AIIB Loan

AIIB Loan for Henan Flood Emergency Recovery and Rehabilitation Project — Improvement of Urban Drainage System and Roads in Xinxiang City

Environmental and Social Impact Assessment and Management Plan

Project Implementation Unit:

Xinxiang City Urban Management Bureau

Xinxiang City Housing and Urban-Rural Development Bureau

September 2024

Version Records

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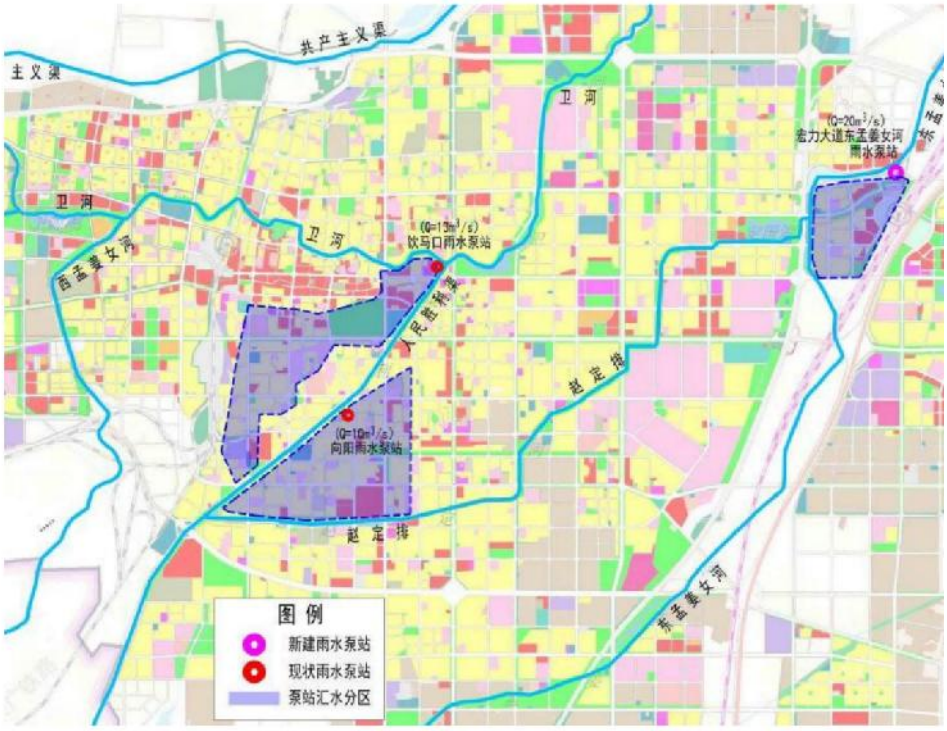
Executive Summary

This project primarily focuses on the comprehensive renovation of urban areas, rivers, and roads in Xinxiang City. It has broad benefits, and the residents generally support the construction. The project involves enhancing drainage capacity in Xinxiang City's urban area following post-flood reconstruction. The engineering works include constructing a new stormwater drainage network, road renovation, pump station, and main channel reconstruction and expansion, as well as improvements to supporting facilities such as roads, lighting, and landscaping. Some project components are located in the central urban area, affecting a large population, which could lead to significant environmental impacts.

According to the AIIB's "Environmental and Social Framework" and the "AIIB Emergency Loan for Henan Flood Emergency Recovery and Rehabilitation Project - Environmental and Social Management Planning Framework" (ESMFP), combined with the "AIIB Emergency Concessional Loan Support for the Henan Flood Disaster Recovery and Rehabilitation Project - Xinxiang Subproject Environmental and Social Impact Risk Identification and Screening Opinions," this project is classified as Category B in terms of environmental impact. Therefore, an Environmental and Social Impact Assessment (ESIA) and an Environmental and Social Management Plan (ESMP) must be prepared for AIIB review and approval.

A. Project Content and Coverage The project is located in Xinxiang City, Henan Province, China, covering three districts: Hongqi District, Muye District, and Weibin District. It includes three sub-projects: (1) the Yinmankou Stormwater Pump Station Catchment Area Project, (2) the Xiangyang Stormwater Pump Station Catchment Area Renovation Project, and (3) the Hongli Avenue East Mengjiangnv River Stormwater Pump Station Catchment Area Construction Project (see Figure 1).



Source: Feasibility Study and Preliminary Design Documents, August 2024

Figure 1 Distribution Map of Subprojects for Improvement of Urban Drainage System and Roads in Xinxiang City

B. Major Enviromental Impacts and Mitigation Measures The project is located in the urban area of Xinxiang City and does not involve ecological sensitive areas or ecological red lines. No construction camps will be set up during the construction period. The environmental impacts during construction mainly include the following aspects:

- **Air Quality:** Dust generated from earthworks and material handling, as well as emissions from machinery and equipment, will impact the surrounding air quality. To effectively mitigate these impacts, the project will implement dust suppression through water spraying, covering material storage areas, and using low-emission construction equipment that meets environmental standards.
- **Water Environment:** Construction wastewater, including pit dewatering, equipment, and vehicle washing water, will be treated through the construction of sedimentation tanks and oil separation facilities. Some wastewater will be reused on-site.
- **Noise:** The operation of construction machinery and equipment will generate noise that may disturb nearby residential areas. The project will use low-noise construction equipment, limit high-noise operation times, and set up noise barriers in sensitive areas.
- **Solid Waste Management:** Construction activities will generate a certain amount of demolition debris, waste pipes, arch rings, and sludge from trench clearing. Proper management will be ensured through waste classification,

recycling, and regulated disposal. Sludge will be transported by tank trucks to the Xinxiang City Pipeline Sludge Solidification Site.

- **Traffic Impact:** During the construction period, transporting construction materials and equipment will increase the traffic flow of heavy vehicles, raising the risk of traffic accidents, especially in densely populated areas like the Yinmankou Stormwater Pump Station Catchment Area near the Pangdonglai Mall on Jiankang Road. To reduce traffic congestion and the impact on residents, the public will be informed of construction information through various channels. Safety barriers, warning signs, and traffic instructions will be set up in the construction area to ensure safety. Regular inspections and reinforcement of traffic guidance facilities will be carried out to prevent accidents.
- **Health and Safety:** Construction workers will face health impacts from dust, exhaust, noise, traffic safety risks, high-temperature working conditions, or other safety risks caused by construction. Contractors should provide safety training before construction and supply appropriate personal protective equipment (PPE) according to the "Standards for the Provision and Use of Labor Protection Goods in Construction Work" (JGJ184-2009).

Environmental Impacts During Operation:

- **Air Environment:** During the operation period, the primary concern for air quality is the potential odor generated by the pump station, particularly if trash racks are not cleaned regularly. Therefore, the project will strengthen pump station maintenance and timely cleaning to reduce odor generation.
- **Water Environment:** The normal operation of the pump stations will effectively improve the drainage capacity of the collection area, reduce surface water accumulation, and related pollution, and ensure that discharge water quality meets environmental protection requirements through modern water treatment facilities.
- **Solid Waste Management:** Solid waste intercepted by the pump stations, including dead branches, leaves, and floating plastic debris, will be regularly cleaned by the sanitation department and transported to waste treatment facilities to ensure environmental cleanliness and hygiene.

C. Major Social Impacts and Mitigation Measures The social impacts of this project mainly include positive and negative effects.

Positive Impacts:

- Eliminating flood-prone waterlogging points, reducing flood disasters.
- Upgrading drainage facilities to solve pipeline blockages.
- Building bridges to improve the road network, promoting convenient and safe travel.
- Enhancing road greening and landscape to improve the urban natural environment.
- Promoting regional development and increasing employment opportunities.

Negative Impacts:

- **Resettlement Impact:** The expropriation of 7.10 mu of collective land affects 2 households and 12 people. It involves permanent occupation of 172.04 mu of state-owned land. The construction on the existing foundation of the flood control and drainage station occupies about 3.06 mu of existing state-owned land, not involving new permanent land occupation. Construction on previously acquired state-owned land occupies about 168.98 mu; this area's state-owned land was acquired from 2012 to 2018 and has been fully converted to state-owned land, not involving compensation work or resettlement impacts (see "Due Diligence Report"). Temporary occupation of state-owned land totals 868.56 mu, including roads and vacant land beside roads. The Yinmankou Stormwater Pump Station Catchment Area Project involves 13 roads, temporarily occupying about 525.01 mu, while the Xiangyang Stormwater Pump Station Catchment Area Renovation Project involves 4 roads, temporarily occupying about 343.55 mu.
- **Flood Season Risk:** Risks associated with incomplete construction before the flood season, which may bring severe weather with strong winds and thunderstorms, posing safety hazards to the construction site, and water accumulation caused by excavation may further affect construction.
- **Traffic and Community Impact:** Construction vehicles entering and leaving urban residential and work areas, temporary traffic restrictions, interference with traffic and other public facilities, and the adverse effects of debris, dust, and noise on the daily lives and travel of community residents.
- **Impact of Migrant Labor:** Increased interaction between migrant labor and residents of the project area, increasing health and sanitation risks such as the spread of AIDS and epidemic diseases, as well as conflicts of different social and cultural customs (including religious beliefs, graves, temples, marriage, and funeral customs).
- **Labor Issues:** Potential use of child labor and forced labor during the recruitment and employment process.
- **Gender-Based Violence:** Gender-based violence issues may arise during the construction process and in daily site affairs, including discriminatory actions against women during employment, including threats, coercion, or arbitrary deprivation of freedom.

Mitigation Measures and Social Management Plan:

Based on the identified major social impacts, the following mitigation measures and social management plans have been developed:

1. To reduce land acquisition risks, a brief Resettlement Action Plan (RAP) is prepared.
2. Prepare flood control preparations or emergency plans if construction is not completed before the flood season.
3. Propose measures from cultural education and community management perspectives to reduce the disturbance of the influx of external population on local residents and society during the construction and operational periods.
4. Strengthen labor management to enhance the protection of labor rights during the construction and operational periods.

5. Improve the labor force guarantee system and working conditions to protect the legitimate rights and interests of labor, and avoid using child labor and forced labor.
6. Develop a specific gender action plan to ensure fair development for women, protect women's labor rights, and prioritize employment opportunities for women in the project area.

D. **Implementation Arrangements**

The Xinxiang City AIIB Emergency Loan Project Working Group Office (i.e., the project organization unit), the Urban Management Bureau, the Housing and Construction Bureau, and other relevant departments (i.e., the specific implementation construction units of the project) will jointly promote the construction of the Xinxiang subproject. The Xinxiang City AIIB Loan Project Office is responsible for:

- Designating an environmental and social coordinator for each contract section to coordinate the implementation of the environmental and social management plan.
- Ensuring that the environmental and social management plan, monitoring scheme, and mitigation measures are included in the bidding documents and construction contracts.
- Responsible for the operation of the grievance mechanism.
- Handling unforeseen adverse impacts and reporting them to AIIB promptly.
- Hiring qualified external environmental and social monitoring units.
- Xinxiang City Project Office will submit environmental and social monitoring reports to AIIB every six months, along with other subprojects.

E. **Stakeholder Engagement**

Based on the nature of the Xinxiang project, field survey results, and interviews with relevant institutions, the primary stakeholders identified include direct beneficiaries and groups negatively impacted by the project within the project impact area, including residents in three project districts of Xinxiang City, seven streets, vulnerable groups, those affected by land acquisition and demolition, and school staff and students. Secondary stakeholders include the Xinxiang City AIIB Emergency Loan Project Working Group Office (i.e., the project organization unit), relevant departments of Xinxiang City, such as Housing and Urban-Rural Development, Water Resources, and Emergency Management (i.e., the specific implementation construction units of the project), Xinxiang City Housing Acquisition Affairs Center, Natural Resources and Planning Bureau, Ecological Environment Bureau, Statistics Bureau, Human Resources and Social Security Bureau (Labor Protection Bureau), Rural Revitalization Bureau, Ethnic Affairs Committee, Women's Federation, Civil Affairs Bureau, Environmental Protection Bureau, Transportation Management Bureau, street offices under West Street, Culture Street, Xiangyang Street, Victory Road Street, Jiankang Road Street, Nanqiao Street, and Peace Street, design units, construction units, and supervision units.

During the project preparation stage, the feasibility study unit, social assessment compilation unit, and environmental assessment compilation unit conducted project information disclosure and notification, as well as institutional interviews, field investigations, focus group discussions, key informant interviews, and questionnaire surveys. These activities provided sufficient informed consultation and public participation. Surveys revealed that residents in the project area were urgently in need of engineering due to the impact on their daily lives, expecting the rapid repair of municipal roads, riverside roads, and bridges for convenient travel. Improvement of public infrastructure near urban rivers in the Xinxiang urban area and beautification of the urban landscape were expected by nearby residents to enhance river management. Nearby school staff, students, and parents hoped for prompt municipal road reconstruction and improvement projects. Low-income groups showed a high level of enthusiasm and willingness to participate in project construction. Women also showed strong participation willingness. There was general recognition of environmental impact mitigation measures. Awareness of the project among local cadres and the public has improved, and support for the project among residents is high.

Based on questionnaire surveys, discussions, in-depth interviews, and interviews with key informants, a plan for information disclosure and public participation for this project was formulated. This includes:

- **Project Preparation Stage:** Project basic information disclosure, site selection willingness survey, design scheme participation and consultation, environmental impact assessment information disclosure, and public consultation, land acquisition, construction information disclosure, and grievance and complaint channels.
- **Project Implementation Stage:** Reducing construction impacts, participation in project construction, management of incoming migrant labor, and grievance and complaint channels.
- **Project Operation Stage:** Flood safety and water safety education, road traffic safety lectures, and grievance and complaint channels.

F. **Grievance Mechanism**

The grievance mechanism for this project mainly includes two types:

1. **Project-Level Grievance Mechanism:** This provides a channel for grievances from affected residents, social groups, and businesses during the project implementation and operation.
2. **Worker-Level Grievance Mechanism:** This provides a channel for grievances from direct and contract workers, and employees responsible for the project.

The project-level grievance mechanism will rely on the existing urban management grievance mechanisms in Xinxiang City, such as the environmental protection hotline and mayor's hotline, and extend its scope to this proposed project by referring to the

grievance mechanisms already established in other construction components of the Xinxiang subproject.

In December 2021, Xinxiang City established the AIIB Project Office, with the integrated department's 4 staff members responsible for the operation of the grievance mechanism. If the Xinxiang City AIIB Project Office receives a grievance, the commander of the integrated command should first verify whether the grievance content is related to the project. If the grievance is related to the project, regardless of whether it concerns environmental or social aspects, the commander should initiate coordination to resolve the grievance. If the grievance is unrelated to this project, the commander will submit the grievance to the relevant authority on behalf of the complainant. All grievances should be recorded and the entire grievance process should be notified to the relevant personnel.

AIIB Grievance Mechanism: The AIIB has established the Project-Affected People's Mechanism (PPM). When affected people believe that an AIIB project has failed to implement its environmental and social policies, resulting in or potentially resulting in adverse impacts on them, and their concerns cannot be satisfactorily resolved through the project grievance compensation mechanism or AIIB management mechanism, they can seek a solution through the PPM. Information on the AIIB's Project-Affected People's Mechanism (PPM) can be accessed via the following link: https://www.aiib.org/en/about-aiib/who-we-are/project-affected-peoples-mechanism/how-we-assist-you/index.html.

The Chinese and English versions of the "AIIB Emergency Loan for Henan Province Heavy Rain and Flood Recovery and Reconstruction Project Environmental and Social Management Planning Framework" have been disclosed on the Henan Provincial Department of Finance website (https://czt.henan.gov.cn/2021/11-05/2342160.html) and the AIIB website (China: Henan Flood Emergency Rehabilitation and Recovery Project - Projects - AIIB). The Chinese and English versions of the project's Environmental and Social Impact Assessment Report and Management Plan, including the grievance mechanism, will be made public on the Xinxiang Municipal Finance Bureau website and the AIIB website before construction. The Xinxiang Municipal Finance Bureau will also prepare a paper version of the Environmental and Social Impact Assessment Report and Management Plan for public review.

1 Introduction

1.1 Project Background

Xinxiang City has applied for an AIIB loan to implement the "AIIB Loan for Henan Flood Emergency Recovery and Rehabilitation Project – Xinxiang City Urban Drainage Capacity Enhancement Project." The project mainly includes three sub-projects: the Yinmankou Stormwater Pump Station Catchment Area Renovation Project, the Xiangyang Stormwater Pump Station Catchment Area Renovation Project, and the Hongli Avenue East Mengjiangnv River Stormwater Pump Station Catchment Area Construction Project.

Through comprehensive system upgrades of the main, secondary, and branch rainwater pipelines in the Yinmankou Stormwater Pump Station area, the expansion and reconstruction of the Xiangyang Stormwater Pump Station (18 m^3/s) and its supporting pipeline network, and the construction of the pipeline network and pump station facilities in the Hongli Avenue East Mengjiangnv River Catchment Area, the project adopts a "trunk and branch combination, system management" approach to improve the urban drainage and flood prevention capacity. It aims to alleviate and even solve waterlogging at flood-prone points during the flood season, ensuring residents' travel safety and the security of their lives and properties during the flood season. The project aspires to achieve "no water accumulation in light rain, no flooding in heavy rain, and no disasters in torrential rain." In addition, the project involves upgrading supporting facilities like roads, lighting, and landscaping. The renovation of damaged road surfaces and replacement of old streetlights will make transportation for nearby residents safer and more convenient, creating a livable, safe, and resilient city and enhancing citizens' happiness and satisfaction.

According to AIIB's environmental and social policy requirements, the project's "Environmental and Social Management Planning Framework" (ESMPF), and the environmental and social risk screening opinions for the Xinxiang subproject, this project is categorized as an Environmental and Social Category B project. It requires the preparation of an Environmental and Social Impact Assessment report, including an Environmental and Social Management Plan.

1.2 Assessment Methods

The environmental and social impact assessment for this project was carried out using the following methods:

1. **Review of Project Design Documents:** Identification of key environmental and social impacts was done through a comprehensive analysis of the project's feasibility study and preliminary design. Potential environmental and social impacts were determined, and their severity and scope were assessed. Based on this analysis, environmental and social impact classification screening opinions were formed and submitted to AIIB for review. The project was categorized as Environmental and Social Category B, necessitating the preparation of an Environmental and Social Impact

Assessment report and an Environmental and Social Management Plan.

2. **Stakeholder Communication:** Starting in October 2022, the project office communicated with residents in the project area to inform stakeholders about the project and gather their attitudes and opinions on its construction. Since December 2022, relevant departments such as the Xinxiang Municipal Government, Xinxiang Finance Bureau, Xinxiang Housing and Urban-Rural Development Bureau, Xinxiang Urban Management Bureau, Hongqi District Government, Weibin District Government, and Muye District Government, along with project design units, have conducted public participation activities. These include holding villager/resident representative meetings, party member meetings, and homeowner meetings in affected streets, communities, and schools. They also disclosed project information through community/village group announcements, project notices, distribution of brochures, hanging of banners, outdoor wall slogans, and WeChat public accounts. Furthermore, they conducted surveys on residents' needs and intentions.

3. **Site Inspection:** From February 2022 to April 2024, multiple on-site inspections were conducted by environmental and social consultants. These field visits aimed to objectively understand the construction sites of various project areas, including location, land use, sensitive points, influencing factors, and the composition and needs of residents, as well as the socioeconomic living conditions of the affected population.

4. **Field Survey:** A field survey was conducted from April 16 to 20, 2024, in the three project points within three counties and districts in the project implementation area:

- **Institutional Interviews and Data Collection:** Ten institutional interviews and discussions were conducted with relevant departments such as the AIIB Emergency Loan Project Working Group Office of the Xinxiang Municipal Finance Bureau (project organization unit), Xinxiang Housing and Urban-Rural Development Bureau (project implementation unit), Urban Management Bureau (project implementation unit), Emergency Management Bureau, Xinxiang Housing Acquisition Affairs Center, Natural Resources and Planning Bureau Acquisition Office, Ecological Environment Bureau, Statistics Bureau, Human Resources and Social Security Bureau (Labor Protection Bureau), Rural Revitalization Bureau, Ethnic and Religious Affairs Commission, Women's Federation, Civil Affairs Bureau, Transportation Management Bureau, and street offices under the jurisdiction of the project area. Basic data and literature closely related to the project were also collected.
- **Focus Group Discussions:** To more comprehensively understand the needs and suggestions of the affected population in the project area (including women, the poor, vulnerable groups, nearby residents, students, hospital staff, and village committee leaders), the social assessment survey team conducted ten focus group discussions with residents in townships and streets of the project area, involving a total of 114 participants. Among them, 33 were women (28.98%), 21 were elderly (18.42%), and 60 were project-related department heads,

community committee members, and village representatives (52.63%).
- **Key Informant Interviews:** The social assessment survey team interviewed key informants at the county/district, township/street, and village/community levels. A total of 53 key informants from the three counties and districts were interviewed, including 19 from Hongqi District, 17 from Weibin District, and 17 from Muye District. This was to better understand stakeholders' attitudes towards the project and provide better suggestions for project design and implementation.
- **Questionnaire Survey:** Using the Probability Proportional to Size (PPS) sampling method, 330 face-to-face questionnaires were completed in the three project counties and districts. After statistical verification and screening, all 330 questionnaires were found to be valid, with a 100% validity rate.

5. **Report Preparation and Review:** Based on the collection and collation of all field survey and interview data, combined with the project design documents and relevant policies and regulations, a comprehensive analysis of the project's environmental and social impacts was carried out. This led to the formation of the "Xinxiang City Urban Drainage Capacity Enhancement Project Environmental and Social Impact Assessment and Environmental and Social Management Plan." The report mainly includes project description, environmental and social baseline, impact assessment, mitigation measures, public consultation, information disclosure, grievance mechanism, and environmental and social management plan.
6. **Information Disclosure and Feedback:** The "Xinxiang City Urban Drainage Capacity Enhancement Project Environmental and Social Impact Assessment and Environmental and Social Management Plan (Draft)" will be disclosed on the websites of the Xinxiang Housing and Urban-Rural Development Bureau and Xinxiang Urban Management Bureau after AIIB review. It will be improved based on public feedback.

1.3 Report Structure

The structure of this report is as follows:

- **Chapter 1: Introduction:** Introduces the background and purpose of this report and its organizational structure.
- **Chapter 2: Policy, Legal, and Administrative Framework:** Describes laws, regulations, policies, and applicable AIIB environmental and social management requirements related to the project.
- **Chapter 3: Project Description:** Describes the project's construction location, content, scale, and technical plan.
- **Chapter 4: Environmental and Social Baseline:** Describes the current environmental and social status of the project area.
- **Chapter 5: Environmental and Social Impact Assessment and Mitigation Measures:** Conducts a detailed assessment of environmental and social impacts and proposes corresponding mitigation measures.
- **Chapter 6: Alternative Analysis:** Compares different alternatives from an environmental and social impact perspective.

- **Chapter 7: Climate Change and Climate Adaptation Capacity Analysis.**
- **Chapter 8: Public Consultation and Information Disclosure:** Describes the public consultation and information disclosure activities carried out and their conclusions, as well as future stakeholder participation plans.
- **Chapter 9: Grievance Mechanism:** Includes grievance channels, methods, and responsible persons.
- **Chapter 10: Environmental and Social Management Plan:** Includes the setup of environmental and social management institutions and personnel responsibilities, specific measures and action plans, monitoring plans, training plans, etc.

2 Policy, Legal, and Administrative Framework

This report is prepared in accordance with the current applicable environmental and social laws and regulations of the People's Republic of China, local and departmental regulations of Henan Province and Xinxiang City, technical guidelines and specifications, and the requirements of the AIIB's "Environmental and Social Framework" (revised in 2023) and the "Environmental and Social Management Planning Framework" (ESMPF) disclosed in November 2021.

2.1 Applicable Environmental Laws, Departmental Regulations, and Policies

2.1.1 Applicable Environmental Laws

1. "Environmental Protection Law of the People's Republic of China" (effective January 1, 2015)
2. "Environmental Impact Assessment Law of the People's Republic of China" (revised December 29, 2018)
3. "Cleaner Production Promotion Law of the People's Republic of China" (effective July 1, 2012)
4. "Air Pollution Prevention and Control Law of the People's Republic of China" (revised October 26, 2018)
5. "Water Pollution Prevention and Control Law of the People's Republic of China" (revised June 27, 2017, effective January 1, 2018)
6. "Law of the People's Republic of China on Prevention and Control of Environmental Noise Pollution" (revised December 29, 2018)
7. "Solid Waste Pollution Environmental Prevention and Control Law of the People's Republic of China" (revised April 29, 2020)
8. "Soil Pollution Prevention and Control Law of the People's Republic of China" (effective August 31, 2018)
9. "Water and Soil Conservation Law of the People's Republic of China" (effective March 1, 2011)
10. "Forest Law of the People's Republic of China" (revised December 28, 2019)
11. "Wild Animal Protection Law of the People's Republic of China" (October 26, 2018)
12. "Cultural Relics Protection Law of the People's Republic of China" (revised November 5, 2017)

2.1.2 Applicable Environmental Regulations and Policies

1. "Regulations on Environmental Protection Management of Construction Projects" (State Council Order No. 682, revised July 16, 2017)
2. "Catalog of Classified Management of Environmental Impact Assessment of Construction Projects" (2021)
3. "Opinions on Further Strengthening Ecological Protection" (Environmental Development [2007] No. 37)
4. "Notice on Printing and Distributing the Interim Measures for the Review

and Management of Major Pollutant Discharge Total Control Indicators for Construction Projects" (Environmental Development [2014] No. 197)
5. "Notice on Further Strengthening Environmental Impact Assessment Management and Preventing Environmental Risks" (Ministry of Environmental Protection Environmental Development [2012] No. 77)
6. "Notice on Printing and Distributing the Guidelines for Delineating Ecological Protection Red Lines" (Environmental Development [2017] No. 48)
7. "Industrial Structure Adjustment Guidance Catalog" (2019 edition)
8. "Measures for Public Participation in Environmental Impact Assessment" (Ministry of Ecology and Environment Order No. 4)
9. "Regulations on Labor Protection in Workplaces with Toxic and Hazardous Substances" (2002)
10. "Environmental Protection Regulations for Construction Projects in Henan Province" (March 29, 2016)
11. "Water Pollution Prevention and Control Regulations of Henan Province" (October 1, 2019)
12. "Air Pollution Prevention and Control Regulations of Henan Province" (March 1, 2018)
13. "Solid Waste Pollution Environmental Prevention and Control Regulations of Henan Province" (January 1, 2012)
14. "Notice on Printing and Distributing the Implementation Plan for the Campaign to Combat Air, Water, and Soil Pollution and Agricultural and Rural Pollution Control in Henan Province in 2021" (Yu Environmental Development [2021] No. 20)
15. "Interim Regulations on Major Administrative Decision-Making Procedures" (2019)

2.1.3 Environmental Impact Assessment Technical Guidelines

1. "Technical Guidelines for Environmental Impact Assessment—General Principles" (HJ2.1-2016)
2. "Technical Guidelines for Environmental Impact Assessment—Atmospheric Environment" (HJ2.2-2018)
3. "Technical Guidelines for Environmental Impact Assessment—Surface Water Environment" (HJ2.3-2018)
4. "Technical Guidelines for Environmental Impact Assessment—Acoustic Environment" (HJ2.4-2009)
5. "Technical Guidelines for Environmental Impact Assessment—Groundwater Environment" (HJ 610-2016)
6. "Technical Guidelines for Environmental Impact Assessment—Ecological Impact" (HJ19-2011)
7. "Technical Guidelines for Environmental Impact Assessment—Soil Environment (Trial)" (HJ964-2018)
8. "Technical Guidelines for Environmental Risk Assessment of Construction Projects" (HJ/T169-2018)
9. "Notice on Printing and Distributing the Outline for the Preparation of Social Stability Risk Analysis and Evaluation Reports for Major Fixed Asset Investment Projects" (Development and Reform Office Investment [2013] No.

428)

According to the "Catalog of Classified Management of Environmental Impact Assessment of Construction Projects" (2021), the proposed stormwater pump station for this project falls under Category 127 of Water Conservancy Projects: Flood Control and Drainage Projects, requiring the preparation of an Environmental Impact Registration Form. The Hongli Avenue East Mengjiangnv River Stormwater Pump Station Catchment Area Construction Project, which includes Station Front Street, Station Front Third Street, Station Front Fifth Street, Station Front Seventh Street, Yantun Drainage Bridge, and Hongli Avenue Station Front Drainage Bridge, falls under Category 131 of Transportation and Pipeline Transportation: Urban Roads, requiring the preparation of an Environmental Impact Assessment Report. The rainwater and sewage pipeline network falls under Category 146: Urban (Town) Pipeline Network and Pipeline Corridor Construction, requiring the preparation of an Environmental Impact Registration Form.

2.2 Applicable Social Laws and Departmental Regulations and Policies

2.2.1 Applicable Social Laws

1. "Labor Law of the People's Republic of China" (revised 2018)
2. "Labor Contract Law of the People's Republic of China" (revised 2012)
3. "Trade Union Law of the People's Republic of China" (2021)
4. "Occupational Disease Prevention and Control Law of the People's Republic of China" (revised 2018)
5. "Law of the People's Republic of China on the Protection of Women's Rights and Interests" (revised 2018)
6. "Special Provisions on Labor Protection of Female Workers" (2012)
7. "Land Administration Law of the People's Republic of China" (revised 2020)
8. "Urban Real Estate Administration Law of the People's Republic of China" (revised 2019)
9. "Regulations on the Implementation of the Land Administration Law of the People's Republic of China" (revised 2021)

2.2.2 Applicable Social Regulations and Policies

1. "Opinions on Strengthening the Social Stability Risk Assessment Mechanism for Major Decision-Making in the New Situation" (2021)
2. "Notice on Printing and Distributing the Interim Measures for Social Stability Risk Assessment of Major Fixed Asset Investment Projects by the National Development and Reform Commission" (Development and Reform Investment [2012] No. 2492)
3. "Notice on Printing and Distributing the Outline for the Preparation of

Social Stability Risk Analysis and Evaluation Reports for Major Fixed Asset Investment Projects" (Development and Reform Office Investment [2013] No. 428)

4. "Notice of the General Office of the Henan Provincial Party Committee and the Provincial Government on Deepening the Work of Social Stability Risk Assessment" (Yu Office [2010] No. 14)

5. "Opinions of the Henan Provincial Committee of the Communist Party of China and the Henan Provincial People's Government on Conducting Petition Evaluation of Major Decision-Making Matters Involving the Interests of the People" (2007)

6. "Notice of the General Office of the Henan Provincial People's Government on Regulating the Distribution and Use of Compensation Fees for the Expropriation of Collective-Owned Land by Farmers" (Yu Government Office [2006] No. 50)

7. "Notice of the Henan Provincial People's Government on the Implementation of the Comprehensive Land Price Standard for Expropriated Areas in Henan Province" (Yu Government [2016] No. 48)

8. "Notice of the Henan Provincial People's Government on the Implementation of the Regulations on the Expropriation and Compensation of Houses on State-Owned Land" (Yu Government [2012] No. 39)

9. "Opinions of the Henan Provincial Department of Human Resources and Social Security, the Henan Provincial Department of Finance, and the Henan Provincial Department of Natural Resources on the Implementation of Subsidies for Farmers Whose Land is Expropriated to Participate in Basic Pension Insurance" (Yu Human Resources and Social Security [2019] No. 1)

10. "Notice of the Henan Provincial People's Government on Issues Related to the Comprehensive Land Price for Expropriated Agricultural Areas" (Yu Government [2020] No. 16)

11. "Notice of the Henan Provincial Department of Human Resources and Social Security on the Minimum Standards for Social Security Expenses for Farmers Whose Land is Expropriated in 2021" (Yu Human Resources and Social Security Office [2021] No. 49)

12. "Notice of the General Office of the Henan Provincial People's Government on Printing and Distributing Several Policy Measures for Accelerating the Post-Disaster Recovery and Development of the Service Industry in Henan Province" (Yu Government Office [2021] No. 64)

13. "Notice of the General Office of the Henan Provincial People's Government on Printing and Distributing the Emergency Plan for Natural Disaster Relief in Henan Province" (Yu Government Office [2016] No. 201)

14. "Labor Security Supervision Regulations" by the State Council (2004)

15. "Notice on Printing and Distributing the Special Labor Protection System for Female Workers in the Workplace" by the General Office of the Ministry of Human Resources and Social Security and six other departments (Ministry of Human Resources and Social Security Office [2023] No. 8)

16. "Notice on Printing and Distributing the Elimination of Sexual Harassment in the Workplace System" by the General Office of the Ministry of Human Resources and Social Security and six other departments (Ministry of Human Resources and Social Security Office [2023] No. 8)

17. "Implementation Details of the Prohibition of Child Labor in Henan Province" (Yu Government Document [1994] No. 241)
18. "Notice of the Henan Provincial People's Government on Printing and Distributing the Implementation Measures for the Work Injury Insurance Regulations in Henan Province" (Yu Government [2003] No. 54)
19. "Special Provisions on Labor Protection of Female Workers in Henan Province" (Provincial Government Order No. 186)

2.2.3 AIIB Environmental and Social Management Requirements

Since this project accepts AIIB investment, the AIIB's Environmental and Social Framework (ESF) will apply to this project. Its key elements are as follows:

- **Environmental and Social Policy (ESP), Environmental and Social Standards (ESS), and Environmental and Social Exclusion List:** ESP specifies the mandatory requirements for identifying, assessing, and managing environmental and social risks and impacts related to projects supported by the AIIB and its clients.
- **Environmental and Social Standard 1 (ESS 1):** Aims to ensure the environmental and social soundness and sustainability of projects and integrate environmental and social factors into the project decision-making process and implementation. If a project may have adverse environmental risks and impacts or social risks and impacts (or both), ESS 1 applies. The scope of environmental and social assessment and management measures is proportionate to the project's risks and impacts. ESS1 provides high-quality environmental and social assessment and risk and impact management through effective mitigation and monitoring measures during project implementation. ESS1 specifies the detailed requirements for environmental and social assessments that must be conducted for any AIIB-funded project.
- **Environmental and Social Standard 2 (ESS 2):** If the project's screening process shows that it involves involuntary resettlement (including recent or foreseeable involuntary resettlement directly related to the project), ESS 2 applies. Involuntary resettlement includes physical displacement (relocation, loss of residential land, or loss of housing) and economic displacement (loss of land or access to land and natural resources; loss of assets or access to assets, income sources, or livelihoods) caused by (a) involuntary acquisition of land or (b) involuntary restrictions on land use or access to legally designated parks and protected areas. It covers such displacement, whether full or partial, permanent or temporary. ESS2 specifies the detailed requirements for projects involving involuntary resettlement.
- **Environmental and Social Standard 3 (ESS 3):** If indigenous peoples (ethnic minorities) are present in the proposed project area or have collective attachment to the area and may be affected by the project, ESS3 applies.

For this project, the applicable AIIB "Environmental and Social Policy (ESP)" includes: "Environmental and Social Assessment and Management Policy" under "Environmental and Social Standard 1—Environmental and Social Risks and Impacts (ESS1)", as well as "Land Acquisition and Involuntary Resettlement (ESS2)"

and the "Environmental and Social Exclusion List (ESEL)." Through discussions and interviews with the Xinxiang Ethnic and Religious Affairs Bureau and a review of demographic data, it was found that there are no ethnic minority communities in the project area, only a few dispersed ethnic minority populations who have moved to Xinxiang due to marriage or work. Therefore, the ESS3 standard on "Indigenous Peoples" does not apply to this project.

2.3 Environmental Impact Assessment Standards

(1) Air Quality

The "Ambient Air Quality Standards" (GB 3095-2012) classifies air quality into two categories. Class 1 standards apply to special areas such as nature reserves and environmentally sensitive regions, while Class 2 standards apply to all other areas, including urban and industrial zones. The location of this subproject falls under the Class 2 ambient air quality functional area. The WHO "Global Air Quality Guidelines" provide global guidance on the thresholds and limits of key air pollutants that pose health risks. In addition to guideline values, the WHO "Global Air Quality Guidelines" also specify interim targets aimed at promoting a gradual transition from high to low concentrations. Table 2-1 compares the Class II standards of "Ambient Air Quality Standards" (GB 3095-2012) with the WHO standards.

The 24-hour SO_2 Class II standard limit (0.15 mg/m³) is higher than the upper limit of the World Bank Group interim standard (0.125 mg/m³), while the 24-hour PM10 (0.15 mg/m³) and PM2.5 (0.075 mg/m³), annual average NO_2 (0.04 mg/m³), and PM2.5 (0.035 mg/m³) are the same as the upper limit of the WHO interim standards. Overall, Chinese standards are highly equivalent to the WHO guidelines or interim target values; therefore, this subproject adopts the Class II standards of "Ambient Air Quality Standards" (GB3095-2012).

Table 2- 1 Comparison of China's GB 3095-2012 with WHO Global Air Quality Guidelines

(Unit: mg/m³)

Item	Time Period	GB 3095-2012 Class II	WHO Global Air Quality Guidelines
			Interim Target
1 SO_2	1 Year	0.06	N/A
	24 Hours	0.15	0.05-0.125
	1 Hour	0.50	N/A
2. PM10	1 Year	0.07	0.02-0.07
	24 Hours	0.15	0.05-0.15
3. PM2.5	1 Year	0.035	0.01-0.035
	24 Hours	0.075	0.025-0.075
	1 Hour	N/A	N/A

Item	Time Period	GB 3095-2012 Class II	WHO Global Air Quality Guidelines
4. NO_2	1 Year	0.04	0.02-0.04
	24 Hours	0.08	0.05-0.12
	1 Hour	0.20	N/A
5. CO	24 Hours	4.0	7.0
	1 Hour	10.0	N/A
6. O_3	Daily Maximum 8 Hours	0.16	0.12-0.16
	1 Hour	0.20	N/A

Source: WHO "Global Air Quality Guidelines (2021)" and "PRC GB 3095-2012"

During the construction period, emissions of asphalt fume and dust will follow the secondary standard of the "Comprehensive Emission Standard of Air Pollutants" (GB16297-1996).

Table 2-2 Comprehensive Emission Standard of Air Pollutants

Pollutant	Unorganized Emission Monitoring Concentration Limit (mg/m³)
Particulates	1.0
Nitrogen Oxides	0.12
Asphalt Fume	Production equipment should not have obvious unorganized emissions

Source: GB3095-2012

The operation and maintenance of the pump station should comply with the current national standard "Emission Standard for Odor Pollutants" (GB 14554-93) Class II standards (applicable to commercial areas, industrial mixed areas, urban areas, and town residential areas, etc.): H_2S concentration limit at the factory boundary is 0.06 mg/m³, and the odor limit is 20.

(2) Noise Environment

The "Environmental Noise Standards" (GB 3096-2008) classifies five functional zones based on their tolerance to noise pollution, ranging from Level 0 to Level 4. Level 0 applies to areas requiring extreme quiet, such as rehabilitation and convalescence zones, thus having the strictest day and night noise standards. Level 1 applies to areas mainly used for residential purposes, hospitals and clinics, educational institutions, and research centers. Level 2 applies to areas with mixed residential and commercial functions. Level 3 applies to areas where industrial production and storage logistics are the primary functions. Level 4 applies to areas adjacent to major roads and highways, and is subdivided into 4a and 4b, with the former applicable to road traffic noise and the latter to railway noise.

According to the "Technical Specifications for Environmental Noise Functional Zoning" (GB/T15190-2014) and the "Environmental Noise Quality Standard" (GB3096-2008), within the evaluation area, the 35m range on both sides of the road red line implements the 4a standard of the "Environmental Noise Quality Standard"

(GB3096-2008), the residential area outside the 35m range implements the Level 1 standard, and the mixed residential-commercial area implements the Level 2 standard.

Comparing the standards for each functional zone with the World Bank Group's EHS guidelines, the World Bank Group has lower noise limits for residential, commercial, and industrial mixed areas but higher limits for night-time noise in industrial zones and areas near main roads. For this subproject, the Level 2 standards are suitable for rural areas and residential communities in China. However, these are not as strict as the World Bank Group's EHS standards. Therefore, this project's area beyond the 35m range of the road red line will follow the World Bank Group's EHS standards, and within the 35m range, it will follow the 4a standards.

Table 2-3 Environmental Noise Quality Standards (Equivalent Sound Level: LAeq: dB)

Noise Functional Zone Category	Applicable Area	GB 3096-2008	World Bank Group Environment, Health, Safety Standards
		Day	Night
0	Areas requiring extreme quiet, such as convalescence zones	50	40
1	Areas mainly used for residential, educational, and research purposes	55	45
2	Residential, commercial, and industrial mixed areas	60	50
3	Industrial areas	65	55
4a	Areas on both sides of urban road main lines	70	55

EHS = Environment, Health, and Safety.
Source: WHO Noise Quality Guidelines (1999) in the International Finance Corporation's "Environmental, Health, and Safety Guidelines" (2007) and China's GB3096-2008.

During the construction period, noise emissions shall comply with the "Standard for Noise Emission on the Boundary of Construction Site" (GB 12523-2011).

Table 2-4 Noise Limits for Construction Activities (Unit: Leq [dB (A)])

Period	Main Noise Source	Noise Limit
		Day
Construction	Bulldozers, excavators, and loaders; pile drivers; concrete mixers, vibrators, and power saws; lifts	70

Source: GB 12348-2008

During operation, the noise of the pump station's boundary shall comply with Class 1 standards of the "Standard for Noise Emission at Boundary of Industrial Enterprises" (GB12348-2008): Daytime 55 dB (A), nighttime 45 dB (A).

(3) Sewage Discharge

The applicable standard for sewage discharge at construction sites is the "Integrated Wastewater Discharge Standard" (GB 8978-1996). The first level standard applies to discharges into Class III water bodies. The second level standard applies to discharges into Class IV and V water bodies. The third level standard applies to discharges into municipal sewers that enter municipal sewage treatment plants for secondary treatment. This subproject does not set up a construction camp but rents local residents' houses. Domestic sewage during construction relies on existing municipal sewage treatment facilities and is discharged into the municipal sewage network, following the third level standard for construction site sewage discharge.

Table 2- 5 Integrated Wastewater Discharge Standards

Parameter	Level 1	Level 2	Level 3
	For discharge into Class III water bodies	For discharge into Class IV and V water bodies	For discharge into municipal sewers
pH	6–9		
SS (mg/L)	70	150	400
BOD_5 (mg/L)	20	30	300
COD (mg/L)	100	150	500
Volatile Phenols (mg/L)	0.5	0.5	2.0
NH_3-N (mg/L)	15	25	---
LAS (= Anionic Surfactant) (mg/L)	5.0	10	

Source: GB 8978-1996

3 Project Description

According to the "Xinxiang City Waterlogging Risk Assessment Report" (September 2022) and the waterlogging situation during the flood season, there are approximately 38 flood-prone points in the main urban area of Xinxiang City. After the heavy rain on July 21, 2021, the city government increased efforts to construct urban drainage and flood prevention infrastructure. This included the construction of eight new stormwater pump stations, such as the Xin Extension Road East Meng River, and upgrading three stormwater pump stations, including the Pingyuan Road Jingguang-Ao Interchange. It also involved building around 40 kilometers of rainwater pipelines, including those on Dongming Avenue, and implementing the reconstruction of municipal infrastructure in the urban area of Xinxiang City. These measures essentially eliminated 16 flood-prone points in the main urban area. The remaining flood-prone points are mainly concentrated in the catchment areas of the Yinmankou, Xiangyang, and Hongli Avenue East Mengjiangnv River stormwater pump stations. This project, through the AIIB loan application for the "Henan Province, including Zhengzhou, Heavy Rain Flood Disaster Recovery and Reconstruction Project – Xinxiang City Urban Drainage Capacity Enhancement Subproject," aims to systematically resolve the remaining flood-prone points in the main urban area.

This project includes three components (subprojects/works): the Yinmankou Stormwater Pump Station Catchment Area Renovation Project, the Xiangyang Stormwater Pump Station Catchment Area Renovation Project, and the Hongli Avenue East Mengjiangnv River Stormwater Pump Station Catchment Area Construction Project. The total investment of this subproject is 1.2065153 billion yuan, of which 800 million yuan is financed through the AIIB loan, and the construction period is 2 years.

