila.

⁵ ADB. 2016. Report and Recommendation of the President to the Board of Directors: Proposed Loan to the People’s Republic of China for the Air Quality Improvement in the Greater Beijing–Tianjin–Hebei Region—China National Investment and Guaranty Corporation’s Green Financing Platform Project. Manila.

⁶ ADB. 2017. Report and Recommendation of the President to the Board of Directors: Proposed Loan to the People’s Republic of China for the Air Quality Improvement in the Greater Beijing–Tianjin–Hebei Region—Regional Emission-Reduction and Pollution-Control Facility. Manila.

⁷ ADB. 2018. Report and Recommendation of the President to the Board of Directors: Proposed Loan to the People’s Republic of China for the Air Quality Improvement in the Greater Beijing–Tianjin–Hebei Region—Shandong Clean Heating and Cooling Project. Manila.

⁸ ADB. 2019. Report and Recommendation of the President to the Board of Directors: Proposed Results-Based Loan to the People’s Republic of China for the Air Quality Improvement in the Greater Beijing–Tianjin–Hebei Region—Henan Cleaner Fuel Switch Investment Program. Manila.

⁹ ADB is also supporting small and medium sized local banks and financial institutions in Hebei, Shandong and Shaanxi provinces, including Bank of Xingtai, Shandong Green Development Fund, and Shaanxi Financial Holding Group, to build local capacity and promote green finance

greenhouse gas emissions reduced.

4. The proposed project utilizes the existing Green Financing Platform (GFP) established under Loan 3504-PRC: Air Quality Improvement in the Greater BTH—China National Investment and Guaranty Corporation (I&G)'s GFP Project to ensure early and efficient start to implementation¹⁰, which has already (i) supported 39 subprojects with a total ADB financing of €332 million, and (ii) delivered substantial results in air pollutant emission reduction.

5. The proposed project uses financial intermediation loan (FIL) modality to address emerging challenges in air quality improvement and GHG emission reduction, and the growing concern over increasing O3 concentrations and HFC emissions in both the greater BTH and YRD regions. The project will also enhance the capacity of domestic clean energy developers to mobilize finance from the domestic market through the issuance of Clean Air Bonds with GFP's credit enhancement support. It will also help further strengthen financial inclusion to promote clean energy investments by introducing (i) Financial Technology (Fin-Tech) for micro, small, and medium-sized enterprise (MSME) and energy service companies (ESCOs), and (ii) gender mainstreaming in GFP operations. The lessons learned and experience from the project are expected to contribute to the knowledge spill-over that would be further disseminated, through ADB organized Asian Clean Energy Forum and BTH air pollution reduction workshops, to other countries facing similar challenges.

6. **Impact and Outcome.** The impact of the proposed project is air quality and public health in the greater BTH and YRD regions improved. The outcome is air pollutant and GHG emission reduction accelerated.

7. The outcome will be achieved through the following outputs:

- (i) **Output 1: Green Financing Platform operation expanded.** The GFP will scale up its operations by (i) expanding regional coverage to the YRD region to accelerate air pollutant and GHG emissions reduction; and (ii) focusing on cutting-edge technologies in renewable energy, clean transport, industrial energy efficiency, and cooling system retrofits. Representative subprojects identified include fast charging stations to support wider uptake of electric vehicles; high-quality biogas and biomass ethanol production plants for industrial, commercial, and residential energy use; high conversion efficiency and low degradation solar photovoltaic power plants; heat, ventilation, and air-conditioning system renovation for industrial energy efficiency; and a cooling system retrofit using water and ice, which will be the first ADB intervention in the cooling sector in the PRC for HFC reduction. As part of scaling up, the GFP will also support strengthening women's leadership in the clean energy sector through networking and training for female managers and employees of the subborrowers.
- (ii) **Output 2: Credit enhancement scheme developed.** The project will establish

¹⁰ Loan 3504-PRC was approved on 12 December 2016 for an amount of €458 million from its ordinary capital resources. This is the second loan under the multiyear lending program for air pollution reduction in the greater BTH region. The loan and project agreements were signed on 25 May 2017, and the project became effective on 14 August 2017. The outcome of the project is air quality improvements and CO2 emission reduction accelerated, and outputs are (i) established GFP and leveraged commercial financing for pollution reduction projects, (ii) lowered barriers and scaled-up financing for small and medium enterprises and energy service company from the GFP, and (iii) strengthened capacity in financial products and to apprise and implement GFPs.

a credit enhancement scheme in the GFP to diversify green bond instruments with longer maturity. These green bonds will provide a direct funding channel for domestic project sponsors for air quality improvement. The credit enhancement scheme will extend guarantee and investment instruments to improve the creditworthiness of domestic developers to issue clean air bonds (CABs).¹¹ The scheme also supports the issuers in (i) capacity development for environmental and social management system (ESMS) compliance; (ii) arrangement of credible independent review for assessing the bond framework and use of proceeds for green investments; (iii) bond issuance arrangements, including the authority's approval, bond structuring, marketing, and pricing; and (iv) credible tracking and monitoring arrangement for use of proceeds and emission reduction. On successful issuance with full subscription in the market, the CABs will be the first air quality improvement-dedicated green bonds in the PRC.

- (iii) **Output 3: Access to inclusive finance improved.** The project will also further strengthen the GFP's capacity for financial inclusion in air quality improvement and GHG emissions reduction. To improve access to finance by MSMEs, including energy service corporations, and to meet the government's policy on strengthening financial services access for MSMEs, 24 the project will introduce a fintech-powered online lending platform. This will enable simplified loan application, customer-specific risk-based loan pricing by using real-time big data to obtain comprehensive information for each loan application for precise credit risk assessment, and credit risk monitoring and management. The project will also help mainstream gender into project implementation by increasing female staffing in the GFP and supporting involvement of women in clean energy investment.

8. This subproject will build a construction waste sorting and disposal center (capacity: 200,000 t/a), ecology restoration of Anji domestic waste landfill after closure and build new landfill including comprehensive landfill area (200,000 m³), emergency landfill area (200,000 m³), fly ash landfill area (100,000 m³), leachate storage tank (30,000 m³) and leachate treatment plant (400 t/d). The subproject will be located at Lujia Village, Dipu Street, Anji County and the site is at north of G235 national Road. The subproject is closed to existing Anji County Municipal Solid Waste (MSW) incineration power plant and Anji County landfill.

9. Once operation, the subproject will treat 200,000 t/a construction waste, treat the fly ash from Anji County MSW incineration power plant and domestic waste in emergency by landfill, treat the unrecyclable waste from construction waste sorting and disposal center by landfill and treat the leachate from Anji County MSW incineration power plant and Anji County landfill and domestic waste of the subproject in leachate treatment plant.

B. Introduction of Borrower

10. China National Investment and Guaranty Corporation (I&G) will be the executing agency (EA) and responsible for overall guidance during project preparation and implementation. Zhejiang Anji Liangshan State Holding Group Co. LTD (ZALSHG) will be the implementing agency (IA) and responsible for implementing the subproject and administering and monitoring contractors and suppliers. A project management office (PMO) will be established in ZALSHG

¹¹ The clean air bond is air quality improvement-dedicated bond that aligns with domestic green bond regulations and international standards. (Climate Bonds Initiative. 2019. Climate Bonds Standard: Version 3.0. London.)

and responsible for day-to-day management of the subproject.

11. ZALSHG was founded in April 17, 2017 a registered capital of 5 billion CNY. It is a state-owned holding company. both sole shareholder and actual controller are Anji County Finance Bureau. Its main businesses are services for state owned holding company; human resources services (excluding occupational intermediary activities and labor dispatch services); state-owned capital management and state-owned equity management.

12. ZALSHG is the main body of state-owned capital operation, land consolidation and infrastructure construction in Anji County, the headquarter of the company mainly undertakes the holding function and the business is mainly conducted by its subsidiaries Anji Development and Investment Corporation, Anji Urban Investment and Anji Transportation Investment Co. Ltd. The business mainly includes land consolidation, infrastructure construction, municipal utilities such as public water and public transportation, real estate development and energy sales.

C. Report Purpose

13. This report, including an environmental management plan (EMP) is prepared following both national regulations and ADB's environmental safeguard requirements specified in the Safeguard Policy Statement (SPS 2009). The EMP is presented in **Appendix I**.

D. Approach to Report Preparation

14. This report has been prepared based on a domestic Feasibility Study Report (FSR); domestic EIA report; public consultations with key stakeholders and affected persons; and site visits, surveys, consultations undertaken by environmental consultants.

E. Report Structure

15. This IEE report consists of an executive summary, nine chapters and one appendix. The report is structured as follows:

Executive Summary

Summarizes critical facts, significant findings, and recommended actions.

I Introduction

Introduces the proposed subproject, report purpose, approach to IEE preparation and IEE structure.

II Policy, Legal, and Administrative Framework

Discusses PRC's and ADB's environmental assessment legal and institutional frameworks, status of approval of the domestic EIA reports, and applicable environmental guidelines and standards.

III Description of the Project

Describes the project rationale, scope, subprojects, location, key features, implementation arrangements, budget and time schedule.

IV Description of the Environment

Describes relevant physical, biological, and socioeconomic conditions within the subproject area.

V Anticipated Environmental Impacts and Mitigation Measures

Describes impacts predicted to occur as a result of the subproject and identifies the mitigation measures which will be implemented.

VI Analysis of Alternatives

Presents an analysis of alternatives undertaken to determine the best way of achieving the subproject objectives while minimizing environmental and social impacts.

VII Information Disclosure, Consultation, and Participation

Describes the process undertaken for engaging stakeholders and carrying out information disclosure and public consultation.

VIII Grievance Redress Mechanism

Describes the subproject grievance redress mechanism (GRM) for resolving complaints.

IX Conclusion and Recommendation

Presents conclusions drawn from the assessment and recommendations.

Appendix

16. Appendix I presents the EMP, including required construction and operation phase environmental mitigation measures, EMoP, reporting requirements, and capacity building. Other appendices present supporting documentation and approvals.

17. Appendix II presents the coronavirus (COVID-19) health and safety plan to address COVID-19 health risks.

II. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

18. This IEE has been prepared in accordance with both the PRC's national and local environmental legal and institutional framework and environmental assessment requirements, and applicable ADB policies, requirements and procedures.

A. Applicable ADB Policies, Regulations and Requirements

19. The major applicable ADB policies, regulations, requirements and procedures for environmental management and environmental impact assessment (EIA) are the Safeguard Policy Statement (SPS, 2009) and the Environmental Safeguards – A Good Practice Sourcebook (2012), which jointly provide the basis for this EIA. The SPS promotes good international practice as reflected in internationally recognized standards such as the World Bank Group's EHS Guidelines. The policy is underpinned by the ADB Operations Manual for the SPS (OM Section F1, 2010).

20. The SPS establishes an environmental review process to ensure that projects undertaken as part of programs funded through ADB loans are environmentally sound, are designed to operate in compliance with applicable regulatory requirements, and are not likely to cause significant environment, health, social, or safety hazards.

21. At an early stage in the project cycle, typically the project identification stage, ADB screens and categorizes proposed projects based on the significance of potential project impacts and risks. Project screening and categorization are undertaken to:

- i) reflect the significance of the project's potential environmental impacts;
- ii) identify the type and level of environmental assessment and institutional resources required for the safeguard measures proportionate to the nature, scale, magnitude and sensitivity of the proposed project's potential impacts; and,
- iii) determine consultation and disclosure requirements.

22. A project's environment category is determined by the category of its most environmentally sensitive component, including direct, indirect, induced, and cumulative impacts. ADB assigns a proposed project to one of the following categories:

- i) **Category A.** Proposed project is likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented; impacts may affect an area larger than the sites or facilities subject to physical works. A full-scale EIA including an EMP, is required.
- ii) **Category B.** Proposed project's potential environmental impacts are less adverse and fewer in number than those of category A projects; impacts are site-specific, few if any of them are irreversible, and impacts can be readily addressed through mitigation measures. An IEE, including an EMP, is required.
- iii) **Category C.** Proposed project is likely to have minimal or no adverse environmental impacts. No EIA or IEE is required although environmental implications need to be reviewed.
- iv) **Category FI.** Proposed project involves the investment of ADB funds to, or through, a financial intermediary.

23. The Subproject has been classified by ADB as environment category B. An IEE has been prepared for the Subproject (this report).

24. The SPS 2009 requires a number of additional considerations, including: (i) project risk and respective mitigation measures and project assurances; (ii) project-level grievance redress

mechanism; (iii) definition of the project area of influence; (iv) physical cultural resources damage prevention analysis; (v) climate change mitigation and adaptation; (vi) occupational and community health and safety requirements (including emergency preparedness and response); (vii) economic displacement that is not part of land acquisition; (viii) biodiversity conservation and natural resources management requirements; (ix) provision of sufficient justification if local standards are used; (x) assurance of adequate consultation and participation; and (xi) assurance that the EMP includes an implementation schedule and measurable performance indicators. These requirements, which may not be covered in a domestic environmental assessment, have been considered, and all applicable environmental requirements in the SPS 2009 are covered in this IEE.

25. During the design, construction, and operation of a project, the SPS also requires the borrower to follow environmental standards consistent with good international practice, as reflected in internationally recognized standards such as the World Bank Group's Environment, Health and Safety Guidelines (hereafter referred to as the EHS Guidelines).¹² The EHS Guidelines includes both general guidelines and industry sector guidelines. The general EHS Guidelines contains (i) environmental guidelines on discharge effluent, air emissions, and other numerical guidelines; (ii) occupational health and safety guidance; (iii) community health and safety guidance; and (iv) construction and decommissioning guidelines.

26. The EHS Guidelines also include performance indicators and prevention and control approaches that are normally acceptable to ADB and are generally considered to be achievable at reasonable costs by existing technology. When host country regulations differ from these levels and measures, the borrower/client is to achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, the borrower/client is required to provide justification for any proposed alternatives.

B. PRC Environmental Legal Framework

27. The environmental protection and management system in the PRC consists of a well-defined hierarchy of regulatory, administrative and technical institutions. At the top level the People's Congress of the PRC has the authority to pass and revise national environmental laws; the Ministry of Ecology and Environment (MEE) under the State Council promulgates national environmental regulations; and the MEE either separately or jointly with the Administration of Quality Supervision, Inspection and Quarantine issues national environmental standards and guidelines. Provincial and local governments can also issue provincial and local environmental regulations and guidelines in accordance with the national ones. In addition, national and local five-year environmental protection plans form an important part of the legal framework.

28. Key PRC environmental laws are listed in **Table II-1**, including associated regulations and decrees that support their implementation. Guidelines for EIA implementation are listed in **Table II-2**.

29. The most far-reaching legislation on pollution prevention and control is the Environmental Protection Law (EPL) (1989, amended 2014, effective 2015 and item 2 in **Table II-1**), which sets out key principles for the nation's pollution control system, including the "Three Simultaneities policy",¹³ the application of pollution levy's, and EIA requirements. The implementation of the "Three Simultaneities" was further strengthened by implementation decrees (items 26 and 28 **Table II-1**) and the Construction Project Environmental Protection Management Regulation (item 17 **Table II-1**).

12 World Bank Group, *Environmental, Health, and Safety Guidelines*, April 30, 2007, Washington, USA. <http://www.ifc.org/ifcext/enviro.nsf/Content/EnvironmentalGuidelines>

13 The "Three Simultaneities Policy" requires the design, construction, and operation of pollution control and treatment facilities to occur simultaneously with the project design, construction, and operation.

Table II-1: Applicable PRC environmental laws, regulations and decrees.

No.	Laws	Issued/ Updated
1	Environmental Impact Assessment Law	2016
2	Environmental Protection Law	2015
3	Atmospheric Pollution Prevention and Control Law	2018
4	Occupational Disease Prevention and Control Law	2018
5	Water and Soil Conservation Law	2011
6	Water Pollution Prevention and Control Law	2018
7	Urban and Rural Planning Law	2008
8	Solid Waste Pollution Prevention and Control Law	2016
9	Water Law	2002
10	Cultural Relics Protection Law	2016
11	Noise Pollution Prevention and Control Law	2017
12	Labor Law	2018
Regulations		
13	Atmospheric Pollution Prevention and Control Action Plan (State Council Announcement No. 37)	2013
14	Policy on Integrated Techniques for Air Pollution Prevention and Control of Small Particulates (MEE Announcement No. 59)	2013
15	Planning Environmental Impact Assessment Regulation	2009
16	Implementation Regulation of Cultural Relics Protection Law	2003
17	Construction Project Environmental Protection Management Regulation	1998
18	Wild Plant Protection Regulation	1996
Decrees and Announcements		
19	Directory for the Management of Construction Project EIA Categorization (MEE Decree 2015-33)	2015
20	Measures for Public Participation in Environmental Protection (MEE Decree 2015-35)	2015
21	Management Measures for Environmental Impact Post Assessment of Construction Projects (on trial) (MEE Decree 2015-37)	2015
22	Government Information Disclosure of Construction Project EIA (on trial) (MEE Announcement No. 103)	2013
23	Measures for Environmental Supervision (MEE Decree 2012-21)	2012
24	Requirements for Preparation of EIA Report Summary (MEE Announcement 2012-51)	2012
25	Strengthening of EIA Management for Prevention of Environmental Risk (MEE Announcement 2012-77)	2012
26	Opinion from the State Council on Important Tasks for Strengthening Environmental Protection (State Council Announcement 2011-35)	2011
27	Management Measures for Operation of the Environmental Complaint Hotline (MEE Decree 2010-15)	2010
28	Management Procedures for the Supervision, Inspection and Environmental Acceptance of Construction Projects under the "Three Simultaneities" (on trial) (MEE Announcement 2009-150)	2009
29	Specifications on the Management of Urban Construction and Demolition Waste (Ministry of Construction Decree 2005-139)	2005
30	Management Measures for Inspection and Acceptance of Environmental Protection at Construction Project Completion (MEE Decree 2001-13)	2001
31	Interim Measures for the Environmental Protection Acceptance of Completed Construction Projects (EIA department of MEP, 2007-04)	2017

Source: consultants.

30. The amended EPL further defines enforcement and supervision responsibilities for all levels of environmental protection authorities, imposes stricter obligations and more severe penalties on enterprises and construction units regarding pollution prevention and control, and allows for environmental public interest litigation including through nongovernment organizations. The procedures and requirements for the technical review of EIA reports by

authorities have been specified (**Table II-2**, item 4), and environmental inspection and enforcement on design, installation, and operation of project-specific environmental protection and control measures are regulated under the “Three Simultaneities” (**Table II-1**, items 5, 15, 25, 26, and 28).

Table II-2: PRC EIA Guidelines.

	Guidelines	Date
1	Technical Guideline on EIA: Construction Projects	HJ/T 2.1-2016
2	Technical Guideline on EIA: Atmospheric Environment	HJ 2.2-2018
3	Technical Guideline on EIA: Surface Water Environment	HJ/T 2.3-2018
4	Technical Guideline on EIA: Acoustic Environment	HJ 2.4-2009
5	Technical Guideline on EIA: Ecological Assessment	HJ 19-2011
6	Technical Guideline on EIA: Ground Water Environment	HJ610-2016
7	Standards for the Assessment of Regional Biodiversity	HJ623-2011
8	Technical Guideline for Assessment on Environmental Risk of Alien Species	HJ624-2011
9	Technical Guideline on Environmental Risk Assessment for Construction Project	HJ/T169-2018
10	Technical Specifications for the Collection, Storage and Transportation of Hazardous Waste	HJ2025-2012
11	National List of Hazardous Wastes (MEE, Order No. 39)	2021
12	General Provisions-Technical Guidelines for Self-Monitoring of Pollution Emission Entities	HJ819-2017
13	Guidelines for Environmental Impact Assessment of Hazardous Wastes in Construction Projects” (MEE, No. 43)	2017
14	Technical Specifications for Application and Issuance of Pollution Discharge Permits	HJ942-2018
15	Technical Requirements for Environmental Protection for Standardized Construction of Centralized Drinking Water Sources	HJ 773-2015

Source: consultants.

31. Public participation and environmental information disclosure provisions are among the most significant changes introduced in the amended EPL, further supported by the decrees on the preparation of EIA summaries for the purpose of public disclosure (**Table II-1**, item 24), information disclosure on construction project EIAs by government (**Table II-1**, item 22), method for public participation in environmental protection (**Table II-1**, item 20), and technical guidelines for public participation in EIAs.

32. For grievance redress, a hotline number (12369) was established in March 2011 at each level of environmental protection authority throughout the nation for receiving and resolving environmental complaints, in accordance with the Management Measures for Operation of the Environmental Complaint Hotline (MEE Decree [2010] No. 15) (**Table II-1**, item 27).

33. The PRC also provides protection for community health and occupational health and safety through the Labor Law (2018) (**Table II-1**, item 12), the Occupational Disease Prevention and Control Law (2001) (**Table II-1**, item 4), and environmental and hygiene standards for construction sites.

34. The Labor Law is also the main legislation regulating labor relations of individuals employed with labor contract by enterprises, institutions, organizations of all type of ownership forms, including contracted by individuals. These legislations are considering interests of employees and employers provide efficient function of labor market, just and secure labor conditions, protection of labor rights and employees health, promote to growth of labor productivity, increase of work quality, raising on this matter welfare and social livelihood level of the population.

35. China and the International Labor Organization (ILO) are actively cooperating on the

elimination of the forced labor. Currently, 26 conventions of the ILO have been ratified, including 4 fundamental ones, which are focused on the preventing of forced labor. This project will be implemented based on the national legislation of prohibition of the forced labor in China.

C. PRC Environmental Impact Assessment Framework and Procedures

36. **EIA Administrative Framework.** The PRC administrative framework consists of national, provincial, and local (city and county) environmental protection authorities. The national authority is the MEE, which promulgates laws, regulations, administrative decrees, technical guidelines, and environmental quality and emission standards on EIA and pollution prevention and control. At the provincial level there are Ecology and Environment Departments (EEDs), which act as gatekeepers for EIA and pollution prevention and control in the provinces. They are often delegated authority by the MEE to approve EIA reports for development planning and construction projects, except for those projects with national interest or which cross provincial boundaries. Local (city or county level) Environmental Protection Bureaus (EEB) enforce environmental laws and conduct environmental monitoring within city or county limits. EEBs can also be delegated the authority to approve EIA reports by the provincial EEDs. EEDs and EEBs are supported by Environmental Monitoring Stations (EMS), which are subsidiaries of EEDs or EEBs and are qualified entities to carry out environmental monitoring.¹⁴

37. The MEE's "Guideline on Jurisdictional Division of Review and Approval of EIAs for Construction Projects" (2019 revised) defines which construction project EIAs require MEE review and approval, and which EIAs are delegated to the provincial EEDs and local EEBs.

38. The PRC has an EIA qualification and registration system, and only qualified and registered institutes and individuals are allowed to prepare EIAs. Under MEE Decree 2015-36, as of 1 November 2015 qualified institutes for conducting EIAs for construction projects in the PRC can no longer be a subsidiary of an environmental authority responsible for approving EIAs.

39. **EIA Legal Framework.** EIA in the PRC is governed by the Environmental Impact Assessment Law (2002) (Table II-1, item 1), covering EIAs for (i) plans (such as new development areas and new industrial parks) and strategic environmental assessments (SEA); and (ii) construction projects. This was followed by the promulgation of two regulations: the Construction Project Environmental Protection Management Ordinance (1998) (Table II-1, item 17) and the Planning Environmental Impact Assessment Regulation (2009) (Table II-1, item 15), both of which require early screening and environmental categorization.

40. **EIA Procedures.** EIA procedures have been established in the PRC for over 20 years. In 2008, MEE issued "Management Guideline on EIA Categories of Construction Projects" (revised 2021). Under MEE decree Directory for the Management of Construction Project Environmental Impact Assessment Categorization (MEE Decree 2015-33) (Table II-1, item 19), classifies EIAs for construction projects into three categories with different reporting requirements, based on the significance of potential environmental impacts and the environmental sensitivity¹⁵ of the project site:

- (i) Projects with significant adverse environmental impacts, for which a full environmental

¹⁴ In this report, "environmental monitoring" refers to the activity of collecting environmental data either through *in-situ* measurements or through sampling followed by laboratory testing of samples.

¹⁵ Environmentally sensitive areas are defined in the Decree, and include: (i) nature reserves and protected areas, scenic areas, world cultural and natural heritage sites, drinking water source protection zones; (ii) basic farmland and grassland, forest parks, geological parks, important wetland, natural woodland, critical habitats for endangered plant and animal species, important aquatic spawning/nursery/ wintering/migration grounds, regions suffering from water resource shortage, serious soil erosion areas, desertification protection areas, eutrophic water bodies; and (iii) inhabited areas with major residential, health care, scientific research, and administration functions, cultural heritage protection sites, and protection areas with historical, cultural, scientific, and ethnic values.

- impact report (EIR) is required;
- (ii) Projects with adverse environmental impacts which are of a lesser degree and/or significance than those of Category A, for which a tabular environmental impact report (EIT) is required; and
- (iii) Projects unlikely to have adverse environmental impacts, for which an environmental impact registration form (EIRF) is required.

41. EIR and EITs report are generally equivalent to ADB's Category A EIA and Category B IEE reports, respectively. The EIRF is similar to an ADB Category C.

42. **EIA Follow-Up Actions.** In 2015, MEE issued decree Management Measures for Post-Environmental Impact Assessment of Construction Projects (MEE Decree 2015-37, item 21 of Table II-1). Under this decree, a trial program was implemented on 1 January 2016 requiring follow-up actions 3 to 5 years after commencement of project operation for large infrastructure and industrial projects or projects located in environmentally sensitive areas. These actions include environmental monitoring and impact assessment to verify the effectiveness of environmental protection measures and to undertake any corrective actions that might be needed. The decree also specifies that the institute that did the original impact assessment for the project cannot undertake post-environmental impact assessment for the same project.

43. **Environmental Protection Acceptance.** In 2017, MEE issued Interim Measures for the Environmental Protection Acceptance of Completed Construction Projects (MEP Decree 2017-4, item 31 of **Table II-1**). Under this measure, environmental protection acceptance can be implemented by the project owner and the procedures and standards for the acceptance were also stipulated.

44. **EIA Guidelines.** The MEE has issued a series of technical guidelines for preparing EIAs (**Table II-2**). These include impact assessment guidelines on general EIA implementation and principles, atmospheric environment and ambient air quality, noise, surface water, groundwater, ecology and regional biodiversity, biodiversity monitoring, quality management on environmental monitoring, and public participation.

D. Project Domestic Environmental Assessment

45. Under MEE decree Directory for the Management of Construction Project Environmental Impact Assessment Categorization (MEE Decree 2015-33), the subproject was classified as category A, requiring the preparation of one EIA report covering the various activities. The report is being prepared by the Zhejiang Province Environmental Engineering Co. Ltd. The company was certified by the MEE to undertake EIAs until 2025, including common construction projects.

46. The domestic EIA report will be reviewed by Huzhou City EEB. The final EIA report will be submitted to Huzhou City EEB for formal review, revision (if required) and approval.

E. Environmental Standards

47. This section discusses the applicable environmental standards that will be adopted for the Subproject.

48. **PRC Environmental Standards.** Standards issued by the MEE generally consist of environmental quality (ambient) standards applicable to the receiving environment, and emission standards applicable to the pollution source. The former includes standards for ambient air quality, noise and vibration, surface water, groundwater, soil, etc. The latter includes standards for integrated wastewater discharge, construction and community noise, odor and air pollutants, etc. (**Table II-3**).

49. As noted above, ADB's SPS requires borrowers to follow environmental standards consistent with good international practice, as reflected in internationally recognized standards such as the World Bank Group's EHS Guidelines. When host country regulations differ from these levels and measures, the borrower is to achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, the borrower is required to provide justification for any proposed alternatives.

Table II-3: Applicable PRC environmental standards.

No.	Standards
1	GB3095-2012 Ambient Air Quality Standards
2	GB16297-1996 Air Pollutant Integrated Emission Standards
3	GB3096-2008 Environmental Quality Standards for Noise
4	GB3838-2002 Environmental Quality Standards for Surface Water
5	GB8978-1996 Integrated Wastewater Discharge Standards
6	GB22337-2008 Emission Standards for Community Noise
7	GB10070-88 Standards of Environmental Vibration in Urban Area
8	GB12523-2011 Emission Standards of Environmental Noise for Boundary of Construction Site
9	GB/T 15190-2014 Technical Specifications for Regionalizing Environmental Noise Function
10	GB12348-2008 Noise Standards for Industrial Enterprises at Site Boundary
11	GB50118-2010 Design Specifications for Noise Insulation of Buildings for Civil Use
12	GB14554-93 Emission Standards for Odor Pollutants
13	GB/T 14848-2017 Quality Standards for Groundwater
14	GB15618-1995 Environmental Quality Standards for Soils
15	GB50210-94 Standards for Flood Control
16	GB11340-2005 Limits and Measurement Methods for Crankcase Pollutants from Heavy-duty Vehicles Equipped with Pressure Ignition Engines
17	GB17691-2005 Emission Limits and Measurement Methods for Exhaust Pollutants from Vehicle Compression-Ignition and Gas Fueled Ignition Engines
18	GB18285-2005 Limits and Measurement Methods for Exhaust Pollutants from Vehicles Equipped with Ignition Engines
19	GB18352-2005 Limits and Measurement Methods for Emissions from Light Duty Vehicles

Source: Consultants and domestic EIA report (2022).

Air Quality

50. Ambient air quality limits are intended to indicate safe exposure levels for the majority of the population, including the very young and the elderly, throughout an individual's lifetime. Limits are given for one or more specific averaging periods, typically one-hour average, 24-hour average, and/or annual average. The longer averaging period such as one year is more applicable to assessing impacts from multiple or regional sources, while shorter averaging periods such as 24 hours and 1 hour are more applicable to assessing short-term impacts from project-related activities such as from peak hour traffic or daily or peak construction activities. The PRC's updated Ambient Air Quality Standards (GB3095-2012) has two classes of limit values; Class 1 standards apply to special areas such as nature reserves and environmentally sensitive areas, and Class 2 standards apply to all other areas, including urban and industrial sites. The PRC standards for Class 2 areas are applicable for the Project.¹⁶

51. The World Health Organization (WHO) Air Quality Guidelines (AQGs) are international standards and are adopted in the EHS Guidelines. In addition to guideline values, interim targets (IT) are given for each pollutant as incremental targets in a progressive reduction of air pollution.

¹⁶ On 29 February 2012, the China State Council approved the roadmap for ambient air quality standards to improve the environment and human health. The Ambient Air Quality Standards (GB3095-2012) prescribes the first-ever limits for PM_{2.5}. It also modified the previous area classifications by combining Class III (special industrial areas) with Class II (residential, mixed use areas).

52. The WHO AQGs and corresponding PRC standards are presented in **Table II-4**. From a review of the table, it can be observed that:

- (i) For TSP, there are PRC standards but no corresponding WHO AQGs.
- (ii) For PM₁₀ PRC Class 2 annual average and 24-hour average standards meet WHO IT-1 guidelines (there are no 1-hour average standards or guidelines for PRC or WHO) but not the WHO AQG.
- (iii) For PM_{2.5} PRC Class 2 annual and 24-hour standards meet WHO IT-1 guidelines (there are no 1-hour standards or guidelines for either PRC or WHO) but not the WHO AQG.
- (iv) For SO₂ PRC WHO only has a 24-hour guidelines. The PRC Class 2 24-hour standard (150 µg/m³) almost meets the WHO IT-1 target (125 µg/m³).
- (v) For NO₂ the PRC standard is equivalent to the WHO annual average guidelines, there is no WHO 24-hour average guideline; and the 1-hour average PRC standard is equivalent to the WHO AQG.

53. Overall the PRC standards show a high degree of equivalency to the WHO AQG or IT-1 values. The PRC Class 2 standards are adopted for use in this report for general ambient air quality assessment, but WHO AQGs will be used for effects monitoring at sensitive receptors.

Table II-4: Comparison of PRC ambient *Air Quality Standards* (GB3095-2012) and WHO ambient air quality guidelines.

Air Quality Parameter	Averaging Period	PRC GB3095-2012 (µg/m ³)		WHO/EHS Guidelines (µg/m ³)	
		Class I (special regions such as national parks)	Class II (all other areas, including urban and industrial areas)	Interim Targets	AQG
TSP	1-year	80	200	n/a	n/a
	24-hour	120	300	n/a	n/a
PM ₁₀	1-year	40	70	20 - 70	15
	24-hour	50	150	50 - 150	45
PM _{2.5}	1-year	15	35	10 - 35	5
	24-hr	35	75	25 - 75	15
SO ₂	1-year	20	60	n/a	n/a
	24-hour	50	150	50 - 125	40
	1-hour	150	500	n/a	n/a
NO ₂	1-year	40	40	20-40	10
	24-hour	80	80	50-120	25
	1-hour	200	200	n/a	n/a
O ₃	8-hour	n/a	n/a	120-160	100
	1-hour	n/a	n/a	n/a	n/a
CO	24-hour	4,000	4,000	7000	4000
	8-hour	n/a		n/a	30
	1-hour	10,000	10,000	n/a	n/a

Note: n/a = not applicable.

Source: WHO Air Quality Guidelines (2022) in IFC *EHS Guidelines* (2007), and PRC GB3095-2012.

Fugitive Particulate Matter

54. Fugitive emission of particulate matter such as dust from construction sites is regulated under PRC's Air Pollutant Integrated Emission Standard (GB16297-1996), which sets 120 mg/m³ as the maximum allowable emission concentration and ≤ 1.0 mg/m³ as the concentration limit at the boundary of construction sites (with no specification on particle diameter). There is no equivalent standard recommended in the EHS Guidelines, and the PRC

standard is adopted for use in this report.

55. During operation, dust will be generated from the operation of construction waste disposal center. Fugitive emission of dust during operation is regulated under PRC's Air Pollutant Integrated Emission Standard (GB16297-1996), which sets 120 mg/m³ as the maximum allowable emission concentration and ≤ 1.0 mg/m³ as the concentration limit at the boundary of construction sites (with no specification on particle diameter). There is no equivalent standard recommended in the EHS Guidelines, and the PRC standard is adopted for use in this report.

Noise and Vibration

56. **Table II-5** presents the relevant PRC Environmental Quality Noise Standards (GB3096-2008) compared with relevant international guidelines from the WHO (as presented in the EHS Guidelines). The classes within the standards are not directly comparable as the PRC noise standards are set in different zones and WHO standards concern noise at specific receptors. Traffic noise and noise at sensitive receptors need different standards to be applied: the PRC standard will be used for traffic noise while the EHS Guidelines will be applied for noise based on types of receptors.

Table II-5: PRC *Environmental Quality Standards for Noise* (GB3096-2008).

Class	PRC Standards Leq dB(A)		International Standards One Hour Leq dB(A)		Comparison
	Day 06-22h	Night 22-06h	Day 07-22h	Night 22-07h	
0: Areas needing extreme quiet, such as special health zones	50	40			Classes are not directly comparable, but PRC Class II standards exceed WHO Class II standards. PRC standards will be used for traffic noise while the EHS Guidelines will be applied for noise based on types of receptors.
I: Mainly residential; and cultural and educational institutions	55	45	WHO Class I: Residential, institutional, educational: 55	WHO Class I: Residential, institutional, educational: 45	
II: Mixed residential, commercial and industrial areas	60	50			
III: Industrial areas	65	55	WHO Class II: industrial, commercial: 70	WHO Class II: Industrial, Commercial: 70	
IVa: Area within 35 m on both sides of urban trunk roads (Class II and above)	70	55			
IVb: Both sides of railway lines	70	60			

Source: WHO Noise Quality Guidelines (1999) in IFC EHS Guidelines (2007), and PRC GB3096-2008.

57. **Table II-6** presents relevant PRC and international standards (US EPA, IFC EHS Guideline: Occupational Health and Safety Standards) for on-site construction noise. The PRC's Emission Standard of Environmental Noise for Boundary of Construction Site (GB12523-2011) regulates construction noise, limiting construction noise levels at the construction site boundary to 70 dB(A) in the day time (0600–2200 hours) and 55 dB(A) at night (22:00–06:00 hours).

Table II-6: PRC *Noise Emission Standard for Construction Site Boundary* (GB12523-2011) and relevant international guidelines.

Day Leq dB(A)	Night Leq dB(A)	International Standards Leq dB(A)
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70	55	US EPA: 85 (day, 8 hour exposure)	IFC EHS Guideline, Occupational Health and Safety: 85 (Equivalent level LAeq, 8h); 110 (Maximum LAmax, fast)
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Source: US EPA, IFC Occupational Health and Safety Standard, and PRC GB12523-2011.

58. Construction activities may cause vibration impact and must comply with PRC Standard of Vibration in Urban Area Environment (GB10070–88). The EHS Guidelines have no vibration standards.

Table II-7: Vertical (Z) Vibration Standard for Various Urban Areas (GB10070–88, Unit: dB)

Scope of Applicable Area	Day	Night
Special residential area	65	65
Residential, cultural and educational area	70	67
Mixed area and commercial center	75	72
Industrial centralized area	75	72
Both sides of arterial roads with more than 100 vehicles per hour	75	72
Within 30 m of railways with more than 20 trains per day	80	80

Source: GB10070–88.

