

# **Yingkou Green Smart Trade Zone Development Project**

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## **Environment and Social Impact Assessment & Environment and Social Management Plan**

(Draft Final)

Prepared by the Project Management Office (PMO) of Yingkou Municipal Government to submit to the Asian Infrastructure Investment Bank (AIIB)

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## **ABBREVIATIONS**

AIIB	Asian Infrastructure Investment Bank
BOD	Biological Oxygen Demand
COD	Chemical Oxygen Demand
CSC	Construction Supervision Company
CUCD	China Urban Construction Design & Research Institute Co., Ltd.
DEIA	Domestic Environmental Impact Assessment Report
DRC	Development and Reform Commission
EA	Executive Agency
EHS	Environmental Health and Safety
EIA	Environmental Impact Assessment
EMDP	Ethnic Minority Development Plan
ESF	Environment and Social Framework
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMoP	Environmental and Social Monitoring Plan
ESSs	Environmental and Social Standards
ESP	Environmental and Social Policies
E&S	Environmental and Social
FSR	Feasibility Study Report
FTZ	Free Trade Zone
GAP	Gender Action Plan
GRM	Grievance Redress Mechanism
HVAC	Heating, Ventilation, Air conditioning and Cooling
IA	Implementation Agency
IUCN	International Union for Conservation of Nature
LEDZ	Liaohu Economic Development Zone
O&M	Operation and Maintenance
PIU	Project Implementation Unit
PLG	Project Leading Group
PMC	Project Management Consultant
PMO	Project Management Office
PPM	Project-Affected Person's Mechanism
PRC	People's Republic of China
RP	Resettlement Plan
SOE	State-owned Enterprises
SS	Suspended Solid

THC	Total Hydrocarbon
TSP	Total Suspended Particulates
WHO	World Health Organization
WWTP	Wastewater Treatment Plant

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## Executive Summary

### A. Introduction

1. The "Asian Infrastructure Investment Bank (AIIB) Loan Yingkou Green Smart Trade Zone Development Project" (hereinafter referred to as the "this project"), was officially included in the "Asian Infrastructure Investment Bank (AIIB) Loan Planning for 2022-2024" on September 5, 2022. The loan amount is 200 million US dollars.

2. Through the coordinated development of Yingkou dry port hub and key industrial parks, the project will improve the functions of Yingkou dry port, promote the development of two engines for logistics and industry. The project aims to connect the diversity of trade commodities and trade methods of Southeast Asia, Japan, South Korea, Russia, Mongolia, and Europe by helping build the Sea and Land Corridor of Northeast China, to promote the facilitation of international and domestic trade, and accelerate the realization of international cross-border interconnection in Liaoning, and strive to build a new development pattern with the domestic cycle as the main body and the domestic and international dual cycles and collaborative promotion, supporting the "Belt and Road" Construction. The project can also promote the green, low-carbon, smart, efficient and sustainable development of the regional economy, comprehensively build Yingkou regional international trade center and advanced manufacturing base, promote the comprehensive revitalization of the economy and high-quality development in Yingkou, and help the revitalization of Northeast China.

3. According to the AIIB's Environmental and Social Policy (ESP), the project was categorized as 'A' due to the adjacent tidal flat wetlands. Therefore, a comprehensive environmental and social impact assessment is required. This report is the Environmental and Social Impact Assessment (ESIA) and Environmental and Social Management Plan (ESMP) of the project, and is prepared in accordance with the requirements of AIIB's ESP, Environmental and Social Standards (ESSs) and relevant laws and regulations of the Government. The preparation of this report is based on two separate domestic environmental impact assessment reports (DEIA) of two subprojects, domestic feasibility study reports (FSRs), field investigation and findings of ESIA team (China Urban Construction Design & Research Institute Co., Ltd.), public participation surveys and meetings, literature survey and other sources of information.

4. The report covers the analysis of project alternatives, E&S baseline, assessed E&S impacts and proposed mitigation measures, land acquisition (LA) and resettlement due diligence, labor occupational safety and health, ESMP, stakeholder consultation and information disclosure, grievance redress mechanism (GRM), etc. Measures have been prepared and included in the ESMP to avoid, mitigate, and offset the potential adverse impacts of the project and its activities on the natural and social environment, so as to promote the sustainable development of the project in terms of environment and society.

### B. Project Description

5. This project includes two subprojects. Sub-project 1 is Free Trade Zone Land Port Hub and Industrial Park Subproject (hereinafter referred to as the "FTZ subproject"), the main components include (i) New construction of a new railway station in the FTZ and (ii) New Construction of Building facilities and municipal infrastructure including municipal roads, water supply and drainage engineering, heating, ventilation, and air conditioning, electricity and gas, and greening engineering in the FTZ. The Sub-project 2 is LEDZ (Phase II) South Expansion Area Municipal Infrastructure Construction Project (hereinafter referred to as the "LEDZ subproject"), the main content of the project is the construction of municipal infrastructure of Yingkou LEDZ (Phase II) South Expansion Zone Park, including municipal roads, water supply and drainage engineering, communication, lighting, and greening engineering.

### **Sub-project 1: Free Trade Zone Land Port Hub and Industrial Park Subproject.**

6. Component A **constructions of railways and related supporting facilities** supports the construction of railways in the comprehensive bonded area to provide the last mile railway connectivity. The main activities of the project include: (i) a new railway with the length of 1.73km, to connect with the Bianhai Station; (ii) a new loading and unloading yard, a container storage area, and a customs inspection area.

7. Component B **constructions of building facilities and municipal infrastructure** involves constructions of logistics hub area, industrialization area and logistics supporting area.

#### a) Logistics hub area

8. The logistics hub area construction includes (i) the high-standard smart warehouse; (ii) the road project in the park; (iii) supporting facilities within each site such as drainage, electrical systems, HVAC (heating, ventilation, and air conditioning), fire protection, landscaping, and other related works.

9. The high-standard smart warehouse project will cover an area of about 24,444 m<sup>2</sup>, with the building area of 18,000 m<sup>2</sup>. The project adopts a high-standard three-dimensional warehouse design, with the building area of 5,000 m<sup>2</sup> having intelligent logistics equipment where the net height of the warehouse is 10 m. There are high platforms on both sides of the warehouse to facilitate the entry and exit of goods.

10. The storage yard project will cover an area of about 20, 472 m<sup>2</sup> that is a one-story yard without lifting equipment, where an area of 3,500 m<sup>2</sup> of the storage yard will be designed to the storage of refrigerated containers with the supporting electrical equipment.

11. In addition, in order to further improve the transportation network in the park, the project will build the planned No. 4 road of 407.87 m.

12. The supporting facilities project plans to construct new stormwater pipes of 350 m in the planned No.4 road, with the diameter of DN800. No new sewage pipes will be constructed. The sewage generated from surrounding plots will be drained into near existing sewage pipes of the new extension of West Street, Xinhai Street, and Xunguan Road.

#### b) Industrialization zone

13. The industrialization zone includes one green standardized factory building, the covered area of the project is approximately 40,940 m<sup>2</sup> with the building area of 9,200 m<sup>2</sup> and the height of 9 m.

14. The industrialization zone also includes the construction of five municipal roads, of which Haixing Road (2,135.06 m), Yingchuan Street (East Section) (223.856 m) are the main roads, and the planned No.9 Road (1,004.375 m), Linchuan Street (East Section) (223.85 m) and Linhe Street (East Section) (223.842 m) are branch roads. Among them, the Haixing Road, Yingchuan Street (East Section) will constitute the skeleton of the road network in the park, and other branch roads complete the service functions.

15. In addition, the project also includes supporting projects within each site such as drainage, electrical systems, HVAC (heating, ventilation, and air conditioning), fire protection, landscaping, and other related projects.

16. The supporting project of industrialization zone plans to build new stormwater pipes of 4,500 m, which the diameter of reserved branch pipes is DN800-DN2000, build new sewage pipes of 2,800 m with the diameter of DN400-DN700, as well build new water supply pipes in the Haixing Road (2,100 m), the Planned No.9 Road (1,000 m), Yingchuan Street (East Section) (220 m), i Linchuan Street (East Section) (220 m), and Linhe Street (East Section) (220 m).

#### c) Logistics supporting area

17. The logistics supporting area includes the international express center and the logistics

supporting warehouse.

18. The International Express Center will cover the project area of about 33,521 m<sup>2</sup>, with a construction area of about 11,000 m<sup>2</sup> and the height of 10 m.

19. The Cloud warehouse will cover the project area of about 30,310 m<sup>2</sup>, with a construction area of about 11,000 m<sup>2</sup> and the height of the cornice of the building is 10 m.

20. In addition, the project also includes supporting projects within each site such as drainage, electrical systems, HVAC (heating, ventilation, and air conditioning), fire protection, landscaping, and other related projects.

d) Other facilities and municipal infrastructure

21. The subproject also includes the construction of other facilities and municipal infrastructure in the area. New electric power pipes are planned to be built of approximately 2,135 m in the Haixing Road and 2,710 m in other roads. 173 sets of new road lights are planned to be set up, and 9,200 m of electric cables will be laid. The subproject will conduct the greening engineering, the total design area of greening will be 3.92 hectares.

**Sub-Project II LEDZ (Phase II) South Expansion Area Municipal Infrastructure Construction Project.**

22. This component will carry out infrastructure construction for the southern expansion zone of LEDZ (Phase II). The construction content covers 12 roads including the planned No.6 Road and Jiachen Avenue, with a total length of about 22.67 km. The project will complete the road engineering, traffic engineering, water supply and drainage engineering, gas engineering, communication engineering, lighting engineering, greening engineering, sponge facilities and smart municipal infrastructure.

23. The water supply pipeline network will be set up. The main pipelines of water supply will be set up in the Planned No.4 Road, Xingyi Street, Qibao Middle Road, and Xinghe Street, which the diameter of pipes is DN400-DN500. The connection pipelines will be set up in the other roads, which the diameter is DN200-DN300.

24. The pipelines of reclaimed water will be laid along the Minxinghe North Street (the Planned No. 4 Road to the Planned No.6 Road), the Planned No.6 Road, and the Donghai South Street, which the diameter is DN200-DN300.

25. A total of 23,700m of new sewage pipelines including the reserved branch pipes will be built, which the diameter is DN400-DN1000.

26. The new stormwater pipes including the reserved branch pipes is planned to build with the total length of 29,500 m, which the diameter is DN600-DN200; and 1.4km of new rainwater culverts will be built.

27. Gas pipelines are arranged in the form of ring branches along the Planned No.6 Road, the Planned No. 4 Road and Yantian Road.

28. The new communication pipelines will be laid under the pedestrians of the new roads .

29. The greening engineering covers the green belt attached to the road and the belt protection green belt on both sides of the main road, integrating the sponge city concept and enriching the landscape level.

**C. Environmental Impacts, Social Risks and Mitigation Measures**

30. **Environmental sensitive receivers.** There are no historical, architectural, religious, or other cultural resources within the project scope, and it does not involve minority ethnic group gathering areas. The Free Trade Zone sub-project is located within an already developed industrial park,

with no residential areas within 500 meters. Part of the shrimp ponds will be occupied within the sub-project area. On the west side is the coastal mudflat, with the nearest railway connection project located about 50 meters away from the coastal mudflat, but separated by a coastal green belt. The environmental protection objective of the Free Trade Zone sub-project is to protect the birds that inhabit and forage in the industrial park, shrimp ponds, and coastal mudflats. The Economic Development Zone sub-project will occupy part of the salt fields, with the nearest residential area being the Qiantang Village 2 kilometers to the north and the southern boundary adjacent to the Minxing River. The environmental protection objective of the Economic Development Zone sub-project is to protect the birds that inhabit and forage in the salt fields and to maintain the water quality of the Minxing River.

**31. Evaluation of the expected environmental impacts and mitigation measures.** Potential negative environmental impacts during the **construction phase** are short-term and localized, related to construction noise, dust, traffic disruption, and worker health, safety and risks. The main risks in the construction stage include:

- Construction dust, exhaust gas from construction machinery and transport vehicles, and asphalt smoke;
- Temporary noise generated from construction machinery and transport vehicles to enterprise employees in the park, and to migratory birds staying in migratory passages at the coastal wetland;
- Concrete curing wastewater during construction, wastewater generated by washing construction machinery and vehicle, and rainfall surface runoff;
- Soil erosion from earth excavation. According to the preliminary estimation based on the engineering design data, the FTZ railway connection project has no borrowings and involves 67,000 m<sup>3</sup> of spoiled earthwork. The FTZ road and municipal engineering project has no borrowings and involve 247,000 m<sup>3</sup> of spoiled earthwork. The earthwork quantity for the construction component in the FTZ subproject is relatively small, with a balanced excavation and fill. The spoiled earthwork from the FTZ sub-project will be utilized for filling in the shrimp ponds within the project site.
- The current status of the LEDZ sub-project is a salt field, with an excavation quantity of 348,000 m<sup>3</sup> and a filling quantity required of 306,000 m<sup>3</sup>. The remaining earthwork from the planned No. 6 road, Jiachen Avenue and Qibao Middle Road can be internally reallocated for backfilling other roads. After internal reallocation, the excavation quantity for the LEDZ sub-project is 348,000 m<sup>3</sup>, requiring borrowings of 217,000m<sup>3</sup>, with no spoiled earthwork.
- Domestic wastes and wastewaters generated by construction workers, as well as the occupational health and safety risks. The FTZ construction and municipal engineering subproject is expected to have about 500 workers during the peak construction period, 50 workers for the railway subproject, and 180 workers for the LEDZ subproject. The construction and municipal components of the FTZ subproject will set up three construction camps, which are respectively located in the construction lands of the proposed Dry Port Hub area, the logistics supporting area and the industrialization area, each covering an area of about 200 m<sup>2</sup>. The railway component of the FTZ subproject will set up one construction camp, located in the project site. The LEDZ subproject will set up a construction camp, which is located at the intersection of Guihua No.6 Road and Dongnanhai Street, with an area of about 500 m<sup>2</sup>.

**32. Impacts on birds.** Centered around the LEDZ subproject, a rectangular area of 30km\*30km is established as the assessment range. Habitat types providing food sources and nesting grounds for birds include aquatic areas, crops, grasslands, and woodlands. The project primarily occupies aquatic areas (salt fields and shrimp ponds), accounting for 2.6% of the assessment range. Grasslands and crops follow, each at 0.5%, with relatively small proportions. There are sufficient alternative areas in the surrounding region for bird habitation, and the project does not occupy coastal tidal wetlands, resulting in minimal impact on habitats.

- Noise and Vibration: the impact of construction activities on birds is the disturbance caused by railway construction and construction machinery noise to the normal lives of birds, prompting some birds to migrate along the coastline. As construction finishes, these impacts gradually disappear, and most bird species are likely to return.

- Construction Lighting: lighting facilities can impact bird migration and night hunting behavior, especially for aerial predators such as Black-headed Gull (*Chroicocephalus ridibundus*), Saunders's Gull (*Saundersilarus saundersi*), Relict Gull (*Ichthyaetus relictus*), Black-tailed Gull (*Larus crassirostris*), Smithsonian Gull (*Larus smithsonianus*), Gull-billed Tern (*Gelochelidon nilotica*), and Little Tern (*Sterna albifrons*).

- Construction wastewater. Construction mud causing water turbidity, large machinery oil leaks, and improper waste treatment directly contribute to water pollution. This directly leads to a reduction in aquatic species and quantity, affecting bird prey availability.

33. The contractor will control and reduce emissions through standard procedures, such as (i) setting up fences in the construction site area, sprinkling water regularly, covering dust nets, paying attention to the wind direction when laying asphalt, etc.; (ii) selecting low-noise equipment and reasonably arranging construction time and construction vehicle routes; (iii) forbidding to pile up construction materials near the Minxing River, and discharge domestic sewage generated by workers into environmentally friendly toilets, and setting up wastewater sedimentation tanks; (iv) Regularly removing domestic garbage, construction spoils, and construction waste etc., recycling pipes, wires, wood, etc., and hiring the third-party units to dispose of hazardous waste, such as waste engine oil, etc.; (v) Strictly implementing all national laws, regulations and guidelines on work safety, and providing training for all workers on basic sanitation, health and safety issues, including training on gender-based violence and infectious diseases;

34. The contractor will mitigate the impacts of construction activities on birds through the following measures:

- (i) Strengthen the management and maintenance of transportation vehicles during the construction process, implement fixed routes for transportation, and minimize the harmful impact within the smallest possible range.

- (ii) Contractors should provide wildlife protection training for construction workers to reduce activities along the coastline. (iii) the direct discharge of untreated sewage into the bay is strictly forbidden.

- (iv) All project activities do not encroach upon coastal tidal wetlands.

- (v) Sound barriers shall be installed at the construction site, the contractor shall delineate work zones and activity areas, and strictly control construction activities within the designated work zones and site boundaries.

- (vi) During the construction period, directed lighting should be used to avoid direct illumination on the coastal zone, especially during the spring and autumn bird migration seasons. Construction vehicles entering coastal roads should reduce speed, low-intensity lights should be used at night, and avoid direct exposure of strong light.

35. **Operation and Maintenance phase (O&M).** During the operation and maintenance (O&M) phase of the project, potential impacts include road traffic noise and vehicle exhaust emissions, railway engineering noise and vibration, rainwater and sewage treatment collected by municipal pipe networks along roads, operating noise and solid waste in warehouses and storage yards in logistics parks, and occupational health and safety risks to workers. The Green Industrial Park of the FTZ plans to absorb equipment manufacturing, mechanical processing and environmentally friendly new material industries during the operation period, and the settled companies must meet the access standards of the "China (Liaoning) FTZ Yingkou Area Overall Planning Environmental Impact Report"; The new logistics warehouse area intends to absorb cross-border e-commerce, and the stacked goods are generally fast-selling. Therefore, the logistics warehouse during the

operation period of the FTZ does not involve the storage of hazardous chemicals.

36. Without considering the noise attenuation effect of green isolation belts, in the short term, the railway noise at daytime is 53.2dB(A) at 30m outside the railway, in the long-term, the railway noise at daytime is 58dB(A) at 30m outside the railway, meeting the Class III standard in the "Standards for Acoustic Environmental Quality Standard" (GB3096-2008). The railway connecting line is separated from the coastal tidal wetlands by a 30-40 meters wide protective forest belt. After the noise attenuation effect of the protective forest, the noise can be reduced to 45.4dB(A) at 30 meters and 49.9dB(A) in the long term. Although birds may gradually adapt over time and the impact of noise on birds may decrease year by year, it is necessary to regularly monitor changes in bird habitats, species, numbers, and noise during both the implementation and operation phases of the project. Based on the monitoring results, appropriate corrective measures should be taken as needed.

37. Vibrations generated by trains passing primarily affect the foraging and nesting activities of birds. Considering that this line is an enterprise-specific line and involves shunting operations, the speed during idle traction operations should not exceed 40km/h, and during pushing operations, it should not exceed 30km/h. The vibration impact is relatively low.

38. **Social risks and mitigation measures. Before construction**, (i) there are social risks caused by policy planning and approval procedures that relevant departments are making efforts to promote pre-approval procedures and ensure its compliance; (ii) there are social risks caused by the rationality of the preparation of engineering program including technical risks such as project changes and extension of construction period, and uncontrollable risks such as exchange rates, interest rates, and foreign debts. The above risks will be avoided as possible through ensuring that the compensation standard and allocation plan are fair and reasonable, fully seeking opinions and suggestions from enterprises and their employees, optimizing the resettlement plan, ensuring that the project procedures are complete and compliant, fully considering engineering risk factors in the design stage, and conducting detailed cost estimation and economic benefit assessment etc. (iii) there are social risks caused by land acquisition, demolition and compensation plan - but the relevant government agencies of the FTZ subproject have a high degree of understanding and strong support for the project construction, and the land acquisition compensation agreement for the LEDZ subproject has been communicated and signed, as well has proposed job transfer arrangements for affected employee; **During the construction period**, there are social risks caused by negative environmental impacts such as construction dust, noise, and pollution incidents, social risks caused by impacts on surrounding traffic, social risks caused by rational project management, and social risks caused by safety issues, which will implement environmental management and monitoring plan, organize traffic control, improve project management and strengthen public engagement to reduce related risks. **During the operation period**, there are social risks caused by operational operations, social risks caused by the soundness of the GRM, and social risks caused by the leading of media, which will increase investment promotion, optimize the business environment of the park to attract enterprises to settle in, and improve the channels and mechanisms for complaints as well as establish a system for monitoring, leading and controlling public opinions to effectively expand citizen engagement, and enhance policy transparency and openness to mitigate risks during the operation period. The social risk of the project is comprehensively evaluated as low risk, and it is learned from the public engagement activities that the public has a high degree of satisfaction with the risk mitigation measures during the implementation of the project. Therefore, social risks will be minimized after implementing mitigation measures.

#### **D. Environmental and Social Management Plan**

39. Based on the conclusions of the Environmental and Social Impact Assessment, an Environmental and Social Management Plan has been developed for this project. This plan includes the establishment of institutions responsible for implementing the plan, their main responsibilities, measures to mitigate environmental and social impacts, timeline for implementation of the measures as well as monitoring arrangements, construction camp management plan, gender action plan, environmental and social monitoring plan, capacity building

and training plan, and estimation of costs for implementing the Environmental and Social Management Plan.

40. The project is implemented by the People's Government of Yingkou City, with the establishment of the Leading Group (PLG) for the coordinated development of the Yingkou Land-Sea Port Hub Key Industrial Park Project and the Project Management Office (PMO) of Yingkou City for supervision and guidance. The Project Implementing Agency (PIA) consists of the Yingkou Area Management Committee of the China (Liaoning) Pilot Free Trade Zone and the Management Committee of the Liaohe River Economic Development Zone. Under the Project Implementing Agency, Yingkou Free Trade Zone Construction Development Co., Ltd., and Yingkou Liaohe River Urban Construction Investment Development Co., Ltd., are designated as the Project Implementation Units (PIU) for their respective sub-projects<sup>1</sup>. As the implementing units, they bear the environmental and social responsibilities of the project, ensuring that all project activities comply with national and local environmental and social laws and regulations, as well as the environmental and social policy requirements of the AIIB.

41. The total estimated cost for implementing the Environmental and Social Management Plan for the project is RMB 15.913 million, including: 1) Implementation costs of environmental and social mitigation measures totaling RMB 12.543 million (RMB 2.044 million for the Free Trade Zone construction part, RMB 1.356 million for the municipal part, RMB 1.782 million for the railway project part; RMB 7.342 million for the Liaohe River Economic Development Zone sub-project); 2) Environmental and ecological monitoring costs of RMB 2.7 million; 3) Training costs of RMB 0.07 million; and 4) Monitoring costs of ESMP implementation of RMB 0.6 million.

## **E. Conclusion and Suggestion**

42. The construction of the project will improve the regional industrial and economic development and promote the sustainable development of the local social economy. The project has received support from the staff of the management committees of the two subprojects, the settled enterprises and relevant departments. Under the precondition of implementing all measures outlined in this ESMP, the project is feasible from the perspective of environmental and social risk management.

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<sup>1</sup> Yinglugaangzu [ 2023] No. 1 "Notice on the Establishment of the Leading Group and Corresponding Organizations for AIIB Loaned Yingkou Green Smart Trade Zone Development Project "

# 1 Introduction

## 1.1 Project Description

1. Yingkou Green Smart Trade Zone Development Project (hereafter referred to as the “project”) involves the Yingkou Free Trade Zone (FTZ) and the Liaohe Economic Development Zone (LEDZ) in Liaoning Province, which is aimed to build smart low-carbon infrastructure in the FTZ and LEDZ and promote regional trade and economic growth. This project involves three areas: transportation, municipal and logistics storage.
2. This project consists of two subprojects:
3. **Subproject 1: Free Trade Zone Land Port Hub and Industrial Park Subproject.** The construction scope includes the construction of a 1.73-kilometer railway line in the logistics hub area within the Free Trade Zone, construction of railway stations, construction of a high-standard intelligent warehouse covering an area of 18,000 square meters, construction of a 20,000 square meter cargo yard, and construction of a supporting municipal road. In the logistics supporting area, the construction includes a 11,000 square meter international express center, a 11,000 square meter cloud warehouse, the construction of a 9,200 square meter green standardized factory building in the industrialization area within the Free Trade Zone, and construction of 5 municipal roads totaling 4,227 meters in length.
4. **Subproject 2: LEDZ (Phase II) South Expansion Area Municipal Infrastructure Construction Project.** The construction scope covers the planning of twelve roads including Ruliu Road and Jiachen Avenue. The total length of roads is approximately 22.67 kilometers. The project will complete road engineering, transportation engineering, water supply and drainage engineering, gas engineering, communication engineering, lighting engineering, greening engineering, sponge city special projects, and smart municipal projects within the region.
5. The total investment of this project is approximately 2.63 billion RMB, including a loan of 200 million US dollars from the Asian Infrastructure Investment Bank, equivalent to approximately 1.45 billion RMB, and domestic matching funds of 1.18 billion RMB. The loan amount for the Free Trade Zone sub-project is 100 million US dollars, with a total investment of approximately 1.307 billion RMB. The loan amount for the Liaohe River Economic Development Zone sub-project is 100 million US dollars, with a total investment of approximately 1.321 billion RMB.
6. The implementation period of this project is from January 2024 to December 2028.

## 1.2 Purposes of Environmental and Social Impact Assessment

7. According to the environmental and social policy requirements of AIIB, the Yingkou Green Smart Trade Zone Development Project was classified as a Category A project for the environment and society that the project may have significant impacts on the environment and society. As the result the project needs to be carried out comprehensive environmental and social impact assessment to ensure that all possible risks and impacts will be fully identified and managed, and the detailed environmental and social impact assessment (ESIA) report including environmental and social management plans (ESMP) is prepared, to eliminate, offset or reduce adverse environmental and social impacts as much as possible, and enhance and expand the positive benefits of the project as much as possible.
8. Therefore, Yingkou Free Trade Zone Construction and Development Co., Ltd. and Yingkou Liaohe Urban Construction Investment and Development Co., Ltd. entrusted China Urban Construction and Design Research Institute Co., Ltd. (CUCD) to undertake the preparation of the EIA and ESMP of this project.

## 1.3 Methods of Environmental and Social Impact Assessment

9. This ESIA is developed based on relevant domestic environmental and social laws,

regulations, policies, technical guidelines, and the environmental and social framework of the AIIB, and has carried out in combination with the engineering characteristics of the project and the environmental characteristics along the route to ensure the accuracy and comprehensiveness of the assessment. The specific assessment methods are as follows:

- (i) **Desk review.** The ESIA compilation team consulted AIIB's ESP and ES Standards, the laws and regulations related to the project, the policies related to economic development and environmental protection of Liaoning Province and Yingkou City, the environmental and social status of Yingkou City, the environmental quality monitoring data of Yingkou City, the statistical yearbook, the planning documents of Yingkou City, and the feasibility study reports, domestic EIA, stability assessment and other documents, as well as Yingkou City Land Use Planning, literatures of wetland biodiversity. Identify gaps between the domestic environmental social assessment and AIIB's requirements and develop a assessment work plan, based on a study of the domestic environmental social assessment report and an understanding of AIIB's ESP requirements. The main reviewed technical materials are as follows:
- AIIB Environment and Social Policy (Revised in 2022)<sup>1</sup>
  - "Feasibility Study Report for the Liaohe Economic Development Zone (Phase II) South Expansion Area Municipal Infrastructure Construction Project", CUCD;
  - "Feasibility Study Report for the Free Trade Zone Land Port Hub and Industrial Park Subproject ", CUCD;
  - "Feasibility Study Report for the New Construction Engineering of Free Trade Zone Railway Station Construction Subproject ", Shenyang Railway Exploration and Design Institute Co., Ltd.;
  - "Environmental Impact Report Form of Construction Projects for the Liaohe Economic Development Zone (Phase II) South Expansion Area Municipal Infrastructure Construction Project ";
  - "Environmental Impact Report for the Regulatory Detailed Planning of Yingkou Liaohe Economic Development Zone (Phase II) ";
  - "Environmental Impact Report Form of Construction Projects for the Free Trade Zone Land Port Hub and Industrial Park Subproject of the Yingkou Green Smart Trade Zone Development Project ";
  - "Land Use Planning of Yingkou City" <sup>2</sup>, "Current Conditions of Water Resources in Yingkou City" <sup>3</sup>, "Investigation and Research on Bird Diversity in Liaoning Coastal (Bohai Rim) Wetlands", <sup>4</sup>etc.
- (ii) **Field survey.** The scope of the on-site investigation includes the proposed project sites and surrounding areas of the FTZ and the LEDZ south expansion (phase II). The key research contents were the natural environment and vegetation status around the salt field in the LEDZ, the surrounding environment of the shrimp ponds in the FTZ, the surrounding environment of the spoil ground, the species of coastal migratory birds in the FTZ and their habitats, and determining the distribution of project-affected enterprises combined with using satellite maps. On-site surveys can intuitively understand and grasp the conditions of the site and the surrounding environment, identify environmental problems timely and provide strong evidence for the preparation of EIA.

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<sup>1</sup> Asian Infrastructure Investment Bank. (2022). Environmental and Social Framework.

<sup>2</sup> Yingkou Municipal Nature Resource Bureau. (2017, November 8). *Overall Planning of Land Use*.

<sup>3</sup> Nie, D.P., Qin, X.M. & Xue, L. (2013). Analysis of Water Resource Condition in Yingkou Area. *Water Resources & Hydropower of Northeast China*, 31(3):42-44.

<sup>4</sup> Yu, J., Bu, X.L., Liu, Y.A., Liu, G.Z., Li, F.L., Xu, Y.L. & Li, H.B. (2021). Investigation and Study on Bird Diversity in Liaoning Coastal Wetlands (Rim of Bohai Sea). *Marine Environmental Science*,40(6):955-964.

- (iii) **On-site symposium.** In late May 2023, symposiums were held in LEDZ and FTZ. Participants in the symposium covered different types of stakeholders, including corporate employees, female representatives, salt fields representatives, local communities, the elderly, vulnerable groups, and implementing agencies that may be affected by project construction and operation in the park. At the symposium, the ESIA compilation team collected various information on the social development status of LEDZ and FTZ, the composition of enterprises in the parks, and the production and livelihood of local people through direct communication with stakeholders, to understand the local people's views on the project and their needs, and listen to their suggestions.
- (iv) **Questionnaire Survey.** The ESIA compilation team designed a set of environmental and social questionnaires based on the characteristics of the project. The survey questions include but are not limited to the possible impacts of the project on the environment, public expectations for the project, etc. and the survey objects were the identified stakeholders in two sub-project areas. Using the questionnaires survey, the ESIA compilation team can collect public opinions and requirements on the project, understand the current social situation, collect statistics on issues that local people are concerned about during project construction and operation, and improve the quality of ESIA with the help of public judgment
- (v) **Individual interviews.** Although the project construction has positive impacts on the local social and economic development as a whole, the impact on individuals may be quite different. For this reason, based on the interviews on the symposium, the ESIA team also conducted individual in-depth interviews by selecting some people who are greatly affected by the project, to understand their views and suggestions on the project construction in a more specific and in-depth manner.
- (vi) **Compilation of the preliminary draft:** Based on the in-depth analysis of the project, combined with the opinions and suggestions collected at the symposium, and the detailed data of the field survey, the ESIA team carried out a comprehensive environmental and social impact assessment in accordance with relevant technical guidelines and assessment methods, and prepared the preliminary draft of ESIA and ESMP.
- (vii) **Public and stakeholder's consultation:** The preliminary draft of ESIA and ESMP shall be consulted by the public, experts, PIUs and the AIIB, to ensure that the assessment is more comprehensive and accurate and fully reflects the demands of different stakeholders.

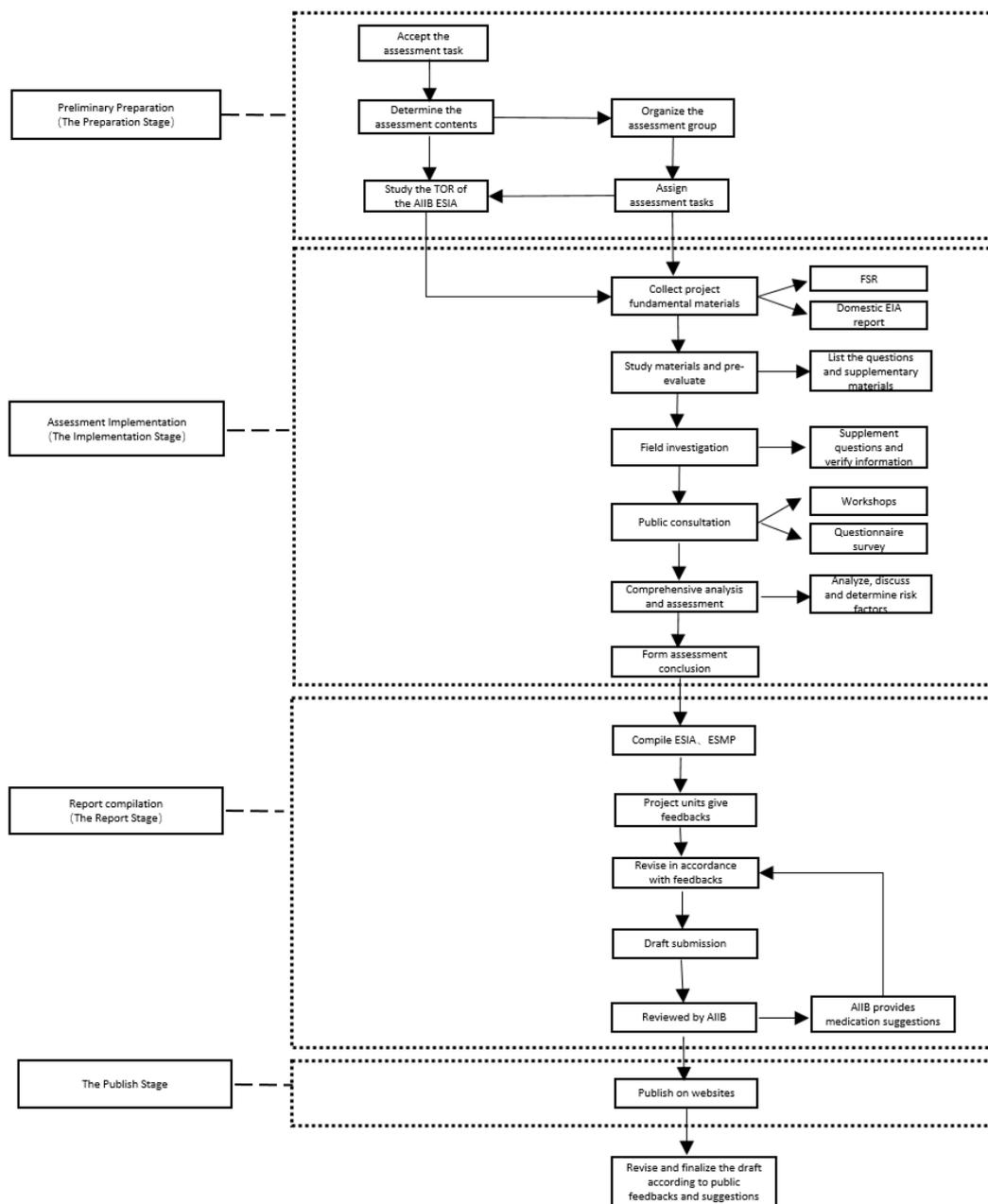


Figure 1-1 The technical flowchart of ESIA

### 1.4 Structure of the Report

10. This ESIA report has been prepared as per requirements of the AIIB’s Environmental and Social Framework. The report will be organized into the following chapters, a brief of each chapter is described below:

#### Executive Summary

**Chapter 1 Introduction:** This section includes project brief description, the purpose of ESIA, the research method of ESIA and the structure of the report.

**Chapter 2 Policy, Legal and Administrative Framework:** This section discusses the national laws applicable to the project, the applicable AIIB ESMP, environmental and social standards (ESSs), and compares the differences between the domestic environmental and social management system with the AIIB ESSs.

**Chapter 3 Project Description:** This section presents the project background, construction goals, construction period, project description, and identification of existing and associated facilities.

**Chapter 4 Alternatives Comparison and Selection:** This section discusses the mandatory selection of project technical solutions and non-project alternatives, and presents the benefits after project implementation.

**Chapter 5 Environmental and Social Baseline Data:** This section presents the relevant geography, environmental quality, ecology, land use, economic development and social status in the project area.

**Chapter 6 Environmental Impact and Risk Analysis and Mitigation Measures:** This section predicts and evaluates the potential positive and negative environmental impacts during both the construction and operational phases of the project. It discusses corresponding mitigation measures and addresses potential climate risks that the project facilities may face, as well as measures to enhance climate resilience and adaptability.