Table 3-1 Key information of the three components[1]

No.	Subproject	PIIU	Construction Content	Land Acquisition Situation
1	Yinmankou Stormwater Pump Station Catchment Area Project	Xinxiang City Urban Management Bureau	Construct 9.16 kilometers of rainwater main pipeline network and supporting sewage network (8.56 kilometers of sewage main pipeline), cleaning of inclined ditches (3.96 kilometers of ditch desilting), as well as corresponding road reconstruction, lighting, and landscaping.	The rainwater pipeline network and supporting sewage, roads, etc., are all constructed through open excavation on existing roads (mainly on main lanes), resulting in road closures. This does not involve land acquisition and demolition but does involve temporary travel impacts. The existing road width generally ranges from 20 meters to 45 meters, and the road grade is urban branch road. In conjunction with the drainage pipeline

[1] Updated based on the preliminary design, August 2024

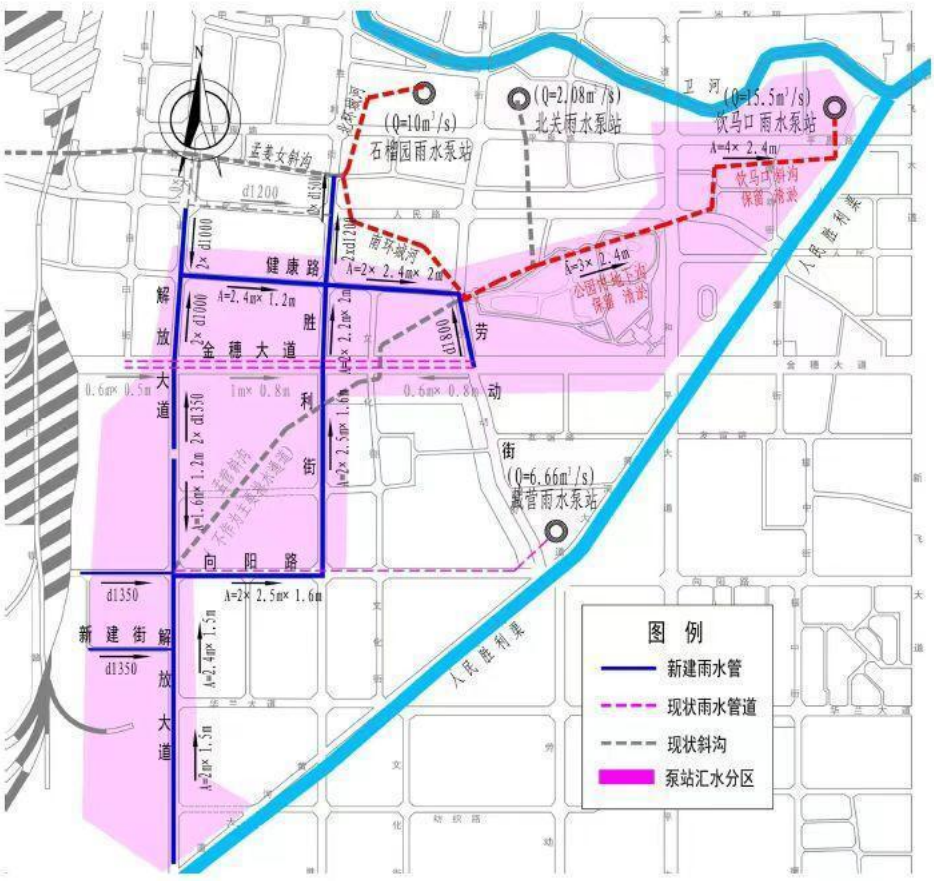
				construction, the entire pavement of the motor vehicle road on this road will be demolished and rebuilt.
2	Xiangyang Stormwater Pump Station Catchment Area Renovation Project	Xinxiang City Urban Management Bureau	Renovation and expansion of Xiangyang Stormwater Pump Station and its inlet main channel (upgrading and reconstruction of an 18 m³/s pump station and a 150-meter inlet box culvert), drainage (flood prevention) pipeline upgrading and renovation project (constructing 5.5 kilometers of rainwater pipeline network and 5.2 kilometers of sewage pipeline network), and upgrading and renovation of supporting projects such as roads, lighting, and landscaping.	The Xiangyang Stormwater Pump Station is upgraded and rebuilt within its original scope, adding to the existing structure on the original site, occupying approximately 3.06 mu of existing state-owned land. Therefore, it does not involve new permanent acquisition of collective land. The remaining rainwater pipeline network and supporting sewage, roads, etc., are all constructed through open excavation on existing roads (mainly on main lanes), without involving permanent land acquisition and demolition impacts.
3	Hongli Avenue East Mengjiangnv River Stormwater Pump Station Catchment Area Construction Project	Xinxiang Housing and Urban-Rural Development Bureau	Construct 4.5 kilometers of rainwater pipeline network, 1 stormwater pump station (scale 20 m³/s), 2.0 kilometers of sewage pipeline network, 2 small bridges (20-meter single-span simply supported beam bridge on Yantun Drainage Bridge on Zhanqian First Street and 13-meter double-span simply supported beam bridge on Hongli Avenue Zhanqian Drainage Bridge), and supporting road projects.	The new stormwater pump station is located in the 4th group of Nie Village, Heping Street Office, covering approximately 7.1 mu of land, which is currently general arable land. The land acquisition affects 2 households with 12 people and does not involve vulnerable groups (low-income households, lonely elderly, single mothers, and disabled individuals, etc.). The remaining rainwater pipeline network and supporting sewage and road projects are new constructions, occupying about 169 mu of previously acquired state-owned land, without involving resettlement impacts. The road land acquisition for the project was completed at different times between 2012 and 2018, and no residual issues have been found so far.

3.1 Yinmankou Stormwater Pump Station Catchment Area

According to the preliminary design document (August 2024), the Yinmankou Stormwater Pump Station catchment area is located on the right bank of the Wei River and on the west side of the People's Victory Canal. The catchment area is enclosed by the Wei River, Heping Avenue, Jiankang Road, Jiefang Avenue, Xiangyang Road, Shengli Street, Jinsui Avenue, and the People's Victory Canal, covering an area of about 3.6 square kilometers with a flow rate of 13 m³/s. Through

scientific scheduling and precise pumping between the Shiliuyuan Stormwater Pump Station in the old city and the Beiguan Stormwater Pump Station, it can meet the stormwater discharge demand during a three-year recurrence interval storm.

According to the three-year recurrence interval standard, the project involves an overall system renovation of the main, secondary, and branch pipes in the Yinmankou Stormwater Pump Station area (catchment area of 3.6 km²). It primarily involves constructing double-barrel box culverts measuring 2.5m×1.6m, 2.2m×2m, and 2.4m×2m along Xiangyang Road, Shengli Road, and Jiankang Road to collect rainwater in the area. This water will be discharged into the Yinmankou Stormwater Pump Station through the park underground ditch and Yinmankou inclined ditch, and then finally pumped into the Wei River. The project also includes upgrades to the roads, sewage, landscaping, and lighting along the reconstructed sections and the simultaneous improvement of the sewage on Jinsui Avenue (Labor Road to Heping Avenue), as well as desilting the inclined ditch within the Yinmankou Stormwater Pump Station catchment area.



饮马口雨水泵站汇水区域雨水改造方案

Source: Preliminary Design General Description, August 2024

Figure 3-1 Yinmakou storwater catchment renovation plan

3.1.1 Drainage (Flood Prevention) Pipe and Sewer Network Upgrading and Reconstruction

1. Jiefang Avenue (Renmin Road to Jiefang South Bridge): Construct new rainwater box culverts measuring 2m×1.5m, 2.4m×1.5m, and 1.6m×1.2m, and rainwater pipes ranging from d1000 to d1350, with a total length of 3,896 meters. Construct new dn800 sewage pipes totaling 2,924 meters.
2. Xiangyang Road (Beijing-Guangzhou Railway to Shengli Street): Construct new double-barrel rainwater box culverts measuring 2.5m×1.6m and rainwater pipes ranging from d1000 to d1350, with a total length of 986 meters. Construct new dn630 and dn800 sewage pipes totaling 990 meters.
3. Shengli Street (Xiangyang Road to Mengjiangnv River Inclined Ditch): Construct new double-barrel rainwater box culverts measuring 2.5m×1.6m and 2.2m×2m, and rainwater pipes of d1200 and d1500, with a total length of 2,326 meters. Construct new dn800 sewage pipes totaling 1,743 meters.
4. Jiankang Road (Jiefang Avenue to Laodong Street): Construct new single-barrel rainwater box culverts measuring 2.4m×1.2m and double-barrel rainwater box culverts measuring 2.4m×2m, with a total length of 1,232 meters. Construct new dn800 sewage pipes totaling 1,213 meters.
5. Laodong Street (Jinsui Avenue to Jiankang Road): Construct new double-barrel rainwater box culverts measuring 2.4m×2m and rainwater pipes of d1800, with a total length of 329 meters. Construct new dn800 sewage pipes totaling 306 meters.
6. Xinjian Street (Beijing-Guangzhou Railway to Jiefang Avenue): Construct new rainwater pipes ranging from d1000 to d1350, with a total length of 393 meters. Construct new dn630 sewage pipes totaling 391 meters.
7. Jinsui Avenue (Laodong Street to Heping Avenue): Construct new d1200 sewage pipes totaling 994 meters.

Considering the construction conditions and foundation bearing capacity of the Yinmankou Stormwater Pump Station catchment area renovation project, and taking into full account:

- Using locally available materials, which are easy to manufacture and in abundant supply;
- Considering not only the cost of the pipe material itself but also the construction costs and service life, as well as the application status of sewage and rainwater pipe materials in Xinxiang City;
- The constraints of the existing pipeline elevation;
- Accelerating the construction progress to avoid long-term impact on the lives of surrounding residents; the rainwater pipelines primarily use reinforced concrete box culverts, with some using reinforced concrete pipes. For sewage pipelines with an internal diameter d≤700mm, PVC-U double-layer axial hollow wall pipes are used. For sewage pipelines with an internal diameter d>700mm, reinforced concrete pipes are used.

The main construction methods for the pipelines are open excavation and pipe

jacking. Considering on-site construction conditions, geological conditions, project cost, and project progress, the rainwater and sewage pipelines on Jiefang Avenue (Xiangyang Road - Jiefang South Bridge) cross the railway at Hualan Avenue, requiring the rainwater box culverts to be replaced with rainwater pipes of the same flow rate, with mechanical pipe jacking used for the rainwater and sewage pipelines at this location. Except for the Jiefang Avenue (Xiangyang Road - Jiefang South Bridge) section crossing the railway using mechanical pipe jacking, the average burial depth of the other rainwater pipelines is about 3.5 meters. Considering the soil conditions in the urban area of Xinxiang City, the rainwater pipeline construction adopts slope excavation.

The new sewage pipeline on Jinsui Avenue (Laodong Street - Heping Avenue) has a burial depth exceeding 5 meters. To avoid extensive excavation of the road surface and minimize traffic impact, this section adopts mechanical pipe jacking for the new sewage pipeline. The sewage pipeline on Xiangyang Road (Jiefang Avenue - Shengli Street) is close to the existing rainwater pipeline, street lights, and roadside trees. To avoid excavation affecting the existing pipeline, this section adopts mechanical pipe jacking for the new sewage pipeline. At the same time, the sewage pipeline on Jiefang Avenue (Xiangyang Road - Jiefang South Bridge) crosses the railway at Hualan Avenue and also adopts mechanical pipe jacking. Except for the three sections mentioned above using mechanical pipe jacking, the average burial depth of the other sewage pipelines is about 3.5-4 meters. Considering the soil conditions in the urban area of Xinxiang City, the sewage pipeline construction adopts slope excavation.

8. Inclined Ditch Desilting: The underground ditch in People's Park and the Yinmankou inclined ditch are the main inflow channels of the Yinmankou Pump Station. The inclined ditches of the South Ring River and North Ring River are used for the interconnection between the Yinmankou Stormwater Pump Station, Shiliuyuan Stormwater Pump Station, and Beiguan Stormwater Pump Station. To ensure that the inflow channel cross-section of the pump station meets the flow requirements, the underground ditch in People's Park, the Yinmankou inclined ditch, the South Ring River inclined ditch, and the North Ring River inclined ditch need to be desilted. High-pressure flushing vehicles will be used to flush the pipelines, discharging the sludge in the upstream pipes into the downstream inspection wells, and then using specialized sludge suction vehicles to extract and transport it to the sludge disposal site designated by the construction unit (Xinxiang City Urban Pipe Network Sludge Solidification Field) for treatment.

   - The underground ditch in People's Park is located within the park, with a total length of about 1.036 km and cross-sectional dimensions of 3m×2.4m. The sediment depth in the underground ditch is about 1.4 meters, with a sediment volume of 4,320.12 m³.
   - The Yinmankou inclined ditch starts at the Environmental Protection Bureau at the People's Road intersection and ends at the end of the culvert on Pingyuan Road, with a total length of about 1.008 km and cross-sectional dimensions of 4m×2.4m. The sediment depth in the inclined ditch is about 1.5

meters, with a sediment volume of 6,067.62 m³.

- The South Ring River inclined ditch starts at West Street and ends at the west gate of People's Park, with a total length of about 1.0 km and cross-sectional dimensions of 5m×3.1m. The sediment depth in the underground ditch is about 1 meter, with a sediment volume of 5,032.3 m³.
- The North Ring River inclined ditch starts at West Street and ends at the Shiliuyuan Stormwater Pump Station, with a total length of about 0.916 km and cross-sectional dimensions of 5m×3.1m. The sediment depth in the underground ditch is about 1 meter, with a sediment volume of 4,580 m³.

3.1.2 Road, Lighting, Landscaping, and Other Supporting Projects Upgrading and Reconstruction

Upgrading and reconstructing roads, lighting, and landscaping for roads such as Jiefang Avenue (Renmin Road to Jiefang South Bridge), Xiangyang Road (Beijing-Guangzhou Railway to Shengli Street), Shengli Street (Xiangyang Road to Mengjiangnv River Inclined Ditch), Jiankang Road (Jiefang Avenue to Laodong Street), Laodong Street (Jinsui Avenue to Jiankang Road), and Xinjian Street (Beijing-Guangzhou Railway to Jiefang Avenue). The specific content is shown in the following table.

Table 3-2 Supporting facilities for Yinmankou Catchment Area Renovation - Road, Lighting, and Landscaping

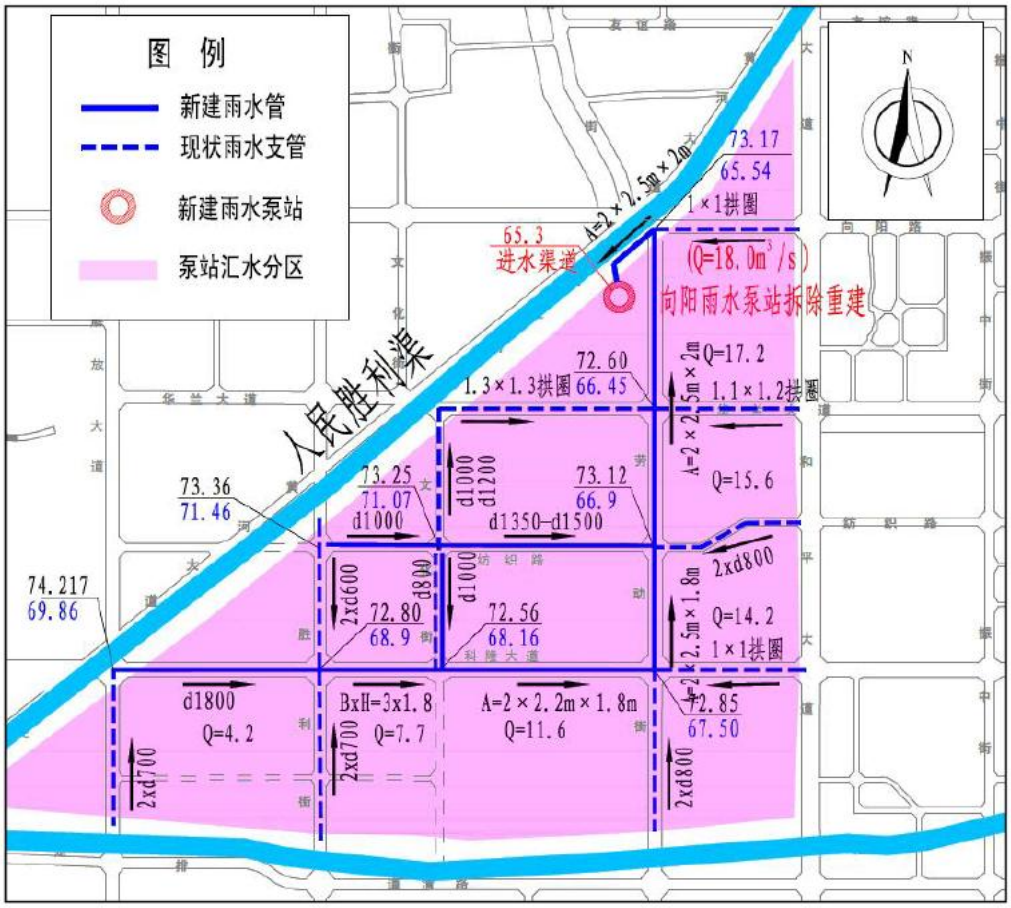
No.	Content	Unit	Scale
1	Jiefang Avenue (Renmin Road to Jiefang South Bridge)		
	Road Length	m	3017
	Red Line Width	m	40, 45
	Tree Grates	sets	1416
	Ligustrum lucidum	plants	751
2	Xiangyang Road (Beijing-Guangzhou Railway to Shengli Street)		
	Road Length	m	1049
	Red Line Width	m	20, 45
	Street Lights	sets	52
	Pre-embedded Traffic Safety Pipes	m	1870
	Tree Grates	sets	283
	Greening Isolation Belt Restoration and Improvement	㎡	4202
3	Shengli Street (Xiangyang Road to Mengjiangnv River Inclined Ditch)		
	Road Length	m	1783
	Red Line Width	m	40
	Street Lights	sets	128
	Lighting Cable	m	4800

No.	Content	Unit	Scale
	Greening Isolation Belt Restoration and Improvement	㎡	7319
4	Jiankang Road (Jiefang Avenue to Laodong Street)		
	Road Length	m	1252
	Red Line Width	m	26
	Street Lights	sets	92
	Pre-embedded Traffic Safety Pipes	m	2740
	Tree Grates	sets	333
5	Laodong Street (Jinsui Avenue to Jiankang Road)		
	Road Length	m	322
	Red Line Width	m	45
	Street Lights	sets	19
	Lighting Cable	m	670
	Greening Isolation Belt Restoration and Improvement	㎡	1212
6	Xinjian Street (Beijing-Guangzhou Railway to Jiefang Avenue)		
	Road Length	m	406
	Red Line Width	m	20

Source: Preliminary Design General Description, August 2024

3.2 Xiangyang Stormwater Pump Station Catchment Area Renovation Project

Facilities such as Kelong Avenue and Laodong Road in the Xiangyang Stormwater Pump Station area were constructed in the early 1980s. Not only do they have low defense standards, but they have also basically reached the end of their service life, and some areas have collapsed. Therefore, the renovation and upgrading work is urgent. The Xiangyang Stormwater Pump Station Catchment Area Renovation Project follows the principle of "combining main and branch channels for systematic management" and mainly includes three components: renovation and expansion of the Xiangyang Stormwater Pump Station and its main inlet channel (upgrading and reconstruction of an 18 m^3/s pump station and a 180-meter inlet box culvert), upgrading and reconstruction of drainage (flood prevention) pipelines (construction of about 5.8 kilometers of rainwater pipelines and 5.6 kilometers of sewage pipelines), and upgrading and reconstruction of supporting projects such as roads, lighting, and landscaping.



Source: Preliminary Design General Description, August 2024

Figure 3-2 Xiangyang Road Stormwater Pump Station Catchment Area Rainwater Renovation Plan

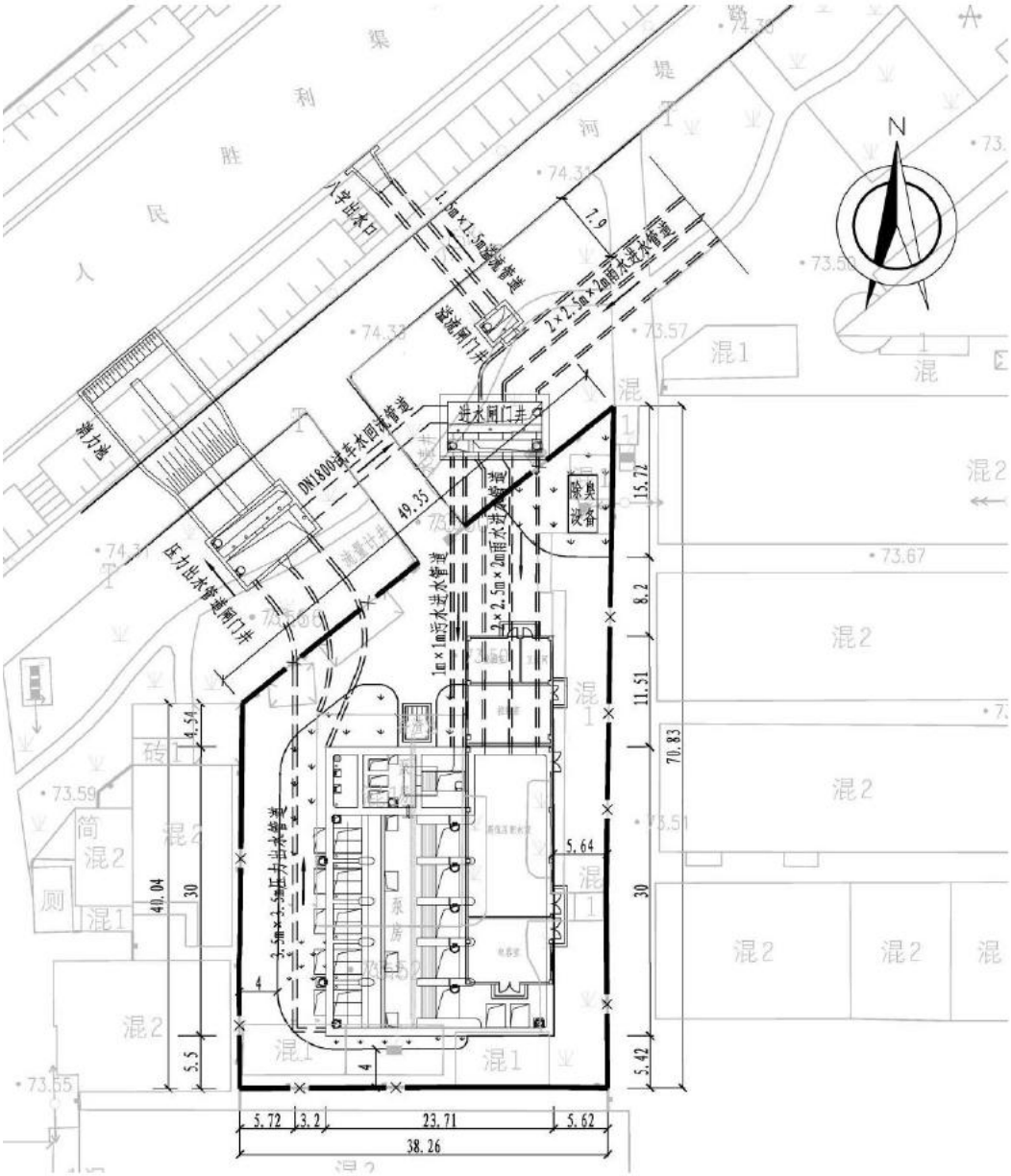
3.2.1 Renovation and Expansion of Xiangyang Stormwater Pump Station and Its Main Inlet Channel

The existing Xiangyang Stormwater Pump Station is located south of the People's Victory Canal and south of Xiangyang Road, covering an area of approximately 2,108.7 square meters. This project requires its demolition and reconstruction. Since the separation of urban sewage and rainwater in Xinxiang City is not complete, there is usually some domestic sewage in the rainwater pipes. To intercept dry season sewage and initial rainwater, this design includes the construction of a terminal interception/initial rainwater pump station on the north side of the rainwater pump room. The process of intercepting sewage during the dry season and initial rainwater is as follows: close the rainwater gate in the rainwater inlet gate well, open the sewage gate, allow the dry season sewage and initial rainwater to enter the sewage grille room through the sewage pipes where debris is intercepted, then diffuse into the sewage pump room collection pool. After being lifted by the submersible sewage

pump, the water enters the downstream existing sewage pipes and eventually flows into the Luotuowan Sewage Treatment Plant to prevent river pollution.

The site for the pump station is trapezoidal, 38.26 meters wide in the east-west direction, 40.04 meters long in the north-south direction on the west side, and 70.83 meters long on the east side. The planned pump station covers an area of 2,108.7 square meters (3.16 mu). Auxiliary structures (high and low voltage distribution room, capacitor room, control room, duty room, and toilet) are located on the eastern part of the station area and built on the pump station forebay with a building area of 668.8 square meters and a height of 4.5 meters. The pump station mainly includes the pump room and auxiliary rooms. The sewage and stormwater pump rooms are entirely underground, measuring 30 meters in length, 27.3 meters in width, and 12.6 meters in depth, with a total area of 819 square meters. The auxiliary room is a two-story building with one above ground and one underground floor. The north side of the pump station is adjacent to the southern bank embankment road of the People's Victory Canal, the east side is adjacent to an existing alley, and the west and south sides are existing buildings. Therefore, the southern embankment road of the People's Victory Canal is set as the main direction for traffic access. The perimeter of the pump station is surrounded by a brick wall, and the main road inside the station is 4 to 5.64 meters wide, meeting the requirements for fire fighting and equipment lifting and transportation. Greening is designed in the northeast corner, west side, and south side of the station area, with a greening area of 339 square meters.

The pump station's inlet channel is located on the right bank (south bank) of the People's Victory Canal, outside the embankment top road, and within the green belt. The channel's burial depth is about 8 meters, with the centerline of the box culvert 10.85 meters from the outer side of the embankment top road, a net distance of 7.9 meters from the embankment top road, and a net distance of 3 to 14.8 meters from the building on the south side. After being lifted by the water pump, rainwater enters the People's Victory Canal. The design selects 5 submersible mixed-flow pumps, each with a design flow rate of 3.6 m^3/s.



Source: Preliminary Design General Description, August 2024

Figure 3-3 Xiangyang Road Rainwater Pumping Station Layout

3.2.2 Drainage (Flood Control) Pipeline Standard Improvement and Sewage Network Renovation Project

1. Renovate the section of Laodong Street (Kelong Avenue to Xiangyang Road) with a dual-cell $2 \times 2.5m \times 1.8m$ rainwater box culvert and a dual-cell $2 \times 2.5m \times 2m$ rainwater box culvert, totaling approximately 1,282 meters. Upgrade the section of Laodong Street (Kelong Avenue to Zhaoding River) with a DN800 sewage pipeline of 2,282 meters.
2. Upgrade the section of Kelong Avenue (Jiefang Avenue to Heping Avenue)

with a D1800 rainwater pipeline, a single-cell 3m×1.8m box culvert, a dual-cell 2.2m × 1.8m box culvert, and a D1200 rainwater pipeline, totaling approximately 2,739 meters, along with a DN800 sewage pipeline of 2,152 meters.

3. Renovate the section of Fangzhi Road (Victory Street to Laodong Street) with D1000, D1350, and D1500 rainwater pipelines, totaling approximately 1,123 meters, and a DN800 sewage pipeline of 1,060 meters.

4. Upgrade the section of Wenhua Street (Fangzhi Road to Kelong Avenue) with a D1000 rainwater pipeline, totaling approximately 337 meters.

3.2.3 Road, Lighting, and Greening Upgrading Projects

Upgrade the road, lighting, and greening for four roads: Laodong Street (Kelong Avenue to Zhaoding River), Kelong Avenue (Jiefang Avenue to Heping Avenue), Fangzhi Road (Victory Street to Laodong Street), and Wenhua Street (Fangzhi Road to Kelong Avenue).

Table 3-3 Xiangyang Rainwater Pumping Station Catchment Area Road, Lighting, and Greening Supporting Project Contents

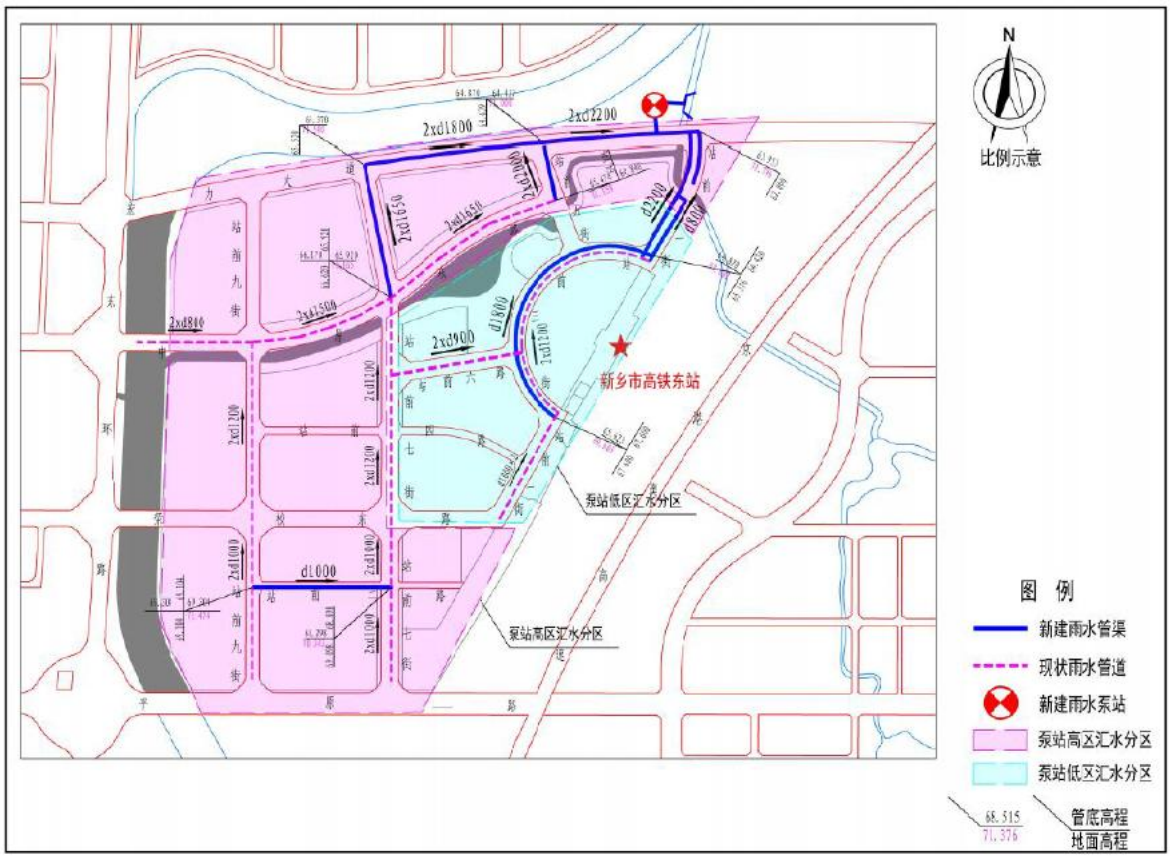
No.	Project Name	Unit	Scale
1	Laodong Street (Kelong Avenue to Zhaoding River)		
	Road Length	m	3016
	Red Line Width	m	45
	Streetlights	set	120
	Pre-embedded Traffic Safety Pipes	m	3958
2	Kelong Avenue (Jiefang Avenue to Heping Avenue)		
	Road Length	m	2228
	Red Line Width	m	45
	Streetlights	set	138
	Pre-embedded Traffic Safety Pipes	m	4228
	Isolation Belt	㎡	7485
	Exterior Green Isolation Belt Restoration and Improvement	㎡	18459
3	Fangzhi Road (Victory Street to Laodong Street)		
	Road Length	m	1067
	Red Line Width	m	26
	Streetlights	set	32
	Pre-embedded Traffic Safety Pipes	m	1089
	Green Isolation Belt Restoration and Improvement	㎡	626
4	Wenhua Street (Fangzhi Road to Kelong Avenue)		
	Road Length	m	392
	Red Line Width	m	26
	Streetlights	set	12
	Courtyard Lights	m	18

No.	Project Name	Unit	Scale
	Pre-embedded Traffic Safety Pipes	m	702

Source: Preliminary Design General Description, August 2024

3.3 Hongli Avenue East Mengjiangnv River Rainwater Pumping Station Catchment Area Construction Project

The Hongli Avenue East Mengjiangnv River Rainwater Pumping Station catchment area lacks primary and secondary rainwater mains and a rainwater pumping station, resulting in an incomplete rainwater pipeline system and poor drainage. Currently, drainage relies solely on a temporary rainwater pumping station located at the northwest corner of Station No. 5 and Station No. 3, with a limited capacity of 3 m³/s, which is insufficient for the drainage needs of the entire area. The main construction content of the Hongli Avenue East Mengjiangnv River Rainwater Pumping Station catchment area construction project includes building a 4.5 km rainwater pipeline network, constructing one rainwater pumping station with a capacity of 20 m³/s, building a 2 km sewage pipeline network, as well as roadworks (including two bridges), lighting, greening, and other supporting projects.



Source: Preliminary Design Description, August 2024

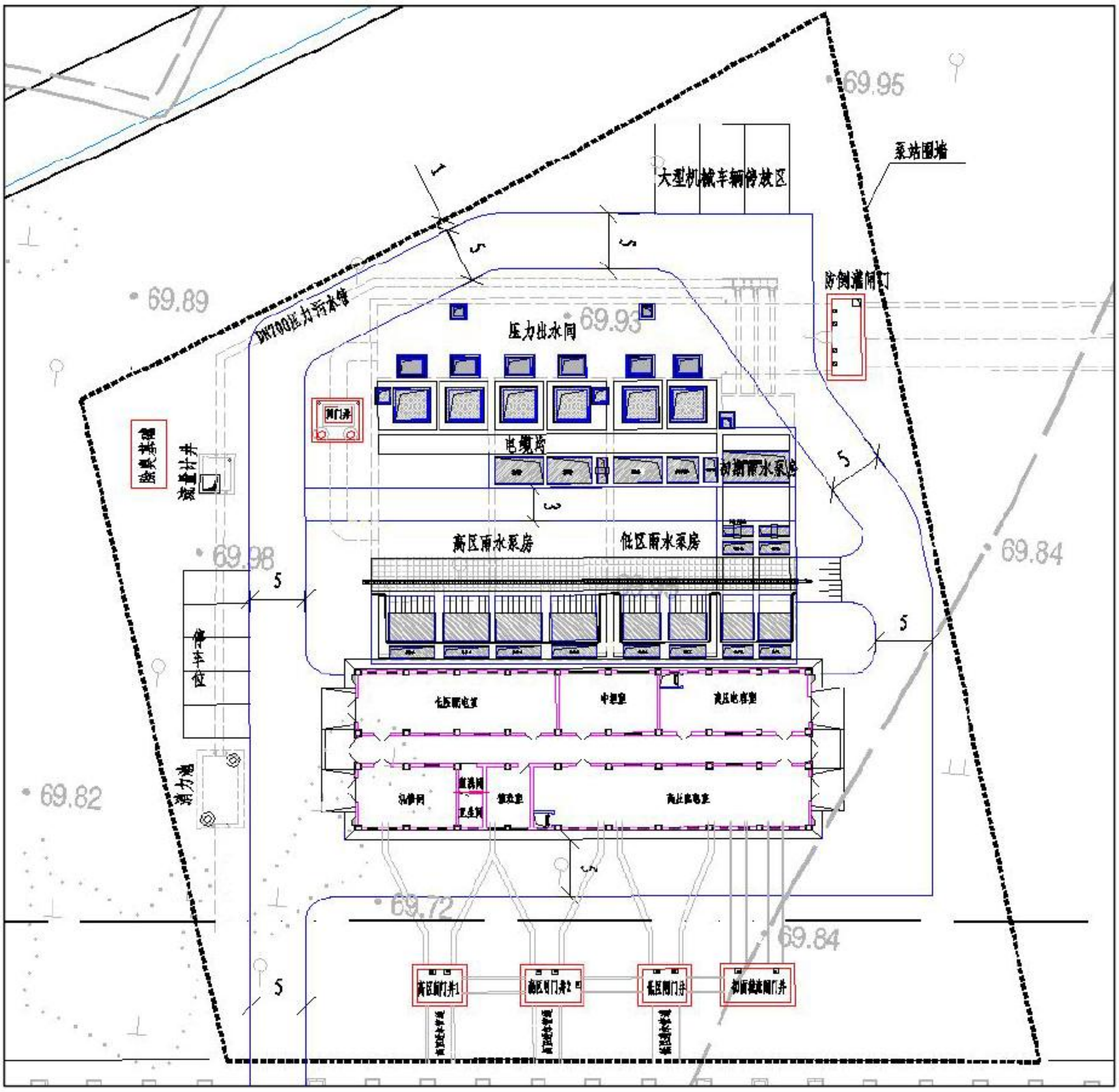
Figure 3-4 Hongli Avenue East Mengjiangnv River Rainwater Pumping Station Catchment Area Pipeline Network and Pump Station Construction Diagram

3.3.1 Hongli Avenue East Mengjiangnv River Rainwater Pump Station Project

The new rainwater pumping station includes the construction of various main buildings and structures such as the rainwater pump house with pump room, sewage pump house with pump room, high-voltage power distribution room, low-voltage power distribution room, capacitor room, central control room, office, and restroom.

The selected location for the pump station is in the fourth group of Nie Village under the combined street office, covering an area of about 7 mu. The current state of the land is general farmland, affecting 2 households comprising 12 people. The impact does not include vulnerable groups such as low-income households, solitary elderly, single mothers, and persons with disabilities.

The remaining parts of the project, including bridges, rainwater pipelines, and associated sewage and road engineering, involve new construction on approximately 169 mu of already acquired state-owned land. This does not involve any relocation impacts. The land acquisition for these sections was completed between 2012 and 2018, with no outstanding issues identified to date. Further details can be found in Chapter 5.



Source: Preliminary Design Description, August 2024

Figure 3- 5 Hongli Avenue East Mengjiangnv River Rainwater Pumping Station Layout

3.3.2 Rainwater Engineering

1. **Zhanqian Street One (Hongli Avenue to Zhanqian Street Three)**: The total road length is 388 meters. A new rainwater pipeline with a total length of 296 meters (main trunk) is constructed. The main rainwater pipe is made of reinforced concrete with a diameter ranging from D800 to D2200.
2. **Zhanqian Street Five (Hongli Avenue to Zhongyuan East Road)**: The total road length is 164 meters. A new rainwater pipeline with a total length of 124 meters is constructed. The main rainwater pipe is a D2000 reinforced concrete pipe.
3. **Zhanqian Street Seven (Hongli Avenue to Zhongyuan East Road)**: The total road length is 381 meters. A new rainwater pipeline with a total length of 652

meters (main trunk) is constructed. The main rainwater pipe is a D1650 reinforced concrete pipe.

4. **Zhanqian Road Two (Zhanqian Street Nine to Zhanqian Street Seven)**: The total road length is 392 meters. A new rainwater pipeline with a total length of 366 meters (main trunk) is constructed. The main rainwater pipe is a D1000 reinforced concrete pipe.

5. **Zhanqian Street Three (Zhanqian Street One to Zhanqian Street One)**: A D1800 reinforced concrete rainwater pipe is constructed, with a total length of 930 meters (main trunk).

6. **Hongli Avenue (Zhanqian Street Seven to Zhanqian Street One)**: The total road length is 948 meters. A new rainwater pipeline with a total length of 2,109 meters (main trunk) is constructed. The main rainwater pipe ranges from D1800 to D2200.

3.3.3 Sewage Engineering

1. **New Zhanqian Street One (Hongli Avenue to Zhanqian Street Three)**: The sewage pipeline has a total length of 165 meters (main trunk). The main sewage pipe is a DN630 PVC-U double-layer axial hollow wall pipe.

2. **New Zhanqian Street Five (Hongli Avenue to Zhongyuan East Road)**: The sewage pipeline has a total length of 62 meters (main trunk). The main sewage pipe is a D800 reinforced concrete pipe.

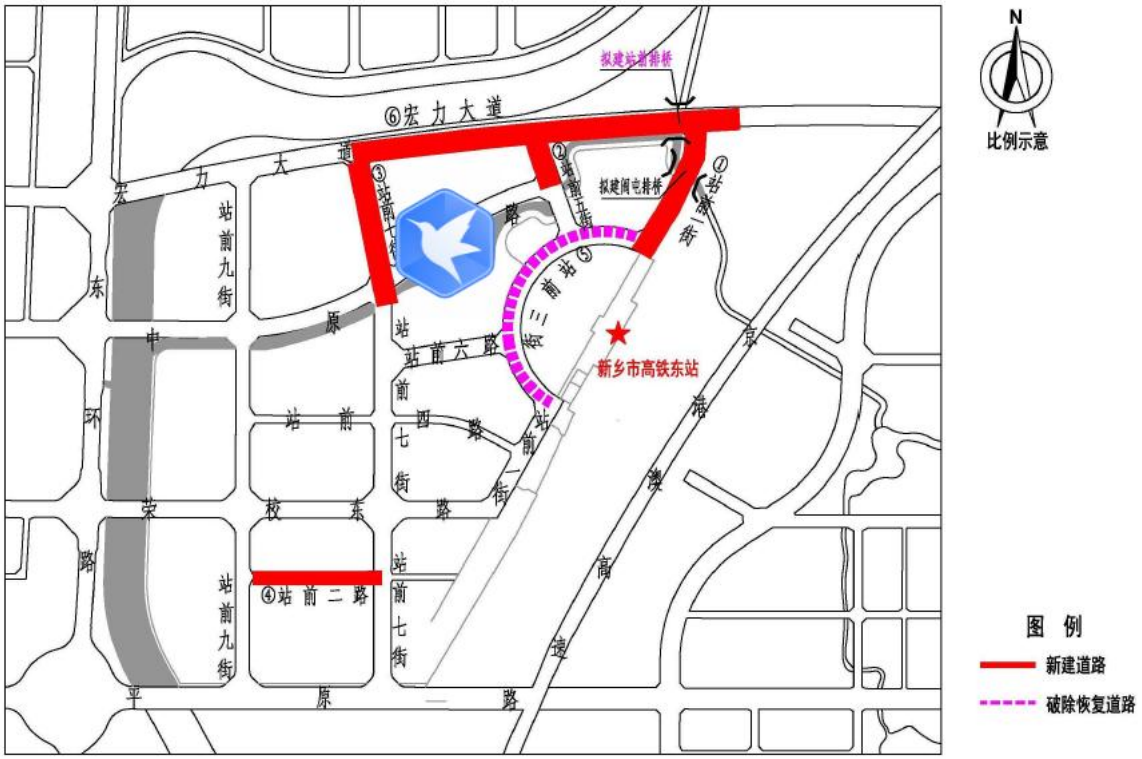
3. **New Zhanqian Street Seven (Hongli Avenue to Zhongyuan East Road)**: The sewage pipeline has a total length of 284 meters (main trunk). The main sewage pipe is a D800 reinforced concrete pipe.

4. **New Zhanqian Road Two (Zhanqian Street Nine to Zhanqian Street Seven)**: The sewage pipeline has a total length of 352 meters (main trunk). The main sewage pipe is a DN630 PVC-U double-layer axial hollow wall pipe.

5. **New Hongli Avenue (Zhanqian Street Seven to Zhanqian Street One)**: The sewage pipeline has a total length of 1,166 meters (main trunk). The main sewage pipe is a D800 reinforced concrete pipe.

3.3.4 Road Engineering

In conjunction with the construction of the Hongli Avenue East Mengjiangnv River Rainwater Pumping Station catchment area, new roads within the area will be constructed and some existing roads will be restored in coordination with pipeline renovations. This project includes a total of 6 roads: Zhanqian Street One (Hongli Avenue to Zhanqian Street Three), Zhanqian Street Five (Hongli Avenue to Zhongyuan East Road), Zhanqian Street Seven (Hongli Avenue to Zhongyuan East Road), Zhanqian Road Two (Zhanqian Street Nine to Zhanqian Street Seven), Zhanqian Street Three, and Hongli Avenue (Zhanqian Street Seven to Zhanqian Street One).