Surface Water

59. PRC's Surface Water Ambient Quality Standard (GB3838-2002) defines five water quality classes for different environmental functions (**Table II-8**). Class I is the highest quality, suitable for head waters and national nature reserves. Class II is suitable for drinking water sources in Class I protection areas, habitats for rare aquatic organisms, breeding grounds for fish and crustaceans, and feeding grounds for fish fry. Class III is suitable for drinking water sources in Class II protection areas, wintering grounds for fish and crustaceans, migration routes, water bodies for aquaculture and capture fishery, and swimming activities. Class IV is suitable for general industrial use and non-contact recreational activities. Class V is the worst quality, suitable only for agricultural and scenic water uses. For rivers near the project area the Class III standard is applicable.

Table II-8: PRC Surface Water Ambient Quality Standard (GB3838-2002).

Parameter	Water Quality Category				
	I	II	III	IV	V
pH	6-9	6-9	6-9	6-9	6-9
Dissolved oxygen (DO) [mg/L]	90% saturation or ≥ 7.5	≥ 6	≥ 5	≥ 3	≥ 2
Permanganate index (I_{Mn}) [mg/L]	≤ 2	≤ 4	≤ 6	≤ 10	≤ 15
Chemical oxygen demand (COD) [mg/L]	≤ 15	≤ 15	≤ 20	≤ 30	≤ 40
5-day Biochemical oxygen demand (BOD_5) [mg/L]	≤ 3	≤ 3	≤ 4	≤ 6	≤ 10
Ammonia nitrogen (NH_3-N) [mg/L]	≤ 0.15	≤ 0.5	≤ 1.0	≤ 1.5	≤ 2.0
Total phosphorus (as P) [mg/L]	≤ 0.02	≤ 0.1	≤ 0.2	≤ 0.3	≤ 0.4
Lakes & reservoirs	≤ 0.01	≤ 0.025	≤ 0.05	≤ 0.1	≤ 0.2
Total nitrogen (lakes, reservoirs, as N) [mg/L]	≤ 0.2	≤ 0.5	≤ 1.0	≤ 1.5	≤ 2.0
Copper (Cu) [mg/L]	≤ 0.01	≤ 1.0	≤ 1.0	≤ 1.0	≤ 1.0
Zinc (Zn) [mg/L]	≤ 0.05	≤ 1.0	≤ 1.0	≤ 2.0	≤ 2.0
Fluoride (as F^-) [mg/L]	≤ 1.0	≤ 1.0	≤ 1.0	≤ 1.5	≤ 1.5
Selenium (Se) [mg/L]	≤ 0.01	≤ 0.01	≤ 0.01	≤ 0.02	≤ 0.02
Arsenic (As) [mg/L]	≤ 0.05	≤ 0.05	≤ 0.05	≤ 0.1	≤ 0.1
Mercury (Hg) [mg/L]	≤ 0.0005	≤ 0.0005	≤ 0.0001	≤ 0.001	≤ 0.001

Parameter	Water Quality Category				
	I	II	III	IV	V
Cadmium (Cd) [mg/L]	≤0.001	≤0.005	≤0.005	≤0.005	≤0.01
Chromium (Cr, hexavalent) [mg/L]	≤0.01	≤0.05	≤0.05	≤0.05	≤0.1
Lead (Pb) [mg/L]	≤0.01	≤0.01	≤0.05	≤0.05	≤0.1
Cyanide (CN) [mg/L]	≤0.005	≤0.05	≤0.2	≤0.2	≤0.2
Volatile phenol [mg/L]	≤0.002	≤0.002	≤0.005	≤0.01	≤0.1
Total petroleum hydrocarbon (TPH) [mg/L]	≤0.05	≤0.05	≤0.05	≤0.5	≤1.0
Anionic surfactant (=LAS) [mg/L]	≤0.2	≤0.2	≤0.2	≤0.3	≤0.3
Sulfide [mg/L]	≤0.05	≤0.1	≤0.2	≤0.5	≤1.0
Fecal coliform bacteria [number/L]	≤200	≤2000	≤10000	≤20000	≤40000

Source: PRC GB3838-2002.

Groundwater

60. The PRC's Groundwater Water Ambient Quality Standards (GB/T14848-2017) is presented in Table II-9. The Class III standard is applicable to the Project. There is no equivalent standard recommended in the EHS Guidelines, and the PRC standard is adopted for use in this report.

Table II-9: Groundwater standard (Class III, GB/T14848-2017 Quality Standard for Ground Water).

No.	Parameter	Class I	Class II	Class III	Class IV	Class V
1	pH		6.5-8.5		5.5-6.5 8.5-9	<5.5->9
2	Ammonia nitrogen (mg/L)	≤0.02	≤0.10	≤0.50	≤1.5	>1.5
3	Chloride (mg/L)	≤50	≤150	≤250	≤350	>350
4	Sulfate (mg/L)	≤50	≤150	≤250	≤350	>350
5	Nitrate (in N) (mg/L)	≤2	≤5	≤20	≤30	>30
6	Nitrite (in N) (mg/L)	≤0.01	≤0.10	≤1.00	≤4.80	>4.80
7	Fluoride (mg/L)	≤1	≤1	≤1	≤2	>2
8	Zinc (mg/L)	≤0.05	≤0.5	≤1	≤5	>5
9	Copper (mg/L)	≤0.01	≤0.05	≤1	≤1.5	>1.5
10	Manganese (mg/L)	≤0.05	≤0.05	≤0.1	≤1.5	>1.5
1	Iron (mg/L)	≤0.1	≤0.2	≤0.3	≤2.0	>2.0
12	Total dissolved solids (mg/L)	≤300	≤500	≤1000	≤2000	>2000
13	Total hardness (mg/L)	≤150	≤300	≤450	≤650	>650
14	Permanganate index (mg/L)	≤1	≤2	≤3	≤10	>10
15	Mercury (mg/L)	≤0.0001	≤0.0001	≤0.001	≤0.002	>0.002
16	Hexavalent chromium (mg/L)	≤0.005	≤0.01	≤0.05	≤0.1	>0.1
17	Arsenic (mg/L)	≤0.001	≤0.001	≤0.01	≤0.05	>0.05
18	Lead (mg/L)	≤0.005	≤0.005	≤0.01	≤0.1	>0.1
19	Cadmium (mg/L)	≤0.0001	≤0.001	≤0.005	≤0.01	>0.01
20	Cyanide (mg/L)	≤0.001	≤0.01	≤0.05	≤0.1	>0.1
21	Volatile phenol (mg/L)	≤0.001	≤0.001	≤0.002	≤0.01	>0.01
22	Benzene (μg/L)	≤0.5	≤1	≤10	≤120	>120
23	Toluene (μg/L)	≤0.5	≤140	≤700	≤1400	>1400
24	Xylene (μg/L)	≤0.5	≤100	≤500	≤1000	>1000
25	Nickel (mg/L)	≤0.002	≤0.002	≤0.02	≤0.1	>0.1

Source: GB/T14848-2017.

Wastewater

61. Discharge of wastewater from construction sites is regulated under the PRC's Integrated Wastewater Discharge Standard (GB8978-1996) (Table II-10). The Class 1 standard applies to discharge into Class III water bodies under GB3838-2002; the Class 2

standard applies to discharge into class IV and V water bodies; and the Class 3 standard applies to discharge into municipal sewers going to municipal wastewater treatment plants (WWTPs) with secondary treatment. No new discharge of wastewater into Class I and II water bodies is allowed. The EHS Guidelines does not have ambient water quality standards and recognizes the use of national and local ambient water quality criteria, and the PRC standards are adopted for use in this report.

Table II-10: PRC Standards for discharging wastewater from construction sites (GB8978–1996).

Parameter		Class 1	Class 2	Class 3
		(Discharge into Class III water bodies)	(Discharge into Class IV and V water bodies)	(Discharge into municipal sewers)
pH	no unit	6-9	6-9	6-9
SS	mg/L	70	150	400
BOD ₅	mg/L	20	30	300
COD	mg/L	100	150	500
TPH	mg/L	5	10	20
Volatile phenol	mg/L	0.5	0.5	2.0
Ammonia Nitrogen NH ₃ -N	mg/L	15	25	---
PO ₄ ²⁻ (as P)	mg/L	0.5	1.0	---
Anionic Surfactants	mg/L	5.0	10	20

Source: PRC GB8978-1996.

62. The leachate treatment plant will treat domestic wastewater and leachate during operation. There is no World Bank Group EHS standards for treated wastewater discharges, and hence PRC standards are applicable to the project. The effluent of leachate treatment plant is regulated under PRC's Standard for Pollution Control on Landfill Sites for Municipal Solid Waste (GB 16889-2008).

Table II-11: Standard for Pollution Control on Landfill Sites for Municipal Solid Waste, GB 16889-2008 and relevant international guidelines (Units: mg/L, except pH, chromaticity and fecal coliform).

No.	Parameter	GB 16889-2008
1	COD _{Cr}	≤100
2	BOD ₅	≤30
3	SS	≤30
4	Total nitrogen	≤10
5	Ammonia nitrogen	≤25
6	Total phosphorus	≤3
7	Chromaticity	≤40
8	pH	6-9
9	Fecal coliform	≤1,000
10	Mercury	≤0.001
11	Cadmium	≤0.01
12	Chromium	≤0.1
13	Chromium VI	≤0.05
14	Arsenic	≤0.1
15	Lead	≤0.1

Source: PRC 18918-2002.

Odor Pollutant Emission

63. The odor generated during the operation mainly consists of ammonia (NH₃) and hydrogen sulfide (H₂S) generated from the landfill. The concentration of NH₃ and H₂S at the boundary of the project site shall comply with the Emission Standard for Odor Pollutant (GB14554-93) - Grade II, which details are summarized in **Table II-12**.

Table II-12: Emission Standard for Odor Pollutant Unit: mg/m³

Parameter	Standard Value	Code of Standard
NH ₃	1.5	GB 14554-93
H ₂ S	0.06	

Solid Waste

64. For general solid waste the Standards for Pollution Control on the Storage and Disposal Site for General Industrial Solid Wastes (GB18599-2001) and its revision in 2013 apply.

Summary of Environmental Standards applicable to the Project

65. **Table II-13** presents the environmental standards and guidelines applicable to the Project, which reflects the requirements set forth by the Anji EEB as presented in the domestic EIA report, and the ADB SPS (2009) on the use of domestic and international standards.

Table II-13: Environmental standards and guidelines applicable to the Project.

Parameter / Area of Concern	Applicable Standards and Guidelines	Remarks
Ambient air quality	<i>Ambient Air Quality Standard</i> (GB3095-2012), Class II	<u>Yearly average:</u> PM ₁₀ : 0.070 mg/m ³ PM _{2.5} : 0.035 mg/m ³ SO ₂ : 0.06 mg/m ³ NO ₂ : 0.04 mg/m ³ CO: 4.0 mg/m ³
		<u>Daily average:</u> TSP: 0.30 mg/m ³ PM ₁₀ : 0.15 mg/m ³ PM _{2.5} : 0.075 mg/m ³ SO ₂ : 0.15 mg/m ³ NO ₂ : 0.08 mg/m ³ CO: 4.0 mg/m ³
		<u>Hourly average:</u> SO ₂ : 0.50 mg/m ³ NO ₂ : 0.20 mg/m ³ CO: 10.0 mg/m ³
Construction air pollutant emission	<i>Air Pollutant Integrated Emission Standard</i> (GB16297-1996)	<u>Maximum allowable emission concentration:</u> Particulate matter (PM): 120 mg/m ³ Fumes from asphalt plant: 40 mg/m ³ during production and 75 mg/m ³ during mixing
		<u>Limits for fugitive emission:</u> PM: ≤1.0 mg/m ³ at construction site boundary Fumes from asphalt plant: no obvious emission at asphalt production plant
Dust emission during operation	<i>Air Pollutant Integrated Emission Standard</i> (GB16297-1996)	<u>Maximum allowable emission concentration:</u> Particulate matter (PM): 120 mg/m ³
		<u>Limits for fugitive emission:</u> PM: ≤1.0 mg/m ³ at construction site boundary
Environmental noise	<i>Environmental Quality Standard for Noise</i> (GB3096-2008): • Class III for areas within the sites	<u>Class III areas:</u> Day time: 65 dB(A) Night time: 55 dB(A)
		<u>Class II areas:</u> Day time: 60 dB(A) Night time: 50 dB(A)

Parameter / Area of Concern	Applicable Standards and Guidelines	Remarks
	<ul style="list-style-type: none"> Class II for sensitive receptors near the sites 	
Construction noise	<i>Emission Standards of Environmental Noise for Boundary of Construction Site (GB12523-2011)</i>	<u>Noise level at construction site boundary:</u> Day time: 70 dB(A) Night time: 55 dB(A) <u>Noise level within construction site:</u> Day time: 60 dB(A) Night time: 50 dB(A)
Surface water quality	<i>Environmental Quality Standards for Surface Water (GB3838-2002)</i> , see Table II-8 .	Class III for rivers near the project area.
Ground water quality	<i>Quality Standard for Ground Water (GB/T 14848-2017)</i> , see Table II 9 .	Class III for groundwater near the project area.
Wastewater discharge	<i>Standard for Pollution Control on Landfill Sites for Municipal Solid Waste (GB 16889-2008)</i> , see Table II-11	<u>Effluence of the leachate treatment plant:</u> COD: ≤100 mg/l BOD ₅ : ≤30 mg/l SS: ≤30 mg/l
Odor	<i>Emission Standard for Odor Pollutant (GB14554-93)</i>	<u>Odor at site boundary:</u> NH ₃ -N: ≤1.5 mg/ m ³ H ₂ S: ≤0.06 mg/m ³
Environmental adverse impacts	<i>WB EHS Guidelines: Environment</i>	Approaches and measures appropriate to mitigate adverse impacts from the project activities
Occupational health and safety	<i>WB EHS Occupational Health and Safety Guidelines</i>	Approaches and measures appropriate to mitigate adverse impacts from the project activities
Community health and safety	<i>WB EHS Community Health and Safety Guidelines</i>	Approaches and measures appropriate to mitigate adverse impacts from the project activities
Construction and Decommissioning	<i>WB EHS Construction and Decommission Guidelines</i>	Approaches and measures appropriate to mitigate adverse impacts from the project activities

Source: Domestic EIA report (2022).

F. International Agreements

66. The PRC is a signatory to a number of international agreements relevant to environment protection. Those relevant to the Project, along with the dates of signing by the PRC, are listed in **Table II-14**.

Table II-14: Applicable international agreements with the PRC as a signatory.

No.	Name of Agreement	PRC Signing Date	Agreement Objective
1	Ramsar Convention on Wetlands of International Importance	1975	Prevent encroachment on and loss of wetlands for now and the future (project includes the reservoir)
2	Convention on Biological Diversity	1993	Conservation and sustainable use of biological diversity (project includes afforestation)
3	United Nations Framework Convention on Climate Change	1994	Achieve stabilization of atmospheric greenhouse gas (GHG) concentrations (project involves GHG emission reduction)

No.	Name of Agreement	PRC Signing Date	Agreement Objective
4	Kyoto Protocol to UN Framework Convention on Climate Change	2005	Further reduction of greenhouse gas emissions (as above)
5	Montreal Protocol on Substances That Deplete the Ozone Layer	1989	Protection of the ozone layer (same as above)
6	UN Convention to Combat Desertification	1996	Combat desertification and mitigate effects of drought (project involves soil erosion control)

Source: Consultants.

III. PROJECT DESCRIPTION

A. The Project

67. The Asian Development Bank (ADB) and the Government of the People's Republic of China (PRC) agreed in 2015 establish a multiyear lending program during 2015–2020 to mutually reinforce government actions for reducing air pollution in the greater Beijing–Tianjin–Hebei (BTH) region. Since 2015, under the multiyear lending program, ADB has approved about \$2 billion in loans that have been implemented successfully. In 2015, ADB approved the first policy-based loan in the PRC under the program, which focused on policy reforms and regulatory capacity strengthening to improve air quality in Hebei Province. In 2016, the second loan was approved to establish a green financing platform (GFP) for developing air pollution reduction projects in the region by enabling better access to finance. In 2017, the third loan was approved to support the adoption of high-level technologies by major polluting entities across key sectors in the region. In 2018, the fourth loan was approved to help Shandong Province adopt more efficient and advanced technologies for heat production and refrigeration by replacing coal with cleaner energy sources such as natural gas, renewable energy, and waste heat recovery. In 2019, the fifth loan was approved to accelerate a switch from coal to natural gas and biogas for residential, commercial, and industrial uses to improve air quality in Henan Province. The proposed project will be the sixth loan under the air quality improvement program.

68. **Change in air pollution sources.** Government actions to accelerate air pollution reduction and ADB's multiyear lending support have resulted in significant air quality improvement in the greater BTH region. The annual average concentration of particulate matter less than 2.5 micrometers in diameter (PM_{2.5}) in the region decreased by 27%, from 60.3 micrograms per cubic meter (µg/m³) in 2015 to 47.9 µg/m³ in 2019. However, this remains far above the national class I ambient air quality standard and the World Health Organization standard (35.0 µg/m³), and the greater BTH region faces two challenges to improve air quality further: (i) the dominant source of PM_{2.5} is shifting from primary emission sources (i.e., directly emitted pollutants from coal combustion, vehicle exhaust, biomass burning, and industrial production processes) to secondary pollutants that are formed in the atmosphere through chemical reactions of precursor pollutants and transported over long distances, and are estimated to contribute 44% of PM_{2.5} pollution in the BTH region 10 and (ii) concentration of ground-level ozone (O₃), which is a gas formed from precursor pollutants and a major source of smog, increased by 18%, from 117.1 µg/m³ in 2015 to 142.2 µg/m³ in 2019. 11

69. **Wide area-based approach and government policy.** Addressing an increase in secondary pollutants, including O₃, in the greater BTH region requires a wider area-based intervention. The Yangtze River Delta (YRD) region, which comprises Anhui, Jiangsu, Zhejiang provinces, and Shanghai Municipality, is the PRC's second largest economic zone, accounting for 22% of gross domestic product (GDP), and is the area with the second highest air pollution concentrations in the PRC. 12 Air pollutant emissions in the country are highly concentrated in the northeast corridor between Beijing and Shanghai, and air quality in the greater BTH and YRD regions is interlinked through air pollutants transported across the two adjacent regions. In June 2018, the Government of the PRC issued the Three-Year Action Plan for Winning the Blue Sky War, 2018–2020, 13 which adds the YRD region as a priority area for wider-area based policy intervention beyond the greater BTH region. It intends to control O₃ as well as PM_{2.5} emissions

by accelerating (i) closure of heavily polluting industries, (ii) reductions of surplus production capacity in industries, (iii) a shift to less air polluting transport modes, and (iv) construction of cleaner and less air polluting energy systems. The plan targets reducing emissions by 2020 (from 2015 levels) by more than 15% for nitrogen oxide and more than 10% for volatile organic compounds (both of which are precursors of O₃), more than 15% for sulfur dioxide, and more than 18% for PM_{2.5}.

70. Increasing hydrofluorocarbon emissions. In addition to air pollution targets, the government issued a nationally determined contribution under the Paris Agreement committing to reaching peak greenhouse gas (GHG) emissions by 2030. GHG emissions growth in the country has been slowing down, with annual GHG emissions growth during 2013–2018 reaching a plateau of 0.4%. However, emissions of hydrofluorocarbon (HFC), which is one of the most potent GHGs, have grown by about 20% annually in 2010–2019. The PRC is the largest HFC producer in the world, accounting for 70% of global production.¹⁷ In addition, HFC emission is highly concentrated in the northeast corridor between Beijing and Shanghai because of the presence of an industrial cluster producing HFC. In the business-as-usual scenario, HFC emission is projected to grow to about 428 million tons of carbon dioxide (CO₂) equivalent by 2030 from 182 million tons of CO₂ equivalent in 2010. In 2016, the PRC adopted the Kigali Amendment to the Montreal Protocol, committing to reach peak consumption and production of HFC by 2024, with an 80% reduction by 2045. In 2019, the government started implementing the Green and High-Efficiency Cooling Action Plan to achieve its commitment to the Kigali Amendment to the Montreal Protocol.

71. **Challenges in sustainable financing for air quality improvement.** Public spending on air quality improvement reached CNY744 billion in 2019, whereas an estimated annual investment of CNY1,538 billion is required to meet the national class I air quality standard by 2030. The domestic green bond market is one of the fundraising channels to narrow this funding gap. After the first green bond guideline was issued by the People's Bank of China in December 2015, the PRC's green bond market expanded from CNY238 billion issued in 2016 to CNY386 billion in 2019, making the PRC the world's largest source of green bond issuance.¹⁸ Despite being the world's largest market by size, the types of green bonds, in the view of issuers and tenors, are not well diversified. About 90% of green bonds in 2019 were corporate bonds. The tenor of green bonds is relatively short: about 60% of bonds issued have a maturity of less than 5 years. Developing a range of instruments and tenors is essential to further develop the domestic green bond market to meet growing green financing demand. In addition, there remain gaps between domestic green bond regulations and international standards with regard to green project and asset definitions, tracking and management of proceeds, and external reviews and assurance; about 50% of PRC green bonds issued in 2019 were not aligned with international standards. Although the gap in standards has been narrowing since 2015, further alignment with international standards is desirable to gain stronger credibility and transparency in the market.

72. **Challenges in financial inclusiveness for air quality improvement.** Micro, small, and medium-sized enterprises (MSMEs) in the PRC account for about 60% of GDP and 80% of urban

¹⁷ HFCs are organic compounds comprised of hydrogen, fluorine, and carbon. These are produced synthetically and primarily used as a refrigerant for cooling and refrigeration. HFCs were developed as alternatives to O₃-depleting substances to be phased out under the Montreal Protocol. However, HFCs are potent GHGs with thousands of times the global warming potential of CO₂.

¹⁸ Climate Bonds Initiative and China Central Depository & Clearing Research Centre. 2020. China Green Bond Market: 2019 Research Report. London.

employment. Women have a higher representation in MSMEs as managers and employees.¹⁹ Despite their substantial contribution to the country's economy, MSMEs still face limited access to finance and high financing costs because of perceived credit risks and stringent collateral requirements by banks. MSMEs lending accounts for only 22% of total bank loans outstanding, and the risk premium of MSMEs is estimated to be 40% higher than that of large enterprises. Because of limited access to finance and delayed investment in pollution reduction, it is estimated that 70% of air and water pollution is attributed to MSMEs.²⁰

73. Increasing emissions post COVID-19. Air pollutant concentration and GHG emissions in the first quarter (Q1) of 2020 dropped by about 30% compared with Q1 2019 because of the coronavirus disease (COVID-19) lockdowns and associated energy consumption declines. With the lifting of the COVID-19 related restrictions in most part of the PRC in late March 2020, year-on-year emissions bounced back and overshot 2019 emissions by about 5% during April–May 2020 because of the rapid economic rebound.²¹ Uninterrupted clean energy investment in the post-pandemic scenario, in parallel with economic recovery, is essential to maintain emissions reduction momentum.

74. Proposed solution. The project aims to comprehensively address emerging challenges in air quality improvement and GHG emissions reduction in the greater BTH and YRD regions. It also aims to stimulate post-COVID-19 recovery investment with build-back-better principles by continuously scaling up clean energy technologies and systems applications in the targeted regions, which together account for about 53.4% of total GDP, 53.0% of total primary energy consumption, and 45.9% of the total population in the PRC. Using lessons learned from the multiyear lending program (para. 1), the project adopts a flexible lending modality with particular attention on mobilizing domestic funds and promoting financial inclusiveness for sustainable clean energy investment. It uses the financial intermediation loan modality, which is the best fit to support geographically scattered investments while maximizing ADB's loan leveraging capacity through revolving the loan funds and mobilizing domestic funds. The project expands the GFP that was established under the second loan (footnote 3) for sustainable investments in air pollutant and GHG emission reduction activities in the expanded regions.²²

75. The GFP directly under the control of China National Investment and Guaranty Corporation (I&G), which is a state-owned financial institution specialized in credit enhancement to support investment for social and economic development. I&G has strengthened its corporate governance since 2015 including professional management, separation of management and operations, mixed ownership, and private sector involvement in areas monopolized by the public sector. I&G has successfully promoted mixed ownership and private sector involvement, and 49% of the I&G stake is not owned by the PRC government, of which about 38% is owned by private financial institutions. The GFP is a first-of-its-kind mechanism dedicated to air pollution reduction in the greater BTH region, and it offers debt financing, credit guarantees, financial leasing, and

¹⁹ Specific statistics are missing, as sex-disaggregated data are not collected on a regular basis.

²⁰ . Li and X. Zeng. 2018. Circular Economic Opportunities for Greening SMEs: The Chinese Experience. Paper prepared for the Eighth Regional 3R Forum in Asia and the Pacific. Madhya Pradesh, India. 9–12 April.

²¹ . Centre for Research on Energy and Clean Air. COVID-19 Air Pollution Rebound Tracker (accessed 30 June 2020).

²² . The loan of €458 million to the PRC for the I&G's GFP project was approved on 12 December 2016 from ADB's ordinary capital resources. The outputs are as follows: (i) GFP and leveraged commercial financing for pollution reduction projects established, (ii) barriers lowered and financing scaled up for small and medium-sized enterprises and energy service company from the GFP, and (iii) capacity in financial products and to appraise and implement GFPs strengthened.

equity investments. It has already supported 13 subprojects with a total investment of €1,043 million of which ADB has financed €332 million.²³

76. **Alignment with Strategy 2030 and country partnership strategy.** The project is aligned with two operational priorities of ADB's Strategy 2030: the project will support (i) operational priority 2 (accelerating progress in achieving gender equality) through gender mainstreaming activities; and (ii) operational priority 3 (tackling climate change, building climate and disaster resilience, and enhancing environmental sustainability) by accelerating low GHG emissions development and ensuring environmental sustainability. The project will contribute to Sustainable Development Goal 5 (achieve gender equality), Sustainable Development Goal 7 (ensure access to affordable, reliable, sustainable, and modern energy for all) and Sustainable Development Goal 13 (take urgent action to combat climate change and its impacts). The project also supports the PRC's nationally determined contribution targeting the following, to be achieved by around 2030: (i) peaking CO₂ emission, (ii) lowering CO₂ emission per unit GDP by 60%–65% from 2005, and (iii) increasing non-fossil fuel usage to 20% of total energy share. The project is also aligned with the priorities of broadening the response to climate change and strengthening environmental sustainability in ADB's country partnership strategy for the PRC, 2016–2020.²⁴

77. The project is aligned with the following impact: air quality and public health in the greater BTH and YRD regions improved. The project will have the following outcome: air pollutants and greenhouse gas emissions reduced

78. The subproject will build a construction waste sorting and disposal center (capacity: 200,000 t/a), ecology restoration of Anji domestic waste landfill after closure and build a new landfill including comprehensive landfill area (200,000 m³), emergency landfill area (200,000 m³), fly ash landfill area (100,000 m³), leachate storage tank (30,000 m³) and leachate treatment plant (400 t/d). The subproject will be located at Lujia Village, Dipu Street, Anji County and the site is at north of G235 national Road. The subproject is closed to existing Anji County Municipal Solid Waste (MSW) incineration power plant and Anji County landfill.

79. Once operation, the subproject will treat 200,000 t/a construction waste, treat the fly ash from Anji County MSW incineration power plant and domestic waste in emergency situation by landfill, treat the unrecyclable waste from construction waste sorting and disposal center by landfill and treat the leachate from Anji County MSW incineration power plant and Anji County landfill and domestic waste of the subproject in leachate treatment plant.

80. Through waste recycling, the subproject will result energy savings and emission reductions and thereby reducing CO₂ and ambient air pollution in Anji County and improve the local air quality in Anji County. The subproject impact will be improved air quality and reduced greenhouse gas emissions in Anji County. The outcome will be energy savings, and a cleaner environment in Anji County.

B. Project Rational

81. Anji County's domestic waste is mainly treated by incineration now and landfill is used in emergency. The Anji County MSW incineration power plant included two phases: phase I of the

²³ €332 million in disbursements under the ADB loan comprises €43 million for guarantee loss reserve, €93 million for financial lease, and €196 million for subloans to subborrowers.

²⁴ The clean air bond is air quality improvement-dedicated bond that aligns with domestic green bond regulations and international standards. (Climate Bonds Initiative. 2019. Climate Bonds Standard: Version 3.0. London.)

plant was officially operated from May 2014 and phase II was operated from December 2016. Now the capacity of the plant was 600 t/d (2x 300 t/d mechanical grate furnaces) and the power generation capacity is 16 MW. The incineration power plant is equipped with a leachate treatment plant. The designed capacity is 100 t/d and the leachate treatment process is "anaerobic baffled reactor (ABR) + denitrification + nitrification + membrane bioreactor (MBR)".

82. Anji County has a landfill which is in the west of Anji County MSW incineration power plant. The landfill was closed from October 2016 and only fly ash from Anji County MSW incineration power plant and domestic waste in emergency are treated in the landfill. The landfill has a leachate treatment plant. The designed capacity is 100 t/d and the leachate treatment process is pretreatment (electrolysis) + biochemical treatment (two-stage A/O) + advanced treatment (ultrafiltration + nanofiltration + reverse osmosis). The plant was operated from August 2015.

83. Construction waste mainly includes building decoration waste and bulky waste (mainly waste furniture and bathroom wares from redecorating). The building decoration waste is mainly from various communities in the urban area of Anji City. In recent years, with the rapid advancement of urban village transformation, building decoration waste quantity was increased significantly. Now the annual construction waste in Anji County is about 170,000 tons. Now Anji County's construction waste is mainly treated by the Anji County MSW incineration power plant after simple sorting and the waste can't treated by incineration is treated in the landfill.

84. The fly ash collected from Anji County MSW incineration power plant is treated in Anji County landfill. Anji County landfill was closed from October 2016 and the capacity is very limited now. In Huzhou City, there is no more certificated site or company which can treat the fly ash, a hazardous waste in China. Construction of a new fly ash landfill is urgent in Anji County.

85. Based on the above information, now the main waste treatment method in Anji County is incineration and the treatment and recycling system is not perfect which is described below.

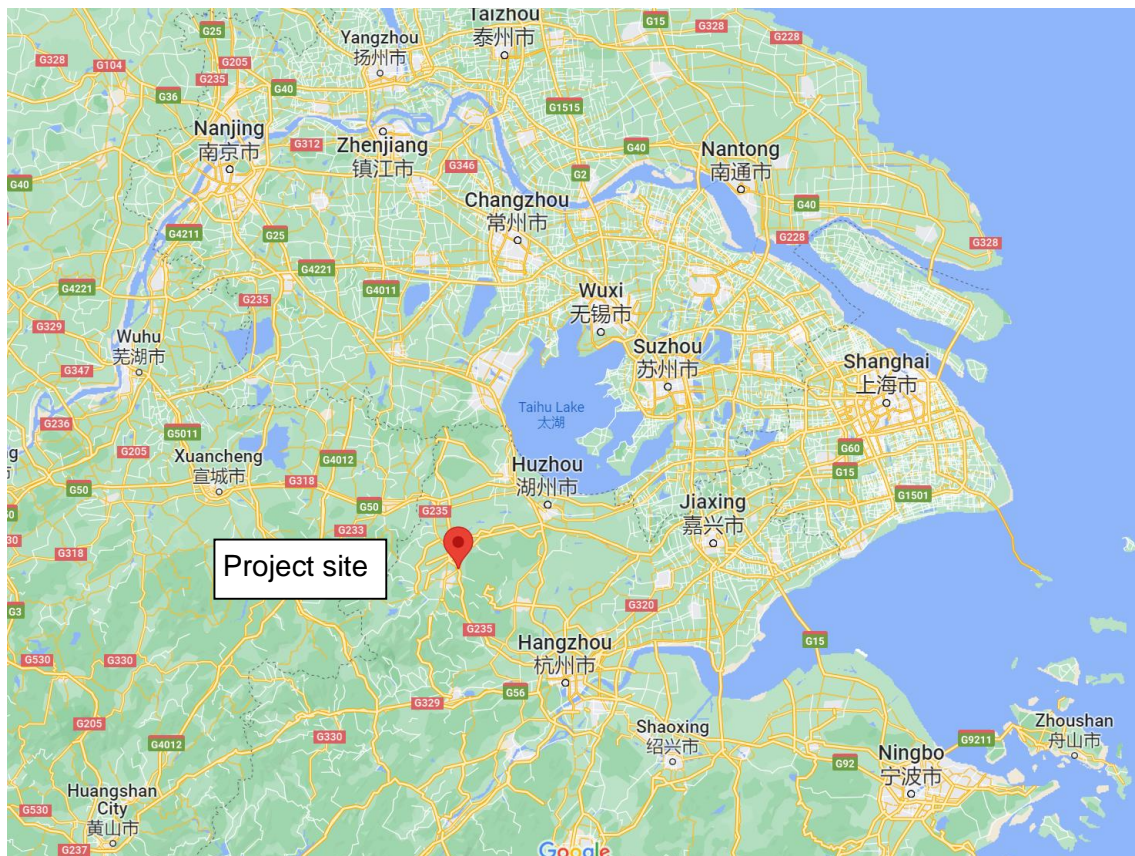
- i) The construction waste disposal site is a small site and the capacity is limited due to the small area;
- ii) The existing landfill was closed from 2016. A new landfill is necessary for fly ash treatment and domestic waste treatment in emergency
- iii) The construction waste is mainly treated in construction waste disposal site or Anji County MSW incineration power plant without recycling.

86. The subproject's implementation will: (i) treat rapidly increasing construction waste and recycle the construction waste; (ii) reduce energy consumption; (iii) improve air quality; and reduce GHG emissions. For these reasons, the "no project" alternative is considered unacceptable.

C. Project Description

87. The subproject will be implemented at Anji County, Huzhou City of Zhejiang Province. Anji is a county in the prefecture-level city of Huzhou in northwestern Zhejiang province and is comprised of 4 subdistricts, 8 towns and 3 townships.

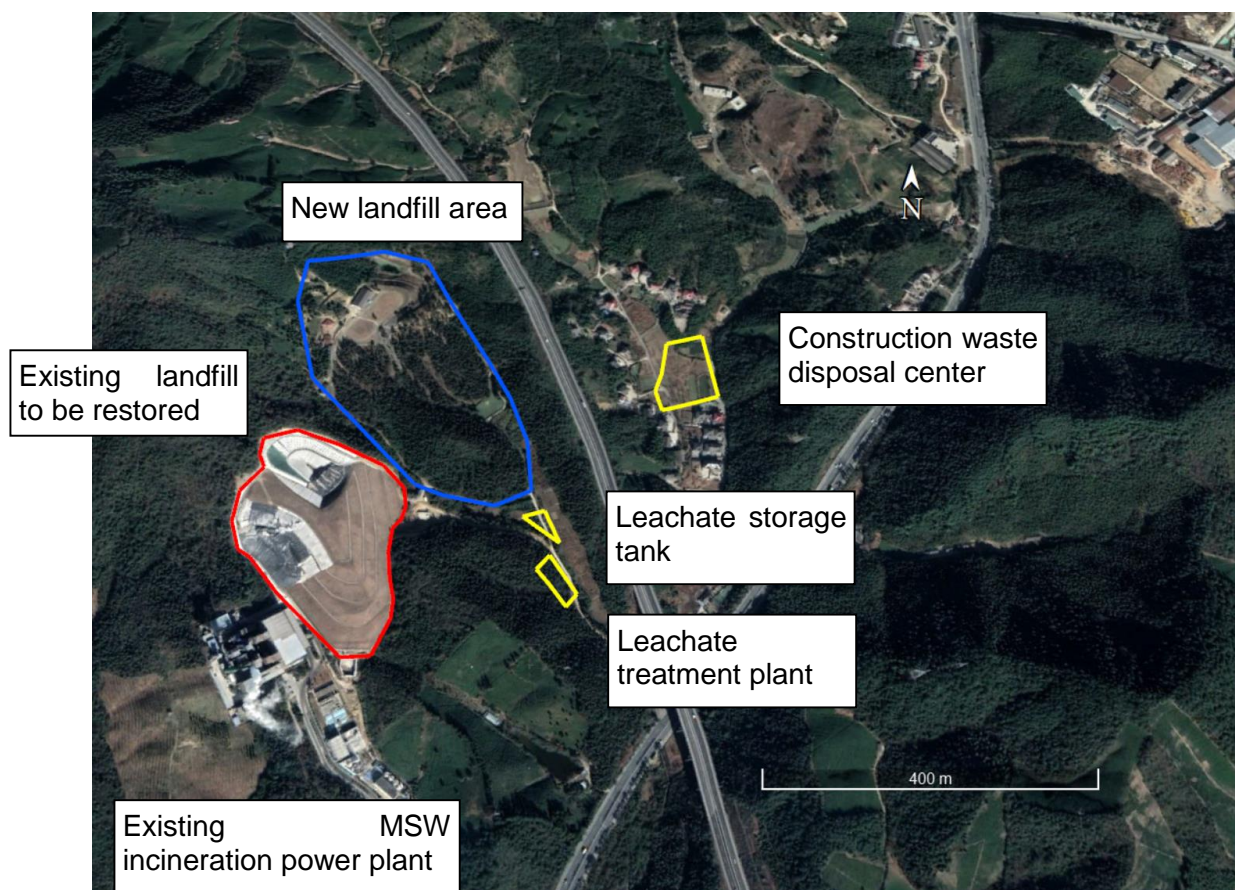
Figure III-1: Subproject location in Zhejiang Province



Source: Google map, 2022

88. The subproject will be located at Lujia Village, Dipu Street, Anji County (**Figure III-2**).

Figure III-2: Subproject location



Source: Google earth, 2022.