**Chapter 7 Social Impact and Risk Analysis and Mitigation Measures:** This section predicts and evaluates the potential positive and negative social impacts, including those on vulnerable groups and gender, during the pre-construction, construction, and operational phases of the project. It discusses corresponding mitigation measures.

**Chapter 8 Community, Occupational Safety and Health:** This section describes the risk impacts of project construction and operation on labor rights, occupational safety and health environment, and discusses the corresponding mitigation measures.

**Chapter 9 Environmental and Social Management Plan:** This section discusses a series of mitigation and management measures that should be taken during project implementation to avoid, reduce, minimize, or compensate adverse environmental and social impacts; describes relevant organizations, responsibility arrangements, capacity development and training plans established to adapt the implementation of ESMP; as well as presents environmental and social monitoring and reporting requirements.

**Chapter 10 Stakeholder Consultation:** This section introduces the method of information disclosure, the way of stakeholder participation, and collects and summarizes the opinions and suggestions of stakeholders.

**Chapter 11 Grievance Redress Mechanism:** This section evaluates the current grievance redress mechanism (GRM)(including informal channels and formal channels), and strengthened the GRM of this project.

**Chapter 12 Conclusions.**

## 2 Policy, Legal and Administrative Framework

11. In September 2022, the coordinated development project of key industrial parks of Liaoning Yingkou Land Port Hub financed by the Asian Infrastructure Investment Bank was approved by the State Council and included in China's 2022-2024 alternative project plan for using Asian Infrastructure Investment Bank loans. The preparation of this report complies with the current applicable environmental and social laws and regulations of the People's Republic of China, local and departmental regulations, technical guidelines and specifications of Liaoning Province and Yingkou City, and the requirements of the AIIB's "Environmental and Social Framework" (revised in 2021).

### 2.1 Applicable national environment-related laws and regulations

12. This chapter introduces China's environmental protection laws and regulations and China's social-related laws, policies and plans involved in and applicable to this project.

#### 2.1.1 Environmental Laws and Administrative Regulations

(i) "Environmental Protection Law of the People's Republic of China" (revised on April 24, 2014)

13. The "Environmental Protection Law of the People's Republic of China" stipulates the basic principles and basic systems of environmental protection, and is a basic and comprehensive law in the field of environmental protection. Local regulations implement the requirements of the Environmental Protection Law, conform to the legislative principles and basic systems of the Environmental Protection Law, and coordinate and connect with the Environmental Protection Law.

14. This Law is enacted for the purpose of protecting and improving the environment, preventing and controlling pollution and other public hazards, safeguarding public health, advancing the construction of an ecological civilization, and promoting sustainable economic and social development.

(ii) "Environmental Impact Assessment Law of the People's Republic of China" (2016.7.2 Amendment)

15. The "Environmental Impact Assessment Law of the People's Republic of China" is the basic guideline for planning or implementing projects to carry out environmental impact assessment. It clarifies the scope of projects that need to be assessed for environmental impact, and specifies the requirements for the preparation, approval, and management of environmental impact assessment documents.

16. Environmental impact assessment should be carried out for new construction projects.

(iii) "Environmental Noise Prevention and Control Law of the People's Republic of China" (2018 Amendment)

17. Article 13 Construction projects for new construction, reconstruction and expansion must abide by the state's regulations on environmental protection management of construction projects.

18. If the construction project may cause noise pollution, the construction unit shall, in accordance with regulations, submit an environmental impact report specifying the measures for the prevention and control of environmental noise pollution, and report to the environmental protection administrative department.

(iv) "Land Administration Law of the People's Republic of China" ( effective from January 1, 2020 )

19. Article 4 The state implements a land use control system. The state formulates an overall plan for land use, stipulates land use, and divides land into agricultural land, construction land, and unused land. Strictly restrict the transformation of agricultural land into construction land, control the total amount of construction land, and implement special protection for cultivated land.

(v) "Water Pollution Prevention and Control Law of the People's Republic of China" (revised in 2017 )

20. Article 4 People's governments at or above the county level shall incorporate water environment protection into their national economic and social development plans. Local people's governments at various levels are responsible for the quality of the water environment in their administrative regions and shall take timely measures to prevent and control water pollution.

(vi) "Law of the People's Republic of China on the Protection of Cultural Relics" (revised in 2015)

21. Article 19 Within the protection scope and construction control zone of a cultural relics protection unit, no facilities that pollute the cultural relics protection unit and its environment shall be constructed, and activities that may affect the safety of the cultural relics protection unit and its environment shall not be carried out. Existing facilities that pollute cultural relics protection units and their environment should be dealt with within a time limit.

(vii) Law of the People's Republic of China on the Prevention and Control of Environmental Pollution by Solid Waste (revised in 2020)

22. Article 17 Construction projects that generate, store, utilize, and dispose of solid waste shall conduct environmental impact assessments in accordance with the law and abide by the state's regulations on environmental protection management of construction projects.

(viii) "Law of the People's Republic of China on the Prevention and Control of Air Pollution" (revised in 2018)

23. Article 2 The prevention and control of air pollution shall aim at improving the quality of the air environment, adhere to source control, plan first, transform the mode of economic development, optimize the industrial structure and layout, and adjust the energy structure.

24. To prevent and control air pollution, we should strengthen the comprehensive prevention and control of air pollution from coal burning, industry, motor vehicles and ships, flying dust, agriculture, etc., promote joint prevention and control of regional air pollution, and control air pollutants such as particulate matter, sulfur dioxide, nitrogen oxides, volatile organic compounds, ammonia, as well as greenhouse gases.

(ix) Regulations on the administration of environmental protection of construction projects (implemented on July 16, 2017)

25. Article 6 The state implements an environmental impact assessment system for construction projects.

26. Article 15 The supporting environmental protection facilities required by the construction project must be designed, constructed and put into operation at the same time as the main project.

(x) "Category Management Directory of Environmental Impact Assessment of Construction Projects" (2021 Edition)

27. The Directory specifies environmentally sensitive areas, classifies the environmental impact assessment report category of construction projects according to the category of construction projects, and determines whether the construction project should prepare an environmental impact

report, environmental impact report form or environmental impact registration form; the construction unit should strictly follow this directory to determine the construction project. The category of environmental impact assessment shall not be changed without authorization.

(xi) "Industrial Structure Adjustment Guidance Catalog (2021)"

28. The catalog covers more than 20 industries, of which 539 are encouraged, 190 are restricted, and 399 are eliminated.

(xii) Wetland Protection Law of the People's Republic of China (June 2022)

29. Article 28 The following acts of damaging wetlands and their ecological functions are prohibited:

i) Opening (enclosing) reclamation and draining natural wetlands, and permanently cutting off the water source of natural wetlands;

ii) Unauthorized landfilling of natural wetlands, unauthorized sand mining, mining, and soil extraction;

iii) Discharging industrial waste water, domestic sewage and other waste water and sewage polluting wetlands that do not meet the water pollutant discharge standards, dumping, stacking, discarding, and scattering solid waste;

iv) Overgrazing or overharvesting of wild plants, overfishing or extinct fishing, excessive fertilization, dosing of pesticides, feeding of bait, and other planting and breeding behaviors that pollute wetlands;

v) Other behaviors that damage wetlands and their ecological functions.

(xiii) Energy Conservation Law of the People's Republic of China (2020 Amendment)

30. Article 15 The state implements a system of energy conservation assessment and review for fixed asset investment projects.

31. Article 35 Construction, design, construction and supervision units of construction projects shall abide by building energy conservation standards.

### **2.1.2 Environmental sector regulations and other normative documents**

(i). "Notice on Printing and Distributing the "14th Five-Year" Noise Pollution Prevention and Control Action Plan" (Huandaqi [ 2023] No. 1);

(ii). "Regulations for the Implementation of the Cultural Relics Protection Law of the People's Republic of China" (2003.7);

(iii). "Notice of the State Council on Printing and Distributing the Action Plan for Water Pollution Prevention and Control" (State Council, Guofa [2015] No. 17, 2015.4.2);

(iv). "Opinions of the Central Committee of the Communist Party of China and the State Council on Accelerating the Construction of Ecological Civilization" (Central Committee of the Communist Party of China, State Council, 2015.4.25);

(v). "Notice of the State Council on Printing and Distributing the Action Plan for Soil Pollution

Prevention and Control" (State Council, Guofa [2016] No. 31, 2016.5.28);

- (vi). Circular of the State Council on the Issuance of the 14th Five-Year Plan for Ecological Protection and Supervision (Ministry of Ecology and Environment, Environment and Ecology [2022] No. 15, 2022.3.18)
- (vii). "Decision of the State Council on the Implementation of the "National Overall Emergency Response Plan for Public Emergencies" (State Council, Guofa [ 2005] No. 11, 2005.4.17);
- (viii). "Interim Measures for the Management of Emergency Plans for Environmental Emergencies" (Ministry of Environmental Protection<sup>5</sup>, Huanfa [2010] No. 113, 2010.9.28);
- (ix). "Guiding Opinions on Strengthening the Prevention and Control of Environmental Noise Pollution to Improve the Quality of Urban and Rural Acoustic Environment" (Ministry of Environmental Protection, Huan Fa [ 2010] No. 144, 2010.12.15);
- (x). "Notice on Further Strengthening Environmental Impact Assessment Management to Prevent Environmental Risks" (Ministry of Environmental Protection, Huan Fa [ 2012] No. 77, 2012.7.3);
- (xi). "Notice on Effectively Strengthening Risk Prevention and Strict Environmental Impact Assessment Management" (Ministry of Environmental Protection, Huan Fa [ 2012] No. 98, 2012.8.7);
- (xii). "Notice on Strengthening Environmental Impact Assessment Management with Improving Environmental Quality as the Core" (Ministry of Environmental Protection, EIA [2016] No. 150, 2016.10.26);
- (xiii). "Wetland Protection Management Regulations" (State Forestry Administration, Order No. 32, 2013.3.28);
- (xiv). "Notice on Implementing Air Pollution Prevention and Control Action Plan and Strictly Enabling Environmental Impact Assessment Access" (General Office of the Ministry of Environmental Protection, Huanban [ 2014] No. 30, 2014.3.25);

### **2.1.3 Local regulations and normative documents**

- (i). "Liaoning Provincial Environmental Protection Regulations" (Implemented on February 1, 2018);
- (ii). "Liaoning Province Water Pollution Prevention and Control Regulations" (Implemented on February 1, 2019);
- (iii). "Measures for the Prevention and Control of Environmental Pollution by Solid Waste in Liaoning Province" (Revised in 2013);
- (iv). "Notice of Liaoning Provincial People's Government on Action Plan for Pollution Prevention and Ecological Construction and Protection in Liaoning Province (2017-

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<sup>5</sup> Ministry of Ecology and Environment of the People's Republic of China

- 2020)" (implemented on April 25, 2017);
- (v). "Dust Emission Standards for Construction and Stacking Sites in Liaoning Province" (DB21/2642-2016);
  - (vi). "Opinions of the People's Government of Yingkou City on the Implementation of the "Three Lines and One List" Ecological Environment Zoning Management and Control" (Yingzhengfa [ 2021] No. 2);
  - (vii). "Notice of Yingkou Municipal People's Government on Printing and Distributing Yingkou City's Three-Year Action Plan for Winning the Blue Sky Defense War (2018-2020)" (Yingzhengfa [2019] No. 6);
  - (viii). "Division of Ambient Air Quality Functional Zones in Yingkou Area" (Ying Zheng Ban Fa [2006] No. 133);
  - (ix). "Yingkou City Atmospheric Environmental Quality Standards Reaching Plan within a Deadline" (Ying Lan Tian Ban Fa [ 2021] No. 86);
  - (x). "Yingkou Urban Acoustic Environment Function Zoning Plan" (Ying Zhengban Fa [2021] No. 15);
  - (xi). "Yingkou City Master Plan (2011-2030)";
  - (xii). "Notice on Printing and Distributing the Work Plan for Deepening the Comprehensive Management of the Bohai Sea and the Yellow Sea (Liaoning Section)" (Liaohuanhan [2021] No. 76)
  - (xiii). "Water Quality Standards Plan of Minxing River in Yingkou";
  - (xiv). "Notice on Implementing the Interim Measures for the Examination and Management of the Total Discharge Index of Major Pollutants in Construction Projects of the Ministry of Environmental Protection" (Liaohuanfa [ 2015] No. 17)

32. The construction content of this project involves cargo storage yards, warehouses, railway yards, industrial plants, road supporting pipe network foundation works, etc. According to the "Category Management Directory of Environmental Impact Assessment of Construction Projects" (2021 Edition), the categories of domestic environmental impact assessment reports of projects are determined as follows:

**Table 2-1 "Categorized Management Directory of Environmental Impact Assessment of Construction Projects" (2021 Edition)**

Category of project activity		Report	Report Form	Registration Form	The meaning of environmentally sensitive area	This Project Condition
44. Real estate industry						
97	Real estate development, commercial complexes, hotels, hotels, office buildings, standard	/	Involving environmentally sensitive areas	/	All areas mentioned in Article 3 (1); the scope of ecological protection red line management and control except (1) mentioned in Article 3 (2), permanent basic farmland, basic grasslands,	The standardized factory building of this project is located in the second-class industrial land and does not involve the

	factory buildings, etc.				forest parks, geological parks, important wetlands, natural forests, Focus on the protection of wildlife habitats and the growth and breeding grounds of wild plants; for the cultural relics protection units in Article 3 (3), for the standard factory buildings, the items of residence, medical care, cultural education, scientific research, Areas with main functions such as administrative offices	sensitive area mentioned in this row. Based on this analysis, this project is not included in the environmental impact assessment management
52. Transportation industry, pipeline transportation industry						
131	Urban roads (excluding maintenance; excluding bypass roads, pedestrian bridges, pedestrian underpasses)	/	Newly built expressways and arterial roads; urban bridges and tunnels	Other		Report Form
132	Newly built and expanded railways	New construction and addition of railways (except for railway contact lines of 30 km or less and dedicated railway lines of 30 km or less); Involving environmentally sensitive areas	30 km and below the railway contact line and 30 km and below the railway dedicated line	/	The entire area referred to in Article 3(a); Article 3 All areas in Article 3 (2); All areas in Article (3)	The construction of special railway lines in this project does not involve sensitive areas, and a report form should be made
146	Urban (town) pipeline network and pipeline gallery construction (excluding water supply pipelines; excluding optical fibers; excluding natural gas pipelines of 1.6 MPa and below)	/	New construction involving environmentally sensitive areas	other	All areas mentioned in Article 3 (1); the scope of ecological protection red line management and control except (1) mentioned in Article 3 (2), permanent basic farmland, geological parks, important wetlands, and natural forests	This project involves the construction of municipal supporting facilities for water supply, rainwater, sewage, electricity, communication and lighting, and does not involve the sensitive areas mentioned in this row, and a report form should be made
53. Loading, unloading and storage industry 59						
149	Dangerous goods storage 594 (oil depots excluding gas stations; gas depots excluding gas stations)	Oil depots with a total capacity of 200,000 m <sup>3</sup> or more (including supporting	Others (storage containing toxic, harmful and dangerous goods; including liquefied natural gas storage)	/		This project does not involve dangerous goods storage, and the included warehouses are not included in the

		oil depots behind the oil product terminal); underground oil depots; underground gas depots				environmental impact assessment management
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33. According to Article 4 of the Catalog of Classified Management of Environmental Impact Assessment of Construction Projects (2021): For construction projects involving two or more project categories in this catalog, the category of environmental impact assessment shall be determined according to the highest single level among them. The implementation agency of the Free Trade Zone Land Port Hub and Industrial Park Subproject and the Yingkou LEDZ Industrial Cooperation Supporting Project Subproject have entrusted the compilation unit of the environmental impact assessment report form, and the draft of the domestic environmental impact assessment report form has been compiled. It is expected the domestic environmental impact assessment reports will be endorsed by the Yingkou ecology and environment bureau by the end of 2024.

#### 2.1.4 Environmental related international conventions

34. The international conventions related to this project that China has signed or signed mainly include:

- Vienna Convention for the Protection of the Ozone Layer (22 March 1985);
- Amended Montreal Protocol on Substances that Deplete the Ozone Layer (16 September 1987);
- Convention on Biological Diversity (5 June 1992);
- Paris Agreement (2016). The long-term goal of the Paris Agreement is to limit the increase in global average temperature to well below 2°C above pre-industrial times and to pursue efforts to limit the increase in temperature to 1.5°C.

### 2.2 Social-related Laws, Regulations, Policies and Plans of the Government

#### 2.2.1 Laws and regulations related to land management and social stability

(i) Interim Regulations on Major Administrative Decision-Making Procedures

35. The regulation clearly states that major administrative decisions should follow the principle of democratic decision-making, fully listen to the opinions of all parties, and ensure that the people participate in decision-making through various channels and methods.

36. Article 14 The decision-making undertaking unit shall fully listen to opinions in a way that is convenient for the public to participate, except for decision-making matters that are not disclosed according to law. Hearing opinions can take various methods such as symposiums, hearings, on-site visits, written solicitation of opinions, public solicitation of opinions from the public, questionnaire surveys, and public opinion surveys. If the decision-making matters involve the interests of specific groups, the decision-making unit shall communicate and negotiate with relevant people's organizations, social organizations, and representatives of the masses, and fully listen to the opinions and suggestions of relevant groups.

37. Article 22 Where the implementation of major administrative decisions may have adverse effects on social stability, public security, etc., the decision-making unit or other units responsible for risk assessment shall organize and assess the risk controllability of the draft decision. If the relevant risks have been evaluated and evaluated in accordance with the relevant regulations,

repeated evaluations will not be made.

(ii) Land Administration Law of the People's Republic of China

38. Article 47 When the state expropriates land, it shall be announced and implemented by the local people's government at or above the county level after approval in accordance with legal procedures. Where a local people's government at or above the county level intends to apply for land expropriation, it shall carry out an investigation of the current situation of the land to be expropriated and an assessment of social stability risks, and include the scope of expropriation, the current situation of the land, the purpose of expropriation, compensation standards, resettlement methods, and social security in the land to be expropriated. The township (town), village, and villager's group where it is located shall make an announcement for at least 30 days, and listen to the opinions of the land-expropriated rural collective economic organization and its members, villagers' committees, and other stakeholders.

(iii) Regulations for the Implementation of the Land Administration Law of the People's Republic of China

39. Article 26 Where land is required to be expropriated, the local people's government at or above the county level believes that it complies with the provisions of Article 45 of the "Land Administration Law", it shall issue a pre-announcement of land expropriation, and carry out investigation of the current situation of the land to be expropriated and social stability risk assessment.

(iv) Regulations on house expropriation and compensation on state-owned land

40. Article 12 Before making a housing expropriation decision, the people's government at the city and county levels shall conduct a social stability risk assessment in accordance with relevant regulations; if the housing expropriation decision involves a large number of expropriated persons, it shall be discussed and decided at the executive meeting of the government.

41. The expropriation compensation fees shall be paid in full, stored in a special account, and earmarked for use.

(v) Urban Real Estate Management Law of the People's Republic of China

42. Article 25 Real estate development must strictly implement urban planning, and implement comprehensive planning, rational layout, comprehensive development, and supporting construction in accordance with the principle of unifying economic, social, and environmental benefits.

(vi) Table 2-2 is the relevant social legal requirements that this project will meet.

43. Procedures for Major Administrative Decision-Making in Liaoning Province

44. Article 14 The decision-making unit shall, based on the nature and category of decision-making matters, scope of influence, degree of social concern, etc., fully listen to public opinions in one or more of the following ways, except for decision-making matters that are not to be made public according to law:

- i) Opinion surveys and questionnaire surveys; ii) Written solicitation of opinions and open solicitation of opinions from the public; iii) Special research and on-site visits; iv) Forums; v) Hearings; vi) Facilitating public participation other ways

45. Article 22 Where the implementation of major administrative decisions may have adverse effects on social stability, public security, etc., the decision-making unit or other units responsible for risk assessment shall organize and assess the risk controllability of the draft decision.

(vii) Measures for the Implementation of the "Land Administration Law of the People's

Republic of China" in Liaoning Province

46. If the land collectively owned by farmers is to be expropriated, the city, county (district) people's government shall perform the land expropriation procedures according to law.

47. Relevant departments shall sign a LA compensation and resettlement agreement with the owner and user right holder of the land to be acquired. The people's government of the city or county (district) applying for land expropriation shall promptly implement land compensation fees, resettlement subsidies, compensation fees for rural villagers' houses and other ground attachments and young crops, and social security fees, and ensure that the full amount is in place, and the special funds dedicated. If the relevant fees are not paid in full, the LA shall not be approved.

(viii) Interim Measures for Urban House Expropriation and Compensation in Yingkou City

48. Article 3 The urban houses that need to be expropriated for the public interest must comply with the overall urban planning, be conducive to urban construction and the renovation of old urban areas, take into account the interests of the state, the collective, and individuals, and follow the principles of democratic decision-making, proper procedures, and open results. Fair compensation shall be given to the owners of expropriated houses (hereinafter referred to as expropriated persons).

(ix) Work Rules for Public Participation in Major Administrative Decisions of the People's Government of Yingkou City

49. Article 5 The decision-making undertaking unit shall, based on the decision-making matters, comprehensively consider factors such as the place of residence, occupation, participation ability, and degree of influence, organize the public, including stakeholders, to participate in major administrative decision-making, and ensure that the participants are extensive, targeted and professionalism. The scope of public participation and the selection of relevant representatives should ensure that the opinions of the affected public can be expressed fairly. For issues of general concern to the society and highly professional issues, public representatives can be selected to participate in major administrative decision-making.

## 2.2.2 Laws and regulations related to labor, health and safety

50. This project will comply with the relevant laws and regulations of China and Liaoning Province on labor rights, occupational health and safety, and protection of women's rights.

- (i) "Safety Production Law of the People's Republic of China" (2014) : This regulation stipulates the rights and obligations of enterprises and workers in safety production, and provides a legal basis for preventing work-related accidents and ensuring the safety of workers ;
- (ii) "Law of the People's Republic of China on the Prevention and Control of Occupational Diseases" (2011): It stipulates in detail the prevention, diagnosis and treatment of occupational diseases, as well as the protection of the rights and interests of occupational disease patients;
- (iii) Labor Law of the People's Republic of China (1995);
- (iv) "Law of the People's Republic of China on the Protection of Minors" (revised in 2020);
- (v) Law of the People's Republic of China on the Protection of Disabled Persons (revised in 2018);
- (vi) The Social Insurance Law of the People's Republic of China (revised in 2018);
- (vii) "Special Regulations on the Labor Protection of Female Workers";
- (viii) AIDS Regulations;
- (ix) "Law of the People's Republic of China on the Protection of Women's Rights and Interests" ;
- (x) "Liaoning Provincial Labor Security Regulations".

## 2.3 Policies and plans for the development of China's logistics hub industry

51. This project complies with the following industry development policies:

- (i) "Notice of the General Office of the State Council on Printing and Distributing the "14th Five-Year" Modern Logistics Development Plan" (Guobanfa [ 2022] No. 17);
- (ii) "National Logistics Hub Network Construction Implementation Plan (2021-2025)" (Fagai Jingmao [2021] No. 956);
- (iii) "Special Action Plan for High-quality Development of Commerce and Trade Logistics ( 2021-2025) ";
- (iv) " Opinions on Promoting the High-quality Development of Logistics and Promoting the Formation of a Strong Domestic Market; Development and Reform Economic and Trade [ 2019] No. 352 ";
- (v) "The 14th Five-Year Plan for the Development of Integrated Transportation Services" (Jiaoyunfa [ 2021] No. 111 );
- (vi) "Implementation Opinions on Accelerating the High-quality Development of Cold Chain Logistics Transportation" (Jiaoyunfa [ 2022] No. 49);
- (vii) "Announcement on the Policy of Exempting Value-Added Tax on Express Collection and Delivery Services" (Announcement No. 18 [2022] of the Ministry of Finance and the State Administration of Taxation);
- (viii) "Seven Important Measures Deployed at the First Meeting of the Chief Commander (Plenary) Scheduling Meeting of the State Council's Logistics Guaranteeing Work Leading Group";
- (ix) "Notice on Further Improving Financial Support and Services in the Field of Transportation and Logistics" (Yinfa [ 2023] No. 32);
- (x) "Guiding Opinions of the Ministry of Transport on Strengthening the Standardization Construction of Transportation Safety Production" (Jiao'an Jian Gui [ 2023] No. 1);
- (xi) " Notice of the National Railway Administration of the Ministry of Transport, the Ministry of Natural Resources, the General Administration of Customs, and the China National Railway Group Co., Ltd. on Printing and Distributing the " Action Plan for Promoting the High-quality Development of Rail-Water Combined Transport (2023-2025) " (Jiaoshuifa [ 2023] No.11);
- (xii) "Notice of the General Office of the Ministry of Transport and the General Office of the Ministry of Finance on Doing a Good Job in Supplementing and Strengthening the Chain of the National Comprehensive Freight Hub " (Jiao Ban Planning [ 2022] No. 34);
- (xiii) " Notice of the Ministry of Finance and the Ministry of Transport on Supporting the Replenishment and Strengthening of the National Comprehensive Freight Hub " (Cai Jian [ 2022] No. 219);
- (xiv) " Implementation Opinions of the National Development and Reform Commission and the Ministry of Transport on Further Reducing Logistics Costs " "
- (xv) "Notice on Printing and Distributing the Implementation Plan for Promoting the Deep Integration and Innovative Development of the Logistics Industry and Manufacturing Industry" (Fagai Jingmao [ 2020] No. 1315);
- (xvi) "Opinions of the General Office of the State Council on Promoting the Coordinated Development of E-commerce and Express Logistics" (Guobanfa [ 2018] No. 1);
- (xvii) "Notice of the General Office of the People's Government of Liaoning Province on Printing and Distributing the "14th Five-Year Plan" Comprehensive Transportation Development Plan of Liaoning Province" (Liao Zheng Ban Fa [2021] No. 36);
- (xviii) "Notice of the General Office of the People's Government of Liaoning Province on Printing and Distributing the Action Plan for Promoting the High-quality Development of Multimodal Transport in Liaoning Province and Optimizing and Adjusting the Transport Structure (2022-2025) " (Liao Zheng Ban Fa [ 2022] No. 42);
- (xix) "Notice of the General Office of the People's Government of Liaoning Province on Printing and Distributing the "14th Five-Year Plan" Service Industry Development Plan of Liaoning Province" (Liao Zheng Ban Fa [ 2022] No. 9 );
- (xx) "Implementation Opinions of the People's Government of Liaoning Province on Vigorously Developing the Modern Logistics Industry" (Liao Zheng Fa [ 2018] No. 30);

- (xxi) "Notice of the General Office of the People's Government of Liaoning Province on Printing and Distributing the Implementation Plan for the High-quality Development of Cold Chain Logistics in Liaoning Province (2022-2025)" (Liao Zheng Ban Fa [2022] No. 45);
- (xxii) "Notice of Yingkou Municipal People's Government on Printing and Distributing the Development Plan of Yingkou Modern Logistics Industry" (Yingzhengfa [2021] No. 9);
- (xxiii) "Notice of the Office of the People's Government of Yingkou City on Printing and Distributing the "14th Five-Year Plan" for Comprehensive Transportation Development in Yingkou City" (Yingzhengbanfa [2022] No. 2);
- (xxiv) "Three-Year Action Plan for High-quality Development of Cold Chain Logistics in Yingkou City (2023-2025)";
- (xxv) "Notice on Printing and Distributing the 14th Five-Year Plan for the National Economy of the Yingkou Area of the China (Liaoning) Pilot Free Trade Zone and the Outline of Long-term Goals in 2035" (Liaoziyingweifa [2021] No. 9).

## **2.4 Applicable AIIB's Environmental and Social Framework, Environmental and Social Policy, and Environmental and Social Standards**

52. Since this project will apply for a loan from the AIIB, the Environmental and Social Framework (ESF) of the AIIB will apply to this project<sup>6</sup>. Its key elements are as follows:

- The AIIB's "Environmental and Social Policy (ESP)" applicable to this project include: "Environmental and Social Standard 1—Environmental and Social Risks and Impacts (ESS1)" in the "Environmental and Social Assessment and Management Policy" and "Land Acquisition and Involuntary Resettlement (ESS2)" and "Environmental and Social Exclusion List (ESEL)".
- Environmental and Social Standard 1: Assessment and management of environmental and social risks and impacts. Environmental and Social Standard 1 (ESS1) aims to ensure the environmental and social robustness and sustainability of projects and supports the integration of environmental and social factors into project decision-making processes and implementation. ESS1 applies if the project is likely to have adverse environmental risks and impacts or social risks and impacts (or both). The scope of environmental and social assessment and management measures is directly proportional to the risks and impacts of the project. ESS1 provides high-quality environmental and social assessment and management of risks and impacts through effective mitigation and monitoring measures during project implementation. ESS1 defines detailed requirements for environmental and social assessments to be conducted for any project invested by the AIIB.
- Environmental and Social Standard 2: Land Acquisition, Land Use Restrictions, and Involuntary Resettlement. If the project's screening process reveals that the project involves involuntary resettlement (including immediate 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; assets or acquired assets, sources of income or livelihood) due to (a) involuntary land acquisition; (b) involuntary restriction of land use or access to legally designated parks and protected areas. It covers such displacement, whether such loss and involuntary restraint is total or partial, permanent or temporary. ESS2 identifies detailed requirements for project resettlement plans involving involuntary resettlement.

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<sup>6</sup>Environmental and Social Criterion 3 : Indigenous Peoples is not applicable to this project because of the urban context of this project, the absence of indigenous peoples in the project city, and the direct financing method of this project.

53. This project and related construction content involves potential additional land requirements, triggering ESS1 and ESS2. The proposed area of the project does not have indigenous peoples or indigenous peoples residing in; therefore, ESS3 will not be triggered.

## **2.5 Comparison of Domestic Environmental and Social Management System and AIIB**

54. China's environmental and social laws and regulations are basically consistent with the AIIB's environmental and social policies and environmental and social standards, but there are some differences in details. These have been analyzed in this environmental impact assessment and social assessment (social management framework and resettlement framework), and solutions have been proposed for possible gaps and deficiencies to ensure that the design, construction and operation of the project meet the AIIB and domestic environmental and social management requirements.

**Table 2-2 Comparative analysis of environmental and social policies between China and AIIB**

Items	AIIB requirements	Chinese requirements	Comparative analysis
Environmental and Social Policies and Regulations	The AIIB requires the adoption of the AIIB's environmental and social framework, and projects applying for AIIB loans must adopt environmental and social policies and environmental and social standards.	China has a series of complete general environmental laws and policies. Construction projects should carry out environmental impact assessments and Environmental protection measures shall comply with environmental quality standards, and at the same time must meet local environmental laws and regulations and relevant requirements. Section C 1.1 details applicable domestic environmental laws and regulations. China has no direct laws and administrative regulations on social impact assessment, but project construction should be based on the "Provisional Regulations on Major Administrative Decision-making Procedures", "National Development and Reform Commission Interim Measures for Social Stability Risk Assessment of Major Fixed Asset Investment Projects", "Regulations for the Implementation of the Land Administration Law of the People's Republic of China". There are corresponding administrative regulations or rules on social impact assessment, such as the Regulations for the Implementation of the Management Law, and the National Development and Reform Commission's "Government Investment Project Feasibility Study Compilation Outline" (2023) has chapter requirements for social assessment and social stability risk assessment, and must meet local related requirements. Section C 1.2 introduces in detail the applicable domestic laws and regulations related to social impact assessment.	Domestic environmental policies and regulations are basically similar to the environmental and social policies of the AIIB. However, domestic environmental policies and regulations focus more on mitigating the adverse impact of construction projects on the environment, while the AIIB focuses on the comprehensive impact on the environment and society. There are no special laws and regulations on social impact assessment in China, but it is stipulated that social assessment and social stability risk assessment must be carried out in the project feasibility study, and social stability risk assessment must pass the review and record. Social stability risk assessment is a unique social risk governance system in China. The project should adopt more stringent regulations while meeting domestic and AIIB requirements.

<p>Environmental Social Category</p>	<p>The AIIB will screen and classify projects as early as possible to determine the nature and level of environmental and social assessment, information disclosure and stakeholder engagement required by the client for the project. The AIIB classifies projects according to their highest environmental and social risks and potential impacts (including direct, indirect, cumulative and induced impacts on the project site). The AIIB divides projects into four categories: (1) Category A, (2) Category B, (3) Category C, and (4) Category F1. Different types of environmental and social impact assessments have different requirements.</p>	<p>The "Construction Project Environmental Impact Assessment Classification Management Catalog (2021 Edition)" is based on the characteristics of construction projects and the environmental sensitivity of the area where it is located, and comprehensively considers the possible impact of construction projects on the environment. The impact assessment is classified into three categories: (1) preparation of environmental impact report (2) preparation of environmental impact report form (3) preparation of environmental impact registration form. According to the "Guidelines for Social Assessment of Municipal Public Facilities Construction Projects" issued by the Ministry of Housing and Urban-Rural Development of the People's Republic of China, social assessments are required for: municipal water supply, drainage, heating, gas, domestic waste disposal, urban rail transit, urban social assessment of the entire project cycle of roads and bridges, urban landscaping projects (including project pre-stage, preparation stage, implementation stage and operation stage).</p>	<p>According to the requirements of the AIIB, this project is assessed as Category A. This project has two subprojects: the LEDZ and the Free Trade Zone subproject, both of which involve multiple construction projects. According to the domestic environmental impact assessment regulations, if the construction content involves two or more project categories in this list, the environmental impact assessment category shall be determined according to the highest single level among them. The sub-projects of LEDZ and Free Trade Zone need to prepare environmental impact report forms. According to domestic guidelines, this project involves municipal projects such as urban roads and urban rail transit, and a social assessment report needs to be prepared.</p>
<p>Preparation of environmental and social impact assessment report</p>	<p>According to environmental and social policies, category A projects need to prepare environmental and social impact assessment reports, environmental and social management plans, and resettlement plans. The environmental and social impact assessment report includes: (1) Project description, including the map of the project area; (2) Policy, legal and administrative framework, including the domestic and international legal framework applicable to the project; (3) Project scope, including stakeholders</p>	<p>According to the "Category of Management Directory of Environmental Impact Assessment of Construction Projects (2021 Edition)", the FTZ and the LEDZ need to prepare an environmental report form. According to the "Guidelines for Social Evaluation of Municipal Public Facilities Construction Projects" issued by the Ministry of Housing and Urban-Rural Development of the People's Republic of China, social analysis is required for municipal construction projects. Social analysis includes (social impact analysis, stakeholder analysis, social mutual adaptability analysis, social risk analysis, project sustainability analysis), social management plan and implementation monitoring and evaluation, expropriation and compensation plan and</p>	<p>The environmental and social impact assessment prepared by the AIIB for Category A projects not only evaluates the potential environmental and social risks and positive and negative impacts of the project, but also compares and analyzes feasible alternatives, and recommends any necessary measures to avoid, minimize, reduce, offset or compensate for adverse impacts and improve the environmental and social performance of the</p>

	<p>Identification and consultation plan; (4) analysis of alternatives; (5) baseline environmental and social data; (6) evaluation of environmental and social risks and impacts; (7) analysis of risks and impacts related to climate change; (8) public consultation and information disclosure; (9) development of mitigation, monitoring and management measures and actions in the form of environmental management plans or environmental impact assessments.</p> <p>In addition, the AIIB Environmental and Social Framework requires that environmental and social risks and impacts of associated facilities<sup>7</sup> be identified and assessed in an environmental and social assessment.</p>	<p>implementation plan, also need to pay attention to the analysis of special affected groups (poverty, social and gender, ethnic minorities, involuntary resettlement).</p>	<p>project. Therefore, on the basis of the report form, the two sub-projects will also adopt more strict requirements of the AIIB to prepare an environmental and social impact assessment report. The scope of the assessment includes identified associated facilities in addition to project facilities.</p>
<p>Environmental and Social Management Plan</p>	<p>The AIIB requires Category A projects to prepare the ESMP, which must propose plans to manage and mitigate environmental and social risks and impacts, including: (1) Mitigation measures (2) Environmental and social monitoring and reporting requirements (3) institutional arrangements</p>	<p>No need to prepare a separate environmental management plan or any other environmental documents. According to the "Guidelines for Social Evaluation of Municipal Public Facilities Construction Projects" issued by the Ministry of Housing and Urban-Rural Development of the People's Republic of China, municipal construction projects need to conduct social analysis, prepare social management plans and implement monitoring and evaluation. According to the "Land Administration Law of the People's Republic of China" and the "Regulations on Compensation for Acquisition of Houses on State-Owned Land", if the acquisition of land and houses is involved, it is necessary to prepare a compensation and resettlement plan for land acquisition</p>	<p>Both consider environmental and social impacts of the project, pay attention to ethnic minorities, social and gender, involuntary resettlement, vulnerable groups, etc., The domestic requirement only require the development of a comprehensive social management plan, with the lack of special gender action plan (GAP), ethnic minority development plan (EMDP).</p>

<sup>7</sup> AIIB Environmental and Social Framework 2022 Para 35. Associated facilities are activities that are not included in the description of the Project set out in the Legal Agreements governing the Project, but which, following consultation with the Client, the Bank determines are: (a) directly and materially related to the Project; (b) carried out, or planned to be carried out, contemporaneously with the Project; and (c) necessary for the Project to be viable and would not be carried out if the Project did not exist.