Source: Preliminary Design Description, August 2024

Figure 3-6 Hongli Avenue East Mengjiangnv River Rainwater Pumping Station Catchment Area Road Engineering

1. **New Zhanqian Street One (Hongli Avenue to Zhanqian Street Three)**:
   - Total length: 387.84 meters.
   - Single carriageway with eight lanes, road width: 50 meters, classified as an urban secondary road.
   - Cross-section composition: 50m = 3m (pedestrian and non-motorized shared sidewalk) + 4m (non-motorized lane) + 3m (green isolation belt) + 30m (motor vehicle lane) + 3m (green isolation belt) + 4m (non-motorized lane) + 3m (pedestrian and non-motorized shared sidewalk).
2. **New Zhanqian Street Five (Hongli Avenue to Zhongyuan East Road)**:
   - Total length: 164.19 meters.
   - Three-lane carriageway with eight lanes, road width: 50 meters, classified as an urban secondary road.
   - Cross-section composition: 50m = 3m (pedestrian and non-motorized shared sidewalk) + 4m (non-motorized lane) + 3m (green isolation belt) + 30m (motor vehicle lane) + 3m (green isolation belt) + 4m (non-motorized lane) + 3m (pedestrian and non-motorized shared sidewalk).
3. **New Zhanqian Street Seven (Hongli Avenue to Zhongyuan East Road)**:
   - Total length: 381.44 meters.
   - Two-lane carriageway with six lanes, road width: 50 meters, classified as an urban secondary road.
   - Cross-section composition: 50m = 3m (pedestrian and non-motorized

shared sidewalk) + 5m (non-motorized lane) + 1.5m (green belt) + 11.5m (motor vehicle lane) + 8m (central isolation belt) + 11.5m (motor vehicle lane) + 1.5m (green belt) + 5m (non-motorized lane) + 3m (pedestrian and non-motorized shared sidewalk).

4. **New Zhanqian Road Two (Zhanqian Street Nine to Zhanqian Street Seven)**:
   - Total length: 391.16 meters.
   - Single carriageway with two lanes, road width: 16 meters, classified as an urban branch road.
   - Cross-section composition: 16m = 3m (sidewalk) + 10m (carriageway) + 3m (sidewalk).
5. **Zhanqian Street Three**:
   - Existing dual D1200 rainwater pipes; new D1800 rainwater pipe is being constructed due to insufficient capacity of the current pipes.
   - The new rainwater pipe is positioned under the west motor vehicle lane, 9.5 meters from the road centerline, using pipe jacking construction.
   - Road surface restoration is included as part of the pipe reconstruction.
6. **New Hongli Avenue (Zhanqian Street Seven to Zhanqian Street One)**:
   - Total length: 948.18 meters.
   - Two-lane carriageway with eight lanes, road width: 55 meters, with 12.5 meters of green belt on each side outside the road boundary.
   - Cross-section composition: 55m (red line) = 3m (pedestrian and non-motorized shared sidewalk) + 5m (non-motorized lane) + 2m (green isolation belt) + 15m (motor vehicle lane) + 5m (central isolation belt) + 15m (motor vehicle lane) + 2m (green isolation belt) + 5m (non-motorized lane) + 3m (pedestrian and non-motorized shared sidewalk).
   - Each side of the road outside the red line has a 12.5-meter green belt.

3.3.5 Power Cable Duct Engineering

1. **New Hongli Avenue (Zhanqian Street Seven to Zhanqian Street One)**: Power cable duct length approximately 1,060 meters.
2. **New Zhanqian Street One (Hongli Avenue to Zhanqian Street Three)**: Power cable duct length approximately 330 meters.
3. **New Zhanqian Street Five (Hongli Avenue to Zhongyuan East Road)**: Power cable duct length approximately 90 meters.
4. **New Zhanqian Street Seven (Hongli Avenue to Zhongyuan East Road)**: Power cable duct length approximately 340 meters.

3.3.6 Lighting Engineering

1. **Hongli Avenue (Zhanqian Street Seven to Zhanqian Street One)**: Installation of one new specialized lighting transformer, 93 integrated pole street lights, laying cables, and pipes approximately 3,450 meters.
2. **Zhanqian Street One (Hongli Avenue to Zhanqian Street Three)**: Installation of two sets of lighting distribution boxes, 24 integrated pole street lights, laying cables, and pipes approximately 900 meters.
3. **Zhanqian Road Two (Zhanqian Street Nine to Zhanqian Street Seven)**:

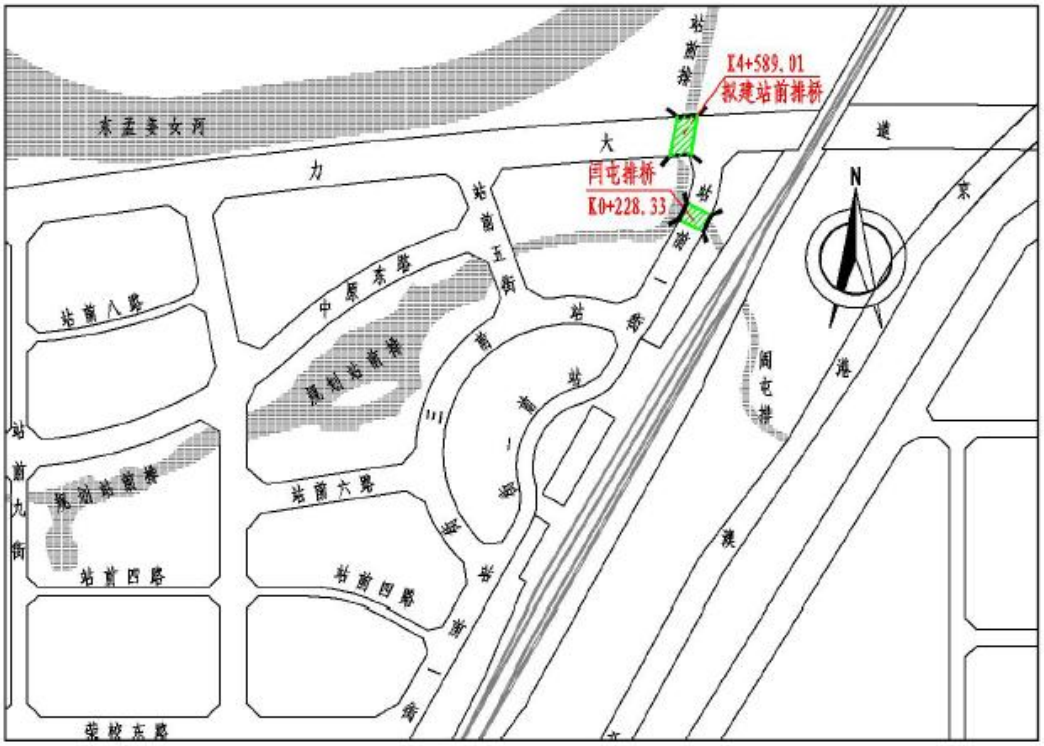
Installation of 17 integrated pole street lights, laying cables, and pipes approximately 600 meters.
4. **Zhanqian Street Five (Hongli Avenue to Zhongyuan East Road)**: Installation of 8 integrated pole street lights, laying cables, and pipes approximately 200 meters.
5. **Zhanqian Street Seven (Hongli Avenue to Zhongyuan East Road)**: Installation of 23 integrated pole street lights, laying cables, and pipes approximately 900 meters.

3.3.7 Greening Engineering

1. **New Zhanqian Street One (Hongli Avenue to Zhanqian Street Three)**: Planting 99 plane trees, installing 99 tree pool grates, green belt area of 1,266 square meters.
2. **New Zhanqian Street Five (Hongli Avenue to Zhongyuan East Road)**: Planting 26 chestnut trees, installing 26 tree pool grates, green belt area of 394 square meters, adding 165 meters of flower irrigation pipes.
3. **New Zhanqian Street Seven (Hongli Avenue to Zhongyuan East Road)**: Planting 86 trees, installing 86 tree pool grates, central median green area of 2,424 square meters, adding 755 meters of flower irrigation pipes.
4. **New Zhanqian Road Two (Zhanqian Street Nine to Zhanqian Street Seven)**: Planting 137 Lagerstroemia speciosa trees, installing 137 tree pool grates.
5. **New Hongli Avenue (Zhanqian Street Seven to Zhanqian Street One)**: Planting 168 ash trees, installing 168 tree pool grates, green belt area for pedestrians and non-motorized vehicles is 3,981 square meters (including street trees), central green isolation belt area of 4,015 square meters, and the outer green area is 20,288 square meters with garden paths and squares covering 3,412 square meters.

3.3.8 Bridge Engineering

Two new bridges are being constructed: Yantun Drainage Bridge on Zhanqian Street One and Hongli Avenue Drainage Bridge.



Source: Preliminary Design Description, August 2024

Figure 3-7 Bridge Project Location Map

1. Hongli Avenue Station Front Discharge Bridge

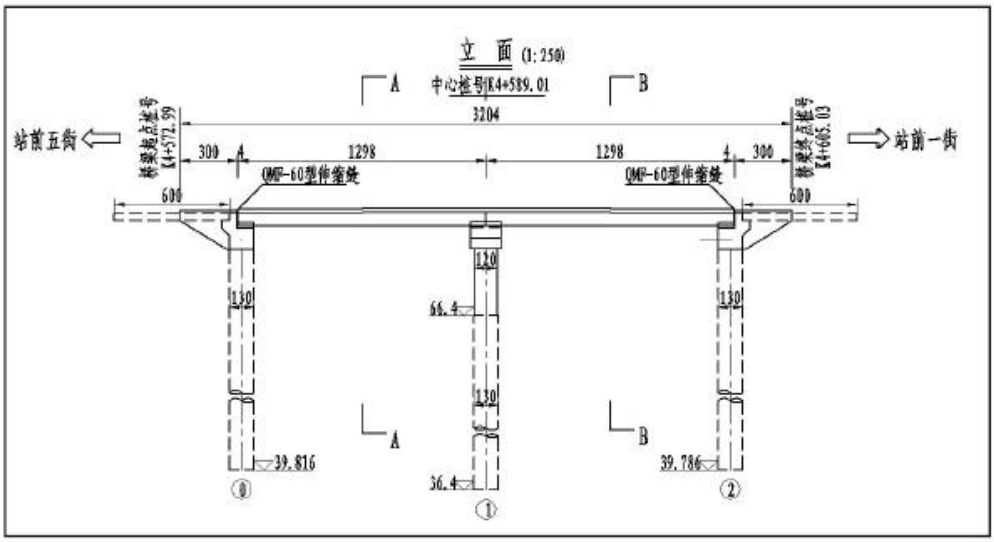
The Hongli Avenue Station Front Discharge Bridge is located in the high-speed rail area of Xinxiang City, crossing the planned station front discharge channel on Hongli Avenue. The bridge spans the station front discharge river, which lies between the confluence of the Station Front Discharge and Yantun Discharge and the confluence of the Station Front Discharge and East Mengjiangnv River. The planned channel bottom width of the Station Front Discharge is 5 meters, with a mouth width of 20 meters, and a slope coefficient of 1:2. The planned riverbed elevation of the Station Front Discharge Channel is 66.68 meters, and the design water level elevation is 70.02 meters.

The Hongli Avenue Station Front Discharge Bridge adopts a two-span, 13-meter-long prestressed concrete simply supported beam bridge. The cross-section layout of the bridge is a double-width bridge with a total width of 55 meters from north to south, comprising: 0.3 meters (railing) + 6.2 meters (mixed pedestrian and non-motorized vehicle path) + 18.5 meters (motor vehicle lane) + 0.5 meters (crash barrier) + 4 meters (central median) + 0.5 meters (crash barrier) + 18.5 meters (motor vehicle lane) + 6.2 meters (mixed pedestrian and non-motorized vehicle path) + 0.3 meters (railing).

The newly constructed bridge's superstructure uses a two-span, 13-meter-long

prestressed concrete hollow slab. The substructure adopts a bored pile (friction pile) foundation with a pile cap beam structure. The lower structure is divided into two sections with a 3.9-meter net distance between them. The bridge abutment cap beam is 1.3 meters wide and 1.1 meters high, while the pier cap beam is 1.6 meters wide and 1.1 meters high; the pier column diameter is 1.2 meters, and the full bridge pile diameter is 1.3 meters. The design scope includes the bridge's main body and the backfill gravel behind the abutment. The standard cross slope of the bridge deck is 1.5%, and the mixed pedestrian and non-motorized vehicle path cross slope is 1.5% (reverse slope).

The bridge is located within the horizontal curve range of the road route but is designed as a straight-line bridge. The road on both sides connects smoothly with the bridge.



Source: Preliminary Design Description, August 2024

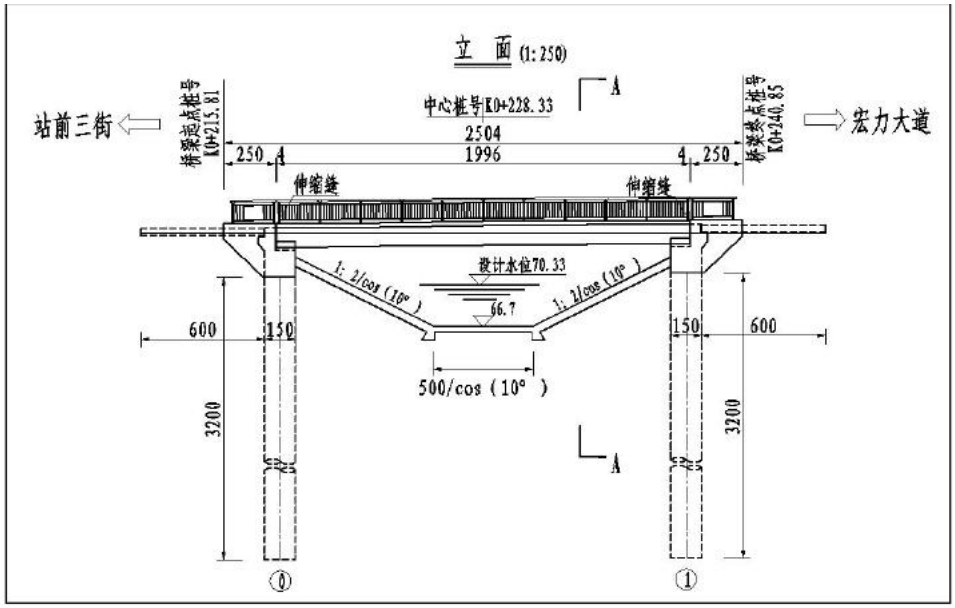
Figure 3-8 Hongli Avenue Station Front Discharge Bridge Elevation

Source: Preliminary Design Description, August 2024

Figure 3-9 Hongli Avenue Station Front Discharge Bridge

2. Zhanqian First Street Yantun Discharge Bridge

The proposed bridge section is trapezoidal, with a riverbed bottom width of 4 meters and an inner slope of 1:2. The embankment is designed for a 20-year flood event with an additional 0.8 meters of freeboard. The inner and outer slopes of the embankment are set at 1:2, and the top width of both embankments is 2.5 meters. The designed embankment top elevation is 70.74 meters. The center pile number of the new bridge is K0+228.33.



Source: Preliminary Design Description, August 2024

Figure 3-10 Zhanqian First Street Yantun Discharge Bridge Design Scheme

Source: Preliminary Design Description, August 2024

Figure 3-11 Zhanqian First Street Yantun Discharge Bridge

3.4 Associated Facilities

According to the "Environmental and Social Management Planning Framework for the AIIB Emergency Loan Henan Province Flood Disaster Recovery and Reconstruction Project," "associated facilities" refer to activities that are not included in the project description specified in the Project Management Agreement but are intrinsically linked to the content of this project. These activities are determined through consultation between the AIIB and the project office. The main criteria for defining associated facilities are as follows: (a) they are directly and substantially related to the project; (b) they are carried out or planned to be carried out concurrently with the project; and (c) they are necessary for the project's feasibility, meaning that if the project does not exist, these facilities would not be built or expanded.

This project primarily involves roads, bridges, drainage pipelines, and drainage pump stations. The sewage within the catchment areas of the Yinmankou Stormwater Pump Station Renovation Project and the Xiangyang Stormwater Pump Station Renovation Project ultimately flows into the Luotuowan Wastewater Treatment Plant (with a daily treatment capacity of 150,000 tons, and an effluent quality of Grade A). After being treated to meet the standards, it is discharged into the Wei River. The sewage within the catchment area of the Hongli Avenue East Mengjiangnv River Stormwater Pump Station eventually flows into the Eastern Wastewater Treatment Plant (with a daily treatment capacity of 100,000 tons, and an effluent quality of Grade A). Both the Luotuowan Wastewater Treatment Plant and the Eastern

Wastewater Treatment Plant have been completed and are in operation, so they are not considered associated facilities of this project.

After the upgrading and renovation of the main stormwater inlet channel of the Yinmankou Stormwater Pump Station, the rainwater in this area mainly drains along Xiangyang Road, Shengli Street, Jiankang Road, and People's Park underground ditch to the Yinmankou inclined ditch, then to the Yinmankou Stormwater Pump Station, and finally is pumped into the Wei River. The rainwater in the Xiangyang Stormwater Pump Station catchment area is lifted by the pump station and then discharged into the People's Victory Canal, which flows into the Wei River. The Wei River dredging and flood control capacity enhancement project was constructed using domestic funds in 2022. This project has considered upstream inflow and the drainage from pump stations in the urban section, raising the flood control standard of the Wei River in the urban section from a 20-year recurrence interval to a 50-year recurrence interval, with the flood control flow at the Yinmankou section increased to 230 m^3/s.

Part of the rainwater in the high area of Hongli Avenue flows from south to north into the main stormwater pipe of Hongli Avenue via the rainwater pipelines on Zhanqian Fifth Street and Zhanqian Seventh Street. The rainwater in the low area flows from south to north into the main stormwater pipe of Hongli Avenue via the rainwater pipelines on Zhanqian Third Street and Zhanqian First Street. Finally, it is pumped into the East Mengjiangnv River through the Hongli Avenue Stormwater Pump Station. The downstream flood control standard of the East Mengjiangnv River is a 50-year recurrence interval, and there are no other projects implemented concurrently.

In summary, according to the AIIB's criteria for defining associated facilities, this project has no associated facilities.

4 Environment and Social Baseline

4.1 Overview of the Natural Environment

1. Regional Location

This subproject is entirely located within Xinxiang City. Xinxiang is situated in the heart of the Central Plains, in the northern part of Henan Province, at 35°18′N latitude and 113°54′E longitude. It borders the Yellow River to the south, facing Zhengzhou and Kaifeng across the river; it lies adjacent to the Taihang Mountains to the north, neighboring Hebi and Anyang; it connects with Jiaozuo, the hometown of Tai Chi, to the west and borders southeastern Shanxi; and it adjoins the oil city of Puyang to the east, connecting with western Shandong. Xinxiang is a significant national comprehensive transportation hub and one of the cities in the Central Plains Urban Agglomeration.

2. Climate

Xinxiang has a warm temperate continental monsoon climate, characterized by four distinct seasons: cold winters, hot summers, cool autumns, and early springs. The annual average temperature is 14°C. July is the hottest month, with an average temperature of 27.3°C, while January is the coldest month, averaging 0.2°C. The highest recorded temperature was 42.7°C (June 20, 1951), and the lowest was -21.3°C (January 13, 1951). The average annual humidity is 68%, with a maximum frozen soil depth of 280 mm. The average annual rainfall is 656.3 mm, with the highest recorded rainfall being 1168.4 mm (1963) and the lowest 241.8 mm (1997). The maximum snow depth was 395 mm (2009). The annual evaporation is 1748.4 mm. Most of the precipitation occurs from June to September, totaling 409.7 mm, accounting for 72% of the annual rainfall, and is often accompanied by heavy rain. The monsoon characteristics are evident, with predominant northeasterly winds in winter and southwesterly winds in summer. The climate is warm-temperate continental monsoon-type, formed under the combined influence of geographical environment, atmospheric circulation, topography, and terrain. The most frequent wind direction throughout the year is east-northeast, with a frequency of 17.49%, followed by northeast winds at 12.3%. The average annual wind speed is 2.45 m/s.

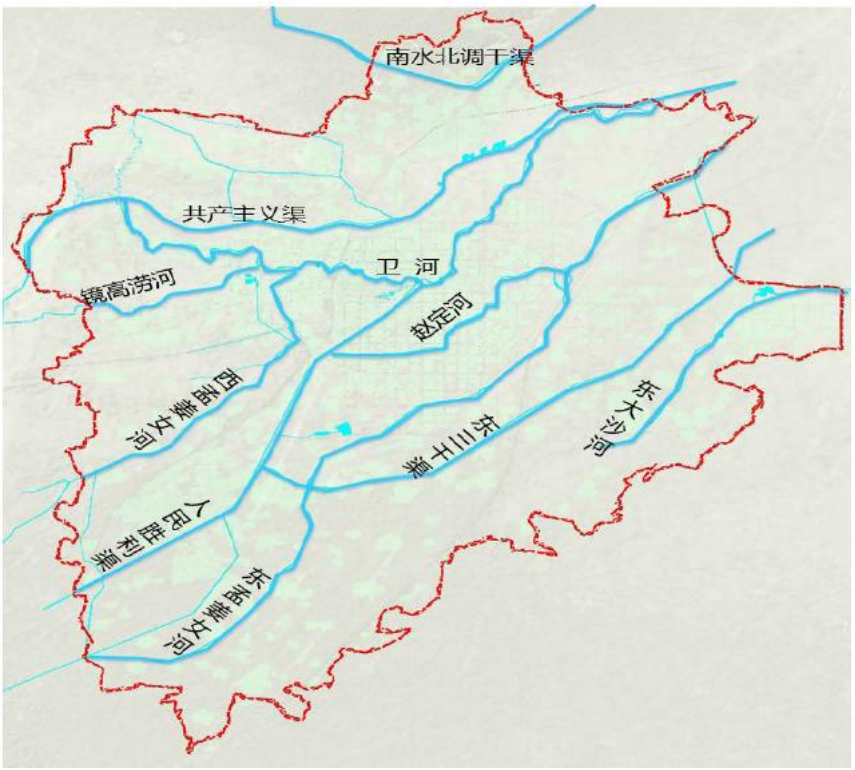
3. Topography and Landforms

Within Xinxiang City, the area of hills and mountains is 1,560 km², accounting for 18.9% of the total area, while the plain area is 6,689 km², covering 81.1% of the total area. The region features various landforms, including medium mountains, low mountains, hills, intermountain basins, and plains. The distribution pattern and extension direction of various landforms are primarily controlled by the northeast-north-northeast trending activities of the Neo-Cathaysian structural system, except for the southern part of the jurisdiction along the Yellow River, which is controlled by the east-west trending activities of the Qinling system. The front fault zone of the Taihang

Mountains, which extends in a north-northeast to northeast direction, serves as the boundary. Since the Cenozoic era, except for the continuous uplift and mountain formation of the crust in the northwest corner, the rest of the area has continued to subside, forming the Yellow River alluvial plain.

4. Rivers and Water Systems

The urban area of Xinxiang belongs to the Hai River Basin. The main rivers within the urban area include the Wei River, the Communist Canal, the West Mengjiangnv River, the East Mengjiangnv River, the People's Victory Canal, the Jinggao Drainage River, and the Minsheng Canal.



Source: Feasibility Study, 2024

Figure 4-1 Schematic Diagram of River Distribution in Xinxiang City

1. Communism Canal

The Communism Canal is a large-scale irrigation channel carved out in 1958, utilizing the original Gongli Canal depression. It starts from the east of Qinchang Village in Wuzhi County on the north bank of the Yellow River and enters the Wei River at Laoguan Zui. The canal has a total length of 156 km, with over 20 km within the jurisdiction of Xinxiang City (from Hehe to Jicheng section). The central urban section is about 17.6 km long (from Xihuan Road to Donghuan Road). The Xinxiang City basin area is 5,160 km², making it the only outlet for floods in the western and northern mountainous areas of Xinxiang City. The current right embankment serves as the urban flood control dike, with the left side being the flood discharge area.

2. Wei River

The Wei River is known as the mother river of Xinxiang City. It originates from Duohuo Town in Lingchuan, Shanxi Province and is an important tributary of the Hai River Basin. It is called the Dasha River above Hehe Town in Xinxiang County and the Wei River below it. The river has a total length of 344.5 km and controls a basin area of 15,228 km². The river section flowing through Xinxiang City is about 100 km long, with the central urban section being 18.8 km long (from Baiquan Avenue to Beihuan Road). The river is winding, with a river mouth width of 50–100 meters and a channel depth of about 7 meters. It serves multiple functions such as flood discharge, drainage, irrigation, water supply, and navigation.

3. People's Victory Canal

The People's Victory Canal was constructed in March 1951 as an irrigation channel from the Yellow River, with an irrigation area of approximately 992 km². It is a seasonal water-release artificial canal. The canal head is located in Qinchang Village, Wuzhi County. The main canal flows from the southwest to the northeast, entering the Wei River at Yinmankou in Xinxiang City, with a total length of 53 km. The urban section of Xinxiang City is about 12 km long (from the Xinhe Railway to the Wei River entry point), with the central urban section being 8 km long (from Renwang Village to the entry point of the Wei River). The river mouth width is 25–34 meters, and it is currently the main channel for the city's domestic, irrigation, and urban river landscape water use.

4. Jinggao Drainage River

The Jinggao Drainage River, formerly known as the Fifth and Sixth Branch Drains of the People's Western First Main Canal, was constructed in 1956. It originates from Zhaojing East in Huojia County and enters the Wei River at Xigao Village in Xinxiang City. It is a plain drainage river with a basin area of 73.9 km². The original design drainage standard was a three-year recurrence interval.

5. West Mengjiangnv River

Historically, the West Mengjiangnv River originated from Wuzhi County, passing through Huojia County, Xinxiang County, and Xinxiang City to Shiliuyuan, where it entered the Wei River. Due to urban construction needs, the river was rerouted in 1951 to flow between Donggao and Xigao Villages into the Wei River. In 1958, during the excavation of the Communism Canal, the upper section was cut off. The river now starts from Houxiaozao in Huojia County, with a basin area of 212.2 km² and a total length of 19.73 km. The urban section is about 8 km long, with a river mouth width of 15–30 meters. It is a main drainage river in the southwestern part of Xinxiang City.

6. Zhaoding River

The Zhaoding River is a tributary of the East Mengjiangnv River and serves as

the main drainage river in the southeastern part of Xinxiang City. It originates from Zhao Village, passing through Duan Village and Liuzhuangying, crossing National Highway 107, and entering the East Mengjiangnv River at Dingguo Village. The river has a total length of 14.7 km. The current central urban section starts from the Wukong Sluice of the People's Victory Canal and flows southeast to join the East Mengjiangnv River at Dingguo Village.

7. East Mengjiangnv River

The East Mengjiangnv River is a tributary of the Wei River. It originates from Dingzhuang in Xinxiang County and flows into the Wei River near Wangzhuang Village in Weihui City. It is the main drainage river in the eastern part of Xinxiang City. The river has a total length of 51.8 km, with a basin area of 468.5 km². The central urban section is about 14.23 km long, and the river mouth width ranges from 8 to 40 meters.

8. South-to-North Water Diversion Main Canal

The main canal of the first phase of the South-to-North Water Diversion Middle Route Project starts from the Taocha Canal Head and crosses the Yangtze, Huaihe, Yellow, and Haihe River basins, providing water supply to Beijing and Tianjin. The canal has a total length of about 1,432 km. In Xinxiang City, the main canal starts from Huixian City and ends at the Canghe Canal, crossing Huixian City, Xinxiang City, and Weihui City from west to east, with a total length of 77.73 km. Construction began in June 2007, and water supply started in 2014. The channel is designed to a 50-year flood protection standard, with an average river mouth width of 60 meters and a maximum width of about 200 meters.

9. Dongsan Main Canal

The Dongsan Main Canal is located in the downstream area of the People's Victory Canal Irrigation District, drawing water from the right bank of the third drop of the main canal, 50 meters upstream, and ending at Houhe Town in the southeast of Weihui City. The total length of the main canal is 38.2 km, with a designed bottom width of 7–11 meters and a water depth of 1.7–2.4 meters. It flows through approximately 22 km of the planned area of Xinxiang City, with the central urban section being about 6 km long.

10. East Dasha River

The East Dasha River is located in the northwest of Yanjin County and the southeast of Weihui City, belonging to the Yellow River water system. It originates from Matouwang Village in Langgongmiao Township, Xinxiang County, and flows through the river gate in Fengzhuang Township, Yanjin County, entering the Liuqing River. The river has a total length of 58.5 km and a basin area of 417.4 km².

4.2 Current Status of Ecological Environment Quality

4.2.1 Ambient Air Quality

According to the atmospheric functional zoning principles, the construction project site is classified as a Class II functional area, and the ambient air quality complies with the "Ambient Air Quality Standard" (GB3095-2012) Level II standard. Based on the "2023 Environmental Quality Annual Report of Xinxiang City" released by the Xinxiang Ecology and Environment Bureau, the regional air quality status data are as follows:

Table 4-1 Current Status of Air Quality in the Project Area

Pollutant	Annual Assessment Index	2021 (μg/m³)	2022 (μg/m³)	2023 (μg/m³)	Standard Value (μg/m³)	Compliance Rate (%)	Compliance Status
PM10	Annual Average Concentration	93	89	80	70	114.3	Exceeding Standard
PM2.5	Annual Average Concentration	47	50	47	35	134.3	Exceeding Standard
SO2	Annual Average Concentration	11	10	9	60	15	Compliant
NO2	Annual Average Concentration	32	30	30	40	75	Compliant
CO	95th Percentile Concentration	1.6 mg/m³	1.4 mg/m³	1.4 mg/m³	4 mg/m³	35	Compliant
O3	90th Percentile Concentration	173	182	183	160	114.4	Exceeding Standard

From the table above, it can be seen that PM10, PM2.5, and O3 do not meet the requirements of the "Ambient Air Quality Standard" (GB3095-2012) Level II standard. According to the "Technical Guidelines for Environmental Impact Assessment - Atmospheric Environment" (HJ2.2-2018), the region where this project is located is classified as a non-compliant area. Compared with the regional environmental quality monitoring results in the "2021 Environmental Quality Annual Report of Xinxiang City," there was some improvement in 2023 except for O3.

4.2.2 Surface Water Environmental Quality

The surface water bodies involved in this project include the East Mengjiangnv River, the People's Victory Canal, the Zhaoding Drain, and the Wei River. The East Mengjiangnv River, People's Victory Canal, and Zhaoding Drain all flow into the Wei River. According to the Henan Provincial Water Environment Functional Zoning, the Wei River complies with the "Surface Water Environmental Quality Standard" (GB3838-2002) Class IV standard. According to the "Monthly Report on Water Quality of Surface Water Environment Responsibility Target Sections in Xinxiang City" published by the Xinxiang Ecology and Environment Bureau from October 2023 to January 2024, the

monitoring data of the Huangfu section of the Wei River meets the "Surface Water Environmental Quality Standard" (GB3838-2002) Class IV standard limit requirements.

Table 4-2 Current Status of Surface Water Quality in the Project Area (2023)

Monitoring Factor	COD	Ammonia Nitrogen	Total Phosphorus
Monitoring Data (October 2023)	15	0.08	0.1
Monitoring Data (November 2023)	27	0.24	0.13
Monitoring Data (January 2024)	14	0.21	0.13
Section Standard	30	1.5	0.3
Compliance Status	Compliant	Compliant	Compliant

4.2.3 Groundwater Quality Status

According to Appendix A of the "Technical Guidelines for Environmental Impact Assessment of Groundwater Environment" (HJ 610-2016), this project is classified as a Category IV construction project. Based on Section 4.1 of the "Technical Guidelines for Environmental Impact Assessment of Groundwater Environment" (HJ 610-2016), Category IV construction projects do not conduct groundwater environmental impact assessments, so this evaluation does not investigate the current status of groundwater environmental quality.

4.2.4 Soil Environmental Quality Status

According to Appendix A of the "Technical Guidelines for Environmental Impact Assessment of Soil Environment (Trial)" (HJ964-2018), this project is classified as a Category IV construction project. Based on Section 4.2.2 of the "Technical Guidelines for Environmental Impact Assessment of Soil Environment (Trial)" (HJ 964-2018), Category IV construction projects may not conduct soil environmental impact assessments, so this evaluation does not investigate the current status of soil environmental quality.

4.2.5 Acoustic Environmental Quality

The project is located in the urban areas of Hongqi District, Weibin District, and Muye District in Xinxiang City. The current status of the acoustic environmental quality refers to the noise monitoring results published in the "2023 Environmental Quality Bulletin of Xinxiang City" by the Xinxiang Ecology and Environment Bureau. The project site is classified as a Category 2 area, and the environmental noise complies with the "Acoustic Environmental Quality Standard" (GB3096-2008) Category 2 standard.

(1) **Urban Area Noise**

In 2023, Xinxiang City conducted daytime and nighttime monitoring of 151 urban area environmental noise monitoring points. The average equivalent

sound level of urban daytime area environmental noise was 55.3 decibels, and the regional acoustic environmental quality was average. The average equivalent sound level of urban nighttime area environmental noise was 45.3 decibels.

(2) **Road Traffic Noise**
In 2023, Xinxiang City conducted daytime and nighttime monitoring of 80 road traffic monitoring points. The total monitoring road length was 239.4 kilometers, and the average equivalent sound level of daytime traffic noise was 64.6 decibels. The daytime road traffic acoustic environmental quality was good.

4.2.6 Ecological Environment

The project area is located in the urban area of Xinxiang City, without key protected wild animals and plants, scenic spots, nature reserves, or other special protection targets. It does not involve ecological sensitive areas or ecological red lines. The site for the East Mengjiangnv Rainwater Pump Station on Hongli Avenue is currently agricultural land. The Xiangyang Rainwater Pump Station is a reconstruction on the original site, with the entrance being common species of landscape greening on both sides of the People's Victory Canal, such as willow trees and Berberis thunbergii. The reconstruction of rainwater and sewage pipelines and roads in this project involves a temporary land occupation of 868.56 mu, all of which are existing roads and vacant land next to roads. The drainage area of the Yinmankou Rainwater Pump Station involves 13 roads, with a temporary land occupation of about 525.01 mu. The Xiangyang Rainwater Pump Station catchment area renovation project involves 4 roads, with a temporary land occupation of about 343.55 mu.

	
Site of the Mengjiangnv pump station	Site of the Xiangyang road pump station

Surroundings of the Xiangyang road pump station

Yinmakou catchment

Figure 4-2Current status of the proposed sites

4.3 Social Baseline

As of the end of 2023, Xinxiang City's land area was 422 square kilometers. The per capita disposable income of urban residents was 39,165 yuan, and that of rural residents was 21,683 yuan. The city's GDP was 334.765 billion yuan, an increase of 1.5% over the previous year. This includes the primary industry with a value added of 29.625 billion yuan (growth of 1.9%), the secondary industry with a value added of 142.084 billion yuan (growth of 0.5%), and the tertiary industry with a value added of 163.056 billion yuan (growth of 2.3%). The industrial structure ratio was 8.9:42.4:48.7. The annual per capita GDP was 54,473 yuan, an increase of 1.9% over the previous year.

The project involves Xinxiang's Hongqi District, Weibin District, and Muye District. The impact of land acquisition affects Muye District. Among the three project counties and districts, Hongqi District has the largest area, followed by Muye District and Weibin District. In terms of per capita disposable income of urban residents, Hongqi District is the highest, while Muye District is the lowest. For rural residents' per capita disposable income, Muye District is the highest, and Hongqi District is the lowest. Regarding total fiscal revenue, Hongqi District ranks the highest, followed by Muye District, with Weibin District being the lowest.

Table 4-3 Overview of Main Socioeconomic Development Indicators in the Project-Affected Areas (2023)

Province/City/County	Land Area (sq km)	Per Capita Disposable Income of Urban Residents (yuan)	Per Capita Disposable Income of Rural Residents (yuan)	Per Capita GDP (yuan)	Total Fiscal Revenue (billion yuan)
Xinxiang City	8,249	39,165	21,683	54,473	241.5
Hongqi District	178	40,594	22,240.8	56,766	14.8
Weibin District	52	40,234	/	56,955	4.02
Muye District	98.6	41,471	24,094.8	55,576	10.53

Data Source: Collected from statistical yearbooks or national economic and

social development statistical reports by the social evaluation survey team from each district.

4.3.1 Population

According to the national economic and social development statistical reports of each district, by the end of 2023, Xinxiang City had a registered population of 6.125 million, with 3.084 million males (50.35%) and 3.041 million females (49.65%), giving a male-to-female ratio of 101:100. The agricultural population was 2.45 million (40%), and the non-agricultural population was 3.675 million (60%). The population density was 14,514 people per square kilometer.

- **Hongqi District:** The registered population was 447,000, with 228,000 males (48.96%) and 219,000 females (51.27%). The male-to-female ratio was 96:100. The agricultural population was 17,000 (3.8%), and the non-agricultural population was 430,000 (96.2%). The population density was 4,865 people per square kilometer.
- **Weibin District:** The registered population was 243,000, with 125,000 males (48.48%) and 118,000 females (51.27%). The male-to-female ratio was 95:100. Weibin District is fully urbanized with no agricultural population. The non-agricultural population was 243,000 (100%). The population density was 4,673 people per square kilometer.
- **Muye District:** The registered population was 428,000, with 221,000 males (48.48%) and 207,000 females (51.52%). The male-to-female ratio was 94:100. The agricultural population was 11,000 (2.6%), and the non-agricultural population was 417,000 (97.4%). The population density was 4,341 people per square kilometer.

Table 4-4 Population Overview of Project Counties and Districts (Unit: 10,000) (2021)

Population Statistics	Xinxiang City	Hongqi District	Weibin District	Muye District
Year-End Total Population (10,000)	612.5	44.7	24.3	42.8
Male Population (10,000)	308.4	22.8	12.5	22.1
Female Population (10,000)	304.1	21.9	11.8	20.7
Population Density (people/km²)	743	2,511	4,673	4,341
Agricultural Population (10,000)	245	1.7	0	1.1
Urban Population (10,000)	367.5	43	24.3	41.7

Data Source: Population data are sourced from national economic and social development statistical reports of each project area.

4.3.2 Minority Population in the Project Area

From April 16 to 20, 2024, the Xinxiang City Project Office and the social evaluation survey team conducted a special field survey on the minority population situation and carried out a series of public participation activities. According to the identification criteria of ESS3 of the AIIB's "Environmental and

Social Framework," the survey collected detailed information on population and ethnic composition in each project area, identifying minority villages and determining if there are any minority settlements.

The project benefit area involves townships/streets and villages near Dashao River in Weibin District, Hongqi District, and Muye District of Xinxiang City, with a directly benefited population of approximately 233,733 people, including 1,832 minority people. The minority population mainly consists of scattered Hui, Mongolian, and Manchu people, accounting for 0.89% of the total population. There are no settled minority populations in the project area. The minority population is small and scattered, with most entering the project area due to marriage or job transfer.

Minorities in the project implementation area enjoy the same social public services as the Han majority. There are no differences in social welfare, rights, protection, cultural customs, or living habits compared to the Han majority. Minorities are indirect beneficiaries of the project and are not directly affected. The proposed project is unlikely to have any negative impact on the minority population.

Table 4-5 Overview of Minority Population in the Project Area

Project Area	Total Population (10,000)	Minority Population (people)	Minority Population Ratio (%)	Minority Population Composition
Hongqi District	12.3075	1,071	0.87	Hui, Mongolian, Manchu, etc.
Weibin District	10.0958	666	0.66	Hui, Mongolian, Manchu, etc.
Muye District	0.97	86	1.09	Hui, Mongolian, Manchu, etc.
Total	23.3733	1,832	0.89	Hui, Mongolian, Manchu, etc.

Data Source: Population data are sourced from the national economic and social development statistical reports and data from the Ethnic and Religious Affairs Bureau of each project area.

Minority Identification Survey Findings:

Table 4-6 Minority Identification (ESS3)

Identification Criteria	Yes	No	Remarks
1. Do they self-identify as members of a distinct indigenous cultural group and are recognized as such by others?		X	All surveyed, including minorities and Han people, consider that there is no difference between local minorities and Han people, and they are fully integrated.
2. Do they have a collective attachment to geographically distinct habitats or		X	

Identification Criteria	Yes	No	Remarks
ancestral territories in the project area and to the natural resources in these habitats and territories?			
3. Do they have customary cultural, economic, social, or political institutions that are distinct from those of the dominant society and culture?		X	
4. Do they have a distinct language that is usually different from the official language of the country or region?		X	They do not have their own language and roles. They speak the local dialect and Chinese Mandarin, fully integrating with the Han people.

1. No minority groups meeting the ESS3 criteria were identified within the three project impact counties.
2. There are no settled minority populations, traditional territories, minority languages, or traditional cultures within the three project construction areas. There are also no minority groups self-identifying as distinct entities.

Therefore, there is no need to develop a minority development plan for this project.

5 Environmental and Social Impact Assessment and Mitigation Measures

5.1 Environmental Impact

5.1.1 Environmental sensitive receptors

The environmental impact assessment scope was determined based on the Technical Guidelines for Environmental Impact Assessment, covering the following areas:

1. **Ecological Environment:** The Yinmakou Rainwater Pump Station catchment area project involves upgrading the drainage pipelines and road surfaces based on existing roads, without any new permanent land occupation. Temporary land occupation during the construction period covers about 525.01 mu, which includes open spaces on both sides of the road. The Xiangyang Rainwater Pump Station catchment area project involves temporary land occupation of 343.55 mu, with an additional 3.06 mu of new state-owned land occupied. The Hongli Avenue Dongmengjiang River Rainwater Pump Station catchment area construction project occupies 168.98 mu of general farmland, with no temporary land occupation. Both the permanent and temporary land occupation of this project do not involve ecological sensitive areas, and the scope of ecological impact assessment is limited to the project area.
2. **Water Environment:** According to the "Technical Guidelines for Environmental Impact Assessment - Surface Water Environment" (HJ2.3-2018), the assessment scope for surface water environment includes 500 meters upstream and 1500 meters downstream of the Xiangyang Rainwater Pump Station and the Dongmengjiang River Rainwater Pump Station outlets.

3. **Air and Acoustic Environment:** The assessment scope for air and acoustic environment impacts covers 200 meters on either side of the pump station construction area and construction roads.

4. **Soil Environment:** According to the "Technical Guidelines for Environmental Impact Assessment - Soil Environment" (Trial) (HJ964-2018), soil environment impact assessment is not required for this project.

5. **Groundwater Environment:** According to the "Technical Guidelines for Environmental Impact Assessment - Groundwater Environment" (HJ610-2016), this project, being a flood prevention and drainage project, does not include concentrated drinking water source protection zones or quasi-protection zones within or around the project area. The sensitivity of the groundwater environment is not significant, so groundwater environment impact assessment is not necessary.
The project involves surface water bodies such as the Dongmengjiang River, People's Victory Canal, Zhaoding Drainage, and Wei River. The Dongmengjiang River, People's Victory Canal, and Zhaoding Drainage eventually flow into the Wei River. The protection goal is the Class IV standard of the "Environmental Quality Standards for Surface Water" (GB3838-2002).

The project area is located in the urban areas of Muye District, Weibin District, and Hongqi District, without involving ecological sensitive areas and without ecological environment protection targets.

Table 5-1 Environmental Air and Acoustic Environment

Engineering Section Name	Environmental and Social Protection Targets
Yinmakou Catchment Area - Jiefang Avenue	Weibei District Salt Industry Company Family Courtyard (30m), Xinliang Community (30m), Chemical Light Company Family Courtyard (30m), Silver Star Community (30m), Harbo Kindergarten (30m), Jujing Garden (30m), Xinxiang Storage and Trade General Company Residential Building (30m), Zitai Yipin (30m), Weibei District Cultural Community (30m), Zhongyuan Community (30m), Wenchang Community (30m), Huangpu Kindergarten (30m), Jinxiu Garden (30m), Angel Community (30m), Yinkang Garden (30m), Xinshi Community (30m), Xinxiang City Central Hospital (30m), Municipal Direct Kindergarten (100m), No. 22 Middle School (30m), Street Shops (30m)
Yinmakou Catchment Area - Xiangyang Road	Tianbao Community (30m), Weibei District Experimental Primary School (30m), Trade Bureau Family Courtyard (30m), Yuanzhu Community (30m), Zhongzhou Community (30m), Shenxin Garden (30m), Wuxing School (30m), Street Shops (30m)
Yinmakou Catchment Area - Jiankang Road	Yucai Kindergarten (30m), Pangdonglai Mall (30m), New Century Garden (30m), Zhi'ai Baobei Kindergarten (50m), Post Office Family Courtyard (30m), Broadcasting Bureau Family Courtyard (30m), Wenkang Garden (30m), Ophthalmic Hospital (50m), Street Shops (30m)
Yinmakou Catchment Area - Shengli Avenue	Xinxiang Experimental Primary School (30m), Helu Kindergarten (30m), Hongqi District Advanced Vocational High School (30m), Xinxiang Vocational Education Center (30m), Xinxiang Xinyu Jia High School (50m), Tianyou Kindergarten (30m), Luhang Family Courtyard (100m), Foreign Language Primary School Family Courtyard (50m), Jiulong Huafu (30m), Shenglu Garden (30m), Chenggui Community (100m), Street Shops (30m)
Xiangyang Road Catchment Area - Laodong Street	Little Star Kindergarten (80m), Xinji Kindergarten (150m), No. 30 Middle School (100m), No. 31 Middle School (30m), Xinxiang City Traditional Chinese Medicine Hospital (100m), Xiangyang New Village (30m), Cotton and Hemp Community (50m), Xinyue City (30m), Quanxin Community (30m), Ningxinyuan (30m), Xinhua Garden (30m), Street Shops (30m)
Xiangyang Road Catchment Area - Kelong Avenue	Jiabao Kindergarten (30m), Xinwen Community (30m), Xinhua Family Garden (30m), Gongmao School Family Courtyard (30m), Infectious Disease Hospital (30m), Xinxiang City Blood Center (30m), Meili Xingcheng (30m), Tianma Lanting Garden (30m), Logistics Vocational College (30m), Chemical Road Primary School (50m), Jinse Jiayuan (30m), Street Shops (30m)
Hongli Avenue Catchment Area	Jindi Square (30m), Rongyuan Community (50m), Jinyuan Talent Community (50m), Street Shops (30m)

5.1.2 Impact during Construction

5.1.2.1 Water

During the construction period, the main wastewater includes dewatering from foundation pits, excess water from sludge, wastewater from washing construction machinery, and concrete mixing and aggregate washing water.