89. The subproject activities are summarized in **Table III-1**.

Table III-1: Project Subprojects and Key Features

No.	Subproject	Characteristics and Special Features
1	Construction waste disposal center	<p>The floor area is 12,151 m² and the building area is 13,991.8 m². It mainly composes of construction waste recycling center, supporting service room, water tank etc. Construction waste recycling center includes construction waste storage room, treatment workshop and storage area. The water tank is underground with an area of 489.30 m².</p> <p>Hardening area: 8,387m².</p> <p>Parking lot: 2, 357 m².</p> <p>Landscape area: 2,804 m².</p> <p>Slope protection area: 1,900 m².</p>
2	Ecological restoration of existing landfill	<p>The component will involve landfill area leveling, slop protection and coverage of existing landfill area and landscape (26,800 m²). Spoil from other components will be used for leveling and coverage of landfill area and landscape area.</p> <p>The landfill area after coverage can be divided into 9 layers and are presented below (from top to bottom):</p> <p>1) Vegetation layer: 500mm thick soil, covering the whole landfill area. The soil in the layer is nutrient-rich cultivated soil for promotion of plant growth.</p>

No.	Subproject	Characteristics and Special Features
		<p>2) Cultivation soil layer: Thickness of the layer is 500mm and the layer composed of compacted soil and permeability coefficient of the soil should be more than 1×10^{-4} cm/s.</p> <p>3) Drainage layer: The layer is composed of 16-32mm crushed stone and has a thickness of 500mm. It is used to drain rainwater on the upper layer and prevent rainwater from accumulating on the anti-seepage layer below it. The drainage layer is connected to the drainage ditches around the landfill area for rainwater emission.</p> <p>4) Gravel layer: The layer 100mm thick and is used to protect the impermeable membrane under it.</p> <p>5) 200g/m² non-woven geotextile layer: The layer is used to protect the impermeable membrane.</p> <p>6) 1.5mm thick HDPE anti-seepage membrane: The layer is used to prevent rainwater from the upper layer from entering the waste layer at the bottom and reduce the amount of generated leachate. The permeability coefficient should be less than 1×10^{-7} cm/s, and protective geotextiles should be provided on the upper and lower surfaces of the geomembrane.</p> <p>7) Clay layer: The layer is 300mm thick and is used to protect the HDPE anti-seepage membrane layer.</p> <p>8) Landfill gas exhaust layer: The layer is 400mm thick and is composed of 25 mm-50mm gravel. The layer is used to discharge the landfill gas generated from decomposition and fermentation of the waste under anaerobic conditions. The gas pressure in the impermeable layer should be no more than 0.75kPa.</p> <p>9) Waste layer.</p> <hr/> <p>Landfill gas collection and emission system will be installed. The system will include 18 landfill gas exhaust wells (15 m for each well); DN 160 HDPE primary pipes (450m); DN 110 HDPE branch pipes (350m); and landfill gas emission pipes (500). Besides, a mobile methane monitoring equipment will be purchased for safety.</p> <hr/> <p>The collected landfill gas will be treated in torch.</p> <hr/> <p>Storm water drainage system maintenance: The existing storm water drainage system is separate from wastewater drainage system and about 500 m storm water intercepting trenches will be cleaned and maintained.</p> <p>Storm water drainage system: The landfill will install 700 m stormwater discharge (0.5 m x 0.5m) concrete channels in the landfill area which will be collected to the existing storm water drainage system.</p> <p>The collected leachate will be stored at the leachate storage tank (30,000 m³).</p>
3	Fly ash landfill area and emergency landfill area	<p>The landfill area will be 27,685m². The component will include anti-seepage measures, retaining wall, leachate system, landfill gas system and storm water system.</p> <p>The landfill area can be divided into the following layers (from top to bottom):</p> <p>1) Waste layer.</p> <p>2) 200g/m² woven geotextile: The layer is used to protect the impermeable membrane.</p> <p>3) Wastewater collection layer: The layer is 350mm thick and is composed of 25 mm-50mm gravel. The layer is used to collect and discharge the wastewater.</p> <p>4) 600g/m² non-woven geotextile layer.</p> <p>5) 1.5mm thick HDPE anti-seepage geomembrane membrane: The layer is used to prevent rainwater from the upper layer from entering the waste layer at the bottom and reduce the amount of generated leachate. The</p>

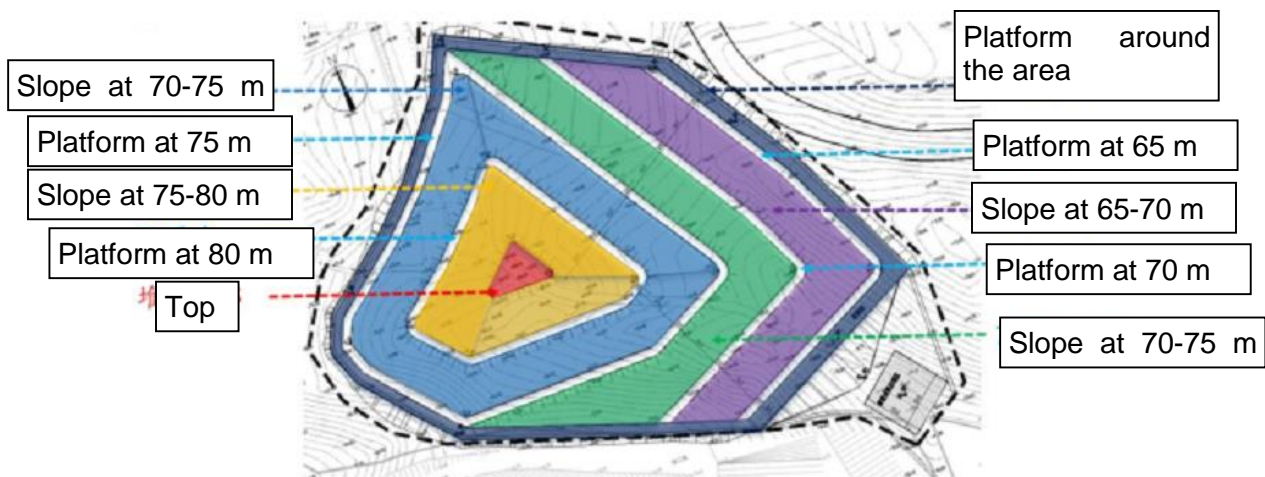
No.	Subproject	Characteristics and Special Features
		<p>permeability coefficient should be less than $1 \times 10^{-7} \text{cm/s}$, and protective geotextiles should be provided on the upper and lower surfaces of the geomembrane.</p> <p>6) geosynthetic clay liner: the layer is water proof layer.</p> <p>7) soil layer: the layer is composed of 500mm thick compacted soil for protection.</p> <p>8) 2.0 mm thick rough surface HDPE geotechnical membrane: The layer is used to prevent rainwater from the upper layer from entering the waste layer at the bottom and reduce the amount of generated leachate.</p> <p>9) geosynthetic clay liner: the layer is water proof layer.</p> <p>10) leachate collection and emission pipelines.</p> <p>11) flat and compacted bottom layer.</p> <p>Side slop area can be divided into the following layers:</p> <p>1) waste layer;</p> <p>2) protection layer: the layer is mainly composted of 300mm thick medium-coarse sand in bags and the layer is mainly for protection;</p> <p>3) 600 g/m² non-woven geotextile layer:</p> <p>4) 2.0 mm thick rough surface HDPE geotechnical membrane: The layer is used to prevent rainwater from the upper layer from entering the waste layer at the bottom and reduce the amount of generated leachate;</p> <p>5) geosynthetic clay liner: the layer is water proof layer;</p> <p>6) leachate collection and emission pipelines;</p> <p>7) trimmed slope.</p> <p>Ground water drainage system will be installed at the bottom of the area.</p> <p>Groundwater blind drains will be installed at the bottom of the area. The blind drains will include primary drains and branch drains. Primary drains will be laid in the central of the bottom area. Primary drains will include primary pipelines and branch pipelines. Primary pipelines will utilize DN400 HDPE perforated pipes and branch pipelines will be DN 200 HDPE perforated pipes. Branch blind drains will be installed at both sides of the primary blind drains and will be rubble blind drains.</p> <p>The groundwater will be collected by the blind drains, the ground water pipelines will pass through the bottom of retaining wall and stored at a groundwater tank (100 m³), then recycled as landscape water.</p> <p>Leachate collection system will be installed. The system will be horizontal leachate collection system at the bottom of the area and the vertical leachate collection system. $\Phi 1000$ mm vertical leachate collection wells will be installed in the landfill area and connected to the horizontal leachate collection system.</p> <p>The leachate will be stored at leachate storage tank (30,000 m³).</p> <p>Landfill gas collection and emission system will be installed.</p> <p>Perforated landfill gas exhaust gas pipes (DN200 HDPE) will be vertically installed in the landfill area. These vertical perforated pipelines will be installed within gabion boxes. The diameter of the gabion boxes is 1.0 m and the distances between two gabion boxes are 45m. The gabion boxes will be filled with pebbles. The height of the gabion boxes will be gradually increased as the landfill work. The nozzle of the pipes will be more than 100 cm above the ground.</p>

No.	Subproject	Characteristics and Special Features
		Horizontal gas collection trenches will be laid at the bottom of the landfill area as well as the intermediate layers of the landfill waste. These trenches will be 250×250mm and filled with D20-D50 pebbles. These horizontal trenches will be connected to the gabion boxes for landfill gas collection.
		The collected landfill gas will be treated in torch.
4	Leachate storage tank	One 30,000 m ³ leachate storage tank will be built for storage of leachate generated in 45 days under maximum load.
5	Leachate treatment plant	One leachate treatment workshop will be built. The treatment process is filter+ Upflow Anaerobic Sludge Blanket + membrane bioreactor +NF+RO. Treatment capacity is 400 m ³ /d.
6	Odor gas treatment system	The leachate storage tank is sealed. Odor gas collection and treatment system will be installed for the leachate storage tank and leachate treatment workshop. The leachate treatment process will be biofilter and the odor removal efficiency will be 95%.
7	Storm water drainage system	Storm water drainage system is separate from wastewater drainage system. Storm water collection system will be installed outside the landfill area. Flood intercepting trenches will be installed within the landfill area and storm water within the landfill area will be collected and treated by the leachate treatment system. The treated leachate will be recycled as landscape water.
8	Power distribution equipment	10 kV power distribution equipment and 35 kV power transformation equipment will be installed. Power will be from the grid.
9	Water supply	Municipal water will be sourced as domestic waste and production water.

Source: FSR, 2022

90. The subproject will restore the existing completed Anji County domestic waste landfill. The activities include landfill area leveling, slop protection and coverage of existing landfill area and landscape (26,800 m²). Spoil from other components will be used for leveling and coverage of landfill area and landscape area. The completed landfill after ecology restoration is presented below.

Figure III-3: Ecology restoration of the completed landfill



Source: FSR, 2022

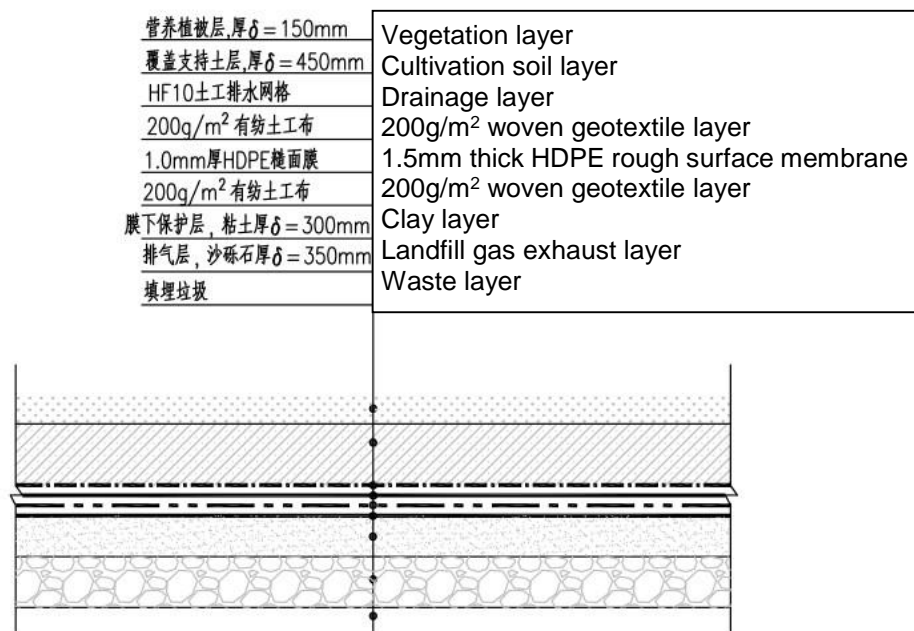
Figure III-4: Sample of landfill after ecology restoration



Source: FSR, 2022

91. The landfill area after coverage can be divided into 9 layers and are presented below

Figure III-5: Vertical view of the covered landfill



Source: FSR, 2022

92. The subproject will build a construction waste sorting and disposal center (capacity: 200,000 t/a). The floor area of construction waste disposal center is 12,151 m² and the building area is 13,991.8 m². It mainly composes of construction waste recycling center, supporting service room, water tank etc. Construction waste recycling center includes construction waste storage room, treatment workshop and storage area. The water tank is underground with an area of 489.30 m². The layout of the construction waste sorting and disposal center is presented below.

Figure III-6: Layout of construction waste disposal center

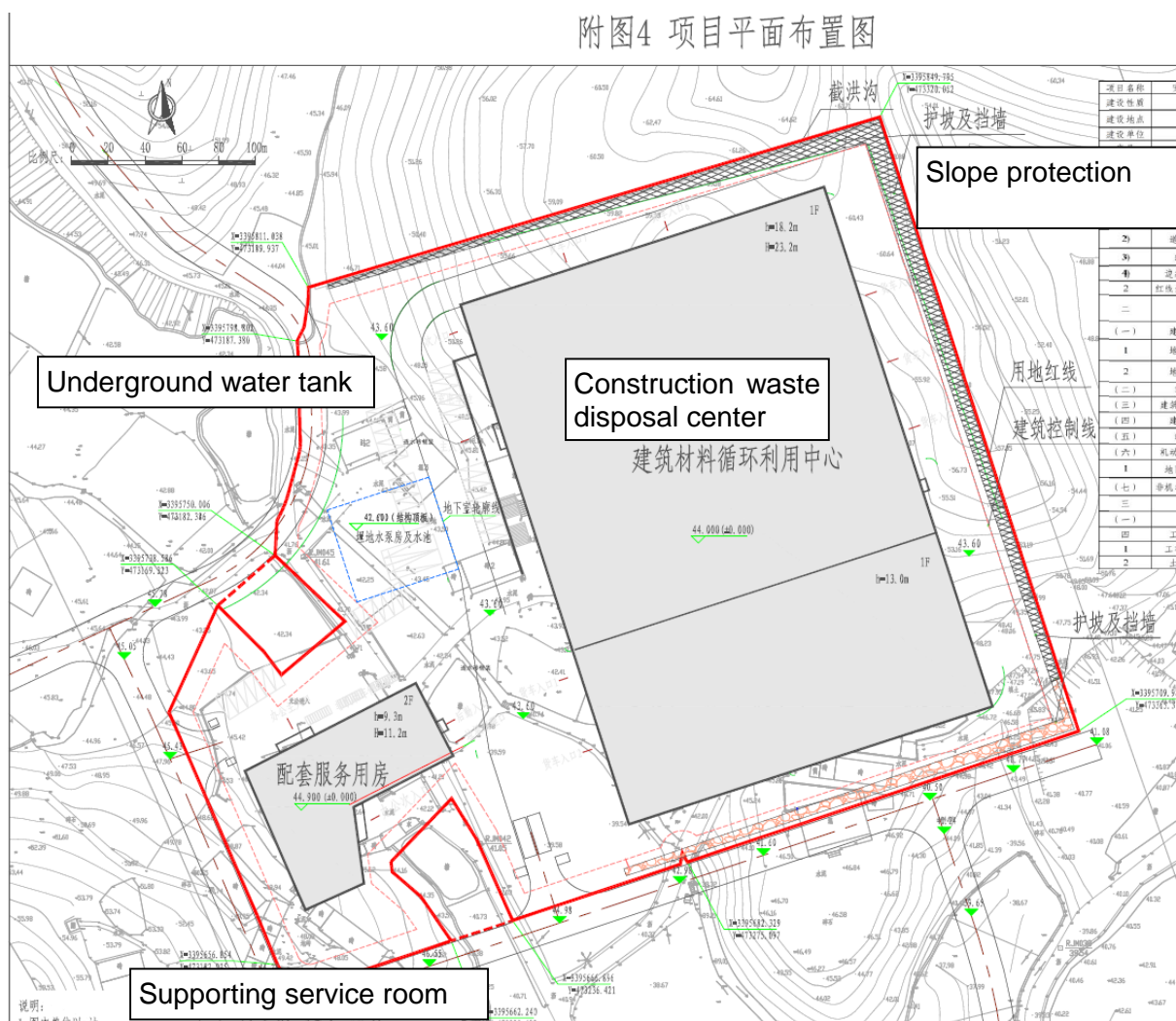


Figure III-7: Render graph of construction waste disposal center



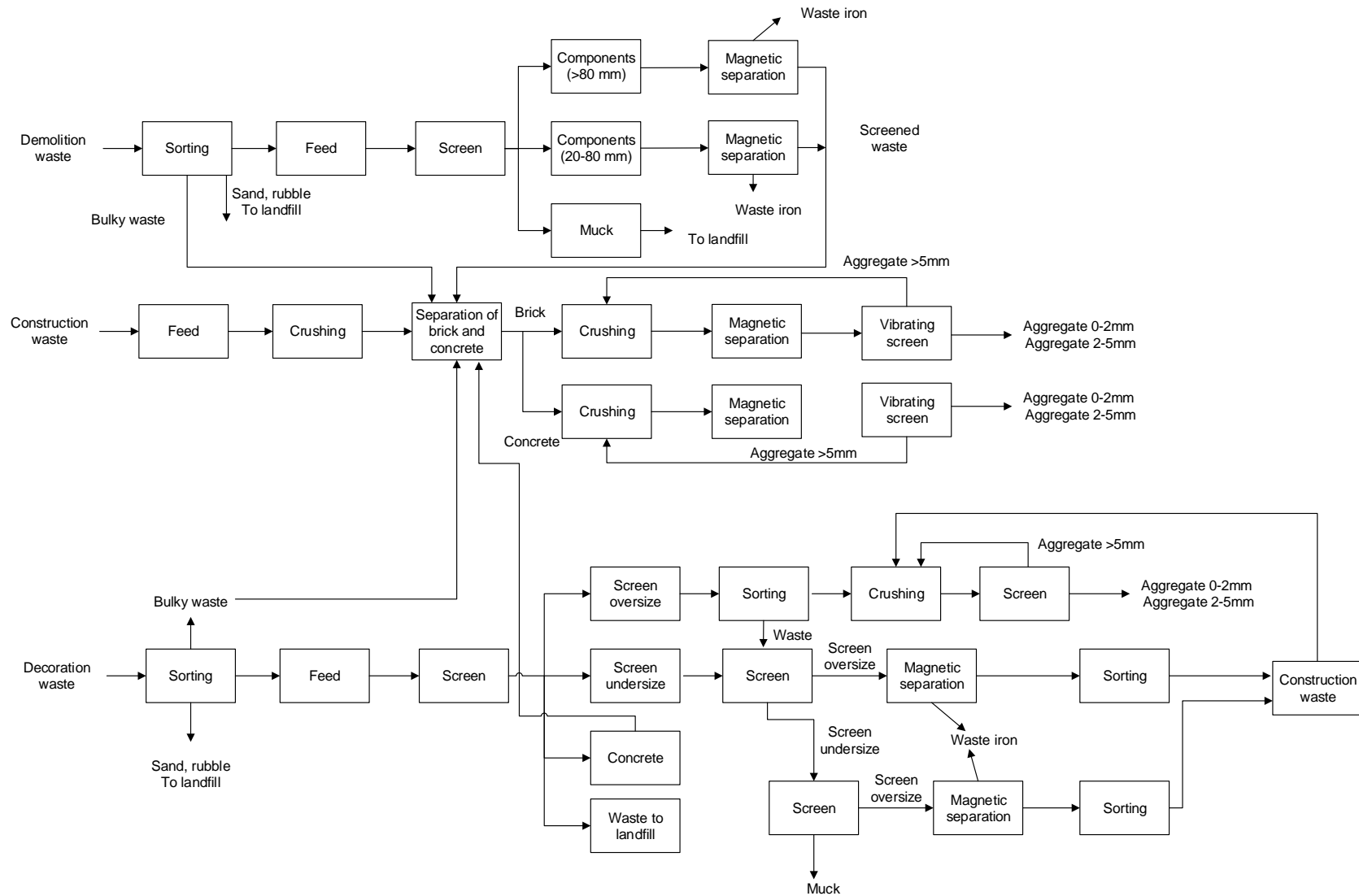
Source: FSR, 2022

93. The center will mainly dispose construction waste, decoration waste, demolition waste and construction waste. The process of the center is presented below.

94. Demolition waste is first manually sorted. The bulky waste will be sent to separation of brick and concrete process of construction waste treatment process for treatment and the sand and rubble will be sent to the landfill for disposal. The waste after sorting will be sent to the heavy screen by conveyor. Then the waste will be screen to three types: particle size >80 mm, particle size is between 20 and 80mm and particle size <20 mm. For components' particle size <20 mm, these components are muck and will be sent to landfill for treatment. For components' particle size >80 mm and particle size is between 20 and 80mm, these components will be treated by electromagnetic separators to remove the iron in the components. Then these components will be classified as screened waste and will be sent to the separation of brick and concrete process of construction waste treatment process.

95. Construction waste will be sent to chain scraper conveyor by loader, then send to jaw crusher for crushing. Then the crushed waste will be sent to separation of brick and concrete process combined with screened waste. In this process, the waste will be divided into brick and concrete. Then brick and concrete will be sent to impact crusher for crush. The crushed waste will be treated by electromagnetic separators to remove the iron, then sent to vibrating screen for screen. The waste will be divided into o three types: aggregate (particle size <2 mm), aggregate (particle size is between 2 and 5mm) and aggregate (particle size >5 mm). For aggregate's particle size >5 mm, the aggregate will be sent to vibrating screen for screen until the particle size is <5 mm. The aggregate (particle size <2 mm) and aggregate (particle size is between 2 and 5mm) will be stored separately and sold out for recycling.

Figure III-8: Process of construction waste disposal center



Source: FSR, 2022

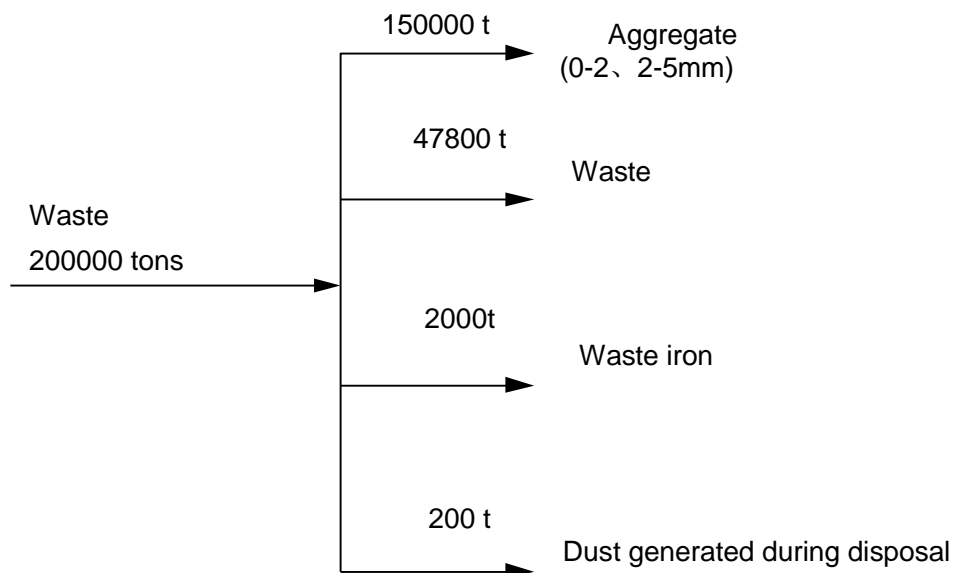
96. Decoration waste is first manually sorted. The bulky waste will be sent to separation of brick and concrete process of construction waste treatment process for treatment and the sand and rubble will be sent to the landfill for disposal. The waste after sorting will be sent to the heavy screen by conveyor. Then the waste will be screen to four types: screen oversize, scree undersize, concrete and waste. Concrete will be sent to the separation of brick and concrete process of construction waste treatment process for treatment and waste will be sent to landfill.

97. The screen oversize will be sent to impact crusher for crushing. The crushed waste will be treated by electromagnetic separators to remove the iron, then sent to vibrating screen for screen. The waste will be divided into o three types: aggregate (particle size <2 mm), aggregate (particle size is between 2 and 5mm) and aggregate (particle size >5 mm). For aggregate's particle size >5 mm, the aggregate will be sent to vibrating screen for screen until the particle size is < 5mm. The aggregate (particle size <2 mm) and aggregate (particle size is between 2 and 5mm) will be stored separately and sold out for recycling.

98. The screen undersize will be treated by secondary screen, then be treated by electromagnetic separators to remove the iron, then sent to vibrating screen for screen. The waste will be divided into o three types: aggregate (particle size <2 mm), aggregate (particle size is between 2 and 5mm) and aggregate (particle size >5 mm). For aggregate's particle size >5 mm, the aggregate will be sent to vibrating screen for screen until the particle size is < 5mm. The aggregate (particle size <2 mm) and aggregate (particle size is between 2 and 5mm) will be stored separately and sold out for recycling.

99. Material balance of construction waste disposal center is presented below.

Figure III-9: Material balance of construction waste disposal center



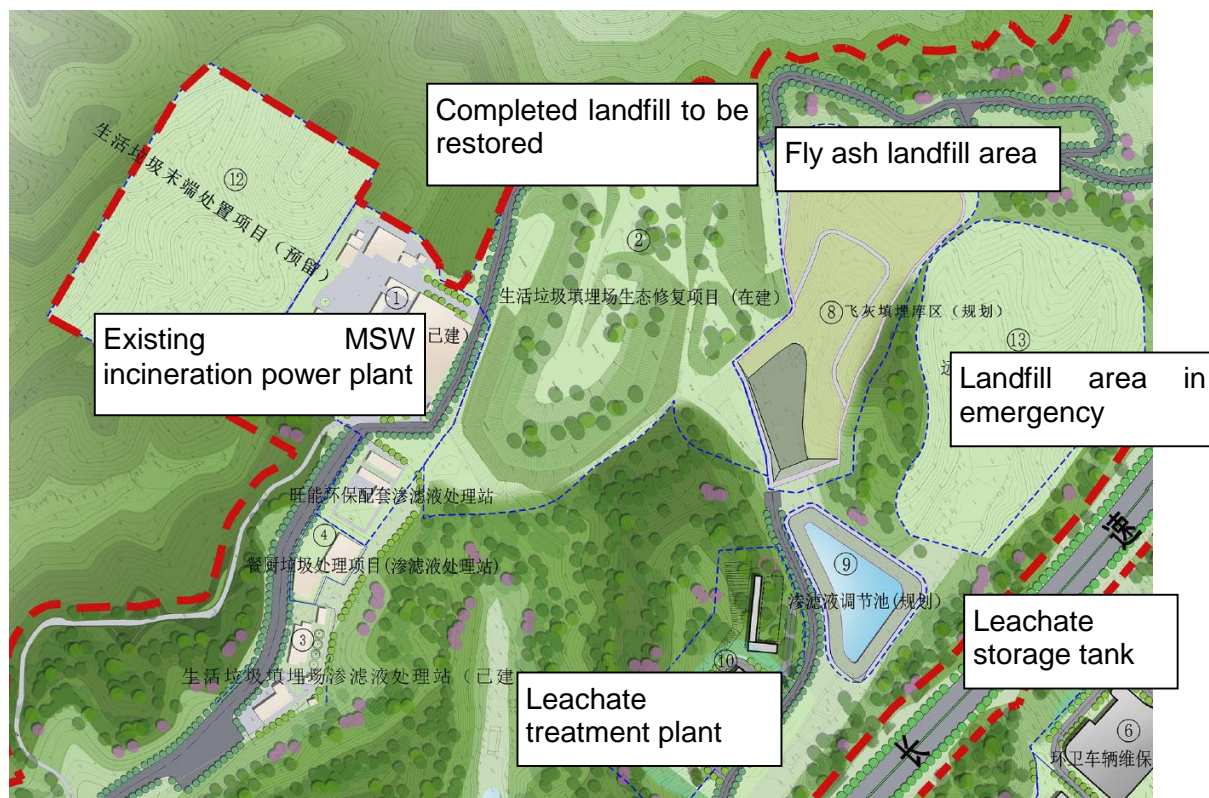
Source: FSR, 2022

100. During operation, construction waste disposal center will recycle 2,000 t waste iron and 15,000 t aggregate annually.

101. The subproject will build a new landfill including comprehensive landfill area (200,000 m³), emergency landfill area (200,000 m³), fly ash landfill area (100,000 m³), leachate storage tank

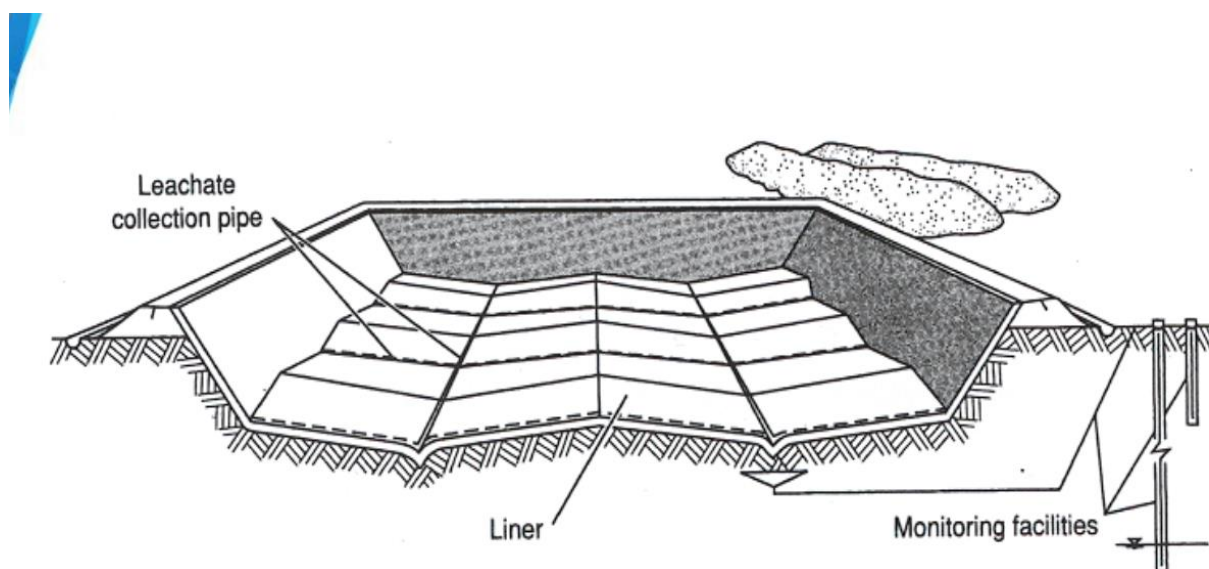
(30,000 m³) and leachate treatment plant (400 t/d). The subproject is closed to existing Anji County Municipal Solid Waste (MSW) incineration power plant and Anji County landfill.

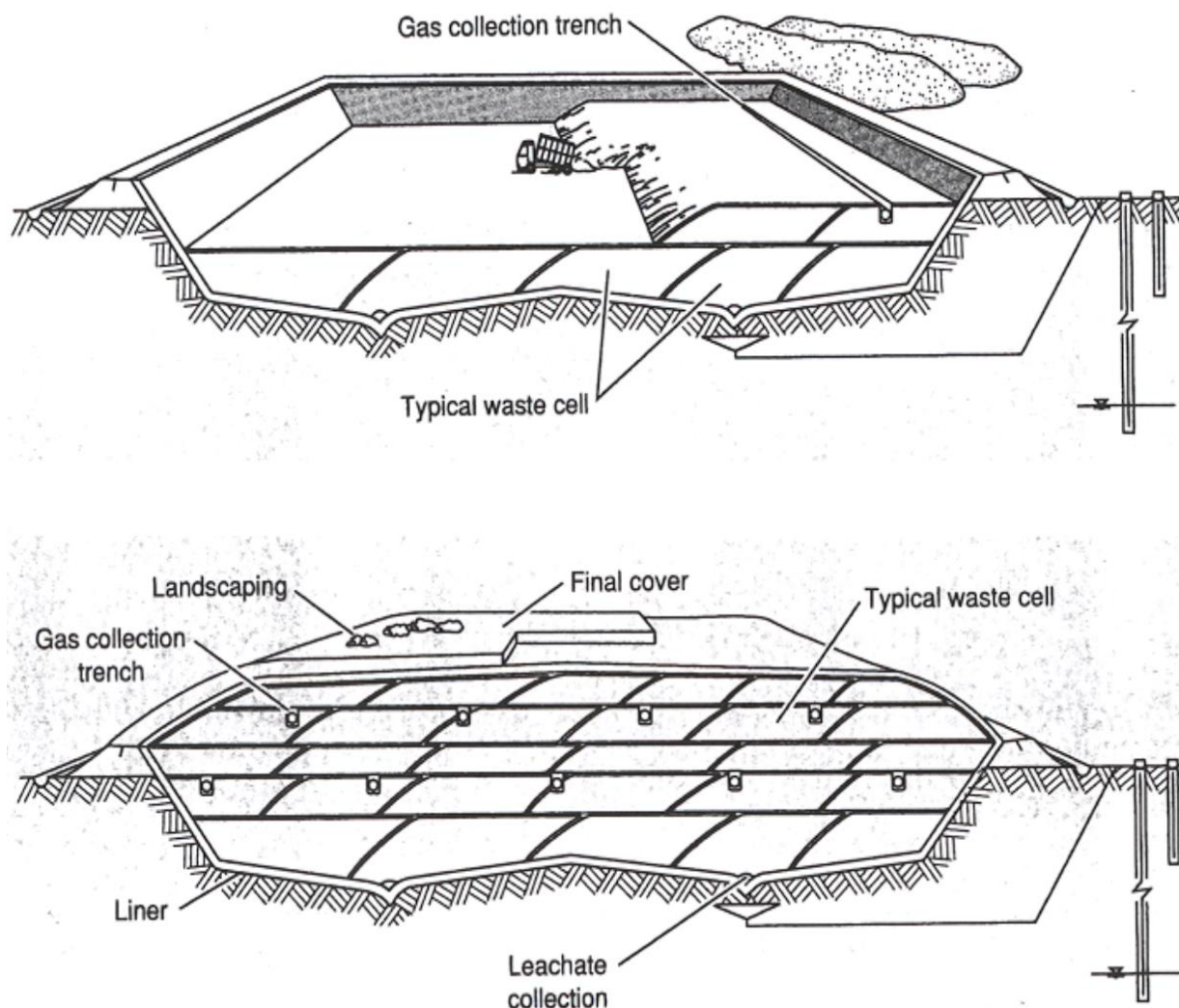
Figure III-10: Layout of landfill area and leachate treatment plant



Source: FSR, 2022

Figure III-11: Schematic diagram of landfill gas and leachate collection system





Source: FSR, 2022

102. The landfill area will be 27,685m². The component will include anti-seepage measures, retaining wall, leachate system, landfill gas system and storm water system.

103. The landfill area can be divided into the following layers (from top to bottom):

- i) Waste layer.
- ii) 200g/m² woven geotextile: The layer is used to protect the impermeable membrane.
- iii) Wastewater collection layer: The layer is 350mm thick and is composed of 25 mm-50mm gravel. The layer is used to collect and discharge the wastewater.
- iv) 600g/m² non-woven geotextile layer.
- v) 2.0 mm thick HDPE anti-seepage geomembrane membrane: The layer is used to prevent rainwater from the upper layer from entering the waste layer at the bottom and reduce the amount of generated leachate. The permeability coefficient should be less than 1×10^{-10} .