			This project adopts stricter AIB requirements and incorporates the ESMP into the ESIA report.
Public Consultation	The AIB requires at least one meaningful consultation for all Category A , B, and C projects. The opinions of affected people and stakeholders will be solicited at all stages of project development. During the design, preparation and implementation of projects, comments received during project preparation and implementation shall be considered. Constant consultation mechanisms are required throughout the whole project lifecycle to disclose information and seek feedback. The results of the public consultation shall be recorded in the ES documents.	Domestically, the preparation of the "Environmental Impact Report" requires public consultation, and the preparation of the "Environmental Impact Report Form" and the "Environmental Impact Registration Form" do not require public consultation. The Ministry of Housing and Urban-Rural Development of the People's Republic of China "Guidelines for Social Evaluation of Municipal Public Facilities Construction Projects" stipulates that social evaluation should focus on public engagement, build an effective engagement mechanism for different stakeholders in the project, and analyze the degree of stakeholder engagement affected by the project, including participation in project preparation, decision-making, construction, operation management, and opportunities to share the results of the project and the opportunities created by the project, and shall pay special attention to the possibility and degree of participation of vulnerable groups. A participatory framework including sharing mechanisms, consultation mechanisms and engagement mechanisms to improve the effectiveness of stakeholder engagement shall be established. According to the State Council Order No. 713 "Regulations on Major Administrative Decision-Making Procedures", public engagement is required before major decisions are made.	According to the requirements of the AIB and domestic policies and regulations, public consultations have been carried out with stakeholders and affected groups, and the feedback obtained from the public consultations is finally reflected in the ESIA.

<p>GRM</p>	<p>The AIIB requires the establishment of a Grievance Redress Mechanism (GRM) for receiving, evaluating and facilitating for addressing arrangements caused concerns, complaints and grievances of affected people regarding the social and environmental performance of borrowers /clients in projects. GRM is important for development projects where adverse impacts or risks are occurring or expected. It also includes information on the AIIB 's Project-Affected Person's Mechanism (PPM), including how to access it, which must be included in project and subproject environmental and social documents and disseminated by the GRM.</p>	<p>The Interim Measures for Public Consultation on Environmental Impact Assessment (Ministry of Environmental Protection, 2006) clearly requires project proponents to provide a GRM for stakeholders to raise their concerns, comments or complaints during project preparation.</p> <p>During the project implementation phase, the National Construction Management Standard (Construction Safety Inspection Standard - JGJ59-2011) clearly requires the contractor to disclose the GRM at the project site, so that stakeholders affected by the project can raise complaints or concerns to the contractor.</p> <p>In addition to project-specific GRM, China has established a formal environmental petition system through which any citizen, legal person, or organization can lodge a petition with environmental departments at all levels through letters, emails, faxes, telephone calls, and personal visits.</p> <p>Also, there is the environmental complaint hotlines opened by the environmental protection department (such as 1 2369 hotline, 12369 WeChat platform and www.12360.gov.cn).</p> <p>Domestic guidelines point out that the project shall set up a special mechanism for accepting and handling grievances and complaints, and promptly publish the results of grievances and complaints. A grievance application can be submitted to the PMO, community organization, government department and other responsible agencies and project implementation and management personnel in non-written form, or a formal written grievance application can be submitted to the relevant responsible agency or department. According to the "Guiding Opinions on Further Optimizing Local Government Service Convenience Hotlines" issued by the General Office of the State Council, all localities have established a 12345 hotline social supervision</p>	<p>Consistent, to establish a formal GRM, has been included in this report.</p>
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		mechanism to accept various inquiries, help, complaints, reports, and suggestions from enterprises and the public.	
Information Disclosure	<p>The AIIB requires disclosure of project information to allow stakeholders to understand project risks and impacts, as well as potential opportunities.</p> <p>The client to post the draft ESIA, ESMPs, ESMPFs, resettlement plans, RPFs, Indigenous Peoples plans and IPPFs, or other approved forms of documentation, through its website, for Category A project 60 days and for Category B project 30 days , prior to Bank's approval.</p>	<p>Domestically, domestic environmental impact assessments are required to be disclosed on the website of the local Ecological Environment Bureau within a limited period of time.</p> <p>According to the Regulations on the Disclosure of Government Information of the People's Republic of China, the administration institution shall actively publicize the approval and implementation of major construction projects, as well as government information that involves the adjustment of public interests, needs to be widely awareness by the public, or requires public engagement in decision-making. In addition, the administration institution shall actively disclose government information related to municipal construction, public services, land acquisition, house acquisition, public security management, etc. The disclosure approaches include government bulletins, government websites or other Internet government media, press conferences, newspapers, radio, television, and other channels. The domestic guideline points out that during the project implementation process, the project design plan, resettlement plan, environmental assessment report, and social assessment report should be published on government information disclosure platforms (radio, television, website, etc.) to accept public supervision.</p>	<p>This report (Both Chinese and English version) must be published on the Yingkou Municipal People's Government related website for sixty (60) calendar days prior to consideration of the AIIB's financing for approval</p>

## 2.6 Applicable Standards for Environmental Impact Assessment

55. The AIB's Environmental and Social Framework (ESF) (revised in 2021) requires projects to comply with international good-practice pollution prevention technologies and practices, such as the Environmental Health and Safety Guidelines - General<sup>8</sup>(2017) of World Bank Group and other internationally recognized standards. Therefore, this project is aligned with standards that is stricter in the internationally recognized standards and domestic standards. The specific applicable standard values are as follows:

### 2.6.1 Environmental Quality Standards

#### (i) Ambient Air Quality Standards

56. Ambient Air Quality Standard (GB3095-2012) of China divides air quality into two categories. Class I standards apply to special areas such as nature reserves and environmentally sensitive areas, and Class II standards apply to all other areas, including urban and industrial areas. The location of this subproject belongs to the Class II ambient air quality functional area. The World Bank Group's Environmental Health Safety Guidelines are based on the Global Air Quality Guidelines of WHO<sup>9</sup>. The Global Air Quality Guidelines provide guidance on thresholds and limits for key air pollutants that compose health risks. In addition to the guideline values, Global Air Quality Guidelines of WHO also set out transitional targets aimed at facilitating a gradual shift from high concentrations to low concentrations. Table 2-3 compares the Class II standard of the "Ambient Air Quality Standards" (GB 3095-2012) with the WHO standards. The Class II standard limit of 24-hour SO<sub>2</sub> (0.15 mg/m<sup>3</sup>) in the "Ambient Air Quality Standards" (GB3095-2012) is higher than the upper limit of the World Bank Group's interim standard (0.125 mg/m<sup>3</sup>); while the Class II standard limit of 24-hour PM<sub>10</sub> (0.15 mg/m<sup>3</sup>) and PM<sub>2.5</sub> (0.075 mg/m<sup>3</sup>), the annual average NO<sub>2</sub> (0.04 mg/m<sup>3</sup>) and PM<sub>2.5</sub> (0.035 mg/m<sup>3</sup>) are respectively the same as the upper limit of the transition period standard of WHO. In general, domestic standards are highly equivalent to WHO guidelines or interim target values, so this project adopts the Class II standard of "Ambient Air Quality Standards" (GB3095-2012) on amendment sheet, and the 24-hour SO<sub>2</sub> adopts the WHO standard.

**Table 2-3 Comparison between GB 3095-2012 and WHO Global Air Quality Guidelines (unit: mg/m<sup>3</sup>)**

No.	Pollutants	Averaging Period	GB 3095-2012 (Class II)	WHO Global Air Quality Guidelines	
				Transition goals	Target
1	SO <sub>2</sub>	1 year	0.06	none	none
		24 hours	0.15	0.05-0.125	0.04
		1 hour	0.50	none	none
2	PM <sub>10</sub>	1 year	0.07	0.02-0.07	0.015
		24 hours	0.15	0.05-0.15	0.045
3	PM <sub>2.5</sub>	1 year	0.035	0.01-0.035	0.005
		24 hours	0.075	0.025-0.075	0.015
		1 hour	none	none	none
4	NO <sub>2</sub>	1 year	0.04	0.02-0.04	0.010
		24 hours	0.08	0.05-0.12	0.025
		1 hour	0.20	none	none
5	CO	24 hours	4.0	7.0	4.0
		1 hour	10.0	none	none
6	O <sub>3</sub>	Maximum average of 8 hours per day	0.16	0.12-0.16	0.10

<sup>8</sup>World Bank. (2017). Environmental, Health, and Safety Guidelines

<sup>9</sup>WHO. (2021). Global Air Quality Guidelines

No.	Pollutants	Averaging Period	GB 3095-2012 (Class II)	WHO Global Air Quality Guidelines	
				Transition goals	Target
		1 hour	0.20	none	none

## (ii) Environmental Quality Standards for Surface Water

57. The EHS guidelines of World Bank do not give reference standards for surface water quality. The surface water involved in this project is the Minxing River on the south side of the project. The main function of the surface water is the recreational water area where the human body does not directly contact, According to Yingkou City Water Environment Functional Zoning, executing the Class IV standard in the Environmental Quality Standards for Surface Water (GB3838-2002). The limit values for some of the indicators are presented in Table 2-4.

**Table 2-4 "Environmental Quality Standards for Surface Water" (GB3838-2002)**

No.	Item	Class IV standard
1	pH	6-9 (dimensionless)
2	Dissolved Oxygen	≥3 mg/L
3	COD	<30 mg/L
4	BOD <sub>5</sub>	<6 mg/L
5	Ammonia Nitrogen	<1.5 mg/L
6	Total Phosphorus	<0.4 mg/L
7	Total Nitrogen	<2.0 mg/L
8	Volatile Phenol	<0.01 mg/L
9	Petro	<0.5 mg/L
10	Fecal Coliforms	<20000 pcs/L

## (iii) Quality Standards for Marine Water

58. The marine water implements the Class III standard in the "Quality Standards for Marine Water" (GB 3097 - 1997), which is applicable to general industrial water areas and coastal scenic tourist areas.

**Table 2-5 Quality Standards for Marine Water (unit: mg/L)<sup>2</sup>**

No.	Item	Standard Limit	No.	Item	Standard Limit
1	Floating Matter	Oil slicks, foam and other floating matter must not appear on the marine surface	13	Mercury≤	0.0002
2	Color, Smell, Taste	The seawater must not have a different color, smell or odor	14	Cadmium≤	0.005
3	Suspended Matter	It is considered-d that the amount of increase is ≤ 100	15	Arsenic≤	0.030
4	Coliform Bacteria ≤ (Unit / L )	10000	16	Total Chromium≤	0.10
5	Fecal Coliform Group ≤ (Unit / L )	2000	17	Copper ≤	0.010
6	Pathogen	Shellfish farming water for human consumption must be free of pathogens	18	Zinc≤	0.050
7	Dissolved Oxygen	> 5	19	Selenium≤	0.020
8	COD≤	3	20	Hexavalent Chromium≤	0.010

9	BOD $\leq$	3	21	Volatile Phenol $\leq$ —	0.005
10	Inorganic Nitrogen $\leq$	0.30	22	Petroleum $\leq$	0.05
11	Anionic Surfactant (As LAS)	0.10	23	Nickel $\leq$	0.010
12	Sulfide $\leq$	0.05			

## (iv) Groundwater

59. The environmental quality standard for groundwater implements the Class III standard in the "Groundwater Quality Standard" (GB/T14848-2017), see Table 2-6.

**Table 2-6 Groundwater Quality Standard (unit: mg/L)**

No.	Item	Standard Limit	No.	Item	Standard Limit
1	pH (dimensionless)	6.5 ~ 8.5	16	Arsenic	$\leq 0.01$
2	Total Hardness (calculated as CaCO <sub>3</sub> )	$\leq 450$	17	Cadmium	$\leq 0.005$
3	Total Dissolved Solids	$\leq 1000$	18	Hexavalent Chromium	$\leq 0.05$
4	Sulfate	$\leq 250$	19	Lead	$\leq 0.01$
5	Chloride	$\leq 250$	20	Copper	$\leq 1.0$
6	Nitrite Nitrogen	$\leq 1.0$	21	Zinc	$\leq 1.0$
7	Nitrate (As N)	$\leq 20$	22	Aluminum	0.2
8	Sodium	$\leq 200$	23	Manganese	0.1
9	Oxygen Consumption (Cod <sub>Mn</sub> Method, Calculated As O <sub>2</sub> )	$\leq 3.0$	24	Iron	0.3
10	Volatile Phenols (Calculated As Phenol)	$\leq 0.002$	25	Total Number Of Colonies	100
11	Cyanide	$\leq 0.05$	26	Total Coliforms	3.0
12	Fluoride	$\leq 1.0$			
13	Sulfide	$\leq 0.02$			
14	Ammonia Nitrogen	$\leq 0.5$ _			
15	Hg	$\leq 0.001$			

## (v) Soil standard

60. The soil environment quality standard for construction land within the evaluation scope shall implement the screening value standard for the Category II of land in the "Soil Environmental Quality-Standards for Soil Pollution Risk Management and Control of Construction Lands" (GB36600-2018).

**Table 2-7 Screening Value and Control Value of Soil Pollution Risks for Construction Land (unit: mg/kg)**

No.	Pollutant Item	CAS number	Screening Value		Control Value	
			Category I Land	Category II Land	Category I Land	Category II Land
Heavy Metals and Inorganics						
1	Arsenic	7440-38-2	20 ①	60 ①	120	140
2	Cadmium	7440-43-9	20	65	47	172
3	Chromium (Hexavalent)	18540-29-9	3.0	5.7	30	78

4	Copper	7440-50-8	2000	18000	8000	36000
5	Lead	7439-92-1	400	800	800	2500
6	Hg	7439-97-6	8	38	33	82
7	Nickel	7440-02-0	150	900	600	2000
Volatile Organic Compounds						
8	Carbon Tetrachloride	56-23-5	0.9	2.8	9	36
9	Chloroform	67-66-3	0.3	0.9	5	10
10	Chloromethane	74-87-3	12	37	31	120
11	1,1-Dichloroethane	75-34-3	3	9	20	100
12	1,2-Dichloroethane	107-06-2	0.52	5	6	twenty one
13	1,1-Dichloroethene	75-34-4	13	66	40	200
14	Cis-1,2-Dichloroethene	156-59-2	66	596	200	2000
15	Trans-1,2-Dichloroethene	156-60-5	10	54	31	163
16	Dichloromethane	75-09-2	94	616	300	2000
17	1,2-Dichloropropane	78-87-5	1	5	5	47
18	1,1,1,2-Tetrachloroethane	630-20-6	2.6	10	26	100
19	1,1,2,2-Tetrachloroethane	79-34-5	1.6	6.8	14	50
20	Tetrachlorethylene	127-18-4	11	53	34	183
21	1,1,1-Trichloroethane	71-55-6	701	840	840	840
22	1,1,2-Trichloroethane	79-00-5	0.6	2.8	5	15
23	Trichlorethylene	79-01-6	0.7	2.8	7	20
24	1,2,3-Trichloropropane	96-18-4	0.05	0.5	0.5	5
25	Vinyl Chloride	75-01-4	0.12	0.43	1.2	4.3
26	Benzene	71-43-2	1	4	10	40
27	Chlorobenzene	108-90-7	68	270	200	1000
28	1,2-Dichlorobenzene	95-50-1	560	560	560	560
29	1,4-Dichlorobenzene	106-46-7	5.6	20	56	200
30	Ethylbenzene	100-41-4	7.2	28	72	280
31	Styrene	100-42-5	1290	1290	1290	1290
32	Toluene	108-88-3	1200	1200	1200	1200
33	M-Xylene + P-Xylene	108-38-3, 106-42-3	163	570	500	570
34	O-Xylene	95-47-6	222	640	640	640
Semi-Volatile Organic Compounds						
35	Nitrobenzene	98-95-3	34	76	190	760
36	Aniline	62-53-3	92	260	211	663
37	2-Chlorophenol	95-57-8	250	2256	500	4500
38	Benz[A] Anthracene	56-55-3	5.5	15	55	151
39	Benzo[A] Pyrene	50-32-8	0.55	1.5	5.5	15
40	Benzo[B] Fluoranthene	205-99-2	5.5	15	55	151
41	Benzo[K] Fluoranthene	207-08-9	55	151	550	1500
42	The	218-01-9	490	1293	4900	12900
43	Dibenzo[A,H] Anthracene	53-70-3	0.55	1.5	5.5	15
44	Indeno [1,2,3-Cd] Pyrene	193-39-5	5.5	15	55	151
45	Naphthalene	91-20-3	25	70	255	700
46	Petroleum Hydrocarbon	-	826	4500	5000	9000
① Note: The land plot which the detected content of pollutants in the soil of a specific plot exceeds the screening value, but is equal to or lower than the background value of the soil environment (see " Soil Environmental Quality-Standards for Soil Pollution Risk Management and Control of Construction Lands (Interim)" (GB36600-2018) 3.6) shall be not incorporated into the polluted land management. The background value of soil environment refers to Appendix A of " Soil Environmental Quality-Standards for Soil Pollution Risk Management and Control of Construction Lands (Interim)" (GB36600-2018) 3.6).						

**(vi) Acoustic environment quality standard**

61. Comparing the standards of each functional area with the EHS guidelines of the World Bank Group listed in Table 2-8, the noise standard value of Class I area in the Environmental Quality Standard for Acoustics (GB 3096-2008) is the same as the EHS guidelines of the World Bank Group. For industrial areas and the areas on both sides of the main road, the domestic standards are stricter than the World Bank Group standards.

Therefore, the area where the project is located is an industrial area, which implements the Class III standard of "Environmental Quality Standards for Acoustics" (GB 3096-2008). Class IV acoustic functional areas are classified according to the "Technical Standards for Classification of Acoustic Environmental Functional Areas" (GB/T15190-2014), the adjacent areas of the road project and railway project are Class III acoustic environmental functional areas, and the distance is within 20 m  $\pm$  5 m. The area is a Class IV sound functional area, which implements a and IV-b standards respectively.

**Table 2-8 Environmental Quality Standards for Acoustic (Equivalent Sound Level: LAeq: dB)**

Noise Function Zone Category	Applicable area	GB 3096-2008		World Bank Group EHS Standards	
		During the Day	At Night	During the Day	At Night
0	Areas requiring extreme quietness, such as wellness areas	50	40	55	45
1	Areas mainly used for residential, cultural and educational institutions	55	45		
2	Mixed residential, commercial and industrial area	60	50		
3	Industrial area	65	55	70	70
4a	Areas on both sides of the urban main road	70	55		
4b	Areas on both sides of the main railway line	70	60		

## 2.6.2 Pollutant Emission Standards

### (i) Air Pollutant Emission Standards

62. The exhaust gas emission in the construction period and operation period shall implement relevant standards in the "Comprehensive Emission Standards of Air Pollutants"(GB16294-1996); the dust emission in the construction period shall implement relevant standards in the "Dust Emission Standards for Construction and Stacking Sites of Liaoning Province" (DB21/2642-2016).

**Table 2-9 "Comprehensive Emission Standard of Air Pollutants" (GB16294-1996) Unit: mg/m<sup>3</sup>**

Pollution Factor	Sulfur Dioxide	Nitrogen Oxides	Particulates
Standard Limit	0.12	0.4	1.0
Remark	Fugitive emission monitoring concentration limit		

**Table 2-10 "Dust Emission Standards for Construction and Stockpiling Sites in Liaoning Province" (DB21/2642-2016) Unit: m g/m<sup>3</sup>**

Item	Area	Concentration Limit
Particulates	According to Urban Areas	0.8

### (ii) Noise Emission Standards

63. The noise emission during the construction period of the project shall comply with the relevant standards of the "Environmental Noise Emission Standards at the Boundary of Construction Sites" (GB12523-2011); the noise emission during the operation period shall comply with the Class I standards of the "Environmental Noise Emission Standards at the Boundary of Industrial Enterprises" (GB12348-2008). In addition, the World Bank EHS guidelines require that the background noise increase from the nearest receiving point outside the site should not exceed 3 dB.

**Table 2-11 "Environmental Noise Emission Limits at Construction Site Boundary" (GB12523-2011)**

Category	During the Day	At Night
Standard Limit: dB(A)	70	55

**Table 2-12 "Environmental Noise Emission Standards at the Boundary of Industrial Enterprises" (GB12348-2008)**

Category	During the Day	At Night
Standard Limit: dB(A)	55	45

## (iii) Sewage Discharge Standards

64. Sewage discharge from construction sites shall comply with China's "Comprehensive Sewage Discharge Standard" (GB 8978-1996). The Class I standard applies to discharges discharged into Category III water bodies under GB 3838-2002. The Class II standard applies to discharge into the Category IV and Category V water bodies. The Class III standard applies to municipal sewer discharges that enter municipal sewage treatment plants for secondary treatment. The domestic sewage during the construction period relies on the existing municipal sewage treatment facilities, and the sewage discharge at the construction site implements the Class III standard.

**Table 2-13 Integrated Wastewater Discharge Standards (GB8978-1996)**

Parameter	Class I	Class II	Class III
	Suitable for discharge into Category III water bodies	Suitable for discharge into Category IV and Category V water bodies	For discharge to municipal sewer
pH	6-9		
SS mg/L	70	150	400
BOD <sub>5</sub> mg/L	20	30	300
COD mg/L	100	150	500
Volatile phenol mg/L	0.5	0.5	2.0
NH <sub>3</sub> -N mg/L	15	25	---
LAS (= anionic surfactant) mg/L	5.0	10	

## (iv) Solid waste

65. For general industrial solid waste, the relevant requirements in the Standards for Pollution Control of General Industrial Solid Waste Storage and Landfill (GB18599-20 20) shall be followed.

## (v) Vibration

66. The vibration generated during the operation of construction machinery and roads and railways shall implement the "Urban Regional Environmental Vibration Standards".

**Table 2-14 Standard values of vertical Z-level vibration in various areas of cities**

Applicable Area	Daytime (dB)	Night (dB)
Special residential area	65	65
Residential area, cultural and educational area	70	67
Mixed area, central business district	75	72
Industrial Zone	75	72
Both sides of traffic arterial roads (both sides of roads with a traffic flow of more than 100 vehicles per hour)	75	72
Both sides of the main railway line ( the residential area on both sides of the outer rail of the railway with a daily traffic flow of no less than 20 trains 30 m away)	80	80

## 3 Project Description

### 3.1 Project Background

67. The national logistics hub is the physical infrastructure at the highest level of trade logistics network system in China. It is not only an industrial operation platform and service center for operation and regional radiation of logistics channels internationally and domestically, but also the core carrier of domestic trade development. The land port hub has outstanding advantages in enhancing the accessibility of the port hinterland and strengthening cross-border trade, playing an important role in optimizing the industrial layout, enhancing the competitiveness of the regional economy, realizing transforming and upgrading of the economic structure, and accelerating optimization of the industrial structure.

68. As the only port logistics hub in Northeast China, Yingkou City is located at the land-sea junction of the China-Mongolia-Russia Economic Corridor along the "Belt and Road Initiative" (BRI). It is the core center for the land-sea combined transportation connecting to the China-Europe Railway Express and contributes to establishing the international logistics center in Northeast Asia with innovative means. Yingkou dry port hub with its industrial park is playing a key role in opening trade in Northeast China and developing the new pattern of "dual cycle". The trade logistics and industrial development of the hub is very important to China's development.

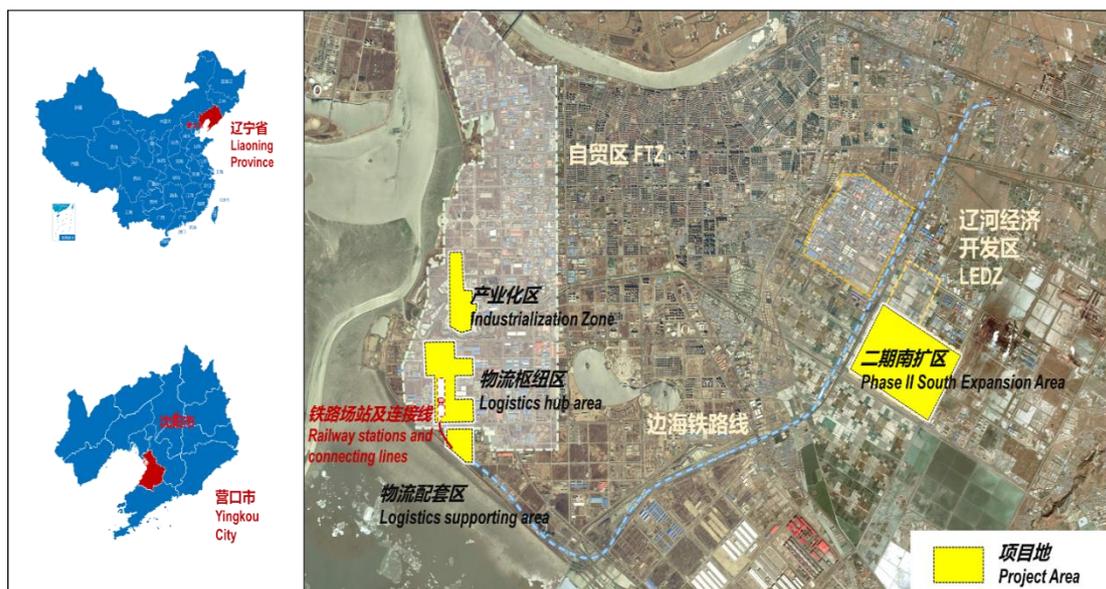
69. The project will improve the main functions of the Yingkou dry port hub and key industrial parks by supporting coordinated development of "twin engines" (the logistics and industries) and accelerating the construction of Yingkou regional international trade center and advanced manufacturing base. With the land port hub, we accelerate the international cross-border interconnection in Liaoning, help build the Northeast Sea and Land Channel, connect Southeast Asia, Japan, South Korea, Russia, Mongolia, and Europe, thereby realizing diversified trade commodities and methods and promoting industrial agglomeration and structural upgrading. The project is supportive to the BRI with the domestic cycle as the main body and the new development pattern of domestic and international dual cycles promoting each other; the project will also provide a demonstration for the green, low-carbon, smart, efficient, and sustainable development of the regional economy, and then promote the overall revitalization of Yingkou's economy with high quality development and boost the revitalization of Northeast China.

70. The construction content of the project includes two subprojects:

- (i) **Free trade zone dry port hub and industrial park subproject:** the construction content includes a 1.73 km railway line located in the logistics hub area of the free trade zone, railway stations, and a high-standard smart warehouse of 18,000 m<sup>2</sup>, a 20472 m<sup>2</sup>, freight yard and a supporting municipal road; an international express center of 11,000 m<sup>2</sup> in the logistics supporting area, a cloud warehouse of 11,000 m<sup>2</sup>, and a green standardized building in the industrialization zone of 9,200 m<sup>2</sup> and 5 municipal roads in the free trade zone.
- (ii) **Yingkou Liaohe Development Zone (Phase II) South Expansion Area Park Infrastructure Construction Subproject:** The construction covers 12 roads including Planning No.6 Road and Jiachen Avenue. The total length of the road is about 22.67km. The project will complete the road engineering, traffic works, water supply and drainage, gas engineering, communication, lighting, landscaping, sponge special project and smart infrastructures in the area, etc.

71. The construction period of the project is from January 2024 to December 2028. The total investment in the project is approximately 2.63 billion RMB, with a loan of 200 million USD from the Asian Infrastructure Investment Bank, equivalent to around 1.45 billion RMB,

and counterpart funds of 1.18 billion RMB.



Source: FSR, 2024, January

**Figure 3-1 Project construction site**

72. See Chapter 3.2 and Chapter 3.3 for the specific construction plan of each subproject.

### **3.2 Subproject 1: Free Trade Zone Land Port Hub and Industrial Park Subproject**

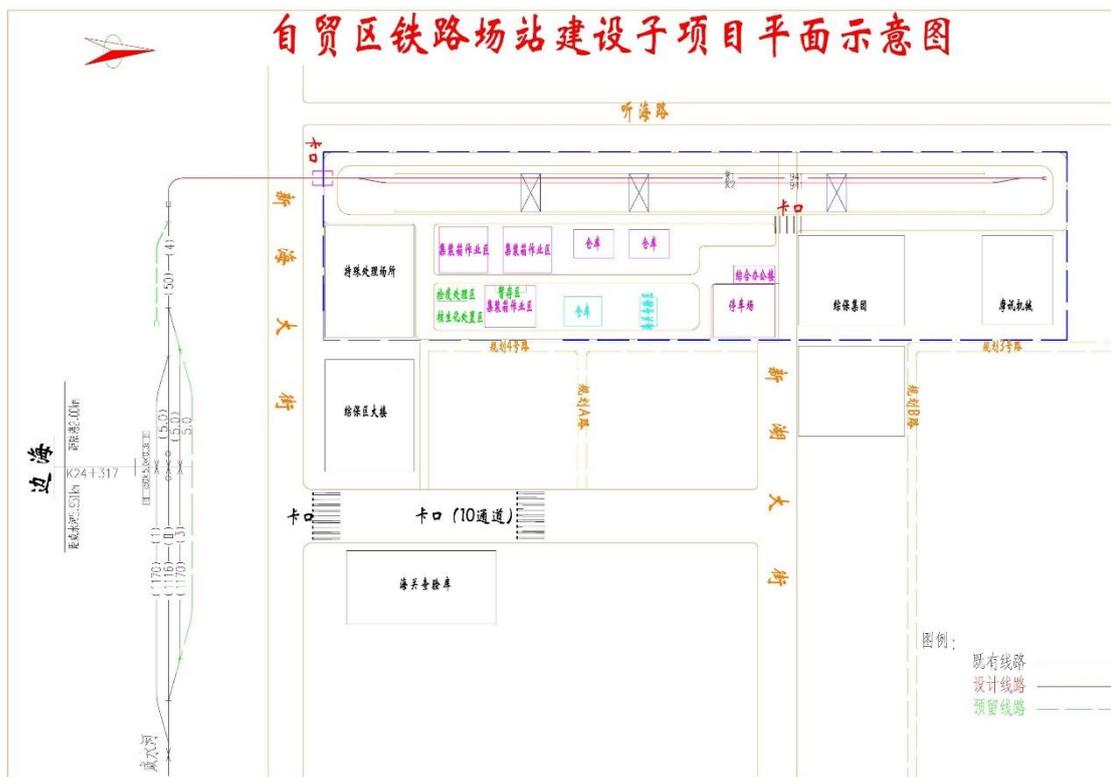
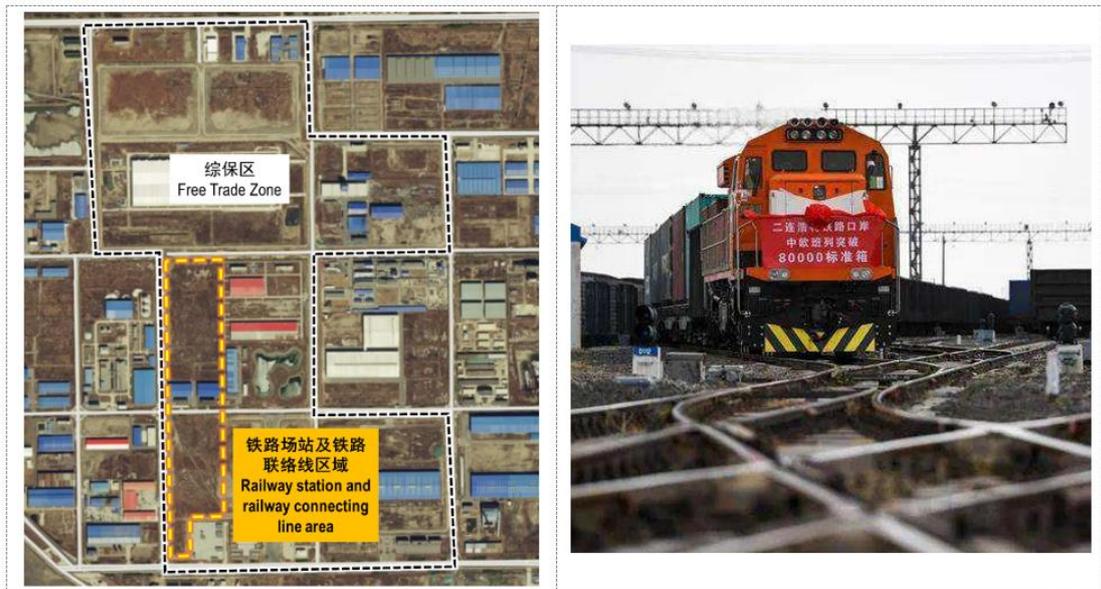
73. Subproject 1 is "FTZ Land Port Hub and Industrial Park Subproject". The EA of this subproject is the Yingkou Area Management Committee of China (Liaoning) Pilot FTZ, and the PIU is Yingkou FTZ Construction and Development Co., Ltd.

#### **3.2.1 FTZ railway station sub-project**

74. The railway station subproject of the FTZ is in Yingkou City in the south of Liaoning Province. It is on the south of Xinlian Street, north of Xinhai Street, between Tinghai Road and Jinghai Road. The subproject mainly includes the construction of the "last mile" railway into the comprehensive bonded area project, and the dry port station in the comprehensive bonded area for the improved functions of railway loading and unloading. The newly-built line is drawn from the west of Bianhai Station on the Bianhai Line, about 400m along the sea embankment and then turns north, and enters the comprehensive bonded area after connecting with Xinhai Street in the west of the sewage treatment plant. The newly-built line is 1.73km long. A safety line with an effective length of 50m is established in the junction. The investment of the railway subproject is about 43,312,070,000 yuan. Additionally, the investment in the related transformation project of Xianshui River Station is 677,700 yuan, and the investment in the long-term Xinhai Avenue leveling and construction project is 48,480,700 yuan.

75. The railway station construction subproject in the comprehensive bonded area includes a land port station in the comprehensive bonded area. In the station, there are loading and unloading area for railway containers and railway containers and the customs supervision operation area. Among them, there are 2 lines in the loading and unloading area for railway containers, with an effective length of 941m and 3 gantry cranes. The customs supervision and inspection area include a container storage area, a general warehouse, a customs inspection area and a reserved unloading area, equipped with relevant machines and equipment. The customs office and office buildings for production personnel houses are established. A ring road is established in the loading and unloading yard, surrounded by closed fences and monitoring facilities, with a railway entry and exit

bayonet and an automobile entrance and exit bayonet set up.



Source: FSR, 2024, January

**Figure 3-2 Schematic diagram of the location and layout of the railway connection line, stations, loading and unloading yards**

76. The average width of roads in the site is 15 m, and the width of auxiliary roads is 7m. Circular fire lanes are established within the project area, and the fire lanes are greater than 4m, so as to meet fire safety standards.

77. In the near future, the railway and Xinhai Street will be connected with the level crossing with the width of 25 m. With the increasing railway traffic volume and highway traffic volume, the level crossing will be changed if properly. In the long-term, Xinhai Street

public-rail interchange will be connected by the scheme that the railway across over the highway. The total length of the road is 630m. The west side of the existing Xinhai Street is the starting point of the designed road, 55 m from the existing T-shaped crossing. From the cross to K0+37 is the upper slope, and after that comes the down slope. The design end point of the road is 65 m away from the existing T-shaped crossing on the east side. It is proposed that the main line of the upper-span railway adopts two-way four-lane lanes with the width of 3.5 m. Auxiliary roads are set up on both sides, and each side of the auxiliary road is single-lane, and some auxiliary roads need to be widened on the basis of existing roads.