1. **Domestic Sewage:**

The project will not establish a construction camp, and construction personnel

will rely on existing city facilities for accommodation and meals. The wastewater will ultimately be treated at the city's sewage treatment plant. Construction personnel involved in pipeline and road engineering can use public toilets near the construction site, while portable toilets should be arranged at pump station construction sites.

2. **Foundation Pit Dewatering:**

In the Yinmakou Rainwater Pump Station area, wellpoint dewatering and open ditch drainage are used. In the Xiangyang Pump Station area, open ditch drainage is used for shallow buried sections like Textile Road and Culture Street. For deeper sections such as Laodong Street and Kelong Avenue, steel sheet piles, internal well dewatering, and open ditch drainage are used. Inside the foundation pits, drainage ditches lead to collection pits, with one collection pit set every 15-20 meters, each equipped with a submersible pump to discharge water into existing drainage pipelines outside the pit. For the pump station foundation pit, a high-pressure jet grouting curtain combined with wellpoint dewatering is used. After excavation to the design elevation, a sump and drainage ditches are installed. In the Hongli Avenue Dongmengjiang River Rainwater Pump Station area, wellpoint dewatering is used along with open ditch drainage. The main sources of foundation pit drainage are rainwater, concrete curing water, and seepage water, with suspended solids (SS) concentrations around 2000 mg/L. Direct discharge of foundation pit drainage would block municipal pipelines, so extracted water is settled in sedimentation tanks before being discharged into municipal sewage manholes.

3. **Wastewater from Washing Construction Machinery and Vehicles:**

During construction, activities such as excavation, concrete pouring, and foundation treatment involve using a large amount of machinery and heavy trucks, which produce washing wastewater. The main pollutants are SS and petroleum, with SS concentrations typically between 3000-4000 mg/L and petroleum concentrations between 30-40 mg/L. Oil-containing wastewater is prohibited from being discharged directly into the Dongmengjiang River and People's Victory Canal. At the Xiangyang Pump Station and the Hongli Avenue Dongmengjiang River Pump Station construction sites, designated washing areas should be set up for wastewater collection and treatment. Oil-containing wastewater should be treated through oil separation before being reused for dust suppression at the construction site.

4. **Wastewater from Bridge Construction:**

The project includes the construction of the Zhanqianpai Bridge and the Yantunpai Bridge, using bored pile construction. This process may disturb the surrounding water bodies, increasing suspended solids in the water. Equipment cleaning wastewater and vehicle washing wastewater during construction may contain oils and metal ions. If not properly treated, this wastewater could be directly discharged into the Dongmengjiang River. A slurry circulation system should be used during drilling to prevent slurry from entering the river. A slurry sedimentation tank and recycling system should be set up. When pouring concrete, use casing or cofferdams to prevent concrete

and cement slurry from directly contacting river water. A cofferdam should be set up around the construction area to prevent sediment and construction wastewater from entering the river directly. Sedimentation tanks should be set up to precipitate suspended solids before discharging the wastewater. Temporary protective facilities such as geotextile or protective nets should be installed along the riverbank near the construction area.

5.1.2.2 Air Environment Impact Analysis:

The main impact on the air environment during construction comes from dust generated during activities such as earth excavation, backfilling, and material stacking, as well as the loading and unloading of dusty materials and the operation of machinery and vehicles. Since the project is primarily a linear project and close to both sides of pipelines and roadworks, measures such as water spraying should be taken in areas concentrated with earth excavation to accelerate dust settlement. Materials should be covered with tarpaulin during transportation. Each contractor should strengthen the maintenance and repair of roads within their responsibility and designate personnel to promptly clean up spilled soil from the road, watering at least twice a day on sunny days.
The Yinmakou Rainwater Pump Station catchment area renovation project involves dredging underground ditches in People's Park, the Yinmakou inclined ditch, the South Ring City River inclined ditch, and the North Ring City River inclined ditch. The dredged sludge will be transported in tank trucks to the sludge solidification site in Xinxiang City, about 7 km from People's Park. The following measures should be taken during transportation to avoid secondary pollution:

- Sludge should be transported to designated disposal sites, and no random dumping is allowed.
- Vehicles must be sealed and have hydraulic rear doors to prevent leaks during transportation.
- Vehicles should follow the approved route and schedule, avoiding densely populated areas, traffic centers, and residential areas during peak hours.
- Sludge should be sprayed with a biological deodorant to suppress odors at the source.
- Transported vehicles should not stop or transfer on the way, and no sludge should be dumped, discarded, or scattered into the environment.
- The transportation company must arrange dedicated personnel to inspect the transportation route. If any leakage or loss occurs, immediate emergency measures should be taken, and the environmental department should be notified.

5.1.2.3 Noise Environment Impact Analysis:

The main sources of noise pollution during construction are the various mechanical equipment and material transportation traffic noise. Based on the "Technical Guidelines for Environmental Noise and Vibration Control Engineering" (HJ2034-2013), Appendix A lists common construction machinery noise sources and levels. The main mechanical equipment used in this project and their noise levels are shown below:

Table 5-2 Noise Emission Sources During Construction

No.	Equipment	Construction Stage	Noise Source Level (Equivalent Sound Level: dB(A))	Emission Type
1	Bulldozer	Site leveling, pipe laying	90	Intermittent
2	Excavator	Pipeline, foundation pit excavation	85	Intermittent
3	Vibrating Rod	Reinforced concrete works	95	Intermittent
4	Hoisting Equipment	Pipeline, pump installation	75	Intermittent
5	Transport Vehicle	Entire construction period	75	Intermittent
6	Pipe Lifting Machine	Pipeline lifting	88	Intermittent
7	Loader	Entire construction period	84	Intermittent
8	Cutting Machine	Pipeline, equipment installation	89	Intermittent
9	Asphalt Milling Machine	Road surface removal	95	Intermittent

Noise sources during construction can be classified into point sources (e.g., mechanical equipment) and line sources (e.g., transportation vehicles). According to the "Technical Guidelines for Environmental Impact Assessment - Acoustic Environment" (HJ2.4-2021), different prediction models are used for point and line sources. Based on prediction results, the main construction machinery meets the "Standard for Noise Limits at Construction Site Boundaries" (GB12523-2011) within 10 meters during the day and 50 meters at night. When all machinery operates simultaneously, the combined noise meets the standard at 10 meters during the day and 100 meters at night.

Table 5-3 Noise Attenuation Prediction During Construction

Equipment	0m	10m	20m	30m	50m	100m	150m
Bulldozer	90	62	56	52.5	48	42	38.5
Excavator	85	57	51	47.5	43	37	33.5
Vibrator	95	67	61	57.5	53	47	43.5
Lifting Equip.	75	47	41	37.5	33	27	23.5
Pipe Lifting	88	60	54	50.5	46	40	36.5
Loader	84	56	50	46.5	42	36	32.5
Welding Equip.	80	52	46	42.5	38	32	28.5
Cutter	89	61	55	51.5	47	41	37.5
Combined Noise	98.0	70	64	60.5	56	50	46.5

5.1.2.2 Solid waste

During the peak construction period of the project, there will be fewer than 100 workers, resulting in a small amount of household waste. The project will not establish construction camps, and household waste will be managed using the existing waste collection and transfer system along the route. Adequate garbage bins will be set up at the pump station construction sites.

The existing Xiangyang Rainwater Pump Station will be demolished, generating a large amount of construction debris and discarded equipment. During the reconstruction of the rainwater pipelines and roads, the existing asphalt pavement, pipelines, and arches will need to be removed. As much of the construction debris and discarded equipment as possible will be recycled.

The construction of the rainwater and sewage pipelines will primarily involve open trenching, with only a few areas using pipe jacking. Open trenching will create temporary soil storage piles, which will be used for backfilling once the pipeline installation is complete. In accordance with the requirements of the Xinxiang Municipal Government, construction soil in the city will be transported to the designated construction waste disposal site located at the intersection of Chuangye Road and Xinzhong Avenue, 200 meters west of Xinxiang East Station, outside the North Ring Road (as shown in Figure 5.2). This site covers an area of 131 mu and has a maximum capacity to process and recycle 100,000 tons of construction waste annually. Currently, the site has not yet accepted any temporary construction waste storage.

Based on the table below, a total of 837,298 cubic meters of temporary soil storage will be required during the construction of the three sub-projects. Of this, the Yinmakou Rainwater Pump Station drainage area sub-project will require 148,597 cubic meters of temporary soil storage for the rainwater pipeline construction, and 114,451 cubic meters for the sewage pipeline construction. The Xiangyang Rainwater Pump Station drainage area sub-project will require 201,603 cubic meters of temporary soil storage for the rainwater pipeline construction and 53,356 cubic meters for the sewage pipeline construction. The Hongli Avenue Rainwater Pump Station drainage area sub-project will require 262,525 cubic meters of temporary soil storage for the rainwater pipeline construction and 56,763 cubic meters for the sewage pipeline construction.
The majority of the temporarily stored soil will eventually be used for backfilling, with a net disposal volume of approximately 167,759 cubic meters.

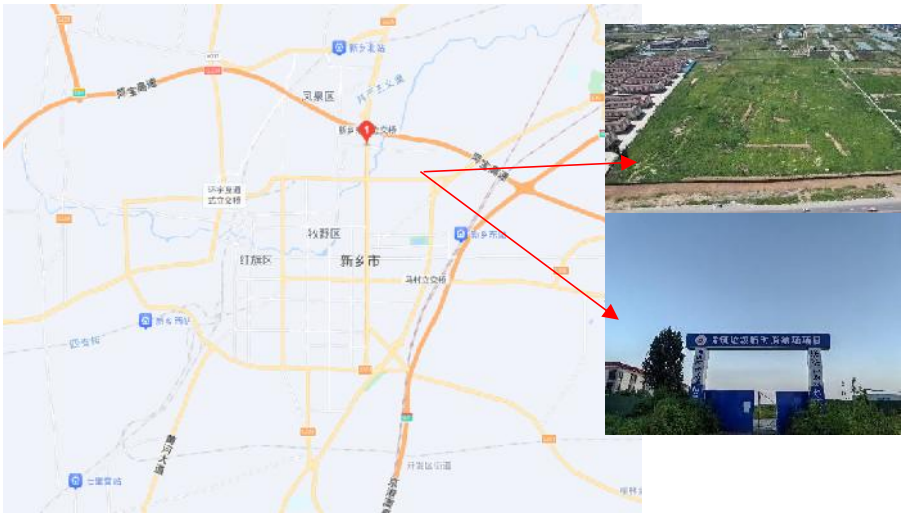


Figure 5-1 Location of Xinxiang construction solid waste receiving site

The reconstruction project of the drainage area of the Yinmakou Rainwater Pumping Station involves desilting underground channels in Renmin Park, Yinmakou Oblique Ditch, Nanhuan City River Oblique Ditch, and Beihuan City River Oblique Ditch, with a total desilting volume of approximately 19,468 cubic meters. The current oblique ditches contain a large amount of floating debris, which must be cleared before desilting begins.

The sludge generated during the desilting process will be transported to a sludge disposal site designated by the construction unit: the sludge solidification facility of the Xinxiang urban pipe network. The desilting will be performed using a high-pressure cleaning truck to flush the pipes, moving the sludge downstream into inspection wells, where a specialized sludge suction truck will extract and transport the sludge. The extracted sludge is estimated to have a water content of 80%-90%. The sludge solidification facility in Xinxiang's urban pipe network is equipped with a grating pool, a flocculation tank, a filter press, and a clean water pool. After the solidification process, the sludge will be turned into sludge cakes with a water content of approximately 30%-60%, which can be transported for use in landscaping.

回转式清污机工作图　　清罐处格栅池工作图

Rotary cleaning machine

絮凝罐、柱塞泵现场图

药剂罐现场图

Dosing

压滤机现场图

清水池现场图

Dewatering　　clean water tank

Figure 5-2 Sludge treatment process photos

5.1.2.5 Ecological Environment Impact Analysis

The project area mainly consists of artificial ecosystems such as farmland, villages, and urban districts. The construction sites along the project route have no significant vegetation cover, and the ecological environment is relatively simple. According to the site investigation, no rare wild animals or plants, and no nationally or provincially protected species are found in the project area, indicating a low sensitivity of the regional ecosystem. The Xiangyang Rainwater Pump Station currently has eight Chinese tallow trees and one large elm tree, all of which will be preserved. The green belts on both sides of the roads mainly include species like Chinese scholar tree, thousand-headed oak, and crabapple. The green belts damaged during construction will be restored and enhanced with sponge city measures, such as using sunken green spaces with grass swales and rain gardens.

5.1.2.6 Impact on Soil Erosion

During construction, activities like land clearing, excavation, and backfilling may lead to soil erosion. These processes disturb the original topography,

causing some damage to vegetation and topsoil within the project area, reducing the soil's resistance to erosion and creating conditions for soil erosion to occur and intensify. It is required that the construction unit optimize construction organization and establish strict construction operation procedures. Excavation and backfilling should be scheduled during non-rainy seasons, and the piling time of excavated and filled soil should be minimized. During construction, excavated soil should be centrally piled within the designated land area. Proper control of the pile slope, height, and location should be maintained to prevent soil erosion.

5.1.2.7 Cultural Resources

No known cultural heritage or archaeological sites were identified at the project site. However, construction activities may interfere with unknown underground cultural relics. To address this issue, the contractor should establish a chance-find procedure for handling material cultural resources: if any cultural relics are found during construction, the following steps should be taken in accordance with Article 32 of the "Cultural Relics Protection Law of the People's Republic of China": (1) Stop construction immediately; (2) Protect the site and report immediately to the Xinxiang Municipal Cultural Relics Management Department; (3) Adjust the construction plan based on the opinions of the Municipal Cultural Relics Management Department; (4) Resume construction only after approval from the Cultural Relics Management Department.

5.1.2.8 Traffic Management

During construction, the transportation of construction materials and equipment may significantly increase the traffic flow of heavy vehicles, raising the risk of traffic accidents. The project site is flat and has convenient transportation, with construction materials transportable from Donghuan Road on the west side. Except for the Hongli Avenue Dongmengjiang River Rainwater Pump Station, which is located in a development zone, the other project components are located in densely populated areas of Xinxiang City, such as near the Pang Donglai Shopping Mall. Road and pipeline construction will require road closures, significantly affecting traffic. Before construction, the construction unit should consult with the traffic department and affected units to develop a traffic organization plan for the construction period and obtain approval from the main affected units. The following measures should be taken during construction to reduce traffic congestion and minimize the impact on residents' lives:

1. At the early stage of construction, issue construction notices through leaflets or verbal notifications to inform the surrounding and passing public. Use traffic broadcasts, Xinxiang Daily, and WeChat platforms to disseminate construction diversion information.
2. Set up enclosures to close off the construction area and install safety warning signs and traffic instruction signs to ensure no unauthorized personnel enters the construction site. The site should be equipped with traffic barriers, crash barrels, traffic warning signs, traffic guiding signs,

warning lights, and barricades as approved by the traffic management department. The enclosures should have reflective markings, civil slogans, night warning lights, and flashing lights. Solar-powered guiding signs, crash barrels, and warning signs should be set at the enclosure ends. A clear guiding route map should be set at intersections or other appropriate locations. The traffic guide enclosure should be reinforced to ensure its stability and reliability. Regular safety inspections should be carried out, and any problems should be repaired promptly to prevent them from collapsing due to natural forces.

5.1.2.9 Labor and Occupational Health and Safety

About 247 construction workers will be involved during the construction phase, with a preference for hiring local workers. Approximately 12% of the workforce will be female. These workers will be distributed across three catchment areas for the drainage system construction, with about 70-100 workers in each area. Female workers will primarily be in departments such as data management, finance, human resources, and logistics. China has established a comprehensive legal and regulatory system for preventing sexual harassment, including the "Civil Code," "Criminal Law," and "Law on the Protection of Women's Rights and Interests," which align with the requirements of AIIB's ESS2. Overall, the project has a "low" risk of sexual harassment. To prevent incidents of sexual harassment, the contractor will provide enough gender-separated facilities based on the number of female staff at the construction site. Relevant rules and regulations will be established, and a dedicated person will be responsible for managing and informing all personnel about the related requirements. The contractor's daily management training will include content on preventing sexual harassment, and a complaint and appeal mechanism will be established to protect personal privacy when handling sexual harassment complaints.

Table 5-4 Construction Workers Statistics (Estimation)

Construction Area	Total Workers	Local Workers	Migrant Workers	Female Workers
Yinmakou Pump Station Catchment Area	78	57	21	15
Xiangyang Pump Station Catchment Area	78	60	18	15
Hongli Avenue Pump Station (Dongmengjiang River) Catchment Area	91	65	26	18
Subtotal	247	182	65	48

Construction workers will face health impacts such as dust, waste gas, and noise, as well as traffic safety risks, high-temperature operations, and other safety risks caused by construction. The contractor should provide safety training before construction and supply appropriate personal protective equipment (gloves, helmets, protective shoes, etc.) in accordance with the "Standard for the Provision and Use of Labor Protection Supplies for

Construction Operations" (JGJ184-2009).

5.1.3 Operational Period Environmental Impact Analysis

During operation, the pump stations will be automatically controlled, primarily managed through patrol inspections. Both the Xiangyang Rainwater Pump Station and the Dongmengjiang River Pump Station will have three staff members, generating minimal domestic sewage. Toilets will be installed in the pump stations, connected to the municipal sewage collection network. Rainwater pumps will only be activated during flood discharge periods, while sewage pumps will operate in non-rain periods. During flood seasons, discharging to the receiving water bodies (People's Victory Canal, Dongmengjiang River, and Weihe River) may have some adverse impacts on water quality. However, the incoming water volume during flood discharge is large, and the discharge duration is short. Furthermore, the pump stations are equipped with grating barriers, limiting the impact on the water quality of the receiving water bodies. During non-flood periods, sewage collected by the Xiangyang Pump Station will be lifted by submersible sewage pumps into the sewage energy dissipation pool and eventually into the existing DN600 pressure sewage pipeline, which discharges to the Luotuowan Sewage Treatment Plant. Sewage collected by the Hongli Avenue Dongmengjiang River Pump Station will be discharged to the East Sewage Treatment Plant.

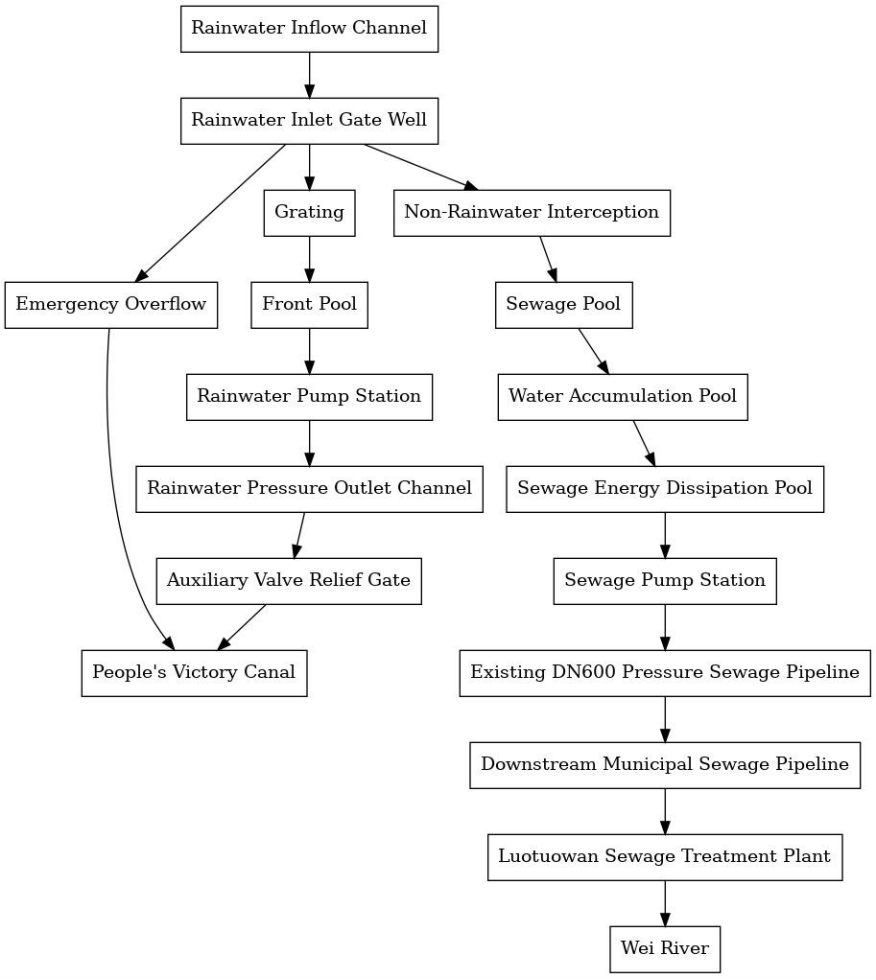


Figure 5-3 Xiangyang pump station process diagram

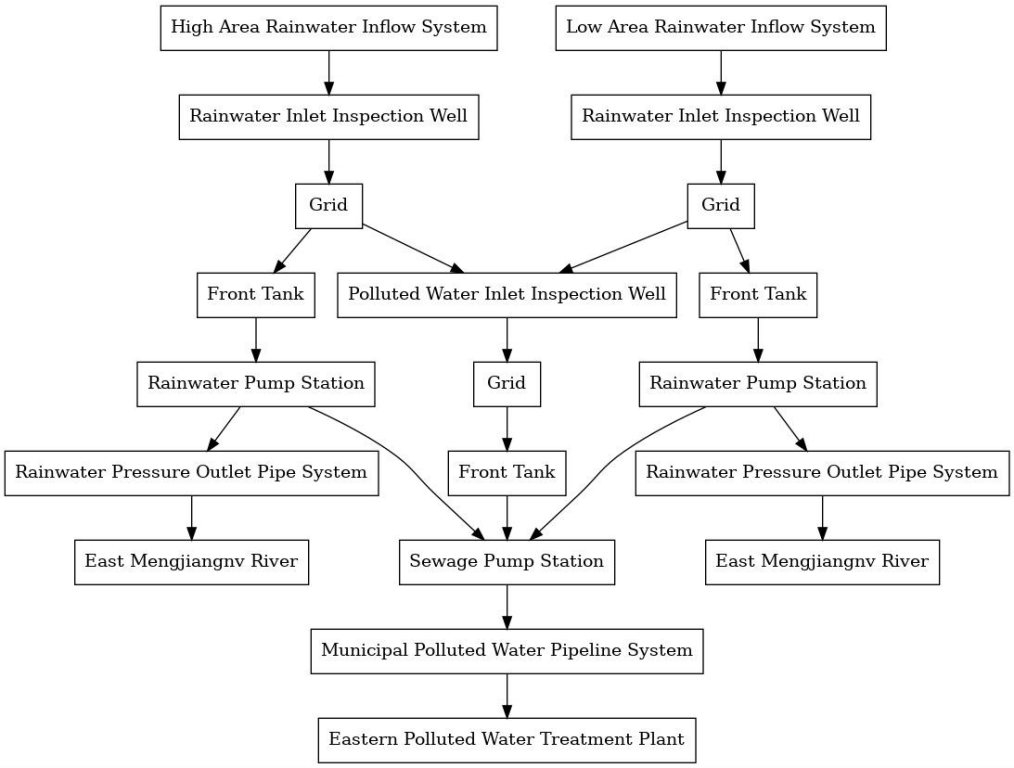


Figure 5-4 Mengjiangnv pump station process diagram

5.1.2.3 Solid Waste

During the operation of the two pump stations, a small amount of screen slag will be produced, mainly consisting of withered branches, leaves, discarded plastic, fruit peels, paper scraps, and a small amount of sediment. The amount generated is influenced by the urban environmental sanitation of the water catchment area. The Dongmengjiang Pump Station will only produce screen slag during the rainy season. The intercepted waste should be collected and transported by the sanitation department to a waste disposal site.

5.1.2.4 Atmospheric Environment Impact

Due to the incomplete separation of stormwater and sewage in Xinxiang City, the rainwater pipes usually carry a large amount of domestic sewage. To intercept dry season sewage, a sewage pump station will be built on one side of the rainwater pump house, mainly to intercept dry season sewage. Odorous gases at the pump station are primarily produced because the drainage pipes easily form anaerobic conditions, where nitrogen- and sulfur-containing organic compounds in sewage decompose into odorous substances. When the pump station equipment is started and operated, it causes turbulence in the water flow, allowing odorous substances that were previously dissolved in the sewage to escape into the atmosphere, causing odor pollution. Most sewage pump stations and combined pump station collection wells are not well-sealed, and the grid decontamination machine in the collection well needs to continuously remove garbage, emitting odors during the cleaning process.

In addition, during the equipment disassembly in the pump house, high concentrations of harmful gases can momentarily escape from the intake pipeline. The proposed Xiangyang Rainwater Pump Station and the Hongli Avenue Dongmengjiang River Rainwater Pump Station will adopt ion deodorization technology. The total exhaust volume of the odor treatment facilities is calculated using the following formula:

Q=Q1+Q2+Q3Q = Q_1 + Q_2 + Q_3Q=Q1 +Q2 +Q3

Q3=K(Q1+Q2)Q_3 = K(Q_1 + Q_2)Q3 =K(Q1 +Q2)

Where:
QQQ = Total exhaust volume collected by the odor treatment facilities (m³/h)
Q1Q_1Q1 = Odor collection volume of the structure (m³/h)
Q2Q_2Q2 = Odor collection volume of the equipment (m³/h)
Q3Q_3Q3 = Infiltration air volume of the collection system (m³/h)
KKK = Infiltration air volume coefficient, usually 5%-10%

The odor volume of the structure can be calculated based on an odor volume index of 10 m³/(㎡ ·h) per unit water surface area, with an additional air exchange volume of 1 to 2 times per hour. The water surface area of the sewage collection pool at the Xiangyang Rainwater Pump Station is 60 ㎡, with a volume of about 700 m³. The water surface area of the collection pool at the Hongli Avenue Dongmengjiang River Rainwater Pump Station is 185 ㎡, with a volume of about 2000 m³.

The odor collection system includes sealing works, an odor conveyance system (collection duct), and a deodorizing fan.

1. Odor Collection Scope
The main areas requiring deodorization in this project are the grid chamber and the collection pool.

2. Odor Sealing Works

1) Design Principles for Odor Sealing

- Sealing the structure to ensure a slight negative pressure to prevent odor leakage.
- Ensuring that sealing covers do not affect the operation and maintenance of equipment inside the structure.
- Rational configuration of air collection pipelines after installing the sealing covers.
- Considering personnel safety issues when maintaining equipment after installing the sealing covers.
- Ensuring that the sealing cover system has sufficient resistance to wind, rain, and snow.

2) Design of the Grid Sealing Hood

To effectively collect the odor escaping from the grid chamber, an air collection hood seal needs to be installed. A lightweight "close-fitting" sealing air collection hood made of a tempered flat glass frame will be set for the grid machine and belt conveyor. The collection hood has movable windows on all sides, which allow for inspection of the equipment operation outside the hood. The hood can be opened during equipment maintenance to ensure safety. If major maintenance is required, the sealing hood can be entirely dismantled. The "close-fitting" hood panels will use tempered flat glass material, and the frame will use corrosion-resistant materials. Considering equipment operation, maintenance, and operation space, the collection hood will be detachable. Two sets of sliding doors are set at the front and top of the grille to facilitate cleaning and routine maintenance of the grid machine and make it easy to maintain and clean the equipment.

3) Design of the Gate Shaft and Submersible Pump Hoist Hole Cover Plate
The pump station's water intake gate shaft, submersible pump hoist hole, and grid hole will be sealed with steel cover plates. This ensures that the deodorization system can efficiently collect odor and prevent odor leakage. Mechanical exhaust and natural air replenishment will maintain a certain negative pressure state within the structure and a certain ventilation rate, ensuring the entire deodorization system runs normally, stably, and efficiently.

5.1.2.5 Ecological Environment Impact Analysis
The project surroundings are mainly composed of artificial ecosystems, such as farmland, villages, and urban areas. The construction sites along the project route have no significant vegetation coverage, and the ecological environment is relatively simple. Site investigations show no rare wild animals or plants in the project area, nor any national or provincial key protected flora and fauna species, indicating a low sensitivity of the regional ecosystem. The Xiangyang Rainwater Pump Station currently has eight Chinese tallow trees and one large elm tree, all of which will be preserved. The green belts on both sides of the roads mainly include species like the Chinese scholar tree, thousand-headed oak, and crabapple. The green belts damaged during construction will be restored and enhanced with sponge city measures, such as using sunken green spaces with grass swales and rain gardens.

5.2 Social Impact Assessment

5.2.1 Tasks of Social Impact Assessment

The goal of the Social Impact Assessment (SIA) is to avoid or minimize adverse environmental and social (ES) risks and impacts based on the Asian Infrastructure Investment Bank's (AIIB) Environmental and Social Framework (ESF) and the Environmental and Social Management Planning Framework (ESMPF) disclosed in November 2021. When these risks and impacts are unavoidable, they should be identified in accordance with relevant Chinese laws and regulations and AIIB's Environmental and Social Policy (ESP), and necessary mitigation measures should be formulated and implemented. Therefore, the project's SIA aims to identify both positive and negative impacts of the project through various participatory methods such as literature review,

field surveys, questionnaires, focus groups, in-depth interviews, and institutional interviews. This also includes mitigating potential social risks, improving project design, safeguarding stakeholders' basic rights, and ensuring equitable participation among stakeholders. The main tasks of this SIA include:

1. Identifying the primary stakeholders of the project and understanding their interests and needs through extensive participation.
2. Conducting an appropriate survey on the applicability of ESS 3 – Indigenous Peoples.
3. Understanding the project's potential social impacts, including both positive and negative ones, and identifying potential social risks based on AIIB's ESF and ESMPF requirements, approved in December 2021.
   - Assessing impacts on communities, such as temporary access restrictions, disruptions to traffic, and other public facilities during construction.
   - Analyzing labor health and safety, as well as the impact of labor influx on communities, and establishing measures to manage interactions between communities and workers.
   - Assessing risks to community health and safety during the construction and operation phases.
4. Identifying different levels of stakeholders, describing key expectations, and analyzing the impacts, issues, and concerns related to each stakeholder subgroup.
5. Identifying the risks and impacts faced by vulnerable groups, understanding the attitudes of women and low-income groups towards the project, and identifying the project's impact on them while developing risk mitigation measures.
6. Evaluating the positive and negative social impacts that the project's intervention may have on different stakeholder subgroups or beneficiaries, prioritizing these impacts based on their significance, and proposing measures to minimize negative impacts and maximize the benefits of positive impacts.
7. Enhancing public participation, proposing project optimization suggestions, and establishing mechanisms for information disclosure and grievance redress.
8. Identifying potential adverse risks and impacts of the project and formulating mitigation measures to reduce these risks and impacts, thereby promoting the achievement of project objectives. This includes using gender-disaggregated data and analysis and considering project design enhancements to promote equal opportunities and women's socioeconomic empowerment, especially in the areas of service provision and employment.

5.2.2 Scope and Objects of the Social Impact Assessment

5.2.2.1 Objects of the Social Impact Assessment

The objects of the social impact assessment for this project are the project's primary and secondary stakeholders. The primary stakeholders include the direct beneficiaries and groups negatively affected by the project construction within the project scope in Hongqi District, Weibin District, and Muye District of Xinxiang City. These include residents, vulnerable groups, individuals affected

by land acquisition and demolition, and school teachers and students. Secondary stakeholders include Xinxiang Project Office, Xinxiang Housing and Urban-Rural Development Bureau, Xinxiang Urban Management Bureau, Xinxiang Emergency Bureau, Xinxiang Housing Expropriation Affairs Center, Xinxiang Natural Resources and Planning Bureau, Xinxiang Statistics Bureau, Xinxiang Ecology and Environment Bureau, Xinxiang Human Resources and Social Security Bureau, Xinxiang Rural Revitalization Bureau, Xinxiang Ethnic and Religious Affairs Committee, Xinxiang Women's Federation, Xinxiang Civil Affairs Bureau, Xinxiang Transportation Management Bureau, and Agricultural and Rural Bureaus of each district, as well as the subdistrict offices of Xijie Street, Wenhua Street, Xiangyang Street, Shengli Road, Jiankang Road, Nanqiao Street, and Heping Street. The project's design, construction, and supervision units are also included. The assessment will also focus on the situations of vulnerable groups and women in terms of livelihood restoration and public participation.

5.2.2.2 Scope of the Social Impact Assessment

The scope of the social impact assessment includes the three subproject areas in Xinxiang City, covering three affected districts and seven towns/streets, as well as nearby affected villages/communities and other stakeholder groups.

5.2.2.3 Key Issues of Social Impact Assessment

The key social issues of this assessment include:

1. Identifying the primary stakeholders and understanding their attitudes and needs concerning the project, including:
   - Issues already faced or likely to be faced by the urban stormwater main network and associated sewage and road improvement in the project area.
   - Issues related to urban road lane improvement, bridge construction, and road facility restoration (traffic, drainage, lighting, greening, etc.) in the project area.
2. Identifying the project's potential social impacts, such as the main sensitive points and concerns of residents, impacts of land acquisition and demolition during construction and implementation, willingness to participate of residents in surrounding areas, community health and safety, identification of ethnic minorities, the impact of migrant workers on the local area, evaluation of labor system of construction units, and occupational health and safety system.
3. Analyzing the impact of the project on low-income groups, particularly their specific needs for the post-disaster reconstruction project following the Xinxiang heavy rainstorm and their willingness and capacity to participate.
4. Analyzing potential gender-based violence issues in the project and the project's impact on women, as well as women's needs for the project, and identifying any gender differences.
5. Assessing information disclosure and public participation in the project, including the awareness, support, and participation level of affected individuals.

6. Integrating social factors into the project plan design and proposing measures to avoid or reduce negative impacts.
7. Formulating a project social management action plan to ensure urban and rural residents in the project area are well informed about the project and participate in its implementation.

5.2.2.4 Stakeholder Identification

Stakeholders are those who can influence or be influenced or benefited by the achievement of project objectives. Stakeholders can be divided into primary and secondary stakeholders. Based on the nature of the Xinxiang subproject, on-site survey results, and interviews with relevant institutions, the primary stakeholders of this project are direct beneficiaries and groups negatively affected by the project construction within the project area, including residents, vulnerable groups, and those affected by land acquisition and demolition. Secondary stakeholders include the project owner, design unit, construction unit, supervision unit, and relevant government functional departments.

5.2.2.5 Primary Stakeholders

The primary stakeholders of this project include direct beneficiaries and groups negatively affected by the project construction.

1. **Project Beneficiaries:**

The implementation of this project will benefit residents in three districts and seven streets of Xinxiang City and nearby areas (mainly including residents, women, the elderly, low-income groups, and school teachers and students). The project will promote social and economic development in seven subdistricts and towns within the project area, benefiting 233,733 people, including 117,642 women, accounting for about 50.33% of the total population. The table below (Table 5-5) provides details on the beneficiary population in each project area.

- **Project Area Residents:**

Project area residents are the most direct beneficiaries of the project. The project will benefit about 233,733 residents in the three project areas. The heavy rainstorm in Xinxiang City in 2021 directly caused flooding in some road sections, severely affecting municipal drainage facilities, disrupting daily life and travel, and causing property damage and psychological distress. The project's construction will positively impact nearby residents as follows (for detailed subproject impact analysis, see Appendix):

- By combining "trunk and branch" systems for comprehensive management, the project will significantly improve the flood control and drainage capacity in Xinxiang City, reducing or eliminating flooding in low-lying areas during the rainy season and reducing the frequency of water disasters. It will also help protect residents' lives and properties from flood threats.
- The project will restore and improve damaged lanes and supporting road facilities (e.g., streetlights), eliminating hidden safety hazards (e.g., road cracks, potholes, roadbed subsidence) in some urban roads and ensuring the safety of residents' lives and properties.

- With the implementation of the project, it will enhance the land value within Xinxiang City, beautify the green scenery along the roads, enrich the cultural life of residents in the project area, and improve the urban landscape.
- The construction and operation of the project will provide spiritual comfort to residents, increase related income from commerce and tourism, offer employment opportunities, and enhance the city's influence.

Table 5-5 Overview of Beneficiary Population in the Project Area

Project City	Project Area	Town/Subdistrict Office	Population	Female Beneficiary Population	Female Beneficiary Proportion (%)
Xinxiang City	Hongqi District	Xijie Street	16,766	8,903	53.1
		Wenhua Street	66,000	33,799	51.21
		Xiangyang Street	40,309	20,058	49.76
	Weibin District	Shengli Road	28,958	14,189	49
		Jiankang Road	29,000	15,486	53.4
		Nanqiao Street	43,000	20,382	47.4
	Muye District	Heping Street	9,700	4,826	49.75
	Total	7	233,733	117,642	50.33

- **Project Area Vulnerable Groups:**

Vulnerable groups in the project area include low-income households, "five guarantees" households, disabled individuals, female-headed households, and other low-income groups (however, there are no vulnerable groups among the 12 individuals affected by the land acquisition). These individuals are relatively vulnerable, and their interests need attention. The project will undoubtedly bring more employment opportunities and a convenient transportation environment to the area. The construction of infrastructure and nearby landscaping will create non-technical positions such as security and cleaning staff, which will be prioritized for local vulnerable groups, allowing them to work locally while taking care of their families, thus providing stable income.

2. **Groups Negatively Affected by Project Construction:**

These groups include those whose normal production and living conditions are negatively affected by construction, land acquisition, and other factors. These are mainly residents affected by permanent and temporary land acquisition, including vulnerable groups such as some low-income individuals and women. Site surveys found that the Xiangyang Pump Station involves the Xiangyang Subdistrict in Hongqi District and Shengli Road Subdistrict in Weibin District. Public participation surveys and forums have been conducted in the nearby Qiudong Community, where most residents (90.6%) believe that expanding the pump station is necessary for flood discharge and support it as long as it does not affect their daily life, travel, and rest. During site interviews, the pump

station construction manager also reported that the existing pump station (a large yard) has enough space to accommodate construction without occupying residents' transportation channels.

The project's resettlement impact is mainly due to land acquisition involved in the construction of the Hongli Avenue East Mengjiang River Rainwater Pump Station catchment area. The resettlement impact affects two households with 12 people in the Muye District of Xinxiang City. The impact of permanent land acquisition affects two households with 12 people. For specific details, refer to the project's "Resettlement Plan."

5.2.2.6 Secondary Stakeholders

The secondary stakeholders of this project include the project owner, design unit, construction unit, supervision unit, and government and its related functional departments.

1. **Financial Bureau Project Office:**

Under the project leadership team of the city, the Xinxiang Project Management Office (hereinafter referred to as "Xinxiang Project Office") is established in the Municipal Finance Bureau, with the director of the Municipal Finance Bureau serving as the office director. It has four groups: the Comprehensive Coordination Group, Tendering and Procurement Group, Finance and Statistics Group, and Project Implementation Group. They are responsible for coordinating, consulting, tendering and procurement, finance and statistics, environmental and social security management, and project implementation supervision for the loan project to ensure its smooth implementation. Relevant industry management departments have also established corresponding industry project offices. They are responsible for the daily management of the project, organizing and guiding project implementation units to carry out preliminary preparation, mid-term implementation, and post-evaluation of the project; specifically implementing project planning, funds, finance, procurement, training, monitoring, and document management; responsible for external affairs reception of the project and handling other tasks assigned by superiors.

2. **PIUs**

The PIUs, Xinxiang Housing and Urban-Rural Development Bureau and Xinxiang Urban Management Bureau, serve as the project's construction and operation institutions, specifically responsible for and coordinating various business relationships and responsible for the construction organization and management of the owner unit.

3. **Government and Its Related Functional Departments:**

This project involves government departments such as the Natural Resources and Planning Bureau, Housing Expropriation Affairs Center, Development and Reform Commission, Transportation Bureau, Statistics Bureau, Human Resources and Social Security Bureau, Women's Federation, Civil Affairs Bureau, Rural Revitalization Bureau, Ecology and Environment Bureau, and

subdistrict offices. The implementation of the project also involves grassroots staff in specific communities/village committees in the project area. The smooth implementation of the project relies on the coordination and cooperation of various government departments.

Other secondary stakeholders of this project include consulting units undertaking design and consultation work, construction units undertaking engineering construction, and others.

5.2.2.7 Demands of stakeholders

(1) The Urgent Need for Post-Disaster Reconstruction of Municipal Infrastructure Due to the Impact on Residents' Daily Travel in the Project Area

The catastrophic flooding disaster in July 2021 destroyed urban roads and pedestrian bridges. Despite the collective efforts of the entire city to combat the floods, the downtown area of Xinxiang suffered significant losses, with severe damage to urban road infrastructure. The curbstones along the roads were damaged or missing, drainage facilities were impaired, and cracks on road surfaces increased, which severely affected the daily travel of residents along these routes.

Several major roads in Xinxiang, such as Jiefang Avenue, Shengli Street, Jiankang Road, and Kelong Street, are critical transportation arteries. These roads are lined with commercial areas, schools, and government institutions, including large commercial complexes like the Sanwei Commercial Plaza and Department Store, as well as schools like Xinxiang Yucai Primary School and Yucai Kindergarten, along with parks and hospitals. Due to the large population flow, many residents in the project area rely on walking or cycling for their daily commute. The damage to the roads has caused significant inconvenience, forcing residents to take detours for their everyday travel.

Interview Record 5-1: Mr. Wang and Others from Shengli Road Office (Age 43)

"The road conditions on Jianshe Road are not very good at the moment, and the drainage facilities urgently need improvement. On the west side of the railway, there is a lot of standing water, and sewage easily spreads into residents' homes. Particularly on Kelong Street, the drainage system is ineffective throughout the year. We, the residents, have reported this issue many times, but there has been no improvement so far; it's the same problem year after year."

“The streetlights along Minzhu Road flicker on and off, and during rainy days, there is even a risk of electrical leakage or electrocution.”

“The terrain here is higher in the north and lower in the south, with a significant slope. The flood in 2021 damaged the roadbed, and now, whenever it rains, the sewage surges out.”

Enhancement of Urban Flood Diversion Channel Capacity to Ensure Effective Operation of Flood Discharge Pathways: The catastrophic rainstorm and flood disaster in July 2021 severely damaged flood diversion channels within Xinxiang’s urban area, disrupting the normal operation of several rainwater discharge routes and negatively impacting daily travel for city residents. Urban residents have expressed a strong desire for the rapid repair and improvement of the flood diversion channels' capacity, as well as the clarification of rainwater and wastewater sources. This is aimed at facilitating residents’ safe travel during the rainy season and ensuring the protection of their normal living environment.

Interview Record 5-2: Mr. Liu and Others from Xiangyang Street, Hongqi District (55 years old)

"At the river junction, heavy rain pushes open the sewage pipes, causing sewage to overflow and pollute the river."

"The water-crossing section on Jianshe Road should be widened; the drainage ditch is too narrow, and it floods easily when heavy rain comes."

"The underground culverts are often clogged, and during rainstorms, they turn into open channels. In 2021, the first floors of residents' homes were flooded by rainwater."