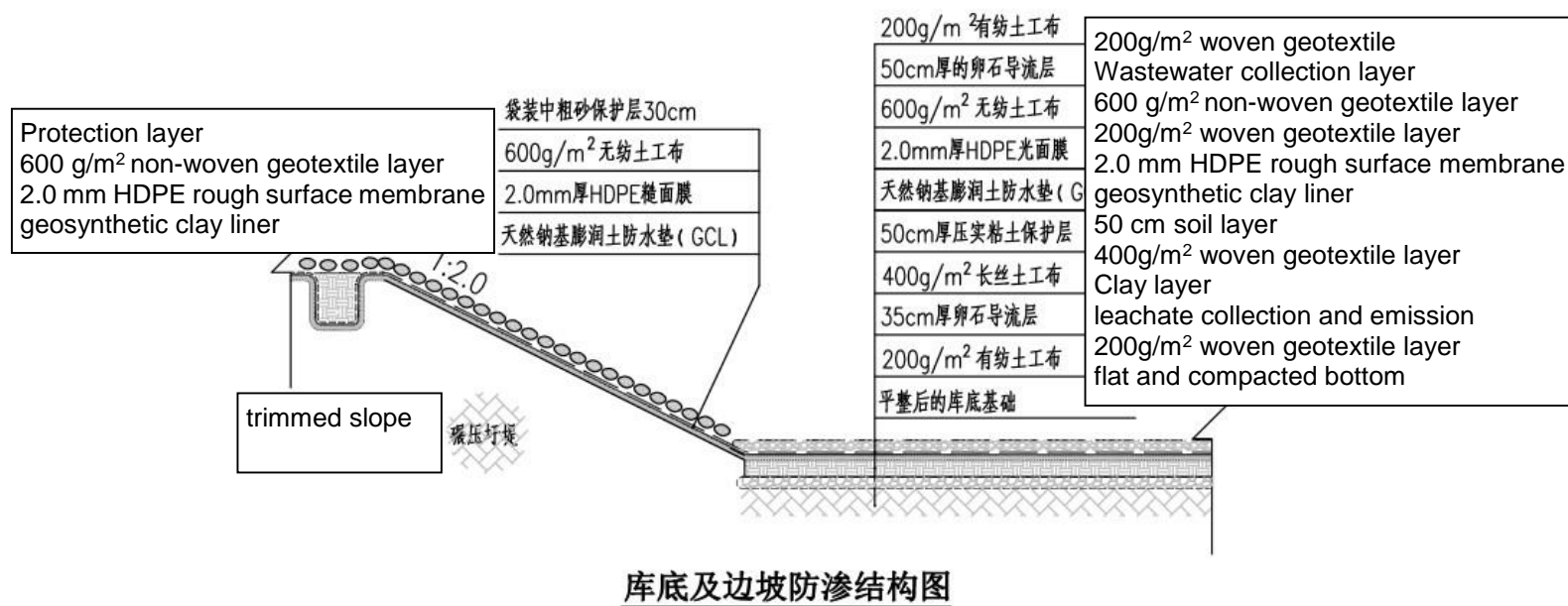
7cm/s, and protective geotextiles should be provided on the upper and lower surfaces of the geomembrane.

- vi) geosynthetic clay liner: the layer is water proof layer.
- vii) soil layer: the layer is composed of 500mm thick compacted soil for protection.
- viii) 400 g/m² woven geotextile layer: the layer is used to prevent rainwater from the upper layer from entering the waste layer at the bottom and reduce the amount of generated leachate.
- ix) geosynthetic clay liner: the layer is water proof layer.
- x) leachate collection and emission pipelines.
- xi) flat and compacted bottom.

104. Side slop area can be divided into the following layers:

- i) waste layer;
- ii) protection layer: the layer is mainly composted of 300mm thick medium-coarse sand in bags and the layer is mainly for protection;
- iii) 600 g/m² non-woven geotextile layer:
- iv) 2.0mm thick rough surface HDPE geotechnical membrane: The layer is used to prevent rainwater from the upper layer from entering the waste layer at the bottom and reduce the amount of generated leachate;
- v) geosynthetic clay liner: the layer is water proof layer;
- vi) leachate collection and emission pipelines.

Figure III-12: Vertical view of the covered landfill



Source: FSR, 2022

Ground water drainage system will be installed at the bottom of the area.

105. Groundwater blind drains will be installed at the bottom of the area. The blind drains will include primary drains and branch drains. Primary drains will be laid in the central of the bottom area. Primary drains will include primary pipelines and branch pipelines. Primary pipelines will utilize DN400 HDPE perforated pipes and branch pipelines will be DN 200 HDPE perforated pipes. Branch blind drains will be installed at both sides of the primary blind drains and will be rubble blind drains.

106. The groundwater will be collected by the blind drains, the ground water pipelines will pass through the bottom of retaining wall and stored at a groundwater tank (100 m³), then recycled as landscape water.

107. Leachate collection system will be installed. The system will be horizontal leachate collection system at the bottom of the area and the vertical leachate collection system. Φ1000 mm vertical leachate collection wells will be installed in the landfill area and connected to the horizontal leachate collection system.

108. The leachate will be stored at leachate storage tank (30,000 m³).

109. Landfill gas collection and emission system will be installed.

110. Perforated landfill gas exhaust gas pipes (DN200 HDPE) will be vertically installed in the landfill area. These vertical perforated pipelines will be installed within gabion boxes. The diameter of the gabion boxes is 1.0 m and the distances between two gabion boxes are 45m. The gabion boxes will be filled with pebbles. The height of the gabion boxes will be gradually increased as the landfill work. The nozzle of the pipes will be more than 100 cm above the ground.

111. Horizontal gas collection trenches will be laid at the bottom of the landfill area as well as the intermediate layers of the landfill waste. These trenches will be 250×250mm and filled with D20-D50 pebbles. These horizontal trenches will be connected to the gabion boxes for landfill gas collection.

112. The collected landfill gas will be treated in torch.

113. Storm water drainage system is separate from wastewater drainage system. Storm water collection system will be installed outside the landfill area. Flood intercepting trenches will be installed within the landfill area and storm water within the landfill area will be collected and treated by the leachate treatment system. The treated leachate will be recycled as landscape water.

Figure III-13: Sample of the gabions



Source: Consultants, 2022

114. One leachate treatment workshop will be built. The treatment process is filter+ Upflow Anaerobic Sludge Blanket + membrane bioreactor + two stage reverse osmosis (RO). Treatment capacity is 400 m³/d.

115. The water quality of the treated leachate is very good and can meet a stringent standard for recycling. The treated leachate will be recycled as landscape water.

116. I&G will be the EA and responsible for overall guidance during project preparation and implementation. ZALSHG will be IA and responsible for implementing project subprojects and administering and monitoring contractors and suppliers. A PMO will be established in ZALSHG and responsible for day-to-day management of the project. Key features of the subproject are listed below.

117. The plant needs a secure electricity supply to meet the demands of electric equipment such as pumps, lighting, control panels, etc. In accordance with national regulations, the central control centers will be equipped with Uninterrupted Power Supplies (UPSs) to ensure the control systems can work continuously. Double 10 kV circuits will be used in the plant. In addition, high voltage and low voltage switch cabinets, direct current (DC) cabinet, and lighting systems have been designed for the plant. Electrical equipment of the subproject is presented below.

Table III-2: Electrical equipment

No.	Item	Type
-----	------	------

1	35 kV transformer	SF9-25000/110
2	Bus reactor (10 kV)	KK-10-1500-6
3	10 kV power distribution equipment	KYN28-12 centrally installed switchgear
4	380 V power distribution equipment	MNS draw out type switchgear
5	380 V transformer	SCB10-1250/10.5KV

Source: FSR, 2022.

118. The plant will install two 35 kV transformers at the two generators. The voltage of generated electricity will be increased to 35 KV by transformers, then transferred to existing 220 kV Jiaziwu substation which is about 0.5 km away by transmission line, then finally to the electric grid.

119. The plant will be in compliance with relevant PRC fire protection regulations and requirements, including the Code for Design of Small Thermal Power Plant (GB50049-2011), Code of Design on Fire Protection of Thermal Power plant and Substation (GB50229-2006) and Regulation on Electric Apparatus Design for Explosion and Fire Risk Environment (GB50058-92). All risk areas will have alarm systems able generate audible and visual alarms, and automatic fire suppression systems.

120. An emergency risk and response plan will be established in accordance with the “National Environmental Emergency Plan” (24 January 2006), other relevant PRC laws, regulations and standards, World Bank EHS Guidelines and ADB’s SPS 2009. In addition, construction and operation phase EHS plans will be developed by specialists in occupational health and safety and boilers to ensure protection of workers and the surrounding community. The nearby communities will be informed of the potential risks of fire, explosion, etc. and the emergency drills will be conducted.

121. During the construction period (from 2022 to 2023), a temporary workers’ camp with a capacity of 100 workers will be installed at the plant site within the premise of the plant. Maximum workers on site will be 80. The worker camp will be connected to municipal water system and sewer system. Domestic waste collection bins will be installed at the worker camp to collect domestic waste.

122. The subproject will utilize municipal water for domestic water and production water. The subproject will have 100 staff and daily domestic water consumption is 10 t/d and the daily production water consumption is 120 t/d.

123. The subproject will generate both domestic wastewater (100 m³/d) and leachate (200 m³/d) during operation. All the wastewater will be treated in the leachate treatment plant then recycled as landscape water.

D. Pollutants generation and emission

124. The wastewater pollutants generated by the subproject are presented in **Table III-3**.

Table III-3: Generated pollutants of the subproject unit: t/a

Item		Concentration (mg/L)	Quantity (t)	Concentration in effluence (mg/L)	Quantity in effluence (t)	Pollutants reduction (t)
Domestic waste water	Quantity	100 m ³ /d	36,500	100 m ³ /d	36,500	36,500
	COD	300	11.0	30	1.10	9.9
	BOD	150	5.5	10	0.37	5.1
	SS	200	7.3	10	0.37	6.9
	NH ₃ -N	30	1.1	1	0.04	1.1
	TN	60	2.2	2	0.07	2.1
	TP	3	0.1	0.5	0.02	0.1
Leachate	Quantity	200 m ³ /d	73,000	200 m ³ /d	73,000	73,000
	COD	10000	730.0	30	3.65	726.4
	BOD	4000	292.0	10	0.73	291.3
	SS	1500	109.5	10	0.73	108.8
	NH ₃ -N	2000	146.0	1	0.37	145.6
	TN	4000	292.0	2	1.10	290.9
	TP	200	14.6	0.5	0.04	14.6
Total	Quantity					109,500
	COD					736.2
	BOD					296.4
	SS					115.7
	NH ₃ -N					146.7
	TN					293.0
	TP					14.7

Source: EIA, 2022

125. During operation, the landfill gas from the subproject is estimated to be 105 m³/h and the main content in landfill gas is methane, H₂S and NH₃.

Table III-4: Pollutants in the landfill gas unit: t/a

Item		CH ₄	H ₂ S	NH ₃
Landfill gas	Emission rate (kg/h)	37.63	0.012	0.041

Item	CH ₄	H ₂ S	NH ₃
Annual emission quantity (t/a)	329.61	0.11	0.355

Source: EIA, 2022

126. The collected gas will be treated in torch and the pollutants in the exhaust gas are presented below.

Table III-5: Pollutants in the exhaust gas unit: t/a

Item	CH ₄	H ₂ S	NH ₃	CO ₂	SO ₂
Exhaust gas					
Emission rate (kg/h)	5.465	0.002	0.041	98.31	0.020
Annual emission quantity (t/a)	47.493	0.016	0.355	861.11	0.177

Source: EIA, 2022

127. The odor gas generated from the leachate wastewater treatment plant (including leachate storage tank) is presented below. The odor gas will be collected (99% collection efficiency) and treated by biofilter (95% removal efficiency)

Table III-6: Pollutants in the exhaust gas unit: t/a

Item	Generation rate (kg/h)	Emission rate (kg/h)	Emission quantity (kg/a)
Leachate storage tank			
NH ₃	0.0046		
H ₂ S	0.00062	NH ₃ 0.00005742	NH ₃ 0.503
Leachate treatment plant			
NH ₃	0.0012	H ₂ S: 0.000007542	H ₂ S: 0.0659
H ₂ S	0.00014		

Source: EIA, 2022

E. Associated and Existing Facilities

128. The project due diligence considered two types of facilities as per ADB's SPS: (i) associated facilities – those which are not funded by the project but whose viability and existence depend exclusively on the project and whose operation and services are essential for the successful operation of the project; and (ii) existing facilities – those which are already established and will be necessary for the project operations, but whose operation does not depend on the project and therefore do not meet the SPS definition of associated facility. These existing facilities are not part of the project scope and will not be subject to any ADB-funded construction, operation, upgrade, rehabilitation, or other activities. Nonetheless, due diligence must be conducted for both associated and existing facilities.

129. The project involves one associated existing facilities, Anji County MSW incineration

power plant (which will provide fly ash to the subproject and receive the domestic waste from the subproject during construction and operation).

130. Anji County MSW incineration power plant. The Anji County MSW incineration power plant included two phases: phase I of the plant was officially operated from May 2014 and phase II was operated from December 2016. Now the capacity of the plant was 600 t/d (2x 300 t/d mechanical grate furnaces) and the power generation capacity is 16 MW. The incineration power plant is equipped with a leachate treatment plant. The designed capacity is 100 t/d and the leachate treatment process is "anaerobic baffled reactor (ABR) + denitrification + nitrification + membrane bioreactor (MBR)". Environmental acceptance of the plant was approved in May 2018 and the online continuous environmental monitoring system was installed for the plant for real time exhaust gas monitoring. The monitoring data was sent to Zhejiang Province EEB data center. If exceedance of limit is observed, Zhejiang Province EEB will send staff to the plant in two hours for inspection. Non-compliance was inspected by Zhejiang Province EEB since operation of the Anji County MSW incineration power plant. No due diligence issues in the Anji County MSW incineration power plant design, construction or operation were documented.

F. Implementation Arrangements

131. I&G will be the EA and responsible for overall guidance during project preparation and implementation. ZALSHG will be IA and responsible for implementing project subprojects and administering and monitoring contractors and suppliers.

132. ZALSHG is the subborrower with one EHS department consists of one manager and two staff. A PMO will be established in ZALSHG. The subborrower is responsible for: (i) pollutants emission monitoring; (ii) implementation of capacity building plan; (iii) implementation of environment management, environmental monitoring and mitigation measures; (iv) reporting to I&G on EMP implementation; and (v) timely and effectively responding to emergency.

133. The PMO will designate a qualified environment and safety officer separately, who will take overall responsibility for supervising the implementation of the EMP, including mitigation measures, coordinating the project level GRM, and preparing monitoring reports for submission by I&G to the ADB. The I&G will engage an environmental consultant (LIEC) prior to the engagement of construction contractors, who will support the PMO in mitigation implementation, environmental monitoring, reporting, and addressing any environment-related issues that arise including grievances. The LIEC will also support contractors in developing construction site-specific environmental management plans (CEMPs) prior to construction and operation.

134.

135. The PMO will implement project components, administer and monitor contractors and suppliers, and be responsible for construction supervision and quality control. The PIUs will ensure that the EMP is implemented proactively and responds to any adverse impact beyond those foreseen in the environmental impact assessment (EIA). The PMO will also attend to requests from relevant agencies and ADB regarding the mitigation measures and monitoring program. PMO will include one qualified environment officer to (i) supervise contractors and ensure compliance with the EMP; (ii) conduct regular site inspections; (iii) coordinate periodic environmental quality monitoring in compliance with the approved monitoring plan; (iv) act as local entry point for the project GRM; and (v) submit semi-annual monitoring results to I&G and ADB. The PMO will also engage an environmental monitoring agency (EMA) to undertake construction and operation phase ambient environmental monitoring, as per the requirements of the

environmental monitoring plan presented in this EMP.

136. The PMO environment officers with support of the LIEC will (i) provide overall coordination and support on environmental aspects; (ii) supervise contractors and construction supervision companies (CSC) and their compliance with the EMP; (iii) conduct regular site compliance inspections; (iv) act as provincial PMO entry point for the project GRM; (v) collect and submit environmental monitoring data provided by (a) contractors and/or CSCs, and (b) the EMA; and (vi) support I&G with preparation of EMP progress section as a part of semiannual project progress reports and semi-annual environmental monitoring reports (EMR). The PMO will be responsible for EMP implementation during construction and operation.

137. The PMO will be suitably staffed, including a qualified Environment, Health and Safety Officer (PMO EHSO), who will take overall responsibility for supervising the implementation of environment mitigation measures, coordinating the project level GRM and preparing monitoring reports for submission by I&G to ADB.

138. Construction contractors will be responsible for implementing the mitigation measures during construction under the supervision of the PMO. In their bids, the contractors will prepare CEMPs which detail how the contractors will comply with the EMP. Each contractor will engage Environment, Health and Safety Officer, who will oversee CEMP implementation, take all reasonable measures to minimize the impact of construction activities on the environment, develop and prepare monthly reports for submission to the IA. Contractors are also required to report any spills, accidents, and grievances received, and take appropriate action. The Environment, Health and Safety Officer will also be responsible for developing CEMPs and an Occupational Health and Safety Plan.

139. CSCs will be responsible for supervising and guiding construction contractors during the project construction phase. CSCs will have a qualified Environment, Health and Safety Officer who will be responsible for supervising construction contractors to ensure proper the implementation of EMP and CEMPs; and preparing and submitting consolidated quarterly EMRs to the provincial PMO based on the CEMPs implementation.

140. Anji EEB is responsible for: (i) compliance with relevant environment regulations of the subproject; (ii) supervision of subproject pollutants emission; and (iii) GRM implementation. Anji EEB also participates in environment compliance monitoring of the subproject.

141. Environment related implementation arrangements are discussed in more detail in the EMP (**Appendix I**).

IV. DESCRIPTION OF THE ENVIRONMENT

A. Location

142. The subproject will be located at Lujia Village, Dipu Street, Anji County, Huzhou City of Zhejiang Province.

143. Anji is a county in the prefecture-level city of Huzhou in northwestern Zhejiang province, People's Republic of China, with a population of 586,409 as of the end of 2020. Anji county is well known for its 60,000 hectares of bamboo groves containing over 40 different species of bamboo. It has been designated a pilot county for ecological and green building construction.

144. Anji is 65 kilometers from Hangzhou. During the 1990s, it took more than two hours to travel to Hangzhou by bus. Poor transportation isolated Anji from the rest of Zhejiang Province, and for many years its economy remained underdeveloped. From 1997 to 2000, highways were built to Hangzhou and Huzhou, and from 2000 to 2002, highways connecting to National Highway G318 were constructed. The provincial highways within its boundary were also widened. Now the highway system traversing the entire boundary has been completed, and it takes less than three hours to reach Shanghai, Nanjing or Suzhou, and less than one hour to get to Hangzhou and Huzhou. Some of Anji's residents have attempted to take the sustainable development road by developing ecology-friendly agriculture, industry and tourism, and building an ecology-friendly city.

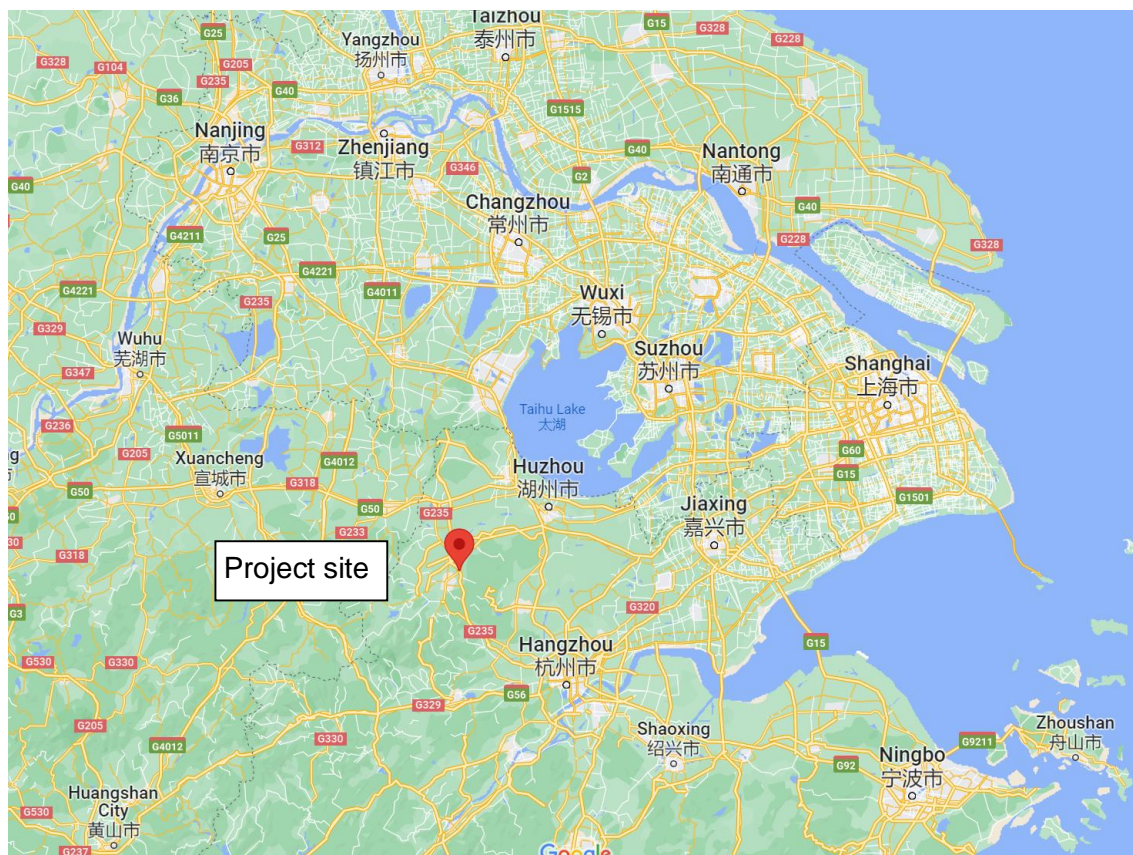
145. The ecological tour area covers one-tenth of the county's total area. Anji produces 12 million commercial bamboo poles annually, ranking first nationwide. It also has China's largest bamboo nursery. The Anji Bamboo Garden is acknowledged by scholars within and outside China as containing the widest variety of bamboo to be found. It was formerly a bamboo grove research base that combined scientific research with teaching, and has received many foreign experts and scholars and officials from the International Network for Bamboo and Rattan.

146. At the Longwang (Dragon King, deity of Chinese folk religion) Mountain Nature Reserve, lies the source of the Huangpu River, and the 800-hectare primeval forest there contains numerous flora and fauna under national protection; Anji's Salamander is only known from this reserve.[3] The Huadong Pumping Storage Power Station, located in the Tianhuangping Scenic Area, is the largest in Asia and second largest worldwide. It is meant to blend in with the surrounding environment, and is a Chinese industrial demonstration project. In 2001, Anji received 1.4 million tourists, earning it 310 million yuan, which made up 6.1% of the county's GDP. A feasibility plan recently commenced on the 20 km² (7.7 sq mi) British designed Huxi Ecological Garden. Qian Kunfang, county magistrate, says, "Though ours is a mountainous county, we nevertheless receive large numbers of visitors, either sightseeing or seeking to invest, every day. Anji's mountains, waters and pure air are now valuable commodities."

147. When developing ecological tourism, the local people naturally gravitate towards ecology-friendly agriculture and industry. By taking advantage of their favorable environment and climate, they are able to develop pollution-free green products, such as bamboo shoots, white tea, alpine vegetables, and flowers. Production bases for green products have been opened, and specialized markets for agricultural products and comprehensive wholesale markets built. In order further to supplement ecological tourism, agricultural sightseeing gardens that provide leisure activities have also been constructed. Pollution-free products currently make up 40 percent of the market, and the per capita income of farmers has increased steadily, from 3,708 yuan in 1998 to 4,556 yuan in 2001. Anji white tea, grown nowhere else in the country, sells for a price higher than the

famous Dragon Well tea. Chain production is a characteristic of Anji's industry. Bamboo, for instance, can be made into food, handicrafts, and building materials, and its remnants can also be utilized. Anji products are now exported to more than 20 countries and regions, and about one-fourth of the county's gross output value of agriculture and industry comes from bamboo-related industries. Anji's fine ecological environment has attracted large numbers of investors. In 2001 alone, over US\$50 million in foreign investment was absorbed. But the local government is strict about protecting its environment, and no future projects are permitted that incur the slightest possibility of pollution.

Figure IV-1: Subproject site location



Source: Google map, 2022

B. Zhejiang Province Overview

148. Zhejiang is an eastern, coastal province of the People's Republic of China. Its capital and largest city is Hangzhou. Zhejiang is bordered by Jiangsu and Shanghai to the north, Anhui to the northwest, Jiangxi to the west and Fujian to the south. To the east is the East China Sea, beyond which lies the Ryukyu Islands. The population of Zhejiang stands at 64.6 million by the end of 2020, the 8th highest among China. Other notable cities include Ningbo and Wenzhou. It has been called 'the backbone of China' due to being a major driving force in the Chinese economy. Zhejiang consists of 90 counties (incl. county-level cities and districts). Neighboring provinces are Anhui, Hebei, Henan and Jiangsu.

149. Zhejiang is divided into eleven prefecture-level divisions: all prefecture-level cities (including two sub-provincial cities). The eleven prefecture-level divisions of Zhejiang are subdivided into 90 county-level divisions (36 districts, 20 county-level cities, 33 counties, and one autonomous county). Those are in turn divided into 1,570 township-level divisions (761 towns, 505 townships, 14 ethnic townships, and 290 subdistricts).

Figure IV-2: Map of Zhejiang Province administrative divisions



Source: Wiki, 2022

150. Zhejiang is one of the richest and most developed provinces in China. As of 2021 its nominal GDP was CNY 7.35 trillion, about 6.43% of the country's GDP and ranked 4th among province-level administrative units; the province's primary, secondary and tertiary industries were 3.3:40.8:55.9. Its nominal GDP per capita was CNY 113,032) and ranked the 5th in the country. The private sector in the province has been playing an increasingly important role in boosting the regional economy since Economic Reform in 1978.

151. Zhejiang's main manufacturing sectors are electromechanical industries, textiles,

chemical industries, food and construction materials. In recent years Zhejiang has followed its own development model, dubbed the "Zhejiang model," which is based on prioritizing and encouraging entrepreneurship, an emphasis on small businesses responsive to the whims of the market, large public investments into infrastructure, and the production of low-cost goods in bulk for both domestic consumption and export. As a result, Zhejiang has made itself one of the richest provinces and the "Zhejiang spirit" has become something of a legend within China. However, some economists now worry that this model is not sustainable, in that it is inefficient and places unreasonable demands on raw materials and public utilities, and also a dead end, in that the myriad small businesses in Zhejiang producing cheap goods in bulk are unable to move to more sophisticated or technologically more advanced industries. The economic heart of Zhejiang is moving from North Zhejiang, centered on Hangzhou, southeastward to the region centered on Wenzhou and Taizhou. The per capita disposable income of urbanites in Zhejiang reached 55,574 CNY in 2021, an annual real growth of 8.4%. The per capita disposable income of rural residents stood at 27,302 CNY, a real growth of 9.4%.

152. Han Chinese makes up the vast majority of the population and the largest Han subgroup are the speakers of Wu varieties of Chinese. There are also 400,000 members of ethnic minorities, including approximately 200,000 She people and approximately 20,000 Hui Chinese. Jingning She Autonomous County in Lishui is the only She autonomous county in China

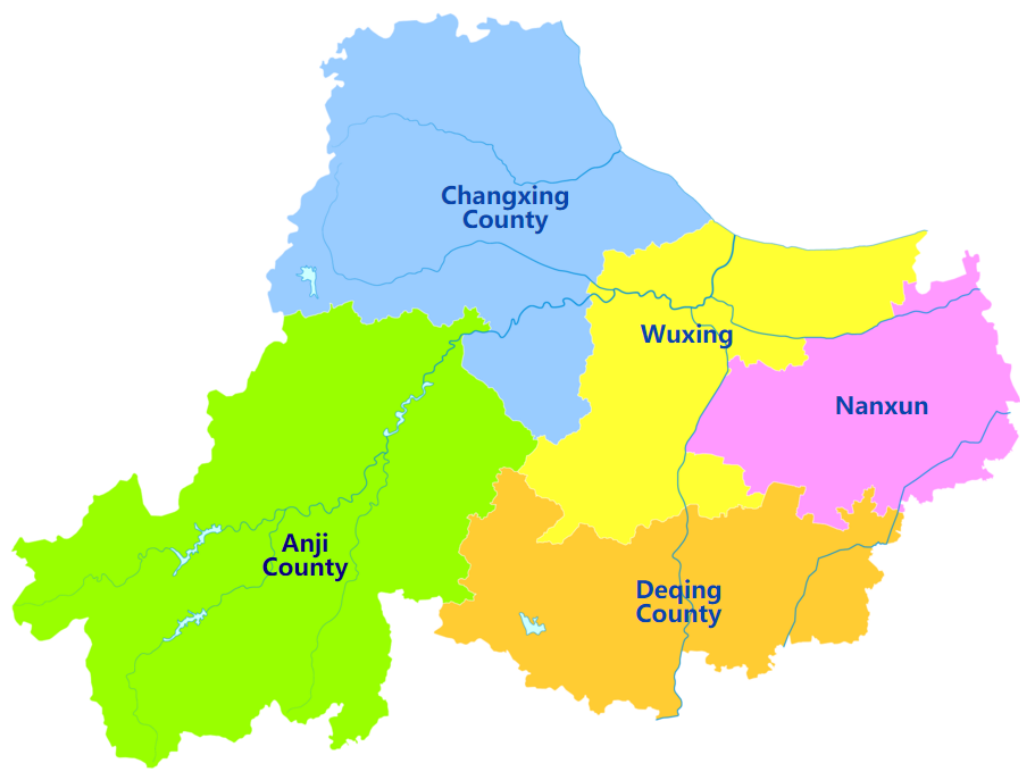
C. Site Physical Resources

153. Huzhou is a prefecture-level city in northern Zhejiang province (Hangzhou–Jiaxing–Huzhou Plain, China). Lying south of the Lake Tai, it borders Jiaxing to the east, Hangzhou to the south, and the provinces of Anhui and Jiangsu to the west and north respectively. As of the 2020 census, its population was 3,367,579 inhabitants, of whom 1,015,937 lived in the built-up (or metro) area made of Wuxing District.

154. Huzhou, in its general aspect, is in the center of the Yangtze River Delta Economic Area, with the city center 10 km south of the Chinese third largest freshwater lake Lake Tai. There are transportation links to the provincial capital of Hangzhou 78 km away in the south, Jiangsu and Anhui province in the west, and the metropolitan municipality of Shanghai 150 km to the northeast.

155. The prefecture-level city of Huzhou administers six county-level divisions, including one economic development zone and two districts and three counties. These are further divided into 66 township-level divisions, including 50 towns, 10 townships and six subdistricts.

Figure IV-3: Map of Huzhou City administrative divisions



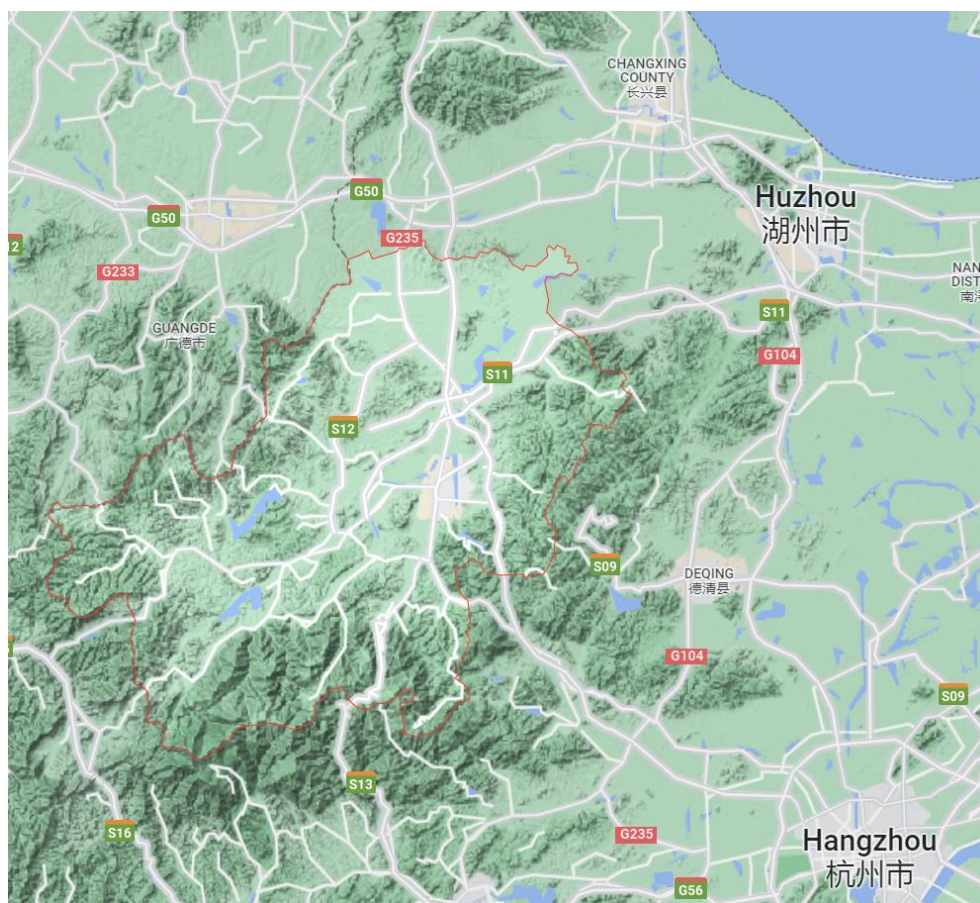
Source: Wiki, 2022

156. Flowing quietly through the city is the Changxing-Huzhou-Shanghai Channel. It is also referred to as the "Eastern Rhine River" for the continuous barge transportation that goes on similarly to the more internationally known Rhine River in Germany.

157. **Topography.** Anji County is in the overturned part of the giant complex of Qiantang to the northeast. The whole county is a combination of various landforms including mountains, hills, valleys, ditches, basins and plains. The Cambrian Yangliu Formation limestone is widely distributed in Zhangcun, Ganggang and Xiatang in the south of Anji County. The siliceous slate in Yonghe Township belongs to the Sinian Upper Xijianshan Formation, which is 600 million years old. Because the above lithology is relatively weak and easy to weather, low hills of 250~400m are formed.

158. There are many mountains, basins, river valleys and plains and rivers in Anji Count. The high mountains in the southwest are surrounded by clouds and mist all year round. The mountains are distributed in the east, south and west of the county, with an area of 216.1km², accounting for 11.5% of the total area of the county. There are 78 peaks over one kilometer in the southern mountainous area. The hills are mainly distributed in the middle of Anji with an elevation below 500m above sea level, with an area of 945.5km², accounting for 50% of the total area of the county. The downlands are mainly distributed in the north-central area, with an area of 246.7km², accounting for 13.1% of the total area of the county. The plains are mainly distributed in the floodplains on both sides of the Xitiao River. The main stream and tributaries form a continuous valley plain with an altitude of 15~5m and an area of 477.3km², accounting for 25.4% of the total area of the county.(**Figure IV-4**).

Figure IV-4: Anji topography



Source: Google map, 2022

159. The site is located at a low mountain and hilly area. The north and east sides of the site are bamboo forest mountains, and the west side is Hangzhou-Changzhou Expressway. The original site was mainly bamboo forest land and idle land, with lush trees and vegetation. The current topography fluctuates greatly. The surface elevation of the site is 39.43 Between -63.54m

160. **Geology and seismicity.** According to domestic EIA, the stratigraphic structure of the subproject area is simple and stable, without unfavorable geological processes, and is therefore suitable for the subproject construction.

161. The PRC classifies seismic intensity into 12 grades under the China Seismic Intensity Table (GB/T 17742-2008), based on the severity of “shaking” of the earth surface and the extent of potential impact. According to the China Seismic Ground Motion Parameters Zoning Map (GB18306-2001, Amendment 1), the seismic intensity in the subproject area is Grade 6, with a design peak ground acceleration of 0.05 g, a 10% probability of exceedance in 50 years, and a return period of 475 years.

162. According to the domestic EIA, the subproject site is class II under the Code for Seismic Design of Buildings (GB50011-2010), applicable to medium dense and loose gravel, dense and medium dense coarse and sands, and clays with a bearing capacity >250 kPa. The subproject site is thus considered as suitable for construction activities, and there is no significant risk of

potential disasters like landslides, mud flows, land subsidence or geological faults.

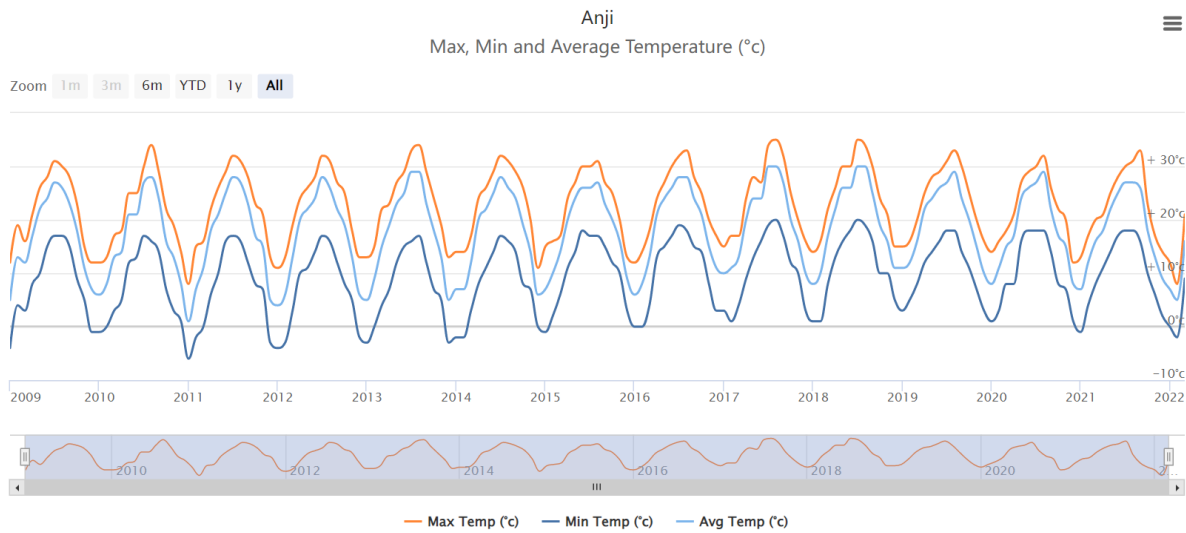
163. **Land use.** The subproject site is in low mountain and hilly area. The site is agricultural land, forest land and construction land before the subproject.