### **3.2.1.1 Railway engineering**

#### **(i) Station**

78. The reconstruction of Bianhai Station maintains the existing horizontal arrangement. In principle, the main line and arrival-departure line of the reconstructed station will remain unchanged, and the effective length of the existing arrival-departure line at Bianhai Station will maintain the status quo (1050m). The station maintains the existing line spacing. New branch lines and section pipelines shall be connected to the arrival and departure lines in the station; newly built connection lines shall be connected to the arrival and departure lines in the station, and safety lines shall be established at the junction. The newly installed signal machine adopts the lens type colored light signal machine, and the signal machine of the trains such as the main line going out of the station in principle adopts the high column aluminum alloy structure signal machine, and the other signal machines use low type.

#### **(ii) Station line track**

79. The station line adopts 50kg/m 25m long standard rail. The joints shall be butt jointed, the rail joint bolts shall be high-strength joint bolts of grade 10.9, the nuts shall be high-strength nuts of grade 10, and the washers shall be high-strength flat washers.

80. The station line adopts the new type II reinforced concrete sleeper, 1520 per km. The fastener adopts type I elastic fastener and rubber backing plate.

81. The width of the track bed top surface of the station line or the curved section with a radius of over 400m is 2.9m, and the curved section with a radius of 400m or less is 3.0m.

82. The station line adopts double-layer crushed stone ballast bed. The thickness of the ballast bed is 35cm, the surface layer is 20cm and the bottom layer is 15cm. Both surface ballast and bottom ballast are made of first-grade gravel ballast. The quality should meet the requirements of "Railway Crushed Stone Ballast"(TB/T2140) and "Railway Crushed Stone Ballast" (TB/T2897).

83. The slope of the ballast bed is 1:1.5. The bottom ballast to the side slope toe should be 0.15m from the ballast bed side slope toe, and the bottom ballast top width should be 2.3m.

84. 50kg/m No.9 concrete sleeper turnouts are adopted for Bianhai station and loading and unloading yard turnouts.

85. For sections where the curve radius of the special line is less than 350m, double-strengthening equipment of gauge rods and rail braces shall be installed, with 10 gauge rods for every 25m of rail and 14 pairs of rail braces for every 25m of rail.

86. The type of newly built special line is single line, and the height of soil embankment and soil cutting track is 0.717 meters.

#### **(iii) Main track**

87. The special line adopts 50kg/m 25m long standard rail. The joints shall be butt jointed, the rail joint bolts shall be high-strength joint bolts of grade 10.9, the nuts shall be high-

strength nuts of grade 10, and the washers shall be high-strength flat washers. New type II reinforced concrete sleepers are used, 1520 per km. The fastener adopts type I elastic fastener and rubber backing plate.

88. The running line of the special line adopts double-layer crushed stone ballast bed with a thickness of 35cm, of which the thickness of the surface layer is 20 cm and the thickness of the bottom layer is 15 cm. Both surface ballast and bottom ballast are made of first-grade gravel ballast.

89. The width of the track bed top surface of the station line or the curved section with a radius of more than 400m is 2.9m, and the curved section with a radius of 400m or less is 3.0m.

90. The slope of the ballast bed is 1:1.5. The bottom ballast side slope toe should be 0.15m from the ballast bed side slope toe, and the bottom ballast top width shall be 2.3m.

91. For sections where the curve radius of the special line is less than 350m, double-strengthening equipment of gauge rods and rail braces shall be installed, with 10 gauge rods for every 25m of rail and 14 pairs of rail braces for every 25m of rail.

(iv) Subgrade

92. The length of the new line of this project is 1.73 km, all of which are subgrade sections, with a filling volume of 5,096 m<sup>3</sup> and an excavation volume of 72,244 m<sup>3</sup>, volume of earthwork is 77,340 m<sup>3</sup>.

(v) Transition section

93. A transition section is set at the connection between the embankment and the abutment, and the transition section adopts an inverted trapezoid. Embankment and horizontal structures are provided with transitional sections.

94. At the connection between the embankment and the hard rock cutting, steps are set longitudinally along the original ground on the side of the cutting, with a width of 0.6m, and a transition section is set on the side of the embankment.

(vi) Bridges and culverts

95. For the new construction of the railway station construction subproject in the FTZ, the mileage range of the new line is CK0+000 ~ CK1+729.10.

96. A new drainage round culvert is newly built at CK0+300 of the new project of the railway station construction subproject in the Free Trade Zone. The design adopts a 1-1.0m round culvert with a total length of 15m. 2 new frame protective culverts: 1 newly built frame protective culvert at CK0+545, there are rainwater, sewage, water supply, reclaimed water and heat pipelines on the small mileage side of the level crossing. The frame protective culvert has a net width of 5m and a total length of 20m; There is a new frame protective culvert at CK0+590. There are rainwater, sewage, water supply, reclaimed water, gas, power and communication pipelines on the large mileage side of the level crossing; the frame protective culvert has a net width of 6m and a total length of 20m.

### 3.2.1.2 Construction plan

(i) List of main buildings (Structures)

**Table 3-1 Proposed Buildings for Railway Stations in the FTZ**

No.	No.	1	
	Site name	Dry port station	
	House name	Building	m <sup>2</sup>
1	Office Complex	1	1,200
2	Warehouse 1	2	1,700
3	Warehouse 2	1	1,300
4	Customs inspection library	1	670
5	Crossing room	1	20
	Total	6	6,590

Source: FSR, 2023, November

**Table 3-2 Proposed structures of the railway station in the FTZ**

No.	Structure name	Dry port station
1	Parking lot	3,340 m <sup>2</sup>
2	Inner road	47,650 m <sup>2</sup>
3	Field hard pavement	17,100 m <sup>2</sup>
4	Wrought iron fence	2,670m
5	Locomotive inspection pits (2)	54m
6	Hard pavement around locomotive inspection pit	420 m <sup>2</sup>
7	Railway bayonet gantry	1
8	Car checkpoint shed	1,120 m <sup>2</sup>
9	container hardened surface	70,080 m <sup>2</sup>
10	Truck Scale foundation	4
11	Rail Scale foundation	1
12	AEI Vehicle Number foundation	1
13	Gantry crane walking track foundation	1,862 m
14	Communication Gantry foundation	1
15	12m monitoring pole foundation	15

Source: FSR, 2023, November

(ii) Architectural Design Features

97. Building duration: 50 years. The fire resistance rating of the logistics distribution center building is Class I, and the rest are Class II.

98. The bottom of the exterior wall is made of 1.2m high and 370 thick MU15 non-clay sintered ordinary bricks, and the upper part is made of 100mm thick rock wool sandwich panels for thermal insulation. The inner partition wall is built with 240mm thick sintered fly ash solid brick and Mb7.5 mixed mortar.

99. The roof of the steel structure house is designed to be waterproof grade II, and the roof panel is made of rock wool sandwich panel roof. The waterproof grade of the rest of the houses is Class II, and the waterproof layer adopts SBS modified bitumen waterproof membrane.

100. The roof and exterior walls adopt a flame-retardant insulation layer (the general combustion performance is not lower than B1 level, and the logistics distribution center is A level).

### 3.2.2 FTZ building facilities and municipal infrastructure project

101. The group of projects aims to expand the development space for the FTZ and build supporting service facilities, mainly including logistics hub areas, industrial areas and warehouses in logistics supporting areas (see Table 3-3 for main technical and economic indicators) and municipal infrastructure construction. The total investment in the FTZ construction and municipal projects is approximately 851.57 million yuan. This includes a total investment of 602.22 million yuan for the construction projects and a total investment of 249.3476 million yuan for the municipal projects.

**Table 3-3 Economic and technical indicators of construction facilities in the free trade zone**

High standard smart warehouse plot					
No.	Item		Unit	Quantity	Remark
1	Planning land area		m <sup>2</sup>	24444	
2	Total surface area		m <sup>2</sup>	18000	
3	Building height		m	10	
4	Building density		%	58.08%	
5	Volume rate			1.47	
6	Green space rate		%	19%	
7	Motor Vehicle Parking Space			56	Among them, there are 38 parking lots for trucks and 18 parking lots for cars.
Freight yard storage area					
No.	Project name		Unit	Quantity	Remark
1	Planning land area		m <sup>2</sup>	20473	
2	Of which	Yard area	m <sup>2</sup>	8184.96	A four-story stockyard, of which approximately 1,300 square meters are equipped with refrigerated container electrical equipment, including diesel generators and outdoor box-type substation
		Road parking area	m	8656.17	
		Green space area	m <sup>2</sup>	3631.87	
3	Green space rate		%	18%	
Standardized factory building plot in the industrialization zone					
No.	Project name		Unit	Quantity	Remark
1	Planning land area		m <sup>2</sup>	40940	

2	Total floor area	m <sup>2</sup>	9200	
3	Building height	m	9	
4	Building density	%	22.47%	
5	Volume rate		0.45	
6	Motor Vehicle Parking Space		29	Among them, there are 20 parking lots for trucks and 9 parking lots for cars.
International Express Center Plot				
No.	Project name	Unit	Quantity	Remark
1	Planning land area	m <sup>2</sup>	33521	
2	Total surface area	m <sup>2</sup>	11000	
3	Building height	m	10	
4	Building density	%	29.09%	
5	Volume rate	0.67	0.58	
6	Green space rate	%	30%	
7	Motor Vehicle Parking Space	No.	46	46 parking lots for trucks
Cloud warehouse plot				
No.	Project name	Unit	Quantity	Remark
1	Planning land area	m <sup>2</sup>	30310	
2	Total surface area	m <sup>2</sup>	11000	
3	Building height	m	10	
4	Building density	%	32.17%	
5	Volume rate	0.67	0.64	
6	Green space rate	%	25%	
7	Motor Vehicle Parking Space	individual	44	44 parking lots for trucks

Source: FSR, 2024, January

(i) Logistics hub area

102. Building facilities. The land area of the high-standard smart warehouse project is about 24,444 m<sup>2</sup> and the total construction area is about 18,000 m<sup>2</sup>. The project is divided into two independent warehouses, one is a three-dimensional warehouse with an area of 11,000 m<sup>2</sup>, and the other is a three-dimensional warehouse design with a construction area of 7,000 square meters and intelligent logistics equipment. The net height of the warehouse is 10m, with a high platform to facilitate the delivery of goods. The primary purpose of the warehouse is to store fast-moving consumer goods for cross-border e-commerce. It does not involve the storage of hazardous items or materials.

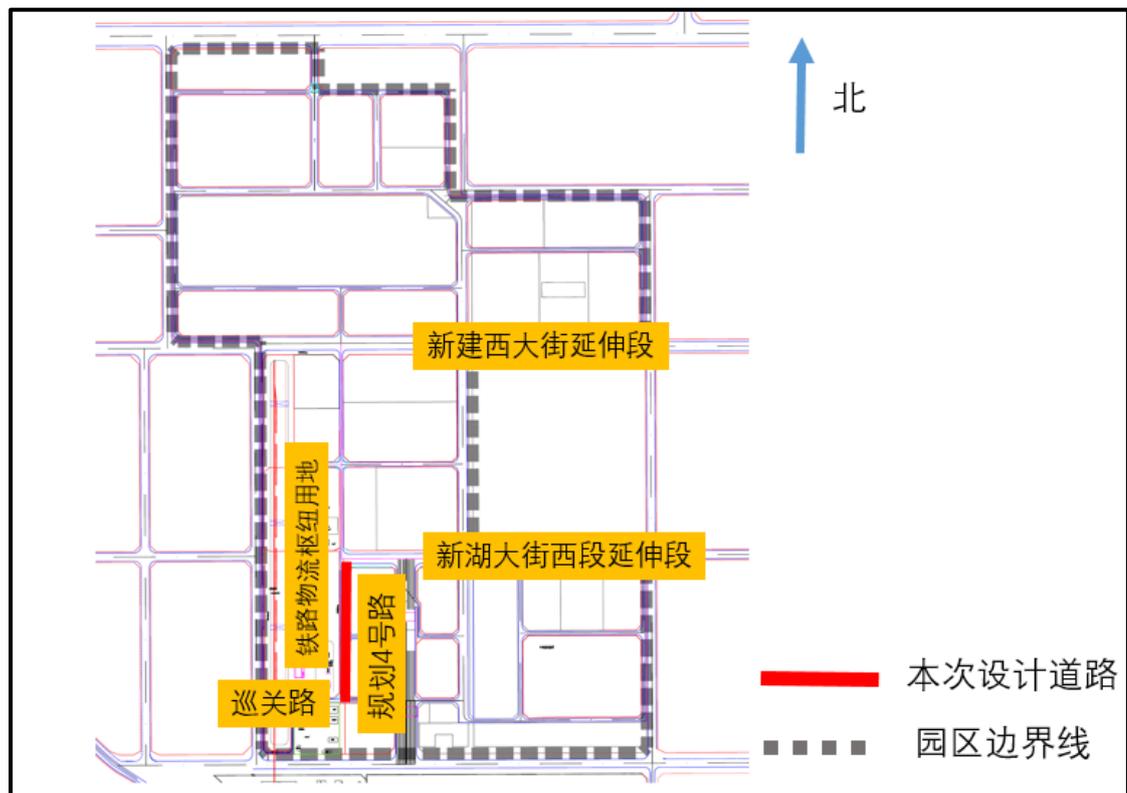
103. The land area of the freight yard subproject is about 20,472 m<sup>2</sup>. It is a four-story yard, with two reach stackers designed. The capacity for the second row on the south side will be changed to a refrigerated container stacking site later. A backup power source and an outdoor diesel generator are considered for refrigerated containers. The project office rooms, service rooms, equipment rooms, communication rooms, water pump rooms, fire control room, power transformation and distribution rooms are designed together with the design of high-standard smart warehouses.

104. Road works. In order to further improve the traffic network in the park, the project will

build a branch road, i.e., the Planning No.4 road. The road is 420m long, the red line is 24m wide. The width of the side green belts is totally 3m.

105.Stormwater works. It is planned that the rainwater from Planning No.4 Road will be discharged from south to north into the west section expansion of Xinhu Street, with DN800. Rainwater branch pipes are reserved within the plot, and the diameter of the reserved branch pipes is DN600. The total length of new rainwater pipes for the project is about 350m (Excluding reserved branch pipes), and the pipe diameter is DN800.

106.It is planned that there will be no sewage pipes under Planning No.4 Road, and the sewage in the surrounding plots will be discharged into the existing sewage pipes of the newly-built West Street expansion, Xinhai Street, and Xunguan Road.



Source: FSR, 2024, January

**Figure 3-3 Schematic diagram of the location and construction content of the logistics hub area**

## (ii) Industrialization zone

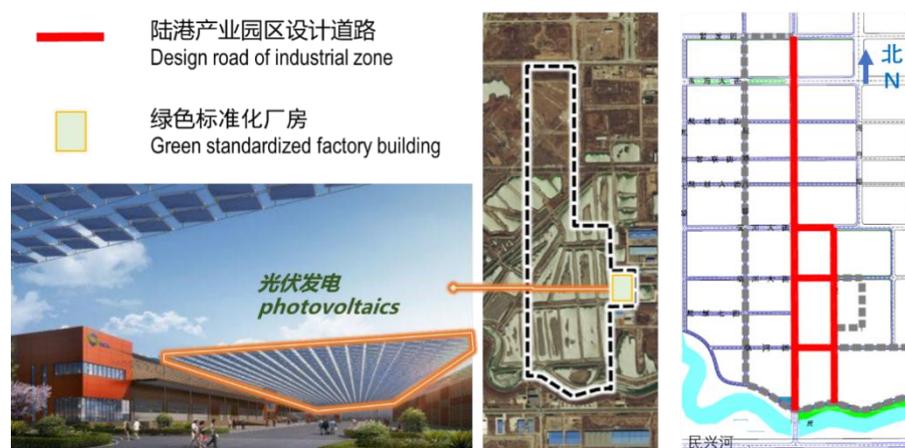
**107. Construction works.** The industrialization zone includes a green standardized factory building according to the requirements of one-star green building, equipped with a photovoltaic power generation system. In the design, there are two 20-ton cranes to meet the production requirements of mechanical processing and equipment manufacturing in the future. The land area of the project is about 40,940 m<sup>2</sup>, the total floor area is about 9,200 m<sup>2</sup>, and the building height is about 9 m.

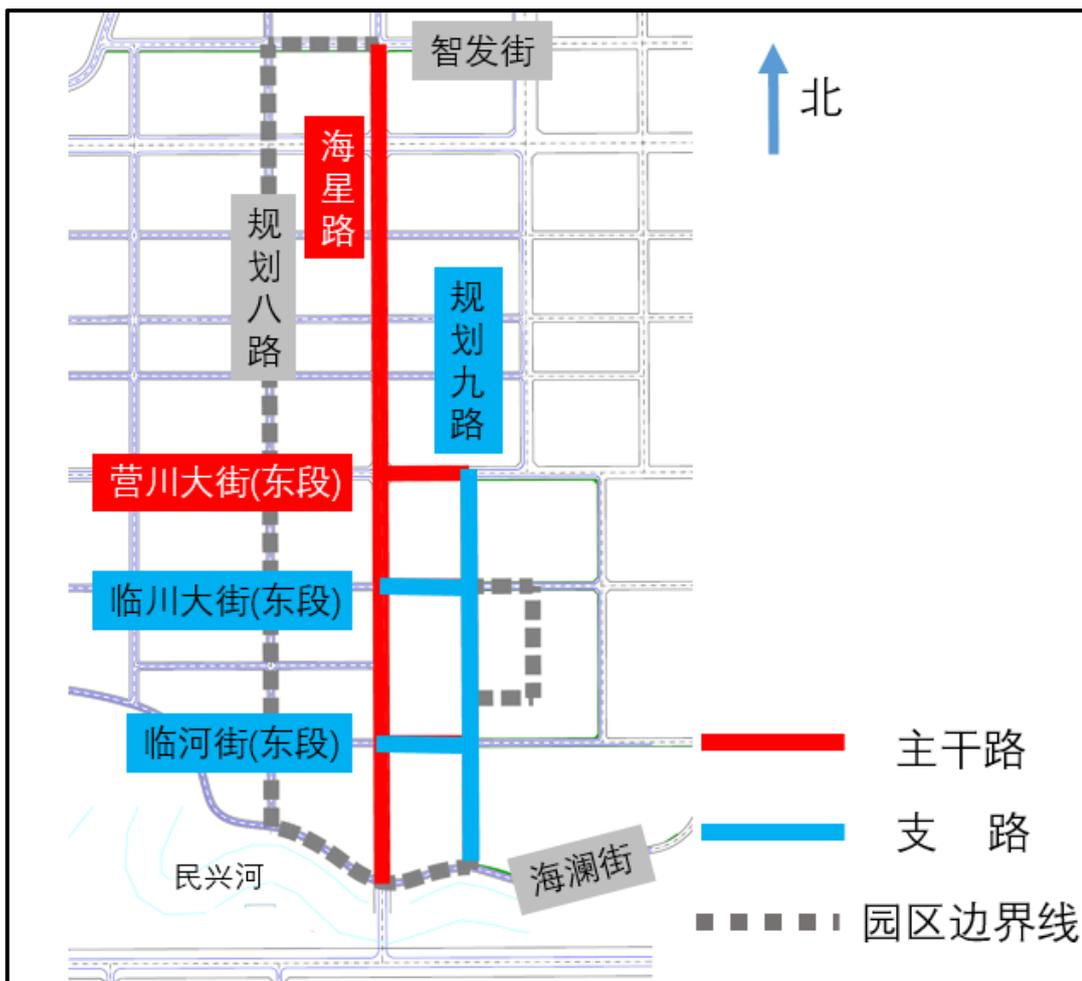
**108. Road works.** The industrialization zone will also build 5 municipal roads, of which Haixing Road and Yingchuan Street (East Section) are the main roads, and Planning No.9 Road, Linchuan Street (East Section) and Linhe Street (East Section) are branch roads. Haixing Road and Yingchuan Street (East Street) constitute the backbone of the road network in the park, and other branch roads will improve the service functions. According to the design of the road section and the landscaping design, the sponge special design of the project adopts various measures such as permeable pavement, concave green area and grass planting ditch, among which the permeable pavement rate of sidewalks is 100%, and the concave green space rate(including outside the red line protective green space)is 21.6% (including grass planting ditch).

**Table 3-4 Main indicators of roads to be built in industrialized areas**

Road name	Grade	Starting and Ending point	Length m	Red line width m	Road construction area m <sup>2</sup>
Haixing Road	Trunk road	(Zhifa Street ~ Hailan Street)	2135	40	85,400
Planning No.9 Road	Branch road	(Yingchuan Street ~ Hailan Street)	1000	20	20,000
Yingchuan Street (East Section)	Trunk road	(Haixing Road ~ Jihuaaji Road)	224	32	7,168
Linchuan Street (East section)	Branch road	(Haixing Road ~ Jihuaaji Road)	224	20	4,480
Linhe Street (East section)	Branch road	(Haixing Road ~ Jihuaaji Road)	224	20	4,480

Source: FSR, 2023, November





Source: FSR, 2024, January

**Figure 3-4 Schematic diagram of the location and construction content of the industrialization zone**

**Table 3-5 Main technical indicators of road works**

No.	Technical indicators	Unit	Specification value	Value	Specification value	Value
1	Road grade		City branch		City trunk road	
2	Design speed	km/h	20		40	
3	Road design years when the traffic volume reaches saturation	Year	10		20	
4	Design service life of pavement structure	Year	10		15	
5	General value/limit value of the minimum length of the flat curve	m	60/40	-	110/70	-
6	No superelevation minimum radius	m	70	-	300	-
7	General value/limit value of the superelevation minimum circle curve radius	m	40/20	-	150/70	-

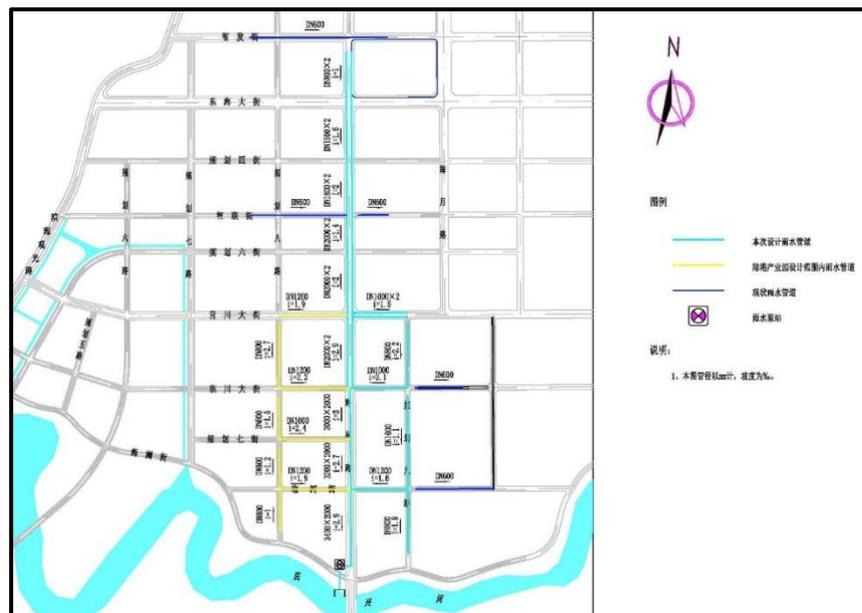
8	Parking Sight	m	≥20	≥20	≥60	≥60
9	Maximum longitudinal slope of motorway	%	8	0.127	6	0.273
10	Longitudinal minimum slope length	m	60	200	130	200
11	General value/limit value of the minimum length of the vertical curve	m	50/20	60	90/40	120.634
12	Vehicle load class		BZZ-100		BZZ-100	
13	Road slope	%	1.5		1.5	
14	Pavement structure type		Asphalt concrete pavement		Asphalt concrete pavement	
15	Lane minimum net height	m	≥4.5		≥4.5	
16	Minimum net height of non-motor vehicle lanes and sidewalks	m	≥2.5		≥2.5	
17	Lateral net width	m	≥0.5		≥0.5	

Source: FSR, 2023, November

109. **Stormwater works.** The land port hub industrial park is relatively flat, with a terrain elevation difference of less than 1m. Rainwater from Planning No.8 Road and Planning No.9 Road is discharged from north to south, and into Haixing Road rainwater pipes from both sides in Linchuan Street and Linhe Street. Finally, the rainwater will be discharged into the rainwater pumping station from north to south via Haixing Road. Reserve rainwater branch pipes at intervals of about 200m at road intersections and plots, and the diameter of the reserved branch pipes is DN600.

110. The service scope of the rainwater pumping station is from the south of Zhifa Street, west to Planning No.7 Road, and east to Planning No.9 Road, about 2.6km<sup>2</sup>.

111. The total length of new rainwater pipes in the project is about 4.5km (excluding reserved branch pipes), and the pipe diameter is DN800-DN2000. The rainwater culvert is about 0.7km, and the size is 3000×2000mm-3400×2000mm.

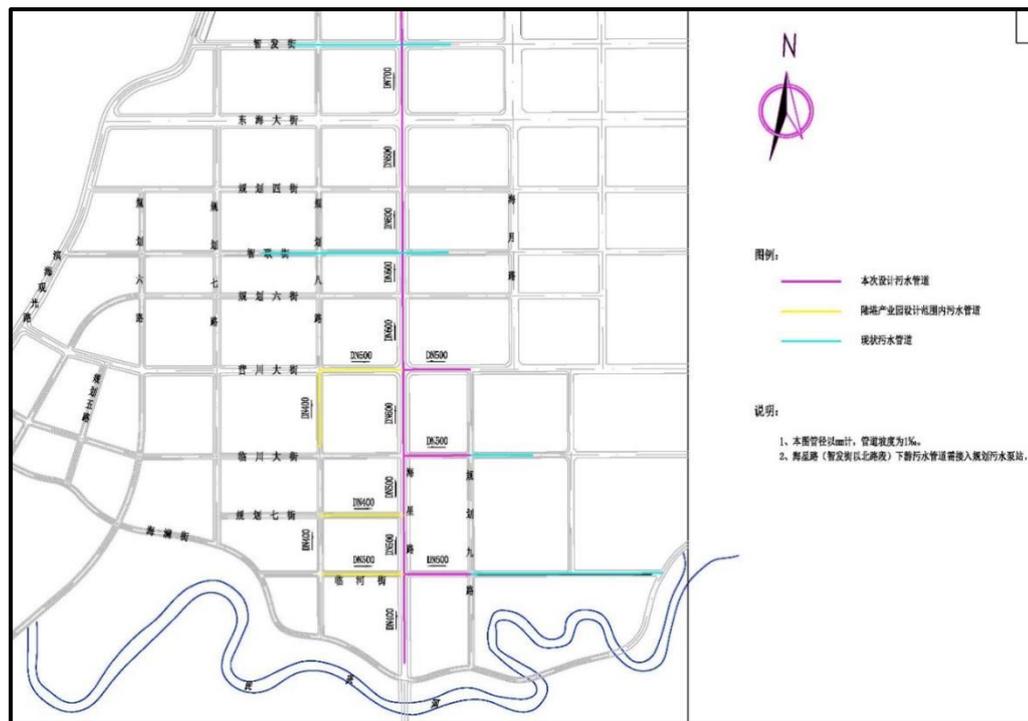


Source: FSR, 2023, November

**Figure 3-5 Plane layout of rainwater pipelines in inland port hub industrial park**

112. **Sewage works.** The project scope of the dry port hub industrial park is relatively flat, with a terrain elevation difference of less than 1 m. Sewage from Yingchuan Street, Linchuan Street, Planning No.7 Road, Linhe Street is discharged to Haixing Road sewage pipes from the east and west side. Finally, the sewage is discharged into the sewage pumping station, which is 650 m north of Zhifa Street through the Haixing Road sewage trunk pipes. The sewage branch pipes at intervals of about 200m are equipped at road intersections and plots, and the diameter of the reserved sewage branch pipes is DN400.

113. The total length of new sewage pipelines in the project is about 2.8km (excluding reserved branch pipes), and the pipe diameter is DN400-DN700.



Source: FSR, 2023, November

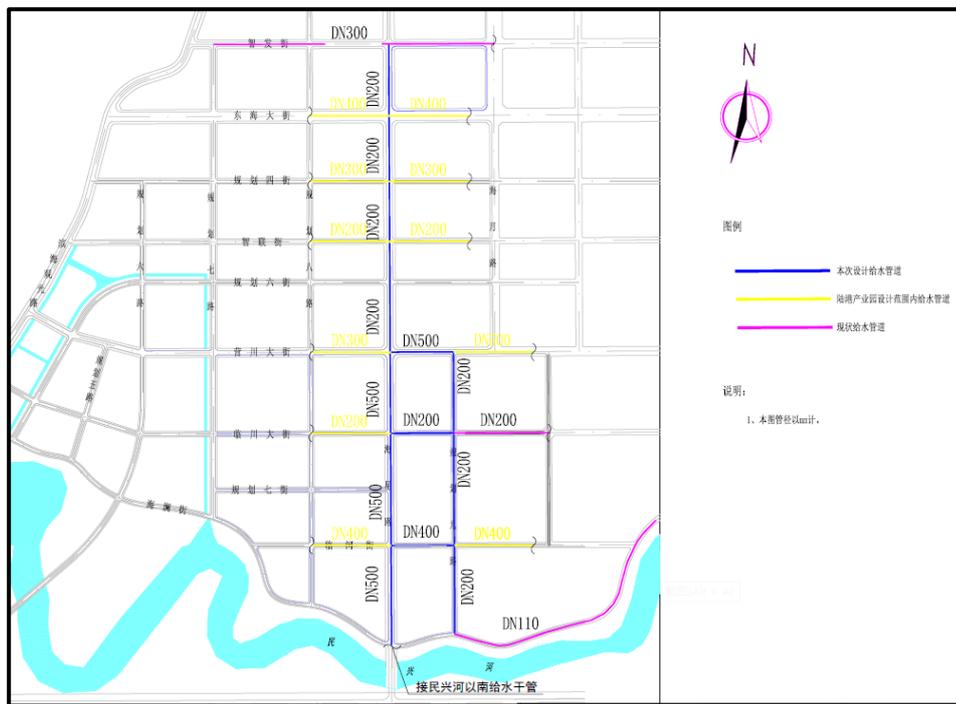
**Figure 3-6 layout of rainwater pipelines in inland port hub industrial park**

114. **Water supply works.** The layout of the water supply project in the land port hub industrial park is as follows:

- Haixing Road: Haixing Road (Zhifa Street -Yingchuan Street) newly builds 1.1 km (excluding reserved branch pipes) DN200 water supply pipeline; Haixing Road (Yingchuan Street-Hailan Street section) newly builds 1 km (excluding reserved branch pipes) DN500 water supply pipe. The Haixing Road water supply pipeline is connected to the existing DN300 pipeline of Zhifa Street to the north, and to the DN110 water supply pipeline of Hailan Street to the south.
- Newly build 1 km (excluding reserved branch pipes) DN200 water supply pipeline on Planning No. 9 Road (Yingchuan Street -Hailan Street).
- Newly build 220 m (excluding reserved branch pipes) DN500 water supply pipeline in the east section of Yingchuan Street (Haixing Road -Guanhua Ninth Road).
- A new 220 m (excluding reserved branch pipe) DN200 water supply pipeline will be built in the east section of Linchuan Street (Haixing Road -Planning No.9

Road).

- newly build 220 m (excluding reserved branch pipes) DN400 water supply pipeline in the east section of Linhe Street (Haixing Road -Guanhua Ninth Road).



Source: FSR, 2024, January

**Figure 3-7 Layout of Stormwater Pipes in the Dry Port Hub Industrial Park**

(iii) Logistics supporting area

115. An international express center and cloud warehouses will be built in the logistics supporting area.

- The land area of the International Express Center project is about 33,521 m<sup>2</sup>. It is located on the south of Xinhai Street and the northeast of the logistics supporting area. A new express center with a construction area of about 11,000 m<sup>2</sup> will be used for customs, post offices, enterprises and other personnel to perform operations. At the same time, it is equipped with necessary office rooms, supporting service rooms, equipment room, communication room, water pump room, fire control room, etc. A high platform is set up to facilitate the entry and exit of goods, and the height of the cornice of the building is 10 m. The photovoltaic power generation system supporting the construction of the project, based on a 25-year period of use, accounting for component attenuation and efficiency, the average annual power generation is about 1,460,000 kWh. According to the calculation, the total annual power consumption of the International Express Center (excluding air-conditioning power consumption) is about 654,000 kWh, and after applying the intelligent management platform and intelligent monitoring platform, the total annual power consumption is about 613,000 kWh. The electricity generated by photovoltaic power generation can be used for the daily operation of the Express Center, and at the same time, the surplus electricity can be fed into the Internet.
- Cloud warehouse project covers an area of about 30,310 m<sup>2</sup> and is located on the south side of Xinhai Street and the east side of the International Express Center. A new cloud warehouse will be built, with a floor area of about 11,000 m<sup>2</sup>, including storage areas, supporting office buildings, supporting service rooms,

etc. Ancillary equipment room, fire control room, communication room, etc. shall be considered along with the International Express Center. The cornice height of the building is 10m.

The photovoltaic power generation system, which is part of the project's supporting infrastructure, is based on a 25-year service life. Calculating component degradation and efficiency, the average annual electricity generation is approximately 1.5723 million kilowatt-hours. According to calculations, the annual total electricity consumption of Cloud Warehouse (excluding air conditioning) is approximately 491,000 kilowatt-hours. After applying the intelligent management platform and smart monitoring platform, the annual total electricity consumption is reduced to approximately 480,000 kilowatt-hours. The electricity generated by the photovoltaic system can meet the daily operational needs of the warehouse, with surplus electricity available for grid connection.

- To promote future regional green development, a reserved area on the south side of Xinhai Avenue and west side of the sewage treatment plant is designated for a charging station and battery exchange station for large equipment and vehicles. This area aims to provide essential support for new energy vehicles and facilities, enhance the utilization rate of new energy vehicles and equipment in the FTZ, and contribute to low-carbon green development.



Source: FSR, 2024, January

**Figure 3-8 Schematic diagram of the location and construction content of the logistics supporting area**

(iv) Other supporting municipal infrastructures

**116. Communications.** Newly build 12×HDPE110 (11 flat-wall pipes + 1 seven-hole pipe) on Haixing Road for about 2.135 km; build 6×HDPE110 (5 flat-wall pipes + 1 seven-hole pipe) for about 2.71km for other road sections.

**117. Lighting.** 173 sets of new street lamps, 8 sets of mid-pole lamps, 9.2 km street lamp cables were laid, and 3 sets of street lamp box transformers were installed. Lay 2 PVC-Ø75 street lamp cable protection pipes and 1 seven-hole pipe reserved for the smart communication system along the road. The quantity of street lamps in lighting BOQ only includes the number of street lamps. For the quantity of integrated poles in the form of multi-poles, refer to the traffic engineering.

**118. Landscaping.** The total area of green design in the FTZ is 3.92 hectares, all of which are green areas affiliated to roads. Among them, the green area attached to the road in the land port hub industrial park is 3.79 hectares, and the green area attached to the road in

the comprehensive bonded area is 0.12 hectares.

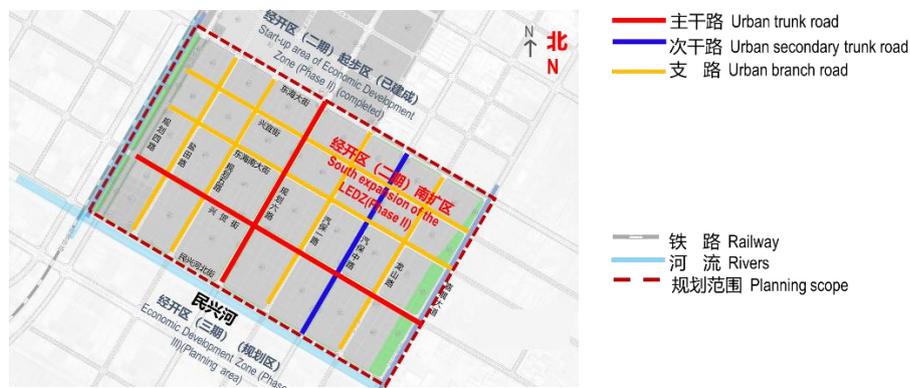
119. The land port hub industrial park includes two north-south roads, Haixing Road and Planning No.9 Road; and 3 east-west roads, Yingchuan Street, Linchuan Street and Linhe Street. According to the nature of surrounding land use and road design forms, the landscaping styles of Haixing Road and Yingchuan Street are similar, and the same tree species shall be used. Planning No.9 Road, Linchuan Street and Linhe Street shall choose the same tree species. Among them, Haixing Road is the main road through the north and south of the park. The width of the red line of the road is 40 m, the length of the road is 2135m, and the attached green space is 26,819 m<sup>2</sup>.