(1) Limited capacity of urban rivers and damaged infrastructure have caused inconvenience to residents' daily lives and travel.

The torrential rain and flooding disaster in July 2021 severely damaged flood protection and drainage systems, such as Weihe River, DongMengjiangnv River, and People's Victory Canal within the urban area of Xinxiang. The

inefficient flood drainage, damaged roads, and displaced or broken sewage networks caused sewage to overflow, significantly inconveniencing residents in terms of daily travel, work, and home life. Residents in the affected areas expressed a strong desire for rapid improvements to the urban drainage systems.

(2) Students and parents along the affected areas wish for road reconstruction and easier access.

The torrential rain and flooding in July 2021 caused varying degrees of damage to Xinxiang's urban roads, supporting facilities, bridges, and drainage systems. The stormwater arches in urban roads are mainly built with brick masonry, dating back to the 1970s and 1980s, with a design standard of only a 0.5-year return period, resulting in partial collapses. Blocked rain and sewage networks have led to poor drainage. The current rainwater pump stations are insufficient for their service areas, and the facilities are outdated and heavily deteriorated. The rainwater pipeline diameters upstream of the underground channels are too small, requiring systematic upgrades. Presently, certain road sections are prone to waterlogging, and damaged streetlights hinder safe travel for students. Numerous schools are distributed throughout the city, such as the elementary and kindergarten schools along Shengli Road. Since the disaster, students, especially those preparing for higher education exams, and their parents, have had to take detours, consuming a great deal of time and energy. During the project construction, road closures and traffic restrictions will require vehicles to detour via longer routes, exacerbating congestion during peak times and adding pressure and burden on students and their families.

(3) Low-income groups are eager to participate in the project.

Field interviews revealed that low-income individuals in the project area strongly support the construction, with 98.9% expressing approval. Many would be willing to participate in project construction and operation, such as working as laborers during construction or as cleaners and channel patrol personnel at the rainwater pumping stations during the project’s operation. This would provide them with local job opportunities, increasing their household income while allowing them to manage family responsibilities simultaneously.

Some low-income households and individuals receiving social assistance expressed their willingness to participate in the project. For them, Xinxiang's urban drainage capacity enhancement project presents an excellent opportunity to increase income and reduce poverty. By contributing labor to the construction process and participating in non-technical roles offered by the project, they hope to secure stable employment and income.

Interview Record 5-3: Zhang from Shengli Road, Weibin District (43 years old)

"In 2021, Victory Canal was severely damaged by torrential rain. Normally, sewage flows into the canal, and in the summer, the smell becomes

unbearable. We don't even go for walks around that area anymore."

"The underground drainage channels are often blocked and damaged, and sewage frequently overflows from the manhole covers. This has been an ongoing issue for many years."

(4) Women show strong support for the project.

The women of Xinxiang are highly supportive of the urban drainage capacity enhancement project, which will improve the rainwater and sewage systems and enhance road lighting. Upon learning about the project's content, many women expressed eagerness for the project to be implemented swiftly. They hope it will reduce flood risks and improve their safety when traveling in rainy conditions, contributing to a better quality of life.

Through a survey of 163 women across the three project sites, it was found that 96.32% of women are willing to participate in the project. Therefore, women in the project areas show strong enthusiasm for participating in the project's construction. The willingness of women in the project areas to engage in the project is summarized in the table below.

Interview Record 5-4: Ms. Zhang from Jiannan, Shengli Road Street (35 years old)

"Shengli Street is already a one-way road, and now, without the drainage system being repaired, it gets especially congested during school pick-up and drop-off times. I don't even dare drive anymore, so I have to squeeze through on my electric scooter. After work, I still need to pick up my child from school. I already get off work late, and my child is about to enter middle school, so time is really tight. Now, every day, my child has to wait at the school gate for me to pick them up, which makes things even more rushed. It's tough for the child too."

Table 5-6 Analysis of Women's Willingness to Participate in Project Construction in the Project Area

Willingness	Frequency	Percentage (%)	Valid Percentage (%)	Cumulative Percentage (%)
Willing	157	96.32	96.5	96.5
Unwilling	6	3.68	3.5	100.0
Total	163	100.0	100.0	

(5) Project Area Grassroots Communities Expect Improved Awareness of the Project

Following the participation and door-to-door promotional surveys conducted by the Project Office, relevant project units, feasibility study teams, social impact assessment (SIA) teams, and environmental impact assessment (EIA) teams, the proportion of survey respondents in the project area who have "heard of" the project has reached 77.78%. This shows that residents' awareness of the project has increased. Among those who have heard of the project, the main

sources of information are the residents'/village committees (66.67%), followed by government promotions (54.63%), and related public notices (36.11%).
During field interviews and focus group discussions, the SIA team found that staff from government departments and grassroots authorities have improved their knowledge of the project. Most residents in the project area have become aware of the project through various channels. However, the primary way for general residents to learn about the project is by word of mouth, so the overall awareness and participation rate among grassroots communities still need to be enhanced. This requires further strengthening of project publicity and actively guiding public participation.

(6) Stakeholder Demand Analysis Table

The demand analysis for the project's stakeholders is detailed in Table 5-7.

Table 5- 7 Needs of the key stakeholders

project	Project Name	Affected streets/townships	Key stakeholders	Demand Analysis
This project	Yinmakou rainwater pumping station water catchment division project Have you estimated the additional funds required? Hongli Avenue East Mengjiangnv River Rainwater Pumping Station Water Catchment Area Construction Project	Hongqi Area: West Street, Wenhua Street Weibin District: Jiankang Road Subdistrict, Nanqiao Subdistrict Hongqi Area: Xiangyang Street Weibin District: Shengli Road Subdistrict Muye District : Niezhuang Village, Heping Street	Residents in the project area	The daily lives of residents in the project area have been affected, and there is an urgent need for flood safety protection projects a. Laying pipe networks to ensure smooth water flow, eliminate flood-prone areas, facilitate residents' daily travel and meet safety needs; b. Road damage causing travel inconvenience; c. Desilt the pipelines to ensure the safety of rainwater and sewage diversion; d. Improve the community's emergency management system and establish a complaint mechanism for residents to complain about pumping stations or communities along the road.
			Low-income people and other vulnerable groups in the project area	Low-income people and other vulnerable groups in the project area expect to obtain employment opportunities and jobs a. Lay pipe networks to repair damaged roads and ensure convenient and safe daily travel for the elderly, pregnant women and children; b. During the construction period, make detour plans to

				keep traffic smooth; after the project is completed, provide corresponding vocational skills training and jobs; c. If there are stable employment opportunities, low-income groups will be more enthusiastic and willing to participate in project construction.
			Women in the project area	Enhance women's community participation and voice, and protect women's rights a. Lay pipelines and reinforce roads to ensure convenient and safe daily travel for women in rainy weather; b. Enhance the voice of women in the community in participatory management of pump station construction; c. During the project construction and operation, priority will be given to providing employment opportunities for women.
			Neighboring residents	Residents along the route expect to improve municipal infrastructure and protect the safety of life and property a. Desilt old pipelines, widen pipelines and lay new pipeline networks to ensure pipeline flood safety; b. Ensure the safety of pipeline flood discharge and smooth flood diversion, and ensure the quality of pipelines for guiding water to quickly leak out; c. Solve the problem of black and smelly water, improve the natural environment and hydrological environment around the sluice gate, and reduce the probability of water pollution.

5.2.3 Social Impact Analysis

The Social Impact Assessment Survey Team (referred to as the "SIA Survey Team") worked closely with the Xinxiang Project Office, Xinxiang Housing and Urban-Rural Development Bureau, Xinxiang Urban Management Bureau, Xinxiang Emergency Management Bureau, Xinxiang Housing Expropriation Affairs Center, Xinxiang Natural Resources Bureau Expropriation Office, various district agricultural and rural bureaus, relevant street offices, property owners, communities/villages, and individuals. From April 16 to April 20, 2024, the team conducted 330 face-to-face questionnaire surveys within the project implementation area, covering three districts. After statistical checks, all 330 questionnaires were deemed valid, resulting in a 100% effective response rate. Respondents included individuals of different age groups, educational levels, and professions, with 167 males and 163 females.

Additionally, the SIA Survey Team conducted 10 focus group discussions, involving 114 participants, of whom 33 were women, accounting for 28.98% of the total participants.

Based on the on-site assessments by the SIA Survey Team, the project's beneficiary area includes seven towns/streets in the Weibei District, Hongqi District, and Muye District of Xinxiang City. The project's construction impact is expected to affect residential areas within a 200-meter radius of the construction sites.

Table 5-8 Social Benefits List

Project Name	Affected Streets/Townships	Social Benefits
Yinmankou Rainwater Pump Station Drainage Area Project	Hongqi District: West Street, Wenhua Street; Weibin District: Jiankang Road, Nanqiao Street	1) Improve drainage facilities, resolving pipeline blockages: a) Clean and repair pipes, increasing the drainage capacity of the current rainwater system. b) Upgrade rainwater pipelines and pump stations that don't meet drainage requirements; improve rainwater systems and correct cross-connections of wastewater and rainwater. c) Relocate conflicting municipal pipelines. 2) Eliminate flood-prone areas, reducing flood risks: a) Enhance the emergency management capacity of the Wei River basin, particularly in areas hit hardest by the 7/20 flood, preventing future flood damage to homes, vehicles, and communities. b) Ensure safety of lives and property, facilitate travel, and improve residents' commuting efficiency. 3) Enhance natural landscapes, improving water quality and the surrounding ecosystem.
Xiangyang Rainwater Pump Station Drainage Area Improvement Project	Hongqi District: Xiangyang Street; Weibin District: Shengli Road Street	1) Improve drainage facilities, resolving pipeline blockages: a) Clean and repair pipes, increasing the drainage capacity of the current rainwater system. b) Upgrade

Project Name	Affected Streets/Townships	Social Benefits
		rainwater pipelines and pump stations; correct mixed connections of rainwater and sewage. c) Relocate conflicting municipal pipelines. 2) Eliminate flood-prone areas, reducing flood risks: a) Improve flood control standards, reducing flood impacts, especially in areas most affected by the 7/20 flood. b) Alleviate psychological stress on residents living near the People's Victory Canal. 3) Separate wastewater and rainwater systems, improving urban water quality: a) Divert rainwater to rivers and wastewater to treatment plants. 4) Achieve source control of runoff and develop a sponge city: a) Implement permeable walkways and ecological tree pits to control runoff.
Hongli Avenue DongMengjiangnv River Rainwater Pump Station Drainage Area Project	Muye District: Heiping Street, Niezhuang Village	1) Improve drainage facilities, resolving pipeline blockages: a) Clean and repair pipes, increasing the drainage capacity of the current rainwater system. b) Upgrade rainwater pipelines and pump stations; correct mixed connections of rainwater and sewage. c) Relocate conflicting municipal pipelines. 2) Eliminate flood-prone areas, reducing flood risks: a) Enhance emergency management in the Wei River basin, preventing future flood damage. b) Ensure the safety of residents and improve commuting efficiency. 3) Promote regional development and create job opportunities: a) Strengthen the role of Xinxiang East Station in supporting urban competitiveness, attract high-end communities and businesses, and improve land utilization. b) Develop commercial areas near the high-speed rail station, creating jobs. 4) Achieve source control of runoff and develop a sponge city: a) Implement sunken green spaces, grass ditches, and rain gardens to control runoff.

5.2.3.1 Social Benifits

Based on the on-site investigation and statistical analysis of 330 survey responses, it was found that residents from the three project counties generally believe the implementation of the project will have several positive impacts:

1) 76.89% of the residents believe that the project will reduce the impact of flood disasters.
2) 74.52% believe that the project will make residential life safer.
3) 67.42% think the project will improve traffic congestion in Xinxiang city and near major rivers.
4) 53.42% think the project will enhance Xinxiang's sewage facilities and

address the issue of clogged inner rivers.

5) 52.11% think the project will help prevent soil erosion and water pollution.
6) 45.21% believe the project will beautify the riverside areas, potentially boosting tourism-related income.
7) 18.57% of the residents believe the project will create more job opportunities.

Table 5- 9 Overview of Residents' Perception of Positive Impacts

Statistical Indicators	What positive impacts might the project have?	Reducing the impact of floods	Making residential life safer	Improving traffic congestion in Xinxiang and near rivers	Enhancing sewage facilities and addressing clogged rivers	Reducing soil erosion and water pollution	Beautifying riversides and increasing tourism income	Creating job opportunities	Don't know
Sample Size		254	246	222	176	172	149	61	14
Percentage (%)		76.89	74.52	67.42	53.42	52.11	45.21	18.57	4.2

(1) Eliminating Waterlogging and Reducing Flooding

The 2021 catastrophic floods caused significant losses of life and property in Xinxiang, with several sections of roads becoming flood-prone, leading to both inconvenience and psychological stress for residents. According to interviews and survey data, the rivers in Xinxiang typically have low water flow, and floods are rare, but the flood protection infrastructure was not up to standard. Upon project completion, flood protection standards in urban areas outside of Xinxiang will improve, relieving residents of their post-disaster concerns and significantly reducing the impact of floods.

Interview Record 5-5: Mr. Zhang, 42, from Jiankang Road, Hongqi District

"Since the flood that year, we've been looking forward to the improvement of the rainwater and sewage networks near our home. This project will make daily commuting more convenient, manage the flood-prone road sections, and provide us with a pleasant environment for leisure and recreation. It's a great public welfare project, and we fully support it."

(2) Improving Drainage Facilities and Resolving Pipe Blockages

Survey results show that 97.12% of residents consider the need for drainage facilities to be moderate or above. During the on-site investigation and interviews, it was found that, following the 2021 flood disaster, there are still some waterlogging points on city roads, and related infrastructure (such as

streetlights and surveillance systems) suffered varying degrees of damage. This project will renovate, repair, and construct new water-damaged sewage facilities (e.g., flood interceptors and rainwater retention ditches), and inspect and repair urban drainage networks. This will effectively resolve the issue of blocked drainage channels beneath the roadside curbs, enhancing rainwater collection capabilities and ensuring the smooth operation of sewage treatment plants. As a result, the city's roads will have significantly improved resilience against natural disasters such as heavy rainfall, reducing water accumulation and improving safety and efficiency in residents' daily lives.

Interview Record 5-6: Mr. Qi, 35, from Wenhua Street, Hongqi District

"Every rainy season, the drainage from the residential area to the main road becomes a problem. We've reported it many times, but nothing has improved, and it happens every year. We hope the city's drainage and sewage treatment facilities can be repaired as soon as possible."

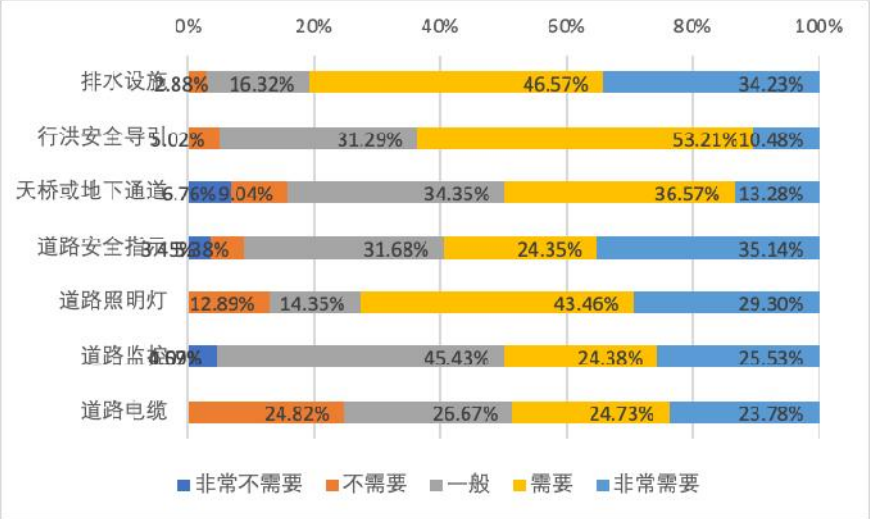


Figure 5-5 Needs for the water resources infrastructures in the project area

(3) Building Bridges to Improve the Road Network and Facilitate Convenient Travel

Survey results show that the Hongli Avenue East Meng Jiangnu River Rainwater Pump Station Watershed Construction Project proposes the construction of two new bridges: one at Zhanqian First Street and another at Hongli Avenue. As a key transportation hub, the convenience of the core roads around Xinxiang East Station significantly impacts the travel of both residents

and passengers. These new bridges can alleviate terrain barriers, reduce traffic bottlenecks, and make commuting easier for both residents and passengers. The bridges will improve transportation efficiency and reduce travel time. By reducing the need for traffic signals, vehicles will no longer be constrained by signal lights, allowing for smooth, quick passage and significantly shortened travel times.

Some sections of Xinxiang's internal roads, impacted by flooding, suffer from water accumulation and damage to infrastructure such as streetlights and surveillance systems. The social impact assessment group learned through field visits and surveys that the primary mode of transportation for Xinxiang residents is electric bikes (83.26%), followed by walking (64.78%), and private cars (58.73%). Many residents expressed concerns about narrow lanes and poor nighttime lighting, which have caused daily inconveniences for themselves and their families. This project needs to address road defects (such as cracks, potholes, and subsidence), and remove hidden safety issues caused by flood-damaged roads. Furthermore, streetlights and related infrastructure must be restored to enhance illumination and reduce crime, ensuring the safety of residents' travel. As for municipal roads, the project will focus on improving city roads, building new bridges, and associated infrastructure.

Interview Record 5-7: Mr. Zhang (35 years old), Shengli Road Subdistrict, Weibin District

"The road conditions on Shengli Road are really bad, with cracks and severe water accumulation points. I have to travel on this road for work every day, and it's extremely bumpy. I hope they can fix these high-traffic roads as soon as possible."

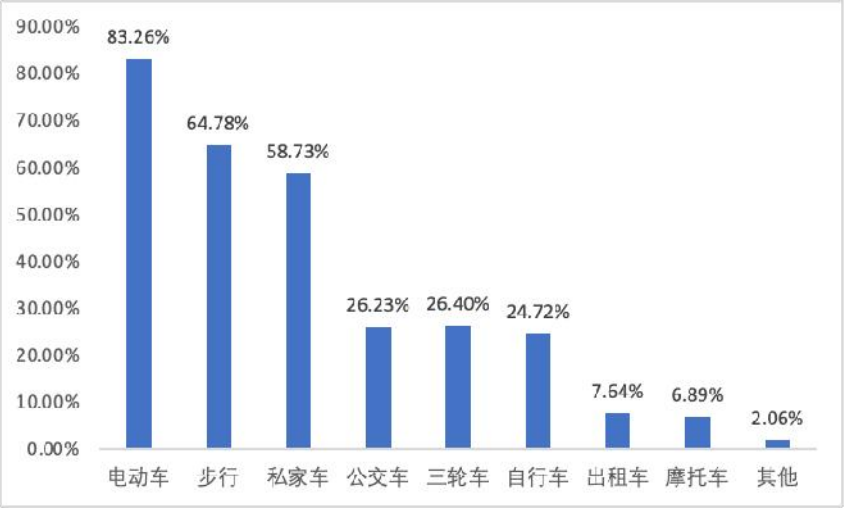


Figure 5-6 Transportation mode in the project area

(4) Enhancing Roadside Landscaping and Improving the Urban Natural Environment

The social impact assessment group found that areas near the People's Victory Canal, Weihe River, and other tributary rivers, as well as nearby parks like Summer Lotus Park, People's Park, and Xiangyang Park, are popular locations for residents to engage in recreational activities. After work, large groups of residents, including seniors and children, often visit these areas to walk, dance in public squares, or enjoy entertainment. However, the current planning near Xinxiang East Station lacks sufficient green spaces, detracting from the residents' leisure experience. Residents are hopeful that the completion of this project will cater to the diverse needs of all age groups, improving urban waterfront landscapes. Additionally, as this project progresses, the improved landscaping in suburban areas will attract more tourism, which in turn will spur private development, enhance local tourism facilities, and increase tourism revenue in Xinxiang's scenic areas.

Interview Record 5-8: Mr. Wang (45 years old), Xiangyang Subdistrict, Hongqi District

"In 2021, we experienced a massive flood that none of us anticipated. My wife and I used to take walks along the Shengli Canal after dinner. Now, the canal is dried up, and the water quality is poor. There are fewer people around, and it's not as lively as before. We fully support this project and hope the construction is completed soon to bring life back to our area."

(5) Promoting Regional Development and Increasing Employment Opportunities

The project will undoubtedly boost economic development in the area. The three-ring urban structure around Xinxiang East Station includes: (1) a supporting service zone for transportation transfer, retail, tourism services, and cultural activities; (2) a comprehensive residential area integrating living, offices, hotels, and business services; and (3) an ecological residential area featuring housing with supporting educational, retail, and recreational facilities. The planned population for this high-speed rail area is approximately 106,000 people. The Xinxiang flood control improvement project will upgrade the urban infrastructure around the high-speed rail station, attracting developers to invest in the area, which will spur nearby residential and commercial development. As the city roads are widened and repaired, travel convenience will improve, increasing both housing prices and rental income for local residents.

Additionally, during the construction and operational phases, there will be both technical and non-technical jobs available, such as the transportation of construction materials, building work, and food services for construction teams.

After completion, the management and maintenance roles at the pump stations, as well as cleaning, security, and logistics positions, will offer employment opportunities. During discussions with the project office and stakeholders, it was agreed that these jobs should be prioritized for local surplus labor, particularly vulnerable groups such as women, the elderly, and low-income individuals, helping them increase their income.
However, survey results indicate that only 18.57% of residents believe the project will increase employment opportunities. This reflects cautious optimism from residents regarding the project's economic impact, as many local people explained to the assessment group that they prefer long-term jobs. Many are hesitant to take short-term, temporary jobs of just 1-2 months since these roles do not offer sustainable employment, and they fear losing long-term work opportunities once the project ends.

Interview Record 5-9: Ms. Kong (55 years old), Xiangyang Subdistrict, Hongqi District

"In 2021, the massive flood caught us all by surprise. We live just a short walk from the park, and there used to be a lot of people coming here to relax and take walks. Once the roads are fixed, not only will our travel be more convenient, but it will also beautify our city's landscape."

5.2.3.2 Social Risks

Table 5-10 Social Risk Matrix

Project Name	Affected Streets/Townships	Social Risks
Yinmakou Rainwater Pump Station Catchment Area Subproject	Hongqi District: West Street, Cultural Street Weibin District: Health Road Street, Nanqiao Street	1) Land Acquisition and Resettlement Impact: Temporary land occupation of about 525.01 mu (no additional permanent land acquisition), upgrading on the existing road base. 2) Social and Environmental Impact During Construction: A. Dust, construction waste, and accumulated silt cause inconvenience for schools, shops, and nearby residents. B. Noise, dust, exhaust emissions from machinery, and wastewater disposal affect community aesthetics and residents' rest. C. Traffic disruptions due to construction; a well-planned traffic diversion scheme is necessary to avoid congestion, especially during peak hours. 3) Influx of Migrant Workers: A. Health and sanitation risks, including the

Project Name	Affected Streets/Townships	Social Risks
		spread of diseases like HIV/AIDS, putting pressure on community health services. B. Cultural and religious conflicts (e.g., beliefs, graves, temples, funeral traditions). 4) Sewage Pipeline Construction Impact: A. Potential road subsidence causing inconvenience for residents. B. The construction company must ensure safety and be prepared for risks such as flooding and trench collapses. 5) Gender Impact: Risk of gender inequality, including discrimination against women during employment, leading to gender-based violence, including threats, coercion, or arbitrary deprivation of freedom.
Xiangyang Rainwater Pump Station Catchment Area Renovation Project	Hongqi District: Xiangyang Street Weibin District: Victory Road Street	1) Land Acquisition and Resettlement Impact: Expansion on state-owned land, occupying about 3.06 mu, with temporary land occupation of 343.55 mu, upgrading on existing roads. 2) Negative Social and Environmental Impact During Construction: A. Dust, construction waste, and accumulated silt causing inconvenience for residents and patients. B. Noise, dust, exhaust emissions from machinery, and wastewater disposal affect community aesthetics and residents' rest. C. Traffic disruptions; construction companies must plan a well-structured traffic diversion to avoid congestion. D. Potential road subsidence due to tunneling. 3) Influx of Migrant Workers: A. Health and sanitation risks (HIV/AIDS, epidemics) putting pressure on local health services. B. Cultural and religious conflicts (e.g., beliefs, temples, funeral traditions). 4) Gender Impact: Risk of gender inequality, including discrimination during employment, leading to gender-based violence, including threats, coercion, or arbitrary deprivation of freedom.
Hongli Avenue East Meng Jiangnu River Rainwater Pump Station Catchment Area Construction Project	MuyeDistrict: Peace Street, Niezhuang Village	1) Land Acquisition and Resettlement Impact: Collective land acquisition of 7.1 mu, affecting 2 households and 12 individuals. 2) Negative Social and Environmental Impact During Construction: A. Dust, construction waste, and accumulated silt cause inconvenience for residents. B. Noise, dust, exhaust emissions from

Project Name	Affected Streets/Townships	Social Risks
		machinery, and wastewater disposal affect community aesthetics and residents' rest. C. Traffic disruptions; construction companies must plan well to avoid congestion. 3) Influx of Migrant Workers: A. Health risks (HIV/AIDS, COVID-19, influenza), putting pressure on community health services. B. Cultural conflicts (e.g., religious beliefs, graves, temples). 4) Sewage Pipeline Tunneling Impact: A. Road subsidence during tunneling. B. Safety measures to prevent collapses and flooding accidents. 5) Gender Impact: Risk of gender inequality and gender-based violence, including discrimination against women during employment, leading to physical or sexual harm.

(1) Potential Land Acquisition Impacts of Project Construction

The resettlement impacts of this project involve the **Muye District** of Xinxiang City, affecting **2 households with a total of 12 individuals**. The permanent acquisition of collective land impacts 2 households and 12 individuals. The primary impacts are as follows (for specific resettlement impacts, please refer to the "Abbreviated Resettlement Plan for the Xinxiang City Drainage Capacity Enhancement Project Supported by the AIIB Emergency Loan for Post-Disaster Recovery in Henan, Xinxiang, and Other Areas"):

1. The project will involve the acquisition of approximately **7.1 mu** (around 1.17 mu) of collective land, which is currently general farmland, impacting 2 households with 12 individuals in **Nie Village, Hezuo Group 4, Heping Subdistrict, Muye District, Xinxiang City**. There are no vulnerable groups involved (e.g., minimum subsistence allowance recipients, widows, single mothers, or disabled persons).
2. The project will permanently occupy **172.04 mu** (approximately 28.67 mu) of state-owned land. For the **Xiangyang Pump Station** expansion project, 3.06 mu of existing state-owned land will be used for vertical expansion. The **Hongli Avenue East Mengjiangnv River Pump Station** subproject will cover 4.5 kilometers of stormwater pipelines, a rainwater pump station with a capacity of 20 m^3/s, two bridges, 2 kilometers of sewage pipelines, and road infrastructure. The total occupation of state-owned land for this subproject amounts to 168.98 mu, and the acquisition of this land was completed between 2012 and 2018, now entirely converted to state-owned land. According to the **Due Diligence Report**, no compensation is required for this state-owned land as it does not involve any further allocation, transfer, or resettlement impacts.

3. The project will temporarily occupy **868.56 mu** of state-owned land, including roads and adjacent vacant land. The **Yinmankou Rainwater Pump Station Catchment Area Subproject** involves 13 roads, with a temporary land occupation of approximately 525.01 mu. The **Xiangyang Pump Station Catchment Area Renovation Subproject** involves a temporary land occupation of approximately 343.55 mu.

This project does not involve any **house demolition impacts**.

Once the affected households and the scale of permanent land acquisition are identified, the potential impacts will be communicated to the villagers in advance. Full compensation will be provided according to current policy, and their opinions and suggestions will be gathered in a timely manner. Contingency mechanisms will be established to address potential and unexpected issues. For detailed resettlement action plans, refer to the "Resettlement Action Plan" prepared for this project.

The land acquisition impacts of the project are summarized in **Table 5-11**:

Table 5-11 Resettlement Impacts of the Project

Project	Affected Entity	Type of Impact	Land Pre-Approval Documents	Remarks
Yinmankou Rainwater Pump Station Catchment Area Subproject	/	Existing roads	/	Upgrading existing roads, temporarily occupying approximately 525.01 mu. No new permanent land acquisition involved.
Xiangyang Pump Station Catchment Area Renovation Subproject	/	Existing state-owned land	/	Vertical expansion on the original site, occupying approximately 3.06 mu of state-owned land. No new permanent land acquisition involved.
/	/	Existing roads	/	Upgrading existing roads, temporarily occupying approximately 343.55 mu. No new permanent land acquisition involved.
Hongli Avenue East Mengjiangnv River Rainwater Pump Station Catchment Area Subproject	**Muye District**	**Nie Village, Heping Subdistrict**	Collective Land	Acquisition of 7.10 mu of collective land, affecting 2 households with 12 individuals.
/	/	Existing state-owned land	/	New construction on pre-acquired state-owned land, occupying approximately 168.98 mu.

Note: Data sourced from the project's "Resettlement Action Plan."

(2) Potential Social and Environmental Impacts of Project Construction

The construction activities of the project may cause certain disruptions to the daily lives and production activities of the surrounding residents, particularly in areas near residential communities and schools.

For example, during the construction of the **Yinmankou Rainwater Pump Station Catchment Area Subproject**, some sections of the roads will be closed, leading to short-term disruptions in traffic. Specifically, the section from **Health Road to Victory Avenue**, approximately **400 meters** long, contains multiple environmental and socially sensitive points within **30 meters** of the project area, including schools, hospitals, residential areas, and shops such as **Yucai Elementary School**, **Zhiai Baby Kindergarten**, **Experimental Primary School**, **Heli Kindergarten**, **Tianyou Kindergarten**, **Eye Hospital**, **Hongqi Senior Vocational School**, **Xinxiang Vocational Education Center**, **Xinyujia Senior High School**, **Post Office Residential Area**, **Wenkang Community**, **Luhang Residential Area**, **Foreign Language Elementary School Residential Area**, as well as the **Pangdonglai Shopping Mall**.

Traffic congestion is particularly severe during peak hours (7:00-9:00 AM and 4:00-6:00 PM), with only one-way traffic allowed on **Health Road** toward **Victory Road**. Even with one-way restrictions, traffic is still very congested during peak school and work hours. Parents picking up and dropping off their children have reported difficulties during rainy weather, which further exacerbates the traffic issues. Therefore, it is necessary to avoid road excavations during the rainy season to minimize the impact on project construction. Moreover, road closures during the construction period may increase traffic congestion along the route, so construction notices and scientifically designed detour plans should be in place before the construction begins.

This finding is confirmed by a statistical analysis of the 330 survey responses. The main negative impacts that residents perceive during the project's implementation are as follows:

1. **86.57%** of residents believe that the project will cause pollution from **waste gas**, **wastewater**, **noise**, and **solid waste** during the construction period.
2. **75.36%** of residents think that there will be **short-term travel inconvenience**.
3. **46.67%** of residents believe that the project will negatively impact **life and property safety**.
4. **25.46%** of residents think that the construction will lead to **soil erosion** and **water pollution** in some sections of rivers outside the urban areas.
5. **11.42%** of residents expect the project to cause **land acquisition** and **house demolition** impacts.
6. **2.69%** of residents are concerned that the project could lead to the spread of **AIDS** or other **infectious diseases**.

These findings are summarized in **Table 5-12**:

Table 5- 12 Residents' Perceptions of Potential Negative Impacts During

Project Construction

Indicator Category	Potential Negative Impacts During Project Implementation
Resident Perception	Pollution from waste gas, wastewater, noise, and solid waste
Sample Size	286
Percentage (%)	86.57

(3) Impacts of Project Construction on Community Health and Safety

1. **Construction near Residential and Public Areas**: Most of the subprojects are linear in nature, with the construction sites located near densely populated areas such as residential areas, schools, and parks. Apart from some sections in the **Hongli Avenue East Mengjiangnv River Rainwater Pump Station Catchment Area Subproject** that will adopt pipe-jacking construction, the rest of the subprojects will use open trench construction. The excavation of pipelines and road modifications will cause inconvenience to residents along the route, with a significant increase in the number of construction and sludge removal vehicles entering and exiting residential areas during the construction period, creating potential traffic safety hazards for the community.

Particularly vulnerable groups such as **children** and **elderly** residents, whose mobility is limited, may face safety risks when avoiding vehicles. Additionally, construction vehicles may drop mud and debris during transport, negatively impacting passing vehicles and pedestrians. Dust in the air may also harm the respiratory health of community members.

In public participation surveys and discussions near **Qiudong Community**, surrounding residents expressed a high level of support (**90.6%**) for the pump station expansion, acknowledging the need to improve flood discharge capacity as long as their daily lives, travel, and rest are not significantly impacted. Project construction managers noted that the existing pump station compound has sufficient space and will not occupy resident traffic routes. Temporary traffic disruptions and inconveniences may occur, and the construction unit should prepare an effective traffic management plan to guide the redirection of people in high-traffic areas like **Health Road** to minimize congestion.

2. **Noise, Dust, and Waste Management**: During construction, issues such as **noise**, **dust**, **tailpipe emissions from construction vehicles**, **wastewater discharge**, and **litter** may negatively affect the residents and businesses near the project area. As the project construction sites are near densely populated urban areas, special attention should be paid to noise and dust isolation to minimize the impact on residents, schools, and surrounding communities.
3. **Increased Traffic and Safety Risks**: The project also involves the

rehabilitation of rivers and bridges in the urban areas of Xinxiang City. As construction progresses, the opening of landscapes and improvements in facilities around the rivers will increase foot and vehicle traffic, which may pose safety risks, especially for schools near the project area. Safety education should be provided to students to prevent accidents.

5.2.4 Lobor

Through a comparative analysis of China's legal framework on labor protection and the key requirements of the Asian Infrastructure Investment Bank (AIIB) **Environmental and Social Framework (ESF) ESS1** on labor and working conditions, it was found that China's labor protection laws align with, and in some cases, are even more stringent than AIIB's requirements. For instance, China's legal provisions on the minimum age for child labor are stricter than those outlined by AIIB. As a result, the existing Chinese legal framework is fully consistent with the key requirements of AIIB's **ESS1**。

5.2.4.1 Loabor conditions and impact

During the construction phase of the project, the restoration and enhancement of municipal roads and water facilities in Xinxiang will cover a wide area, involve a significant depth of work, and require a large volume of tasks. Therefore, professional construction teams will need to be organized for the construction activities. If local teams do not meet the required qualifications, additional labor, approximately 65 workers, will be sourced from outside the region (provincial, city, or county levels), including around 55 male workers and 10 female workers (15.38%). Meanwhile, around 182 workers will be recruited locally, comprising 156 male workers and 26 female workers (14.29%), with roles mainly in manual labor, scaffolding, masonry, cleaning, and cooking.

Male workers are expected to handle major construction and technical roles, while female workers will primarily perform non-technical roles. During construction, attention must be given to preventing gender-based violence, including any form of discrimination against women or any harm (physical or sexual), threats, coercion, or arbitrary deprivation of freedom based on gender. The proportion of female workers should also be increased to ensure more equitable gender representation.

With the influx of external labor, the interaction and exchange between these workers and local residents will intensify, raising potential social and health risks. Based on similar project experiences, contractors usually rent local vacant houses for accommodation and living, without constructing separate camps. This can introduce conditions for the spread of diseases like AIDS and other contagious illnesses. Additionally, external workers unfamiliar with local social norms and customs (such as religious beliefs, cemeteries, temples, and wedding or funeral customs) might unintentionally offend local traditions, causing social discomfort or crises. To mitigate these risks, contractors are required to develop appropriate camp management procedures before starting construction, based on the local housing arrangements.

Table 5-13 Overview of Expected Labor Composition and Roles During Project Construction

Project Area	External Labor (persons) - Female Labor Ratio (15%)	Main Roles	Local Labor (persons) - Female Labor Ratio (15%)	Main Roles	Total
Yinmakou Rainwater Pump Station Catchment Area Project	21	Project management, financial management, contract management, large machinery operation, etc.	57	Construction workers, material transport, cooks, cleaners, etc.	78
Xiangyang Rainwater Pump Station Catchment Area Upgrade Project	18	Project management, financial management, contract management, large machinery operation, etc.	60	Earthwork transport, material transport, construction workers, cooks, cleaners, etc.	78
Hongli Avenue East Mengjiangnv River Rainwater Pump Station Catchment Area Project	26	Project management, financial management, contract management, large machinery operation, etc.	65	Earthwork transport, material transport, construction workers, cooks, cleaners, etc.	91
Total	65	/	182	/	247

5.2.4.2 Labor and GBV Management

The project office and implementing agency must ensure that construction units and contractors strictly comply with labor safety laws and regulations in the People's Republic of China. They should ensure that project-related personnel are treated fairly and provided with a safe and healthy work environment, following Xinxiang City's labor management regulations and ordinances. To achieve labor protection objectives, Xinxiang City has established and improved mechanisms for labor rights protection and supervision to safeguard workers' legal rights.

1. **Strict Entry System:** Any unit or organization hiring laborers must hold legal certificates, create recruitment brochures, and use legal means such as information dissemination, human resource services, or job fairs.
2. **Labor Record Keeping:** Employers should establish a staff roster for workers with whom they have established labor relations, and promptly record changes or terminations of labor contracts.
3. **Daily Inspection and Special Law Enforcement:** Regularly inspect employers' compliance with prohibitions on child labor, special labor protection for female and minor workers, work time and rest regulations, wage payments, and minimum wage standards.
4. **Rights Protection Publicity System:** Set up labor rights protection notice boards at workplaces to inform laborers of their legal rights and ways to protect them.
5. **Clarification of Government Responsibilities and Establishment of Supervision Systems:** Establish a system for publicizing major violations of labor security, strengthening social supervision, and enhancing the deterrent effect of labor security inspections.

In terms of GBV management, Xinxiang City takes various measures to protect female workers' rights, reducing gender-based labor discrimination. According to the "Special Provisions on Labor Protection for Female Employees in Henan Province," employers cannot limit female employees' rights to marry or have children in labor (employment) contracts. They are prohibited from reducing wages, benefits, or restricting promotions due to marriage, pregnancy, maternity leave, or breastfeeding. Employers must take effective measures to prevent and stop sexual harassment in the workplace. If a female employee experiences sexual harassment, the employer must handle it promptly and protect the employee's privacy.

Women workers are encouraged to defend their rights. The Xinxiang Women's Federation provides consultation services, sets up boards, organizes legal knowledge competitions, and disseminates materials to raise awareness about preventing and eliminating GBV. The hotline number for the Xinxiang Women's Federation is 0373-3696338.

5.2.4.3 Measures and Recommendations

Construction units should meet the following five requirements:

1. **Equal Opportunity and Fair Treatment:** Employ project staff based on the principles of equal opportunity and fair treatment without discrimination against women, disabled persons, migrant workers, or youth of legal working age.
2. **Protection and Assistance:** Establish working time limits, rest periods, and leave policies to protect workers' safety and health. Provide adequate labor protection supplies as needed based on construction requirements and workplace hazards. Special care should be given to women, disabled persons, migrant workers, and youth of legal working age.

3. **Right to Organize:** In line with national laws, workers have the right to form and join organizations of their choice and ensure collective bargaining without interference.
4. **Prevention of Sexual Harassment:** Set up separate temporary toilets for male and female workers based on the number of female staff. Establish anti-sexual harassment regulations and appoint responsible personnel to inform all staff of the requirements. Include anti-sexual harassment content in daily management training.
5. **Labor Complaint and Grievance Mechanism:** Establish a clear mechanism for handling labor complaints and grievances, including a labor protection supervision mechanism. When handling sexual harassment complaints, personal privacy must be protected according to the law. The labor grievance mechanism aligns with the project's grievance mechanism, as outlined in Section 8 of this report.

5.2.5 Current Status of Poverty (Low-Income Groups)

After precise poverty alleviation and eradication campaigns, there are no poverty villages, households, or populations under current standards in the three project counties and districts as of 2021. Absolute poverty has been historically eradicated. However, poverty can still manifest in forms like relative poverty and low-income populations. Here, poverty refers to low-income populations, primarily those who transitioned to low-income status after poverty alleviation at the end of 2021.

5.2.5.1 Current Poverty (Low-Income) Status in the Project Area

By the end of 2023, there were no poverty villages, households, or populations in the project area under current standards. However, poverty can still manifest in forms like relative poverty and low-income populations, mainly referring to those who transitioned to low-income status after poverty alleviation in 2019.

5.2.5.2 Current Poverty (Low-Income) Status in the Directly Affected Area

As of the end of 2023, the project area had 233,700 people, including 1,400 low-income individuals, accounting for 0.60% of the total population. Details are as follows:

- Xijie Street: 16,800 people, 97 low-income individuals (0.58%)
- Wenhua Street: 66,000 people, 476 low-income individuals (0.72%)
- Xiangyang Street: 40,300 people, 203 low-income individuals (0.50%)
- Shengli Road: 29,000 people, 126 low-income individuals (0.44%)
- Jiankang Road: 29,000 people, 142 low-income individuals (0.49%)
- Nanqiao Street: 43,000 people, 237 low-income individuals (0.55%)
- Heping Street: 9,700 people, 87 low-income individuals (0.90%)

Table 5-14 Distribution of Poverty Population in the Project Area

Area	Street	Total Population (Ten Thousand)	Low-Income Population (Ten Thousand)	Low-Income Proportion (%)
Hongqi District	Xijie Street	1.68	0.0097	0.58%
	Wenhua Street	6.60	0.0476	0.72%
	Xiangyang Street	4.03	0.0203	0.50%
Weibin District	Shengli Road	2.90	0.0126	0.44%
	Jiankang Road	2.90	0.0142	0.49%
	Nanqiao Street	4.30	0.0237	0.55%
Muye District	Heping Street	0.97	0.0087	0.90%
Total (Project Area)	7	23.37	0.1400	0.60%

5.2.5.3 Livelihood Pattern of Low-Income Population

Low-income populations in the project area exhibit small-scale, self-sufficient agricultural characteristics:

1. **Narrow Income Sources:** Relying primarily on traditional agriculture, 70.52% of low-income populations' income mainly comes from planting and animal husbandry. Agricultural income constitutes an average of 63.5% of total household income, indicating high dependency on traditional agricultural income.

2. Single Operating Model: Predominantly engage in traditional agriculture and farming methods. Interviews reveal that low-income individuals mainly grow grains and few cash crops, with 83.35% growing wheat and 82.17% growing corn. Only 12.29% grow other crops like vegetables. Most low-income individuals have low education levels and are older (men over 50, women over 45), making it difficult to accept new agricultural technologies. They rarely adopt modern mechanical technologies and have low participation in cooperatives.

5.2.5.4 Causes of Low Income in the Project Area

Most villages/communities in the project area are near the outskirts of Xinxiang City. Reasons for low income include:

1. **Rising Living Costs:** The modern lifestyle in the project area results in high living costs, including housing, transportation, and education, which adds financial pressure.
2. **Difficulty in Employment:** Low-income residents often have low

education levels, lack skills, and are of older age, making it hard to adapt to rapid changes. They are less inclined to participate in training, leading to difficulty in finding jobs and increasing the likelihood of unemployment.

3. **Poverty Due to Illness or Disability:** Illness and disability are major causes of low income in the project area. Some individuals rely on welfare or their elderly parents' pensions due to lost labor ability, resulting in financial hardship.

4. **Poverty Due to Disasters:** The 2021 Xinxiang City flood caused significant economic damage and property losses, affecting already low-income individuals. Insufficient aid led to direct or indirect inclusion in welfare programs.

5.1.5.5 Support Measures in the Project Area

The poverty alleviation measures in the project area include:

1. **Monitoring and Assistance:** Establish dynamic monitoring and assistance mechanisms to detect, intervene, and help early. Implement one-on-one assistance for low-income households.

2. **Ensuring Basic Needs:** Improve policies on education, healthcare, housing, and social security to ensure "no worry about food and clothing, and access to compulsory education, basic medical services, and safe housing."

3. **Promoting Industrial Revitalization and Employment:** Launch "Rain and Dew Program" training, support microcredit, and foster industries like specialty farming, garment processing, and photovoltaic power generation.

5.2.5.5 Needs of Low-Income Groups for the Project

The analysis of the low-income situation in the project area reveals that the proposed project will impact a total of 1,400 low-income individuals. It is crucial to address their specific needs, incorporate their feedback, and mitigate potential adverse effects on their livelihoods. This approach ensures that the project respects the needs of this group, serves them effectively, and contributes to their stable economic growth.