164. **Hydrology.** There are many rivers in Anji County. The water system is dendritic distribution. The main stream of Xitiao River runs through the county, its branches are Xixi and Nanxi, and the first-level tributaries are Daxi, Huxi, Lixi, Xiaoshugang and Hunnigang. The rivers are characterized by mountains and streams, with short sources and rapid currents, narrow valleys, large gradients of riverbeds, large fluctuations of stream water, and large changes in flood and dryness during the year.

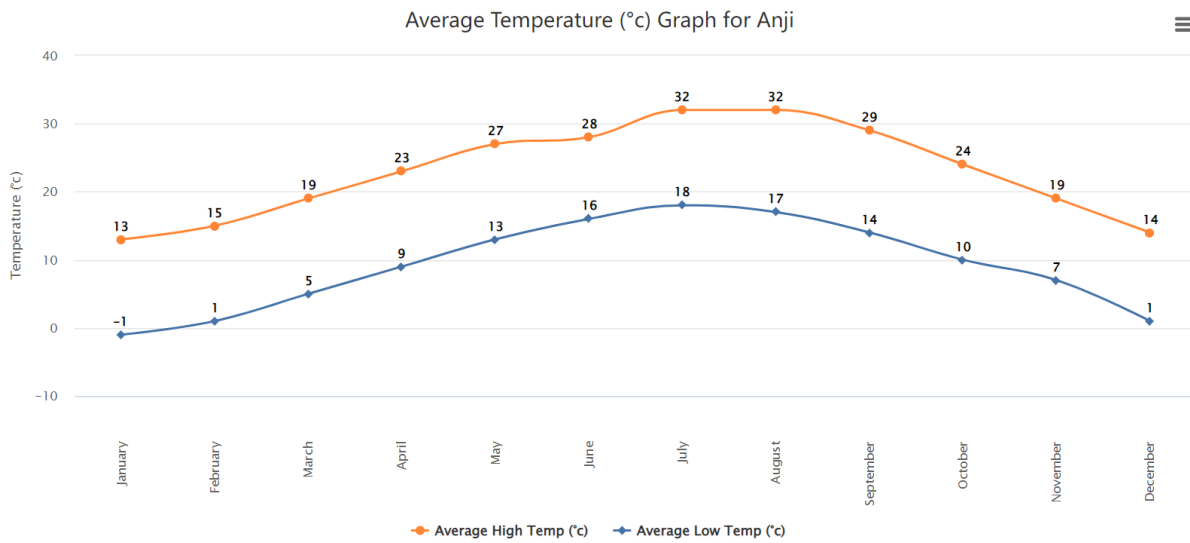
165. The Xitiao River originates from the southwest mountainous area, and runs through the whole county in a northeast direction. It has a drainage area of 1882.9km² above the county level and a main stream length of 108.3km. The upstream branch, Xixi, originates from Lion Mountain in Yonghe Township (formerly Yaocun Township), and Nanxi originates from Longwang Mountain in Zhangcun Town. The dry mouth is 58.4km long. Except for Xitiaoxi, Shanchuan Township, Dipu Township and a small part of Kuntong Township. Regional precipitation enters Dongtiao River through Yuhang and Deqing County; precipitation in a small part of Yonghe Township enters Dongjin River in Anhui Province. In the middle section of Nanxi and Xixi two branches, there are two large reservoirs, Laoshikan and Fushi, respectively, with storage capacities of 116 million m³ and 218 million m³, respectively, controlling an area of 580km² in the upper reaches of Nanxi and Xixi. The county also has two medium-sized reservoirs and 75 small reservoirs of 10-10 million m³, with a total storage capacity of about 500 million m³.

166. **Meteorology and Climate.** Anji has a temperate continental climate with four distinct seasons. It is dry in the spring, hot and rainy in the summer, cool in the autumn, and dry and cold in the winter. The average annual temperature in Anji is 15.6°C and the maximum recorded summer temperature was 41°C, and the lowest maximum recorded temperature is -18.0°C. The average annual precipitation is 1485.4 mm, In winter months, precipitation is low. Average annual average humidity is 58%. The dominate wind direction is northwest.

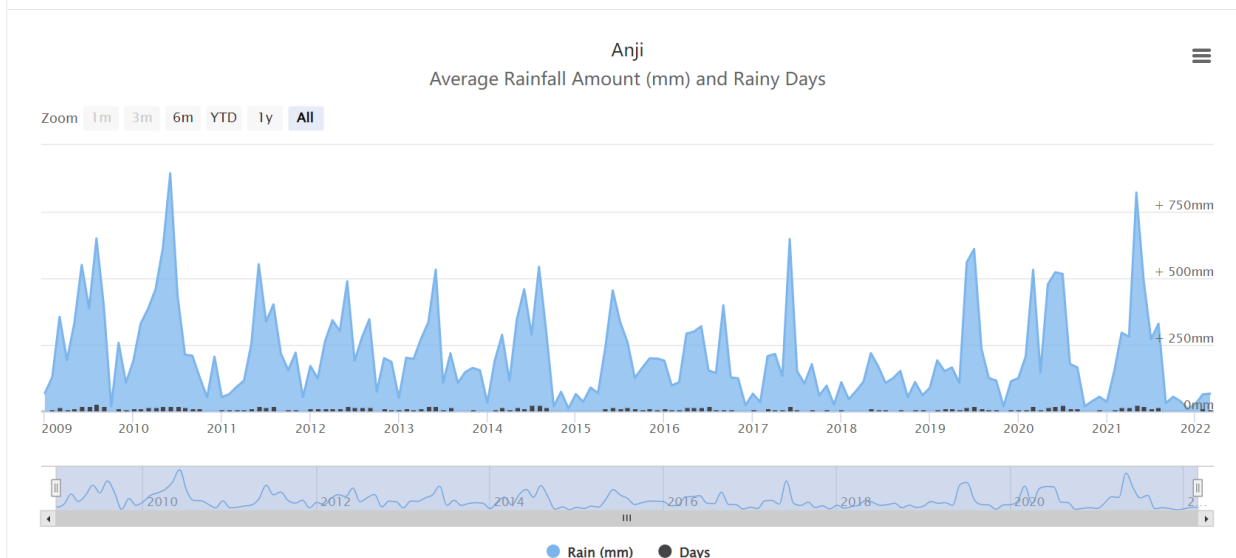
167. Sunshine hours of Anji were 2,006.1 hours. There is an average of 226 frost free days per year. The first frost typically occurs in the November, and the last frost day is typically in February.

Figure IV-5: Temperature and rainfall data for Anji County, 2009 to 2022

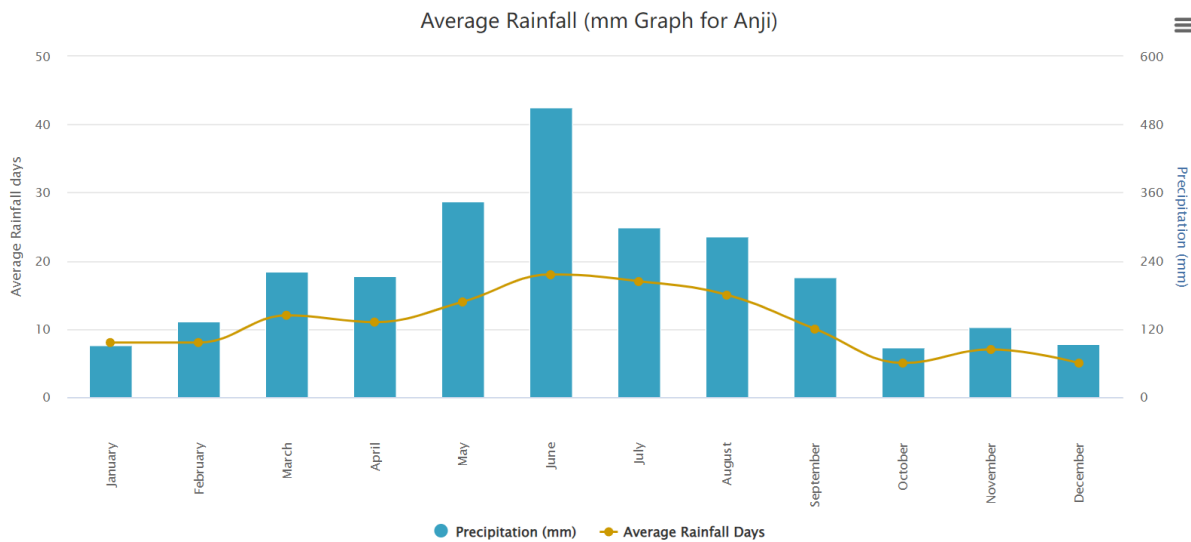
Monthly Average Temperature



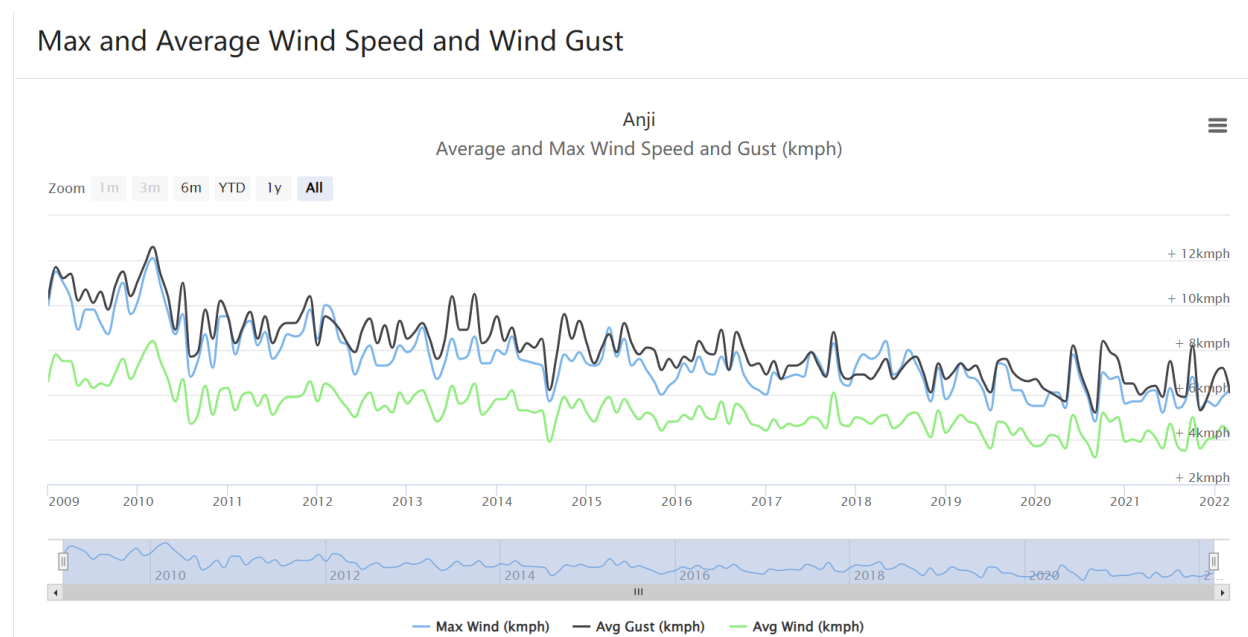
Rainfall and Rain Days



Monthly Average Rainfall



Source: <https://www.worldweatheronline.com/anji-weather-averages/zhejiang/cn.aspx>

Figure IV-6: Monthly average windspeed data for Anji County, 2009 to 2022

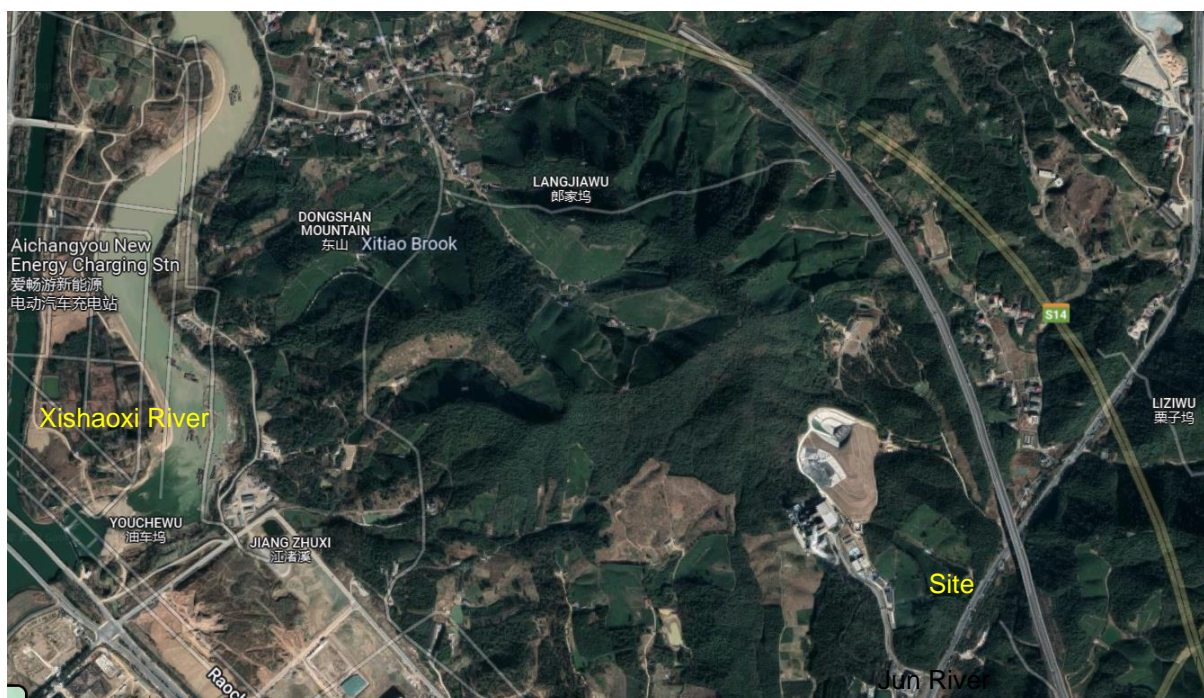
Source: <https://www.worldweatheronline.com/anji-weather-averages/zhejiang/cn.aspx>

168. The main strata in Anji County are Quaternary, Jurassic and Silurian. The Quaternary is mainly distributed in river valley plains, valleys and valley slopes in mountainous areas, with a thickness of 1~15m, and is generally a binary structure. The surface layer is cohesive soil or sandy soil, and the bottom layer is sand or gravel surface; Upstream of Puxi and Shimagang, west of Huxi, with a thickness of 190~8130m, it is purple-red-brown-red sandstone, siltstone and rhyolite. The Silurian is mainly distributed in the Dipu Port, the middle and upper reaches of the Shima Port, the Meiyuan River Basin and the east of the Hu River, with a thickness of 220-5230 m, and is composed of quartz sandstone, siltstone and shale.

169. The soil in Anji County includes five soil types: red soil, yellow soil, lithologic soil, fluvo-aquic soil, and paddy soil. Red soil is mainly distributed in low mountains and hills below 600m above sea level; yellow soil is mainly distributed in mountains above 600m above sea level; lithological soil is mainly distributed in the central and northern hills, fluvo-aquic soil is the main dry land soil in the county; paddy soil is mainly distributed on both sides of Tiaoxi River, hilly slopes, gentle mountain slopes and river valleys, mountain ridges. The project area is mainly yellow loam soil

170. **Surface water.** Surface water resource in the subproject area is presented in **Figure IV-7**. The nearest river is J Xitiao River which is about 2.5 km away from the subproject site in west direction. There are no reservoirs or rivers in the subproject impact zone.

Figure IV-7: Water resources in the subproject area



Source: Google map and domestic EIA

D. Ambient environment baseline and environmental monitoring

171. Environmental baseline monitoring undertaken during the preparation of the domestic EIA (DEIA) included: (i) surface water quality of the rivers near the site; (ii) ambient air quality at the site; (iii) groundwater quality at the site; and (iv) noise levels at the site.

1. Air Quality

172. Air quality index. MEE monitors air pollution in cities throughout the PRC and presents the results in an Air Quality Index (AQI) based on the level of 6 pollutants (**Figure IV-8**).

173. The AQI was introduced in 2012 and replaces the old Air Pollution Index (API). The MEE measures airborne pollution using AQI. The AQI is based on the concentration levels of six major atmospheric pollutants: SO₂, NO₂, PM₁₀, carbon monoxide (CO), ozone (O₃), and PM_{2.5}. The AQI is employed at monitoring stations in 367 cities across the nation.

174. The MEE measures and assigns an individual air quality score (IAQI) to each of the six pollutants over a period of one, eight, or 24 hours. A city's final AQI is the highest of those six scores with that particular pollutant being the city's major pollutant. When the index is lower than 50, the ministry does not name the major pollutant. The AQI ranges from zero to over 300.

175. Air quality in Anji. In 2020, the pollutants PM₁₀, PM_{2.5}, SO₂, NO₂, CO and O₃ of Anji County met Grade II of the PRC Ambient Air Quality Standards GB3095-2012. The data are from the ambient air quality on-line monitoring systems located in the urban area of Anji County. The PRC's Technical Guideline of Environmental Impact Assessment - Ambient Air Quality (HJ2.2-2018) stipulates that "in an EIA study, data from regional automatic monitoring points that with similar geographical location, topography and climatic conditions of the project area can be used in the EIA." The annual average monitoring data from the local auto-monitoring systems conform to the provisions of HJ664 Guideline. Based on **Table IV-1**, the air quality of the urban area meets the Class II standards of PRC Ambient Air Quality Standards of GB3095-2012 and WHO guidelines IT-1 values.

Table IV-1: Anji urban area ambient air quality, 2020 (mg/m³).

Item	Monitoring results (annual average)					
	SO ₂	NO ₂	PM ₁₀	CO	O ₃	PM _{2.5}
Anji County (2020)	16	24	36	0.6	115	28
Grade II Standard value of GB3095-2012	60	40	70	4	160(8-hour)	35
Standard compliance	Yes	Yes	Yes	Yes	Yes	Yes

Source: Domestic DEIA, 2022.

2. Groundwater quality

176. Groundwater is not the source of drinking water in Anji County. Regular groundwater monitoring is conducted near the existing landfill and the monitoring results can meet the Class III standard of Underground Water Quality Standard (GB/T 14848—2017) (**Table IV-9**).

177. Besides, the groundwater monitoring data is disclosed to the public and the link is <http://www.zjrqchina.com/index.php?m=Article&a=show&id=2050>.

Table IV-2: Monitoring Results of Groundwater at the existing landfill at 2021 (Unit: mg/L)

Item	Concentration range	Limit	Standard compliance
pH	7.11-7.37	6.5-8.5	Yes
Ammonia nitrogen	0.033-0.141	≤0.5	Yes
DO	5.22-5.67	≥3.0	Yes
Sulfate	7.3-36.2	≤250	Yes
Chloride	1.01-22.35	≤250	Yes
Nitrate	1.02-15.65	≤20.0	Yes
Cadmium	0.0005 L	≤0.005	Yes
Chromium VI	0.004 L	≤0.05	Yes
Arsenic	0.001 L	≤0.01	Yes
Lead	0.2 L	≤0.01	Yes
Nickel	0.005 L	≤0.02	Yes
Copper	0.05 L	≤1.0	Yes
Zinc	0.05 L	≤1.0	Yes

Source: Domestic DEIA, 2022.

3. Surface water quality

178. The nearest surface water bodies near the subproject are Xitiaoxi River. Surface water sampling was conducted by the domestic EIA Institute at the in June 2021. Samples were taken and the results are presented in **Table IV-3**. Based on the results the surface water quality of the rivers near the project site meets the Class III standard of the PRC's Surface Water Ambient Quality Standard (GB3838-2002, there are no World Bank EHS guidelines)²⁵. Overall, the surface water quality near the subproject in Anji County is good.

Table IV-3: Surface water quality of near the subproject, 2021. unit: mg/L except pH.

Location	Item	Results			Limit (Class III)	Standard Compliance
		2021.08.14	2021.08.15	2021.08.16		
Xun River (Longtang-Sishui section)	pH	7.22	7.35	7.32	6-9	Yes
	Dissolved oxygen	5.7	5.8	5.6	≥5	Yes
	Ammonia nitrogen	0.13	0.22	0.45	≤ 1.0	Yes
	Total phosphorus	0.03	0.05	0.07	≤ 0.2	Yes
	Petroleum	0.011	0.016	0.018	≤ 0.05	Yes
	Permanganate index	1.3	1.4	1.7	≤6	Yes
	COD	11	15	14	≤20	Yes
	BOD	2.1	2.5	1.9	≤4	Yes

Source: Domestic EIA, 2022.

4. Noise

179. Noise baseline monitoring was undertaken by the DEIA Institute in August 2021 at the project site boundaries. The results in **Table IV-4** show that noise baseline at all points met the PRC Class II standards in PRC Environmental Quality Standards for Noise (GB3096-2008).

Table IV-4: Noise monitoring data. Unit dB(A).

No.	Location
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²⁵ Class III of Surface Water Ambient Quality Standard (GB3838-2002) is suitable for drinking water sources in Class II protection areas, wintering grounds for fish and crustaceans, migration routes, water bodies for aquaculture and capture fishery, and swimming activities.

		Monitoring time	Monitoring result	PRC Limit	Standard compliance
1	Existing landfill	Daytime	44.1-50.9	60	Yes
		Nighttime	39.2-43.2	50	Yes
2	Construction waste disposal center	Daytime	46.5-51.5	60	Yes
		Nighttime	40.2-45.8	50	Yes
3	New landfill	Daytime	42.0-48.9	60	Yes
		Nighttime	40.1-44.1	50	Yes

Source: Domestic EIA (2022).

180. The results indicate that daytime and nighttime noise levels at the at the site meet the applicable Class III standards (65 dB(A) daytime, 55 dB(A) nighttime) in *PRC Noise Standards for Industrial Enterprises at Site Boundary* (GB12348-2008).

5. e) COVID-19 outbreak

181. From January 23, 2020, to March 1, 2022, there were 10 confirmed Covid-19 cases in Huzhou, of which all 10 recovered.²⁶ As of March 1, 2022, no new cases have been found since March 23, 2020, and all the 10 confirmed cases were recovered before March 23, 2020. Nonetheless, Anji County is required to follow the PRC and Zhejiang Province requirements to strictly control and monitor public movements within, and in and out of, Anji County. Body temperature scanners were installed at bus stations, and persons who enter Anji County via all methods (car, train, plane, bus) are required to provide a Health Code, which has been assigned by the PRC's State Council's APP for each person, to demonstrate that the persons have not visited the medium-risk or high-risk areas in last 14 days (these areas are updated and published on a daily basis by the State Council). If the persons have visited medium risk or high-risk areas in last 14 days without negative nucleic acid detection certification, the person cannot enter Anji County or is allowed to enter Anji County.

182. Anji County also implemented COVID-19 prevention and control measures following the PRC and Zhejiang Province's requirements, including disinfection/cleaning of public space, temperature checks at entrances of facilities, social distancing measures, mandatory use of personal protective equipment such as facemasks and procedures to be adopted in the event any person is infected with COVID-19.

183. The project EMP includes the requirement for a COVID-19 health and safety plan to address health risks. An outline and minimum requirements for the plan are given in Appendix 3, based on international and national guidelines.

E. Ecology and Sensitive Resources

184. **Ecology.** Huzhou City is home to a reported 1,235 plant species in 152 families. The fauna resources of Anji include wild terrestrial and aquatic species typically associated with river basins.

185. The vegetation type of Anji County belongs to the mid-subtropical evergreen broad-leaved forest belt. The forest coverage rate and vegetation coverage rate are as high as 70% and 75% respectively. Among them, the bamboo forest area is more than 1 million mu, accounting for about one third of the total area of the county. One of the top ten bamboo towns in China, the storage of moso bamboo ranks first in the country. In the vegetation zoning of the province, Anji County

26 https://news.sina.cn/project/fy2020/yq_province.shtml?wm=3049_0016&city=CN330500000000000

belongs to the subtropical northern edge of the mixed forest belt of broad-leaved, deciduous and evergreen coniferous leaves, with dense vegetation and a wide variety of species. The tree species include conifers such as masson pine, fir, cedar, torreya, golden pine, and broad-leaved trees such as purple nan, hemp chestnut, green maple oak, and white oak. The main timber trees are Masson pine and Chinese fir, but the economic forests such as tea tree, tung tung, small mixed bamboo and chestnut are mainly planted in the low and gentle hillside area.

186. The animals distributed in the surrounding area are small animals such as poultry, domestic animals, wild birds (egrets, sparrows), frogs (frogs), snakes (water snakes, red scorpions, etc.), mice, etc., and there are no rare animals and plants protected by the state.

187. The subproject site is in low mountain area. Natural flora within the subproject area is destroyed due to the farming activities in the past and there are no known ecological and/or sensitive resources in or near the subproject site.

Figure IV-8: Subproject site conditions



Source: consultants

188. Based on the domestic EIA, site surveys and records review, there are no known rare or endangered flora or fauna, species with international, national or provincial protection status,

areas of natural or critical habitat,²⁷ parks, nature reserves, or areas with special national, regional or local ecological significance within or adjacent to any of the subproject site. There are also no known drinking water sources, scenic sites, or, based on both sites surveys and a review of relevant literature, sites with Physical Cultural Resources (PCRs).²⁸

189. **Sensitive receptors.** The domestic EIA report identifies 3 sensitive receptors for air and noise impacts near the subproject site during construction phase and operation phase.

Table IV-5: Sensitive receptors near the plant

No.	Location	Direction	Distance (m)
1	Yangguang Meichen community	SW	2,100
2	Dipu Town	E	1,700
3	Yangjiawu Village	N	1,800

Source: Domestic EIA (2022).

190. Sensitive receptors are given special attention in the assessment of impacts (Section V) and the EMP (Appendix I).

F. Socio-economic and Cultural Resources

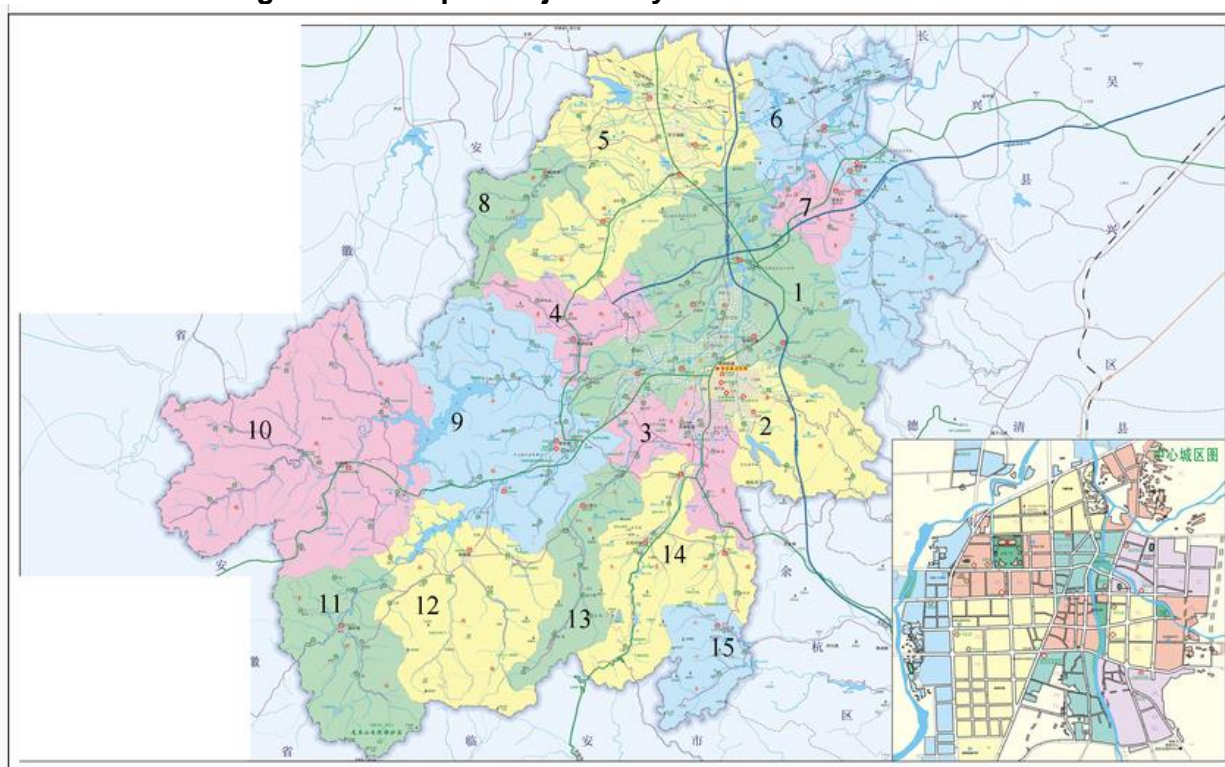
191. **Huzhou City.** The prefecture-level city of Huzhou administers six county-level divisions, including one economic development zone and two districts and three counties. These are further divided into 66 township-level divisions, including 50 towns, 10 townships and six subdistricts.

192. As of 2020, there are 4 subdistricts, 8 towns and 3 townships in Anji.

²⁷ Natural habitat is land and water areas where the biological communities are formed largely by native plant and animal species, and where human activity has not essentially modified the area's primary ecological functions. Critical habitat are areas with high biodiversity value, including habitat required for the survival of critically endangered or endangered species; areas having special significance for endemic or restricted-range species; sites that are critical for the survival of migratory species; areas supporting globally significant concentrations or numbers of individuals of congregatory species; areas with unique assemblages of species or that are associated with key evolutionary processes or provide key ecosystem services; and areas having biodiversity of significant social, economic, or cultural importance to local communities (Environment Safeguards: A Good Practice Sourcebook, ADB, 2012).

²⁸ PCRs are broadly defined as covering all types of tangible cultural heritage, including movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic or other cultural significance. PCR are human-made objects, natural features, or a mix of the two. They may be located in urban or rural areas and may be above or below ground or underwater. They may be known and listed on official inventories, but often they are undiscovered (Environment Safeguards: A Good Practice Sourcebook, ADB, 2012).

Figure IV-9: Map of Anji County administrative divisions



Source: <https://en.wikipedia.org/wiki/Anji>

193. There are 3 ethnicities in Anji including Hui, Li and She. However, the ethnic minorities only account for 0.63% of the total population while the rest is Han ethnicity. None of the ethnic groups will be affected by the subproject implementation.

194. **Economy.** In 2021, the county's GDP was CNY 56.33 billion, of which the primary sector accounted for 4.9%; the secondary sector accounted for 48.4%; and the tertiary sector accounted for 46.7%. Per capita disposable income in 2021 in urban area was CNY 65,750 and in rural area was CNY 39,495.

195. **Employment.** In 2021, Anji's employees have increased by 27,114 and the registered unemployment rate was 1.62%.

196. **Traffic.** Anji is served by Huzhou railway station, situated to the west of the city. Both conventional and high-speed trains stop at the station

197. **Physical Cultural Resources.** Anji has a rich history. However, there are no known PCRs in subproject site or in a radius of 500 m from the subproject site and within the airshed that could be affected by the subproject.

V. ANTICIPATED IMPACTS AND MITIGATION MEASURES

A. Subproject Area of Influence and Sensitive Receptors

198. The subproject zone of influence, the total area which might be subject to adverse impacts of the project, is defined as:

- i) A 200 m zone around the boundary of all subproject sites with respect to noise during construction and operation;
- ii) A 200 m zone around the boundary of all subproject sites with respect to air pollution during construction and operation; and
- iii) A 100 m zone around the boundary of the subproject with respect to local terrestrial and aquatic ecology.

199. Sensitive receptors, defined as settlements and/or environmental values that might be affected by the subproject construction and/or operation, were also identified. These comprise (i) villages and communities potentially subject to construction or operational noise, air pollution, altered water quality, and/or environment-related social impacts; (ii) public service facilities vulnerable to disturbance or pollution; and (iii) vegetation, fauna habitats, and agricultural lands. The sensitive receptors related to the subproject are identified and summarized in **Table V-1**.

Table V-1: Subproject environmentally sensitive receptors.

No.	Location	Direction	Distance (m)
1	Yangguang Meichen community	SW	2,100
2	Dipu Town	E	1,700
3	Yangjiawu Village	N	1,800

Source: DEIA, 2022.

200. Anticipated positive and negative environmental impacts of the proposed subproject were assessed based on the domestic FSR, domestic EIA, public consultations led by the IA and assisted by consultants and site visits, surveys and consultations undertaken by consultants.

201. Pre-construction, construction and operation phases were considered separately. The results of the assessment indicate that during the pre-construction phase environmental issues are very limited and are mostly associated with ensuring appropriate incorporation of mitigation measures into the subproject design.

202. Potential negative construction phase environmental impacts are short-term and localized, and are associated with fugitive dust, construction noise, potential water quality degradation, wastewater, solid waste, disruption of traffic, and risks to worker and community health and safety. These impacts will be effectively mitigated through good construction and health and safety practices, including construction soil and spoil management; dust controls including site watering and the use of ready-mix concrete; noise controls including limiting times and seasons when noisy activities can occur, selecting low noise equipment and scheduling materials delivery to avoid densely populated or sensitive areas; water quality protection measures including managing site runoff, provision of worker sanitary facilities to reduce the impacts to the nearby surface water

body; good solid and hazardous waste management practices; and good health, safety and emergency response procedures. Construction will not affect any parks, protected areas or rare or threatened flora or fauna species.

203. Potential negative operation phase impacts include waste, wastewater, odor; domestic wastewater; noise; and potential safety risks. These impacts will be effectively mitigated through good design, including, for example, good landfill management; noise control measures; and good waste and health and safety management practices and plans.

204. Potential positive operation phase impacts are significant and long-term and are associated with energy savings and emissions reductions compared to equivalent production of iron and aggregate.

205. The subproject will deliver significant positive social and environmental impacts to beneficiaries through annual recycling of 2,000 t waste iron and 15,000 t aggregate. When compared to the equivalent production of iron and aggregate through traditional methods, once operational the subproject will: (i) result in annual energy savings equivalent to 1,414.6 tce, thereby providing a global public good by avoiding the annual emission of 3,860.0 tons of CO₂; and (ii) improve local air quality through the estimated annual reduction of emissions of SO₂ by 7.4 tons, NO_x by 8.3 tons, and PM by 1.5 tons.

B. Pre-Construction Phase Measures to be Implemented During Detailed Design

1. Siting and Land Acquisition

206. The subproject will permanently occupy 40.11 mu (26,740 m²) of land including 1.24 mu construction land and 38.87 mu collection land. There will be no physical house relocation. The subproject will not entail any permanent or temporary physical displacement or economic displacement. This is because:

- (i) Based on social specialist's work, up to now, compensation work for land acquisition of the Plant has been completed and all compensation fees have been paid off. The certificate for the use of state-owned land has been obtained. Land acquisition has been completed for those subprojects in which new facilities will be constructed, and was found to be in compliance with PRC and ADB requirements
- (ii) The compensation rates, resettlement program, and compensation distribution program of the proposed plant have been determined through repeated consultations. Compensation for acquired land has been paid to the affected households timely and in full. As a result, there has been no complaint to the grievance redress mechanism. The compensation rates and resettlement program comply with the applicable state and provincial regulations and policies, and ADB's involuntary resettlement safeguard principles. The APs are satisfied with the resettlement policies, and their income has risen, demonstrating that the resettlement program of the proposed plant has been effective.

207. Overall, the subproject will not result in any involuntary land acquisition, resettlement or physical displacement. There will be no loss of personal property, structures, crops, trees or other assets. There are also no potential adverse impacts on disadvantaged or vulnerable groups, including the poor, women and children, and Indigenous Peoples.

2. Mitigation Measures and Monitoring during Detailed Design

208. Mitigation measures to be adopted during detailed design to minimize the impacts are as follows:

- (i) **Detailed Design.** Environmental mitigation and pollution control measures indicated in this EIA, the EMP and the domestic EIA will be incorporated into the detailed design.
- (ii) **Organization.** A PMO will be established and an external Loan Implementation Environmental Consultant (LIEC) will be hired by the EA.
- (iii) **Institutional strengthening:** Prior to the start of construction, the institutional strengthening and training program will be delivered by the LIEC. The training will focus on ADB's and PRC's relevant environmental, health and safety laws, regulations and policies; implementation of the EMP, environmental monitoring, chance find procedures for PCRs, and the GRM. Training will be provided to the IA, relevant PMO staff, contractors and CSCs
- (iv) **Bidding Documents and Contracts.** Environmental mitigation measures indicated in this EIA, the EMP and the domestic EIA will be included in contracts for civil works and equipment installations. All contractors will be required to strictly comply with the EMP.
- (v) **Environmental monitoring.** The environmental monitoring program (EMoP, see **Table 3** in **Appendix I**) will be incorporated into the design to ensure that environmental impacts are closely monitored and activities of the subproject construction and operation are closely supervised against the PRC environmental laws, regulations and standards, ADB SPS, EMP and the approved domestic EIA.
- (vi) **Safety measures for COVID-19.** Prior to the arrival of external subproject personnel (e.g., workers and consultants), the PMO will implement safety procedures and screening to ensure that all staff are tested negative for COVID-19 and do not pose a threat to local populations, as per the COVID-19 measures in the EMP.
- (vii) **Updating the EMP.** In case of any changes in the detailed subproject design, the EMP will be updated as needed, including the mitigation measures and monitoring plan. This will be the responsibility of the PMO and LIEC.
- (viii) **GRM.** The PMO and PIUs will implement the project wide GRM at least two months before the start of construction to ensure that the surrounding residential communities, villages, schools and hospitals are well informed and have the opportunity to discuss any concerns. This is further to the public consultations already conducted during subproject preparation (see Section VI).
- (ix) **Contractor obligations.** All contractors, in their bids, will respond to the environmental clauses in the bidding documents for EMP requirements. Prior to construction, each contractor will develop its site EMP based on the subproject EMP, and assign a Contractor's Environment, Health and Safety (EHS) Officer. The site EMP shall at minimum include: (a) surface water and ecosystem protection; (b) spill control and management; (c) site drainage and soil erosion protection; (d) temporary traffic management; (e) construction site access control; (f) health and safety and emergency response; (g) all other mitigation measures listed in the subproject EMP; (h) contractor performance targets; and (i) safety measures for COVID-19 in the EMP. The site EMP will be submitted to the PMO environment officer for approval, with the support from the EEB of Anji County.