120. In the comprehensive bonded area, the red line width of the Planning No. 4 road is 24m, the road length is 420m, and the width of the green belts on both sides is 3m in total.

### 3.3 Subproject 2: Industrial Cooperation Supporting Project of Liaohe EDZ in Yingkou

121. The subproject is located in the south expansion zone of Liaohe EDZ (Phase II), with a total investment of about 1.32 billion yuan. The South Expansion Area is located on the southwest of the Phase II start-up area. The specific scope starts from Donghai Street in the north, Minxing River North Street in the south, the control line on the east of the Bianhai Railway in the west, and Jiachen Avenue in the east, covering a total area of 406 hectares. The project implementing agency (PIA) of the subproject is the Management Committee of LEDZ, and the project implementation unit (PIU) is Yingkou Liaohe Urban Construction Investment Development Co., Ltd.

122. The construction content covers 12 roads including Planning No.6 Road and Jiachen Avenue, with a total length of about 22.67 km, as well as water supply and drainage, gas, communication, lighting, landscaping, sponge city, and smart municipal services, etc.



Source: FSR, 2024, January

**Figure 3-9 Distribution of the construction content of the subprojects of LEDZ in Yingkou**

123. **Road works.** The proposed construction includes 8 vertical and 4 horizontal directions, among which the Planning No.6 Road, Jiachen Avenue and Xinghe Street are the main roads, Planning No.4 Road and Qibao Middle Road are secondary trunk roads, Yantian Road, Planning No.5 Road and Qibao No.1 Road, Longshan Road, Xingyi Street, Donghai South Street and Minxing North Street are branch roads, and Planning No.6 Road, Jiachen Avenue, Xinghe Street, Planning No.4 Road, and Qibao Middle Road constitute the road network structure of the park. The remaining branch roads will complement service functions, among which the Planning No.6 road will be built as demonstration roads.

124. **Water supply works.** The water supply pipe network adopts the layout of ring-shaped, of which the main water supply pipes are arranged on Planning No.4 Road, Xingyi Street, Qibao Middle Road, and Xinghe Street, with pipe diameters of DN400-DN500, and other

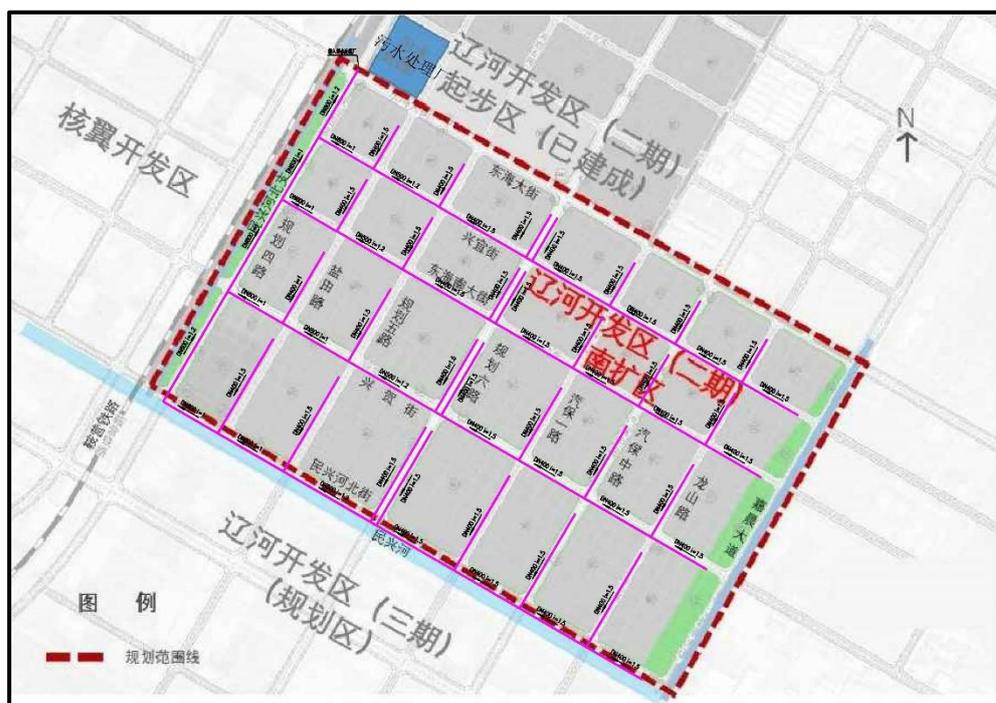
roads are arranged with water supply connecting pipes, with pipe diameters of DN200-DN300 .

125.**Reclaimed water.** The reclaimed water pipeline adopts a branch-like arrangement, and reclaimed water pipelines are laid along Minxing North Street (Planning No.4 Road-Planning No.6 Road), Planning No.6 Road and Donghai South Street, with a pipe diameter of DN200-DN300.

126.**Sewage works.** The construction of the sewage pipe network in the Phase II of the start-up area of Liaohe EDZ in Yingkou has been completed. In the southwest of the start-up area, a sewage lifting pump station has been built on the westernmost side of Donghai Street. The sewage in the start-up area is lifted by the pump station and temporarily discharged into the existing sewage pipe on the north side of the start-up area. The design scale of the pump station is 13,000 m<sup>3</sup>/d, and the diameter of the outlet pipe is DN500.

127. In the future, after the construction of this project scope (the Phase II south expansion area) is completed, the pump station will collect the sewage from the start-up area and upgrade it to the newly planned four-way sewage pipeline in the south expansion area, and finally discharge it into the sewage treatment plant on the southwest side of the south expansion area for treatment.

128. The total length of new sewage pipelines in the project is about 23.7 km (including reserved branch pipes), and the pipe diameter is DN400-DN1000.



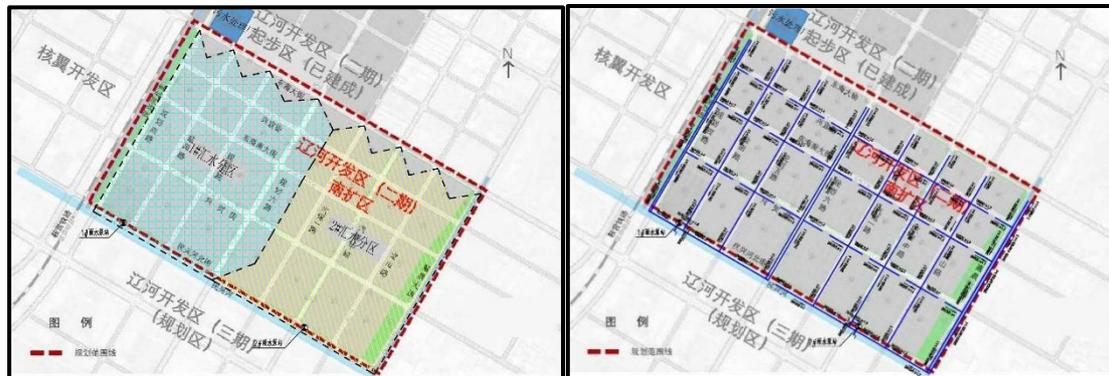
Source: FSR, 2024, January

**Figure 3-10 Plane layout of sewage pipeline**

129.**Stormwater works.** According to the terrain analysis and road vertical design, the Phase II south expansion area is divided between Planning No.6 Road and Qibao No.1 Road, with 1# water catchment area on the west side and 2# water catchment area on the east side. The rainwater from roads in the 1# catchment area and plots passes through the DN600-DN2000 rainwater main pipes of Planning No.4 Road, Yantian Road, Planning No.5 Road, and Planning No.6 Road from north to south to Minxing North Street DN1500-DN2000 rainwater pipes and 2500×2000 rainwater square culverts, and finally discharged into the 1# rainwater lifting pumping station, forcibly discharged to the Minxing River.

130. The rainwater from the 2# catchment subdivision road and the plot passes through the

DN600-DN2000 rainwater main pipe of Qibao No.1 Road, Qibao Middle Road, Longshan Road, and Jiachen Avenue from north to south to the DN1500-DN2000 rainwater pipe of Minxing North Street, and finally discharges into 2 #Rainwater lift pumping station, forcibly discharged to Minxing River.



Source: FSR, 2024, January

**Figure 3-11 LEDZ Phase II South Expansion Area Catchment Sub-area and Stormwater Pipeline Network Arrangement Plan**

131. Rainwater pipelines reserve rainwater branch lines every 200m, and the diameter of reserved rainwater branch pipes is DN600. The subproject will build new rainwater pipes with a total length of about 29.5km (including reserved branch pipes) with a pipe diameter of DN600-DN200; and a rainwater square culvert of 1.4 km with a specification of H×B=2.0m×2.5m.

132. **Gas engineering.** The gas source is directly connected to the existing De400 natural gas medium-pressure pipeline on Donghai Street. The designed transmission and distribution system adopts medium-voltage Class A. The user adopts the air supply method of a special pressure regulating box (cabinet). The pipe material is polyethylene pipe, and the pipe specification is De400-De160. It is arranged in a circular branch along the Planning No.6 Road, the Planning No.4 Road, Yantian Road and other roads.

133. **Communications.** Newly build communication pipes are laid on the east and north of the road, and the whole line is laid under the sidewalk of the newly built road.

134. **Lighting.** The street lighting adopts bilateral symmetrical layout, and the illumination standard meets the requirements of the national standards. With the power supply radius of 500~600m, a total of 12 street light box transformers are configured to supply power for road lighting. 2 PVC-Ø75 street lamp cable protection pipes and 1 seven-hole plum blossom pipe reserved for the smart communication system are laid along the whole road.

135. **Landscaping.** The landscaping includes green land attached to the road and the belt-shaped protective green land on both sides of the main road. According to the current conditions and combined with the upper requirements, the overall green structure is divided into three types: landscape road greening, main road greening and branch road greening. Through measures such as optimizing the landscape interface, shaping large-scale landscapes, and integrating the concept of sponge city, a water-saving green space with landscape layers will be established.

136. **Road Greening:** mainly refers to Planning No.6 Road, which is the main road of the park and runs through the Phase I and Phase II of the Economic Development Zone. It is the greening corridor with the largest greening area and the most abundant landscape functions in the park.

137. **Trunk road greening:** including Jiachen Avenue, Xinghe Street, Planning No.4 Road

and Qibao Middle Road. The four roads are the main roads of the park, and the green belts on both sides form a belt-like green space with continuous landscape, which constitutes the main framework of road greening in the park.

138. **Branch road greening:** Including Yantian Road, Planning No.5 Road and other branch road.

### 3.4 Associated Facility Analysis

#### 3.4.1 Associated Facility Identification

139. According to the AIIB "Environmental and Social Framework" (2022 revision), the definition of "facilities" on associated facilities refers to the project activities not included in the project legal agreement, but these activities are inherently related to the project construction content. The main definition principles are: (a) directly and substantially related to the project; (b) carried out, or planned to be carried out, contemporaneously with the Project; and (c) necessary for the Project to be viable and would not be carried out if the Project did not exist.

140. The facilities related to the operation of this project include water supply plants and sewage treatment plants related to the water supply, reclaimed water, and sewage pipe network engineering of the project construction. According to the above definition principles, the associated facilities of this project are determined through the associated facility judgment matrix (Table 3-6) as follows:

**Table 3-6 Project-related facility identification matrix**

Facility Name	Directly and Materially Related to the Project	Contemporaneously with or Planned for the Project	Necessary for the Project to be Viable	Remark
<b>Yingkou Free Trade Zone</b>				
The Second Water Supply Plant	Yes	No	Yes	The water of Dry Pot Industrial Park is supplied by the Second Water Supply Plant, which is the existing water supply plant and identified as an existing facility.
The Sixth Water Supply Plant	Yes	No	Yes	The Comprehensive Bonded Area is supplied by the sixth water supply plant, which is the existing water plant and identified as an existing facility.
The Third Wastewater Treatment Plant	Yes	No	Yes	The wastewater collected by the factories, warehouses and sewage pipe network constructed in this project is the existing facilities.
<b>LEDZ</b>				
Waste water Treatment Plant of LEDZ	Yes	No	Yes	The project will build a 6.6 km reclaimed water pipeline. The sewage treatment plant in the LEDZ is the reclaimed water source. The recent treatment scale is 20,000 m <sup>3</sup> per day, which is the existing facilities.

Waste water Treatment Plant to be built in LEDZ	Yes	Yes	Yes	The plant will receive the waste water collected by the sewage pipe network of this project and identify it as an associated facility
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141. The current status of the southern expansion area of the Liaohe River Economic Development Zone lacks sewage treatment facilities. The proposed sewage treatment plant in the Liaohe River Development Zone will receive sewage collected by the proposed sewage pipeline network in the Liaohe River Economic Development Zone sub-project. Without this sewage treatment plant, the collected sewage cannot be effectively treated. The construction period is estimated to be from 2024 to 2026, synchronously implemented with this project. According to the three criteria for identifying related facilities, it is recognized as a related facility of this project.

### 3.4.2 Due diligence of associated facilities

142. According to the controlling detailed plans of Phase I and Phase II of the Yingkou Liaohe River Economic Development Zone, the predicted total sewage volume for Phase I and Phase II of the Yingkou Liaohe River Economic Development Zone is 49,700 cubic meters per day. However, there is currently no sewage treatment plant in the park to receive this sewage. It can only be pumped to the Yingkou East Sewage Treatment Plant in the north through pumping stations, resulting in overloaded operation of the Yingkou East Sewage Treatment Plant. Therefore, it is urgent to construct the sewage treatment plant in the Liaohe River Development Zone.

143. The owner of the Liaohe River Development Zone Sewage Treatment Plant is Yingkou Liaohe River Urban Construction Investment Development Co., Ltd., which is also the implementing unit of this project. The Liaohe River Development Zone Sewage Treatment Plant mainly serves the Phase I and Phase II areas of the Yingkou Liaohe River Economic Development Zone. The Phase I area covers an area of approximately 8.5 square kilometers, and the Phase II area covers an area of approximately 6.5 square kilometers, with a total design capacity of 50,000 cubic meters per day, of which the recent scale is 30,000 cubic meters per day. The Liaohe River Development Zone Sewage Treatment Plant completed feasibility approval in September 2023. The Administrative Approval Bureau of the Administrative Committee of the Yingkou Liaohe River Economic Development Zone approved the "Environmental Impact Assessment Report of the Yingkou Liaohe River Development Zone Sewage Treatment Project" (Yingliakai Approval [2023] No. 20) in December 2023.

144. According to the "Environmental Impact Assessment Report of the Yingkou Liaohe River Development Zone Sewage Treatment Project", the Liaohe River Development Zone Sewage Treatment Plant adopts the process flow of "coarse grid and inlet pumping station + fine grid and aeration sedimentation tank + regulation and accident pool + multi-stage A2/O bio pool (MBBR) + high-efficiency sedimentation tank + filter cloth filter pool + ultrafiltration membrane (partial) + sodium hypochlorite disinfection". The treated effluent of the sewage treatment plant complies with the "Pollutant Discharge Standard for Urban Sewage Treatment Plants" (GB18918-2002) Grade A standard, "Water Quality for Urban Sewage Reuse Urban Miscellaneous Water" (GB/T18920-2020), and "Water Quality for Urban Sewage Reuse Industrial Water" (GB/T19923-2005), with the following main index requirements: COD<sub>Cr</sub> ≤ 50 mg/L; BOD<sub>5</sub> ≤ 10 mg/L; SS ≤ 10 mg/L; TN ≤ 15 mg/L; NH<sub>3</sub>-N ≤ 5(8) mg/L; TP ≤ 0.5 mg/L. The treated effluent of 20,000 cubic meters per day is pumped out and sent to the external pipeline network for reuse, and another 10,000 cubic meters per day is discharged back to the Minxing River.

145. The location of the Liaohe River Development Zone Sewage Treatment Plant is within Phase II of the Yingkou Liaohe River Economic Development Zone, enclosed by Ruliu Road, Xingda Street, Yantian Road, and Donghai Avenue, with a planned total land area

of 60,263.2 square meters, and a recent area of 47,200 square meters. This plot belongs to the controlling detailed planning range of Phase II of the Yingkou Liaohe River Economic Development Zone, with land use nature as W1 (Class I logistics warehousing land). It needs to be transferred from state-owned land to drainage land, and has not yet obtained the state-owned land use right certificate. This plot is state-owned vacant land, with no buildings and no historical legacy issues, and does not involve house acquisition, compensation, or resettlement expenses.

146. As a related facility of this project, the environmental management performance of the Liaohe River Development Zone Sewage Treatment Plant during the construction and operation period (first year) will be included in the environmental and social monitoring report of this project and reported to AIB every six months.

## 4 Alternatives

### 4.1 No project alternative

147. No project replacement means that the project will not be constructed. If the status quo is maintained, the factors restricting the development of Yingkou City still exist. The construction of Yingkou dry port hub and collaborative industrial park has achieved initial results. This project aims to further improve the dry port hub project and expand the space for industrial development. If the project is not constructed, Yingkou City will still face the following problems:

- **The function of logistics and trade is insufficient.** The functions of the existing logistics modules are not yet perfect in the Yingkou FTZ, resulting in inconvenient logistics between ports and high logistics costs. For example, the existing railway line is not connected to the terminal distribution network of the FTZ, nor has the function of customs inspection, which limits the realization of the direct loading and unloading function, and the "last mile" problem of the linkage between the zone and the port waiting to be solved. In addition, the annual transportation volume of existing enterprises in the comprehensive bonded area is close to 3 million tons, but they only rely on land transportation, resulting in high transportation costs. What's more serious is that the regional highways bear too much bulk cargo transportation problems, such as overloading up to 206% and using inferior fuel, which has caused great damage to the environment. Therefore, the improvement of the logistics trade function is not only related to the regional economy, but also involves the sustainable development of the regional ecological environment.
- **There is insufficient room for industrial development.** Due to factors such as imperfect infrastructure and low level of intelligence, the LEDZ cannot meet the development needs of the clean energy industry in the park, especially in the face of the advancement of the clean energy high-end equipment manufacturing industry. In addition, there is basically no remaining contiguous land in the Yingkou FTZ, and the space for industrial development is limited. It is urgent to make up for the infrastructure shortcomings of the industrial development cooperation park.
- **Insufficient industrial supporting service facilities.** With the development of Yingkou dry port hub and industrial park, supporting service facilities such as warehouses and factories have gradually become restrictive factors. Special industries such as grain warehousing and cold fresh logistics require more efficient and intelligent logistics facilities. The lack of standard green factory buildings also increases the initial cost of settled enterprises.

148. In summary, the no-project plan has greatly restricted the logistics trade, industrial development space and industrial supporting service facilities of Yingkou Dry Port Hub Industrial Park, which may further restrict the overall economic development of Yingkou City and Liaoning Province. If the project is completed, it will promote regional trade and economic growth and increase the local employment rate, reflecting the importance of the project for people's livelihood and sustainable regional development.

### 4.2 Comparison and Selection of Technical Solutions

#### 4.2.1 Comparison and Selection of Road Engineering Design Schemes for Municipal Engineering Projects

149. **Cross-sectional Design Scheme.** Based on the traditional cross-section design, this project adopts permeable pavement and adds sunken green spaces on both sides or in the center of the road. The road safety of this design is good, and the permeable pavement

and sunken green space can increase the absorption and filtration of rainwater, thereby improving the effect of the sponge city and climate resilience.

#### **150. Pavement Structure Design Scheme.**

##### Option 1: Asphalt Concrete Pavement

151. The advantages of asphalt concrete pavement are low noise, small vibration and no reflection, which provide superior driving comfort and safety for automobiles. In addition, the construction of asphalt concrete pavement is highly mechanized, which can realize scientific management and precise control in material selection and proportioning, mechanical operation and quality inspection, to ensure that the construction quality meets high standards while meeting the appearance requirements. Furthermore, the paving efficiency of asphalt concrete pavement is high. Compared with cement concrete pavement, it can open to traffic earlier and realize the usage of the pavement in advance. In terms of maintenance and conservation, asphalt concrete pavement also shows the advantages of convenience and quickness.

152. However, asphalt concrete pavements also have some disadvantages. Asphalt concrete pavements are often thicker than cement concrete pavements due to their structural characteristics, and high-quality heavy-traffic road petroleum asphalt or modified asphalt is used to ensure performance, all of which lead to higher initial construction costs of asphalt concrete pavements. In addition, due to the relatively short designed service life of the asphalt concrete pavement, its maintenance and repair costs will be relatively high in the later period.

##### Option 2: Cement Concrete Pavement

153. The cement concrete pavement has the advantages of high rigidity, good stability, long service life, and strong adaptability to the roadbed. Its initial investment cost is lower than that of asphalt concrete pavement, and its subsequent maintenance and repair costs are relatively small.

154. The white cement concrete pavement is seriously reflective in the sun, which affects the driver's vision, promotes driver fatigue, and reduces driving safety. At the same time, there are a large number of structural joints on the cement concrete pavement, which can easily cause vehicle jumping, make driving uncomfortable, generate relatively loud noises to the surrounding environment, and increase the loss of goods during goods transportation.

155. The maintenance and repair of cement concrete pavement generally adopts the manual operation method of small machines and tools, which takes a long time, and larger maintenance operations even need to interrupt part of the traffic.

156. Overall, considering various factors such as construction, landscape, maintenance, and restoration, asphalt concrete pavement is not only safe, efficient, and fast, but also has beautiful and comfortable conditions of use; while cement concrete pavement has obvious limitations in use performance, so it is recommended that all roads of this project adopt asphalt concrete pavement.

#### **157. Comparison and Selection of Road Lighting Fixtures for Lighting Engineering.**

Common road lighting sources include gas discharge lights (including high-pressure sodium lights, ceramic metal halide lights and new ceramic metal halide lights (Cosmoplis several light sources) and green lighting source LED lights.

158. From an environmental point of view, road lighting mainly considers factors such as energy efficiency, lifespan, environmental protection and light pollution. There is a comparison of high pressure sodium lights, ceramic metal halide lights and LED lights:

- High-Pressure Sodium lights: High-pressure sodium lights have relatively high energy efficiency, but have a low color temperature and poor color reproducibility.

They usually present yellow light, which may affect people's visual comfort. Additionally, they have a medium lifespan and relatively high maintenance costs. Moreover, the mercury and sodium contained in these lights have a certain impact on the environment.

- Ceramic Metal Halide lights: The color temperature and color reproducibility are better than high-pressure sodium lights, but the energy efficiency is relatively low, the lifespan is shorter, and more frequent replacement and maintenance are required, which may lead to higher maintenance costs and resource consumption. In addition, metal halide lights may emit some UV radiation.
- LED Light: The energy efficiency and lifespan of LED light are higher than the other two kinds of lights, and the light source is adjustable, which can adjust the light of different color temperature, with good color reproducibility and friendly to human eyes. LED lights contain no harmful substances, with relatively low maintenance costs and are the most environmentally friendly option. However, its initial investment cost is relatively high.

159. Therefore, LED lights are used for road lighting in this project. Although the initial investment cost is high, its excellent energy efficiency, long lifespan and environmental-friendly feature make it able to bring greater benefits in long-term use.

#### **4.2.2 Comparison and Selection of Architectural Design and Structural Schemes in FTZ**

160. Reinforced concrete bent frame structure and portal steel frame structure are two commonly used storage and factory building structures. The advantages and disadvantages of these two structural forms are described in detail below:

161. Reinforced Concrete Bent Frame Structure:

- Advantages: The overall effect of the structure is good, the rigidity is high, the seismic performance is superior, it can well match the plane layout of the building, and the space separation is flexible. In addition, the member materials of this structure are easily available, and are excellent in stability, fire resistance, and durability.
- Disadvantages: The construction period is relatively long, the component size is large, and the cost is relatively high.

162. Portal Steel Frame Structure:

- Advantages: This structure has extremely high strength and certain toughness; the material is uniform, and the safety and reliability are high. Also, the steel frame structure has good flexibility, can adapt to various space forms, and has fast construction speed, simple production and short construction period.
- Disadvantages: The structure has general heat resistance and poor fire resistance.

163. The portal steel frame structure has a short construction period and more flexible structure, and steel is a recyclable material. After the building's service life is over, its main components can be reused, so the portal steel frame structure is selected.

## **5 Description of the Environmental and Social Economic Development**

### **5.1 Natural Environment**

#### **5.1.1 Geographic Location**

164. Yingkou City is an important port city in Northeast China, which is located in the southwest of Liaoning Province. Its geographic coordinates are roughly 40°39' to 41°20' north latitude and 121°56' to 123°31' east longitude. The city is located at the estuary of the Yalujiang River and Liaohe River, which has the largest natural deep-water harbor in Liaodongwan Bay. And it is an important material distribution center and sea outlet in Northeast China, and an important part of the Bohai Economic Zone. Yingkou City has special advantages in terms of geographical location that borders the Yellow Sea in the east, Dalian City in the south, Jinzhou City in the west, and Panjin City in the north, making it an important channel for logistics transportation from Northeast China to overseas.

165. The FTZ of Yingkou is located in the west of the main urban area of Yingkou, with the east to Desheng Road (Chenghu West Road), the south to Xingang Street, the west to the seashore, and the north to Binhe Road.

166. Yingkou LEDZ Management Committee (formerly Yingkou Small and Medium Enterprise Pioneering Park Management Committee) was established in April 2008, which is located in the main urban area of Yingkou City, Liaoning Province, adjacent to the east side of Zhuanglin Road (Shizheng Road) of National Highway No. 305, and adjacent to Liaoning (Yingkou) Coastal Industrial Base in the southwest, 50 km away from Bayuquan Port Area of Yingkou Port, 12 kilometers away from Yingkou Station of Harbin-Dalian High-speed Railway, and 15 km away from Yingkou Lanqi Airport. The total planning area is 30 square kilometers, and the first phase planning area is 10 square kilometers, of which the starting area is 5.58 km<sup>2</sup> and the south expansion area is 4.42 km<sup>2</sup>.<sup>10</sup>

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<sup>10</sup> Official website of Yingkou Liaohe Economic Development Zone Management Committee  
<http://lhkfq.yingkou.gov.cn/>



Figure 5-1 Schematic diagram 1the location of the project area

### 5.1.2 Meteorology

167. Yingkou City has a temperate semi-humid monsoon climate. Controlled by continental and oceanic air masses, it is characterized by cold winters with little snow, windy and dry springs, hot and rainy summers, and humid and cool autumns. And it has four seasons that rain and heat are occurring in the same season, and has features such as mild climate, concentrated precipitation, and large evaporation.

168. The temperature in Yingkou fluctuates widely, with an annual average temperature of 10.1°C, with a maximum temperature of 36.8°C and a minimum temperature of -28.2°C. The average annual rainfall in Yingkou City is 643.6 mm, of which the rainfall is most concentrated from June to September, with the highest rainfall over the years being 895.3 mm and the minimum rainfall being 445 mm. On the other hand, the annual average evaporation reaches 1814 mm, which is 2.3 times of the precipitation. The climate humidity is moderate, and the annual average relative humidity is 60%.

169. From the perspective of wind direction, the north wind and northeast wind dominate in winter, the southwest wind dominates in spring and autumn, and the south wind dominates in summer. The annual average wind speed is about 4 m/s. In addition, the ground freezing period in Yingkou City usually starts in early November and thaws in early April of the following year, and the soil freezes to a depth of about 1 meter.

170. Due to its special geographical location, close to the mountains and the sea, and affected by the natural environment and atmospheric circulation, meteorological disasters occur in Yingkou City from time to time, including drought, heavy rain, hail, strong wind, and the resulting floods and mudslides. These disasters are characterized by strong suddenness, high intensity and short duration.

### 5.1.3 Geology, Topography, Terrain

171. Yingkou City is located in the southwestern part of Liaoning Province, on the Liaodong Peninsula in the Liaohe Delta. The terrain gradually decreases from east to west in a step-like manner, and generally presents three main landforms: mountains, hills, and plains.

172. The mountainous landforms are mainly distributed in the southeast of the urban area, mainly composed of mountains such as Daqingshan Mountain and Xiaoqingshan Mountain. These mountains are mostly sandstone and shale, with relatively steep slopes and obvious topographical undulations. The hilly landforms are mainly distributed in the central part of the urban area, mainly composed of Shichengzi hills and Panjiadian hills, with relatively low elevation and gentle slopes. The plain landform is mainly distributed in the west and north of the urban area, formed by the large amount of sediment carried by the Liaohe River when flowed through Yingkou area, with the lowest elevation, flat ground and fertile soils, which is the main agricultural farming area in Yingkou City.

173. From the perspective of geological conditions, Yingkou City is mainly composed of Quaternary and Tertiary strata, and its geological structure is relatively stable. The main mineral resources are oil, natural gas, coal, quartz sand, dolomite and so on.

174. The project area belongs to the coastal Liaohe Valley accumulation plain area, and the altitude is generally between 3 and 10m. The terrain is high in the northeast and low in the southwest, the natural ground elevation is between 1.0 and 4.0m, and the average ground slope is about 2%.

### 5.1.4 Hydrology and Water System

175. The project area belongs to the Liaohe River Basin, bordering Liaodong Bay in the west and Daliao River in the north, with Minxing River passing through the industrial park of Liaohe Economic Development Zone in the project area. Daliao River flows through the south-central Liaoning Province, after accepting Hun River, Taizi River and Outer Liao River in Sanqiao River, it flows through Haicheng, Panshan, Dashiqiao, Dawa, Yingkou and other cities and counties, and then enters into the Bohai Sea in Sidougou in the outskirts of Yingkou City, and its main tributaries are Labor River, Huzhuang River, Heipuyao River, Qingtian River, and Tigotou River, etc. The project area is 469 km<sup>2</sup> within the jurisdiction of Yingkou City. The watershed area of Daliao River under the jurisdiction of Yingkou City is 469 km<sup>2</sup>, and the length of the river in the region is 27.90 km.

176. Minxing River, formerly known as Fengshi River, is located in the southern part of the main city of Yingkou, with a length of about 20 km. It is an artificial drainage channel dug in 1943, which mainly excludes the surface water from the upstream Taiping Mountain and the crystallization pond of the salt field. Minxing River from east to west 18 km into the Liaohe Estuary.

177. The groundwater depth in the project area ranges from 0.07 to 2.5 meters<sup>11</sup>, and the groundwater type is loose rock porous aquifer of the Quaternary system, primarily consisting of sandy deposits. Groundwater recharge mainly occurs through atmospheric precipitation and lateral inflow. Groundwater discharge primarily occurs through underground runoff and artificial extraction. The groundwater level exhibits seasonal fluctuations, with a variation range of 1-2 meters.

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<sup>11</sup> Yingkou Liaoh River Economic Development Zone Industrial Cooperation Supporting Project Geotechnical Investigation Report," Liaoning Engineering Exploration & Design Institute Co., Ltd., August 2023.

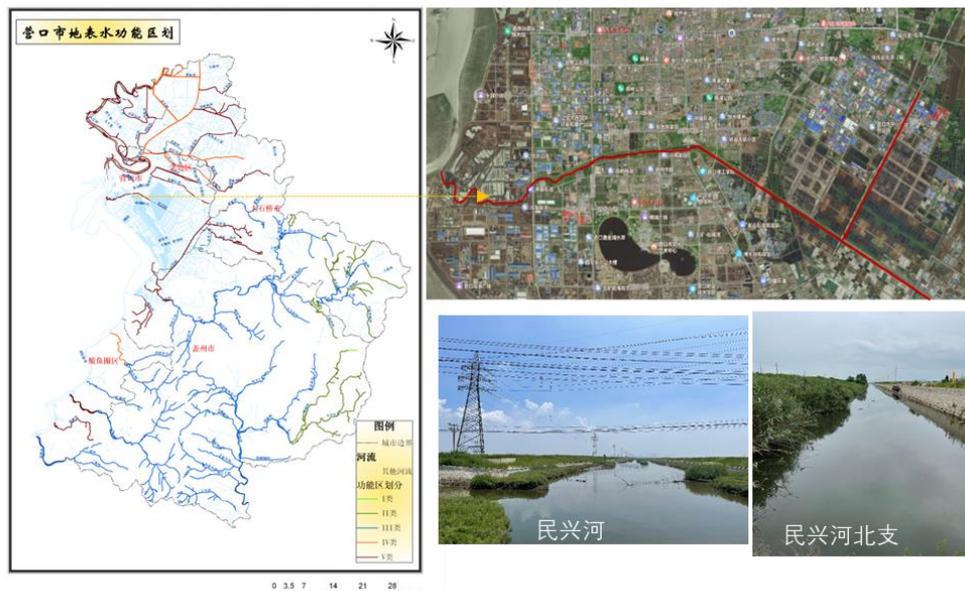


Figure 5-2 Water system diagram of the project area

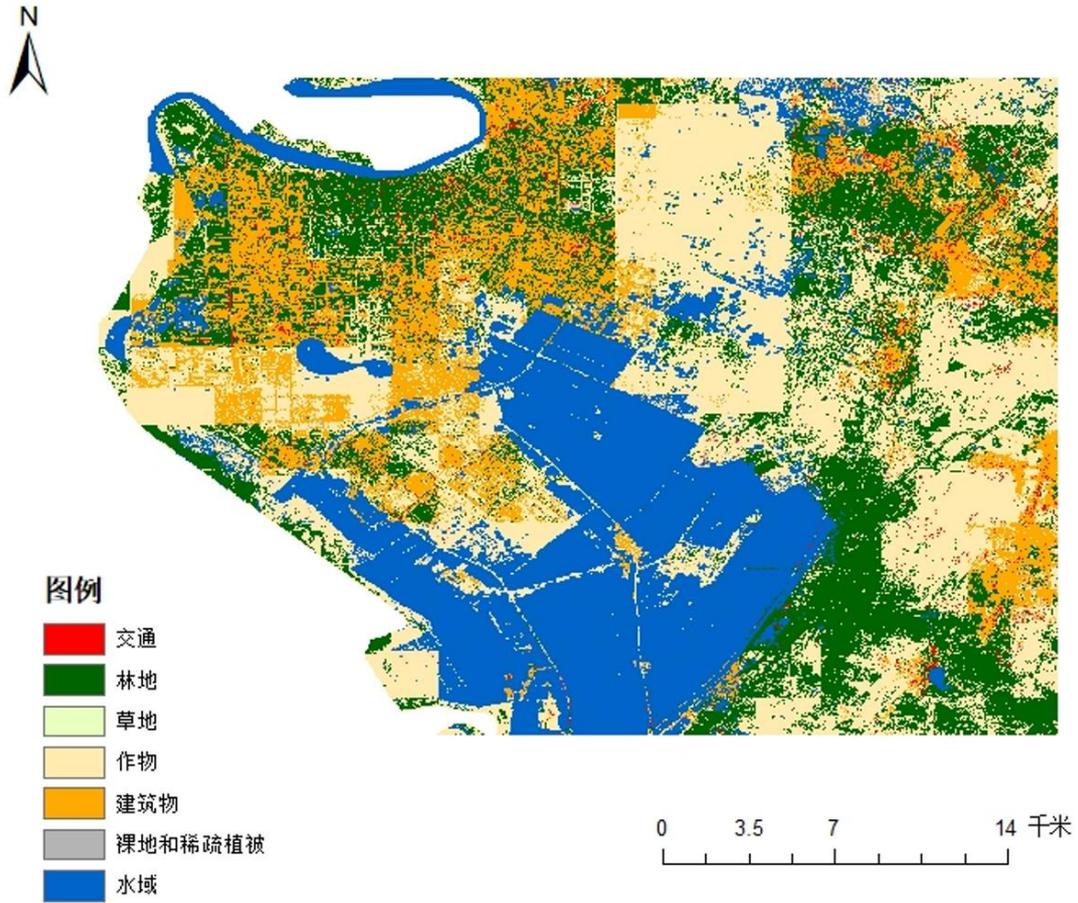
## 5.2 Ecosystem

178. The ecological and environmental survey of the project area utilizes methods such as data collection, on-site investigation (conducted in May and November 2023), remote sensing, and geographic information system analysis to analyze the current state of the natural environment of the project and its surroundings.

### 5.2.1 Habitat type

179. The land use classification data is sourced from the "SinoLC-1" project's land use type map, which is China's first nationwide land cover map with a 1-meter resolution. It was created using a deep learning framework and open-access data (<https://doi.org/10.5281/zenodo.7707461>). Centered around the LEDZ sub-project, a rectangular area of 30kmx30km was constructed. Land use type data covering the LEDZ sub-project, the FTZ sub-project, and the surrounding 30km30km rectangular region were extracted from the SinoLC-1 land use type map. Spatial analysis of land use types was conducted to understand the habitat types in the project area and its surroundings.