During the field survey, the social assessment team conducted interviews, community meetings, and gathered information from the Xinxiang Rural Revitalization Bureau to understand the needs of the formerly impoverished population in the project area. The findings indicate several key demands from this group:

a. Preference for Job Opportunities and Positions

Feedback from community meetings and data analysis shows that previously registered impoverished households expressed a desire for employment opportunities created by the project. Many families in this group are relatively poor, and some members are disabled, making employment difficult. They urgently need job opportunities to supplement their household income. The construction and subsequent operation phases of the project will generate several non-technical positions, such as cleaners, patrol personnel, and security staff at the pump stations. These positions, if suitable, can be prioritized for the low-income group. By addressing their specific needs and incorporating their suggestions, the project can avoid negative impacts on their lives and contribute to their economic stability and prosperity.

Interview Record 5-10: Ms. Zhou from Nanqiao Road Street, Weibin District (54 years old)

"My husband is in poor health; he was injured on a construction site before and is now at home recuperating without a job. My daughter is married and can't take care of us, the elderly couple. I also need to take care of my mother-in-law and husband, so I can only find some small jobs nearby. I work as a cleaner in the park, sweeping leaves, collecting waste, and picking up bottles to sell."

This record highlights the need for local employment opportunities for low-income individuals, especially those with caregiving responsibilities and limited mobility. The project can help by creating job opportunities, such as in cleaning or maintenance, which can provide a stable income for people like Ms. Zhou.

b. Vocational Skills Training for Low-Income Groups

Low-income groups in the project area have expressed a need for vocational skills training. Meetings and data analysis revealed that a lack of employment skills limits their income sources. With ongoing industrialization, urbanization, and improvements in social security systems, urban residents' income channels have diversified, including wages, property income, personal income, and government transfers. However, for low-income groups and other vulnerable populations, their income sources and livelihood patterns remain narrow and limited. Due to their lower education, lack of skills, and older age, they often face discrimination in the labor market, resulting in insufficient livelihood opportunities.

Therefore, during the construction and operation phases of the project, it is essential to provide vocational skills training to low-income and other vulnerable groups. This can include training for roles such as pump station patrol personnel, cleaners, and administrators, offering them relevant job skills and standards.

c. Minimizing Impact on Vulnerable Groups' Transportation

During the construction and operation phases, efforts should be made to reduce the impact on vulnerable groups' travel. The construction activities, including road excavation and bridge construction, may cause inconvenience, especially for disabled individuals. To mitigate this, prominent detour signs should be set up during construction, and transportation assistance should be provided to vulnerable groups, including the elderly, along the project route. This will help ensure that the project does not unduly disrupt the daily lives and mobility of these groups.

5.2.5.6 Impact of the Project on Low-Income Groups

The project potentially hinders poverty alleviation and creates new poverty, mainly through land acquisition and relocation. Low-income communities and individuals are often at a disadvantage in utilizing compensation, gaining project benefits, and adapting to changes. This could exacerbate low-income

issues within regions and communities. After the completion of the Xinxiang City urban drainage capacity enhancement project, local prices may increase, causing daily consumption pressure on low-income groups.

However, based on the project's design philosophy and subsequent safeguards, the implementation of the project will not worsen poverty in low-income areas or cause new poverty. It will ensure that low-income populations can benefit equally and achieve poverty alleviation. The specific benefits include:

1. **Providing Direct and Indirect Employment Opportunities to Increase Economic Income:** The project will create jobs during construction and operation, including temporary or permanent positions. Non-technical jobs such as construction laborers, sand and stone transport workers, and cooks will be provided during the construction phase, prioritizing local low-income populations and women to increase their economic income. The project will also indirectly create employment opportunities by improving infrastructure, attracting more tourists to Xinxiang, and developing local tourism resources. This will create more jobs in catering, accommodation, sightseeing, leisure, and sanitation, helping low-income groups and women to find employment locally and increase their economic income.
2. **Improving Local Traffic Infrastructure and Reducing Traffic Accidents:** The construction of bridges near Xinxiang East Station will ease traffic congestion and reduce traffic accidents, ensuring the safety of local residents. The project can reduce the frequency of traffic accidents in the project area, thereby lowering unnecessary medical expenses.
3. **Promoting Social Equity and Sharing Development Achievements with Low-Income Groups:** The proposed project will significantly improve the water-related traffic infrastructure and public service supply level in Xinxiang City, providing more convenience to urban and rural residents and enabling them to enjoy high-quality medical and educational resources in Xinxiang. The project will not only offer a better living experience for the surrounding low-income population, such as enjoying the beautiful green scenery of the city but also bring more development opportunities, such as increased opportunities for non-agricultural employment and entrepreneurship. To some extent, the project's construction can benefit local residents, including a large number of low-income individuals, allowing them to share the achievements of social development.

5.2.6 Gender Analysis

5.2.6.1 Current Situation of Women's Development in the Project Area

China has established a comprehensive legal and policy framework to promote gender equality and enhance women's socio-economic status. The project will be implemented within China's legal and policy framework, in line with the overall objectives and requirements of the "Outline of the 14th Five-Year Plan for National Economic and Social Development and Long-Range Objectives for 2035" and "China Women's Development Outline (2021-2030)." The project will coordinate with women's federations at all levels in the project area to protect women's rights and facilitate gender development.

Table 5-15 Organizational Structure of Women's Federations at All Levels

Level	Affected Parties
National Organization	All-China Women's Federation
Local Organizations	Henan Provincial Women's Federation, Xinxiang Municipal Women's Federation, Women's Federations of Hongqi District, Weibin District, and Muye District
Grassroots Organizations	Women's Federations of Xijie Street, Wenhua Street, Xiangyang Street, Shengli Road, Jiankang Road, Nanqiao Street, and Heping Street
Community Women's Federations within the Project Area	Women's Federations of affected communities within the project area
Group Members	Grassroots trade union female worker committees of affected enterprises in the project area

According to the "Xinxiang City 2023 National Social and Economic Development Statistical Bulletin," by the end of 2023, the permanent population of Xinxiang City was 6.125 million, including 3.084 million men and 3.041 million women, with a gender ratio of 101:100. In the three project areas, the total population was 1.1418 million, including 544,000 women, accounting for 47.64% of the total population. Among the three project areas, the female population proportion was highest in Hongqi District (48.99%) and lowest in Muye District (43.36%). The gender ratio was highest in Muye District (107) and lowest in Hongqi District (104). The women's population status in the three project areas is detailed in Table 5-16.

Table 5-16 Basic Situation of Women's Population in the Project Area

Area	Population (Ten Thousand)	Males (Ten Thousand)	Females (Ten Thousand)	Female Proportion of Total Population (%)	Gender Ratio (Female = 100)
Xinxiang City	612.5	308.4	304.1	49.65	101
Hongqi District	44.7	22.8	21.9	48.99	104
Weibin District	24.3	12.5	11.8	48.56	106
Muye District	42.8	22.1	20.7	48.36	107

Source: Xinxiang City 2023 National Social and Economic Development Statistical Bulletin.

5.2.6.2 Gender Differences in the Project Area

(1) Characteristics of the Survey Sample Population Structure

To understand women's development in the project area, the social assessment survey team conducted questionnaires and interviews with women during the field survey. Female respondents accounted for 49.35% of

the questionnaire survey sample, with a total of 163 female respondents.

(2)Age Composition: According to the survey sample statistics, men and women accounted for 50.65% and 49.35%, respectively. Among the female samples, the age group of 45-54 had the largest number, accounting for 58.3%, followed by the age group of 35-44, accounting for 39.4%. The age group of 18-24 had the least representation, accounting for 12.7%. The detailed distribution is shown in Figure 5-7.

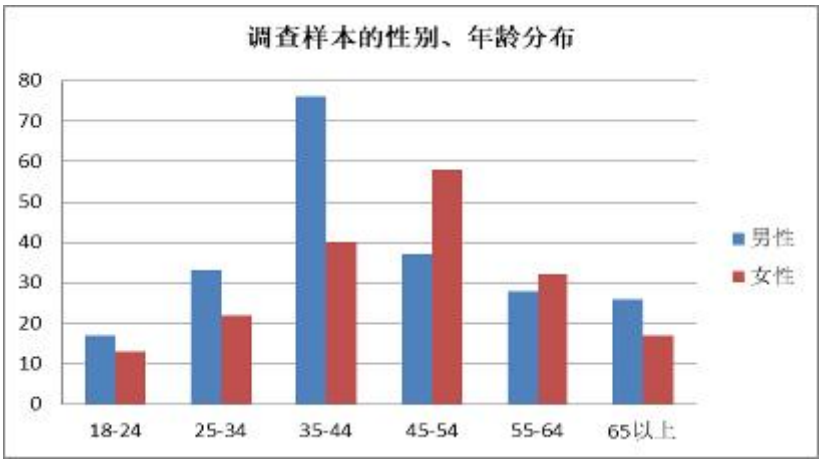


Figure 5-7 Gender and age distribution of survey samples

Educational status . From the distribution of educational level of the survey samples, the cultural level of the survey subjects is mainly concentrated in the junior high school level, with females and males accounting for 56.82% and 52.55% of their groups respectively, which is higher than that of males; females with high school or technical secondary school education account for 18.57% of their group, which is lower than the 25.08% of males; females with primary school education account for 11.64%, while males only account for 3.26% of their group; whether it is junior high school or primary school level, females are significantly higher than males, indicating that the educational level of women in the project area is relatively low.

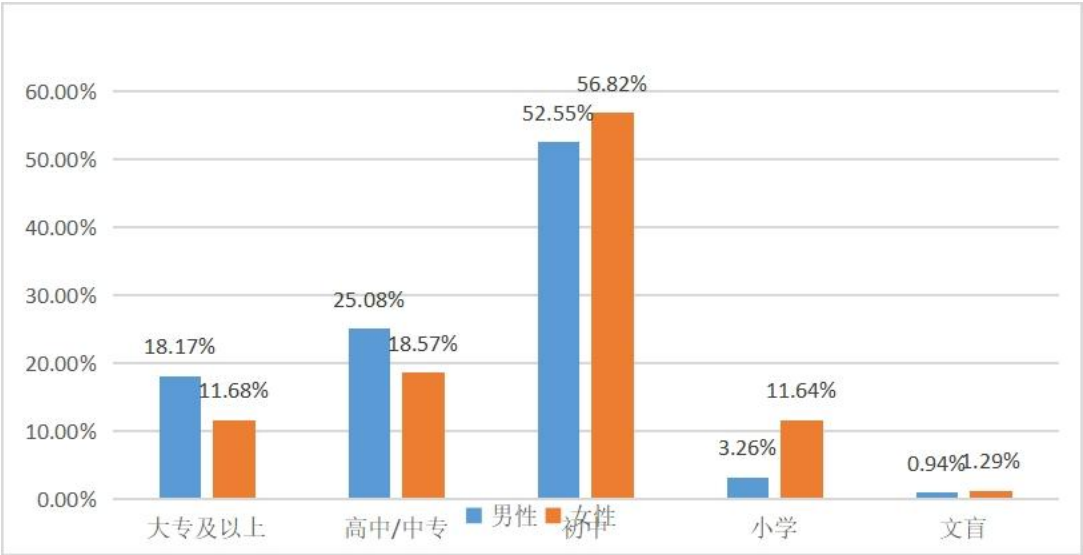


Figure 5-8 Educational level of the survey sample

Occupational composition . From the overall distribution of the survey samples in the project area, in the occupational composition of both sexes, more than one-third of both men and women are government officials, enterprise personnel, and enterprise personnel, and the employment ratio of men is higher than that of women. Among other and self-employed professionals, the occupational composition of women is higher than that of men. This shows that in the labor market, the employment of men and women is relatively balanced. Combined with the interview situation, young and middle-aged men and women in urban areas mainly work nearby or work part-time, while older women mostly stay at home and rarely go out to work. There is still a relatively obvious division of roles between the two sexes. Men mainly play roles outside, while women play a more obvious role in managing the home. Most of the respondents said that women mainly do housework at home and take care of the elderly and children.

Table 5-17 Gender and occupation distribution of survey samples

Profession	male		female		total	
	Number of people	percentage	Number of people	percentage	Number of people	percentage
Office staff	13	7.86%	9	5.39%	twenty two	6.64%
Public institution staff	32	18.87%	twenty one	12.77%	52	15.86%
Corporate staff	28	16.98%	20	12.34%	48	14.69%
Sole proprietor	31	18.41%	twenty three	14.11%	54	16.29%
Freelancing	26	15.58%	38	23.27%	64	19.38%
student	6	3.46%	15	9.41%	twenty one	6.40%
retire	9	5.35%	15	9.45%	twenty four	7.38%
Farmers	11	6.57%	8	4.95%	19	5.77%
other	12	6.92%	14	8.31%	25	7.61%
total	167	100%	163	100%	330	100.00%

(2) Gender differences in project areas (baseline)

AIIB projects have always paid attention to gender equality and women's development. ESS1 clearly states that it is necessary to identify any adverse gender risks and impacts based on gender factors, and formulate mitigation measures to reduce these risks and impacts; promote equal opportunities and social and economic empowerment for women by optimizing project design. By referring to the analysis dimensions of gender differences by international financial institutions such as the World Bank and the Asian Development Bank (ADB), combined with the actual situation of this project, we selected three

dimensions of participation in decision-making, economic participation, and development capacity, and conducted a gender difference analysis.

The proportion of women participating in the mobilization, consultation and decision-making of this project is lower than that of men. The proportion of women participating in consultation meetings related to this project (37.9%) is lower than that of men (49%). The proportion of women (39.3%) who believe that they have a better understanding of policies such as land acquisition compensation and noise pollution control implementation standards is also lower than that of men (45.8%). The interviews found that women's recognition and participation rate of the project showed a positive trend.

Interview Record 5-11: Jian'nan Community, Jiankang Road Office, Ms. Liu (35 years old)
"I usually stay home taking care of the kids, cooking, and doing household chores. Sometimes when there's a meeting or something to sign in the community, it's always my husband who goes. Honestly, I think there are things we women can handle too, but we just don't get the opportunity. We'd like to attend meetings and give our opinions. I hope the government can give us women more chances in the future."

The economic status of women in the project area is lower than that of men. The income of families in the project area is still mainly supported by men. The survey results show that men's income accounts for 62.7%, while women's income accounts for only 24.3%. The interviews found that the decision-making power of the family is mainly in the hands of men. Women are limited by low cultural level, physiological ability differences, heavy housework burden and the restriction of taking care of the elderly and children. Women's work outside the home is restricted by many objective factors, which also leads to women's contribution to family economic activities being significantly lower than that of men, and their family economic status is lower than that of men.

Women have less access to employment information and skills training than men. Rural women in the project area suffer from more employment difficulties than men in the job market. For example, their chances of obtaining employment information (24.7%) are significantly lower than men (70.2%), which also reduces their chances of participating in income-generating activities (such as creating micro-enterprises). enterprise or join a cooperative organization). In addition, heavy household chores and the task of taking care of the elderly and children also make women lack time to participate in various employment skills training activities.

Interview Record 5-12: Qiu-Dong Community, Ms. Sun (42 years old) and Others

"I'm currently doing odd jobs—whenever there's work, I take it; otherwise, I just stay home. If there's an opportunity, I'd prefer to lease out my land and find a more stable and easier job. I'm not asking for a high salary, just

something steady."

"I currently work at a nearby factory, but I'm not too happy with the pay. The benefits at our factory are indeed not as good as those at other nearby places. Lately, I've been thinking of switching jobs, hoping for a better-paying one."

Table 5-18 Gender difference analysis table

serial number	Specific options	male	female	No distinction between men and women/joint participation	Difference analysis	Remark	Dimensions
1	Who attends the mobilization and consultation meeting on the urban drainage capacity improvement project held in the community?	49%	37.9%	13.1%	The proportion of female participants is much lower than that of male participants	Female respondents have a strong desire to attend the conference	Participate in decision-making
2	Who in the family is more familiar with policies such as land acquisition compensation and noise pollution control implementation regulations?	45.8%	39.3%	14.9%	Women are less familiar with policies than men	Women need to be more familiar with the policies related to this project	
3	Do men and women have more access to information about employmen	70.2%	24.7%	5.1%	Men are more likely to get employment informati	information dissemination and skills training for women	

	t opportunities (in business and skills)?				on than women	should be increased	
4	Who earns more in the family, the man or the woman?	62.7 %	24.3 %	12.0 %	Men in the household earn more than women	Increase women's income	Economic participation
5	Do you think it is difficult for women in your family to find employment?	35.1%	64.9%	/	It is more difficult for women to find employment	Give priority to providing employment opportunities for women	

5.2.6.3 Project Impact on Women

(1) Positive Impacts

The project is expected to provide employment opportunities for women, thereby increasing their economic income. During the construction phase, the project is anticipated to offer 49 temporary positions, such as low-skilled laborers, cleaners, traffic maintenance workers, and cooks for the construction crew. These nearby temporary jobs can be offered to young and middle-aged women and low-income groups, enabling local women and low-income groups to increase their non-agricultural economic income. After the project is completed, it will provide some non-technical positions (12 in total), such as cleaners, patrol officers, and security personnel. These positions will be prioritized for residents affected by the project area, particularly those from low-income households and women seeking work, ensuring increased economic income for low-income groups. Additionally, the project will promote the sale of agricultural and specialty products from various regions of Yunnan Province and boost tourism, positively impacting the income of women's families in the project area.

The project encourages women's participation and promotes their personal development. The AIIB project encourages women's involvement and pays attention to the protection of women's rights. During the construction and implementation phases, using existing community and village committees can promote women's participation in relevant public affairs, encouraging women to participate in project discussions and consultation meetings. More women will be able to understand and participate in the project, have full say, express their needs, and seek more development opportunities. Moreover, providing safety awareness training and employment training for women will help improve their overall competence and promote their long-term development. Field surveys show that women have a high willingness to participate in public activities, so public participation activities in the community should prioritize involving female groups.

The project will also provide a more comfortable and convenient travel environment for women. The project will promote the improvement and supporting infrastructure of public facilities such as buses, subways, high-speed rail, catering, and accommodation trade centers at Xinxiang High-speed Rail East Station, reducing travel time and improving the travel experience for women in the project area.

(2) Negative Impacts
Although the project implementation will benefit women, if there is a lack of gender sensitivity in the project's design, implementation, and management, and if women's needs and suggestions are overlooked, it could reduce the project's effectiveness and bring certain social risks to women. Specific issues include:

Women's specific needs may be overlooked. In the project area, due to social and cultural traditions and economic control factors, women's social status is still lower than men's. Major family decisions are mostly made by men, and men often participate in public affairs. Consequently, the design, implementation, and operation management of the project may easily overlook women's specific needs and suggestions, leading to inadequate attention to women's needs.

Potential gender-based violence risks. Gender-based violence is any harmful act based on social attributed gender differences between individuals without their consent. This includes physical, sexual, or mental harm or suffering, threats, coercion, and other deprivations of freedom. These actions can occur publicly or privately. During the project's implementation and operation, the proportion of male workers is significantly higher than female workers, with men more involved in technical and managerial roles. If not managed properly, harmful behaviors such as gender-based violence, sexual exploitation and abuse, and sexual harassment may occur, negatively impacting female workers' physical and mental health on-site and in institutions.

5.2.6.4 Gender Action Plan

Based on the questionnaire survey of the project area, women's discussion sessions, in-depth interviews, and field investigations, the concentrated needs of women in the project area have been summarized. In response to these needs, the following action recommendations are proposed.

Table 5- 19 Gender Action Plan

Specific Measures or Actions	Monitoring Indicators	Implementing Agency	Target Population
A. Increase Employment Opportunities for Women	a. During the project's construction and operation phases, prioritize providing technical and non-technical positions for women in the project area. b. For jobs	A.1 Priority employment opportunities for women (baseline value of female workers during the construction phase is about 8%, target	AIIB Project Office, Contractors

Specific Measures or Actions	Monitoring Indicators	Implementing Agency	Target Population
	with low physical demands, appropriately widen the recruitment age range and prioritize hiring women aged 40-50 who find it difficult to find non-agricultural employment, such as cleaners, inspectors, and caretakers.	value 12%).	
B. Enhance Women's Development Capabilities	a. Improve women's employment and entrepreneurial skills, knowledge, and opportunities by organizing employment knowledge lectures, skill training classes, and employment and entrepreneurship seminars. b. In flood control and disaster mitigation training and sustainable information disclosure capacity-building training, provide appropriate skills training content considering women's physiological, psychological quality, education level, and personal needs, and set appropriate training times to ensure women have equal opportunities to improve their skills with men.	B.1 Female participation in various training programs, including flood control and disaster mitigation training, women's rights awareness education, and employment skills training (baseline 12%, target 20%). B.2 Improve training participation for women in the project area in project information disclosure and management (baseline 12%, target 20%).	Women's Federations, Human Resources and Social Security Bureau, Agriculture and Rural Bureau
C. Expand Women's Participation in Decision-making	a. Increase women's participation in relevant community affairs decisions. b. Increase the proportion of women signing land acquisition or demolition compensation agreements or "joint signing by husband and wife."	C.1 The proportion of women participating in project mobilization, information disclosure, policy publicity, and consultation (baseline 12%, target 20%). C.2 The proportion of women signing land acquisition or demolition compensation agreements (baseline 0%, target 100%).	Community/village groups, AIIB Project Office, Land Acquisition and Demolition Office, Contractors
D. Reduce Gender-based Violence Risks	a. Strengthen the protection of female workers' rights and provide regular psychological health counseling and female workers' rights protection training. b.	D.1 100% of female workers received labor rights protection training. D.2 Ensure 100% equal pay for female and male workers, with zero	AIIB Project Office, Women's Federations, Contractors

Specific Measures or Actions	Monitoring Indicators	Implementing Agency	Target Population
	Strengthen supervision of construction sites to prevent gender-based violence, sexual exploitation and abuse, and sexual harassment. c. Establish a clear grievance mechanism, form a site grievance committee including at least two female members, and ensure the safety of committee members to avoid bias or fear of retaliation.	incidents of gender-based violence. D.3 Establishment of grievance channels and the number of female members.	

6 Alternatives

6.1 Pump Station Site Selection

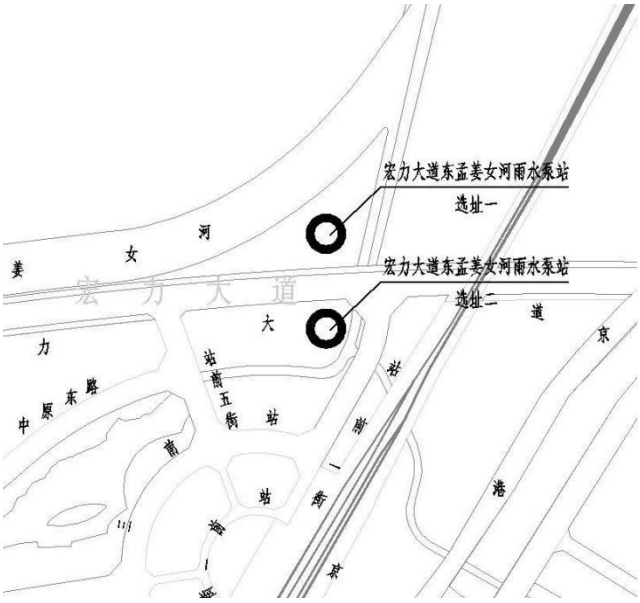
Pump station site selection considerations include the following principles:

1. Compliance with Xinxiang City's overall urban planning.
2. Proximity to the drainage system segments that need upgrading.
3. Near the downstream receiving water body.
4. Minimize demolition and reduce farmland occupation.
5. In line with Xinxiang City's flood control plan, choosing a lower terrain location to reduce excavation depth, but not in areas prone to flooding or threatened by floods. The flood control standard should not be lower than the urban flood control standard.
6. Relatively good engineering geological conditions.
7. Convenient transportation with nearby accessible power and water sources.
8. Located on the downwind side of the town's maximum summer frequency wind direction and meeting environmental protection requirements.
9. The site selection should consider the possibility of future development and expansion space.

The Xiangyang Stormwater Pump Station will be rebuilt on its original site, with no other alternative plans. The Hongli Avenue Dongmeng Jiangnu River Stormwater Pump Station has two proposed sites. Option One is located at the northwest corner of the intersection of Zhanqian First Street and Hongli Avenue, while Option Two is at the southwest corner of the same intersection. Option One is currently farmland and does not involve demolition. Option Two is located on an existing river channel and does not involve demolition but requires rerouting the river channel. Therefore, Option One is chosen as the site for the Dongmeng Jiangnu River Pump Station.

The Hongli Avenue Dongmeng Jiangnu River Stormwater Pump Station is a new pump station. Considering the current drainage situation and relevant planning in the urban area, and taking into account construction conditions, investment, ecological environment impact, and short- and long-term construction conditions, as well as the above site selection principles and the actual land situation, field surveys were conducted to compare the advantages and disadvantages of different sites. The proposed location for the stormwater pump station is:

- Option One: Northwest corner of the intersection of Hongli Avenue and Zhanqian First Street.
- Option Two: Southwest corner of the intersection of Hongli Avenue and Zhanqian First Street.



Source: Feasibility Study, 2024

Table 6-1 Technical and Economic Comparison of Site Selection for Hongli Avenue Stormwater Pump Station

Criteria	Option One	Option Two
Location	Southwest corner of the intersection of Zhanqian First Street and Hongli Avenue	Northwest corner of the intersection of Zhanqian First Street and Hongli Avenue
Land Conditions	The site is currently general agricultural land, with no need for demolition.	The site is located on an existing river channel and requires rerouting, affecting land acquisition.
Transportation	No existing municipal roads, making transportation inconvenient.	No existing municipal roads, making transportation inconvenient.
Inlet Channel	The inlet channel is laid along Hongli Avenue, resulting in a longer inlet channel.	The inlet channel is laid along Hongli Avenue, resulting in a shorter inlet channel.
Outlet Conditions	The outlet pipeline is shorter, providing better outflow conditions.	The outlet pipeline is longer, providing moderate outflow conditions.
Land Acquisition Conditions	No demolition is required, and land acquisition is relatively easy.	Demolition is required, making land acquisition moderately challenging.
Environmental Impact	The surrounding area is farmland, with minimal impact on operations.	The surrounding area is designated for transportation use, which may impact operations.

- Environmental Impact: The surrounding area is designated for transportation use, which may impact operations.

Based on the above technical and economic analysis, both options have their pros and cons. However, Option One is deemed better, especially considering its lower land acquisition difficulty, making it more feasible for later implementation. After incorporating the opinions of the planning department, Option One is recommended as the site for the Hongli Avenue Dongmeng

Jiangnu River Stormwater Pump Station.

6.2 Pipe Material

The feasibility study focuses on comparing commonly used municipal drainage pipe materials in China, including fiberglass reinforced plastic sand pipes (FRP), high-density polyethylene pipes (PVC-U), and reinforced concrete pipes. The analysis suggests that for drainage pipe diameters of d≤700mm, underground plastic pipes are superior to reinforced concrete pipes in terms of convenience of pipeline laying, ease of transportation, water tightness, and hydraulic conditions. For drainage pipe diameters of d≥800mm, reinforced concrete pipes are the most cost-effective.
Considering the construction conditions, foundation bearing capacity, and other factors of the renovation project for the catchment areas of the Xiangyang Road Pump Station and Yinmakou Stormwater Pump Station, the project will use reinforced concrete box culverts for the primary stormwater pipelines and partially adopt reinforced concrete pipes. For sewage pipelines with diameters of d≤700mm, PVC-U double-wall axial hollow pipes will be used, while reinforced concrete pipes will be used for sewage pipelines with diameters of d>700mm.
For the Dongmeng Jiangnu River Stormwater Pump Station catchment area, the stormwater pipes will primarily use reinforced concrete pipes, and large drainage channels (such as the pump station inlet channel) will use reinforced concrete box culverts.

6.3 Road Surface Structure

Given the trends in urban road surfaces both domestically and internationally, the preferred road surface types are asphalt concrete and cement concrete. Each road surface structure has its advantages and disadvantages. Generally, both can meet road usage requirements. Based on Xinxiang City's road construction experience, a comparative analysis of common asphalt concrete and cement concrete road surfaces is shown below:

Table 6-2 Comparison of Road Surface Structures

Criteria	**Cement Concrete Surface**	**Asphalt Concrete Surface**
Design Life	30 years (main road)	15 years (main road)
Advantages	- High rigidity	- Good smoothness
	- Strong load-bearing capacity	- Low noise
	- Good stability	- Comfortable driving
	- Excellent skid resistance	- Non-reflective
	- Long service life	- Easy maintenance
		- Quick traffic reopening
		- Strong adaptability to roadbed deformation
		- Promotes safe high-speed driving
Disadvantages	- Poor surface smoothness	- Shorter service life
	- Low driving comfort	- Relatively higher maintenance costs

Criteria	Cement Concrete Surface	Asphalt Concrete Surface
	- High noise	
	- Difficult maintenance	

In recent years, the widespread use of high-quality imported and modified asphalt has significantly improved the smoothness, skid resistance, and durability of asphalt concrete surfaces. Although the cost of asphalt concrete is slightly higher, its strong adaptability, especially its much lower operational noise compared to cement surfaces, makes it less disruptive to urban residents. Therefore, asphalt concrete surface structure is recommended.

6.4 Construction Plan

The feasibility study compares the open-cut method and pipe jacking method. The open-cut method has the advantages of simple construction techniques, speed, economic efficiency, and better structural stress conditions. It should be the preferred method when there are no ground traffic or environmental restrictions. However, its disadvantages are also apparent, such as prolonged traffic disruptions, noise, and vibration. The open-cut method is the most basic and commonly used construction method for underground engineering in soft soil. It has a long history and wide application, with open-cut construction accounting for more than two-thirds of soft soil engineering.
Pipe jacking technology thoroughly resolves issues like the destruction of urban buildings and road traffic congestion during pipeline laying. It excels in stable soil layers and environmental protection. This is particularly important in cities with heavy traffic, dense populations, numerous surface structures, and complex underground pipelines. It creates a clean, comfortable, and beautiful environment for the city. The key to pipe jacking technology lies in correcting the deviation of the pipe's underground extension. It is especially suitable for trenchless laying of medium and large-diameter pipes. It is economical, efficient, and environmentally friendly, with integrated functions. The advantages include: no ground excavation, no demolition or damage to surface structures, no environmental destruction, no impact on pipeline differential settlement, time-saving, high efficiency, and overall low cost.

Based on the above principles and current conditions, since the new sewage and stormwater pipelines are buried deeply, the trench excavation requires breaking a surface width of approximately 12 meters, with insufficient space for construction. The pipe jacking method will be used in some areas, including the new sewage pipeline on Jinsui Avenue (Laodong Street-Peace Avenue) with a depth exceeding 5 meters. To avoid large-scale road surface excavation and reduce traffic impact, mechanical pipe jacking will be employed for the new sewage pipeline in this section. The sewage pipeline on Xiangyang Road (Liberation Avenue-Victory Street) is close to existing rainwater, street lights, and trees. To avoid excavation affecting existing pipelines, mechanical pipe jacking will be used for the new sewage pipeline in this section. Other sections will adopt the open-cut construction method, with areas where the work surface is insufficient adopting supported excavation.

7 Climate Change and Climate Adaptation Capacity Analysis

7.1 Climate Change

Climate refers to the long-term average state of the atmosphere's physical characteristics, which has a certain degree of stability. According to the World Meteorological Organization (WMO), a standard climate calculation period is 30 years. Climate is measured by characteristics such as cold, warm, dry, and wet, typically represented by average values and deviations over a period. Most of the project area is located in the planned and existing urban areas of Xinxiang City, on the edge of the North China Plain, with potential climate issues including heavy rain, strong winds, hail, low-temperature frost, and drought.

7.2 Climate Adaptation Capacity Analysis

7.2.1 Construction Process Climate Adaptation Capacity Analysis

Climate change poses challenges to construction, such as increased rainfall, extended rainy seasons, and more frequent extreme precipitation events, which can delay earthworks and construction schedules. Extreme weather conditions like strong winds, heavy rain, and heavy snow pose safety risks for large equipment and machinery, as well as for construction workers.

Given the project's characteristics, the focus during construction is on responding to floods caused by strong winds and heavy rain, as well as preparing for high-temperature drought, hail, and low-temperature frost.

1. Enhancing Early Warning

To ensure the safety of construction personnel, it is crucial to stay informed about current and future weather conditions. Command and supervision departments should take timely measures based on meteorological information to reasonably schedule work and avoid disasters caused by extreme weather.

2. Flood Response During Construction

The construction of drainage systems may affect the capacity of existing drainage systems. Flood prevention measures should be implemented in terms of construction organization, engineering measures, and material and equipment guarantees.

- Organizational Measures
  - Establish a Safe Flood Season Leading Group for the Engineering Management Office to organize and lead flood prevention efforts. This group will follow the local flood control command and actively cooperate with local flood control work.
  - Form multiple mobile emergency rescue teams based on the project's different sections, each led by a section project manager with 30-50 skilled personnel. These teams will be dispatched by the municipal flood control command and higher-level flood control departments.
- Engineering Measures
  - In urban sections, make full use of nearby municipal road

drainage systems for drainage. During temporary pipeline blockage, ensure proper flow diversion.

- Strengthen flood season channel and channel slope protection, replace channel slope protection, high fill channel section protection, and implement measures to prevent and remove channel waterlogging. Ensure the safety of the channel project during flood season.
- Thoroughly inspect water-passing culverts on construction roads and the surrounding drainage systems, and equip the site with necessary water pumps to ensure safe flood season operations. Strengthen road maintenance in construction areas to ensure unobstructed roads.
- According to the flood control plan, conduct a comprehensive inspection of spoil grounds, temporary facilities, equipment, and bridge projects, and establish corresponding anti-scour and drainage facilities to prevent water damage during construction.

- Material and Equipment Guarantee Measures
  - The supervision department will inspect the flood control material reserves and on-site facilities for each section. Sections lacking adequate flood control equipment and materials will be required to rectify the situation within the specified time frame according to flood control requirements. During the flood season, ensure that transport vehicles, excavators, bulldozers, generators, and water pumps are in good standby condition to meet emergency dispatch and use requirements during urgent rain and water situations.

3. Wind Response During Construction

Strong winds refer to winds at ground level that reach Beaufort scale 8 (average wind speed 17.2–20.7 m/s) or above. In China, winds with an instantaneous wind speed of 17 m/s or above (or visually estimated at Beaufort scale 8 or higher) are classified as strong winds. During strong wind weather, outdoor operations should be halted, and dust control measures such as covering and watering should be implemented at construction sites and spoil grounds to reduce the impact on the surrounding environment. Construction vehicles should not be parked under tall buildings or trees to prevent damage from falling glass or branches.

7.2.2 Operation Process Climate Adaptation Capacity Analysis

The project involves the restoration of important urban flood drainage facilities such as rivers, roads, and channels. Strengthening the systematic and scientific nature of operation management and improving emergency response capabilities can significantly enhance the city's ability to respond to extreme heavy rain and maximize the project's benefits. During operation, the focus is on responding to disasters such as heavy rain, drought, hail, and low-temperature frost.

1. Heavy Rain Response During Operation

To enhance the perception and response capacity for heavy rain, the Xinxiang City Emergency Management Bureau has initiated the construction of an urban smart water environment (flood control) platform. Once the project is completed, it will comprehensively improve the city's smart flood control and

drainage management. The platform primarily provides model analysis and flood control emergency command functions. The main components of the project's climate adaptation during operation include model analysis, flood control emergency command, improving post-disaster emergency relief mechanisms, and operational management measures.

- Model Analysis
  - Using static models, different rainfall scenarios can be examined to assess overflow at inspection wells, analyze pipeline capacity in response to climate change, and conduct economic evaluations. This enables a more intuitive assessment of the city's drainage capacity during different rainfall events, providing pre-disaster network capacity improvement plans and identifying areas requiring enhanced protection during disasters.
  - Real-time dynamic flood and pump station models will forecast potential flood warning levels under predicted rainfall in the next 2 hours, offering emergency plans based on the warning levels. These models will also provide operational suggestions for pump stations based on current and predicted water levels, aiding in timely and effective flood control decision-making.
- Flood Control Emergency Command
  - Through data collection from rainfall stations, river levels, road waterlogging points, and intelligent video monitoring, combined with flood model analysis data, decision-makers can receive information on rainfall and flooding to activate emergency plans. An emergency call mechanism will promptly communicate flood control tasks and dispatch notifications to relevant personnel. The platform will also send SMS reminders to the responsible individuals, who can use the smart water management app to promptly report on-site situations to decision-makers. This mechanism enhances flood control emergency coordination and decision-making capabilities, achieving timely warnings, accurate assessments, rapid response, unified command, and joint actions to improve resilience to extreme weather.
  - In the event of an extreme flood, residents in the floodplain should be relocated to safe areas. Relevant departments' flood control personnel should familiarize themselves with the terrain, road traffic information, and population within the flood-affected area. Pre-determined flood inundation maps should guide the planning of evacuation routes to ensure orderly and planned withdrawal during emergencies, avoiding chaos. Pre-determined inundation maps should also specify resettlement points for disaster victims and provide information on evacuation routes in advance to ensure swift and safe evacuation during disasters.
- Improving Post-Disaster Emergency Relief Mechanisms
  - Clearly define the responsibilities of the government and related departments to ensure the orderly progress of post-disaster emergency relief work. After the flood recedes, local governments and flood control offices should promptly organize residents to return home and start post-disaster reconstruction. For those severely affected with substantial losses and unable to help themselves, the local government should promptly provide disaster relief funds and assist in rebuilding homes and resuming production.
  - Ensure timely replenishment of materials consumed during flood control and rescue operations according to the graded collection

requirements of local governments at all levels to facilitate smooth flood control work.

- Existing flood control projects damaged by extreme floods should be quickly repaired or rebuilt to restore their primary flood control functions and be ready for future floods.
- Coordinate with relevant departments to quickly repair and restore the functionality of essential infrastructure damaged by extreme floods, such as communication cables, electricity, roads, and hydrological monitoring stations.
- Ensure that new flood control systems must meet the national flood control standards.
- Conduct disaster assessments to qualitatively and quantitatively summarize, analyze, and evaluate each aspect and stage of flood control efforts during the extreme flood process. Collect opinions and suggestions from relevant departments and disaster-stricken residents to identify problems and loopholes in flood control work.

○ Engineering Operation Management Measures

- During the operation phase, establish corresponding energy management measures and systems for the operation of energy-consuming equipment to reduce energy consumption. Train management and operational personnel on energy conservation, requiring operators to have energy-saving operation certificates and to strengthen fuel management. Utilize existing conditions to reduce energy consumption, such as using grouped controls for road lighting based on production requirements and natural lighting conditions to reduce electricity consumption.
- To maintain the safety, naturalness, and ecological integrity of rivers, and to ensure water quality and bank protection, strengthen the control and management of sewage discharge along river routes. Based on the river's course, bank safety, and the need for ecological protection of river channels and floodplains, develop detailed implementation rules for watershed system management and maintenance, assigning specific responsibilities to personnel. For the maintenance of riverbank walls and slopes, follow the principle of "regular maintenance, immediate repair, prompt cleaning, with a focus on prevention over repair and repair over emergency response" to manage and maintain the operation of river systems.

2. Low-Temperature Frost Response During Operation

Low-temperature freezing disasters primarily result from strong cold air or cold waves from the polar regions, leading to a continuous drop in temperatures that damages crops and reduces agricultural output. Such disasters include low-temperature rain, cold damage, frost, and cold waves.

○ The primary defense measures include selecting suitable crop varieties and planting periods based on local climatic conditions to avoid harmful low temperatures during sensitive periods. Adjust plant layout and variety ratios based on cold damage forecasts. Regulate the microclimate to avoid spring low temperatures and allow plants to evade autumn cold. Strengthen basic construction and management of planting areas.

○ Meteorologists have mastered the regularities of low-temperature climates and enhanced cold damage forecasting. Long-term

trend forecasting facilitates adjustments in crop layout and variety matching. Medium- and short-term forecasts provide reliable bases for timely emergency countermeasures.

3. Hail Response During Operation

Hail is highly destructive, often damaging crops, buildings, and even causing injuries or fatalities to people and livestock. Large hailstones can cause significant damage to vast farmland, trees, buildings, and vehicles.

- Implement meteorological warnings and take artificial intervention measures to increase hail embryos, reduce hail diameter, and disrupt hail cloud water transport. Protect important plants and trees in advance, evacuate personnel, and ensure protective measures for outdoor workers to avoid casualties.

4. Drought Response During Operation

Drought refers to a climate phenomenon where the total freshwater is insufficient to meet human survival and economic development needs, often a long-term phenomenon. Droughts remain a major natural disaster for humanity, even in technologically advanced societies.

- To address drought, adjust regional planting structures and select drought-tolerant plant varieties. Ensure proper water allocation and use modern technology and water-saving measures to reduce water consumption. Rationally develop and use unconventional water bodies.

8 Public Consultation and Information Disclosure

8.1 Purpose of Public Participation and Information Disclosure

Public participation in environmental and social impact assessments is intended to improve the quality of these assessments by gathering more information and suggestions. It ensures the process becomes more democratic and public-oriented, allowing those directly or indirectly connected to the project to be involved. This participation helps ensure transparency and credibility in the assessment decision-making process, allowing the public to express their opinions to make the assessment more comprehensive and fair.

Public participation is a crucial component of the environmental and social impact assessment process and is an effective way to enhance scientific decision-making. It fosters two-way communication between the project developer, evaluation units, and the public. By involving those directly or indirectly affected by the project, the process enables a better understanding of potential environmental and social impacts, as well as mitigation measures, while allowing for feedback and suggestions. The primary goals are to ensure public opinions are considered in environmental protection and social monitoring measures, facilitate communication between the public and the developer, gather public viewpoints for assessment refinement, and strengthen public supervision as part of the post-evaluation process to ensure sustainable development.

8.2 Relevant Laws, Regulations, Policies, and Stakeholder Identification

This assessment follows the public consultation and information disclosure requirements of the "Asian Infrastructure Investment Bank Emergency Loan Henan Province Flood Disaster Recovery and Reconstruction Project Environmental and Social Management Planning Framework" and complies with domestic public participation requirements, as detailed in Chapter 2 of this report.

8.3 Completed Information Disclosure and Public Consultation

Public consultation and information disclosure for this project employed methods like online announcements, newspaper publications, posting notices, displaying information on-site, surveys, focus group discussions, in-depth interviews, and key informant interviews. The assessment team conducted public consultation and information disclosure as required by the "Environmental Impact Assessment Law of the People's Republic of China," the "Interim Measures for Public Participation in Environmental Impact Assessment" issued by the Ministry of Environmental Protection, and the "Environmental and Social Framework" of the Asian Infrastructure Investment Bank (2023 revision). Since the start of the project preparation in 2021, various public consultation and information disclosure activities have been carried out by the Xinxiang Municipal Finance Bureau AIIB Project Office and related departments. These include activities during the project's preparation phase, led by the project office, developer, and relevant consulting units, with

information disclosures and public participation activities organized at various stages.

Between February 17-19, June 9-16, July 29-31, and August 9-12, 2022, the Environmental and Social Impact Assessment Survey Team conducted public surveys in four districts within the project implementation area. They carried out these surveys with the collaboration of the Xinxiang Municipal Finance Bureau AIIB Project Office and other relevant units.

Table 8-1 Overview of Public Participation Activities for the Project

Participation Type	Date	Location	Content	Participants	Notes
Project Information Notification and Disclosure	April 2022	Related Websites https://www.henan.gov.cn/2022/04-27/2439640.html	Latest project developments	Project office of each district, public in project areas	First round of announcement
	October 2022	Affected village - Nie Zhuang Village	Information disclosure	Project office, consulting units, related townships, communities, villagers	
	October 2022	Nie Zhuang Village	On-site inspection, project information disclosure, gathering opinions	Project office, developer, technical consulting experts, government officials, villagers	
	June 2023	Affected communities	Posting notices	Developer, environmental consulting units	Second round of announcement
	July, September 2023	Mainstream provincial newspapers, Xinxiang Daily	Online and notice posting	Developer, environmental consulting units	
Field Surveys	April 16-20, 2024	Affected communities	Conducting socioeconomic sample surveys	Villages, project office, developer, resettleme	First round of field surveys

Participation Type	Date	Location	Content	Participants	Notes
				nt plan compilation units	
	April 16-20, 2024	Affected communities	On-site survey, questionnaires, interviews to gather opinions on the project	Affected villages, project office, developer, social impact assessment team	
	April 16-20, 2024	Proposed project sites	On-site surveys, resident interviews for project communication	Social impact assessment team	
Questionnaire Survey	April 2024	Affected communities	Distributed 330 questionnaires, collected 330 valid responses	Affected community residents, social impact assessment team	First round of survey
Focus Group Discussions	April 2024	Affected communities	Held 10 focus group discussions with 114 participants	Affected community residents, village committee members, social impact assessment team	First round of discussions
Key Informant Interviews	April 2024	Relevant institutions, affected communities	Conducted 53 interviews with key informants in project areas	Government officials, community members, company employees, social impact assessment team	

8.3.1 Public Participation Results in the Project Preparation Stage

1. Starting in October 2022, during on-site investigations, the project office

began communicating with residents in the project areas regarding the construction content, necessity, and social benefits of the Xinxiang subproject, gathering their attitudes and opinions on the project.