- (x) **Environmental management preparation.** Ensure that prior to the start of construction, the PMO environment officers, together with environmental supervision engineers from CSCs, are mobilized and prepared to be responsible for their EMP supervision responsibilities. Also ensure that contractor's EHS Officer is mobilized and prepared for their site EMP implementation responsibilities.

3. **Grievance Redress Mechanism**

209. In accordance with the GRM presented in Chapter VIII of the IEE, a staff member from IA will be assigned to be overall responsible for the GRM; GRM training will be provided for PMO, IA and GRM access points; and the GRM access point phone numbers, fax numbers, addresses and emails will be disclosed to the public at the construction site and the plant.

4. **Training and Capacity Building**

210. An institutional strengthening and training program will be delivered by LIEC (see **Table 4** in **Appendix I**). The training will focus on ADB's and PRC's environmental, health and safety laws, regulations and policies; implementation of the EMP, EMoP, the GRM and international good EHS practices. Training will be provided to the IA, relevant staff and contractors and the construction supervision company.

5. **Permitting**

211. All necessary permits have been obtained from the relevant authorities.

C. **Anticipated Environmental Impacts and Mitigation Measures during Construction Phase**

212. Potential negative construction phase environmental impacts are short-term and localized, and are associated with fugitive dust, construction noise, potential water quality degradation, wastewater, solid waste, disruption of traffic, and risks to worker and community health and safety. These impacts will be effectively mitigated through good construction and health and safety practices, including construction soil and spoil management; dust controls including site watering and the use of ready-mix concrete; noise controls including limiting times and seasons when noisy activities can occur, selecting low noise equipment and scheduling materials delivery to avoid densely populated or sensitive areas; water quality protection measures including managing site runoff, provision of worker sanitary facilities to reduce the impacts to the nearby surface water body; good solid and hazardous waste management practices; and good health, safety and emergency response procedures. Construction will not affect any parks, protected areas or rare or threatened flora or fauna species. Potential impacts are assessed and addressed below. Identified impacts can be readily addressed through the application of good construction site practices

1. **Impacts to Flora and Fauna**

213. Typical construction impacts on flora and fauna include removal of vegetation and disruption of the ecosystem during construction. If present, rare or endangered flora or fauna may also be impacted. However, based on site visit the subproject construction site is with little or no vegetation cover due to the mining activities in the past. It is therefore unlikely that there will be direct impacts on natural lands or ecological values from subproject site developments.

214. The locations of subproject site have been reviewed against provincial records provided by the IBAT.²⁹ maps of Zhejiang protected areas and Important Bird and Biodiversity Areas (IBBAs). No subproject encroaches on any legally protected natural area or other critical habitats.

215. Based on site visits, there is no known rare or endangered flora or fauna, parks, nature reserves or areas with special ecological significance which will be impacted by the subproject. Impacts on flora or fauna are thus expected to be minimal and short-term. Nonetheless, to address potential impacts, a greening plan will be implemented. Site vegetation plans will be developed at subproject site using appropriate local native species. Any existing greening areas impacted by the subproject will be restored post-construction using appropriate native species.

216. During construction, construction working areas will be demarcated to prevent encroachment and damage to adjacent areas.

2. Erosion and Spoil

217. Construction activities such as land leveling, excavation and filling activities may lead to surface erosion. The most vulnerable soil erosion areas in the construction site include excavation sites, leveling sites, spoil sites, temporary construction sites, and other areas where surface soil is disturbed. Soil erosion can also be more serious on slopes or near water bodies, though based on site visits all construction sites are generally flat and there are no rivers, streams, ditches or lakes that are likely to be affected. Soil erosion can also occur after the completion of construction if site restoration is inadequate. Pipeline excavation and burial may also cause localized erosion and mudding of adjacent road. Finally, construction activities may generate surplus spoil.

218. These impacts can be mitigated through typical good construction practice as set out in EHS Guidelines on Construction and Decommissioning (C&D), erosion controls and site maintenance:

- (i) At construction site, the potential for storm water runoff will be assessed and appropriate storm water drainage systems to minimize soil erosion will be implemented, including perimeter bunds and establishment of temporary detention and settling ponds to control topsoil runoff.
- (ii) Land excavation and filling will be balanced so as minimize the requirement for fill material transportation.
- (iii) During earthworks, the area of soil exposed to potential erosion at any time will be minimized through good project and construction management practices.
- (iv) Temporary spoil storage sites (and storage containers at lane modification and stations construction sites) will be identified, designed, and operated to minimize impacts. Spoil sites will be restored at the conclusion of storage activities.
- (v) Spoil will be reused on-site to the maximum extent feasible as fill. Excess spoil that cannot be used on-site will be transported to an approved spoil disposal site.
- (vi) Spoil and aggregate piles will be covered with landscape material and/or regularly watered.
- (vii) Waste construction material such as residual concrete, asphalt, etc., will be properly handled for reuse or disposal.

²⁹ International Biodiversity Assessment Tool. <https://www.ibat-alliance.org/ibat-conservation/>

- (viii) Construction and material handling activities will be limited or halted during periods of rains and high winds.
- (ix) Any planned paving or vegetating of areas will be done as soon as practical after the materials are removed to protect and stabilize the soil.
- (x) Once construction is complete disturbed surfaces will be properly sloped and revegetated with native trees and grass (see greening plan).

3. Wastewater

219. Inappropriate disposal of domestic wastewater (from construction workers) or construction wastewater (from drainage of washing construction equipment and vehicles, and oil-containing wastewater from machinery repairs) may cause soil or groundwater resources contamination.

220. Construction wastewater will be produced from the maintenance and cleaning of mechanical equipment and vehicles, maintenance water for mixing and curing concrete, cooling water, and lost water and soil during the construction period which is discharged as pollutants. It is unlikely that runoff from site will reach distant water bodies, however to guard against runoff and infiltration impacting the immediately surrounding areas the contractors shall ensure that runoff from site will not reach distant water bodies.

221. Inappropriate disposal of construction wastewater (from construction site runoff, washing construction equipment and vehicles, pouring and curing concrete, and oil-containing wastewater from machinery repairs) could potentially pollute nearby water bodies and clog local drains. Workers will generate but limited amount of domestic wastewater.

222. To prevent pollution of water resources, the following mitigation measures and construction good practice as set out in EHS Guidelines on C&D, will be implemented:

- (i) Worker camp will be installed with sufficient toilets (based on the staff numbers, 4 toilets are sufficient) which will be provided for the workers and will be cleaned and discharged to the municipal sewerage system on a regular basis. Once the construction starts, if it is found that 4 toilets are not enough or there are female workers, more toilets will be provided.
- (ii) Construction wastewater will be directed to temporary detention and settling ponds, and then treated water will be partly recycled for use in dust control and the rest of treated water will be discharged to the local municipal sewer system and the waste residue in the tank is cleared and transported to designated certificated and engineered landfills by the local sanitation department personnel. If needed, polyacrylamide flocculent will be used to facilitate particle settling. All discharged construction wastewater will to be treated to meet the appropriate PRC standard GB/T 31962-2015 prior to discharge. Discharged water will then be treated in the existing leachate treatment plant of the landfill.
- (iii) All necessary measures will be undertaken to prevent construction materials and waste from entering drains and water bodies.
- (iv) Maintenance of construction equipment and vehicles will not be allowed on sites to reduce wastewater generation.
- (v) Oil traps are provided for service areas and parking areas, and oil-water separators are installed before the sedimentation tank for oil-containing wastewater;

- (vi) All construction machinery is repaired and washed at special repairing shops. No on-site machine repair, maintenance and washing shall be allowed so as to reduce wastewater generation;
- (vii) Storage facilities for fuels, oil, and other hazardous materials are within secured areas on impermeable surfaces with 110% volume of the materials stored, and provided with bunds and cleanup kits;
- (viii) The contractors' fuel suppliers are properly licensed, follow proper protocol for transferring fuel, and are in compliance with Transportation, Loading and Unloading of Dangerous or Harmful Goods (JT 3145-88);

4. Air Pollution

223. Fugitive emission of dust (measured as TSP) during earthworks and fumes from asphaltting and concrete batching off-site are expected to be the main air pollutants during the construction stage. The PRC's Air Pollutant Integrated Emission Standard (GB16297-1996) establishes standards for the emission of air pollutants from these activities.

224. Fugitive dust will be generated on construction sites during earthworks from construction activities, uncovered earth material stockpiles on construction sites and temporary spoil storage and disposal areas (and containers), and from vehicles hauling loads, especially if loads are uncovered. The EIA predicts unmitigated compliance with the Ambient Air Quality Standard (GB3095-1996) at 150 m downwind of TSP generating activities or locations. With mitigation measures such as frequent watering of unpaved areas and haul roads (7–8 times each day), the IEE estimates that the amount of dust could be reduced by 70% or more and the impact area be reduced to within 100 m downwind of earthwork activities. Impacts will be short-term and localized, and in line with typical construction works that occur daily in cities throughout the PRC and the world.

225. Anticipated sources of air pollution from construction activities include: (i) dust generated from loading, hauling and unloading; (ii) dust generated from disturbed and uncovered construction areas, especially on windy days; (iii) dust generated by the movement of vehicles and heavy machinery on unpaved access and haul roads; (vi) emissions from construction vehicles (gaseous CO and NO₂) and heavy diesel machinery and equipment.

226. Without appropriate mitigations, construction phase activities may generate significant localized total suspended particulate (TSP)³⁰ levels, with worst case conditions occurring in clear weather without watering.

227. To reduce air quality impacts during the construction period, the following air quality management measure and construction good practice as set out in EHS Guidelines on C&D will be implemented:

- (i) Water will be sprayed on active construction sites including where fugitive dust is being generated on a daily basis, and more frequently during windy days.
- (ii) Transport vehicles will be limited to low speeds in construction sites.

³⁰ Airborne particles or aerosols that are less than 100 micrometers are collectively referred to as total suspended particulate matter (TSP).

- (iii) Loads will be covered during truck transportation to avoid spillage or fugitive dust generation. Fine materials will be transported in fully contained trucks.
- (iv) Construction site roads will be well maintained and watered and swept on an as-needed basis. Construction site road entry points will be equipped with truck drive through wash ponds.
- (v) Transport routes and delivery schedules will be planned to avoid densely populated and sensitive areas, and high traffic times.
- (vi) Store petroleum or other harmful materials in appropriate places and cover to minimize fugitive dust and emission.
- (vii) Provide regular maintenance to vehicles in order to limit gaseous emissions (to be done off-site).
- (viii) Temporary fencing will be erected around dusty activities.
- (ix) Construction spoil, aggregate other construction materials will be temporary stored using containers, but they may the potential to generate dust. Thus, containers will be covered and/or watered if necessary. Powdered materials such as cement and lime will be stored in sealed bags or containers.
- (x) Muddy or dusty materials on public roads outside the exits of works areas will be cleaned immediately.
- (xi) On-site asphaltting and concrete batching are prohibited.
- (xii) Disturbed site will be revegetated as soon as possible after the completion of works.

228. Overall, air quality impacts from construction activities will be short-term (because of the phased construction approach), localized and low in magnitude, and are in line with typical construction or road works undertaken daily in cities throughout the PRC and around the world.

5. Noise Impacts

229. During the construction phase noise and vibration will be generated by on site construction activities using heavy equipment and by the transport of construction materials and equipment. Noise source during construction phase is considered a point noise source, and the predictive model is as follows:

$$L_i = L_0 - 20 \lg \frac{R_i}{R_0} - \Delta L$$

Where, L_i and L_0 are equipment noise sound levels at R_i and R_0 , respectively, ΔL is additional decrement produced by barriers, vegetation and air.

230. For the impact of multiple construction machines on a location, sound level superposition uses the following formula:

$$L = 10 \lg \sum 10^{0.1 \times L_i}$$

231. A significant increase in localized noise is expected during construction. Noise will be from construction activities including equipment unload and installation and other heavy machinery, as

well as noise from goods and material transportation. The major anticipated noise sources at each construction stage are presented in **Table V-1**. Though noise levels may be high, the impacts will be temporary and localized, and can be further mitigated. Noise fence will be installed during construction to mitigate noise impacts.

Table V-2: Primary noise sources at each construction stage

Construction Phase	No	Name	Sound Level dB(A)	Distance from the source (m)	Noise level without/with fence	Directivity
Earthwork	1.1	Excavator	80-85	5	40-45/30-35	No
	1.2	Loader	85-90	5	45-50/35-40	No
	1.3	Bulldozer	85-90	3	45-50/35-40	No
	1.4	Dump truck	85-90	3	45-50/35-40	No
Foundation Construction	2.1	Pile equipment	95-105	15	55-65/45-55	No
	2.2	Land leveler	85-90	15	45-50/35-40	No
	2.3	Crane	70-75	15	30-35/20-25	No
	2.4	Truck crane	70-75	15	30-35/20-25	No
Structure Construction	3.1	Concrete pump truck	90-93	4	50-53/40-43	No
	3.2	Concrete transport vehicle	90-93	4	50-53/40-43	No
	3.3	Vibrator	85-90	3	45-50/35-40	No
Final Finishing	4.1	Electrical drill	85-95	5	45-55/35-40	No
	4.2	Electrical hammer	90-95	5	50-55/40-45	No
	4.3	Electrical saw	90-95	5	50-55/40-45	No
Transport Vehicle	5.1	Trailer	70-75	5	30-35/20-25	No
	5.2	Flat car	70-75	5	30-35/20-25	No
	5.3	Truck	70-75	5	30-35/20-25	No

Source: Domestic EIA.

232. To ensure construction activities meet PRC noise standards and to protect workers and adjacent residents, the following mitigation measures and construction good practice as set out in EHS Guidelines on C&D will be implemented:

- (i) Construction activities will be planned in consultation with local authorities and communities so that activities with the greatest potential to generate noise and vibration are planned during periods of the day that will result in the least disturbance.
- (ii) Construction activities, and particularly noisy ones, are to be limited to reasonable hours during the day and early evening. Construction activities will be strictly prohibited during the nighttime (22:00 h to 07:00 h). Exceptions will only be allowed in special cases, and only after getting approval of the surrounding residents, local EEB and other relevant departments. And nearby residents should be notified of such night time activities well in advance.
- (iii) When undertaking construction planning, simultaneous high-noise activities will be avoided, and high noise activities will be scheduled during the day rather than

evening hours. Similarly, construction site will be planned to avoid multiple high noise activities or equipment from operating at the same location.

- (iv) Low-noise equipment will be selected as much as possible. Equipment and machinery will be equipped with mufflers and will be properly maintained to minimize noise.
- (v) Noise PPE will be provided to workers to meet the requirements in occupational exposure limits for hazardous agents in work place Part 2: physical agents (GBZ 2.2-2007) and EHS Guidelines.
- (vi) Transportation routes and delivery schedules will be planned during detailed design to avoid densely populated and sensitive areas and high traffic times.
- (vii) Vehicles transporting construction materials or waste will slow down and not use their horn when passing through or nearby sensitive locations, such as residential communities, schools and hospitals.
- (viii) Special attention will be paid to protect sensitive sites near the subproject site: High noise construction activities will be positioned as far away from sensitive sites as possible.

6. Solid Waste

233. Solid waste generated in the construction phase will include construction and domestic waste. Construction wastes include various waste packing materials and waste generated during equipment installation and cleaning. An estimated of 0.5 kg/day per worker of domestic waste will be generated from construction workers. Inappropriate waste storage and disposal could affect soil, groundwater, and surface water resources, and hence, public health and sanitation.

234. The following solid waste management measure and construction good practice as set out in EHS Guidelines on C&D will be implemented:

- (i) Wastes will be reused or recycled to the extent possible.
- (ii) Littering by workers will be prohibited.
- (iii) Excavated soil will be backfilled onsite to the extent possible. Excess spoil that cannot be used on-site will be transported to an approved spoil disposal site.
- (iv) Existing domestic waste containers will be used for domestic waste collection at work sites. Domestic waste will be collected on a regular basis by the local sanitation departments and transported for recycling, reuse, or disposal at a licensed landfill, in accordance with relevant PRC regulations and requirements.
- (v) Construction waste dumpsters will be provided at all work sites. Construction waste will be collected on a regular basis by a licensed waste collection company and transported for recycling, reuse, or disposal at a licensed landfill, in accordance with relevant PRC regulations and requirements.
- (vi) There should be no final waste disposal on site. Waste incineration at or near the site is strictly prohibited.
- (vii) Contractors will be held responsible for proper removal and disposal of any significant residual materials, wastes, spoil and contaminated soils that remain on the site after construction.

7. Hazardous and Polluting Materials

235. Inappropriate transportation, storage, use and spills of petroleum products and hazardous materials such as oily waste can cause soil, surface and groundwater contamination. To prevent this, the following mitigation measures and construction good practice as set out in EHS Guidelines on C&D will be implemented:

- (i) A hazardous material handling and disposal protocol that includes spill emergency response will be prepared and implemented by contractors.
- (ii) Storage facilities for fuels, oil, chemicals and other hazardous materials will be within secured areas on impermeable surfaces provided with dikes with a 110% volume, and at least 300 m from drainage structures and important water bodies. A standalone site within the storage facility will be designated for hazardous wastes.
- (iii) Signs will be placed at chemicals and hazardous materials storage sites to provide information on type and name of chemicals and hazardous materials.
- (iv) Suppliers of chemicals and hazardous materials must hold proper licenses and follow all relevant protocols and PRC regulations and requirements.
- (v) A licensed company will be hired to collect, transport, and dispose of hazardous materials in accordance with relevant PRC regulations and requirements.

8. Impacts on Community Health and Safety

236. Subproject construction activities have the potential to cause community disturbance such as traffic congestion or delays, and public safety risks from heavy vehicles and machinery traffic and risk to kids trying to get onto construction site. Mitigations and construction good practice as set out in EHS Guidelines on C&D and EHS general guidelines will be implemented to address traffic and other community disturbance issues.

- (i) Transportation routes and delivery schedules will be planned during detailed design to avoid densely populated and sensitive areas and high traffic times.
- (ii) Vehicles transporting construction materials or wastes will slow down and not use their horn when passing through or nearby sensitive locations, such as residential communities, schools and hospitals.
- (iii) Signs will be placed at construction sites in clear view of the public, warning people of potential dangers such as moving. All sites will be made secure, discouraging access by members of the public through appropriate fencing whenever appropriate.
- (iv) Emergency response system and health and safety protocols will be developed by the IA before construction.

9. Workers Occupational Health and Safety

237. Construction may cause physical hazards to workers from noise and vibration, dust, handling heavy materials and equipment, falling objects, work on slippery surfaces, fire hazards, chemical hazards such as toxic fumes and vapors, and others.

238. Contractors will implement adequate precautions to protect the health and safety of their workers:

- (i) Each contractor will undertake H&S risk assessment of construction works and implement relevant construction phase EHS plan in line with construction good practice as set out in EHS Guidelines on C&D and Occupational H&S guidelines.
- (ii) Identify and minimize the causes of potential hazards to workers. Implement appropriate safety measures.
- (iii) Provide training to workers on occupational health and safety, emergency response, especially with respect to using potentially dangerous equipment and storage, handling and disposal of hazardous waste. Induction will be conducted before construction and no worker is allowed on site without induction.
- (iv) Ensure that all equipment is maintained in a safe operating condition.
- (v) Provide appropriate PPE to workers.
- (vi) Provide procedures for limiting exposure to high noise or heat working environments in compliance with PRC occupational exposure limits for hazardous agents in work place Part 2: physical agents (GBZ 2.2-2007) and World Bank EHS Guidelines.
- (vii) Ensure regular safety meetings with staff.

10. Physical Culture Resources

239. Based on site visits there are no known cultural heritage or archaeological sites at or near the subproject sites. However, construction activities have the potential to disturb as yet unknown underground cultural relics. To address this issue, a construction phase chance find procedure will be established and activated if any chance finds of PCRs are encountered:

- (i) construction activities will be immediately suspended if any PCRs are encountered;
- (ii) destroying, damaging, defacing, or concealing PCRs will be strictly prohibited in accordance with PRC regulations;
- (iii) local Cultural Heritage Bureau will be promptly informed and consulted; and,
- (iv) construction activities will resume only after thorough investigation and with the permission of the local Cultural Heritage Bureau.
- (v) In case of any PCR is found, ADB SPS 2009 requirements as well as PRC laws and regulations will be followed.

D. Anticipated Operation Phase Impacts and Mitigation Measures

240. Potential negative operation phase impacts include waste, wastewater, odor; domestic wastewater; noise; and potential safety risks. These impacts will be effectively mitigated through good design, including, for example, good landfill management; noise control measures; and good waste and health and safety management practices and plans.

1. Air Pollution

241. The primary air emission is the odor from leachate storage tank and leachate treatment plant and dust from construction waste disposal center. To minimize emissions and associated impacts, the subproject will be designed to be in compliance with the most stringent PRC national standard.

242. To address air pollution issues, the following measures will be implemented:

- (i) The leachate storage tank is sealed. Odor gas collection and treatment system will be installed for the leachate storage tank and leachate treatment workshop. The leachate treatment process will be biofilter and the odor removal efficiency will be 95%.
- (ii) Dust generated during construction waste disposal will be collected and treated by bag filters. The collected dust will be treated by landfill.
- (iii) Ambient monitoring will be undertaken at the site

2. Water supply and wastewater pollution

243. The subproject will generate both domestic wastewater (100 m³/d) and leachate (200 m³/d) during operation. All the wastewater will be treated in the leachate treatment plant then recycled as landscape water.

244. To address production and domestic wastewater, good practice water management measures per the general EHS Guidelines and the following measures will be implemented:

- (i) Domestic wastewater will be produced from worker sanitation facilities. Domestic wastewater will be treated in digestion tank and will be discharged to the leachate treatment plant for treatment.
- (ii) Leachate will be treated in leachate treatment workshop combined with domestic waste water. The treated wastewater will be recycled as landscape water.

3. Solid Waste

245. The subproject will generate a domestic waste and production waste. Production waste will be generated during operation. If not properly managed this waste can cause visual and environmental impacts. To mitigate this risk, the following measures and good practice waste management measures will be implemented:

- (i) Domestic waste bins will be provided and domestic waste will be routinely collected by the local sanitation department for recycling, if possible, or final disposal at Anji County MSW incineration power plant.
- (ii) No burning of wastes will be permitted at the subproject site.
- (iii) Dust generated will be collected and treated by bag filters. The collected dust will be treated in landfill
- (iv) Oily waste from equipment maintenance will be collected, transported and treated by a certified 3rd party hazardous waste treatment company.

4. Chemicals and Hazardous Materials

246. Toxic, hazardous, and harmful materials present in the operation of the subproject include petroleum products, and chemicals used for leachate treatment, waste lubrication oil and waste oil-contained fabric. Toxic chemicals and hazardous wastes can have negative impacts on human health and the environment if not appropriately managed. Special care and good practice hazardous materials measures per the EHS General Guidelines and will be taken to mitigate

these risks, including:

- (i) A registry of all activities that involve the handling of potentially hazardous substances will be developed, including protocols for the storage, handling and spill response. This will include all fuels, oils, grease, lubricants, and other chemicals.
- (ii) All chemicals, toxic, hazardous, and harmful materials will be transported in spill proof tanks with filling hoses and nozzles in working order,
- (iii) All chemicals, toxic, hazardous, and harmful materials will be stored in secure areas with impermeable surfaces and protective dikes such that spillage or leakage will be contained from affecting soil, surface water or groundwater systems. The area should be 110% volume of storage capacity. Their usage will be strictly monitored and recorded.
- (iv) Material safety data sheets (MSDSs) will be posted for all hazardous materials.
- (v) Good housekeeping procedures will be established to avoid the risk of spills.
- (vi) Spills will be dealt with immediately, and personnel will be trained and tasked with this responsibility.
- (vii) Workers will be properly trained before handling hazardous wastes and have the requisite PPE.
- (viii) Hazardous wastes will be stored in temporary closed containers with warning signs and collected and disposed by licensed contractors on an as needed basis. Urea will be stored in a 30 m³ warehouse with leak detector and warning signs.
- (ix) Engineering and administrative control measures will be implemented to avoid or minimize the release of hazardous substances into the work environment keeping the level of exposure below internationally established or recognized limits.
- (x) Keep the number of employees exposed, or likely to become exposed, to a minimum to hazardous substances.
- (xi) Communicating chemical hazards to workers through labeling and marking according to national and internationally recognized requirements and standards, including the International Chemical Safety Cards (ICSC), Materials Safety Data Sheets (MSDS), or equivalent. Any means of written communication should be in an easily understood language and be readily available to exposed workers and first-aid personnel.
- (xii) Training workers in the use of the available information (such as MSDSs), safe work practices, and appropriate use of PPE.

5. Noise

247. Noise sources during operation will mainly be from noise from pumps, boiler, power generator, transformer etc. To mitigate noise impacts the subproject will:

- (i) Low-noise equipment will be used as far as possible, and noise reduction measures such as noise elimination, shock absorption, insulated enclosures and sound dampening materials on exterior walls will be implemented.
- (ii) All equipment will be properly maintained in order to minimize noise.

- (iii) Appropriate noise PPE will be provided to the workers who are likely to be exposed to high noise level environments to meet the requirements in occupational exposure limits for hazardous agents in work place Part 2: physical agents (GBZ 2.2-2007) and EHG Guidelines on Occupational H&S.
- (iv) Layout for subproject site will be reasonable planned to reduce noise.

248. Noise modeling is implemented in domestic EIA based on Technical Guidelines for EIA – Acoustic Environment (HJ 2.4-2009) There are three prediction modes in this guideline for predicting point noise sources at outdoor, for indoor noise sources and cumulative results for different noise sources. The estimated noise levels at the site boundaries are presented below. The results indicates that noise levels during operation can comply with relevant standards.

Table V-3: Estimated noise level at the site boundaries during operation

Location	Daytime (dB(A))		Compliance status	Nighttime (dB(A))		Compliance status
	Estimated noise level	Limit		Estimated noise level	Limit	
West boundary	44.6	65	Yes	44.6	55	Yes
South boundary	41.8	65	Yes	41.8	55	Yes
East boundary	38.8	65	Yes	38.8	55	Yes
North boundary	36.0	65	Yes	36.0	55	Yes

Source: Domestic EIA, 2022.

6. Community and Occupational Health and Safety

249. Plant operation poses potential risks to workers and community. To mitigate potential health and safety risks to workers, the following measures and good practice measures per the EHS Guidelines on occupational H&S, EHS Guidelines for Thermal Power Plants and EHS Guidelines for Geothermal Power Generation will be taken:

- (i) Operation phase EHS plan and traffic management plan will be developed and implemented and workers will be trained regularly on their implementation.
- (ii) The nearby communities will be informed of the potential risks and the emergency response plan.
- (iii) PPE including goggles, gloves, safety shoes will be provided to workers. Correct standard dust masks will be provided to workers working with waste. Noise protection equipment will be provided to workers in high-noise area. Noise areas with more than 85 dBA shall be marked and hearing protections shall be provided to workers. Appropriate masks will be provided to workers in urea area following the PRC standards.
- (iv) Provide training to workers on occupational health and safety, and emergency response.
- (v) Vehicles transporting materials or wastes will slow down to 30 km/h and not use their horn when passing through or nearby sensitive locations, such as residential communities, schools and hospitals.

- (vi) Safe traffic control measures, including road signs and flag persons to warn of dangerous conditions will be taken as needed. Regular maintenance of vehicles to minimize potential accidents caused by equipment malfunction.
- (vii) Subproject site will be fence with restricted public access.

7. Emergency Response Plan

250. An emergency risk and response plan will be established in accordance with the “National Environmental Emergency Plan” (24 January 2006) and other relevant PRC laws, regulations and standards and will include measures in the World Bank EHS guidelines with respect to occupational and community health and safety. The nearby communities will be informed of the potential risks and the emergency response plan. Major elements of the emergency response plan are presented in **Table 2** of Appendix I.

E. Anticipated Positive Operation Phase Impacts

251. The subproject will deliver significant positive social and environmental impacts to beneficiaries through annual recycling of 2,000 t waste iron and 15,000 t aggregate. When compared to the equivalent production of iron and aggregate through traditional methods, once operational the subproject will: (i) result in annual energy savings equivalent to 1,414.6 tce, thereby providing a global public good by avoiding the annual emission of 3,860.0 tons of CO₂; and (ii) improve local air quality through the estimated annual reduction of emissions of SO₂ by 7.4 tons, NO_x by 8.3 tons, and PM by 1.5 tons.

VI. ANALYSIS OF ALTERNATIVES

252. An analysis of subproject alternatives was undertaken during the feasibility stage to determine the most financially and technically feasible way of achieving the project objectives while minimizing environmental and social impacts.

A. No Project Alternative

253. Anji County's domestic waste is mainly treated by incineration now and landfill is used in emergency. The Anji County MSW incineration power plant included two phases: phase I of the plant was officially operated from May 2014 and phase II was operated from December 2016. Now the capacity of the plant was 600 t/d (2x 300 t/d mechanical grate furnaces) and the power generation capacity is 16 MW. The incineration power plant is equipped with a leachate treatment plant. The designed capacity is 100 t/d and the leachate treatment process is "anaerobic baffled reactor (ABR) + denitrification + nitrification + membrane bioreactor (MBR)".

254. Anji County has a landfill which is in the west of Anji County MSW incineration power plant. The landfill was closed from October 2016 and only fly ash from Anji County MSW incineration power plant and domestic waste in emergency are treated in the landfill. The landfill has a leachate treatment plant. The designed capacity is 100 t/d and the leachate treatment process is pretreatment (electrolysis) + biochemical treatment (two-stage A/O) + advanced treatment (ultrafiltration + nanofiltration + reverse osmosis). The plant was operated from August 2015.

255. Construction waste mainly includes building decoration waste and bulky waste (mainly waste furniture and bathroom wares from redecorating). The building decoration waste is mainly from various communities in the urban area of Anji City. In recent years, with the rapid advancement of urban village transformation, building decoration waste quantity was increased significantly. Now the annual construction waste in Anji County is about 170,000 tons. Now Anji County's construction waste is mainly treated by the Anji County MSW incineration power plant after simple sorting and the waste can't be treated by incineration is treated in the landfill.

256. The fly ash collected from Anji County MSW incineration power plant is treated in Anji County landfill. Anji County landfill was closed from October 2016 and the capacity is very limited now. In Huzhou City, there is no more certificated site or company which can treat the fly ash, a hazardous waste in China. Construction of a new fly ash landfill is urgent in Anji County.

257. Based on the above information, now the main waste treatment method in Anji County is incineration and the treatment and recycling system is not perfect which is described below.

- i) The construction waste disposal site is a small site and the capacity is limited due to the small area;
- ii) The existing landfill was closed from 2016. A new landfill is necessary for fly ash treatment and domestic waste treatment in emergency
- iii) The construction waste is mainly treated in construction waste disposal site or Anji County MSW incineration power plant without recycling.

258. The subproject's implementation will: (i) treat rapidly increasing construction waste and recycle the construction waste; (ii) reduce energy consumption; (iii) improve air quality; and reduce GHG emissions. For these reasons, the "no project" alternative is considered

unacceptable.

B. Solid waste treatment method

Table VI-1: Comparison of different municipal waste treatment

Item	Landfill	Incineration	Compost
Operation Safety	Relatively good	Good	Good
Technical Reliability	Reliable	Reliable	Relatively Reliable
Floor Area	Large	Small	Moderate
Site selection conditions	It is relatively difficult, needs to consider topographic, engineering geological and hydro geologic conditions, prevent pollution of surface water and underground water, generally being far away from the downtown area, with relatively short transportation	Easy May be constructed close to downtown Relatively short transportation	Not easy. Need to avoid densely populated area and prevent odorous impacts, with moderate transportation distance.
Final Disposal	No need for final treatment, but quantity is large.	Only cinder need to be conducted landfill treatment, which will be about 10% - 20% of initial quantity	Non-compost products need to conduct landfill treatment, which will be about 20-25% of initial quantity
Recovery of Resources	There is no successful case of separate in site, but it is potentially possible	Pretreatment Process Part of raw materials may be recovered	Pretreatment Process Part of raw materials may be recovered
Surface Water Pollution	Possible However, measures may be taken to lower the possibilities	While conducting cinder landfill, the possibility of its pollution to surface water is similar to that of landfill.	NA
Underground Water Pollution	Possible, although anti-seepage measure may be taken, leakage is still possible	It is related to disposal means of cinder, and it may happen if it is improperly disposed	It is related to disposal means of cinder, and it may happen if it is improperly disposed
Atmospheric Pollution	It may be controlled by adopting such measures as covering and compaction.	It may be controlled to be up to the standard	There are some odorous impacts, but the possibility of over proof pollution indices is not high.
Soil Pollution	Limited to landfill site	NA	Need to control heavy metal contents in compost
Construction Investments	Relatively low, but the land requisition costs in economically developed areas are very high	Imported equipment: 0.5-0.6 million CNY/t; Domestic equipment: 0.2-0.5 million CNY/t.	0.1-0.15 million CNY/t

259. Therefore, MSW incineration generation may duly realize environmentally friendly municipal solid waste (MSW) treatment, reducing quantity and turning it into resources. Although it will also generate wastes, such as exhaust gases, fly ash and cinder, etc., corresponding environmental measures may be adopted to minimize the negative impacts, which can save land resources, recover waste heat for power generation, which is suitable for economically developed, densely populated areas with scarce land resources.

260. Overall, the subproject has selected the most appropriate MSW treatment method.

C. Overall Alternative Analysis

261. Based on the analysis of alternatives, the subproject has selected the most appropriate and sustainable MSW treatment method.

VII. INFORMATION DISCLOSURE AND PUBLIC CONSULTATION

A. PRC and ADB Requirements for Disclosure and Public Consultation

1. PRC Requirements

262. Relevant provisions in the PRC *Environmental Impact Assessment Law* (revised in 2016) and the *Regulations on the Administration of Construction Project Environmental Protection* (No. 253 Order of the State Council, 1998, revised in 2017) require that an EIA study for a construction project shall solicit opinions from affected residents, as well as other organizations and concerned stakeholders. However, the requirements for public consultation are different for various sectors and projects. For an environmental Category A project a full EIA report is required including two rounds of public consultations, while for a Category B project only a simplified tabular EIA is required without the need for public consultation.

263. The “Provisional Regulations on Public Participation in Environmental Impact Assessment” (2006) promulgated by State Environmental Protection Administration further improved the legislation of public participation in EIA in China. It provides detailed requirements for the public participation process, including information disclosure standards, consultation methods, and public enquiry process. It is significant since it was the first document clearly regulating public participation in EIA in China.³¹

264. In 2014, former MEE released “Guiding Opinions on Promoting Public Participation in Environmental Protection” (2014, No. 48) which defines public participation as ‘citizens, legal persons and other organizations’ voluntary participation in environmental legislation, enforcement, judicature and law obedience, and the development, utilization, protection and transformation activities related to environment.

265. The “Guideline on Public Participation” in EIA (2018) requires the contractors or the contracted EIA institute and the relevant EEB disclose EIA information in a manner accessible to the public. EITs are disclosed on the relevant EEB website for a period of 10 working days. However, there are no requirements for disclosure of monitoring reports during construction.

266. The public disclosure and consultation process undertaken during the preparation of the domestic EIA was undertaken in compliance with the relevant PRC requirements, including the “Provisional Regulations on Public Participation in Environmental Impact Assessment” (2006) and the “Guiding Opinions on Promoting Public Participation in Environmental Protection” (2014, No. 48).

2. ADB Requirements

267. ADB’s SPS (2009) has specific requirements for information disclosure and public consultation. Information disclosure involves delivering information about a proposed project to the general public and to affected communities and other stakeholders, beginning early in the project cycle and continuing throughout the life of the project. Information disclosure is intended to facilitate constructive engagement with affected communities and stakeholders over the life of the project.

³¹ Wang Ya Nan, 2012. Public Participation in EIA, SEA and Environmental Planning in China. Environmental Impact Assessment Research Centre.

268. The SPS requires that borrowers take a proactive disclosure approach and provide relevant information from environmental assessment documentation directly to affected peoples and stakeholders. In addition, in order to make key documents widely available to the general public, the SPS requires submission to ADB for posting on the ADB website as follows:

- (i) a draft full EIA (including the draft EMP) at least 120 days prior to ADB Board consideration for Category A projects, and/or environmental assessment and review frameworks before project appraisal, where applicable;
- (ii) the final EIA/IEE;
- (iii) a new or updated EIA/IEE, EMP and corrective action plan prepared during project implementation, if any; and
- (iv) environmental monitoring reports.