180. The habitats in the project area and surroundings are primarily composed of crops (32.9%) and water bodies (24.7%), followed by forests (24.0%), buildings (16.5%), transportation facilities (1.35%), bare land (0.4%), and grassland (0.2%). The water bodies include marine aquaculture areas, salt fields, urban artificial landscape water bodies, shallow sea areas, muddy beaches, and estuarine waters, with salt fields being predominant. According to the "Wetland Classification" (GB/T24708-2009), salt fields and marine aquaculture areas (shrimp ponds) belong to artificial wetlands, while shallow sea areas and muddy beaches belong to natural wetlands.



Source: ESIA preparation unit

**Figure 5-3 Land-use type of the project site and surroundings**



Salt field



Coastal tidal wetland

Grassland

Source: ESIA preparation unit

**Figure 5-4 Photos of classic habitats in the project site**

### 5.2.2 Flora

181. The terrain within the design scope of the dry port hub industrial park and the comprehensive bonded area in the FTZ is relatively flat, and the natural conditions and land use conditions are relatively good. The salinity of the soil is relatively high, and the current vegetation is dominated by saline-alkali-tolerant vegetation such as Suaeda salsa and reeds. Most of the current land in the dry port hub industrial park is wasteland and agricultural land (shrimp pond). The greening on both sides of the roads in the comprehensive bonded area is growing well, and the main tree species planted now include: Arbors - locust tree (*Sophora japonica* Linn), poplar (*Populus* L.), paulownia (*Platanus orientalis* Linn.), ginkgo (*Ginkgo biloba* L), shrubs, Chinese pagoda tree (*Styphnolobium japonicum* 'Pendula'), spruce (*Picea asperata*), Chinese pine (*Pinus tabuliformis* Carr.); Shrubs - purple Berberis foliage (*Berberis thunbergii* 'Atropurpurea'), Chinese flowering crabapple (*Malus spectabilis*), Acer japonica (*Acer tataricum*), Golden Leaf Elm (*Ulmus pumila* 'Jinye'), Procumbent juniper (*Sabina procumbens* (Endl.) Iwata et Kusaka), Lilac (*Syringa oblata*), Korean Weigela (*Weigela florida* (Bunge) A. DC.), etc.; Ground cover - herba violae (*Viola philippica*), Green bristlegrass (*Setaria viridis* (L.) Beauv.), etc.

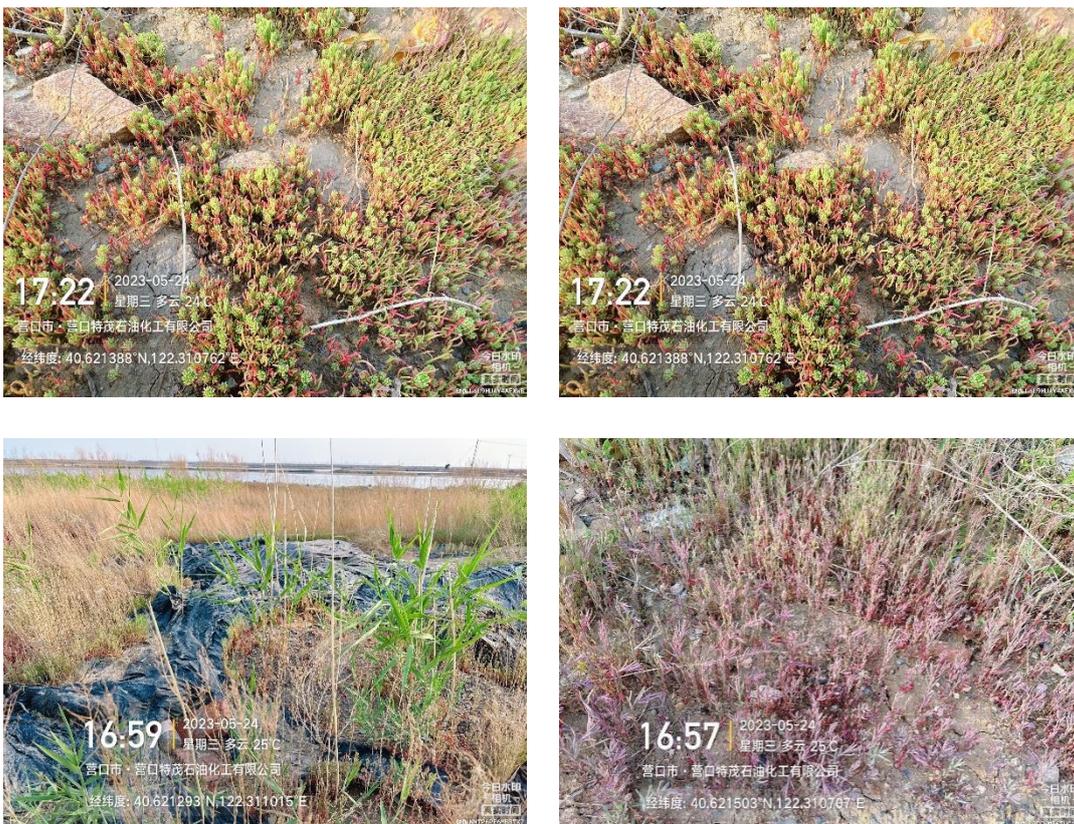




Source: FSR

**Figure 5-5 Vegetation coverage of the sub-projects in the FTZ**

182. The southern extension of Yingkou LEDZ (Phase II) is mainly a low-yield salt field, which is frequently affected by human production and living activities, with little natural vegetation. There are no protected and endemic plant distributions in the project area, which are common and widely distributed species. According to the field survey, most of the projects along the route are saline-alkali land and low-yield salt fields; the surrounding area is mostly weeds and bushes, and there are a few trees such as poplars around. Photos of the vegetation in the area are as follows.



Source: ESIA preparation unit

**Figure 5-6 Vegetation coverage of the subproject in the LEDZ**

### 5.2.3 Fauna

183. Due to frequent human activities within the evaluation scope of this project, and the main wild animals are rodents and birds.

184. The baseline data for bird species is derived from publicly available published literature. Liaoning coastal (Bohai Sea) wetlands are a key area along the East Asian-Australian migratory route for migratory birds, of which the Yingkou coastal wetlands are an important part. Bird baseline data are quoted from published literatures. According to the species and amount of waterbirds recorded by "Waterfowl resource assessment during spring migration in Yingkou coastal wetland, China" that conducted from 2016 to 2022 for five consecutive years<sup>13</sup>, and the results of "Diversity and Seasonal Dynamics of Waterbirds in the Daliao River Estuary, Yingkou of Liaoning" conducted from January-December 2019, in the intertidal zone and in nearby mudflats between the mouth of the Daliao River and Sidougou, Yingkou City, China<sup>14</sup>, there are 45 species of waterfowl in Yingkou Coastal Wetland, among which Great Curlew (*Numenius madagascariensis*) and the Great Knot (*Calidris tenuirostris*) have been certified as endangered in the Red List of the International Union for Conservation of Nature (IUCN), and the Black-Billed Gull (*Saundersilarus saundersi*) and the Relic Gull (*Ichthyaetus relictus*) belongs to the Vulnerable category. Five other species are near-threatened, including the Bar-tailed Godwit (*Limosa lapponica*), Black-tailed Godwit, Eurasian Curlew (*Numenius arquata*), Red Knot (*Calidris canutus*), and Red-necked Stint (*Calidris ruficollis*). In terms of the residence type of waterbirds, travelers dominated, with 38 species, accounting for 90.09% of the total number of individuals; four species of summer migratory birds accounted for 0.43%; one species of winter migratory birds accounted for 0.66%, and two species of summering birds accounted for 8.83%. The list of water birds in Yingkou coastal wetland is shown in Table 5-5. Every spring and autumn, large numbers of sandpipers and plovers gather briefly at the mouth of the Da Liao River, creating a spectacular phenomenon known as the "bird wave."

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<sup>13</sup> Lei, W., Gao, D.X., Xing, Q.H., Liao, G.X., Shangguan, K.X., Chen, P.F., Cong, P.F., & Liu, C.A. (2022). Waterfowl resource assessment during spring migration in Yingkou coastal wetland, China. *Marine Environmental Science*, 41(1): 106-112. doi: 10.12111/j.mes.20200160

<sup>14</sup> Zeng, Y.J. & Jia, Y.F. (2022). Diversity and Seasonal Dynamics of Waterbirds in the Daliao River Estuary, Yingkou of Liaoning. *Wetland Science & Management*, 18(1):5.

**Table 5-1 List of water birds in Yingkou coastal wetlands**

No.	Head	Division	Name	Scientific Name	IUCN	Cities	CMS	Agreement on the Protection of Migratory Birds Between China and Foreign Countries	National Key Protection Level	China Endangered Animal Red Book	Three Have Protect Birds	Residential	
1	Anseriformes	Duck family	Nosed Shelduck	<i>Tadorna tadorna</i>	LC			Sino-Japan			√	S	
2			Spot Bill Duck	<i>Anas zonorhyncha</i>	LC						√	S	
3			Common Merganser	<i>Mergus merganser</i>	LC			Sino-Japan			√	S	
4			Whooper Swan	<i>Cygnus cygnus</i>	LC								P
5			Bean Goose	<i>Anser fabalis</i>	LC								P
6			Falcated Duck	<i>Anas falcata</i>	LC								P
7			Green-winged Teal	<i>Anas crecca</i>	LC								P
8			Ferruginous Duck	<i>Aythya nyroca</i>	LC								P
9			Northern Shoveler	<i>Anas clypeata</i>	LC								P
10			Eurasian Wigeon	<i>Anas Penelope</i>	LC								P
11			Common Merganser	<i>Maspia tyrhynchos</i>	LC								P
12	Grebe	Grebe family	Little Grebe	<i>Tachybaptus ruficollis</i>	LC						√	R	
13			Crested Grebe	<i>Podiceps cristatus</i>	LC			Sino-Japan			√	S	

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14	Plover	Oystercatcher	Oystercatcher	<i>Haematopus ostralegus</i>	LC			Sino-Japan			√	S	
15		Anti-billed Sandpiper	Black-Winged Stilt	<i>Himantopus himantopus</i>	LC			Sino-Japan			√	S	
16			Anti-Billed Sandpiper	<i>Recurvirostra avosetta</i>	LC			Sino-Japan			√	P	
17		Ploveridae	Golden Plover		<i>Pluvialis fulva</i>	LC			Sino-Australia, Sino-Japan				P
18			Gray Plover		<i>Pluvialis squatarola</i>	LC			Sino-Australia, Sino-Japan			√	P
19			Ring-Necked Plovers		<i>Charadrius alexandrinus</i>	LC						√	P
20			Mongolian Sand Plover		<i>Charadrius mongolus</i>	LC			Sino-Australia, Sino-Japan			√	P
21			Iron-Billed Sandplover		<i>Charadrius leschenaultii</i>	LC			Sino-Australia, Sino-Japan			√	P
22			Semi-Webbed Sandpiper		<i>Limnodromus semipalmatus</i>	LC			Sino-Australia			√	P
23			Black-Tailed Godwit		<i>Limosa limosa</i>	LC			Sino-Australia, Sino-Japan			√	S
24		Bar-Tailed Godwit		<i>Limosa lapponica</i>	LC			Sino-Australia, Sino-Japan			√	P	
25		Little Curlew		<i>Numenius minutus</i>	LC			Sino-Australia	II				P
26		Middle Curlew		<i>Numenius phaeopus</i>	LC			Sino-Australia, Sino-Japan			√	P	
27		Curlew		<i>Numenius arquata</i>	LC			Sino-Australia, Sino-Japan			√	P	
28		Great Curlew		<i>Numenius madagascariensis</i>	EN			Sino-Australia, Sino-Japan			√	P	
29		Crane Sandpiper		<i>Tringa erythropus</i>	LC			Sino-Japan			√	P	
30		Redshank		<i>Tringa totanus</i>	LC			Sino-Australia, Sino-Japan			√	P	
31		Sandpiper		<i>Tringa stagnatilis</i>	LC			Sino-Australia, Sino-Japan			√	P	

32			Greenshank	<i>Tringa nebularia</i>	LC			Sino-Australia, Sino-Japan			√	P	
33			Sandpiper	<i>Xenus cinereus</i>	LC			Sino-Australia, Sino-Japan			√	P	
34			Turnstone	<i>Arenaria Interpres</i>	LC			Sino-Australia, Sino-Japan			√	P	
35			Great Knot	<i>Calidris tenuirostris</i>	EN			Sino-Australia, Sino-Japan			√	P	
36			Red Knot	<i>Calidris canutus</i>	LC		II	Sino-Australia, Sino-Japan			√	P	
37			Red Neck Sandpiper	<i>Calidris ruficollis</i>	LC			Sino-Australia, Sino-Japan			√	P	
38			Greenshank	<i>Calidris temminckii</i>	LC			Sino-Japan			√	P	
39			Black Knot	<i>Calidris alpina</i>	LC			Sino-Australia, Sino-Japan			√	P	
40		Gullidae	Red-Headed Gull	<i>Chroicocephalus ridibundus</i>	LC			Sino-Japan			√	P	
41			Saunders Gull	<i>Saundersilarus saundersi</i>	VU		I			V	√	P	
42			Relict Gull	<i>Ichthyaelus relictus</i>	VU		I	I		I	V		P
43			Black-Tailed Gull	<i>Larus crassirostris</i>								√	P
44			Siberian Herring Gull	<i>Larus Smithsonianus</i>					Sino-Japan			√	P
45			Gull-Billed Gull	<i>Gelochelidon nilotica</i>								√	P
46			White-Fronted Tern	<i>Sterna albifrons</i>					Sino-Australia, Sino-Japan			√	S
47	Pelicans	Heron	Egret	<i>Egretta garzetta</i>							√	S	

Note: ① The Red List rating of the International Union for Conservation of Nature (IUCN): “EN” means Endangered, “VU” means Vulnerable; ② According to Appendix I and II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Marked; ③ Marked according to Appendices I and II of the Convention on the Conservation of Migratory Species of Wild Animals (CMS); ④ Sino-foreign Migratory Bird Conservation Agreement: “Sino-Australia” means “Agreement between the Government of the People’s Republic of China and the Government of Australia on the Protection of Migratory Birds

and Their Habitat Environment”, “Sino-Japan” means the “Agreement between the Government of the People’s Republic of China and the Government of Japan on the Protection of Migratory Birds and Their Habitat Environment”; ⑤ Levels of National Key Protected Animals: Level I, Level II; ⑥ Levels of “China Red Data Book of Endangered Animals”: “V” means Vulnerable Level; ⑦ “√” indicates that it belongs to the “Three Protected Birds”, that is, the “List of Terrestrial Wild Animals Protected by the State, Beneficial or of Important Economic and Scientific Research Value”; ⑧ “R” indicates Resident, “S” stands for Summer visitor and “P” stands for Passage migrant.

Data source: “Assessment of Waterbird Status During Spring Migration Period in Yingkou Coastal Wetland, Liaoning Province”

Table 5-2 The ecological characteristics and conservation status of key protected bird species in Yinkou City (IUCN Red List).

No.	Name	Scientific Name	IUCN Red List	Living Habits	Breeding Season	Habitat Requirements	Spring Migration Routes	Autumn Migration Routes	Yingkou City Appearance Month	Global Population Size
1	Great Curlew	<i>Numenius madagascariensis</i>	Endangered (EN)	Foraging on mudflats, wetlands and estuaries	arctic summer	Tidal estuaries flats, and wetlands	Southeast Asia / Australia → siberia	siberia → Southeast Asia / Australia	Spring (March-May) , Autumn (September-November)	<5,000 adults
2	Great Knot	<i>Calidris tenuirostris</i>	Endangered (EN)	Foraging along coastal mudflats and beaches	Siberian summer	Tidal flats and estuaries	Australia New Zealand → siberia	siberia → Australia New Zealand	Spring (March-May) , Autumn (September-November)	About 30,000 to 40,000
3	Black-Billed Gull	<i>Saundersilarus saundersi</i>	Vulnerable (VU)	Foraging in coastal areas	spring to early summer	Coastal islands, tidal flats and estuaries	Southeast Asian coastal areas → Yellow Sea coastal islands	Yellow Sea coastal islands → Southeast Asian coastal areas	Spring (March-May) , autumn (September-November) , winter overwintering	7,000 to 10,000 adults
4	Relict gull	<i>Ichthyaetus relictus</i>	Vulnerable (VU)	Foraging in coastal areas	spring	Coastal areas and inland lakes	warm coastal areas in the south → inland lake	inland lake → warm coastal areas in the south	Spring (March-May) , Autumn (September-November)	Fewer than 10,000 adults
5	Bar-tailed Godwit	<i>Limosa lapponica</i>	Near Threatened	Foraging in wetlands, swamps, and coastal beaches	Summer in cold northern regions	Tidal wetlands flats, and estuaries	Australia New Zealand → Siberia / Northern Europe / North	Siberia / Northern Europe / America → Australia New	Spring (March-May) , autumn (September-November) , winter overwintering	-

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							America	Zealand		
6	black-tailed godwit	<i>Limosa limosa</i>	Near Threatened (NT)	Foraging in wetlands, swamps, and coastal beaches	Summer in cold northern regions	Tidal wetlands estuaries flats, and	Australia New Zealand → Siberia / Northern North America	Siberia / Northern North America → Australia New Zealand	Spring (March-May) , Autumn (September-November)	-
7	White-rumped Curlew	<i>Numenius arquata</i>	Near Threatened (NT)	Foraging in wetlands, swamps, and coastal beaches	Summer in cold northern regions	Tidal wetlands estuaries flats, and	Australia New Zealand → Siberia / Northern North America	Siberia / Northern North America → Australia New Zealand	Spring (March-May) , Autumn (September-November)	-
8	Red Knot	<i>Calidris canutus</i>	Near Threatened (NT)	Foraging along beaches and estuaries	arctic summer	Tidal estuaries wetlands flats, and	Australia New Zealand → Siberia / Northern North America	Siberia / Northern North America → Australia New Zealand	Spring (March-May) , Autumn (September-November)	-
9	Red-necked Sandpiper	<i>Calidris ruficollis</i>	Near Threatened (NT)	Foraging along beaches and estuaries	arctic summer	Tidal estuaries wetlands flats, and	Australia New Zealand → Siberia / Northern North America	Siberia / Northern North America → Australia New Zealand	Spring (March-May) , Autumn (September-November)	-

Source: IUCN

185. The land for the LEDZ subproject is a low-yield salt field. During the on-site investigation by the ESIA preparation unit in May 2023, a small number of birds were observed to stay for a short time, resting and foraging here, and no protected bird species and their nests were identified during the on-site investigation, indicating that there is not a bird habitat, with no ecological significance.



**Figure 5-7 The footprints left by birds in the salt field**



**Figure 5-8 Birds foraging in the salt field.**

#### 5.2.4 Protected Area

186. According to Article 14 of the Law of the People's Republic of China on the Protection of Wetlands (implemented on June 1, 2022), the government implements hierarchical management of wetlands, and classifies wetlands into important wetlands and general wetlands in accordance with their ecological location, area, and the importance of preserving ecological functions and biodiversity. Important wetlands include national important wetlands and provincial important wetlands, and wetlands other than important wetlands are general wetlands. Important wetlands are classified as ecological protection red line according to law. The list and scope of general wetlands are issued by the local people's governments at or above the county level or their authorized departments. The *Criteria for Recognition of General Wetlands in Liaoning Province (2022)* stipulates that general wetlands refer to wetlands other than important wetlands (including internationally important wetlands, nationally important wetlands and provincially important wetlands), and that wetlands with any of the following criteria within Liaoning Province can be recognized as general wetlands:

- (i) A single wetland or multiple wetland complex with an area of less than 5,000 hectares that conforms to the characteristics of wetlands and has a strong ecological function or hydrological role;
- (ii) Typical representatives of wetland types or endemic types of wetlands within the municipal administrative area;
- (iii) Wetlands that serve as important habitats for wildlife under provincial key protection as well as terrestrial wildlife with important ecological, scientific and social values;
- (iv) Wetlands with more than 2,000 breeding, wintering and migratory stops of waterbirds of 1 per cent of the total number of multiple or single species flocks;
- (v) Wetlands with representative, rare or regional characteristic plant communities concentrated and distributed;
- (vi) Wetlands with scientific research, popularization of science and education, history and culture, and ecotourism value.

187. According to the results of the Third National Land Survey<sup>15</sup>, the wetland area of Yingkou City is 14,978.35 hectares. Among them, coastal mudflats have the largest area of 11,668.38 hectares, accounting for 77.90% of the city's wetland area; inland mudflats have the second largest area of 3,038.62 hectares, accounting for 20.30% of the city's wetland area; and marshy grasslands have the smallest area of 269.7 hectares, accounting for 1.8% of the city's wetland area. As confirmed by the Forestry and Grassland Bureau of Yingkou City, there are no important wetlands in Yingkou City. The nearest important wetland to the Project is the Liaoning Liaohekou National Nature Reserve about 55 kilometers to the north. There is one general wetland identified in Yingkou City, which is Dongtan General Wetland<sup>16</sup> in Laobian District of Yingkou City, about 15 km away from the Project area. There is no nature reserve within the Project site, and the ecological red line is not involved. There is no nature reserve within the project site, and the project does not involve the ecological red line. There is a 8km coastal tidal flat on the south side of the comprehensive bonded zone in the FTZ, extending from the Sidaokou Fishing Port in the north to the Yingkou Huaneng Power Plant in the south. However, this section of coastal tidal flat wetland does not meet the recognition criteria for general wetlands in Liaoning Province.

### 5.3 Environmental Quality Baseline

188. The baseline data for environmental quality mainly comes from the regional environmental quality data published by the Yingkou Municipal Ecological Environment Bureau and the project-level environmental status monitoring results conducted by third-party testing units commissioned by domestic environmental assessment units in accordance with the Environmental Impact Assessment Technical Guidelines.

#### 5.3.1 Ambient Air Quality

189. According to the "Ambient Air Quality Status of Yingkou City from January to December 2022" published on the official website of Yingkou Ecological Environment Bureau (<http://sthjj.yingkou.gov.cn>), it can be known that from January to December 2022, days of different grades of the ambient air quality index (AQI) of Yingkou are: 108 days for excellent, 196 days for good, 52 days for light pollution, 6 days for moderate pollution, 2 days for heavy pollution, and 1 day for serious pollution, with a compliance rate of 83.3%. The concentrations of various pollutants in the ambient air are: the average concentration of PM<sub>2.5</sub> is 32 µg/m<sup>3</sup>, the average concentration of PM<sub>10</sub> is 55 µg/m<sup>3</sup>, the average concentration of SO<sub>2</sub> is 11 µg/m<sup>3</sup>, the average concentration of NO<sub>2</sub> is 25 µg/m<sup>3</sup>, and the 90th percentile of the O<sub>3</sub>-day maximum 8-hour moving average was 159 µg/m<sup>3</sup>, and the 95th percentile of CO 24-hour average was 1.6 mg/m<sup>3</sup>. The analysis of the above data list is as follows:

**Table 5-3 Evaluation Form of Regional Ambient Air Quality Status (General Pollutants)**

Pollutants	Annual Evaluation Index	Current Concentration/ (µg/m <sup>3</sup> )	Standard Value/(µg/m <sup>3</sup> )	Occupation Rate/%	Compliance
PM <sub>2.5</sub>	Annual Average Mass Concentration	32	35	91.4	Exceed the Standard
PM <sub>10</sub>	Annual Average Mass Concentration	55	70	78.6	Up to Standard
SO <sub>2</sub>	Annual Average Mass Concentration	11	60	18.3	Up to Standard

<sup>15</sup> Yingkou Municipal Bureau of Forestry and Grassland. (2023). Planning on wetlands protection in Yingkou City (2023-2030)

<sup>16</sup> Yingkou Municipal Bureau of Forestry and Grassland. (2022, December 8). Notice on Issuing the List of General Wetlands in Yingkou City.

NO <sub>2</sub>	Annual Average Mass Concentration	25	40	72.5	Up to Standard
CO	95th Percentile Daily Average Mass Concentration	1,600	4,000	42.5	Up to Standard
O <sub>3</sub>	Daily Maximum 8-Hour Average 90th Percentile Daily Average Mass Concentration	159	160	90	Up to Standard

190. In 2022, the 24-hour average 95th percentile annual average concentrations of PM<sub>2.5</sub>, PM<sub>10</sub>, SO<sub>2</sub>, NO<sub>2</sub>, and CO in the ambient air of Yingkou City all met the Class II standard in the "Ambient Air Quality Standard" (GB3095-2012) and their revision requirements. It can be seen from the statistical results that this area is a standard area.

### 5.3.2 Acoustic Environment Quality

191. According to the "Yingkou City Urban Acoustic Environment Functional Zoning Plan" (Yingzhengbanfa [2021] No. 15), the area where the project is located belongs to the Category III of acoustic environment functional area, and the environmental noise should implement the standards of Category III function zone in the "Acoustic Environmental Quality Standard" (GB3096-2008)

192. The FTZ subproject: Shenyang Lvcheng Environmental Monitoring Co., Ltd has conducted environmental quality monitoring from June 10, 2023 to June 11, 2023. The daytime noise of railway lines and logistics supporting centers was slightly higher than the limit value of the Class III standard (65dB at daytime and 55dB at night) in the "Environmental Quality Standard for Acoustics (GB3096-2008)", and the noise at night meets the requirements of Class III standard.

**Table 5-4 The monitoring results of the acoustic environment quality of the FTZ subproject FTZ**

No.	Monitoring Location	During The Day		At Night	
		2023.06.10	2023.06.11	2023.06.10	2023.06.11
N 1	1 m from the boundary of the center point of the industrialization zone	64	64	51	52
N 2	1 m from the boundary of the central point of the logistics supporting area	67	67	52	52
N 3	1 m from the boundary of the central point of the dry port hub area	59	66	52	53
N 4	1 m from the start of the railway line	64	64	51	52
N 5	15 m east of the railway centerline	66	66	52	53
N 6	1m from Railway station	67	68	53	53
N 7	Railway station	54	53	43	43



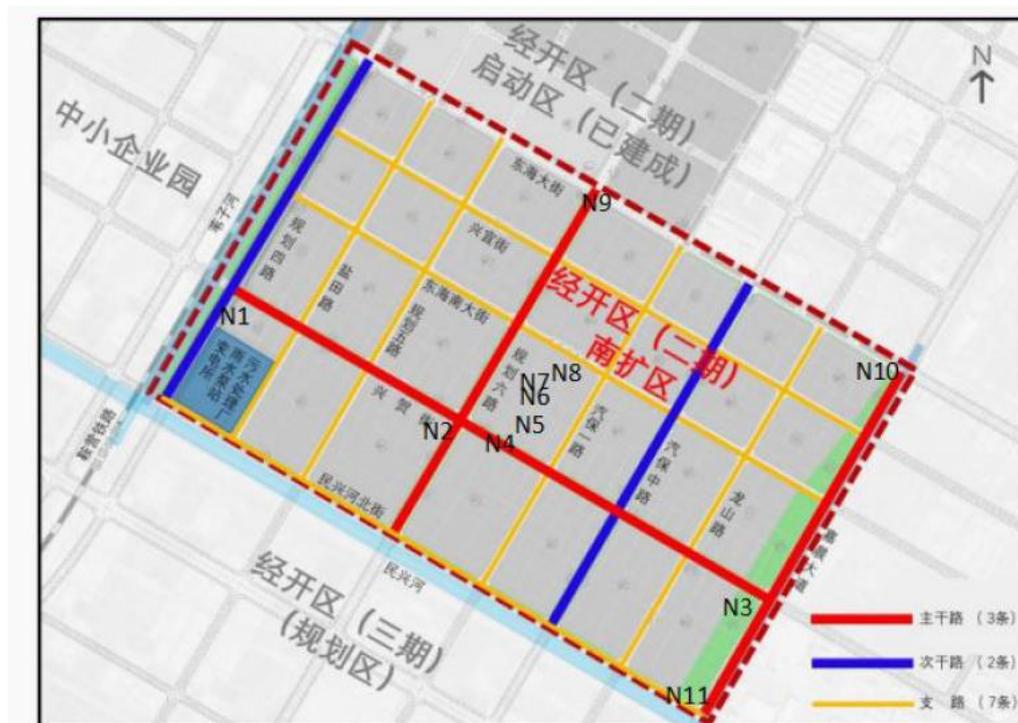
**Figure 5-9The FTZ sub-project monitoring location map**

193.The LEDZ subproject: The construction unit entrusts Shenyang Lvcheng Environmental Monitoring Co., Ltd. to monitor the current situation of the acoustic environment quality around the evaluation area. The ambient noise value in the area where the project is located meets the limit requirements of Class III standards (65dB at daytime and 55dB at night) in the “*Environmental Quality Standard for Acoustics (GB3096-2008)*”, and the noise on both sides of the planned road meets the Class IV standard in the “*Environmental Quality Standard for Acoustics (GB3096-2008)*” (70dB during the day and 55dB at night).

**Table 5-5 Status Quo of Noise Quality in the LEDZ subproject**

Chapter 5 Description of the Environmental and Social Economic Development

Detection Point	Test Results			
	November 11, 2022		November 12, 2022	
	During the Day	At Night	During the Day	At Night
N1 The starting point of Xinghe Street	60	52	59	52
N2 The middle section of Xinghe Street	61	53	62	51
N3 The end of Xinghe Street	62	49	61	50
N4 20 m away from north of Xinghe Street	60	51	60	52
N5 40 m away from north of Xinghe Street	60	52	61	50
N6 80 m away from north of Xinghe Street	61	51	62	51
N7 120 m away from north of Xinghe Street	62	53	63	51
N8 200 m away from north of Xinghe Street	62	52	60	50
N9 The north starting point of Guihua No.6 Road	61	51	61	53
N10 The north starting point of Jiachen Avenue	62	51	59	52
N11 The south starting point of Jiachen Avenue	61	52	60	50



Source: Environmental Impact Assessment Form of the LEDZ (Phase II) South

Expansion Area Municipal Infrastructure Construction Project, 2023.

**Figure 5-10 Noise monitoring location map of the LEDZ subproject**

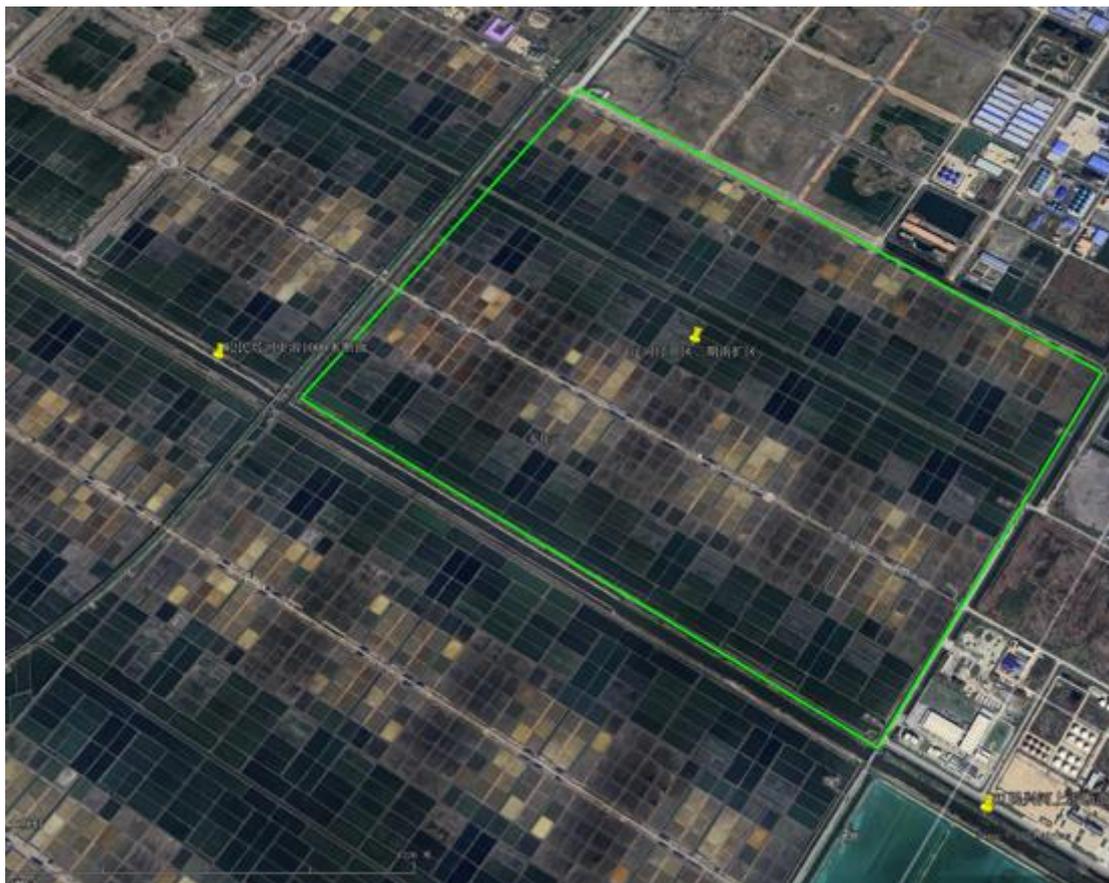
### 5.3.3 Environmental Quality of Surface Water

194. The main surface water in Yingkou City is Minxing River, and the evaluation of surface water follows the "Environmental Quality Standards for Surface Water". This evaluation of the current quality monitoring of surface water Minxing River refers to the monitoring data of Liaoning Zhuhai Testing Technology Co., Ltd. from August 3 to August 5, 2022. Surface water monitoring data showed that the monitoring data of chemical oxygen demand, five-day biochemical oxygen demand, total nitrogen, and petroleum in the upper reaches of the Minxing River all exceeded the Class IV standard in the "Environmental Quality Standards for Surface Water" (GB3838-2002), the monitoring data of chemical oxygen demand, five-day biochemical oxygen demand, and petroleum in the lower reaches of the Minxing River all exceeded the Class IV standard in the "Environmental Quality Standards for Surface Water" (GB3838-2002), and the monitoring data of other monitoring factors in two monitoring points T all met the Class IV standard in the "Environmental Quality Standards for Surface Water" (GB3838-2002). The reason for exceeding the standard is that the flow of Minxing River is relatively small, and the upstream domestic sewage has not been collected and treated in a centralized manner so that parts of domestic sewage were discharged, and there was non-pointed pollution in the rural of the upper reach leading to the excessive pollutants.

**Table 5-6 Statistical results at the monitoring sections of the Minxing River**  
Unit: mg/L (except pH)

Monitoring Section	Project	pH	CODCr	BOD <sub>5</sub>	SS	Ammonia nitrogen	Chroma	Total Nitrogen
# 1 Minxing River Upstream Section	Monitoring Value	7.36-7.62	35-39	9.3-9.5	18-23	1.80-1.82	10	1.97-1.98
	Sij	0.18-0.31	0.875-0.975	0.93-0.95	/	0.9-0.91	/	0.985-0.99
	Standard Value	6-9	40	10	/	2.0	/	2.0
# 2 Lower Minxing River	Monitoring Value	7.29-7.33	36-39	9.6-9.7	25-26	1.73-1.76	10	19.4-1.99
	Sij	0.145-0.165	0.9-0.975	0.96-0.97	/	0.865~0.88	/	0.97-0.995
	Standard Value	6-9	40	10	/	2.0	/	2.0

Source: Environmental Impact Assessment Form of the LEDZ (Phase II) South Expansion Area Municipal Infrastructure Construction Project, 2023.



**Figure 5-11 Minxing River Water Quality Monitoring Location Map**

### 5.3.4 Environmental Quality of Groundwater

195. The groundwater quality complies with Class III standards as per the "Groundwater Quality Standards" (GB/T14848-2017). The current groundwater quality assessment references monitoring data collected by Yingkou Environmental Impact Assessment Co., Ltd. on July 8th to 9th, 2019. The groundwater monitoring data indicates that the groundwater in the evaluation area is saline. The monitoring results of chloride, ammonia nitrogen, dissolved solids, and permanganate index at each monitoring point all exceed the Class III standard values specified in the "Groundwater Quality Standards" (GB/T14848-2017). However, the monitoring results of other parameters at each monitoring point comply with the Class III standard values specified in the "Groundwater Quality Standards" (GB/T14848-2017). The exceedance of dissolved solids and permanganate index is mainly due to local geological conditions. The excess chloride is attributed to the area's geological formation as a result of marine and terrestrial sedimentation, influenced by seawater. The excess ammonia nitrogen is caused by the shallow burial of local groundwater, leading to local surface water infiltration.