2. Since December 2023, under the guidance of technical assistance consulting experts, the Xinxiang Municipal Government and other related departments have conducted a series of socioeconomic surveys and public consultations, including with approximately 30% female participation. This involved various methods such as publicizing information through meetings, community/ village project information announcements, project notices, distributing pamphlets, and using other media like public accounts.

3. In April 2024, the social assessment survey team conducted field visits to project areas, including surveys, discussions, interviews, and consultations with affected residents, and socioeconomic sampling. The team informed residents about the project construction content and gathered detailed feedback on their needs and expectations.

8.3.2 Institutional Interviews

The project assessment team conducted 47 institutional interviews and discussions with departments and organizations involved in the project. These included the Xinxiang Municipal Project Office, the Xinxiang Housing and Urban-Rural Development Bureau, the Municipal Urban Management Bureau, and other relevant institutions. The interviews aimed to collect foundational data and documents related to the project.

Table 8-2 Overview of Institutional Interviews in Each Project Area

Project Area	Institutional Interviews	Departments Interviewed
Hongqi District	17	Municipal Project Office, Urban and Rural Development Bureau, Emergency Bureau, Natural Resources and Planning Bureau, and others
Weibin District	16	Project office, Housing and Urban-Rural Development Bureau, Water Bureau, and others
Muye District	14	Project office, Housing and Urban-Rural Development Bureau, Emergency Bureau, and others
Total	47	----------

The public participation process has played a significant role in improving project decision-making by ensuring transparency and involving stakeholders in identifying potential environmental and social impacts. This has helped formulate more effective mitigation measures and enhance the overall project planning.

8.3.3 Field Visit

The investigation team conducted on-site surveys of the road conditions and infrastructure conditions near the towns, streets, communities/villages affected by the construction of the three projects, as well as the construction sites of the project stations. The team gained a more practical and objective understanding of the impact of the projects in each project area of the Xinxiang subproject on the production and life of the surrounding residents, the land acquisition and demolition situation, the social and economic living conditions of the urban and rural residents and the affected people in the project beneficiary areas, and their suggestions, main concerns and demands for the Xinxiang subproject projects and supporting facilities. The on-site survey conditions of each project area are shown in the figure below, and the details of the on-site survey are shown in the table below.

Figure 8 -1 Investigation team's field survey map
(Shangxiangyang rainwater pump station catchment area reconstruction project, Zhongyinmakou rainwater pump station catchment sub-project station, Xiahongli Avenue East Mengjiangnv River rainwater pump station catchment area construction project)

Table 8-3 Field survey status table of each project area

Municipal level	County level	Subdistricts in the project area	Visit communities/villages
Xinxiang	Hongqi District	West Street, Wenhua Street, Xiangyang Street	Jianbei and Jiannan communities
	Weibin District	Shengli Road Subdistrict, Jiankang Road Subdistrict, Nanqiao Subdistrict	Spring/Summer, Autumn/Winter, New Machine Community
	MuyeDistrict	Peace Street	Niezhuang Village

8.3.4 Focus Group Discussion

In order to more comprehensively understand the needs and suggestions of the affected people in the project area (including urban and rural residents, women, low-income groups, and vulnerable groups in the project area), the survey team conducted a focus group discussion in the field survey in response to the project beneficiaries' evaluation of the current status of the nearby rivers and municipal roads in Xinxiang City near their current residential areas, their expectations for the prospects of the Xinxiang subproject, and their concerns and suggestions brought about by the implementation of the project. The survey team conducted 10 focus group discussions with residents in different streets and communities in the project counties, with a total of 114 participants. See the figure and table below for details.

Figure 8-2 Focus group discussion (part)

Table 8-4 Focus Group Discussion and Participants Details

Project Area	Symposium composition and sessions						total	
	Women		elder		Heads of relevant project departments, neighborhood committees and residents' representatives		Number of participants	Number of seminars
	people	Sessions	people	Sessions	people	Sessions	people	Sessions
Hongqi District	10	4	8	4	18	3	36	4
Weibin District	12	3	6	3	19	3	37	3
MuyeDistrict	11	4	7	4	twenty	2	41	4

					three			
total	33	10	twenty one	10	60	13	114	10

8.3.5 Key informant interviews

The survey team interviewed key informants at the project county, township, and village/community levels to better understand stakeholders' attitudes toward the project and provide better suggestions for project design and implementation. The survey team interviewed 53 key informants in three counties.

Figure 8-3 Interviews with key informants (partial)

A total of 53 key informants were interviewed in this survey, including 19 in Hongqi District, 17 in Weibin District, and 17 in Muye District. See Table 8-5 for details of the interviews with key informants in the project counties and districts.

Table 8-5 Interviews with key informants

Project Area	Head of Institution	Village/Neighborhood Committee	total
Hongqi District	11	8	19
Weibin District	9	8	17
MuyeDistrict	10	7	17
total	30	twenty three	53

8.3.6 Questionnaire

Based on the probability proportional to size sampling (PPS sampling) method, the investigation team calculated that the sample size of the questionnaire survey for this project was approximately 330, with a confidence level of 95% and a maximum absolute error d of 5%. 330 questionnaires were actually completed, meeting the statistical requirements.

During the field investigation, the investigation team completed a total of 330 one-on-one face-to-face questionnaires in the three project counties. After statistical testing and screening, 330 questionnaires were valid, with a questionnaire efficiency of 100%.




For details on the sample distribution of the social assessment questionnaire survey in the project area, please refer to Table 8-6 below.

Table 8-6 Distribution of questionnaire survey samples

Project Area	Number of questionnaires (copies)	percentage(%)
Hongqi District	113	34.31
Weibin District	107	32.56
MuyeDistrict	109	33.13
total	330	100

The establishment and analysis of the questionnaire database was done using IBM

SPSS statistical software. After statistics, the basic information of the valid samples is shown in Table 8-7 below.

Table 8-7 Basic information of valid samples

Statistical indicators	Statistics
gender	There are 167 males, accounting for 50.61%; and 163 females, accounting for 49.39%.
age	Those aged 18-24 accounted for 12.96%, those aged 25-34 accounted for 27.78%, and those aged 35-44 accounted for 25.93%. Those aged 45-54 and above account for 22.22%, those aged 55-64 account for 9.26%, and those aged 65 and above account for 1.85%.
Household registration type	Urban areas account for 59.26% and rural areas account for 40.74%.
Education	1% are illiterate, 7% are in primary school, 54.5% are in junior high school, 22.25% are in high school/technical secondary school, and 15.25% are in college or above.
Profession	Government employees accounted for 6.75%, public institution employees accounted for 16.0%, and corporate employees accounted for 14.75%. Self-employed people accounted for 16.5%, freelancers accounted for 19.0%, unemployed/unemployed accounted for 0%, and students accounted for 6.25%. Retirees accounted for 7.25%, farmers accounted for 5.25%, and others accounted for 7.5%.

8.4 Public participation plan for each stage of the project

Information disclosure and public participation will run through the entire project cycle.

Based on the identification of stakeholders and the engineering content of this project, a public participation plan for each stage of this project has been formulated, as shown in the table below.

Table 8-8 Public consultation at different stages

stage	Participation content	How to participate	Implementation Unit	Participants	Issues to be addressed	Funding
Project preparation stage	**Disclosure of basic project information**	Television, radio, posting notices, distributing leaflets, village meetings, village committee notices, the Internet	Project Office, Township and Village Committee	Residents (residents in the project area, especially those in the project implementation area), township/town cadres, project offices, schools along the project area, enterprises, institutions, and shop operators	Publicize basic project information; Collect opinions and suggestions from residents, schools, enterprises, institutions and shops; Answer questions from residents, schools, enterprises, institutions and shops.	Project budget funds
	Site selection intention survey	Residents' representative meeting, questionnaire survey	Project Office, Consulting Unit	Residents, project offices, consulting units, schools along the project area, enterprises, institutions, and shop operators	Conduct site selection surveys on residents, schools, enterprises, institutions and shops involved in the project; The questionnaire survey uses actual households as the survey population; The project can only be implemented if more than 80% of the residents in the village agree	Project budget funds

					to participate.	
	Design participation and consultation	Resident interviews, seminars, and public notices	Project office, project design unit, consulting unit	Residents, project offices, project design units, consulting units, village committees	Formulate a flood prevention and disaster reduction training plan for residents along the route, including flood safety education and training, flood warning and drills, and raising residents' awareness of flood prevention and safety; During the design process, residents are encouraged to put forward their own opinions and suggestions on relevant design contents; After the preliminary design of the plan is completed, the project office should publicize the plan in the project village and collect opinions and suggestions from residents.	Project budget funds
	Land Acquisition	Negotiations between the street and residents	Village committee, project office	Residents, village committees, project offices, natural resources departments	Confirmation of land occupation; The neighborhood committee negotiates with residents to determine the content and method of compensation; The neighborhood committee signs relevant agreements with residents and provides compensation in accordance with the requirements of the agreements.	Project budget funds
Project imple	**Construction Information Disclosure**	Post notices, hang propaganda	Project office, constructi	Villagers, project office, construction	Public construction time and progress plan;	/

mentation phase		slogans, broadcast, etc. at residents' representative conferences and village committee bulletin boards	on unit, village committee	unit, village committee	Construction site distribution; Main impacts of construction: Safety issues that villagers need to be aware of; The construction unit's contact person and contact information, etc.	
	Reduce construction impact	Improve corresponding emergency plans and effective mitigation measures	Project office, construction unit Village Supervisory Committee	Project office, construction unit Transportation Bureau, Traffic Police, Ecological Environment Bureau, Village Supervision Committee Villager representative	When excavating the road, leave a convenient path for residents in the project area to travel; Take measures to reduce dust and noise; Pipeline network laying should avoid residential areas as much as possible; Try to identify the affected households and affected amounts involved in temporary land occupation.	Project budget funds
	Participate in project construction	Villagers' meeting, villagers' representative meeting	Project office, construction unit, village committe	Villagers, project office, construction unit, village committee	Determine the positions that can be provided by the project construction; Determine the selection criteria for project construction personnel, giving priority to poor	Internal budget of construction unit

			e		households and women; Determine the remuneration for those involved in the project construction as well as the technical training and safety system training for those involved in the construction.	
	Management of Import of Foreign Workers	Expand safety and health publicity and standardize the education and management of construction personnel	Project Office Construction unit Health Bureau Village Supervisory Committee Residents in the project area	Project office, construction unit Health Bureau, Township and Community Hospitals, Village Committees, Village Supervision Committees Migrant workers and community residents	Carry out public health and HIV/AIDS and COVID-19 prevention education and publicity, and include it in the contract documents; Conducting physical examinations for project construction workers; Strengthen publicity and education on the local social culture and traditional customs of the project area for outsiders. To ensure the physical and mental health of female workers on construction sites, construction units should provide regular mental health counseling for female workers. Construction companies should strengthen supervision of construction sites (to avoid harmful behaviors such as gender-based violence, sexual exploitation and abuse, and sexual harassment) and establish clear channels for complaints.	Project Budget

					Construction sites should establish a grievance complaint team, which should include at least two female members, and ensure the safety of team members (to avoid bias and fear of retaliation).	
Project operation stage	**Flood safety and water safety education**	Knowledge Lectures	Project Office, Village Committee	Villagers, village committee	The passenger flow at Xinxiang High-speed Railway Station has increased, and the rainy season poses a threat to the personal safety of residents in the project area. Flood prevention and water safety education has been provided to enhance residents' safety awareness; Conduct special lectures on flood prevention and disaster relief knowledge using the heavy rain in Xinxiang City as an example, including flood safety education and training, flood prevention warnings and drills, and improve residents' awareness of flood prevention and safety; Diversified disaster training content (earthquake disaster protection, urban flood control, Yellow River flood control, etc.); When conducting education and training on flood control and drainage, special attention is paid to the proportion of women, the elderly	Special funds from administrative departments and village collective finances

					and children attending lectures; Actively carry out natural disaster personnel training and strengthen the construction of Xinxiang City's disaster information personnel team;	
	Publicizing channels for complaints and appeals	Television, radio, posting notices, distributing leaflets, villagers' meetings, village committee notices, the Internet	Project Office, relevant government management departments and village committees	Project Office, relevant government management departments, sub-district/township/village committees	Publicize the project implementation supervision telephone number in appropriate places and open a complaint handling channel; Regarding the relevant issues raised by residents during the operation of the project, complaints raised through various channels such as on-site complaints, letters, and telephone calls will be accepted and notified on-site. If on-site notification is not possible, a reply should be given within 15 days; Pay attention to listening to the opinions of vulnerable groups such as women and low-income people to ensure open, fair and transparent implementation of the project.	/

9 Grievance Mechanism

9.1 Grievance and Complaint Procedure

During the preparation, construction, and operation phases of the project, a grievance mechanism will be established to promptly understand and address the impacts and issues brought to stakeholders by the project. This mechanism ensures the need for information disclosure and the widest possible community participation. It will be built upon the existing grievance channels in the project area. All grievance records and resolutions will be documented through the semi-annual environmental and social monitoring mechanism and reported to the Asian Infrastructure Investment Bank (AIIB).

The project's grievance mechanism will extend and expand on existing channels in Xinxiang City (such as the environmental protection hotline and mayor's hotline). The project office, referring to the grievance mechanisms established for other construction activities under the AIIB Xinxiang subproject, will establish a mechanism that meets the AIIB requirements for the content of this project.

The grievance mechanism mainly includes two types:

1. Project-Level Grievance Mechanism: Provides a channel for affected residents, social groups, business entities, etc., during the implementation and operation of the project.
2. Worker-Level Grievance Mechanism: Provides a channel for direct and contract workers, including employees responsible for the project.

(1) Grievance Mechanism for Project-Affected People

This mechanism addresses complaints mainly caused by the project, such as dust from construction, construction noise, improper disposal of construction waste, safety measures for the public and construction workers, and noise and waste generated during operation. Currently, residents in Xinxiang City mainly use the mayor's complaint hotline 0373-12345 and the environmental protection hotline 0373-12369 to report issues. The improved grievance mechanism complies with the regulatory standards of the People’s Republic of China, which protect citizens’ rights from environmental and social impacts related to construction. According to the "Regulations on Letters and Visits" (No. 431), released by the State Council of the People’s Republic of China in 2005, and the "Measures for Environmental Letters and Visits" (Order No. 15), issued by the former Ministry of Environmental Protection in December 2010, a complaint acceptance mechanism has been established at all government levels.

Xinxiang City established a project office in December 2021, with four staff members in the comprehensive department responsible for the operation of the grievance mechanism. If the Xinxiang project office receives a complaint, the head of the comprehensive department should first verify whether the complaint is related to the project. If it is, regardless of whether it is related to the environment or society, the

responsible person should initiate coordination to resolve the complaint. If the complaint is not related to this project, the person in charge submits it to the relevant authority on behalf of the complainant. All complaints should be recorded, and the entire process should be communicated to the relevant personnel. The basic steps and timeframes for the grievance mechanism are as follows:

- Phase One (5 days): If an issue arises during construction or operation, the affected person can file a written or oral complaint to the contractor. The contractor will: (1) immediately stop the relevant activity after confirming the problem (e.g., construction site noise affecting nearby residents); (2) not resume the activity until the complaint is resolved; (3) immediately notify the project implementing agency of the complaint and the proposed solution; (4) provide a clear response to the affected person within two days; (5) resolve the issue within five days of receiving the complaint if possible.
- Phase Two (5 days): If the contractor cannot determine a solution, or the affected person is not satisfied, the project implementing agency will organize a meeting with key stakeholders (including the contractor and the affected person) to develop a plan acceptable to all parties, including key steps to resolve the issue. The contractor should immediately implement the resolution and resolve the issue within 15 days. All measures and outcomes should be recorded.
- Phase Three (15 days): If the project implementing agency cannot determine a solution, or the complainant is not satisfied with the proposed solution, the Xinxiang project office will organize a stakeholder consultation meeting (including the complainant, contractor, local ecological environment bureau, human resources and social security bureau, urban environmental management bureau, and other relevant regulatory departments) within seven days. A solution acceptable to all parties should be determined, including clear steps. The contractor will immediately implement the agreed solution and completely resolve the issue within 15 days. All actions and outcomes of each phase will be recorded. At the end of Phase Three, the Xinxiang project office will inform the AIIB of the results.
- Phase Four: If the complainant is still not satisfied with the decision of the Xinxiang project office, they can appeal to the administrative authority with jurisdiction for arbitration following the "Administrative Procedure Law of the People's Republic of China."
- Phase Five: If the complainant is still not satisfied with the arbitration decision, they can file a lawsuit in a civil court following the Civil Procedure Law.

(2) Grievance Mechanism for Workers

The project implementing agency will establish a separate complaint handling center to deal with complaints raised by workers on construction sites to contractors. These complaints include issues such as wages, overtime pay, timely payment, accommodation problems, or facilities related to drinking water, sanitation, and medical services.

Meanwhile, in the GBV (Gender-Based Violence) management, relying on the guidance and coordination of the project office, district women's federations, townships/streets, and village/community women's federations, the project implementation agency, project construction units (contractors), etc., will set up dedicated staff responsible for maintaining women's rights. This will involve taking effective measures to prevent and stop sexual harassment of female workers in labor places, and establishing a rapid response mechanism for grievances and complaints regarding GBV for female workers and women in the project area. If there is behavior that harms the personal safety of female workers, such as sexual harassment in the workplace, the victim can immediately report or complain to the employer, and the employer should handle it promptly and protect the personal privacy of female workers according to law.

Additionally, the AIIB has established a Project-Affected People's Mechanism (PPM). If project-affected people believe they have suffered or may suffer adverse effects due to the AIIB project's failure to implement its environmental and social policies (ESP) and are not satisfied with the resolution through the project's grievance redress mechanism (GRM) or AIIB management mechanism, the PPM provides an independent and impartial review opportunity. Information about PPM can be accessed through the following link: PPM.

9.2 Grievance and Complaint Record and Tracking Feedback

During the implementation of the social management action plan, social action management institutions at all levels should keep records of grievances and processing results, and report them in writing to the Xinxiang project office once a month. The Xinxiang project office will regularly check the grievance handling registration.

To fully document the grievances and related issues of the affected population, the Xinxiang project office and project implementing agencies have developed a registration form for handling grievances and complaints of the affected population. A sample of the form is shown in Table 9-1.

Table 9-1 Grievance and Complaint Registration Form

Complainant Name	Time	Location	Feedback from Complaint Receiving Unit	Project Office	Suggestions from External Monitoring Unit	Progress on Issue Resolution	AIIB Opinion
Reason for Complaint							
Requested Resolution							
Proposed Solution							

Complainant Name	Time	Location	Feedback from Complaint Receiving Unit	Project Office	Suggestions from External Monitoring Unit	Progress on Issue Resolution	AIIB Opinion
Actual Handling Situation							
Responsible Person (Signature)							

Note: 1) The recorder should truthfully record the complainant's content and requirements. 2) The complaint process should not be interfered with or obstructed in any way. 3) The proposed solution should be replied to the complainant within the specified time.

9.3 Contact Information for Expressing Grievances and Complaints

The project's social action implementing agency will arrange for the main person in charge to be responsible for receiving and handling the dissatisfaction and complaints of the affected population. Their names, office addresses, and contact numbers are shown in Table 9-2. After the bidding is completed, the construction and supervision units need to confirm the environmental and social responsibility person as their grievance mechanism contact person.

Table 9-2 Information of Institutions and Personnel Receiving Complaints and Grievances from Affected People

Institution/Unit	Contact Person	Address	Phone
Xinxiang Project Office	Ren Jinsheng	No. 698, East Section of Jinsui Avenue, Hongqi District, Xinxiang City	13937367384
Xinxiang Housing and Urban-Rural Development Bureau	Ma Shaoqing	Northeast 60 meters intersection of Rongxiao Road and College Street, Muye District, Xinxiang City	13937359908
Xinxiang Urban Management Bureau	Pang Jinghua	Xinxiang Urban Management Bureau	15736968315

10 Environmental and Social Management Plan

10.1 Responsibilities of Institutions for Implementing the Environmental and Social Management Plan

The Asian Infrastructure Investment Bank (AIIB) Emergency Loan Project Leading Group Office of Xinxiang City (referred to as "Xinxiang Project Office") is fully responsible for the organization, management, implementation, supervision, and guidance of this project, and for liaising with the AIIB and the Henan Province AIIB Project Office. The Xinxiang Project Office is set up in the Municipal Finance Bureau, with one office director (also serving as the director of the Municipal Finance Bureau) and four deputy directors. It consists of a comprehensive coordination group, a bidding and procurement group, an execution management group, and a financial payment group. The execution management group will be responsible for specific work related to environmental and social management.

Xinxiang City's Weibin District, Hongqi District, and Muye District have established AIIB project coordination leading groups responsible for the organization and coordination of AIIB projects. Under the unified coordination and guidance of the Henan Province Post-Disaster Reconstruction Work Leading Group and the Xinxiang Project Office, they are responsible for overall coordination and inter-departmental cooperation within their jurisdictions to promote the smooth implementation of the project.

Under the guidance of the work team, the project office is mainly responsible for comprehensive coordination, bidding and procurement guidance, financial statistics, project implementation supervision, and other daily work to ensure the smooth implementation of the loan project. Relevant industry authorities have also established industry project offices. The primary responsibilities of the project office include managing the daily work of the project, organizing and guiding the project implementing units to carry out the preliminary preparation, mid-term implementation, and post-evaluation of the project, and specifically implementing the supervision and management of project plans, funds, finance, procurement, training, monitoring, and archives.

The Xinxiang Urban Management Bureau and Housing and Urban-Rural Development Bureau are the implementing agencies for this project. The Urban Management Bureau is responsible for constructing facilities in the drainage area of the Yinmakou Rainwater Pumping Station and the drainage area of the Xiangyang Rainwater Pumping Station. The Housing and Urban-Rural Development Bureau is responsible for constructing facilities in the drainage area of the Hongli Avenue East Mengjiangnv River Rainwater Pumping Station. These two implementing agencies will each be responsible for:

1. Appointing a coordinator for environmental and social management plan implementation;
2. Ensuring that the environmental and social management plan, monitoring scheme, and mitigation measures are included in the bidding

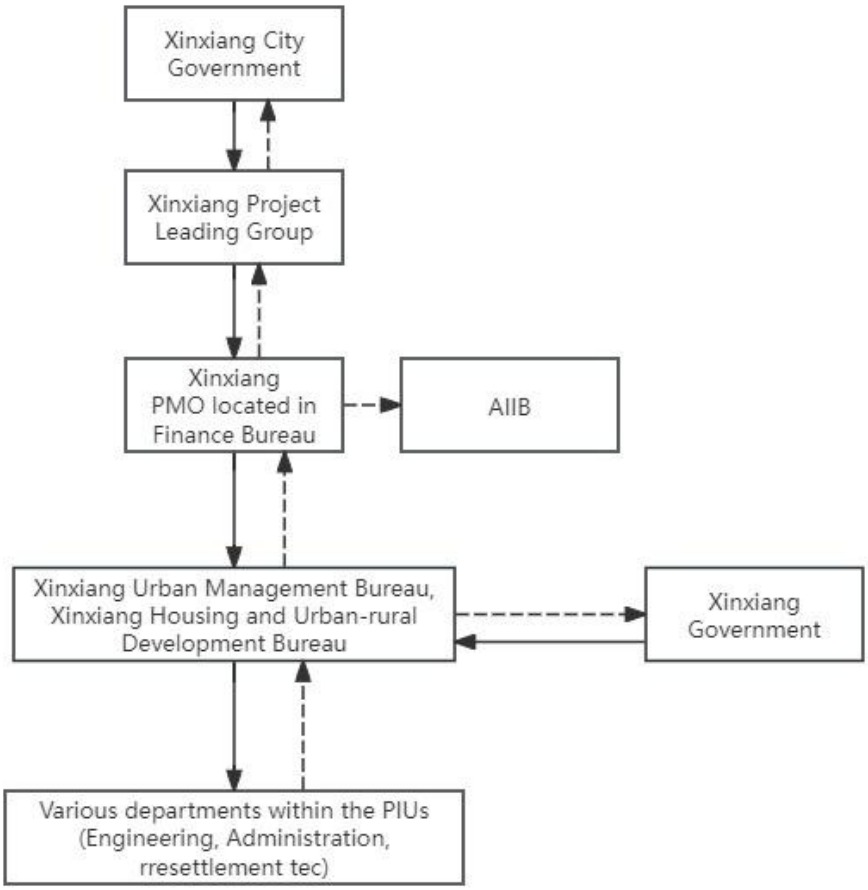
documents and construction contracts;
3. Managing the operation of the grievance mechanism;
4. Addressing unforeseen adverse impacts and reporting to the AIIB in a timely manner;
5. Hiring qualified external environmental and social monitoring units.

Contractor:

1. Ensure adequate funding and manpower throughout the construction phase to implement the mitigation measures and monitoring schemes in the Environmental and Social Management Plan;
2. Be responsible for the operation of the grievance mechanism during the construction phase.

Construction Supervisor:

1. Ensure sufficient funds and human resources to supervise and guide the contractor, requiring the contractor to implement mitigation measures and monitoring according to the requirements of the Environmental and Social Management Plan in a timely manner;
2. Monitor construction progress and quality;
3. Appoint qualified staff responsible for occupational health and safety to conduct regular on-site supervision of the contractor;
4. Supervise the contractor's performance in implementing the Environmental and Social Management Plan.



Note: Solid arrows represent supervision and guidance, while dashed arrows represent reporting.

Figure 10-1 Environmental and social management organizational structure

10.2 Anticipated Environmental and Social Impacts and Mitigation Measures

Based on the identified environmental and social impacts, corresponding mitigation measures have been developed and are detailed in Table 10-1. The design units and contractors will integrate these mitigation measures into the design, bidding documents, construction contracts, and operational management under the supervision of the project implementation units and supervision companies. The effectiveness of these measures will be assessed based on monitoring results from supervision and external monitoring units to determine if adjustments or improvements are necessary.

10.2.1Minimizing Land Acquisition Impacts

A brief Resettlement Action Plan has been developed based on the project's

resettlement impact.

During project operation, a Resettlement Policy Framework will be developed based on possible results of noise impact monitoring and evaluation.

Special attention is needed for vulnerable groups (if any), such as female-headed households, low-income households, and households receiving social assistance, to ensure how they use the resettlement compensation for income recovery.

10.2.2Reducing Potential Natural and Social Environmental Impacts

Mitigation measures for natural and social environmental risks during the construction and operation phases are listed in Table 10-1.

10.2.3 Reducing Traffic Safety Risks

The construction period may significantly occupy road surfaces, impacting traffic safety. To address traffic safety risks during construction and operation, the project office and the implementation agency will mitigate traffic safety risks in the project area according to the traffic safety management regulations of Xinxiang City. This includes planning dedicated routes for construction vehicles, improving road signs, installing protective barriers, and conducting traffic safety publicity.

Additional mitigation measures for traffic safety during construction include:

- Publicizing project information, including project overview, specific information of the construction unit, construction period, construction scope, and construction impact.
- Planning routes for large construction vehicles, avoiding peak hours to minimize the impact on residents' travel and road damage; carrying out construction during periods with less pedestrian flow such as early morning and nighttime; and avoiding peak commuting hours for heavy transport vehicles.
- Increasing traffic safety awareness by installing road signs and travel diversion plans.

Further mitigation measures for traffic safety during the operation phase include:

- Planning road passage settings reasonably and advocating for residents to travel during off-peak hours to reduce the risk of traffic congestion collisions.
- Strengthening traffic safety publicity, increasing the number of traffic guidance officers and traffic command posts to better maintain traffic order.

10.2.4Labor Management

Labor management primarily involves the protection of labor rights during construction and operation phases. In consultation with the project office of the

Finance Bureau, the following measures will be taken for the management of migrant workers during the construction phase:

- Clearly stipulate equal opportunity and fair treatment principles in the employment of project staff, prohibiting discrimination based on characteristics unrelated to job requirements, such as age or gender restrictions.
- Improve the grievance handling mechanism for workers (including direct workers and contract workers).
- Develop comprehensive training plans for workers.
- Provide appropriate protection and assistance measures for specific groups of workers, such as women, disabled persons, migrant workers, and children of legal working age, to address project staff deficiencies.
- Specific occupational and health measures are detailed in the Environmental Management Plan.

10.2.5Reducing the Impact of Influx of Migrant Workers During Construction and Operation Phases

During the project construction, a certain amount of labor will be sourced from other regions (provinces, cities, counties). The influx of a large number of external construction workers into the project area and increased interactions with local residents will lead to certain social and health risks. During the operation period, the increase in migrant workers and commercial personnel may strain local water, electricity, and land resources. Therefore, it is necessary to expand safety and health publicity, standardize the education and management of construction personnel, and prevent social risks. The specific management plan to reduce the impact of the influx of migrant workers during construction and operation phases includes:

- Strengthening education and publicity on health and prevention of AIDS, COVID-19, and other infectious diseases, including incorporating it into the contractor's contract documents.
- Inviting respected elders or knowledgeable community cadres in the project area to carry out publicity activities on local social and cultural customs, such as distributing pamphlets, posters, and photo albums.
- Improving community management, adopting a shift rotation system, and ensuring timely registration of external personnel entering the community to ensure the safety of internal community members.
- Improving circuit facility planning to reduce the pressure on electricity and water use; increasing the number of garbage stations, the frequency of sanitation vehicles, and the number of cleaning staff.

10.2.6Risks of AIDS and Epidemic Diseases

During the project construction and operation, there are risks of epidemic diseases. To strengthen health and epidemic prevention publicity and mitigation measures:

- Strengthening education and publicity on health and prevention of AIDS and

epidemic diseases, including the prevention of AIDS, influenza, and other infectious diseases, should be included in the contractor's contract documents.

- Public health and AIDS and epidemic disease prevention education should be incorporated into the project contracts and be effectively implemented.
- Conduct physical examinations for construction workers (e.g., set up temporary clinics, fully utilize local medical resources).
- Carry out various forms of AIDS and epidemic disease prevention publicity activities, such as distributing pamphlets, posters, and photo albums.

10.2.7 Reducing the Risk of Inadequate Participation of Vulnerable Groups

The vulnerable groups in this project mainly include women, low-income populations, and ethnic minorities. The survey found that there is a risk of inadequate participation among vulnerable groups. Recommendations for female participation in social engagement are detailed in the Gender Action Plan. Measures to increase the participation of ethnic minority groups include: During the project construction period, ways to increase the participation of ethnic minorities include:

- Increase the forms of participation for low-income populations and ethnic minorities in this project, such as using WeChat and TikTok.
- Consider the needs of low-income populations and ethnic minorities during information publicity, providing targeted information guidance and training.
- Provide employment opportunities for low-income groups and ethnic minorities during construction, such as in low-skilled positions.

During the project operation period, ways to increase the participation of low-income populations and ethnic minorities include:

- Establishing consultation service desks using ethnic minority languages during project operation.
- Providing service-oriented positions for low-income populations and ethnic minorities during project operation, ensuring equal pay for equal work.
- Consider the needs of low-income populations and ethnic minorities during information publicity, providing targeted information guidance and training.

10.2.8 Gender Action Plan

The construction contractor and project office, in coordination with the Women's Federation and community grassroots units, take the following gender action measures to enhance women's capacity in employment, development, and participation and to reduce the risk of gender-based violence during participation:

- Appoint a dedicated officer responsible for safeguarding women's rights and formulate an institutional framework and implementation plan to prevent and curb sexual harassment of female workers in the workplace.
- Provide regular mental health consultations and training on the protection of

female workers' rights.

- Strengthen supervision of construction sites to avoid harmful behaviors such as gender-based violence, sexual exploitation and abuse, and sexual harassment.
- Establish clear grievance and complaint channels, forming a construction site grievance group that includes at least two female members, and ensuring the safety of grievance group members to prevent situations of prejudice or fear of retaliation.

To increase employment opportunities for women:

- During project construction and operation, give priority to providing technical and non-technical positions to women in the villages involved in the project area.
- For jobs that do not require high physical demands, relax the employment age range and give priority to hiring women aged 40 to 50 who find it difficult to obtain non-agricultural employment opportunities, such as cleaning, cooking, and maintenance jobs.

To enhance women's development capabilities:

- Hold employment knowledge lectures, skill training courses, and employment and entrepreneurship seminars to improve women's skills, knowledge, and opportunities for employment and entrepreneurship.
- In the training for flood prevention, disaster mitigation, and sustainable information disclosure capacity building, provide appropriate skill training content considering factors such as women's physiological and psychological qualities, educational level, and personal needs, and set appropriate training times to further ensure that women have equal opportunities with men to improve their skills.

To expand women's participation in decision-making:

- Increase the proportion of women participating in related community decision-making.
- Increase the proportion of women signing or jointly signing with their spouses the land acquisition or resettlement compensation agreements.

10.3 Environmental and Social Management Plan

Based on extensive consultations and discussions with the project office, owners, implementing agencies, relevant institutions, and project area residents, a feasible environmental mitigation and social management plan has been developed to address the impacts and potential risks on the environment, society, and women caused by this project. The specific measures are compiled separately by sub-projects. The design units and contractors will incorporate the mitigation measures into the design, bidding documents, construction contracts, and operational management under the supervision of the project implementation units

and supervision companies. The effectiveness of these measures will be evaluated based on the monitoring results from supervision and external monitoring units to determine if adjustments and improvements are needed.

Table 10-1 Environmental Management Plan A (Applicable to the Yinmakou Watershed Subproject)

Impact Factors	Mitigation Measures	Implementation Unit	Supervision Unit
Construction Period			
Air Emissions/Dust	1) Perform layered compaction and water spraying during excavation and backfilling to suppress dust; 2) Erect barriers around the construction area to reduce dust impact on nearby residents; 3) Assign personnel to regularly clean and spray water within 50m of the main entrances/exits and around the construction perimeter to maintain a 100% cleanliness rate; 4) Store dust-generating materials like cement and lime in warehouses or containers, and concentrate waste soil and construction debris in designated areas. Take solidification, covering, or greening measures to achieve 100% implementation, and immediately transport debris to designated temporary storage areas. Prohibit any burning of waste on-site; 5) Use commercial concrete and asphalt without setting up temporary mixing stations. If on-site mixing of mortar or concrete is required, avoid spillage and wastage; 6) Use low-sulfur gasoline or diesel for construction machinery and vehicles. Strengthen daily maintenance to ensure proper functioning and prevent excessive emissions; 7) Cover exposed ground/soil with netting or transport it promptly to restore vegetation.	Construction Unit	Construction Supervision, Xinxiang Urban Management Bureau
Odor from Silt Dredging	1) Transport dredged silt to designated disposal stations and handle it carefully; 2) Do not dump silt randomly at disposal sites, avoid secondary pollution, and take responsibility for any incidents; 3) Use sealed dump trucks with hydraulic rear doors to transport silt, ensuring no leaks during transport. Clean up immediately if leakage occurs; 4) Spray biological deodorant on silt before	Construction Unit	Construction Supervision, Xinxiang Urban Management Bureau

Impact Factors	Mitigation Measures	Implementation Unit	Supervision Unit
	transport to reduce odor at the source; 5) Follow designated routes and timings for transport, avoiding densely populated areas and peak traffic periods to reduce odor impact on sensitive areas; 6) Do not stop or transfer silt during transportation; 7) Assign personnel to inspect transport routes regularly and respond to any leaks or spills; 8) Follow directives from silt disposal station managers during unloading; 9) Clean transport vehicles at disposal sites after use and properly dispose of pollutants to prevent secondary pollution; 10) Train workers on legal, technical, and safety protocols.		
Wastewater	1) Rent nearby housing for workers and use existing local facilities, setting up temporary toilets on-site; 2) Establish a designated vehicle washing area with hardened, impermeable ground, drainage channels, and oil-separation sedimentation ponds. Reuse treated wastewater for dust suppression or discharge it according to standards; 3) Store construction materials and waste away from water bodies and implement erosion control measures, such as soil enclosures and drainage ditches, to prevent material runoff; 4) Avoid large-scale earthwork during the rainy season. Implement drainage and soil retention measures to ensure a functioning drainage system; 5) Store oils and chemicals in designated warehouses with impermeable flooring, and dispose of waste oils and solvents safely; 6) Recycle or properly dispose of household and construction waste, ensuring that usable materials are prioritized for reuse or recycling. Non-recyclable waste should be handled by sanitation departments.	Construction Unit	Construction Supervision, Xinxiang Urban Management Bureau
Noise and Vibration	1) Reasonably schedule construction times, prohibiting night work (22:00–6:00). If night work is necessary, obtain permits and notify nearby residents; 2) Use advanced construction methods and low-noise equipment; 3) Regularly maintain equipment to prevent abnormal noise; 4) Set up noise-reducing barriers near	Construction Unit	Construction Supervision, Xinxiang Urban Management Bureau

Impact Factors	Mitigation Measures	Implementation Unit	Supervision Unit
	sensitive areas (e.g., steel plates or solid walls); 5) Control the speed of heavy machinery and prohibit unnecessary honking; 6) Schedule construction vehicle access to avoid residential and school areas during peak times. Place high-noise equipment away from residential areas; 7) Conduct noise monitoring and ensure compliance with national noise standards; 8) Use vibration isolation trenches to block vibrations near residential areas.		
Solid Waste	1) Dispose of construction waste according to local regulations; 2) Maintain cleanliness and order at the construction site. Separate household and construction waste and arrange regular disposal by sanitation departments; 3) Minimize solid waste generation during construction, prioritize resource reuse, and ensure proper waste classification. Recycle usable materials and transport non-recyclable waste to designated disposal sites; 4) Maximize the reuse of excavated soil and transport excess to designated storage facilities; 5) Recycle removed asphalt and arch structures; 6) Handle hazardous waste like used oil and solvents through certified companies; 7) Use vacuum trucks to remove silt from ditches and transport it to designated treatment facilities.	Construction Unit	Construction Supervision, Xinxiang Urban Management Bureau
Soil and Water Conservation	1) Control the construction boundary to minimize vegetation disturbance; 2) Cover exposed soil during construction to prevent erosion; 3) Avoid excavation during the rainy season to reduce erosion risk; 4) Restore and replant temporary construction sites after completion.	Construction Unit	Construction Supervision, Xinxiang Urban Management Bureau
Ecological Environment	1) Train workers on wildlife and plant protection measures; 2) Restrict construction activities to designated areas to avoid damaging vegetation outside the construction zone; 3) Prohibit the use of banned herbicides and pesticides; 4) Minimize damage to greenery along roads and within the pump station project area. Report any protected plants and relocate them; 5) Implement ecological restoration to	Construction Unit	Construction Supervision, Xinxiang Urban Management Bureau

Impact Factors	Mitigation Measures	Implementation Unit	Supervision Unit
	minimize habitat disturbance.		
Traffic Management	1) Coordinate with traffic authorities and affected parties to develop acceptable traffic management plans before construction in high-traffic areas (e.g., Health Road and Fat Donglai Mall); 2) Notify the public in advance of construction through flyers, announcements, and social media platforms; 3) Erect barriers to isolate the construction zone, ensuring safety measures like traffic signs and warning lights are in place. Conduct regular safety checks and repairs.	Construction Unit	Xinxiang Traffic Bureau
Public Information and Grievance Mechanism	1) Place notice boards at the construction site entrance, providing contractor and supervisor information, project duration, and local environmental authority contact details; 2) Set up clear traffic diversion signs and propose alternative routes to affected parties during peak traffic hours; 3) Minimize disruptions to public services, and notify residents in advance of any unavoidable impacts; 4) Establish a grievance mechanism, assigning staff to handle complaints; 5) Participate in public meetings to explain construction activities and gather feedback.	Construction Unit	Construction Supervision, Xinxiang Urban Management Bureau
Cultural Heritage Protection	1) Train workers on cultural heritage protection, prohibiting any destruction of cultural relics; 2) Establish a chance-find procedure: halt work if any relics are found, protect the site, and report to local authorities. Resume work only after approval.	Construction Unit	Construction Supervision, Xinxiang Urban Management Bureau, Cultural Heritage Bureau
Operation Period	**(None)**	**N/A**	**N/A**

Table 10-2 Environmental Management Plan B (Applicable to the Xiangyang Watershed Subproject)

Impact Factors	Mitigation Measures	Implementation Unit	Supervision Unit
Construction Period			

Impact Factors	Mitigation Measures	Implementation Unit	Supervision Unit
Air Emissions/Dust	1) Perform compaction in layers and apply water during excavation and backfilling to suppress dust; 2) Erect dust barriers in densely populated residential areas to reduce the impact on nearby residents; 3) Assign personnel to regularly clean and water the area within 50m of the main entrances/exits and around the perimeter of the construction site, ensuring a 100% cleanliness rate; 4) Store dust-generating construction materials such as cement and lime in warehouses or containers, and concentrate excavated soil and construction waste in designated areas. Implement solidification, covering, or greening measures to achieve a 100% implementation rate. Promptly transport excess soil and waste to designated temporary storage points, and prohibit any burning of waste on site; 5) Use commercial concrete and asphalt. Do not set up temporary mixing stations at the construction site. If on-site mixing of mortar or concrete is required, avoid spillage and waste; 6) Use low-sulfur gasoline or diesel for machinery and vehicles, and ensure regular maintenance to prevent excessive exhaust emissions; 7) Cover exposed ground/earthworks at the construction site with mesh or transport it away promptly, restoring vegetation where possible.	Construction Unit	Construction Supervision, Xinxiang Urban Management Bureau
Wastewater	1) Workers should rent nearby housing and use local facilities. Set up temporary toilets on site. 2) Establish designated vehicle and machinery washing areas, with hardened, impermeable ground, drainage channels, and oil-separation sedimentation ponds. Reuse treated wastewater for dust suppression or discharge in compliance with standards; 3) Store construction materials, waste, and excavated soil away from water bodies, and implement erosion control measures, such as topsoil enclosures and interception ditches; 4) Avoid large-scale excavation during the rainy season. Implement drainage and soil retention measures to keep the construction site free of waterlogging; 5) Store oils and chemical solvents in dedicated, impermeable warehouses, and	Construction Unit	Construction Supervision, Xinxiang Urban Management Bureau

Impact Factors	Mitigation Measures	Implementation Unit	Supervision Unit
	ensure proper disposal of waste oils and solvents; 6) Recycle and properly classify all waste, including construction, household, and repair waste. Send recyclable materials to collection stations and ensure the non-recyclable waste is safely disposed of by sanitation departments.		
Noise and Vibration	1) Reasonably schedule construction times and prohibit night work (22:00–6:00). If night work is necessary due to technical reasons, obtain a night construction permit and inform nearby residents; 2) Optimize construction methods and use low-noise equipment; 3) Regularly maintain equipment to prevent abnormal noise; 4) Set up noise-reducing barriers (e.g., steel plates or solid walls) near sensitive areas; 5) Control the speed of heavy machinery and prohibit unnecessary honking; 6) Schedule construction vehicle access to avoid residential and school areas during peak times. Place high-noise equipment away from residential areas, and use enclosures to reduce noise; 7) Conduct noise monitoring according to the "Emission Standard of Environmental Noise for Boundary of Construction Site" (GB12523-2011), and keep records of the noise levels; 8) For sections near residential areas, consider using vibration isolation trenches to block the transmission of vibrations.	Construction Unit	Construction Supervision, Xinxiang Urban Management Bureau
Solid Waste	1) Dispose of construction waste according to Xinxiang city regulations; 2) Maintain a clean and organized site. Separate household and construction waste, and arrange for regular collection and disposal by sanitation departments; 3) Minimize waste generation during construction, and recycle materials whenever possible. Recycle bricks and steel from construction waste; 4) Maximize the reuse of soil and earth materials, and minimize the amount of discarded soil. Transport excess soil to designated disposal sites and cover it for protection; 5) Recycle removed asphalt and arch structures; 6) Ensure hazardous waste like used oils and solvents is handled by qualified	Construction Unit	Construction Supervision, Xinxiang Urban Management Bureau