269. The SPS also requires that the borrower carry out meaningful consultation with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation. Consultations should include presentations on environmental impacts, benefits and mitigation measures, the project GRM, and ADB's Accountability Mechanism. For category A projects, such consultations should include consultations both at an early stage of EIA field work and when the draft EIA report is available.

B. Project Information Disclosure

270. EIA Institute has undertaken public consultation and information disclosure in accordance with the Guidelines on Public Consultation for EIA (2018) during EIA process. Two rounds of public consultation are implemented.

1. Phase 1: Public Consultation and Information Disclosure by EIA Institute

271. IA disclosed the information of the subproject in two steps:

- (i) The first public information notice was posted on the Anji Government's website in March 2021, early in the EIA preparation process. The information in the first public information disclosure is listed below (The link is http://huzaj.zjzwfw.gov.cn/art/2021/3/16/art_1460379_7987.html):
 - (a) Name and summary of the subproject.
 - (b) Name and contact information of the construction company.
 - (c) Name and contact information of the institute responsible for preparing the EIA of the subproject.
 - (d) EIA procedures and content.
 - (e) Type of EIA notification notice.
 - (f) Request for questions, suggestions and feedback from the public.
- (ii) A second public information notice will be also posted on the Anji Government's website after the domestic EIA is approved. The notice will include Project name and information below:
 - (a) Name and summary of the subproject.
 - (b) Name and contact information of the institute responsible for preparing the

EIA report.

- (c) Name and contact information of the institute responsible for approval of the EIA report.
- (d) Name and contact information of the construction company.
- (e) Potential project environmental impacts and mitigation measures during construction phase and operation phase.
- (f) Key conclusions of the EIA report.
- (g) Contact information to get abridged versions of the EIA report.

272. No public feedback was received during first round of public information disclosure.

Figure VII-1: Information disclosure

安吉县生态资源循环利用基地规划环境影响评价第一次公示

建设单位：安吉县城市建设发展有限公司

2021-03-16
打印本页 关闭窗口

一、规划名称及概况

- 1、项目名称：安吉县生态资源循环利用基地规划。
- 2、规划面积及范围：安吉县生态资源循环利用基地规划范围位于安吉县城东北侧杭长高速两侧，235国道以北。以杭长高速为分界线分为东西两个区块，东区块主要位于原栗子坞居民点待拆迁区域，东区块规划面积483651.7471m²（725.4776亩），西区块位于安吉县生活垃圾填埋场和安吉旺能焚烧厂以南及以东区域，西区块规划面积325431.0125m²（488.1465亩），基地总规划面积809082.7596m²（1213.62亩）。
- 3、规划目标：立足生态资源循环利用基地，辐射安吉县，聚焦固废处置项目、资源循环利用项目、环保新技术孵化项目，协同发展工业旅游项目、垃圾处理文化项目，塑造安吉“中国最美县域”新形象，成为城市固废处置和资源循环利用的典范。
- 4、规划定位：聚焦固废处置项目、资源循环利用项目、环保新技术孵化项目，协同发展工业旅游项目、垃圾处理文化项目。
- 5、发展战略：“一个目标、四园同创、五大产业、五化引领”的战略发展思路：
 - ①一个目标：建设国内领先、国际一流的固体废弃物循环经济产业园。
 - ②四园同创：生态环保示范园、固废资源循环利用园、固废末端处置保障园、自主研发创新园。
 - ③五大产业：聚焦固废处置产业、资源循环利用产业、环保新技术孵化产业，协同发展工业旅游产业、垃圾处理文化产业。
 - ④五化引领：以“高端化、智慧化、特色化、绿色化、循环化”为引领。
- 6、规划结构：规划结构为“一园、三区”：
 - ①一园：以“高端化、智慧化、特色化、绿色化、循环化”为引领，打造生态环保示范园、固废资源循环利用园、末端处置保障园、自主研发创新园。
 - ②三区：包括末端处置区，资源再生利用区和办公管理服务区。

二、规划单位和联系方式

- 1、规划单位：安吉县城市建设发展有限公司
- 2、单位地址：安吉县递铺镇凤凰五区188号
- 3、联系人：江浩泽
- 4、联系电话：15067537080

三、环境影响报告书编制单位的名称

- 1、单位名称：浙江省环境工程有限公司
- 2、单位所在地：杭州市西湖区黄姑山路9号天科大厦6-7层
- 3、联系人：邓红红
- 4、联系电话：17826896653

四、公众意见表的网络链接

Source: consultants

273. According to ADB SPS's requirements, the ZALSHG held a public survey on March 2021 with the assistance from the environment specialist. The survey was implemented in Lujia Village of Dipu Street. Because of COVID-19, online survey was conducted. Interview with the villager head was conducted.

274. A total of 38 questionnaires were distributed and 38 completed questionnaires were received. The main contents of the questionnaire are potential impacts and mitigation measures. Some photos of the consultation survey are shown in **Figure VII-2**.

Table VII-1: Summary data on questionnaire respondents.

Participants		38 Participants	%
Gender	Male	21	55.3%
	Female	17	44.7%
Age Group	<20	1	2.6%
	20-40	17	44.7%
	41-60	15	39.5%
	≥60	5	13.2%
	Illiterate	2	5.3%
Education	Primary school	3	7.9%
	Junior high school	9	23.7%
	Senior high school	10	26.3%
	Vocational school	5	13.2%
	College and above	9	23.7%
Ethnic	Han	38	100.0%
	Others	0	0
Occupation	Farmer	21	55.3%
	Civil servant	5	13.2%
	Employee	6	15.8%
	Others	6	15.8%

275. Of the respondents in the public consultation meeting 92.1% knew about the subproject either from other people, newspapers, or information signs. The top three environmental issues respondents identified in their neighborhoods are noise (34.2%), air quality (28.9%) and solid waste (18.4%). Dust (44.7%), noise (42.1%), and solid waste (5.3%) were identified as the top three issues during the construction phase. Over 89.4% of the respondents indicated that they understand the adverse impacts of the subproject during the construction period. Noise (28.9%) air pollution (23.7%) and wastewater (15.8%) were identified as the top three issues during the operation phase. Over 89.2% of the respondents indicated that they understand the adverse impacts of the subproject during the operation period. These concerns are addressed through the subproject design features and safeguard mitigation measures in the subproject EMP (Appendix I).

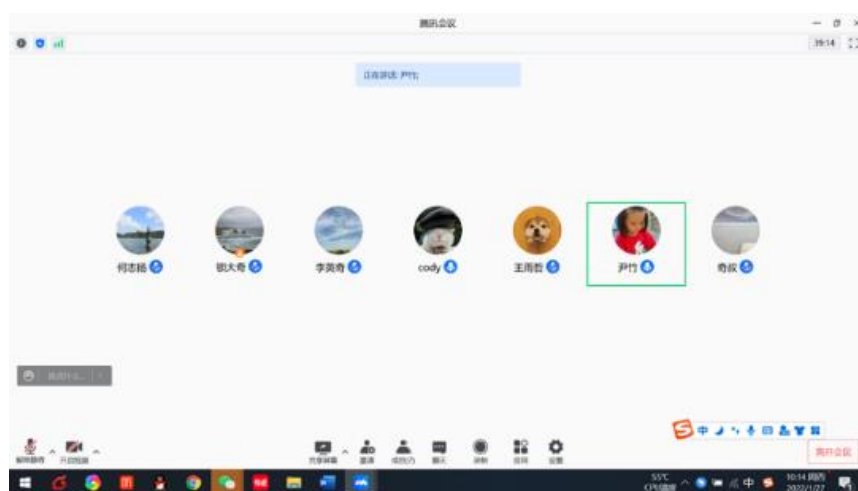
276. Overall support for the subproject amongst the participants of the first consultation meeting was very strong; 100% of the respondents indicated that the subproject would improve local economic development; and 100% indicated that they support the proposed subproject.

Table VII-2: Project public consultation questionnaire

Name	Sex	Age
Education level	Occupation	Nationality
Contact information		
Question	Choices	Yes Comments
1. In your opinion, what are the major environment pollution issues in your areas?	Ambient air Noise Surface water Groundwater Soil Solid waste Odor Risks associated with chemicals and hazardous chemicals Other concern	
2. Distance between your working place and project site	<1 km 1-3 km 3-5 km > 5km	
3. Distance between your house and project site	<1 km 1-3 km 3-5 km > 5km	
4. Do you know this project before this public consultation?	Yes No	
5. Do you understand the potential adverse impacts during the construction of the proposed project subprojects?	Clearly understand Somewhat understand Barely understand Do not understand	
6. What would be the major impacts during project construction?	Noise Dust Solid waste Traffic congestion No major impacts	
7. After learning about mitigation measures during the construction, do you accept anticipated construction phase impacts?	Accept Barely accept Do not accept Have no idea	
8. Do you understand all the anticipated environmental and health and safety adverse impacts of the project during operation?	Clearly understand Somewhat understand Barely understand Do not understand	
9. What are the major impacts of this project during operation period?	Air pollution Noise pollution Waste water pollution Soil pollution Solid waste pollution Odor gas No major impacts	
10. Do you accept the adverse impacts of the project after you	Accept Barely accept Do not accept	

understand the mitigation measures?	Have no idea
Question	Choices
11. Do you think construction of this project can improve local economic development or not?	Yes
	No
	I do not know
12. Do you support the project?	Yes
	No
	I do not know
Suggestions or requirements for environment protection of the project	

Figure VII-2: Public consultation activities held by IA



Online meeting



Meeting with the village head and PMO

Source: consultants

Table VII-3: Public consultation questionnaire results.

Name	Sex	Age	
Education level	Occupation	Nationality	
Contact information			
Question	Choices	Yes	Comments
13. In your opinion, what are the major environment pollution issues in your areas?	Ambient air	11	28.9%
	Noise	13	34.2%
	Surface water	3	7.9%

	Groundwater	2	5.3%
	Soil	2	5.3%
	Solid waste	7	18.4%
	Odor	0	0.0%
	Risks associated with chemicals and hazardous chemicals	0	0.0%
	Other concern	0	0.0%
14. Distance between your working place and project site	<1 km	3	7.9%
	1-3 km	9	23.7%
	3-5 km	15	39.5%
	> 5km	11	28.9%
15. Distance between your house and project site	<1 km	1	2.6%
	1-3 km	8	21.1%
	3-5 km	11	28.9%
	> 5km	18	47.4%
16. Do you know this project before this public consultation?	Yes	35	92.1%
	No	3	7.9%
17. Do you understand the potential adverse impacts during the construction of the proposed project subprojects?	Clearly understand	24	63.2%
	Somewhat understand	10	26.3%
	Barely understand	2	5.3%
	Do not understand	2	5.3%
18. What would be the major impacts during project construction?	Noise	17	44.7%
	Dust	16	42.1%
	Solid waste	2	5.3%
	Traffic congestion	2	5.3%
	No major impacts	1	2.6%
19. After learning about mitigation measures during the construction, do you accept anticipated construction phase impacts?	Accept	23	60.5%
	Barely accept	11	28.9%
	Do not accept	2	5.3%
	Have no idea	2	5.3%
20. Do you understand all the anticipated environmental and health and safety adverse impacts of the project during operation?	Clearly understand	24	63.2%
	Somewhat understand	12	31.6%
	Barely understand	1	2.6%
	Do not understand	1	2.6%
21. What are the major impacts of this project during operation period?	Air pollution	9	23.7%
	Noise pollution	11	28.9%
	Waste water pollution	6	15.8%
	Soil pollution	3	7.9%
	Solid waste pollution	2	5.3%
	Odor gas	5	13.2%
	No major impacts	2	5.3%
22. Do you accept the adverse impacts of the project after you understand the mitigation measures?	Accept	0	0.0%
	Barely accept	26	68.4%
	Do not accept	9	23.7%
	Have no idea	1	2.6%
Question	Choices	2	5.3%
23. Do you think construction of this project can improve local economic development or not?	Yes	38	100%
	No	0	0
	I do not know	0	0
24. Do you support the project?	Yes	38	100%
	No	0	0
	I do not know	0	0
Suggestions or requirements for environment protection of the project			

C. Future Consultation Activities

277. This IEE will be disclosed on the ADB website. Any update in the IEE resulting from a change in project scope will be similarly disclosed.

278. Public consultations will be maintained with subproject communities throughout subproject implementation, including: (i) before and after key works to ensure residents are informed of and have the opportunity to respond to, pending works and procedures; (ii) broader consultations about subproject progress. Future consultation will be undertaken by the PMO's Environment and Social Officers, via questionnaire surveys, household visits, workshops, and public hearings (see EMP for further details).

VIII. GRIEVANCE REDRESS MECHANISM

A. Introduction

279. A project grievance can be defined as an actual or perceived project related problem that gives ground for complaint by an affected person (AP). As a general policy, a PMO will be established by IA and it will work proactively toward preventing grievances through the implementation of mitigation measures and community liaison activities that anticipate and address potential issues before they become grievances. In addition, as the project has strong public support and will not involve any involuntary land or property acquisition or resettlement, significant grievance are unlikely to happen. Nonetheless, during construction and operation it is possible that unanticipated impacts may occur if the mitigation measures are not properly implemented, or unforeseen issues arise. In order to address complaints if or when they arise, a subproject-level GRM has been developed in accordance with ADB requirements. A GRM is a systematic process for receiving, recording, evaluating and addressing AP's project-related grievances transparently and in a reasonable timeframe.

B. ADB's GRM Requirements

280. The ADB's SPS 2009 requires a project to establish a GRM to receive and facilitate resolution of AP's concerns and complaints about the project's environmental performance during construction as well as operation phases of the project. The GRM should be scaled to the risks and adverse impacts of the project; should address affected people's concerns and complaints promptly, using an understandable and transparent process; should be readily accessible to the community at no cost and without retribution; and, should not impede access to the PRC's judicial or administrative remedies.

C. Current GRM Practices in the PRC

281. At the national level, a framework to address grievance has been established. State Council Decree No. 431 "Regulations on Letters and Visits" (January 2005) establishes a complaint mechanism at all levels of government, and safeguards the complainants from any retaliation. The former MEP Decree No. 34 "Environmental Letters and Visits System" provides specific guidelines to establish a system and address environmental complaints. When APs are affected by project activities, they may complain to the contractors and the project company by themselves or through their community organizations, or complain directly to local EEBs. If the issue is not resolved they may take legal action, though that is typically considered as a last option.

D. Project Level GRM

282. The objective of the subproject GRM is to prevent and address community concerns, reduce risks, and assist the project to maximize environmental and social benefits. In addition to serving as a platform to resolve grievances, the sub-project level GRM has been designed to (i) open channels for effective communication, including the identification of new environmental issues of concern arising from the subproject; (ii) demonstrate concern about community members and their environmental well-being; and (iii) prevent and mitigate any adverse environmental impacts on communities caused by subproject implementation and operations. The GRM will be accessible to all members of the community through public information disclosure at IA's website, project site and community center, etc.

283. The overall approach of the GRM is to deal with grievances at a local level first in an efficient manner and escalate to higher level of authority if the grievance cannot be resolved. The designated person from the PMO will be responsible for implementation of the GRM. The PMO will be the key contact point for residents, businesses, government departments and other stakeholders who may require information about the subproject or who have an issue they would like to discuss.

284. The Subproject level GRM is different from the main project level GRM and will be implemented through four escalating steps which is presented in **Figure VIII-1**, advancing to the next level only if the grievance was unable to be redressed at the previous level

- (i) **Step 1:** If a concern arises, the AP should try to resolve the issue of concern directly with the project implementer (ZALSHG who is responsible for the subproject construction and operation) or with the implementer via GRM access points (community leaders, neighborhood organizations, local Ecology and Environment Bureau (EEB) and national environment protection hotline 12369). Implementer will record the grievance, assess its eligibility and report back to the AP within 5 working days. If the grievance is eligible, the implementer will try to resolve the concern. If the concern is resolved successfully, no further follow-up action is required. If not, the implementer shall record any complaint and actions taken to resolve the issues and report the results to subborrower (Beijing Sanju GreEnergy Tech Co., Ltd.). If no solution is found within 10 working days or if the complainant is not satisfied with the suggested solution under Step 1, proceed to Step 2. The AP may also skip step 1 and directly file the complaint with the subborrower;
- (ii) **Step 2:** The subborrower will investigate the complaint, and consult with the local EEB, and other stakeholders as appropriate to identify a solution. The subborrower will give a clear reply to the AP within 10 working days with the suggested solution, and the subborrower will ensure that implementation of the agreed-upon redress solution begins immediately. If no solution is found or if the complainant is not satisfied with the suggested solution under Step 2, proceed to Step 3;
- (iii) **Step 3:** The subborrower will inform I&G, who is the implementing agency and PMO of the Loan 3504-PRC, and ADB about the grievance. I&G will organize a multi-stakeholder meeting within 10 days, where all relevant stakeholders, including the complainant, PMO, subborrower and local EEB, can discuss the issue. The multi-stakeholder meeting will aim to find a solution acceptable to all, and identify responsibilities and an action plan. The subborrower will ensure that the implementation of agreed-upon redress solution begin immediately. If no satisfied solution is formed by stakeholders, proceed to Step 4.
- (iv) **Step 4:** If the complainant is still not satisfied with the suggested solution under Step 3, the PMO will organize a hearing process following the PRC public hearing procedures (including the complainant, implementer and/or subborrower, local EEB). A solution acceptable to all shall be identified including clear steps. Based on the hearing results, an action plan shall be developed and the subborrower will ensure that the implementation of the agreed-upon redress solution begins immediately. If complaints are still not addressed, they may seek legal redress.

306. If the complainants are not satisfied with the suggested solution under Step 4, the APs

can access ADB's Office of the Special Project Facilitator (OSPF) or Compliance Review Panel (CRP), or seek local legal address.

307. The PMO shall inform ADB on the complaints that have been received and the solutions, which shall be included in the semi-annual environmental monitoring reports.

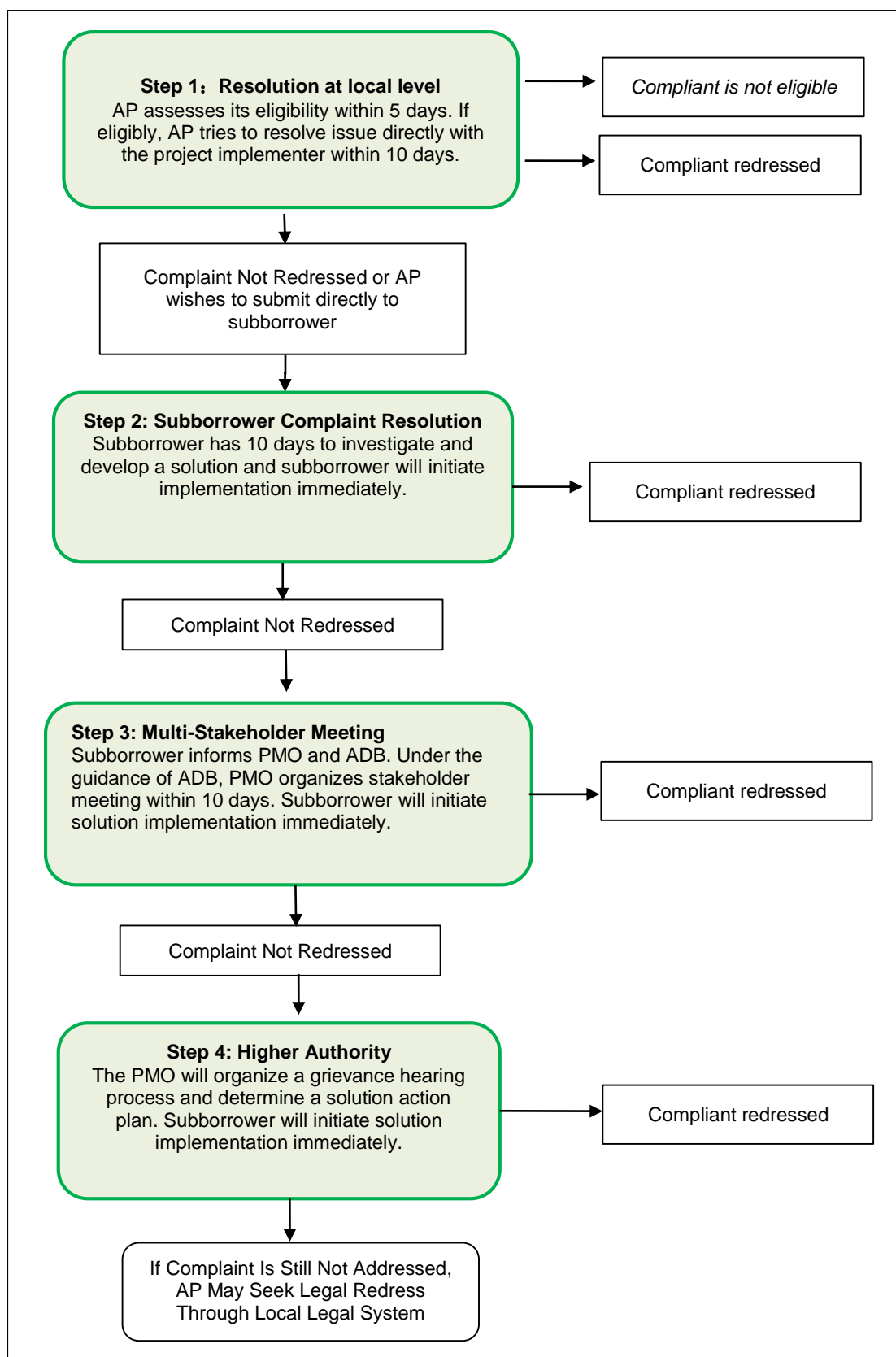


Figure VIII-1: Five Step Project GRM

IX. CONCLUSIONS

285. This IEE report has been prepared for the proposed Anji County Solid Waste Treatment Subproject of the Air Quality Improvement in the Greater Beijing-Tianjin-Hebei Region – Green Financing Scale up Project (the Project) of the People's Republic of China (PRC). The proposed Project is the sixth loan in a multi-year multi-sectoral Asian Development Bank (ADB) support for air quality improvement in the greater Beijing–Tianjin–Hebei (BTH) region.

286. The subproject will build a construction waste sorting and disposal center (capacity: 200,000 t/a), ecology restoration of Anji domestic waste landfill after closure and build new landfill including comprehensive landfill area (200,000 m³), emergency landfill area (200,000 m³), fly ash landfill area (100,000 m³), leachate storage tank (30,000 m³) and leachate treatment plant (400 t/d). The subproject will be located at Lujia Village, Dipu Street, Anji County. During operation, construction waste disposal center will recycle 2,000 t waste iron and 15,000 t aggregate annually

287. The subproject will deliver significant positive social and environmental impacts to beneficiaries through annual recycling of 2,000 t waste iron and 15,000 t aggregate. When compared to the equivalent production of iron and aggregate through traditional methods, once operational the subproject will: (i) result in annual energy savings equivalent to 1,414.6 tce, thereby providing a global public good by avoiding the annual emission of 3,860.0 tons of CO₂; and (ii) improve local air quality through the estimated annual reduction of emissions of SO₂ by 7.4 tons, NO_x by 8.3 tons, and PM by 1.5 tons.

288. The Subproject has: (i) selected appropriate technologies to treat the leachate and fly ash; (ii) identified potential negative environment impacts and appropriately established mitigation measures; (iii) received public support from the project beneficiaries and affected people; (iv) established effective project GRM procedures; and (v) prepared a comprehensive EMP including environmental management and supervision structure, environmental mitigation and monitoring plans, and capacity building and training.

289. It is concluded that the project will not result in adverse environmental impacts that are irreversible, diverse, or unprecedented. Any minimal adverse environmental impacts associated with the project will be prevented, reduced, or minimized through the implementation of the project EMP.

APPENDIX I. ENVIRONMENTAL MANAGEMENT PLAN**ENVIRONMENTAL MANAGEMENT PLAN FOR ANJI
COUNTY SOLID WASTE TREATMENT SUBPROJECT**

**Prepared by China National Investment and Guaranty Corporation for
the Asian Development Bank**

This Environmental Management Plan is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature. Your attention is directed to the "terms of use" section of the ADB website in which the full Initial Environmental Examination is given.

In preparing any country program or strategy, financing any project, or by making any designation of or reference to a particular territory or geographic area in this document, the Asian Development Bank does not intend to make any judgments as to the legal or other status of any territory or area.

A. Objectives

1. This EMP report is prepared for the proposed Anji County solid waste treatment subproject of the Air Quality Improvement in the Greater Beijing-Tianjin-Hebei Region – Green Financing Scale up Project of the PRC. The proposed project is the sixth loan in a multi-year multi-sectoral ADB support for air quality improvement in the greater BTH region.
2. The subproject will build a construction waste sorting and disposal center (capacity: 200,000 t/a), ecology restoration of Anji domestic waste landfill after closure and build new landfill including comprehensive landfill area (200,000 m³), emergency landfill area (200,000 m³), fly ash landfill area (100,000 m³), leachate storage tank (30,000 m³) and leachate treatment plant (400 t/d). The subproject will be located at Lujia Village, Dipu Street, Anji County and the site is at north of G235 national Road. The subproject is closed to existing Anji County Municipal Solid Waste (MSW) incineration power plant and Anji County landfill.
3. Once operation, the subproject will treat 200,000 t/a construction waste, treat the fly ash from Anji County MSW incineration power plant and domestic waste in emergency (for example, the Anji County MSW incineration power plant is under maintenance or the domestic waste quantity exceeds the capacity of Anji County MSW incineration power plant) by landfill, treat the unrecyclable waste from construction waste sorting and disposal center by landfill and treat the leachate from Anji County MSW incineration power plant and Anji County landfill and domestic waste of the subproject in leachate treatment plant
4. The objectives of the EMP are to ensure (i) implementation of the identified mitigation and management measures to avoid, reduce, mitigate, and compensate for anticipated adverse environment impacts; (ii) implementation of monitoring and reporting; and (iii) the subproject compliance with the PRC's relevant environmental laws, standards and regulations and ADB's SPS 2009. Organizational responsibilities and budgets are clearly identified for implementation, monitoring and reporting.
5. The EMP is to be implemented in all phases of the project cycle, including design, pre-construction, construction, and operation. In the detailed design stage, the EMP will be used by the design institute for incorporating mitigation measures into the detailed designs. The EMP will be updated at the end of the detailed design, as needed.
6. The EMP will be included as a separate annex in all bidding and contract documents. The contractors will be informed of their obligations to implement the EMP, and to provide for EMP implementation costs in their bids for project works.

B. Implementation Arrangements

7. I&G will be the EA and responsible for overall guidance during project preparation and implementation. ZALSHG will be IA and responsible for implementing project subprojects and administering and monitoring contractors and suppliers.
8. ZALSHG is the subborrower with one EHS department consists of one manager and two staff. The subborrower is responsible for: (i) pollutants emission monitoring; (ii) implementation of capacity building plan; (iii) implementation of environment management, environmental monitoring and mitigation measures; (iv) reporting to I&G on EMP implementation; and (v) timely and effectively responding to emergency.

9. Anji EEB is responsible for: (i) compliance with relevant environment regulations of the subproject; (ii) supervision of subproject pollutants emission; and (iii) GRM implementation. Anji EEB also participates in environment compliance monitoring of the subproject.

10. ADB will conduct regular review missions. I&G will prepare annual environmental monitoring reports and submit them to ADB. ADB will review the reports and disclose them on ADB's website. If the subproject is in compliance with the EMP's requirements, appropriate corrective actions shall be taken following ADB's requirements.

11. Roles and responsibilities for the EMP implementation are presented in **Table 1**.

Table 1: Project implementation and management organizations

Organization	Role and Responsibility
I&G	<p>Serves as the EA and establishes an ESMS department with qualified full-time staff. ESMS department is responsible for the implementation of all subprojects, including: -</p> <ul style="list-style-type: none"> - Formulating subproject management and operating procedures, implementation plans, and budget; - Ensuring subproject's compliance with loan and project agreements, and with the safeguards requirements as specified in the ESMS; - Participating in capacity building and training activities. - Overseeing the implementation of different subproject outputs; - Monitoring the subproject's physical and financial progress, and compliance with subproject's reporting requirements, ensuring subproject progress reports are prepared and submitted to ADB on time; - Addressing complaints received from APs; - Coordinating the activities of and meeting the requirements of the ADB review missions; - Supervision implementation of EMP and EMoP; - Conducting regular site visits and safeguard review missions in accordance with the requirements set forth in the ESMS; - Preparing and submitting consolidated semi-annual and annual environmental monitoring reports as required by the ESMS to ADB; - Requiring subborrowers to prepare corrective action plans in the event of noncompliance with EMP or EMoP
IA	<p>Main responsibilities include:</p> <ul style="list-style-type: none"> - Contracting and administering contractors and suppliers. - Ensuring compliance with EMP, EMoP, engaging external environmental safeguard consultants if needed; - Preparing subproject progress reports for submission to the ESMS department of I&G; - Operation and maintenance of the subproject; - Coordinating with and assisting the PMO in developing subproject management procedures and detailed implementation plan, and monitoring achievement thereof; - Preparing semi-annual and annual environmental monitoring reports and submit to ESMS department of I&G
EMS	<ul style="list-style-type: none"> - A qualified independent environmental monitoring station will be recruited to implement the ambient monitoring portion of the EMoP.
ADB	<ul style="list-style-type: none"> - Responsible for the following: <ul style="list-style-type: none"> - Providing the EA and ESMS department with guidance to ensure smooth subproject implementation and achieve the desired development impacts and their sustainability; - Conducting regular review missions; - Monitoring the implementation of EMP and EMoP; - Monitoring status of compliance with loan and project covenants, including safeguards; - Reviewing environmental monitoring reports and disclosing them on ADB website;

-
- Regularly updating the subproject information documents for public disclosure at ADB website, including the safeguards documents.
 - Requiring EA to develop corrective action plan for any non-compliance issues
-

ADB = Asian Development Bank, EMP = Environmental Management Plan, O&M = operation and maintenance.

C. Potential Impacts and Mitigation Measures

12. The potential impacts of the project during pre-construction, construction and operation have been identified and appropriate mitigation measures developed (see Chapter V of the IEE). Potential impacts and the mitigation measures are presented in **Table 2**.

D. Environment Monitoring Plan

13. An EMoP to monitor the environmental impacts of the project and assess the effectiveness of mitigation measures is presented in **Table 3**. The EMoP includes both compliance inspection and ambient air, noise, and wastewater monitoring undertaken by the 3rd party environmental monitoring entity. Ambient monitoring will be conducted in compliance with relevant PRC regulations, methods and technical specifications.

14. The data and results of environmental compliance inspection and monitoring activities will be used to assess: (i) the extent and severity of actual environmental impacts against the predicted impacts and baseline data collected before the project implementation; (ii) performance or effectiveness of environmental mitigation measures or compliance with pertinent environmental rules and regulations; (iii) trends in impacts; (iv) overall effectiveness of EMP implementation; and (v) the need for additional mitigation measures and corrective actions if non-compliance is observed.

E. Institutional Strengthening and Capacity Building

15. The institutional strengthening and capacity building focus on the safeguard requirements of relevant PRC laws and regulations and the ADB SPS 2009. The training will focus on the ADB SPS; PRC safeguard requirements; development and implementation of EHS plans during construction and operation; implementation of the EMP, the EMoP, and the GRM; and worker and community health and safety issues and measures (**Table 4**).

Table 2: Environment Impacts and Mitigation Measures

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Source of Funds
			Implemented by	Supervised by	
<u>A. Detailed Design Phase</u>					
Incorporate Mitigation Measures and Monitoring in Detailed Design and Bidding and Contracting	Include mitigation measures and monitoring program in detailed design	Environmental mitigation and pollution control measures identified in the IEE, the EMP and the domestic EIAs will be incorporated into the detailed design.	PMO supported by LIEC	IA	Detailed Design Budget
	Include mitigation measures and monitoring program in bidding documents	Environmental mitigation measures identified in the IEE, EMP and the domestic EIA will be incorporated in the bidding documents for the project and will be included in contract documents for civil constructions and equipment installations. All contractors shall be required to strictly comply with the EMP.	PMO supported by LIEC	IA	Detailed Design Budget
	Environmental monitoring incorporated into design.	The environmental monitoring program will be incorporated into the design to ensure that environmental impacts are closely monitored and activities of the project construction and operating are closely supervised against the PRC environmental laws, regulations and standards, ADB SPS, and the project EMP and approved domestic EIA.	PMO supported by LIEC	IA	Detailed Design Budget
Grievance Redress Mechanism (GRM)	Impacts on project Affected Persons	In accordance with the GRM presented in Chapter VIII, a staff member within the PMO will be assigned overall responsibility for the GRM; GRM training will be provided for PMO members and GRM access points; and the GRM access point phone numbers, fax numbers, addresses and emails will be disclosed	PMO supported by LIEC	EA, ADB	PMO Operating Budget

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Source of Funds
			Implemented by	Supervised by	
		to the public.			
<u>B. Construction Phase</u>					
Flora and Fauna	Removal of vegetation	<p>A greening plan will be implemented:</p> <ul style="list-style-type: none"> – Site vegetation plans will be developed using appropriate native species. – Any existing vegetated areas impacted during construction will be restored post-construction using appropriate native species. 	DI (plan design), Contractors (plan implementation)	IA supported by LIEC	Contractor construction budget
Wastewater	Surface and groundwater contamination from construction wastewater, and domestic water	<p>Good wastewater management practices as set out in EHS Guidelines on Construction and Decommissioning and EHS General Guidelines:</p> <ul style="list-style-type: none"> – Worker camp will be installed with sufficient portable toilets (based on the staff numbers, 6 toilets are sufficient) which will be provided for the workers and will be cleaned and discharged to the municipal sewerage system on a regular basis. – Construction wastewater will be directed to temporary detention and settling ponds, and then treated water will be partly recycled for use in dust control and the rest of treated water will be discharged to the local municipal sewer system and the waste residue in the tank is cleared and transported to designated certificated and engineered landfills by the local sanitation department personnel. If needed, polyacrylamide flocculent will be used to facilitate particle settling. All discharged construction wastewater will to be treated to meet the 	Contractors	IA supported by LIEC	Contractor construction budget

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Source of Funds
			Implemented by	Supervised by	
		<p>appropriate PRC standard GB/T 31962-2015 prior to discharge. Discharged water will then be treated in the leachate treatment plant of the landfill.</p> <ul style="list-style-type: none"> – All necessary measures will be undertaken to prevent construction materials and waste from entering drains and water bodies. – Maintenance of construction equipment and vehicles will not be allowed on sites to reduce wastewater generation. – Oil traps are provided for service areas and parking areas, and oil-water separators are installed before the sedimentation tank for oil-containing wastewater; – All construction machinery is repaired and washed at special repairing shops. No on-site machine repair, maintenance and washing shall be allowed so as to reduce wastewater generation; – Storage facilities for fuels, oil, and other hazardous materials are within secured areas on impermeable surfaces, and provided with bunds with 110% of the volume of materials stored and cleanup kits; – The contractors' fuel suppliers are properly licensed, follow proper protocol for transferring fuel, and are in compliance with Transportation, Loading and Unloading of Dangerous or Harmful Goods (JT 3145-88); – Construction wastewater will be directed to temporary detention and settling ponds. Areas where construction equipment is being washed will be equipped with water 			

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Source of Funds
			Implemented by	Supervised by	
		<p>collection basins and sediment traps. After settling, supernatant will be recycled and sediment will be periodically excavated, and either reused if possible as fill, disposed at official spoil disposal sites, or disposed at official or landfills.</p> <ul style="list-style-type: none"> – Maintenance of construction equipment and vehicles will not be allowed on site so as to reduce wastewater generation. 			
Erosion and Spoil	Soil erosion, spoil disposal	<p>Good practice construction erosion controls and site maintenance as set out in EHS Guidelines on C&D and EHS General Guidelines:</p> <ul style="list-style-type: none"> – At construction site the potential for storm water runoff will be assessed and appropriate storm water drainage systems to minimize soil erosion will be implemented, including perimeter bunds and establishment of temporary detention and settling ponds to control topsoil runoff. – Land excavation and filling will be balanced so as minimize the requirement for fill transportation. – During earthworks the area of soil exposed to potential erosion at any one time will be minimized through good project and construction management. – Temporary spoil storage sites (and storage containers at lane modification and stations construction sites) will be identified, designed, and operated to minimize impacts. Spoil sites will be restored at the conclusion of storage activities. 	Contractors	IA supported by LIEC	Contractor construction budget

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Source of Funds
			Implemented by	Supervised by	
		<ul style="list-style-type: none"> Spoil will be reused on-site or other project sites to the maximum extent feasible as fill. Excess spoil that cannot be used on-site will be transported to an approved spoil disposal site. Spoil and aggregate piles will be covered with landscape material and/or regularly watered. Waste construction material such as residual concrete, asphalt, etc., will be properly handled for reuse or disposal. Construction and material handling activities will be limited or halted during periods of rains and high winds. Open excavation areas during trenching activities will be minimized, and appropriate construction compaction techniques utilized. Any planned paving or vegetating of areas will be done as soon as practical after the materials are removed to protect and stabilize the soil. Once construction is complete disturbed surfaces will be properly sloped and revegetated with native trees and grass (see greening plan). 			
Air Pollution	Dust, vehicle emissions, H ₂ S	<p>The following air quality management measure and construction good practice as set out in EHS Guidelines on C&D and EHS General Guidelines will be implemented:</p> <ul style="list-style-type: none"> Water will be sprayed on active construction sites 	Contractors	IA supported by LIEC	Contractor construction budget

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Source of Funds
			Implemented by	Supervised by	
		<p>including where fugitive dust is being generated on a daily basis, and more frequently during windy days.</p> <ul style="list-style-type: none"> – Transport vehicles will be limited to low speeds at construction sites. – Loads will be covered during truck transportation to avoid spillage or fugitive dust generation. Fine materials will be transported in fully contained trucks. – Construction site roads will be well maintained and watered and swept on an as-needed basis. Construction site road entry points will be equipped with truck drive through wash ponds. – Transport routes and delivery schedules will be planned to avoid densely populated and sensitive areas, and high traffic times. – Store petroleum or other harmful materials in appropriate places and cover to minimize fugitive dust and emission. – Provide regular maintenance to vehicles in order to limit gaseous emissions (to be done off-site). – Temporary fencing will be erected around dusty activities. – Construction spoil, aggregate other construction materials will be temporary stored using containers, but they may the potential to generate dust. Thus, containers will be covered and/or watered if necessary. Powdered materials such as cement and lime will be 			

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Source of Funds
			Implemented by	Supervised by	
		<p>stored in sealed bags or containers.</p> <ul style="list-style-type: none"> – Muddy or dusty materials on public roads outside the exits of works areas will be cleaned immediately. – Disturbed site will be revegetated as soon as possible after the completion of works. – On-site asphaltting and concrete batching are prohibited. – Disturbed site will be revegetated as soon as possible after the completion of works. 			
Noise	Impacts from construction noise on sensitive resources	<p>To ensure construction activities meet PRC noise standards (Noise Standards for Construction Site Boundary, GB 12523-2011) and to protect workers, the following mitigation measures and construction good practice as set out in EHS Guidelines on C&D and EHS General Guidelines will be implemented:</p> <ul style="list-style-type: none"> – Construction activities will be planned in consultation with local authorities and communities so that activities with the greatest potential to generate noise and vibration are planned during periods of the day that will result in the least disturbance. – Construction activities, and particularly noisy ones, are to be limited to reasonable hours during the day and early evening. Construction activities will be strictly prohibited during the nighttime (22:00 h to 07:00 h). Exceptions will only be allowed in special cases, and only after getting approval of the surrounding residents, local EEB and other relevant departments. And nearby residents should be notified of such night time activities 	Contractors	IA supported by LIEC	Contractor construction budget

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Source of Funds
			Implemented by	Supervised by	
		<p>well in advance.</p> <ul style="list-style-type: none"> – When undertaking construction planning, simultaneous high-noise activities will be avoided, and high noise activities will be scheduled during the day rather than evening hours. Similarly, construction site will be planned to avoid multiple high noise activities or equipment from operating at the same location. – Low-noise equipment will be selected as much as possible. Equipment and machinery will be equipped with mufflers and will be properly maintained to minimize noise. – Noise PPE will be provided to workers to meet the requirements in occupational exposure limits for hazardous agents in work place Part 2: physical agents (GBZ 2.2-2007). – Transportation routes and delivery schedules will be planned during detailed design to avoid densely populated and sensitive areas and high traffic times. – Vehicles transporting construction materials or waste will slow down and not use their horn when passing through or nearby sensitive locations, such as residential communities, schools and hospitals. – Special attention will be paid to protect sensitive sites near the project site: high noise construction activities will be positioned as far away from sensitive sites as possible. 			