**Table 5-7 Groundwater quality monitoring results**

**Unit: mg/L (except pH)**

Item	Ground water monitoring results				Class III of GB/T14848-2017
	GW1	GW2	GW3	GW4	
pH	7.01	7.54	7.08	7.90	6-8.5
K+	27.31	29.74	28.75	27.84	/
Na+	73.18	74.42	73.74	75.42	/
Ca+	195.8	221.4	216.9	205.2	/
Mg <sup>2+</sup>	179.53	120.45	187.02	183.45	/
CO <sub>3</sub> <sup>2-</sup>	ND	ND	ND	ND	/
HCO <sub>3</sub> <sup>-</sup>	464	452	409	421	/

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Cl-	3072	3425	3127	3044	/
SO42-	138	142	136	145	/
Ammonia Nitrogen	4.26	2.58	2.32	2.12	≤0.50 mg/L
Total Hardness	388.0	350.8	332.3	312.8	≤450 mg/L
Dissolved Solids	5650	5550	5030	5060	≤1000 mg/L
Petroleum	0.02	0.02	0.03	0.03	/
Nitrate	0.03	0.04	0.46	1.38	≤20.0 mg/L
Nitrite	0.001	0.001	0.005	0.005	≤1.00 mg/L
Anionic Surfactant	0.054	0.060	ND	ND	≤0.3 mg/L
Sulfide	ND	ND	0.008	0.009	≤0.02 mg/L
Fluoride	0.83	0.85	0.84	0.83	≤1.0 mg/L
Volatile Phenols	0.0017	0.0016	0.0017	0.0016	≤0.002 mg/L
Cyanide	ND	ND	ND	ND	≤0.05 mg/L
Arsenic	ND	ND	ND	ND	≤0.01 mg/L
Mercury	0.70	0.63	0.76	0.65	≤0.001 mg/L
Hexavalent Chromium	ND	ND	ND	ND	≤0.05 mg/L
Lead	ND	ND	ND	ND	≤0.01 mg/L
Cadmium	ND	ND	ND	ND	≤0.005 mg/L
Iron	0.22	0.16	0.13	0.10	≤0.3 mg/L
Manganese	ND	ND	ND	ND	≤0.10 mg/L
Permanganate Index	12.4	9.3	9.3	8.6	≤3.0 mg/L
Total Coliforms	ND	ND	ND	ND	≤3.0MPN/100mL
Total Bacteria	ND	ND	ND	ND	≤100CFU/mL

Source: Environmental Impact Assessment Report of the Controlled Detailed Planning of the Second Phase of Yingkou Liaohe Economic Development Zone, 2020



Figure 5-12 Groundwater sampling locations

## 5.4 Land use status

### 5.4.1 Yingkou FTZ Dry Port Hub and Industrial Park Subproject

(i) The New Construction Project of the Railway Station Construction Subproject in Yingkou FTZ

196. The current land-use type of the component is the state-owned construction land, involving the recovery and transfer of permanent state-owned land use rights, with the land area of 252,646 m<sup>2</sup>. Except for the state-owned construction land owned by the FTZ Management Committee, the right to use the remaining the state-owned construction land belongs to Yingkou Comprehensive Bonded Zone Bonded Logistics Group Co., Ltd. and Yingkou Coastal Development and Construction Group Co., Ltd. so that it needs to go through the land-use right recovery and transfer procedures of the state-owned construction land.

197. There is Anlida Enterprise of the Comprehensive Insurance Group within the scope of the proposed railway station, and it is planned to demolish an office building and a factory building (land area of 25,813.46 m<sup>2</sup>, building area of 7,603.08 m<sup>2</sup>), and it is owned by Yingkou Comprehensive Bonded Zone Bonded Logistics Group Co., Ltd.

198. The South Wastewater Plant of FTZ is located in the south side of the railway station. The railway line is planned to pass through the South Wastewater Plant so that the aeration tank on the west side of the wastewater plant needs to be removed. After the demolition of the land, the new line will be drawn from the west side of the Bianhai Station on the Bianhai Line, and then it will go along the sea embankment for about 400m and then turn north passing on the west side of the wastewater treatment plant and introducing to the comprehensive bonded areas after setting up the level crossing of Xinhai Street.

199. The sewage plant is a supporting facility in the park, which started construction in March 2008, covering an area of 87,300 m<sup>2</sup>, and was planned to serve surrounding enterprises. Due to the impact of the global economic crisis, the original enterprises withdrew their capital, and the wastewater plant construction was suspended. The Management Committee of the FTZ has signed an acquisition and compensation agreement with Yingkou Coastal Development and Construction Group Co., Ltd. on December 18, 2020. The demolition part of the wastewater plant covers an area of 31,508 m<sup>2</sup>, with the building area of 10,995 m<sup>2</sup>.

200. The project construction does not occupy cultivated land and permanent basic farmland, and does not occupy land within the red line of ecological protection.



Source: Google Earth, Photographed on October 24, 2021

**Figure 5-13 Satellite images of land status within the project area of Yingkou FTZ**

(ii) The Building Facilities and Municipal Infrastructure Project in the FTZ

201. The land property is state-owned construction land, which the current land status is blank lands. 281,083 m<sup>2</sup> of permanent land acquisition are involved, of which the state-owned construction land required for municipal road construction project needs to be acquired from the FTZ Branch of Yingkou Natural Resources Bureau, and the state-owned construction required for standardized factory building construction project needs to be acquired from the FTZ Branch of the Natural Resources Bureau of Yingkou City.

202. The project construction does not occupy cultivated land and permanent basic farmland, and does not occupy land within the red line of ecological protection.

### 5.4.2 Liaohe Economic Development Zone Project

203. Most of the current land is state-owned low-yield salt fields. The sub-project of the industrial cooperation supporting project of LEDZ in Yingkou involves permanent land occupation of 4,060,000 m<sup>2</sup>, all of which are state-owned construction land; Currently, the right to use the land belongs to Yingkou Asset Management Company, which needs to recover the state-owned land use right by Yingkou Natural Resources Bureau and then transfer it to Liaohe Economic Development Zone Urban Investment Company. The demolition area of the ground buildings is 4,060,000 m<sup>2</sup>, which is owned by the Yingkou Salt Industry Co. Ltd and requires expropriation compensation.

204. The project construction does not occupy cultivated land and permanent basic farmland, and does not occupy land within the red line of ecological protection.



Source: Google Earth, photographed on October 24, 2021



Figure 5-14 Satellite image of land status within the project area of Yingkou FTZ

## 5.5 Socio-economics Status

### 5.5.1 Population Structure

205. As of the end of 2021, Yingkou City has a registered population of 2.269 million.

Among them, the urban population was 1.205 million, accounting for 53.09%. The annual birth population was 9,150, with a birth rate of 4.02‰; the death population was 16,915, with a death rate of 7.44‰; the natural population growth rate was -3.41‰.<sup>17</sup>

206. According to the 1‰ population sampling survey, the permanent resident population of the city was 2.286 million at the end of the year. Among them, the urban population was 1.549 million, accounting for 67.75% of the permanent population; the rural population was 737,000, accounting for 32.25%.<sup>18</sup>

(i) Gender structure

207. Among the population of Yingkou, the male population is 1,173,434, accounting for 50.39%; the female population is 1,155,148, accounting for 49.61%. The sex ratio of the total population (female as 100, the ratio of men to women) dropped from 104.95 in the sixth national census in 2010 to 101.58.<sup>19</sup>

(ii) Ethnic structure

208. There are 40 ethnic groups in Yingkou City, namely Han, Manchu, Hui, Korean, Mongolian, Tibetan, Xibe, Uyghur, Miao, Yi, Zhuang, Buyi, Dong, Yao, Bai, Tujia, Hani, Li, Gaoshan, Daur, Russian, Ewenki, Oroqen, Hezhe, Lisu, She, Shui, Dongxiang, Tu, Qiang, Kirgiz, Wa, Jingpo, Mulao, Brown, Sala, Maonan, Gelao, Pumi, Jinuo. There are 154,000 ethnic minorities, accounting for 6.33% of the total population of Yingkou. There are 5 ethnic minorities with a relatively large population, including 122,479 peoples of Manchus, 13,703 peoples of Huis, 9,737 peoples of Korean, 5,525 peoples of Mongolians, and 1,156 peoples of Xibes.

209. According to the field survey, this project locates in the development zone. In the land use scope of this project, it does not involve minority population concentrated area.

(iii) Age structure

210. Among the population of Yingkou, the population aged 0-14[4] is 269,137, accounting for 11.56%; the population aged 15-59 is 1,475,067, accounting for 63.35%; the population aged 60 and over is 584,378, accounting for 25.09%, of which 65 and The above population is 402,789 people, accounting for 17.30%.

### 5.5.2 Income and Employment

211. In 2022, the per capita disposable income of urban permanent residents was 42,977 yuan, an increase of 1.6% over the previous year; the per capita disposable income of rural permanent residents was 22,858 yuan, an increase of 3.3%. According to the Bulletin of the Fourth National Economic Census of Yingkou City, at the end of 2018, there were 428,100 employees in legal entities in the city's secondary and tertiary industries, of which 150,200 were female employees. Self-employed households employed 226,600 people, including 110,200 female employees.

### 5.5.3 Social Security and Welfare

212. By the end of 2022, the number of participants in the basic old-age pension insurance for urban employees will be 1.137 million, a year-on-year increase of 3.6%. The number of people participating in urban and rural residents social endowment insurance was 612,000,

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<sup>17</sup> Yingkou Municipal Bureau of Statistics. (2024, June 4). Main Data of the Seventh National Population Census of Yingkou City.

<sup>18</sup> Yingkou Municipal Bureau of Statistics. (2023, April 20). Statistical Report of Yingkou on the 2022 National Economy and Social Development.

<sup>19</sup> Yingkou Municipal Bureau of Statistics. (2024, June 4). Main Data of the Seventh National Population Census of Yingkou City.

an increase of 5.5%. At the end of the year, 346,000 people participated in work-related injury insurance, including 20,000 migrant workers. At the end of the year, 1.923 million people participated in basic medical insurance, including 927,000 people who participated in urban employee basic medical insurance and 996,000 people who participated in urban and rural residents basic medical insurance. At the end of the year, 388,000 people participated in maternity insurance. At the end of the year, 342,000 people participated in unemployment insurance. There were 20,200 new urban jobs throughout the year, and 39,400 registered urban unemployed persons.<sup>20</sup>

#### **5.5.4 Regional National Economic Characteristics**

213. In 2022, the annual GDP of Yingkou City was 143.16 billion yuan, a decrease of 2.3% over the previous year. Among them, the added value of the primary industry was 12.66 billion yuan, an increase of 2.7%; the added value of the secondary industry was 63.08 billion yuan, a decrease of 8.7%; the added value of the tertiary industry was 67.41 billion yuan, an increase of 2.3%. The annual per capita GDP was 62,269 yuan, a decrease of 1.4% over the previous year<sup>21</sup>. According to the "Statistical Bulletin on National Economic and Social Development of Yingkou City in 2022", the per capita disposable income of urban permanent residents in 2022 was 42,977 yuan, an increase of 1.6% over the previous year; the per capita disposable income of rural permanent residents was 22,858 yuan, an increase of 3.3%.

214. In 2021, Yingkou's total import and export was 53.46 billion yuan, an increase of 13.0% over the previous year. Among them, the total export value was 26.82 billion yuan, an increase of 44.2%; the total import value was 26.63 billion yuan, a decrease of 7.2%. The vigorous development of Yingkou's economic industry mainly relies on the Yingkou area of China (Liaoning) FTZ Pilot, Yingkou LEDZ, Yingkou Coastal Industrial Base, Yingkou High-tech Industrial Development Zone and other industrial parks. Among them, the FTZ and the LEDZ are important platforms and carriers for the economic and social development of Yingkou City, and are the key support for the further development of regional dry port hubs and industrial facilities<sup>22</sup> as well as the essential foundation for further establishing the comprehensive transportation channel, facilitating construction of the comprehensive freight hub, and promoting the construction of the collection and distribution system in port areas and parks.

#### **5.5.5 Park Development**

##### **5.5.5.1 Overview of Yingkou Area of FTZ Pilot**

215. At present, there are 283 technology-based small and medium-sized enterprises in the FTZ, accounting for 43% of Yingkou City; 104 national high-tech enterprises, accounting for 31% of Yingkou City; 34 young eagle enterprises (the innovative enterprises that have been registered for no more than 10 years, have strong innovation ability, have made breakthroughs in a specific field, have high development potential in the future and have been recognized by the market), accounting for 42% of Yingkou City; 13 gazelle enterprises (the small and medium-sized enterprises that have crossed the valley of death and entered the high growth period with the support of technological innovation or commercial innovation), accounting for 41% of Yingkou City.

##### **(i) Overview of Yingkou Dry Port Hub Industrial Park**

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<sup>20</sup> Yingkou Municipal Bureau of Statistics. (2023, April 20). Statistical Report of Yingkou on the 2022 National Economy and Social Development.

<sup>21</sup> 2022 Yingkou National Economic and Social Development Statistical Bulletin, Yingkou Statistics Bureau, April 20, 2023

<sup>22</sup> The Liaoning Yingkou Free Trade Zone are opening to the outside world with the "three zones composition" and "multiple driving forces", China News, July 3, 2019

216. The Dry Port Industrial Park is based on the international dry port and relies on the advantages of the international logistics resources of the dry port to set up the Lingang Industrial Zone (the Lingang Industrial Zone consists of the Lingang Industrial Zone and the Lingang Service Area). The large output and large volume of the cluster provide sufficient freight resources for the dry port, and the high-quality modern service cluster in the Lingang service area gathers the freight resources in the economic hinterland for the dry port, thus forming an progressive organic relationship between the international dry port, a Lingang industrial area, inland cities, the direct economic hinterland of the dry port and the indirect economic hinterland of the dry port , and has contributed to the development model of "districts are established according to the port, and the district supports the port, and the port is linked to the construction of the port and the city", so that the inland city can be developed into an international port city.

(ii) Overview of Yingkou Comprehensive Bonded Zone

217. Yingkou Comprehensive Bonded Zone focuses on bonded logistics, bonded processing, bonded services and other businesses, focuses on the development of bulk commodity trade such as magnesium, sugar, grain, agricultural products, alumina, etc.; the port and shipping services such as freight forwarding, shipping finance and insurance, and ship inspection and testing; the processing display transactions based on daily high-end consumer goods, specialty processing industrial products, the two-way investment based on output of high-end equipment production capacity and introduction of high-tech product materials, etc., the bonded warehousing and logistics services based on cross-border e-commerce, supply chain management, consolidation, etc. The zone also emphasizes cultivating offshore service industries that focus on offshore finance and R&D outsourcing, technological service industries that focus on R&D and transformation of safety equipment and biomedicine, and new types of trade such as international leasing that focus on bonded maintenance and large-scale equipment and facility exports form, to promote Yingkou to embark on a new journey of a new round of revitalization of the Northeast China and the strategic opening of the coastal economic belt.

218. Since the opening of the customs, the opening function of Yingkou Comprehensive Bonded Zone has been continuously improved, the export-oriented economy has developed rapidly, and the industrial foundation has been continuously consolidated. The zone has established closer, more free and convenient economic and trade communication and people-to-people exchanges with Japan, the Republic of Korea, Russia, Mongolia and Central and Eastern European countries. Also it has attracted advantageous projects such as Italian Industrial Park, Anqi Musical Instruments, Liaoning Supply and Marketing Hengis Cross-border Supply Chain Smart Park, Kaiwen Sugar Industry, and Yijie Cross-border (Yingkou) International Commodity Exhibition and Trading Center. The accumulated import and export volume was 2.2 billion yuan. In 2020, the growth rate of import and export in Yingkou Comprehensive Bonded Zone ranked second in China

**5.5.5.2 Yingkou LEDZ**

219. The park focuses on the development of the three leading industries of automobiles and auto parts and related industries, deep processing of agricultural and sideline products, and modern logistics. As of now, the LEDZ industrial park has a total of 496 existing industrial enterprises. The LEDZ has consistently integrated the guidance of enterprises' independent innovation into industrial development. As of 2022, it has 23 technology-based small and medium-sized enterprises, 15 high-tech enterprises, 5 fledgling enterprises, 3 gazelle enterprises, and 22 provincial and municipal-level technology center enterprises, along with 7 specialized and new enterprises.

220. During the "13th Five-Year Plan" period, the total import and export of goods in the LEDZ amounted to 445 million yuan, with completion values for each year as follows: 0.88 billion yuan in 2016, 0.76 billion yuan in 2017, 0.71 billion yuan in 2018, 1.1 billion yuan in 2019, and 1 billion yuan in 2020, laying a solid foundation for the start of the "14th Five-Year Plan." The target for the "14th Five-Year Plan" is to achieve a total import and export

volume of 671 million yuan, with an average annual growth rate of 10%.<sup>23</sup>

## 5.6 Physical and Cultural Resources

221. There are no known cultural heritages or cultural resources that need to be protected within the scope of the project.

## 5.7 Environmental Protection Target

222. Referring to the identification criteria of environmental protection objectives in the "Technical Guidelines for the Preparation of Environmental Impact Assessment Reports for Construction Projects," the atmospheric environmental protection objective includes natural reserves, scenic spots, cultural areas, and areas with a relatively concentrated population within a 500-meter range outside the project boundary. The noise environmental protection objective covers a 50-meter range outside the project boundary. The ecological protection objective encompasses important species, ecologically sensitive areas, and other species, populations, and biological communities requiring protection, as well as seasonal ecological spaces. According to the above criteria, the environmental protection objectives for this project are as follows:

### 5.7.1 FTZ sub-project

223. There are no residential areas within a 500-meter range of the FTZ subproject site. There are no noise environmental protection objectives within a 50-meter range around. The atmospheric environmental protection objective covers the employees of park enterprises within a 500-meter range outside the project boundary, with the company names listed in Table 13-1 of the Stakeholder Identification Matrix, such as Yingkou Futai Technology Co., Ltd.

224. Ecological protection objective: Within the project's land area, there are no designated ecological protection areas. However, the coastline stretching 8 kilometers from the north of Yingkou Sidaogou Fishing Port to the south of Yingkou Huaneng Power Plant is identified as a resting place for migratory birds. The western side of the railway project's 1.73-kilometer connecting line includes coastal tidal wetlands and Bird Wave Square, with the closest distance being approximately 50 meters. There is a protective forest belt approximately 30-40 meters wide between the railway connecting line and the tidal wetlands.

225. The construction of subproject A of the FTZ involves the land occupation of shrimp ponds. The future operation route of the railway of subproject B of the FTZ is only 50-200 m away from the coastal wetland on the west side.

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<sup>23</sup> China Urban Construction Design and Research Institute. (2024 January). Feasibility Study Report of the AIIB Loan Yingkou Green Smart Trade Zone Development Project



Photos of the protective forest belt



Photos of current road conditions on the south side of the freight yard location



Photo of the current situation of the road next to the location of the green standardized industrial plant



Photos of the status quo of the location of green standardized industrial plants

Source: ESIA preparation unit

**Figure 5-15 Surrounding environment of FTZ sub-project**





Figure 5-17 Surrounding environment of LEDZ subproject

## **6 Environmental Impact Assessment and Mitigation Measures**

### **6.1 Environmental Impact Identification**

227. Preliminary identification of possible environmental impacts of project activities is carried out using matrix method (Table 6-1). Use the intersection of ranks and columns to describe the impact degree and characteristics of project activities on various environmental factors. These impacts include positive or negative, continuous or temporary, direct or indirect.

#### **(i) Identification of main environmental impacts during the construction period**

228. Environmental impacts during construction mainly come from the construction activities, including related noise, dust, construction wastewater, soil erosion, construction solid waste and muck disposal, environmental sanitation in construction camps, and impacts on bird habitats in nearby coastal wetlands.

229. During the construction period, the operation of bulldozers, excavators, drilling machines, pile drivers, concrete mixers and other large construction equipment, as well as the transportation and handling of construction materials, will generate considerable noise pollution.

230. Activities such as earthwork excavation, stone crushing and concrete mixing on the construction site will generate a large amount of dust. At the same time, construction activities will also generate a certain amount of wastewater, such as wastewater generated during the cleaning of equipment and tools, and concrete preparation.

231. Large-scale excavation and filling activities may cause soil stripping, resulting in soil erosion.

232. All kinds of construction waste, packaging waste and other solid waste generated during the construction process may cause environmental pollution if not handled properly.

233. The western side of the Yingkou FTZ subproject is the Yingkou coastal beach wetland, and the LEDZ subproject occupies the salt flat wetland, and the construction activities may have some impacts on the perching birds and the local ecosystem. Noise during construction may interfere with the orientation and orientation of migratory birds, thereby affecting their migratory behavior. In addition, the strong light at the construction site may disrupt the biological clock of migratory birds, affecting their normal migration and rest. Second, construction activities may cause damage to the wetland ecosystem. Wetlands are important supply stations during the migration of migratory birds, providing them with rich food resources and safe resting places. Construction activities such as excavation and filling may change the topography and hydrological conditions of the wetland, thereby destroying the integrity of the wetland ecosystem.

#### **(ii) Identification of main environmental impacts during the operation period**

234. The project will construct 6 municipal roads in Yingkou FTZ with a total length of 4.22 km, and 12 municipal roads with a total length of 22.67 km in the Phase II of the south expansion area of LEDZ. The car exhaust and noise are the main impacts during the project operation period. In addition, the international express delivery center, cargo storage yard, smart warehouse and standard factory building built by the project will lead to an increase in logistics vehicles, which may bring risks related to traffic safety.

235. This project will build a 1.73 km railway connection line. The vibration, noise and light generated by freight trains may affect the habitat of wetland birds and interfere with bird migration.

**Table 6-1 The environment and social impacts recognition matrix**

Stage	Activities/Aspects	Characteristic		Influence Level			Direct/Indirect	Duration
		Negative	Positive	Slight	Medium	High		
Construction Period	The operation of construction machinery and transport vehicles will generate certain noise and vibration	√			√		direct	short term
	Construction noise, construction wastewater, dust, water and soil erosion caused by earthwork excavation and material transportation during road construction and pipeline laying, plant and warehouse construction	√			√		direct	short term
	Spoil and other construction waste generated by earthwork excavation and filling	√			√		direct	short term
	The domestic waste and domestic sewage generated in the construction camp and the new load on the municipal treatment facilities	√		√			direct	short term
	Traffic safety and community safety for noise from construction activities such as road construction and pipeline laying	√			√		direct	Intermittent
	Public service facilities caused by excavation, such as temporary service interruptions such as water supply and power supply	√			√		direct	short term
	Railway construction activities: Noise and light affect migratory birds in coastal wetlands in May and September	√			√		direct	Intermittent
	Damage to the original ecological environment caused by the land occupation of the project facilities	√			√		direct	permanent
Operation period	Improvement of park infrastructure such as heating, water supply, sewerage, road lighting and solid waste collection		√			√	direct	long
	Road traffic noise and vehicle emissions	√			√		direct	long

The impact of noise and vibration generated by train operation and locomotive whistle on employees of nearby enterprises	√			√		direct	Intermittent
Effects of light and noise during train operation on coastal wetland birds	√			√		direct	long
Loading exhaust gas generated during loading and unloading	√			√		direct	long
Industrial waste and hazardous waste generated by standardized workshops, freight yards, and smart warehouses	√			√		direct	long
Workers in railway station areas, standardized workshops, freight yards, and smart warehouses have new demands on public service facilities, such as heating, water supply, sewage treatment, and solid waste collection, putting pressure on public facilities	√		√			direct	long
Logistics transport vehicles increase traffic pressure and traffic safety on the surrounding area	√			√		indirect	long

## **6.2 Environmental Impact Prediction and Mitigation Measures**

### **6.2.1 Impacts and mitigation measures during the construction period**

#### **6.2.1.1 Ambient Air Impact Analysis and Mitigation Measures**

##### **(i) Construction dust**

236. During the construction period, dust generated from main construction activities such as excavation, backfilling, soil and earthmoving, soil stockpiling, as well as loading, unloading, and transportation of construction materials, disperses into the surrounding air. Typically, the range affected by dust generated from construction sites under natural wind conditions is within 100-150 meters. For this project, the installation of municipal roads and pipeline networks constitutes linear engineering, and construction materials and excavated soil will be piled up on both sides of the construction route as construction progresses. Within a 500-meter range of the project site, there are no special sensitive areas such as schools or hospitals, but during construction, the dust concentration in the air within the construction area may exceed the secondary standard requirements in some periods. The main affected individuals are construction workers and employees of nearby enterprises. In the dust generated at the construction site, inhalable particles (PM10) typically constitute a significant proportion of total suspended particles (TSP), possibly exceeding 50%. This is because construction activities usually disturb the surface, generating a large number of fine particles, including PM10 particles that can remain suspended in the air and be inhaled by humans. Therefore, monitoring and controlling PM10 is crucial in the air quality management at construction sites.

##### **(ii) Construction Machinery Exhaust Gas and Transportation Vehicle Exhaust Gas**

237. Vehicles and various fuel-fueled machinery in the construction site of this project are relatively scattered, and the intensity of exhaust emission sources is relatively small. The main pollution factors are SO<sub>2</sub>, NO<sub>x</sub>, CO and incompletely burned total hydrocarbon (THC), which are non-continuous intermittent emissions. Due to the short construction time, the amount of waste gas generated is small, and the surroundings of the construction site are open, which is conducive to the diffusion of waste gas. At the same time, the source of waste gas pollution is characterized by discontinuity and fluidity. Strengthen the maintenance and reasonable operation of mechanical equipment; choose to use more electric tools and low-emission mechanical equipment, and prohibit the use of mechanical equipment that cannot meet the emission standards; design a reasonable construction process, conduct reasonable construction organization arrangements, and reduce repetitive operations; After strictly controlling the transportation time and transportation routes and other measures, the exhaust gas of construction machinery and the exhaust gas of transportation vehicles will not cause obvious adverse effects on the surrounding atmospheric environment .

##### **(iii) Asphalt smoke**

238. The roads of this project are paved with commercial concrete, and the commercial concrete is purchased and transported to the construction site for paving, without mixing on site. Asphalt fumes contain THC, TSP and benzo[a]pyrene (B[a]P) and other toxic and harmful substances, which are harmful to the health of operators and surrounding residents. Since the asphalt of this project is purchased from the existing asphalt mixing station in Yingkou City, the project itself does not carry out asphalt mixing, so only a small amount of asphalt smoke will be generated during the asphalt paving process. The asphalt fumes generated during the construction of the project are less and can spread rapidly, which will not have a significant impact on the construction workers and the surrounding enterprise staff.

239. To sum up, during the construction period of the project, the construction will have

some impact on the ambient air quality around the construction site, but these impacts will disappear with the end of the construction period. Therefore, the project construction period will not cause significant deterioration of the ambient air quality of the project location.

240. According to the *Three-Year Action Plan (2018-2020) of the Ministry of Housing and Urban-Rural Development and Liaoning Province* to win the blue sky defense war, the construction site should achieve 100% enclosure around the construction site, 100% coverage of stacking materials, 100% flushing of vehicles entering and exiting, 100% greening of the ground at the construction site, 100% wet operation at the demolition site, and 100% airtight transportation of muck vehicles. According to the requirements of *Yingkou Air Pollution Prevention and Control Regulations*, the contractor should formulate a plan for the prevention and control of dust pollution, and adopt dust prevention measures such as sealing, enclosure, covering, spraying, road hardening, vehicle washing and dust prevention, timing construction, and vegetation restoration at the construction site.

241. The specific measures taken by this project are as follows:

(i) Set a continuous and airtight steel frame advertising fence, the height of which should not be lower than 1.8 m<sup>24</sup>, and it should be set along the construction road;

(ii) When dust is likely to be generated when the wind speed is above Grade 4, the contractor shall suspend earthwork excavation, and take effective measures such as covering and stockpiling, sprinkling water, etc., to reduce dust pollution;

(iii) Clear and transport construction waste in a timely manner. If it cannot be cleared and transported temporarily, measures such as covering with tarpaulin should be taken. Vehicles transporting dust-prone materials such as sand, stone, cement, and earthwork must be tightly sealed and leakage is strictly prohibited;

(iv) In order to reduce the amount of dust generated, a car washing station is set up at the entrance and exit to wash the vehicles entering and exiting, and sprinkle water to reduce dust, effectively reducing dust pollution on the construction road, and at the same time limiting the speed of vehicles.

(v) During the excavation process, sprinkle water to keep humidity: the loose and dry topsoil in the construction site should also be frequently sprinkled with water to prevent dust; when backfilling the earthwork, water should be properly sprinkled when the surface soil is dry to prevent dust from flying;

(vi) To strengthen the management of backfilling earthwork storage yards, it is necessary to formulate measures such as earthwork surface compaction, regular water spraying, and covering; unnecessary soil and construction material waste should be transported away in time, and it is not suitable to accumulate for a long time;

(vii) Construction material transport vehicles should be equipped with anti-sprinkling equipment according to regulations, and the load should not be too full to ensure that they will not be scattered during transportation; Contractors should plan a program for the transportation of construction materials and spoils, including operating route and time of transport vehicles, and avoid driving in sensitive areas such as traffic concentrated areas

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<sup>24</sup> "Liaoning Province Air Pollution Prevention and Control Regulations (2020 Amendment)" (Liaoning Provincial People's Congress Standing Committee, 2020.03.30 Amendment)

and residential buildings areas;

(viii) Measures such as covering dust-proof nets, spraying dust inhibitors or watering shall be taken for the stacking of materials that are prone to dust generation, and the temporary stockpiles shall be covered with tarpaulin;

(ix) Rinse the transport vehicles with canopies and loading and unloading sites before loading and unloading, so as to reduce the dirt carried by wheels and chassis from scattering on the road;

(x) The soil spilled on the road surface during transportation should be cleaned in time to reduce dust during operation;

(xi) During the construction process, it is strictly forbidden to burn waste building materials as fuel.

(xii) Asphalt concrete is purchased from a professional mixing station with a large scale and better equipment, which avoids the harmful gas generated when the asphalt is melted, and the asphalt smoke pollution during paving is relatively small. When the construction section passes through the densely sensitive areas, pay attention to the change of wind direction when pouring asphalt. The asphalt paving must be carried out when the work area is in the downwind direction of the sensitive points, so as to avoid the spread of asphalt smoke to the environmentally sensitive points during paving operations and reduce the impact on the environment and people's health.

#### **6.2.1.2 Noise Impact Analysis and Mitigation Measures**

(i) Characteristics of construction noise pollution sources

242. Many construction machines and transportation vehicles are needed in the construction process of the construction project. The construction machines mainly include excavators, bulldozers, loaders, road rollers, etc., and the transportation vehicles include various trucks and dump trucks. The noise pollution generated by the inland port logistics hub subproject can be regarded as a fixed noise source. The construction of roads and municipal pipe networks in the FTZ and the LEDZ is different from general construction, and the noise generated by it has unique characteristic as follows:

① There are various types of construction machinery, and there are different construction machinery in different construction stages, and more or less construction machinery is put into use in the same construction stage, which makes the construction noise characteristic of accidental.

② The noise source characteristics of different equipment are different, some of which are vibrating, sudden and pulse-like, which have a greater impact on people; some equipment have low frequencies, are not easy to attenuate, and make people feel irritable; The noise is relatively high, but the sound level difference between them is still very large, and the operating noise of some equipment can be as high as 90dB or more.

③ Construction noise sources are different from general fixed noise sources. There are both fixed noise sources and mobile noise sources. Construction machinery is often exposed to the outside, and they will move within a certain small range within a certain period of time., which increases the scope of noise pollution during this period compared with fixed noise sources, but compared with mobile noise sources, construction noise

pollution is still within a local range.

④ The construction equipment and its affected area are relatively small, therefore, the construction equipment noise can basically be regarded as a point sound source.

⑤ For specific sections of roads, construction noise pollution only occurs within a period of time.

(ii) Prediction mode

243. The construction machinery is regarded as a point sound source, and the impact prediction model of the point sound source in the semi-free sound field is:

$$L_{\text{施}} = L_0 - 20 \lg \frac{r}{r_0}$$

244. In the formula:  $L_0$  -- construction machinery noise level at the measuring point at a distance of  $r_0$  (m) from the sound source, dB;

$r$  -- the distance between the prediction point and the construction machine (m).

245. Without considering the noise attenuation of green belts and buildings, the prediction results of noise values of various construction machinery at different distances are shown in Table 7-2.

**Table 6-2 List of noise source intensity of construction machinery Unit: dB (A)**

No.	mechanical type	noise source intensity (at 5m)	Distance from construction point (m)							
			10	20	30	40	60	100	140	200
1	jackhammer	90	84.0	78.0	74.4	71.9	68.4	64.0	61.1	58.0
2	loader	90	84.0	78.0	74.4	71.9	68.4	64.0	61.1	58.0
3	bulldozer	86	80.0	74.0	70.4	67.9	64.4	60.0	57.1	54.0
4	excavator	84	78.0	72.0	68.4	65.9	62.4	58.0	55.1	52.0
5	drilling rig	74	68.0	62.0	58.4	55.9	52.4	48.0	45.1	42.0
6	crane	74	68.0	62.0	58.4	55.9	52.4	48.0	45.1	42.0
7	roller	86	80.0	74.0	70.4	67.9	64.4	60.0	57.1	54.0
8	Grader	90	84.0	78.0	74.4	71.9	68.4	64.0	61.1	58.0
9	paver	87	81.0	75.0	71.4	68.9	65.4	61.0	58.1	55.0
10	vibrator	93	87.0	81.0	77.4	74.9	71.4	67.0	64.1	61.0
11	Ramming machine	93	87.0	81.0	77.4	74.9	71.4	67.0	64.1	61.0

246. Due to the high noise source intensity of construction machinery, when a single machine is in operation, the noise at the boundary of the construction site will exceed the daytime standard (70dB) of the *Environmental Noise Emission Standard for the Boundary of Construction Sites (GB12523-2011)* at 60-100 m, 200m still exceeds the night standard (55dB). The surrounding area of the project is industrial land without residential areas, but the noise may affect the employees of surrounding enterprises, and cause harm to the operators of construction machinery and on-site workers. Noise prevention and control

measures should be taken during the construction process. During the construction process, a continuous temporary sound insulation screen should be installed on the construction road section to reduce the impact of construction equipment noise on the employees of surrounding enterprises.

247.Noise prevention measures during the construction period:

(i) Select low-noise construction machinery and equipment

248.During the construction, the contractor must choose construction machinery and transport vehicles that meet the relevant national standards, and use various types of construction machinery and equipment with low noise and low vibration. Noise sources should be considered to install sound insulation covers (such as generator cars, etc.), and at the same time, the maintenance of various construction equipment should be strengthened to keep them in good operation, so as to fundamentally reduce the noise source intensity.

(ii) Set up a temporary sound insulation screen

249.For construction machinery and equipment sites that emit high-intensity noise, continuous temporary sound insulation baffles or sound-absorbing barriers should be installed on the side close to the environmental protection target to reduce the impact of construction noise on residents. Prolonged exposure to high decibel noise, especially continuous noise exceeding 85 dB, may result in hearing loss for construction workers. Provide earplugs or earmuffs for workers exposed to high noise levels to minimize the impact on hearing.

(iii) Reasonably layout the construction site

250.Reasonable and scientific layout of the construction site is the main way to reduce construction noise, such as relatively concentrating the fixed vibration sources on the construction site to reduce the scope of influence; fixed mechanical equipment such as air compressors and generators are placed in temporary rooms on the construction site. Sound insulation panels are installed in the house to reduce noise; avoid multiple high-noise machinery and equipment being used on the same site and at the same time.

(iv) Reasonable arrangement of construction work time

251.Night work (22:00-6:00) is prohibited. If continuous operation is necessary due to the construction process, for sites where continuous construction operations are required, the contractor should contact the local environmental protection department and city management department in a timely manner according to the specific situation, apply for a night construction permit in accordance with the regulations, and issue an announcement to maximize the understanding of the employees of the surrounding enterprises that may be affected.

(v) Reasonably arrange the route and time of construction transport vehicles

252.For construction transport vehicles, especially large transport vehicles, a reasonable transport route and time should be determined in accordance with the regulations of relevant departments. The main transportation road should be selected as far away as possible from sensitive points such as residential buildings, and no-sounding signs should be set up at sensitive points that cannot be avoided. Stop or reduce the operation of construction transport vehicles during peak hours of road traffic to reduce the impact of transport traffic noise.

(vi) Advocate scientific management and civilized construction

253. Strengthen the scientific management of the construction site, do a good job in the education of workers' awareness of environmental protection; vigorously advocate the consciousness of civilized construction, and minimize the aggravation of construction noise caused by human factors.