Impact Factors	Mitigation Measures	Implementation Unit	Supervision Unit
	entities. Keep records and prohibit illegal disposal.		
Soil and Water Conservation	1) Strictly control the construction boundary and minimize vegetation disturbance; 2) Cover exposed soil to prevent erosion; 3) Avoid excavation during the rainy season to prevent erosion of exposed surfaces; 4) Restore temporary construction sites by leveling and re-greening them after construction is complete.	Construction Unit	Construction Supervision, Xinxiang Urban Management Bureau
Ecological Environment	1) Train workers on wildlife and plant protection; 2) Limit construction to designated areas and prohibit vegetation damage outside the construction zone; 3) Prohibit the use of banned herbicides and pesticides; 4) Minimize damage to the surrounding greenery and landscaping near the Xiangyang Rainwater Pump Station site. Report and protect any discovered protected plants. 5) Complete ecological restoration as soon as possible after construction to minimize habitat disturbance for local wildlife.	Construction Unit	Construction Supervision, Xinxiang Urban Management Bureau
Traffic Management	1) For construction near high-traffic areas (such as Health Road and the vicinity of Fat Donglai Mall), coordinate with traffic authorities and affected parties to develop traffic management plans; 2) Issue construction notices and inform nearby residents and businesses through flyers, announcements, and social media platforms; 3) Erect barriers to isolate the construction zone and set up warning signs and traffic instructions. Regularly inspect and repair traffic control barriers.	Construction Unit	Xinxiang Traffic Bureau
Public Information and Grievance Mechanism	1) Place notice boards at the construction site entrance with the contractor's name, supervision unit, project duration, and local environmental authority contact information; 2) Set up clear traffic diversion signs during peak traffic hours; 3) Minimize the impact on public services. If disruptions are unavoidable, notify the project owner, and ensure residents are informed in advance; 4) Establish an effective grievance mechanism and assign staff to handle complaints. Participate in public meetings held in the project area to explain construction activities and environmental	Construction Unit	Construction Supervision, Xinxiang Urban Management Bureau

Impact Factors	Mitigation Measures	Implementation Unit	Supervision Unit
	protection measures, and respond to concerns raised by the public.		
Cultural Heritage Protection	1) Train workers on cultural heritage protection, prohibiting any destruction of cultural relics; 2) Establish a chance-find procedure: halt work if any relics are found, protect the site, and report to local cultural heritage authorities for guidance. Resume work only after approval is received.	Construction Unit	Construction Supervision, Xinxiang Urban Management Bureau, Cultural Heritage Bureau
Operation Period			
Noise	1) Use low-noise equipment and vibration-dampening features in machinery selection; 2) Install noise and vibration control measures at pump stations, such as rubber joints and vibration pads; 3) Maintain equipment to minimize noise and provide proper training to staff for correct operations and timely repairs.	Xinxiang Municipal Facilities Management Center	Xinxiang Ecology and Environment Bureau
Odor	1) Regularly maintain ion deodorization equipment to ensure proper functioning; 2) Keep the pump station and related facilities clean, and remove accumulated waste to reduce odor sources; 3) Ensure all seals are intact to prevent odor leaks.	Xinxiang Municipal Facilities Management Center	Xinxiang Ecology and Environment Bureau
Solid Waste	Regularly clean and dispose of trash from grid systems.	Xinxiang Municipal Facilities Management Center	Xinxiang Ecology and Environment Bureau

Table 10-3 Environmental Management Plan C (Applicable to the Hongli Avenue Watershed Subproject)

Impact Factors	Mitigation Measures	Implementation Unit	Supervision Unit
Construction Period			
Air Emissions/Dust	1) Compacted in layers and sprayed with water to reduce dust during excavation and backfilling; 2) Dust barriers should be set up during construction along existing roads near Xinxiang East Station to reduce the impact of dust on nearby residents and passengers; 3) Ensure regular cleaning and watering of the area within 50m of main entrances/exits and around the	Construction Unit	Construction Supervision, Xinxiang Housing and Urban-Rural Development Bureau

Impact Factors	Mitigation Measures	Implementation Unit	Supervision Unit
	construction site, maintaining a 100% cleanliness rate; 4) Store cement, lime, and other dust-generating materials in warehouses or containers; concentrate soil and construction waste in designated areas, and apply solidification, covering, or greening to ensure a 100% implementation rate; promptly transport to designated waste disposal sites and prohibit any burning of waste; 5) Use commercial concrete and asphalt, and avoid setting up temporary mixing stations at the construction site. If on-site mixing is necessary, ensure no spills or waste; 6) Recommend using low-sulfur gasoline or diesel for machinery and vehicles, and regularly maintain them to avoid excessive emissions; 7) Cover exposed ground/earthworks at the construction site with mesh or remove them promptly, restoring vegetation.		
Wastewater	1) Workers will rent nearby houses, using local existing facilities, and temporary toilets will be set up on-site. 2) Establish a designated washing area at the site, with hardened, impermeable ground, surrounding drainage ditches, and oil-separation sedimentation ponds. Wastewater from vehicle and machinery washing should be treated and reused for dust suppression or discharged in compliance with standards. 3) Near DongMengjiangnv River, construction materials, waste, and excavation earth must be stored away from water bodies, with erosion control measures like bagged topsoil enclosures and interception ditches to prevent soil erosion. 4) Avoid large-scale earthwork excavation during the rainy season and maintain drainage systems to prevent waterlogging. 5) Oil and chemical solvents should be stored in specialized impermeable warehouses, and waste oil/solvents should be collected and treated, not dumped randomly. 6) Recycle, classify, store, and dispose of waste to prevent pollution to water bodies, utilizing materials when possible and handing non-recyclable waste to sanitation departments for safe disposal.	Construction Unit	Construction Supervision, Xinxiang Housing and Urban-Rural Development Bureau

Impact Factors	Mitigation Measures	Implementation Unit	Supervision Unit
Noise and Vibration	1) Schedule construction work reasonably, and prohibit night work (22:00-6:00) around built areas of Xinxiang East Station, unless a night construction permit is obtained, and residents are informed; 2) Use advanced low-noise equipment and construction methods; 3) Regularly maintain equipment to prevent abnormal noise; 4) Install noise-reducing barriers near sensitive areas (e.g., steel plates, solid walls); 5) Control the speed of heavy machinery like bulldozers and excavators, and prohibit honking; 6) Manage transportation vehicles to avoid noise; 7) Noise monitoring should comply with the "Emission Standard of Environmental Noise for Boundary of Construction Site" (GB12523-2011) and keep records; 8) For sections near residential areas, vibration trenches may be used to block the spread of vibration.	Construction Unit	Construction Supervision, Xinxiang Housing and Urban-Rural Development Bureau
Solid Waste	1) Follow local regulations for construction waste disposal; 2) Keep the site clean, classify waste, and ensure proper storage for removal by sanitation departments. 3) Minimize waste generation and recycle materials like bricks and steel. 4) Optimize soil and earth allocation to minimize excess soil. 5) Recycle asphalt and abandoned arch structures when possible. 6) Hazardous waste like used oils should be handled by qualified entities. 7) Clear sediment from drainage channels with vacuum trucks and dispose of it at designated sites.	Construction Unit	Construction Supervision, Xinxiang Housing and Urban-Rural Development Bureau
Water and Soil Conservation	1) Strictly control the construction boundary, especially near newly built roads like Hongli Avenue, to minimize vegetation disturbance; 2) Cover exposed earth to reduce erosion; 3) Avoid excavation during the rainy season; 4) Restore and green temporary construction sites after completion.	Construction Unit	Construction Supervision, Xinxiang Housing and Urban-Rural Development Bureau
Ecological Environment	1) Train workers on the protection of wildlife and plants; 2) Restrict construction to designated	Construction Unit	Construction Supervision, Xinxiang Housing

Impact Factors	Mitigation Measures	Implementation Unit	Supervision Unit
	areas and prohibit damage to vegetation outside the construction zone; 3) Prohibit the use of banned herbicides and pesticides; 4) Report and protect any discovered protected plants during construction. 5) Carry out ecological restoration after project completion.		and Urban-Rural Development Bureau
Traffic Management	1) Use announcements and broadcasts to inform the public of construction plans and detours. 2) Erect barriers and safety signs at the site. 3) Inspect traffic control facilities regularly.	Construction Unit	Xinxiang Traffic Bureau
Public Information and Grievances	1) Post public notices at the construction site entrance with contractor, supervision unit, project timeline, and contact details for environmental authorities; 2) Set up clear traffic detour signs during peak hours; 3) Minimize disruptions to public services and inform the public of any unavoidable impacts; 4) Establish a grievance mechanism to handle public complaints.	Construction Unit	Construction Supervision, Xinxiang Housing and Urban-Rural Development Bureau
Cultural Heritage Protection	1) Train workers on cultural heritage protection; 2) Establish a chance-find procedure: halt work if any artifacts are found, protect the site, and report to cultural authorities for guidance.	Construction Unit	Construction Supervision, Xinxiang Housing and Urban-Rural Development Bureau, Cultural Heritage Bureau
Operational Period			
Noise	1) Use low-noise equipment; 2) Install noise-reducing measures like flexible rubber joints at pump stations. 3) Maintain equipment to prevent abnormal noise.	Xinxiang Housing and Urban-Rural Development Bureau	Xinxiang Ecology and Environment Bureau
Odor	1) Regularly maintain odor control equipment; 2) Keep pump stations clean and prevent odor leaks.	Xinxiang Housing and Urban-Rural Development Bureau	Xinxiang Ecology and Environment Bureau
Solid Waste	Remove debris from grids promptly.	Xinxiang Housing and Urban-Rural Development Bureau	Xinxiang Ecology and Environment Bureau

Table 10-4 Social Management Plan and Gender Action Plan

stage	Specific measures or actions		Implementation Unit	Supervision Unit	Funding	Monitoring indicators
Social Management Plan						
Construction period	Impacts of Migration and Land Acquisition and Demolition	Implement the resettlement plan in accordance with the approved abbreviated resettlement action plan;	Xinxiang City Muye District Government, Heping Subdistrict Office, Niezhuang Village Committee;	Xinxiang Project Office	Project Funding	Monitoring of the implementation of resettlement plans.
	Potential risks to other societies	a. For the impacts on the atmosphere, dust, wastewater, solid waste, etc., refer to the environmental management action plan; b.1) Before the project starts, the government will hold a meeting with the street offices and communities along the project line for coordination; 2) An announcement will be made at the construction section one week in advance, and the project construction information will be publicized at the project site, news media, the official account of the Urban Management Bureau website, and community WeChat groups; 3) An unobstructed channel for project complaints will be maintained. c. Ensure that operations at the construction site comply with the relevant labor safety laws and regulations of the People's Republic of China, including wearing	contractor	Xinxiang Project Office	Project Budget	a. Monitoring of the implementation of the environmental management plan; b. Legal and compliant project construction information disclosure board, project public opinion solicitation record, and project emergency plan publicity board; c. The project bidding documents and contract must include environmental security and safety measures, as well as the implementation of epidemic prevention and control measures; the number and specific conditions of cases of violations of labor safety-related laws and regulations at the construction site must be recorded. The type and number of dust reduction measures taken at the construction site;

stage	Specific measures or actions		Implementation Unit	Supervision Unit	Funding	Monitoring indicators
		necessary personal safety protection equipment such as hard hats, etc. at the construction site; as well as COVID-19 protection equipment such as masks, thermometers, health code, and itinerary code checks, etc.; d. Reasonably arrange the construction time to reduce the noise, dust, waste residue and exhaust emissions caused by construction machinery and material transportation vehicles during project construction activities.				d. The number and content of complaints from surrounding residents about serious disturbances, such as nighttime work, dumping of construction waste leading to sewer blockage, etc.;
	Risks of unfinished construction before the flood season	a. Make solid preparations before the flood season, carry out publicity during the flood season, and raise awareness of flood disasters; carry out flood prevention training and drills in various forms; b. Organize relevant personnel to conduct a dragnet inspection before the flood season, formulate measures to deal with the problems found and eliminate them within a time limit, and formulate emergency flood control measures for historical problems that cannot be solved for the time being; c. Check and verify the flood control materials prepared by the construction team and the masses, make up for any deficiencies, and keep them properly; d. Revise and improve the flood prevention plan and ensure its operability according to the actual situation; e. Appropriately increase the labor ratio to	contractor	Xinxiang Project Office, Emergency Management Bureau	Project Budget	a. The number of educational trainings on special topics related to flood control and drainage, the number of participants, and the proportion of female participants; b. Diversified disaster training content (earthquake disaster protection, urban flood control, Yellow River flood control, etc.) c. Regularly check the learning effect of trainees and conduct indicator assessment d. Formulate and clarify the management process of disaster relief material reserves and disaster relief funds

stage	Specific measures or actions		Implementation Unit	Supervision Unit	Funding	Monitoring indicators
		ensure the progress of the project;				
	Risks of Pipeline Jacking Construction	a. In the preparation of the construction organization design, the construction plan shall always be determined in accordance with the principles of reliable technology, effective measures, reasonable construction sequence arrangement and ensuring safety; b. Avoid construction on rainy days, conduct comprehensive comparison of various plans for pipeline jacking, inspection well construction, backfilling construction, etc., and further optimize the construction plan under the principles of ensuring safety, quality, meeting the construction period, and being environmentally friendly; c. Strengthen the construction of on-site management system, do a good job in personnel division of labor, and establish and improve regulatory mechanisms and operating procedures; d. Strictly implement the requirements of various construction process specifications and related quality standards, and complete the work tasks	contractor	Xinxiang Project Office	Project Budget	a. Special construction plan.
	Traffic safety risks	a. Public disclosure of project information, including project overview, specific information of the project construction unit, construction period, construction scope, construction impact, etc.; b. Rationally plan the sections where large vehicles are required to operate during road and pipe network construction, and avoid	contractor	Xinxiang City Project Office, Traffic Police Team	Project budget, government department budget	Public notice board including project overview, specific information of project construction unit, construction period, construction scope, construction impact, etc.; b. The road planning for large trucks includes the number of road signs for staggered travel, detour plans, and

stage	Specific measures or actions		Implementation Unit	Supervision Unit	Funding	Monitoring indicators
		peak travel times to reduce the impact of construction vehicles and muck trucks on residents' travel and damage to relevant sections of the road; carry out construction during the early morning and night hours when there are fewer people; and avoid peak travel times for heavy-duty transport vehicles during rush hour and school rush hour; c. Increase traffic safety publicity, and add traffic signs and travel detour plans on community roads. d. For the excavation and construction of rainwater and sewage pipe networks, it is necessary to refine the excavation sections and formulate detailed traffic detour plans and emergency plans for rainwater and sewage overflow during the flood season, and at the same time increase safety warning signs on the construction road surface.				notices on work and community bulletin boards; c. Traffic safety publicity and education, including the number of brochures, posters and photo albums; the number of training lectures and the number of participants; the distribution location and photos of village road signboards. d. Detailed traffic detour plans and the number of traffic safety warning signs for pipeline excavation construction sections; it is necessary to avoid excavating the road surface during the flood season to reduce the impact of the flood season on project construction, and formulate emergency plans.

stage	Specific measures or actions		Implementation Unit	Supervision Unit	Funding	Monitoring indicators
	Labor Management	a. Clearly stipulate that the principles of equal opportunity and fair treatment must be adhered to during the hiring process. In addition, personal characteristics that are not related to inherent job requirements, such as restrictions on applicants' age and gender, must not be discriminated against; b. Improve the complaint handling mechanism for employees (including direct workers and contract workers) c. Improve employee training plans; d. Provide appropriate protection and assistance measures for specific groups of workers, such as women, persons with disabilities, migrant workers and children of legal working age, to address project staff deficiencies; e. Ensure that necessary personal safety protection equipment, such as hard hats, etc., and COVID-19 protection equipment, such as masks, thermometers, etc., are worn at the construction site; f. Specific occupational and health measures are detailed in the environmental management plan;	contractor	Xinxiang Project Office	Project labor management program fees	a. The proportion of women, persons with disabilities and other special groups among the employed workers, as well as the proportion of each age group; b. Complaint handling mechanism; c. Staff training plan; d. Protection measures and regulations for women, the disabled and child workers; e. Promotional photos and materials on safety protection in the construction safety record manual; f. Implementation of the environmental management plan;
	Risks of an influx of foreign population	a . Do a good job in community management, adopt a shift rotation system, and ensure the safety of people within the community; b. Improve the planning of circuit facilities to reduce the pressure on electricity and water consumption; increase the number of	Project street community, contractor	Xinxiang Project Office	Project budget, government department budget	a. The number of times community information is managed and updated; b. Circuit planning scope and maintenance frequency; number of community garbage stations, cleaning frequency of sanitation vehicles and number of cleaners;

stage	Specific measures or actions		Implementation Unit	Supervision Unit	Funding	Monitoring indicators
		garbage stations, the working frequency of sanitation vehicles and the number of cleaners; c. Invite prestigious elders or knowledgeable community cadres in the project area to carry out publicity activities on local social and cultural customs, such as brochures, posters, photo albums, etc.;				c. Publicity and education on local social and cultural customs, including the number of brochures, posters and photo albums;
	Social risks such as AIDS and epidemic diseases	a. Strengthening education and publicity on health and prevention of AIDS and epidemic diseases, including prevention of AIDS, epidemic diseases and other infectious diseases, should be included in the contract documents; b. Public health and AIDS and epidemic disease prevention education should be included in the project contract, as well as education and publicity for employees in the industrial park, and be effectively implemented; c. Conduct physical examinations for project construction workers (e.g. setting up temporary medical clinics, making full use of local medical resources, etc.); d. Carry out various publicity activities on AIDS and epidemic disease prevention, such as brochures, posters, photo albums, etc.;	contractor	Xinxiang Project Office	Project budget, government department budget	a. The terms of the construction contract and its implementation. b. Public safety and AIDS and epidemic disease prevention training courses and the number of trainees. c. Number of health clinics. d. Promotion of knowledge on AIDS, epidemic disease prevention and control during the construction phase, including the number of brochures, posters and photo albums.
	Risk of insufficient participation of	a. Increase the number of ways for low-income people to participate in this project, such as WeChat and Douyin; b. Provide employment opportunities for low-income people during the construction	Project street community, contractor	Xinxiang Project Office	Project funding, government funding	a . The number and proportion of low-income people participating in project information dissemination and discussion ; b. The number and proportion of

stage	Specific measures or actions		Implementation Unit	Supervision Unit	Funding	Monitoring indicators
	vulnerable groups	process, such as low-skilled jobs;				low-income people among construction workers.
Operation Period	Potential social risks during project operation	a. Formulate a social education and training plan along the route, carry out special lectures on flood prevention and disaster relief knowledge using the heavy rain in Xinxiang City as an example, including flood safety education and training, conduct flood prevention warnings and drills, and enhance residents' awareness of flood prevention and safety; b. Diversified disaster training content (earthquake disaster protection, urban flood control, etc.); c. When carrying out education and training related to flood control and drainage, special attention should be paid to the proportion of women, the elderly and children attending lectures; d. Actively carry out natural disaster personnel training and strengthen the construction of disaster information personnel team;	contractor	Xinxiang Project Office	Project funds, government budget	a. The number of educational trainings on special topics related to flood control and drainage, the number of participants, and the proportion of female participants; b. Diversified disaster training content (earthquake disaster protection, urban flood control, Yellow River flood control, etc.) c. Regularly check the learning effect of trainees and conduct indicator assessment d. Formulate and clarify the management process of disaster relief material reserves and disaster relief funds
	Traffic safety risks	a. Rationally plan the traffic settings of road sections and encourage residents to travel during off-peak hours to reduce the risk of traffic jams and collisions; b. Strengthen traffic safety publicity, add traffic counselors and traffic control stations to better maintain traffic order;	Project street community, contractor	Xinxiang City Project Office, Traffic Police Team	Project budget, government department budget	a. The planning of the road sections where the vehicles are to be operated includes the number of road signboards and notice boards in the workplace and community; b. Traffic safety publicity and education, including the number of brochures, posters and photo albums;

stage	Specific measures or actions		Implementation Unit	Supervision Unit	Funding	Monitoring indicators
						the number of training seminars and participants; the number of traffic control stations and counselors;
	Labor management risks	a. Clearly stipulate that the principles of equal opportunity and fair treatment must be adhered to during the hiring process. In addition, personal characteristics that are not related to inherent job requirements, such as restrictions on applicants' age and gender, must not be discriminated against; b. Provide appropriate protection and assistance measures for specific groups of workers, such as women, persons with disabilities, migrant workers and children of statutory working age, to address project staff deficiencies; c. Gender-based violence See Gender Action Plan	contractor	Xinxiang Project Office, Xinxiang Housing and Urban-Rural Development Bureau, Urban Management Bureau	Project labor management program fees	a. The proportion of women, persons with disabilities and other special groups among the employed workers, as well as the proportion of each age group; b. Protection measures and regulations for women, the disabled and child workers; c. Implementation of the gender action plan.
	Risks of an influx of foreign population	a . Do a good job in community management, adopt a shift rotation system, and ensure the safety of people within the community; b. Improve the planning of circuit facilities to reduce the pressure on electricity and water consumption; increase the number of garbage stations, the working frequency of sanitation vehicles and the number of cleaners; c. Invite prestigious elders or knowledgeable	Xinxiang Housing and Urban-Rural Development Bureau, Urban Management Bureau , project street communities	Xinxiang Project Office	Project budget, government department budget	a. Frequency of information updating and management; b. Circuit planning scope and maintenance frequency; number of community garbage stations, cleaning frequency of sanitation vehicles and number of cleaners; c. Publicity and education on local social and cultural customs, including the number of brochures, posters and photo albums;

stage	Specific measures or actions		Implementation Unit	Supervision Unit	Funding	Monitoring indicators
		community cadres in the project area to carry out publicity activities on local social and cultural customs, such as brochures, posters, photo albums, etc.;				
	Risk of insufficient participation of vulnerable groups	a. Provide service jobs for low-income people during the operation period and ensure equal pay for equal work; b. Take the needs of low-income people into account when disseminating information, and provide targeted information guidance and training.	Xinxiang Housing and Urban-Rural Development Bureau, Urban Management Bureau , project street communities	Xinxiang Project Office	Project funding, government funding	a. The number and proportion of low-income people participating in service jobs and their salary levels; b . Number of information guidance and training sessions specifically targeted at low-income populations;
Gender Action Plan						
A. Reducing the risk of gender-based violence		a. The contractor shall appoint a specialist to be responsible for the protection of women's rights and interests, and formulate a system and implementation plan to prevent and stop female employees from being sexually harassed in the workplace; b. Provide regular mental health counseling and training on the protection of female workers' rights for female workers; c. Strengthen supervision of construction	Xinxiang Housing and Urban-Rural Development Bureau, Urban Management Bureau, Contractor	Xinxiang City Project Office, Women's Federation	Project budget, government finance	a. Formulate specific systems and implementation plans to prevent and stop female employees from being sexually harassed in the workplace; b. 100% of female workers received labor rights protection training; c. Ensure that 100% of female and male workers receive equal pay for equal work and that there are no incidents of gender-based violence;

stage	Specific measures or actions	Implementation Unit	Supervision Unit	Funding	Monitoring indicators
	sites to avoid gender-based violence, sexual exploitation and abuse, sexual harassment and other harmful behaviors; d. Establish clear channels for complaints and grievances, set up a construction site complaint team, which should include at least two female members, and ensure the safety of the members of the complaint team to avoid situations where the team members are subject to prejudice and fear of retaliation.				d. Establishment of complaint channels and the number of female members.
B. Increase employment opportunities for women	a. During the project construction and operation period, technical and non-technical positions will be provided to women in the villages and groups involved in the project area on a priority basis. b. For jobs that do not require high physical strength, the age range for hiring should be appropriately relaxed, and priority should be given to women aged 40 to 50 who have difficulty finding non-agricultural employment opportunities, such as cleaning, cooking, and housekeeping.	Xinxiang Municipal Housing and Urban-Rural Development Bureau, Urban Management Bureau, townships and sub-districts, contractors	Xinxiang City Project Office, Women's Federation, Human Resources and Social Security Bureau	Project budget, government finance	a. Give priority to providing project employment opportunities for women (the baseline ratio of female workers during the construction period is about 8 %, and the target ratio is 12 %).
C. Enhance women's development capabilities	a. Improve women's employment and entrepreneurship skills, knowledge and opportunities by holding employment knowledge lectures, skills and knowledge training courses, and employment and entrepreneurship seminars. b. In the flood prevention and disaster reduction and sustainable information disclosure capacity building training,	Xinxiang Municipal Housing and Urban-Rural Development Bureau, Urban Management Bureau, townships and	Xinxiang City Project Office, Women's Federation	Project budget, government finance	a. The proportion of women participating in various trainings, including noise prevention, women’s rights publicity and education, and employment skills training (baseline 12%, target 20%). b. Increase women's participation in project information disclosure and management training in project areas

stage	Specific measures or actions	Implementation Unit	Supervision Unit	Funding	Monitoring indicators
	appropriate skill training content should be provided and appropriate training time should be set in combination with women's physiological and psychological qualities, education level, personal needs and other factors, so as to further ensure that women have the same opportunities as men to improve their skills.	sub-districts, contractors			(baseline 12%, target 20%).
D. Expanding women's participation in decision-making	a. Increase the participation of women in decision-making on community affairs; b. Increase the proportion of women signing or "couples signing" land acquisition or demolition compensation agreements.	Xinxiang Municipal Housing and Urban-Rural Development Bureau, Urban Management Bureau, townships and sub-districts, contractors	Xinxiang City Project Office, Women's Federation	Project budget, government finance	a. The proportion of women participating in project mobilization, information disclosure, policy advocacy and consultation for women (baseline 12%, target 20%). b. The proportion of women who sign land acquisition or house demolition compensation agreements (baseline 0%, target 100%).

10.4 Capacity Building

The Xinxiang Project Office has no prior experience with AIIB projects, and there are no domestic environmental impact assessment requirements for this type of project. Therefore, the implementation of this Environmental and Social Management Plan (ESMP) presents a new task for the project implementation unit. During the course of this project, the Xinxiang Project Office will organize external experts to provide initial training on the implementation of the ESMP to the environmental and social officers of the implementing agencies, construction companies, and supervision units. The training will cover topics such as AIIB's Environmental and Social Policies, best management practices during construction, monitoring and reporting processes, and grievance mechanisms.Monitoring and Reporting.

10.5 Environmental and Reporting

10.5.1Monitoring Program

Environmental monitoring is a fundamental tool for managing the environmental protection of construction projects. This project will monitor the impact of construction activities on the ambient air and noise environment surrounding the construction site and the relevant conditions during the operation period. Monitoring plans are developed according to the construction content and cycle of each subproject. The Xinxiang City Project Office and the project implementation agency will commission a qualified third-party organization to complete this task. They will also hire a qualified third-party agency as an environmental supervisor to oversee the entire scope and process of the primary and temporary projects.

The monitoring within the "Environmental and Social Management Plan" includes:

1. **Internal Monitoring**: Conducted by the supervision company and the project implementation unit.
2. **External Monitoring**: Compliance monitoring performed by a qualified third party hired by the Xinxiang City Housing and Urban-Rural Development Bureau.

Table 10-1 Environmental and Social Monitoring Indicators

Project	Parameters	Location/Method	Frequency	Implemented by
Construction Period				
Internal Monitoring				
Air Quality	Implementation of mitigation measures	On-site inspection of construction site	Daily	Construction Supervision
Noise	Implementation of	Construction	Daily	Construction

Project	Parameters	Location/Method	Frequency	Implemented by
	mitigation measures; Monitor noise levels using handheld devices if residents file noise complaints	boundary		Supervision
Solid Waste	Construction and domestic waste	On-site inspection of construction site	Daily	Construction Supervision
Soil Erosion	Soil erosion conditions	On-site inspection of construction site and spoil disposal areas (if any)	Daily	Construction Supervision
Occupational Health and Safety	On-site sanitation, supply of clean water, provision of personal protective equipment	On-site inspection of construction site	Daily	Construction Supervision
Traffic and Road Safety Measures	Safety signs, traffic instructions, and warnings at construction site and access points	On-site inspection of construction site	Daily	Construction Supervision
Grievance Mechanism	Receipt of environment and social complaints	Whether complaints were received and how they were addressed, and whether the affected parties are satisfied	Ongoing	Construction Supervision, Implementing Unit, Construction Unit
External Monitoring				
Construction Period				
Noise	Continuous equivalent noise level (Leq)	Construction boundary and noise-sensitive points (schools, hospitals)	Monthly, continuous for two days each time	Qualified Environmental Monitoring Unit
Air Quality	TSP, PM10	Construction boundary and sensitive points	Monthly, 24-hour average value	Qualified Environmental Monitoring Unit
Construction Wastewater	SS, pH, petroleum	Wastewater discharge points at construction site	Monthly	Qualified Environmental Monitoring Unit
Surface Water Quality	TN, TP, COD, BOD, pH, petroleum	100m upstream and 200m downstream of Yantun Discharge Bridge and Station Front Discharge Bridge; Victory Canal Inlet at Xiangyang Pump Station	Biannually	Qualified Environmental Monitoring Unit

Project	Parameters	Location/Method	Frequency	Implemented by
Operation Period (External Monitoring)				
Xiangyang Pump Station and Dong Meng Jiangnu River Pump Station	Noise	Around the site boundary	Biannually, continuous for two days (daytime and nighttime)	Qualified Environmental Monitoring Unit
H2S, NH3	At the site boundary and 50 meters downwind	Biannually	Qualified Environmental Monitoring Unit	

10.5.2 Reporting

The Xinxiang Project Office is required to regularly report on the implementation of the Environmental and Social Management Plan, the Resettlement Action Plan, and other requirements set out in related environmental and social documents within its jurisdiction. This involves quarterly reports during the first year of subproject implementation, followed by semi-annual reports thereafter. These reports will serve as independent documents as well as part of the project implementation report.

10.6 Estimation of Environmental and Social Management Costs

The total cost for implementing and managing the environmental and social mitigation measures is estimated at CNY 15.57 million. This includes:

1. Environmental Protection and Safe Construction Measures During Construction: A total of CNY15.05 million, which covers the cost of sedimentation tanks, noise barriers, fog cannons for dust suppression, traffic signs, etc. Of this amount, the Yinmaikou Catchment Area Improvement Project accounts for CNY 6.14 million, the Xiangyang Rainwater Pumping Station Catchment Area Project for CNY 5.05 million, and the Hongli Avenue East Mengjiangnv River Rainwater Pumping Station Construction Project for CNY 3.84 million. These costs will be borne by the contractors as part of the construction contract.
2. Environmental and Social Monitoring Costs:CNY 400,000.
3. Capacity Building and Training Costs:CNY 20,000.
4. Training and Public Participation Costs: Including training sessions for hiring women, low-income workers, organizing public participation, and handling grievances, estimated at CNY 100,000.

Appendix

(1) References:

1. AIIB Loan for Post-Disaster Recovery and Reconstruction Project of the Severe Flooding and Rainstorms in Zhengzhou and Other Areas of Henan Province – Feasibility Study Report on the Flood Drainage Capacity Improvement Project in the Urban Area of Xinxiang, March 2024.
2. AIIB Loan for Post-Disaster Recovery and Reconstruction Project of the Severe Flooding and Rainstorms in Zhengzhou and Other Areas of Henan Province – Preliminary Design of the Drainage Area Reconstruction Project for Yinmankou Rainwater Pumping Station in the Urban Area of Xinxiang, May 2024.
3. AIIB Loan for Post-Disaster Recovery and Reconstruction Project of the Severe Flooding and Rainstorms in Zhengzhou and Other Areas of Henan Province – Preliminary Design of the Drainage Area Construction Project for Hongli Avenue East Mengjiangnv River Rainwater Pumping Station in the Urban Area of Xinxiang, May 2024.
4. AIIB Loan for Post-Disaster Recovery and Reconstruction Project of the Severe Flooding and Rainstorms in Zhengzhou and Other Areas of Henan Province – Preliminary Design of the Drainage Area Reconstruction Project for Xiangyang Rainwater Pumping Station in the Urban Area of Xinxiang, May 2024.

(2) Overview of Resident Focus Group Meetings in the Project Area

Survey Date	Survey Unit	Survey Time	Survey Location	Survey Method and Content
April 17	Hongqi District	10:30 AM	West Street Subdistrict	1) Women's Focus Group: 6 participants (2 youth under 30, 2 middle-aged 30-55, 2 elderly over 55). 2) Elderly Focus Group: 2 participants (1 male, 1 female). 3) Vulnerable Groups Focus Group: 6 participants (2 from low-income households, 2 with disabilities, 2 on social assistance).
April 17		3:00 PM	Cultural Street Subdistrict	Same format as above.
April 18	Hongqi District	9:30 AM	Xiangyang Subdistrict	1) Women's Focus Group: 6 participants (2 youth under 30, 2 middle-aged 30-55, 2 elderly over 55). 2) Elderly Focus Group: 2 participants (1 male, 1 female). 3) Vulnerable Groups Focus Group: 6 participants (2 from low-income households, 2 with disabilities, 2 on social assistance).
April 18	Weibin District	3:00 PM	Victory Road Subdistrict	Resident Focus Group: 20 participants (10 men, 10 women). Elderly Focus Group: 2 participants (1 male, 1 female). Vulnerable Groups Focus Group: 6 participants (2 from low-income households, 2 with disabilities, 2 on social assistance).
April 19	Weibin District	9:30 AM	Health Road Subdistrict	Resident Focus Group: 20 participants (10 men, 10 women). Elderly Focus Group: 2 participants (1 male, 1 female). Vulnerable Groups Focus Group: 6 participants (2 from low-income households, 2 with disabilities, 2 on social assistance).
April 19	Weibin District	3:00 PM	Nanqiao Subdistrict	1) Women's Focus Group: 6 participants (2 youth under 30, 2 middle-aged 30-55, 2 elderly over 55). 2) Elderly Focus Group: 2 participants (1 male, 1 female). 3) Vulnerable Groups Focus Group: 6 participants (2 from low-income households, 2 with disabilities, 2 on social assistance).
June 20	Muye District	9:30 AM	Heping Subdistrict	Resident Focus Group: 20 participants (10 men, 10 women). Elderly Focus Group: 2 participants (1 male, 1 female). Vulnerable Groups Focus Group: 6 participants (2 from low-income households, 2 with disabilities, 2 on social assistance).

(3) List of interviewees

Related chapters	Specific details of the people involved in the interview record
5	Interview record 6-1: Mr. Wang from Shengli Road Office (43 years old)
	Interview record 6-2: Mr. Liu from Xiangyang Street, Hongqi District (55 years old)
	Interview record 6-3: Mr. Zhang from Shengli Road, Weibin District (43 years old)
	Interview record 6-4: Ms. Zhang from Jiannan, Shengli Road Subdistrict (35 years old)
	Interview record 6-5: Mr. Zhang from Jiankang Road, Hongqi District (42 years old)
	Interview record 6-6: Mr. Qi from Wenhua Street, Hongqi District (35 years old)
	Interview record 6-7: Mr. Zhang from Shengli Road, Weibin District (35 years old)
	Interview record 6-8: Mr. Wang (45 years old) from Xiangyang Street, Hongqi District
	Interview record 6-9: Ms. Kong (55 years old) from Xiangyang Street, Hongqi District
	Interview Record 6-10: Ms. Zhou (54 years old) from Nanqiao Road, Weibin District
	Interview record 6-11: Ms. Liu (35 years old) from Jiannan Community, Jiankang Road Office
	Interview Record 6-12: Ms. Sun (42 years old) from Qiudong Community, etc.

(4) Interview Records

Time	**April 2024**
Location	Qiudong Community, Xinxiang City
Organizer	Xinxiang City Urban Management Bureau
Participants	Project Office Manager, Urban Management Bureau Manager, Community Secretary, Project Area Residents, SIA Survey Team
Discussion Topic	Special Group Discussion on Xinxiang City Urban Drainage Capacity Enhancement Project
Main Content and Outcomes	
1. Disaster Impact	Xinxiang City suffered severe damage during the extreme rainfall in July 2021. Several rivers, including the Dasha River and Shanmen River, had levee collapses, slope damage, weir destruction, and bridge washouts.
2. Resident Losses	Residents reported significant property losses from the July 20, 2021, flood disaster. Flood discharge areas experienced complete crop failure, and farming is no longer viable. The Dasha River's levees are low, and the river channel is too narrow to withstand extreme rainfall.
3. Project Awareness and Support	The residents are well-informed about the project and are very supportive of its development. They believe the construction should start as soon as possible.
4. Resident Needs	1) There is an urgent demand for the reconstruction and expansion of rainwater pumping stations: "I hope that after the project is completed, drainage during rainfall will be faster." 2) Female villagers expressed the hope for job opportunities: "I heard the project is about to start construction. I stay at home with my children and don't have a job. I hope this project can bring job opportunities for stay-at-home women like me. We are willing to participate in daily river and road maintenance, such as cleaning. We are willing to do that work."

Time	April 2024
	

(5) Overview of Social Benefits and Impact Analysis

Project Name	Affected Street/Township	Social Benefits	Social Risks
Yinmankou Rainwater Pump Station Catchment Area Project	Hongqi District: Xijie Street, Wenhua Street; Weibin District: Jiankang Road, Nanqiao Street	1) Enhancing Drainage Facilities to Alleviate Pipeline Congestion: a. Cleaning and repairing pipelines to increase the drainage capacity of the existing rainwater system; b. Upgrading unsatisfactory rainwater networks and pump stations, and simultaneously improving wrong or mixed connections between rainwater and sewage pipelines along the route; c. Relocating other municipal pipelines that conflict with the new pipelines in elevation. 2) Eliminating Flood-Prone Areas and Reducing Flood Damage: a. Increasing the disaster emergency management capacity of the Wei River basin, especially in the areas most severely affected by the July 20 floods, to avoid houses, vehicles, and communities being flooded again; b. Protecting the lives and property of urban residents and improving travel efficiency. 3) Improving Natural Landscapes: Improving pipeline water pollution, water body deterioration, and surrounding natural ecological environment, thus enhancing water quality.	1) Land Acquisition and Resettlement Impact: Temporary occupation of about 525.01 mu of existing state-owned land without new permanent land acquisition. 2) Negative Natural and Social Environmental Impacts During Construction: A. Dust, earthwork, and accumulated sludge during construction cause inconvenience to nearby residents, patients, and their travel. B. Noise from construction machinery and material transport vehicles, dust, and exhaust emissions, as well as wastewater and garbage disposal during construction, affect the community landscape and residents' rest. C. Temporary traffic impact due to construction. The construction unit should prepare a traffic diversion plan to avoid congestion. 3) Impact of Migrant Workers: Increased contact between migrant workers and road residents may affect social stability. A. Health and hygiene risks, such as AIDS, COVID-19, influenza, increasing pressure on community epidemic prevention. B. Cultural conflicts (including religious beliefs, temples, burial customs). 4) Impact of Sewage Pipeline Excavation: a. Excavation may cause road settlement, affecting traffic. Construction units and municipal departments should publicize the construction to avoid interfering with residents' travel. b. Construction parties should ensure safety, with adequate contingency plans to avoid earth collapse and flooding during the rainy season. 5) Gender Impact: Potential gender inequality during construction and daily site activities, including discrimination against women,

Project Name	Affected Street/Township	Social Benefits	Social Risks
			causing physical or sexual harm, and gender-based violence.
Xiangyang Rainwater Pump Station Catchment Area Improvement Project	Hongqi District: Xiangyang Street; Weibin District: Shengli Road	1) Enhancing Drainage Facilities to Alleviate Pipeline Congestion: a. Cleaning and repairing pipelines to increase the drainage capacity of the existing rainwater system; b. Upgrading unsatisfactory rainwater networks and pump stations, and simultaneously improving wrong or mixed connections between rainwater and sewage pipelines along the route; c. Relocating other municipal pipelines that conflict with the new pipelines in elevation. 2) Eliminating Flood-Prone Areas and Reducing Flood Damage: a. Raising urban flood control standards to reduce the impact of flood disasters, especially in areas severely affected by the July 20 floods; b. Reducing the psychological burden of residents near the People's Victory Canal after the disaster. 3) Sewage and Rainwater Separation to Improve Urban Water Environment: a. Simultaneously separating sewage and rainwater to realize rainwater entering the river and sewage entering the treatment plant, thus improving the urban water environment. 4) Achieving Source Reduction and Building Sponge Cities: a. Using permeable pavement, ecological tree pits, and other facilities to control annual runoff within the road area and achieve source reduction of rainwater.	1) Land Acquisition and Resettlement Impact: Expansion on the original site occupying about 3.06 mu of existing state-owned land without new permanent land acquisition. Temporary occupation of about 343.55 mu without new permanent land acquisition. 2) Negative Natural and Social Environmental Impacts During Construction: A. Dust, earthwork, and accumulated sludge during construction cause inconvenience to nearby residents, patients, and their travel. B. Noise from construction machinery and material transport vehicles, dust, and exhaust emissions, as well as wastewater and garbage disposal during construction, affect the community landscape and residents' rest. C. Temporary traffic impact due to construction. The construction unit should prepare a traffic diversion plan to avoid congestion. 3) Impact of Migrant Workers: Increased contact between migrant workers and pump station and road residents may affect social stability. A. Health and hygiene risks, such as AIDS, influenza, increasing pressure on community health. B. Cultural conflicts (including religious beliefs, temples, burial customs). 4) Impact of Trenchless Pipeline Installation: A. Possible road settlement during pipeline installation, affecting traffic. Construction units and municipal departments should publicize the construction to avoid interfering with residents' travel. B. Safety concerns during trenchless pipeline installation, with contingency plans to avoid earth collapse and falling from heights. 5) Gender Impact: Potential gender

Project Name	Affected Street/Township	Social Benefits	Social Risks
			inequality during construction and daily site activities, including discrimination against women, causing physical or sexual harm, and gender-based violence.
Hongli Avenue East Mengjiangnv River Rainwater Pump Station Catchment Area Construction Project	Muye District: Heping Street, Nie Village	1) Enhancing Drainage Facilities to Alleviate Pipeline Congestion: a. Cleaning and repairing pipelines to increase the drainage capacity of the existing rainwater system; b. Upgrading unsatisfactory rainwater networks and pump stations, and simultaneously improving wrong or mixed connections between rainwater and sewage pipelines along the route; c. Relocating other municipal pipelines that conflict with the new pipelines in elevation. 2) Eliminating Flood-Prone Areas and Reducing Flood Damage: a. Increasing the disaster emergency management capacity of the Wei River basin, especially in areas severely affected by the July 20 floods, to avoid houses, vehicles, and communities being flooded again; b. Protecting the lives and property of urban residents and improving travel efficiency. 3) Promoting Regional Development and Increasing Employment Opportunities: a. Enhancing the support role of Xinxiang East Station in improving urban competitiveness, promoting high-speed rail economy development, attracting high-end communities and office buildings, and increasing land development utilization. b. Functional development of three circles around the high-speed rail station, promoting commercial development and bringing more employment opportunities. 4) Achieving Source Reduction and Building Sponge Cities: a. Using sunken green spaces, grass ditches, rain gardens, and other facilities to control annual runoff within the road	1) Land Acquisition and Resettlement Impact: Acquisition of 7.1 mu of collective land affecting 2 households with 12 people. Construction on about 168.98 mu of already acquired state-owned land. 2) Negative Natural and Social Environmental Impacts During Construction: A. Dust, earthwork, and accumulated sludge during construction cause inconvenience to nearby residents, patients, and their travel. B. Noise from construction machinery and material transport vehicles, dust, and exhaust emissions, as well as wastewater and garbage disposal during construction, affect the community landscape and residents' rest. C. Temporary traffic impact due to construction. The construction unit should prepare a traffic diversion plan to avoid congestion. 3) Impact of Migrant Workers: Increased contact between migrant workers and road residents may affect social stability. A. Health and hygiene risks, such as AIDS, influenza, increasing pressure on community health. B. Cultural conflicts (including religious beliefs, temples, burial customs). 4) Impact of Sewage Trenchless Installation (Zhanqian Third Street): a. Potential road settlement during pipeline installation affecting traffic. b. Safety concerns during trenchless pipeline installation, with contingency plans to avoid earth collapse and falling from heights. c. Ensuring construction safety to avoid earth collapse and overflow of accumulated water during the rainy season. 5) Gender Impact:

Project Name	Affected Street/Township	Social Benefits	Social Risks
		area and achieve source reduction of rainwater.	Potential gender inequality during construction and daily site activities, including discrimination against women, causing physical or sexual harm, and gender-based violence.