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Source of Funds
			Implemented by	Supervised by	
Solid Waste	Inappropriate Waste Disposal	<p>The following solid waste management measure and construction good practice as set out in EHS Guidelines on C&D and EHS General Guidelines will be implemented:</p> <ul style="list-style-type: none"> – Wastes will be reused or recycled to the extent possible. – Littering by workers will be prohibited. – Excavated soil will be backfilled onsite to the extent possible. Excess spoil that cannot be used on-site will be transported to an approved spoil disposal site. – Existing domestic waste containers will be used for domestic waste collection at work sites. Domestic waste will be collected on a regular basis by the local sanitation departments and transported for recycling, reuse, or disposal at a licensed landfill, in accordance with relevant PRC regulations and requirements. – Construction waste dumpsters will be provided at all work sites. Construction waste will be collected on a regular basis by a licensed waste collection company and transported for recycling, reuse, or disposal at a licensed landfill, in accordance with relevant PRC regulations and requirements. – There should be no final waste disposal on site. Waste incineration at or near the site is strictly prohibited. – Contractors will be held responsible for proper removal and disposal of any significant residual materials, wastes, and contaminated soils that remain on the site 	Contractors, local sanitation departments (domestic waste), licensed waste collection companies (construction waste)	IA supported by LIEC	Contractor construction budget

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Source of Funds
			Implemented by	Supervised by	
		after construction.			
Hazardous and Polluting Materials	Inappropriate transportation, storage, use and spills	<ul style="list-style-type: none"> – The following mitigation measures and construction good practice as set out in EHS Guidelines on C&D and EHS General Guidelines will be implemented: – A hazardous material handling and disposal protocol that includes spill emergency response will be prepared and implemented by contractors. – Storage facilities for fuels, oil, chemicals and other hazardous materials will be within secured areas on impermeable surfaces provided with dikes with a 110% volume, and at least 300 m from drainage structures and important water bodies. A standalone site within the storage facility will be designated for hazardous wastes. – Signs will be placed at chemicals and hazardous materials storage sites to provide information on type and name of chemicals and hazardous materials. – Suppliers of chemicals and hazardous materials must hold proper licenses and follow all relevant protocols and PRC regulations and requirements. – A licensed company will be hired to collect, transport, and dispose of hazardous materials in accordance with relevant PRC regulations and requirements. 	Contractors, waste management companies	IA supported by LIEC	Contractor construction budget

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Source of Funds
			Implemented by	Supervised by	
Socioeconomic Resources	Community Disturbance and Safety	<ul style="list-style-type: none"> – Transportation routes and delivery schedules will be planned during detailed design to avoid densely populated and sensitive areas and high traffic times. – Vehicles transporting construction materials or wastes will slow down and not use their horn when passing through or nearby sensitive locations, such as residential communities, schools and hospitals. – Signs will be placed at construction sites in clear view of the public, warning people of potential dangers such as moving. All sites will be made secure, discouraging access by members of the public through appropriate fencing whenever appropriate. – Emergency response system and health and safety protocols will be developed by the IA before construction. 	DI (plan design), Contractors (plan implementation)	IA supported by LIEC	Contractor construction budget
	Worker Occupational Health and Safety	<p>Contractors will implement adequate precautions to protect the health and safety of their workers:</p> <ul style="list-style-type: none"> – Each contractor will undertake H&S risk assessment of construction works and implement relevant construction phase EHS plan in line with construction good practice as set out in EHS Guidelines on C&D, EHS General Guidelines and Occupational H&S guidelines. – Identify and minimize the causes of potential hazards to workers. Implement appropriate safety measures. – Provide training to workers on occupational health and safety, emergency response, especially with respect to using potentially dangerous equipment and storage, 	EHS Plan Developed by LIEC	IA supported by LIEC	LIEC Budget
			EHS Plan implemented by contractors	IA supported by LIEC	Contractor construction budget

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Source of Funds
			Implemented by	Supervised by	
		<p>handling and disposal of hazardous waste. Induction will be conducted before construction and no worker is allowed on site without induction.</p> <ul style="list-style-type: none"> – Ensure that all equipment is maintained in a safe operating condition. – Provide appropriate PPE to workers. – Provide procedures for limiting exposure to high noise or heat working environments in compliance with PRC occupational exposure limits for hazardous agents in work place Part 2: physical agents (GBZ 2.2-2007). – Ensure regular safety meetings with staff. 			
Physical Cultural Resources	As yet unknown PCR's may be damaged if proper precautions are not taken.	<p>A construction phase chance find procedure will be established and activated if any chance finds of PCR's are encountered:</p> <ul style="list-style-type: none"> – construction activities will be immediately suspended if any PCR's are encountered; – destroying, damaging, defacing, or concealing PCR's will be strictly prohibited in accordance with PRC regulations; – local Cultural Heritage Bureau will be promptly informed and consulted; and, – construction activities will resume only after thorough investigation and with the permission of the local Cultural Heritage Bureau. – In case of any PCR is found, ADB SPS 2009 	Contractors	IA supported by LIEC and local Cultural Heritage Bureau	In the event that a PCR is discovered, the direct cost for compensation to contractor will be covered by a special fund to be developed for cultural relic protection.

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Source of Funds
			Implemented by	Supervised by	
		requirements as well as PRC laws and regulations will be followed.			
<u>C. Operation Phase</u>					
Air Pollution	Combustion Emissions	– The leachate storage tank is sealed. Odor gas collection and treatment system will be installed for the leachate storage tank and leachate treatment workshop. The leachate treatment process will be biofilter and the odor removal efficiency will be 95%.	DI (plan design)	IA	Design and construction budget
			Contractors (construction)	IA	
		– Dust generated during construction waste disposal will be collected and treated by bag filters. The collected dust will be treated by landfill	IA (operation)	EA and EEB	IA operation budget
		– Ambient monitoring will be undertaken at the site.			
Wastewater	Discharge of Production and Domestic Wastewater	– Domestic wastewater will be produced from worker sanitation facilities. Domestic wastewater will be treated in digestion tank and will be discharged to the leachate treatment plant for treatment.	IA	EA supported by LIEC, EEB	IA operation budget
		– Leachate will be treated in leachate treatment workshop combined with domestic waste water. The treated wastewater will be recycled as landscape water.			
Solid Waste	Collection and Disposal	- Domestic waste bins will be provided and domestic waste will be routinely collected by the local sanitation department for recycling, if possible, or final disposal at Anji County MSW incineration power plant.	IA, District Sanitation Departments	EA supported by LIEC, EEB	IA operation budget

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Source of Funds
			Implemented by	Supervised by	
		<ul style="list-style-type: none"> - No burning of wastes will be permitted at the subproject site. - Dust generated will be collected and treated by bag filters. The collected dust will be treated in landfill. - Oily waste from equipment maintenance will be collected, transported and treated by a certified 3rd party hazardous waste treatment company. 			
Chemical and Hazardous Materials	Inappropriate Management	<ul style="list-style-type: none"> - A register of all activities that involve the handling of potentially hazardous substances will be developed, including protocols for the storage, handling and spill response. This will include all fuels, oils, grease, lubricants, and other chemicals. - All chemicals, toxic, hazardous, and harmful materials will be transported in spill proof tanks with filling hoses and nozzles in working order, - All chemicals, toxic, hazardous, and harmful materials will be stored in secure areas with impermeable surfaces and protective dikes such that spillage or leakage will be contained from affecting soil, surface water or groundwater systems. The area should be 110% volume of storage capacity. Their usage will be strictly monitored and recorded. Some chemicals will be stored off-site, such as water quality analysis chemicals which will be stored at an independent laboratory. - Material safety data sheets (MSDSs) will be posted for all hazardous materials. 	IA, Licensed Contactors	EA supported by LIEC, EEB	IA operation budget

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Source of Funds
			Implemented by	Supervised by	
		<ul style="list-style-type: none"> - Good housekeeping procedures will be established to avoid the risk of spills. - Spills will be dealt with immediately, and personnel will be trained and tasked with this responsibility. - Workers will be properly trained before handling hazardous wastes and have the requisite PPE. - Hazardous wastes including waste urea, oily waste, waste chemicals and waste ion exchange resin will be collected and disposed by licensed contractors on an as needed basis. - Engineering and administrative control measures will be implemented to avoid or minimize the release of hazardous substances into the work environment keeping the level of exposure below internationally established or recognized limits. - Keep the number of employees exposed, or likely to become exposed, to a minimum to hazardous substances. - Communicating chemical hazards to workers through labeling and marking according to national and internationally recognized requirements and standards, including the International Chemical Safety Cards (ICSC), Materials Safety Data Sheets (MSDS), or equivalent. Any means of written communication should be in an easily understood language and be readily available to exposed workers and first-aid personnel. 			

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Source of Funds
			Implemented by	Supervised by	
		<ul style="list-style-type: none"> - Training workers in the use of the available information (such as MSDSs), safe work practices, and appropriate use of PPE. 			
Noise	Impact on Sensitive Receptors	<ul style="list-style-type: none"> - Low-noise equipment will be used as far as possible, and noise reduction measures such as noise elimination, shock absorption, insulated enclosures and sound dampening materials on exterior walls will be implemented. - All equipment will be properly maintained in order to minimize noise. - Appropriate noise PPE will be provided to the workers who are likely to be exposed to high noise level environments to meet the requirements in occupational exposure limits for hazardous agents in work place Part 2: physical agents (GBZ 2.2-2007), EHS General Guidelines and EHS Guidelines on Occupational H&S. - Layout for project site will be reasonable planned to reduce noise. 	IA	EA supported by LIEC, EEB	IA operation budget
Community and Occupational Health and Safety	Risks to Workers and Community	<ul style="list-style-type: none"> - Operation phase EHS plan and traffic management plan will be developed and implemented and workers will be trained regularly on their implementation. - The nearby communities will be informed of the potential risks and the emergency response plan. - PPE including goggles, gloves, safety shoes will be provided to workers. Correct standard dust masks will be provided to workers working with waste. Noise protection equipment will be provided to workers in high- 	Plans developed by LIEC Plans implemented by IA	EA supported by LIEC and authorities	IA operation budget

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Source of Funds
			Implemented by	Supervised by	
		<p>noise area. Noise areas with more than 85 dBA shall be marked and hearing protections shall be provided to workers. Appropriate masks will be provided to workers in urea area following the PRC standards</p> <ul style="list-style-type: none"> – Provide training to workers on occupational health and safety, and emergency response. – Transportation route of the vehicles will use the existing expressway and urban roads except exit and entrance. Vehicles transporting materials or wastes will slow down to 30 km/h and not use their horn when passing through or nearby sensitive locations, such as residential communities, schools and hospitals – Safe traffic control measures, including road signs and flag persons to warn of dangerous conditions will be taken as needed. Regular maintenance of vehicles to minimize potential accidents caused by equipment malfunction. – Subproject site will be fence with restricted public access. 			

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Source of Funds
			Implemented by	Supervised by	
	Emergency Response	<p>A draft emergency risk and response has been established in accordance with the “National Environmental Emergency Plan” (24 January 2006), other relevant PRC laws, regulations and standards, as well as World Bank EHS Guidelines and ADB’s SPS 2009 and will include measures in the World Bank EHS guidelines with respect to occupational and community health and safety. The plan must be established and in place before the plant is operational.</p> <p>Indicative plan requirements are as follows:</p> <ul style="list-style-type: none"> – Procedures for responding to different types of emergency situations will be identified in the response plan. – Emergency exercises will be conducted and they should include different emergency scenarios. <p>Training Requirements</p> <ul style="list-style-type: none"> – Appropriate operating and maintenance employees will be trained to ensure that they are knowledgeable of the requirements of emergency response plan. Training will be provided as follows: <ul style="list-style-type: none"> – Initial training to all employees before the gas-fired facilities are put in operation. – When new equipment, materials, or processes are introduced. – When emergency response procedures have been updated or revised. <p>Annual Emergency Simulation</p> <ul style="list-style-type: none"> – Simulated emergency exercises will be conducted at least annually. <p>Receiving Notification of a Possible Emergency</p>	<p>Plans developed by PMO with support from LIEC</p> <p>Plans implemented by IA</p>	EA supported by LIEC and local emergency authorities	LIEC budget and IA budget

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Source of Funds
			Implemented by	Supervised by	
		<ul style="list-style-type: none"> When a supervisor receives a report of a possible emergency situation, he/she should obtain at minimum the following information from the reporting person: <ul style="list-style-type: none"> Name of person reporting emergency; Nature of emergency - leak, fire, interruption of service if leak, odor present, etc. Details of emergency: location, amount, how long has the odor been noticed, what actions have been taken, etc. Leaks or other emergencies require prompt investigation. <p>Immediate On-site Action</p> <ul style="list-style-type: none"> The first responder will assess the nature of the report. This assessment should include the status of the emergency, an estimation of how the incident might progress, and an evaluation of the manpower, equipment, and materials needed to adequately cope with the situation. If there is a strong odor or any measurable reading of gas detected inside a structure: <ul style="list-style-type: none"> Clear the building of all occupants. Eliminate potential ignition sources. Localize or isolate the problem and shut off gas as needed. Determine the extent of the hazardous area and establish a restricted area. The responding supervisor shall determine the extent of the emergency and inform the dispatcher of the condition at the site. If emergency procedures are put into effect, the responding supervisor should select a location and establish an emergency command post. The responding supervisor will assign one person to 			

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Source of Funds
			Implemented by	Supervised by	
		<p>remain at the command post to maintain communications until the emergency is over.</p> <ul style="list-style-type: none"> – When necessary, the command post will be coordinated with the local emergency responders. When local emergency responders are involved, they will be in charge of the incident. – The responding supervisor will make himself known to fire and/or police department officials, or other authority having jurisdiction, and will remain with them during the emergency. – All employees reporting to the scene of the emergency will report to the command post for identification and instructions. – Key personnel will be alerted, and it will be their responsibility to keep the emergency personnel under their supervision informed and available for emergency call out. – When a system failure cannot be made safely by normal procedures, emergency shutdown procedures should be implemented. – Reduce system pressure or segment a section before repair procedures are implemented. – Well trained and qualified personnel will be dispatched to monitor system pressure and repair work. <p>Communication with Public Officials</p> <ul style="list-style-type: none"> – When an emergency resulting in a hazard to the public safety occurs, the local fire department, police, the city medical emergency center and other relevant public officials should be notified. An emergency call list will be prepared and make it available at the plant control room. 			

DI = design institute, EMP = environment monitoring plan, EMS = environment monitoring station, EEB = ecology and environment bureau, GRM = grievance redress mechanism, IA = implementing agency, LIEC = loan implementation environmental consultant.

Source: Domestic Project EIA Report (2022) and TA consultants.

Table 3: Environmental Monitoring Plan (EMoP)

Subject	Parameter/Methodology	Monitoring Location	Frequency	Implemented by	Supervised by
A. Construction Phase					
Air Pollution	Ambient dust monitoring (TSP, PM ₁₀ , PM _{2.5}) following PRC requirements	Boundaries of the construction site	Weekly during construction season	EMS	EA, EEB
	Compliance inspection of implementation of air pollution control measures	Construction site	daily during construction season	IA	EA, EEB
Wastewater	Water sampling - COD, TSS, pH etc. following PRC requirements	- Wastewater discharge point of the construction site	Monthly during construction	IA	EA, EEB
Noise	Ambient noise monitoring (day and night Leq dB(A)) using portable monitoring device following PRC requirement	Boundaries of the construction site	Weekly during construction season	EMS	EA, EEB
Solid Waste	Compliance inspection of implementation of solid waste management measures	Waste collection and disposal sites.	Monthly during construction	IA	EA, EEB
	Ash and slag testing for compliance with PRC Organic Fertilizer Standards before selling	Ash and slag storage sites	Semi-annually	IA	EA, EEB
Hazardous and Polluting Materials	Compliance inspections of implementation of hazardous materials management measures	Storage facilities for fuels, oil, chemicals and other hazardous materials. Vehicle and equipment	Monthly during construction	IA	EA, EEB

Subject	Parameter/Methodology	Monitoring Location	Frequency	Implemented by	Supervised by
		maintenance areas.			
Flora and Fauna	Compliance inspection of land clearing to ensure mitigation measures are being implemented	Construction site	Monthly during construction	IA	EA, EEB
Socioeconomic Impacts	Compliance inspection of implementation of traffic control measures	Construction site roads. Transportation routes.	Monthly during construction season	IA	EA, EEB
	Compliance inspection of implementation of Occupational and Community Health and Safety measures including records on near miss, minor, major, fatal accidents and an Emergency Response Plan	Construction site	Monthly during construction season	IA	EA, EEB
B. Operation Phase					
Air pollutants generated from operation	Emission monitoring (PM, SO ₂ , NO _x)	Exhaust stack	Quarterly	EMS	EA, EEB
	Continuous emission monitoring (PM _{2.5} , PM ₁₀ , SO ₂ , NO _x)	Exhaust stack	Continuous	IA	EA, EEB
	Ambient air quality at the receptors and at the area maximum predicted deposition (PM _{2.5} , PM ₁₀ , SO ₂ , NO _x)	Nearby receptors	Quarterly	EMS	EA, EEB
Wastewater	Wastewater sampling - COD, TSS, pH etc. following PRC	Discharge outlet to municipal sewer of the plant	Quarterly	IA	EA, EEB

Subject	Parameter/Methodology	Monitoring Location	Frequency	Implemented by	Supervised by
	requirements	Site			
Solid Waste	Compliance inspection to of operation phase solid waste management measures implementation, contaminants in fly ash	Plant Site	Semi-annually	IA	EA, EEB
Noise	Noise monitoring (1-h average level per World Bank EHS Guidelines requirement, day and night Leq dB(A))	Boundaries of the site	Quarterly	EMS	EA, EEB
Hazardous and Polluting Materials	Compliance inspection of operation phase Hazardous Materials Management Plans (HMMPs) implementation	Plant Site	Semi-annually	IA	EA, EEB
Health and Safety and Emergency Response	Compliance inspection of operation phase occupational and community health and safety management measures including keeping records on near miss, minor, major, fatal accidents and an Emergency Response Plan implementation	Plant Site	Semi-annually	IA	EA, EEB
Environmental acceptance	Compliance testing for environment acceptance	CHP Site	Once	IA	EA, EEB

Table 4: Institutional strengthening and training program

Training Topic	Trainers	Attendees	Contents	Times	Days	# Persons	Budget (USD)
Construction Phase Environmental, Health and Safety Training	LIEC	Contractors, PMO, IA, EA	ADB and PRC laws, regulations and policies <ul style="list-style-type: none">– ADB's Safeguard Policy Statement– Project applicable PRC environmental, health and safety laws, policies, standards and regulations– International environmental, health and safety management practice in civil irrigation and drainage construction	3 (once prior to start of construction, and then once during second and third years)	2	30	Training Development Fixed costs: \$2000 per course delivery x 3 = \$ 6,000
			GRM <ul style="list-style-type: none">– GRM structure, responsibilities, and timeframe– Types of grievances and eligibility assessment				
			Implementation of Construction Phase EMP <ul style="list-style-type: none">– Impacts and mitigation measures– Monitoring and reporting requirements– Non-compliance and corrective actions				
Operation Phase Environmental, Health and Safety Plan Training	LIEC	PMO, IA, EA	ADB and PRC laws, regulations and policies <ul style="list-style-type: none">– ADB's Safeguard Policy Statement– Project applicable PRC environmental, health and safety laws, policies, standards and regulations– International environmental, health and safety management practice in civil irrigation and drainage operation	3 (once prior to start of operation, and then once during second and third years)	2	30	Training Development Fixed costs: \$2000 per course delivery x 3 = \$6,000
			GRM <ul style="list-style-type: none">– GRM structure, responsibilities, and timeframe– Types of grievances and eligibility assessment				
			Implementation of Operation Phase EMP <ul style="list-style-type: none">– Impacts and mitigation measures– Monitoring and reporting requirements– Non-compliance and corrective actions				
Total				6		60	\$12,000

F. Reporting Requirements

16. **Environmental reporting.** The CSCs will submit monthly reports to the PMO on implementation and compliance with the EMP and CEMPs, including information on all spills, accidents including near miss, minor, major, fatal accidents, grievance received, and appropriate actions taken.

17. Based on the CSCs' monthly EMP progress reports and the compliance inspection and ambient monitoring results, the PMO will prepare semi-annual environmental reports including EMP implementation and monitoring results for submission to the IA and EA. The PMO ESO with the support from the LIEC will prepare semi-annual EMRs for onward submission to the IA and the PMO, and then to ADB. The reports should assess the project's compliance with the EMP and PRC environmental standards, identify any environment-related implementation issues and necessary corrective actions, and reflect these in a corrective action plan. The performance of the contractors in respect of environmental compliance will also be reported, as will the operation and performance of the project GRM, environmental institutional strengthening and training, and compliance with all safeguards covenants.

18. **Review by ADB.** ADB will review the semiannual EMRs and ADB missions will inspect the project progress and implementation on site twice a year. For environmental issues, inspections will focus mainly on (i) monitoring data; (ii) the implementation status of project performance indicators specified in the loan covenants on the environment, environmental compliance, implementation of the EMP, and environmental institutional strengthening and training; (iii) the environmental performance of contractors, CSCs and the PMO; and (iv) operation and performance of the project GRM.

19. **Environmental acceptance reporting.** Within 3 months after completion, or no later than 1 year with permission of the Anji EEB, an environmental acceptance report shall be prepared by a licensed institute in accordance with the PRC Regulation on Project Completion Environmental Audit (MEP, 2001), approved by the relevant environmental authority, and reported to ADB. The environmental acceptance report will indicate the timing, extent, effectiveness of completed mitigation and of maintenance, and the need for additional mitigation measures and monitoring (if any) during operation.

20. The environmental reporting requirements are summarized in the **Table 5**.

Table 5: Reporting Requirements

Report	Prepared by	Submitted to	Frequency
A. Construction Phase			
EMP implementation reports	CSC	IA	Monthly
Compliance monitoring reports	EMS	IA and EA	Quarterly
Environmental monitoring reports	EA	ADB	Semi-annually
B. Operation Phase			

Report	Prepared by	Submitted to	Frequency
Environmental monitoring report	EA	ADB	Annually

G. Performance Indicators

21. Performance indicators (**Table 6**) have been developed to assess the implementation of the EMP. These indicators will be used to evaluate the effectiveness of environmental management during the subproject implementation.

Table 6: Performance Indicators

No.	Description	Indicators
1	Staffing	(i) PMO established with appropriately qualified staff including Environmental Officer. (ii) Appropriately qualified environmental expert recruited if needed. (iii) 3rd party environmental monitoring entity engaged.
2	Budgeting	(i) Environment mitigation cost during construction and operation is sufficiently and timely allocated. (ii) Environment monitoring cost is sufficiently and timely allocated. (iii) Budget for capacity building is sufficiently and timely allocated.
3	Monitoring	(i) Compliance monitoring is conducted by IA as per EMoP. (ii) Construction phase and operation phase ambient and effluent monitoring is conducted by EMS.
4	Supervision	(i) IA to review the implementation of EMP. (ii) ADB review missions.
5	Reporting	(i) Semi-annual environmental monitoring reports during construction phase and annual reports operation phase prepared by the IA are submitted to EA and ADB.
6	Capacity Building	(i) Training on ADB safeguard policy, EMP implementation, and GRM is provided during subproject implementation.
7	Grievance Redress Mechanism	(i) GRM contact persons are designated at all IA and the PMO, and GRM contact information disclosed to the public before construction. (ii) All complains are recorded and processed within the set time framework in the GRM of this EIA.
8	Compliance with PRC standards	(i) Project complies with the PRC's environmental laws and regulations and meets all required standards.

H. Estimated Budget for EMP Implementation

22. The estimated budget for EMP implementation of the project is presented in **Table 7**. Costs are presented for mitigation implementation, ambient monitoring, capacity building, implementation support if needed, and GRM implementation. The costs do not include salaries of PMO staff.

I. Mechanisms for Feedback and Adjustment

23. Based on environmental inspection and monitoring reports, the PMO shall decide, in consultation with the LIEC, whether (i) further mitigation measures are required as corrective actions, or (ii) some improvements are required for environmental management practices. The effectiveness of mitigation measures and monitoring plans will be evaluated by a feedback reporting system. Adjustment to the EMP will be made, if necessary. The PMO Environmental Officer and the LIEC will play critical roles in the feedback and adjustment mechanism.

24. If during inspection and monitoring, substantial deviation from the EMP is observed or any changes are made to the project that may cause substantial adverse environmental impacts or increase the number of affected people, then the PMO will immediately consult with ADB and form an environmental assessment team to conduct additional environmental assessment. If necessary, further public consultation will be undertaken. The revised DEIAs and project IEE, including this EMP, will be submitted to the ADB for review, appraisal, and public disclosure. The revised EMP will be passed to the contractors, CSCs and PIUs for implementation.

J. Environmental Acceptance

25. After a three months trial operation period the Anji EEB will conduct an environmental acceptance inspection for the subproject and issue environmental acceptance approvals. If the subproject is in compliance with all conditions for approval of the domestic EIA, the subproject can be put into formal operation.

Table 7: Estimated Budget for Implementing EMP

Construction Phase						Source of Funds
1. Ambient Monitoring	Unit	Unit Cost	# Times	Cost USD	Cost RMB	
Air - TSP	Quarterly	\$ 300	8	\$ 2,400	¥15,249	Counterpart Financing
Noise	Quarterly	\$ 200	8	\$ 1,600	¥10,166	
Subtotal				\$ 4,000	¥25,415	
2. Capacity Building	Unit	Course Cost	# Times	Cost USD	Cost RMB	
Construction Phase HSE Plan Development and Training	EHS Plan Development	\$ 2,000	4	\$ 8,000	¥50,830	Counterpart Financing
	EHS Course Development	\$ 2,000	1	\$ 2,000	¥12,707	
	EHS Course Delivery	\$ 4,000	1	\$ 4,000	¥25,415	
Subtotal				\$ 14,000	¥88,952	
TOTAL Construction Phase				Cost USD \$ 18,000	Cost RMB ¥114,367	
Operation Phase (first 2 years)						
	Unit	Unit Cost	# Times	Cost USD	Cost RMB	Counterpart
1. Ambient Monitoring	Unit	Unit Cost	# Times	Cost USD	Cost RMB	
Odor and dust	Seasonal Sampling	\$ 400	8	\$ 3,200	¥20,332	Counterpart Financing
Noise	Seasonal Sampling	\$ 200	8	\$ 1,600	¥10,166	
Groundwater	Seasonal Sampling	\$ 200	16	\$ 3,200	¥20,332	
Wastewater	Seasonal Sampling	\$ 150	8	\$ 1,200	¥7,624	
Subtotal				\$ 9,200	¥38,122	
2. Capacity Building	Unit	Course Cost	# Times	Cost USD	Cost RMB	
Operation Phase HSE Plan Development and Training	EHS Plan Development	\$ 2,000	4	\$ 8,000	¥50,830	Counterpart Financing
	EHS Course Development	\$ 2,000	1	\$ 2,000	¥12,707	
	EHS Course Delivery	\$ 4,000	1	\$ 4,000	¥25,415	
Subtotal				\$ 14,000	¥88,952	
TOTAL Operation Phase				Cost USD \$ 23,200	Cost RMB ¥147,406	
GRAND TOTAL Construction + Operation				Cost USD \$ 41,200	Cost RMB ¥261,772	
LIEC						
Loan Implementation EHS Consultant	Person Months	\$ 6,000	9	\$ 54,000	¥343,100	ADB Loan

APPENDIX II. COVID 19 – PROJECT HEALTH & SAFETY PLAN (DRAFT GUIDELINES)

Item	Good Practices	Who implements	Who supervises
Awareness materials	<ul style="list-style-type: none"> • Preparation of awareness materials on COVID-19 e.g., signs, posters • Installation of awareness signs at work sites, for visibility to workers and the general public 	Contractor	CSC, PMO, LIEC
Detection Measures	<ul style="list-style-type: none"> • Control and document the entry/exit to the work site for both workers and other parties. • Prevent sick workers from entering the site through checking temperatures of workers and other people entering the site. Require self-reporting prior to entering the site. • All workers to self-monitor their health, possibly with the use of questionnaires, and take their body temperature regularly. • Thermal screening at the workplace to be considered only in the context of a combination of measures for prevention and control of COVID-19 at the workplace and along with risk communication. 	Contractor	CSC, PMO, LIEC
Physical Distancing measures	<ul style="list-style-type: none"> • Keep a distance of at least 1 meter between workers and minimize physical contact, ensure strict control over external access, and queue management (marking on the floor, barriers). • Reduce density of people in the building (no more than 1 person per every 10 m²), physical spacing at least 1 meter apart for work stations and common spaces, such as entrances/exits, lifts, pantries/canteens, stairs, where congregation or queuing of employees or visitors/clients might occur. • Avoid crowding by staggering working hours to reduce the congregation of employees at common spaces such as entrances or exits. • Implement or enhance shift or split-team arrangements, or teleworking. • Minimize the movement of local workers in and out of the site (e.g., avoid workers returning home to affected areas, or returning to site from affected areas). • Minimize the workers' contact with local community. 	Contractor	CSC, PMO, LIEC
Respiratory measures	<ul style="list-style-type: none"> • All workers should wear a face mask. • If a worker is sick, they should not come to work if a member of staff or a worker feels unwell while at work, provide a medical mask so that they may get home safely. • Where masks are used, whether in line with government policy or by personal choice, it is very important to ensure safe and proper use, care and disposal 	Contractor	CSC, PMO, LIEC

Item	Good Practices	Who implements	Who supervises
Hand Hygiene measures:	<ul style="list-style-type: none"> • Regular and thorough handwashing with soap and water or hand hygiene with alcohol-based hand-rub (a) before starting work, before eating, frequently during the work shift, especially after contact with co-workers or customers, (b) after going to the bathroom, after contact with secretions, excretions and body fluids, after contact with potentially contaminated objects (gloves, clothing, masks, used tissues, waste), and immediately after removing gloves and other protective equipment but before touching eyes, nose, or mouth. • Hand hygiene stations, such as hand washing and hand rub dispensers, should be put in prominent places around the workplace and be made accessible to all staff, contractors, clients or customers, and visitors along with communication materials to promote hand hygiene 	Contractor	CSC, PMO, LIEC
Cleaning and Disinfection	<ul style="list-style-type: none"> • Cleaning and Disinfection off all site facilities, including offices, accommodation, canteens and common spaces: • Cleaning (soap, water, and mechanical action) to remove dirt, debris, and other materials from surfaces. Disinfection of dirty surfaces and objects only after cleaning. • Most common disinfectants – sodium hypochlorite (bleach) of surface at concentration 0.1% or alcohol at least 70% concentration for surfaces which can be damaged by sodium hypochlorite. • Priority disinfection of high-touch surfaces - commonly used areas, door and window handles, light switches, kitchen and food preparation areas, bathroom surfaces, toilets and taps, touchscreen personal devices, personal computer keyboards, and work surfaces. • Disinfectant solutions must always be prepared and used according to the manufacturer's instructions, including instructions to protect the safety and health of disinfection workers, use of personal protective equipment, and avoiding mixing different chemical disinfectants. • Provide appropriate PPEs to the cleaners. • Manage the waste as the medical waste, and dispose of it in accordance with local regulations. 	Contractor	CSC, PMO, LIEC
Response measures if workers found with COVID-19 symptoms	<ul style="list-style-type: none"> • Workers who are unwell or who develop symptoms consistent with COVID-19 to stay at home, self-isolate, and contact a medical professional or the local COVID-19 information line for advice on testing and referral (consider telemedicine and flexible sick leave policy). • Standard operating procedures to be prepared to manage a person who becomes sick at the workplace and is suspected of having COVID-19, 	Contractor	CSC, PMO, LIEC

Item	Good Practices	Who implements	Who supervises
	<p>including isolation, contact tracing and disinfection.</p> <ul style="list-style-type: none"> • People who were in close contact at the workplace with persons with laboratory-confirmed COVID-19 should be quarantined for 14 days from the last time of the contact in accordance with WHO recommendations. • Set out differentiated procedures for the treatment of sick persons, based on the case severity. Pay workers throughout periods of illness, isolation or quarantine. • Set aside a part of worker accommodation for precautionary self-quarantine. • Establish communications with local medical services and refer sick workers to there. 		
Adjusting Work Practices and Manage Work Related Travels	<ul style="list-style-type: none"> • Consider changes to work processes and timings to minimize contact between workers (e.g., decreasing the size of work team, changing to a 24-hour work rotation). • Cancel or postpone non-essential travel to areas with community transmission of COVID-19. • Provide hand sanitizer to workers who must travel, advise workers to comply with instructions from local authorities where they are travelling, as well as information on whom to contact if they feel ill while travelling. • Workers returning from an area where COVID-19 transmission is occurring should monitor themselves for symptoms for 14 days and take their temperature twice a day; if they are feeling unwell, they should stay at home, self-isolate, and contact a medical professional. 	Contractor	CSC, PMO, LIEC
Communication and Contact with the Community	<ul style="list-style-type: none"> • Carefully manage the relations with the community with clear and regular communication. • Made aware of the procedures put in place at the site to address issues related to COVID-19. • Practice social distancing with the local community. 	Contractor	CSC, PMO, LIEC
Risk communication, training, and education	<ul style="list-style-type: none"> • Provide posters, videos, and electronic message boards to increase awareness of COVID-19 among workers and promote safe individual practices at the workplace, engage workers in providing feedback on the preventive measures and their effectiveness. • Provide regular information about the risk of COVID-19 using official sources, such as government agencies and WHO, and emphasize the effectiveness of adopting protective measures and counteracting rumors and misinformation. • Special attention should be given to reaching out to and engaging 	Contractor	CSC, PMO, LIEC

Item	Good Practices	Who implements	Who supervises
	<p>vulnerable and marginalized groups of workers, such as those in the informal economy and migrant workers, domestic workers, subcontracted and self-employed workers, and those working under digital labor platforms.</p> <ul style="list-style-type: none"> • Train the workers on procedures in place by the project, and their own responsibilities in implementing them. 		