(vii) Strengthen environmental management and accept environmental supervision from environmental protection department

254. In order to effectively control the impact of construction noise on the urban environment, in addition to implementing relevant control measures, environmental management must also be strengthened; according to relevant national and local laws, decrees, regulations, and regulations, the contractor should actively accept the supervision and management of the environmental protection department and inspection; when contracting the project, the contractor should include the relevant construction noise control into the contract content, and assign special personnel to be responsible during the construction and project supervision process, so as to ensure the implementation of construction noise control measures.

(viii) The contractor needs to implement various construction management systems

255. The contractor must ensure that the construction noise meets the "Environmental Noise Emission Standards for Construction Site Boundaries" (GB12523-2011), and conscientiously implement the "Law of the People's Republic of China on the Prevention and Control of Noise Pollution" and other relevant national and local regulations.

(ix) Carry out the noise monitoring during the construction period, and supplement corresponding noise prevention and control measures according to the monitoring results.

(x) The project owner should instruct the contractor to mark the notice and complaint telephone number on the construction site. The contractor should contact the local environmental protection department in time after receiving the report, so as to deal with various environmental disputes in time.

### **6.2.1.3 Water Environment Impact Analysis and Mitigation Measures**

256. The surrounding water bodies involved in this project are Minxing River and Liaodong Bay Sea area. Wastewater generated during construction mainly includes concrete maintenance wastewater during construction, oily wastewater generated by construction machinery and vehicle washing, domestic sewage generated by workers, and pipeline pressure test wastewater. In addition, the industrialized area of FTZ sub-project involves the occupation of shrimp ponds, which require pumping and dredging.

(i) Concrete maintenance wastewater during construction

257. Commercial concrete is used in this project, and there is no concrete mixing wastewater. Water pollution sources such as concrete curing waste water and rainwater scour generated during construction are related to multiple factors such as construction conditions, construction methods, and weather. The main pollutant of the concrete curing wastewater during the construction period of this project is suspended solid (SS); according to the engineering construction experience, the general production wastewater is alkaline, and the concentration of suspended solids in the water quality is high. The SS concentration reaches 3,000 mg/L-5,000 mg/L, and the main components of suspended solids are inorganic matter such as soil particles and cement particles. The project is relatively scattered, and the discharge volume is relatively small. The water area

discharged from the project does not involve water sources and centralized water intakes. In this project, a temporary sedimentation tank is set up on the temporary construction site, and all the treated construction wastewater will be reused for sprinkling and dust reduction in the construction site. Since the sprinkling and dust reduction process does not have high water quality requirements, the wastewater can basically be fully reused and will not be discharged into the surface water and will not have adverse effects on the regional surface water environment.

(ii) Construction machinery and vehicle washing wastewater

258. A certain amount of waste water will be produced during the maintenance and washing of machinery and vehicles. The main pollutants are high-concentration sediment suspended matter and relatively high-concentration petroleum substances. The waste water from construction machinery and vehicle washing needs to be collected and treated intensively. Direct discharge into the Minxing River and the sea is prohibited. A sedimentation tank with grease trap is set up on site, and the volume of the vehicle washing sedimentation tank is 2 m<sup>3</sup>. The transport vehicles are cleaned and then driven out of the construction area of the project. Vehicle washing wastewater is used for dust reduction after degreasing and sedimentation.

(iii) Domestic sewage

259. The sewage production of workers is estimated at 120 L per person per day, and the domestic sewage production of workers during the construction of this project is about 39.6 m<sup>3</sup>/d. The main pollutants of domestic sewage are COD, BOD<sub>5</sub>, ammonia nitrogen, SS, etc., and the concentration is about 300 mg/L, 200 mg/L, 30 mg/L, 200 mg/L. The construction site is divided into operational areas, material storage areas, and living areas. The FTZ sub-project has a total of 4 material storage and living areas (1 each for the Industrialization Zone, Logistics Supporting Zone, Land Port Hub Zone, and 1 for the railway project), each occupying an area of approximately 200m<sup>2</sup>. The LEDZ sub-project has one area for parking construction machinery, material storage, residence, and office use, covering an area of approximately 500m<sup>2</sup>, located within the project site. The FSR initially estimates that the living area will only serve as an office and rest area without providing accommodation. If providing accommodation and meals, it must meet the basic requirements for construction camp management outlined in Section 9.3 of this report. Contractors should develop specific construction camp management plans based on the construction organization plan and site conditions. For conservative considerations, this assessment assumes the provision of accommodation in the living area. The domestic sewage generated in the construction camp is discharged into the mobile environmental protection toilet and cleaned regularly.

**Table 6-3 Estimation of domestic sewage volume**

Project name	Number of construction workers	Domestic sewage volume (m <sup>3</sup> /d)
Yingkou FTZ road and municipal pipe network project	70	8.4
Railway connection	100	12
FTZ dry port hub and industrial park sub-project	90	10.8
LEDZ	70	8.4

(iv) Water gushing from the cofferdam

260. The industrialization zone portion of the FTZ subproject will occupy 40,940 m<sup>2</sup> of the existing shrimp ponds. The road area within the industrialization zone will require pumping and dredging, and the remainder will be directly backfilled. A small amount of silt will be removed and is used for planting soil for the road greening in this project. The extracted

water from the shrimp ponds will be used for sprinkling to suppress dust in the construction area of the FTZ subprojects after sedimentation, and it is prohibited to discharge directly into the Minxing River or the sea area.

(v) Pipeline pressure test wastewater

261. The pipeline pressure test wastewater in the FTZ and LEDZ is about 600-1,000 m<sup>3</sup>, which is used for road maintenance and sprinkling.

262. In addition, all construction materials shall not be piled near the Minxing River and the sea to prevent the storm from entering the water body, and temporary shelter canvas shall be prepared.

#### **6.2.1.4 Solid Waste Impact Analysis and Mitigation Measures**

263. The solid waste during the construction period is mainly domestic waste generated by construction workers, construction waste and earthwork excavation spoils and slags. According to the *"Law of the People's Republic of China on the Prevention and Control of Environmental Pollution by Solid Waste"* (implemented on September 1, 2020), the project contractor should prepare a construction waste treatment plan before starting construction, take pollution prevention and control measures, and report to the local government at or above the county level for environmental sanitation. The project contractor shall promptly clear and transport the solid waste such as construction waste generated during the construction process of the project, and use or dispose of it in accordance with the regulations of the local environmental department. Contractors shall not dump, scatter or pile up construction waste generated during construction without authorization

(i) Municipal solid waste

264. The amount of domestic waste generated by construction workers is calculated at 0.5 kg per person per day. The domestic waste production during the construction period of this project is about 165 kg / day, including 35 kg / day for roads and municipal pipe network subprojects in the FTZ, 50 kg / day for railway connecting lines, dry port hubs and industrial parks in the FTZ Project 4.5 kg / day, LEDZ sub-project 3.5 kg / day. Domestic waste is transported by the environmental sanitation department to Yingkou Municipal Waste Incineration Plant and the city's domestic waste for overall treatment. Enough segregation waste collection bins shall be provided in the construction camp and construction site.

265. Yingkou Waste Incineration Plant is operated and managed by Yingkou Yuefeng Power Environmental Protection Co., Ltd. It is in the metallurgical heavy equipment area of Yingkou Coastal Industrial Base. The company was established in April 2020 with a total investment of 928.3683 billion yuan. The factory covers an area of 129,984 m<sup>2</sup>, about 194.9 mu of land, build 2 sets of 750 t/d incinerators + 2 sets of flue gas purification lines + 2 sets of 15 MW steam turbine generator sets, currently processing 1,500 t of waste per day; the actual processing capacity is 1,200 tons. The amount of domestic waste generated during the construction period of this project is relatively small, and will not exceed the processing capacity of Yingkou Municipal Waste Incineration Plant.



Office Building of Yingkou Yuefeng Power Environmental Protection Co., Ltd.

Automatic Temperature Control System of Waste Incinerator

**Figure 6-1 Status of Waste Incineration Plant in Yingkou City**

(ii) construction waste

266. Some structures of the existing sewage plant need to be demolished for the project of the connecting line of the railway project. The amount of construction waste generated during the demolition process was 14,399.6 m<sup>3</sup>, transported to the construction waste disposal site in Yingkou City for treatment, and a small amount of sedimentation tank mud and spoils during the project construction period were sent to the construction waste treatment plant in Yingkou City for treatment.

(iii) Construction spoil

267. According to preliminary estimates based on engineering design data, there is no debit for the railway connection project in the FTZ, and 67,000 m<sup>3</sup> of abandoned land; no debits are required for roads and municipal works in the FTZ, and 247,000 m<sup>2</sup> of abandoned land; The engineering volume is small, and the cut and fill are balanced. The subproject spoil of Yingkou FTZ will be used for shrimp pond filling within the project area.

268. The current situation of the LEDZ subproject is a salt field, with 348,000 cubic meters of excavation and 306,000 cubic meters of filling required. The remaining soil from Planning No.6 Road, Jiachen Avenue and Qibaozhong Road can be internally deployed for backfilling of other roads. After internal redeployment, the LEDZ sub-project has 348,000 m<sup>3</sup> of excavation and requires 217,000 m<sup>3</sup> of borrowed material, with no abandoned soil. The stripped topsoil is temporarily piled up within the area occupied by one side of the road. The location is the middle section of Qibao Middle Road. The area is 100 m in length and 5 m in width, and covers an area of 0.05 hm<sup>2</sup>. The stockpiled topsoil is retained as needed, and a total of 619 m<sup>3</sup> is temporarily stockpiled. Temporary soil piles shall be arranged in a trapezoidal shape with a maximum pile height of 1.5 m and a slope ratio of 1:1.5.

269. The earthwork quantities of this project is shown in the table below:

**Table 6-4 Calculation table of excavation and filling of each subproject (unit: m<sup>3</sup>)**

	project	Excavation	backfill	debit	Abandoned square (abandoned slag yard)
	Railway Yard Engineering				

FTZ sub-project	A. Railway Subproject	72,244	5,096	No borrowed soil	67,148
	B. Municipal engineering subgrade earthwork				
	Haixing Road Road Works	115,357	2,152	0	113,205
	Planning Nine Road Road Works	33,144	530	0	32,614
	Yingchuan Street (East Section) Road Project	11,282	189	0	11,093
	Linchuan Street (East Section) Road Works	7,051	129	0	6,922
	Linhe Street (East Section) Road Works	7,051	129	0	6,922
	Planning No. 4 Road	9,250	247	0	9,003
	<b>total</b>	<b>255,379</b>	<b>8,472</b>	<b>No borrowed soil</b>	<b>246,907</b>
Subproject of Liaohe LEDZ	Municipal engineering subgrade earthwork				
	Planning No. 6 road works	45,287	30,808	0	14,479
	Jiachen Avenue Road Works	74,127	58,635	0	15,492
	Planning No.4 road works	14,089	50,915	36,826	0
	Qibao Middle Road Road Engineering	32,744	29,387	0	3,357
	Yantian Road Road Works	13,448	39,704	26,256	0
	Planning No. 5 road works	10,204	44,554	34,350	0
	Qibao Road Project	13,699.3	43,337.2	29,637.9	0
	Longshan Road Works	11,218.6	40,547.8	29,329.2	0
	Xinghe Street Road Project	52,564	54,407	1,843	0
	Xingyi Street Road Project	6,952	96,957	90,005	0
	Donghai South Street Road Project	16,298	74,336	58,038	0
	Minxing North Street Road Project	57,751	1,777	0	55,974
	<b>total</b>	<b>348,381.9</b>	<b>565,365</b>	<b>216,983.1</b>	<b>No spoil</b>

### 6.2.1.5 Ecological Impacts and Mitigation Measures

#### (i) Analysis of the impact on terrestrial plants

270. The current vegetation in the project area is dominated by salt-tolerant alkali poncho grass and reeds, with no protected or rare wild plant species. The permanent land occupation of the project will cause biomass loss, and the lost biomass can be compensated through roads and site greening. The total area of greening design in the FTZ is 3.92 hectares, all of which are road accessory green areas. Among them, the area of green space attached to roads in the dry port hub industrial area is 3.79 hectares, and the area of green space attached to roads in the logistics hub area is 0.12 hectares.

271. The main vegetation in the temporarily occupied area of this project is wild grass, and there are no wild plants under national key protection scope. The project construction will cause certain damage to the plants in the temporarily occupied land. During the construction period of the project, there will be many people and vehicles entering. If the construction management is not good, the shrub layer and herbaceous layer on both sides of the road will be greatly damaged, and even lead to their disappearance, resulting in the loss of the level of the biological community and the large change in the vertical structure, results in decreased stability and resistance of the community. Therefore, the scope of temporary construction land occupation must be strictly controlled to avoid interference and destruction of vegetation outside the scope of land use, and reduce the impact on local

vegetation communities.

272. During the construction of the project, the access road is the current road, and the dust generated by the transportation vehicles will directly affect the living organisms of the surrounding plants on both sides of the road. These plants are mainly artificially planted plants, and there are no wild plants under national key protection. The dust generated by transport vehicles falls on the leaves of plants, which will block the stomata of plants, block the absorption of light on the surface of plant leaves, and affect the photosynthesis of plants. The long-term impact may lead to slow growth of plants and even death. If these dusts are washed by rainwater and infiltrated into the ground, it will cause soil compaction and affect the absorption of water and minerals by plant roots. In addition, the stacking of raw materials, asphalt and vehicle oil spills, and vehicle exhaust emissions can also pollute the air and soil, thereby indirectly affecting the growth of plants.

(ii) Analysis of the impact on birds

273. There are no documented protected reptiles, amphibians and mammals within the project area because of human activities. Since the project site is adjacent to coastal mudflat wetlands and Yingkou is an important stopover and transit point for migratory birds along the East Asia-Australia migratory corridor, the ecological impact assessment of the project mainly focuses on the analysis of impacts on birds.

**Impacts on bird habitats**

274. The impact of construction period on birds is potentially reflected in the destruction of nests and habitats of birds. The standard green plant of the industrialization zone of the FTZ sub-project will permanently occupy 40,940 m<sup>2</sup> of shrimp ponds, 63,831 m<sup>2</sup> occupied by the logistics support area, 131,396 m<sup>2</sup> occupied by the municipal roads, and 195,325 m<sup>2</sup> occupied by the railroad yard project are all in current status for the barren grassland (the railroad yard project occupies a total land area of 252,646 m<sup>2</sup>, of which 31,508 m<sup>2</sup> is the abandoned waste water treatment plant and 25,813 m<sup>2</sup> is the Anlida building). The LEDZ sub-project will occupy 4,060,000 m<sup>2</sup> of salt land. Shrimp ponds, barren grasslands and salt fields are the habitat and feeding places for some birds, and the change of land use status may lead to the reduction of the habitat and feeding places for these birds:

- Waterfowl species (e.g., ducks, mottled ducks, common mergansers, etc.): These birds depend on wetlands and waters as their primary foraging and breeding grounds. The area occupied by the project may reduce the amount of water and wetland area available for these birds, affecting their foraging and breeding activities.
- Shorebirds (e.g., various species of plovers and sandpipers): Shorebirds depend on coastal mudflats and estuarine areas for foraging. Project impacts to these bird habitats would be not significant.
- Gulls (e.g., red-billed gulls, black-billed gulls, relict gulls, etc.): Gulls typically breed and feed in coastal areas and are particularly sensitive to habitat disturbance. Project construction could destroy their nesting sites and reduce available food resources.
- Other birds such as egrets: Birds such as egrets may rely on heathlands and wetlands within the project area for habitat, and loss of heathlands may affect egret roosting and foraging.

275. Centered around the LEDZ subproject, a rectangular area of 30km \* 30km is established as the assessment range. The habitat types providing food sources and nesting sites for birds include water bodies, crops, grasslands, and forests. The project area mainly occupies water bodies (salt fields and shrimp ponds), accounting for 2.6% of the assessment range. Grasslands and crops follow, each at 0.5%, with a relatively small

proportion. The surrounding areas of the project have sufficient alternative areas for bird habitat, and the project area does not occupy coastal mudflat wetlands, resulting in minimal impact on the habitat.

**Table 6-5 Analysis of habitats within project sites**

Land use	Assessed area (m <sup>2</sup> )	Project area	Proportion
traffic	9026333.704	3996.13079	0.004%
Woodland	160194535.3	290562.1735	0.2%
Grassland	1029127.141	4791.143491	0.5%
Crop	220068958	1002381.286	0.5%
Building	109948950	173432.5198	0.2%
Bare land	2951005.781	4734.59447	0.2%
Water bodies	164948460.6	4300147.195	2.6%

Source: ESIA preparation unit.

**276. Noise and vibration impact:** The impact of project construction on birds is mainly manifested in the disturbance of the normal life of birds by the activities of railway construction workers and the noise of construction machinery, causing some birds to migrate to other places along the coastline. With the completion of the construction, the above-mentioned impacts will disappear, and most of the birds will gradually migrate back. Vibration mainly affects the perching and dormancy of birds. The impact range of construction machinery vibration generally does not exceed 60 m, so the impact of vibration on birds is not obvious.

**277. Construction lights:** Lighting facilities can impact the migration and nocturnal hunting behavior of birds, especially those engaged in aerial predation, such as Black-headed Gull (*Chroicocephalus ridibundus*), Saunders's Gull (*Saundersilarus saundersi*), Relict Gull (*Ichthyaetus relictus*), Black-tailed Gull (*Larus crassirostris*), Siberian Gull (*Larus smithsonianus*), Gull-billed Tern (*Gelochelidon nilotica*), and Little Tern (*Sterna albifrons*). During the construction stage, the light in the project area is mainly point light sources scattered over the project area, and domestic regulation forbidden to construction activities are forbidden to conduct from 10PM to 6 AM by domestic regulation; as a result, the impact of construction light on birds is identified as relatively low. The above impacts will disappear by the end of construction.

**278. Construction wastewater:** the turbidity of water caused by construction mud, the leakage of large-scale machinery oil and the improper disposal of various waste are the direct causes of water pollution, which directly lead to the reduction of aquatic species and quantity, thus affecting the predation of birds

**279. Mitigation measures:**

280. During the construction period, contractors should take the following measures to minimize the impact on birds and their habitats to the greatest extent possible:

- (i) **Construction Time Management:** During the peak periods of bird breeding and migration (March-May and September-November), schedule operations that produce low noise and vibration in the early mornings (6:00-8:00) and evenings (17:00-19:00), when birds are most active. Avoid the use of heavy machinery and high-noise construction during these times.
- (ii) **Environmental Protection and Education:** i) Contractors should provide environmental protection and wildlife conservation training to construction workers to ensure all personnel understand and strictly adhere to bird protection measures. The training should cover bird identification, habitat needs, and how to minimize the impact of construction activities on birds. ii) Display educational materials about local birds and their conservation measures at the construction

site to enhance awareness among all participants.

- (iii) Sewage Management: Prohibit the direct discharge of untreated sewage into Minxing River and the bay.
- (iv) Habitat Protection: All project activities must not occupy coastal mudflats.
- (v) Noise Control: Install sound barriers at the construction site, designate work zones and activity areas, and strictly limit construction activities to these designated areas.
- (vi) Light Pollution Control: Use low-intensity, directional lighting during construction to ensure that light is directed only towards necessary areas and avoid direct lighting on coastal zones, especially during bird migration seasons in spring and autumn. Install light shields on lamps to reduce light scattering and disturbance to birds. Vehicles entering coastal roads should reduce speed, use low-energy lights at night, and avoid direct bright lighting. Turn off unnecessary lights at night.
- (vii) Vehicle Management and Maintenance: Enhance the management and maintenance of transport vehicles during construction to ensure they are in good condition. Establish fixed transportation routes that avoid bird habitats and minimize harmful impacts.
- (viii) Waste Management: Set up sufficient garbage and waste collection points at the construction site, ensure proper sorting and timely disposal; garbage collection points should be covered to prevent scattering of trash and contact with birds.

#### **6.2.1.6 Soil erosion**

281. During the construction of roadbed, pipeline and foundation, the surface is exposed and temporary earthwork is piled up. If the protection is not proper, it is easy to cause water and soil erosion, and it will enter the Minxing River, sea area or drainage system.

282. During the excavation of earthwork, due to the loose structure, a small amount of water and soil loss will be caused when it rains. Therefore, it is required that when carrying out earthwork excavation, one is to set up drainage ditches and sedimentation tanks around the stacking site, and the other is to not carry out excavation operations or only carry out small-scale operations during the rainy season to minimize soil erosion caused by stacking soil. In addition, when excavating earth and stone, temporary walls should be built, and at the same time reduce the slope and storage time of temporary piles of soil, compact backfill in time, build drainage ditches on the construction site to prevent rainwater from scouring the site, and set up sedimentation at the outlet of the drainage ditch, so that rainwater is cleaned and then discharged outside. Thus the soil erosion can be effectively reduced.

283. Mitigation measures:

- (i) Construction site: The construction site of this project adopts the principle of nearby layout. This project plans to set up 3 construction sites for parking construction machinery and material stacking. After the project construction is completed, the temporary facilities should be removed in time. The waste is removed, and the vegetation is restored on the site. The planting method adopts the form of natural scattered planting, and selects common local species to reduce and compensate for the adverse impact caused by the construction.
- (ii) Temporary soil storage yard: During the construction process, the surface soil is stripped and piled up in the temporary storage yard, the ground is cleaned in time, and water is properly sprinkled. The temporary storage yard should be protected from wind and rain. The construction spoil will be used for greening and covering soil in the later stage, and the rest of the spoil will be transported to the spoil yard designated by the construction department for disposal. After the construction is

completed, the vegetation will be restored on the site to restore the original land use function. The vegetation restoration will use local common species to reduce and make up for adverse effects caused by the construction.

- (iii) Excavation and backfill should be avoided in rainy seasons to prevent secondary soil erosion.
- (iv) Construction sites and temporary soil dumps should be equipped with special cut-off ditches, diversion cofferdams, and temporary anti-seepage sedimentation tanks to divert rainwater into the sedimentation tanks and reuse them after sedimentation to prevent soil erosion caused by rainwater erosion.

#### **6.2.1.7 Impact Analysis and Mitigation Measures of Urban Ecological Landscape**

284. The project covers a total area of 459.3729 hectares, all of which are permanent land occupations. The temporary land occupation of the project is mainly the temporary land occupation of construction, production and living areas and temporary transfer stations. The project temporarily occupies an area of 6.75 mu, all of which are saline-alkali land.

285. The impact of project land occupation on the ecological environment are mainly about ecological elements such as vegetation, soil, and natural landscape. Construction rolling and personnel activities destroy surface vegetation, cause vegetation damage, and affect vegetation growth and development.

286. After the construction of the project is completed, the temporary construction land will be cleared, the site will be restored and the vegetation will be greened, which will not cause a major impact on the regional land use.

#### **6.2.1.8 Physical and cultural resources**

287. There are no known surface cultural resources within the project area. During the construction of existing projects within the Free Trade Zone and the Liaohai Economic Development Zone, no material cultural resources were found. However, some relics may be discovered during pile driving and excavation work. If relics or cultural heritage are discovered during construction, work must immediately cease to protect the site. The discovery must be reported to the relevant cultural heritage authorities, and measures must be taken as required by these authorities. Work may only resume with the consent of the cultural heritage authorities.

### **6.2.2 Impacts and Mitigation Measures during Operation Period**

#### **6.2.2.1 Atmospheric environmental impact**

##### **(i) Exhaust gas**

288. The pollutants emitted by transportation mainly include NO<sub>x</sub>, CO, HC and PM. The contribution of transportation pollution to fine particulate matter in the atmosphere includes the direct emission of soot and the release of NO<sub>x</sub> and other prerequisite pollutants in the air, as well as the fine particles produced after the chemical reaction. Motor vehicles passing through during the operation period will produce a certain amount of exhaust gas. According to the source strength analysis, the emissions of CO, NO<sub>2</sub>, and THC in the exhaust gas of motor vehicles during the project operation period are relatively small, and the exhaust gas has high mobility and relatively fast diffusion capacity. Pollution sources are not concentrated. With the continuous improvement of China's implementation of single-vehicle emission standards, the emission of single-vehicle exhaust will continue to decrease, the proportion of transport vehicles will be more optimized, and the proportion of high-energy consumption and high-pollution vehicles will be gradually reduced. Vehicle exhaust emissions will be greatly reduced. Therefore, the scope of impact of highway vehicle exhaust on the ambient air on both sides of the line will be reduced, and the impact

of the highway on the air quality along the line will be slight.

289. The environmental protection department should strengthen the vehicle exhaust inspection system and prohibit vehicles whose exhaust gas does not meet the emission standards from driving on the road. Strengthen road management and road surface maintenance to maintain good road operation and reduce traffic jams. Plant fast-growing tree species along the edge of the site, and set up a green belt with a certain width to prevent the diffusion of exhaust gas and reduce the impact of exhaust gas on the surrounding environment.

### **(ii) Road dust**

#### **① Impact Analysis**

290. During the operation period, road dust is the main source of urban atmospheric particulate matter, and the contribution rate of urban dust to PM<sub>2.5</sub> is about 20%, which is one of the main factors affecting the quality of atmospheric environment. Road dust emission is closely related to road dust load and average vehicle weight. The amount of road dust also varies from season to season. In many areas, the amount of dust accumulated in winter and spring is greater than that in summer and autumn. The cause of road dust is not only the condition of the dust particles itself, but (1) The interaction between the tire and the ground causes direct dust. The heavy-duty vehicle tires rub against the ground, crushing and crushing the road dust, and the passing cars generate impact airflow, which raises the road dust. (2) The mechanical load on the car body generates air flow and causes secondary dust. During the operation period of the project park, most of the passing vehicles are heavy-duty dump trucks. During the driving process, they break through the air in front and cause negative pressure, which drives the airflow around the vehicle body to flow in the opposite direction, resulting in the secondary dusting of the dust deposited on the ground. The size of the dust is related to the weight and speed of the vehicle.

#### **② Mitigation**

291. During the operation period, the environmental sanitation department of the park will clean the road surface in time, and adopt the combination of "mechanical cleaning + washing + suction sweeping + washing + manual washing + manual washing" to clean the roads in the park in accordance with the regulations and standards of the *"Administrative Measures for Cleaning of Urban Roads and Public Places"*. Carry out vacuuming, expand the scope of road cleaning, and intensify cleaning efforts. At the same time, the reclaimed water after sewage reuse can be used, and the high-pressure and low-flow water flow can be used to sprinkle water on the road surface in time to suppress the generation of secondary dust. Greening both sides of the road to reduce the area of bare land, and at the same time it plays a role in blocking and absorbing dust. Limit the speed of road vehicles, establish road dust monitoring procedures and methods, regularly monitor the dust content of the atmospheric environment, grasp the road dust pollution in the park, and respond in time to reduce the impact of dust on the atmospheric environment.

### **(iii) Unloading of transport vehicles raises dust**

#### **① Impact Analysis**

292. The dust generated by the unloading of transport vehicles is also one of the main factors causing the dust. As an important logistics distribution center, the logistics supporting area of the FTZ has a high frequency of loading and unloading activities, and the airflow generated drives the dust on the site. With the implementation of the project, the goal of comprehensive railway protection will be realized, the "last mile" will be opened up, and the "road-to-rail" will be promoted. The transportation structure will be optimized, the volume of truck transportation will be greatly reduced, and the impact of dust from unloading vehicles on the atmosphere will be reduced.

## ② Mitigation measures

293. The *Air Pollution Prevention and Control Law* clearly stipulates that the loading and unloading materials should be sealed or sprayed to prevent dust pollution, and the storage yard should set up cleaning facilities for transport vehicles at the exit, and the vehicles can only be driven out after washing.

294. The specific mitigation measures are as follows:

- (i) Strengthen the management of logistics transportation vehicles, clearly require them to take closed transportation measures such as covering with tarpaulins, prohibit vehicles without protective measures from going on the road, and require them to drive at a speed limit.
- (ii) The body of the logistics transport vehicle shall be covered with a tarpaulin or a closed body. If the vehicle body is covered with a tarpaulin, it shall be tightly sealed, and the edge of the tarpaulin shall cover at least 15 cm below the upper edge of the vehicle groove, and open-top transportation is not allowed.
- (iii) The Exit of the logistics warehouse is equipped with washing and cleaning facilities for transport vehicles, and the vehicle is rinsed one by one.
- (iv) The cleaning range must cover the parts below 1.5 m high on both sides of the car body and the chassis of the whole car. It is strictly forbidden to go on the road with dust and soil.
- (v) Facilities such as overflow seats, diversion channels, collection pools, and grit chambers should be set up around the flushing site to ensure that the flushing wastewater is reused after sedimentation and cannot be discharged outside.

### 6.2.2.2 Noise Impact Analysis and Mitigation Measures

295. The noise sources of the subproject during the operation period are mainly traffic noise, equipment noise and loading and unloading noise. As the project is put into operation, more enterprises are attracted to settle in, and the noise of equipment operation and loading and unloading noise of each enterprise increases accordingly. The new municipal roads in the LEDZ and the FTZ have been put into operation, which has improved the traffic network in the park and increased the traffic volume of enterprises, resulting in increased traffic noise.

296. In addition, the operation of the FTZ railway will generate railway transportation noise, including whistle noise, running noise and rail noise. Rail noise is caused by the friction between the train and the rails during the running process, which not only pollutes the surrounding acoustic environment, but also causes ground vibration. The whistle noise is sharp, the sound frequency is relatively high, and the railway transportation noise travels a long distance, causing certain damage to the acoustic environment.

#### i. LEDZ Road Engineering

297. This assessment predicts and evaluates the noise impact during the daytime flat peak hours and nighttime flat peak hours in the initial stage of operation (2025), mid-term operation (2035) and long-term operation (2045). The predicted range of this project is within 200 m of the red line of the road. The current situation has no specific acoustic environmental protection objectives. According to the "Control Plan for the Phase II of the Liaohe Economic Development Zone," the project area is designated as industrial land of category two, with no residential areas.

298. The Planning No.4 Road, Qibao Middle Road is the secondary road; Yantian Road, Planned No.5 Road, Qibao No.1 Road, Longshan Road, Xingyi Street, Donghai South Street, and Minxing Hebei Street as branch roads. For noise prediction, main roads, one secondary road (Planned No.4 Road), and one branch road (Xingyi Street) are selected.

299. In accordance with the requirements of the "Urban Road Engineering Design Code" and considering the actual project conditions, the design service life for the main arterial roads, when the traffic volume reaches saturation, is set at 20 years. The traffic flow forecast for the main arterial roads is from 2024 to 2044.

**Table 6-6 Traffic volume forecast for road projects of Liaohe Economic Development Zone sub-project**

Peak hour traffic (pcu/h)									
Characteristic year	2025	2030		2035		2040		2045	
Index	Flow	Flow	Growth Rate						
Planned No.6 roads (three lanes)	630	856	7.17%	1125	6.29%	1415	5.16%	1723	4.35%
Jiachen Avenue (three lanes)	630	856	7.17%	1125	6.29%	1415	5.16%	1723	4.35%
Xinghe Street (two lanes)	480	610	5.42%	770	5.25%	960	4.94%	1150	3.96%
Planned No.4 roads	480	615	5.63%	738	4.00%	835	2.63%	-	-
Xingyi Street	205	276	6.93%	335	4.28%	382	2.81%	-	-

**Table 6-7 Table of predicted average daily traffic flow for road sections in characteristic years**

Average daily traffic volume (pcu/d)					
Characteristic year	2025	2030	2035	2040	2045
index	Traffic volume				
Planned No.6 Road (three lanes)	7560	12229	16072	20215	24615
Jiachen Avenue (three lanes)	7560	12229	16072	20215	24615
Xinghe Street (two lanes)	5760	8714	11000	13715	16429
Planned No. 4 Road	5760	8786	10543	11929	-
Qibao Middle Road	5760	8786	10543	11929	-
Xingyi Street	2460	3943	4786	5457	-
Yantian Road	2460	3943	4786	5457	-
Planned No.5 roads	2460	3943	4786	5457	-
Qibao No.1 Road	2460	3943	4786	5457	-
Longshan Road	2460	3943	4786	5457	-
Donghai South Street	2460	3943	4786	5457	-
Minxinghe North Street	2460	3943	4786	5457	-

**Table 6-8 Car models and day and night ratio table**

Car model	Small car	Mid-Size Car	Large Car
Vehicle model ratio (%)	75	20	5
Conversion factor	Small: 1.0 Medium: 1.5 Large: =2.5		
day/night ratio	4.0		

**Table 6-9 1 (vehicles/d)**

Road section name	Evaluation period car model	2025		2030		2035		2040		2045	
		daytime	at night								

Planned No.6 Road	Small car	514 7	1286	8326	2081	12857.6	3214.4	16172	4043	19692	4923
	mid-size car	772 0.5	1929	1956. 64	489.1 6	2571.52	642.88	3234. 4	808. 6	3938.4	984.6
	large car	756	75.6	489.1 6	122.2 9	642.88	160.72	808.6	202. 15	984.6	246.1 5
Jiachen Avenue	Small car	604 8	1512	9783. 2	2445. 8	12857.6	3214.4	16172	4043	19692	4923
	mid-size car	120 9.6	302.4	1956. 64	489.1 6	2571.52	642.88	3234. 4	808. 6	3938.4	984.6
	large car	302 .4	75.6	489.1 6	122.2 9	642.88	160.72	808.6	202. 15	984.6	246.1 5
Xinghe Street	Small car	460 8	1152	6971. 2	1742. 8	8800	2200	10972	2743	13143.2	3285. 8
	mid-size car	921 .6	230.4	1394. 24	348.5 6	1760	440	2194. 4	548. 6	2628.64	657.1 6
	large car	230 .4	57.6	348.5 6	87.14	440	110	548.6	137. 15	657.16	164.2 9
Planned No.4 Road	Small car	460 8	1152	3514. 4	1757. 2	8434.4	2108.6	9543. 2	2385. .8	-	-
	mid-size car	921 .6	230.4	702.8 8	351.4 4	1686.88	421.72	1908. 64	477. 16	-	-
	large car	230 .4	57.6	175.7 2	87.86	421.72	105.43	477.1 6	119. 29	-	-
Qibao Middle Road	Small car	460 8	1152	3514. 4	1757. 2	8434.4	2108.6	9543. 2	2385. .8	-	-
	mid-size car	921 .6	230.4	702.8 8	351.4 4	1686.88	421.72	1908. 64	477. 16	-	-
	large car	230 .4	57.6	175.7 2	87.86	421.72	105.43	477.1 6	119. 29	-	-
Xingyi Street	Small car	196 8	492	3154. 4	788.6	3828.8	957.2	4365. 6	1091 .4	-	-
	mid-size car	393 .6	98.4	630.8 8	157.7 2	765.76	191.44	873.1 2	218. 28	-	-
	large car	98. 4	24.6	157.7 2	39.43	191.44	47.86	218.2 8	54.5 7	-	-
Yantian Road	Small car	196 8	492	3154. 4	788.6	3828.8	957.2	4365. 6	1091 .4	-	-
	mid-size car	393 .6	98.4	630.8 8	157.7 2	765.76	191.44	873.1 2	218. 28	-	-
	large car	98. 4	24.6	157.7 2	39.43	191.44	47.86	218.2 8	54.5 7	-	-
Planned No.5 Road	Small car	196 8	492	3154. 4	788.6	3828.8	957.2	4365. 6	1091 .4	-	-
	mid-size car	393 .6	98.4	630.8 8	157.7 2	765.76	191.44	873.1 2	218. 28	-	-
	large car	98. 4	24.6	157.7 2	39.43	191.44	47.86	218.2 8	54.5 7	-	-
Qibao No. 1 Road	Small car	196 8	492	3154. 4	788.6	3828.8	957.2	4365. 6	1091 .4	-	-
	mid-size car	393 .6	98.4	630.8 8	157.7 2	765.76	191.44	873.1 2	218. 28	-	-
	large car	98. 4	24.6	157.7 2	39.43	191.44	47.86	218.2 8	54.5 7	-	-

Longshan Road	Small car	1968	492	3154.4	788.6	3828.8	957.2	4365.6	1091.4	-	-
	mid-size car	393.6	98.4	630.88	157.72	765.76	191.44	873.12	218.28	-	-
	large car	98.4	24.6	157.72	39.43	191.44	47.86	218.28	54.57	-	-
Donghai South Street	Small car	1968	492	3154.4	788.6	3828.8	957.2	4365.6	1091.4	-	-
	mid-size car	393.6	98.4	630.88	157.72	765.76	191.44	873.12	218.28	-	-
	large car	98.4	24.6	157.72	39.43	191.44	47.86	218.28	54.57	-	-
Minxinghe North Street	Small car	1968	492	3154.4	788.6	3828.8	957.2	4365.6	1091.4	-	-
	mid-size car	393.6	98.4	630.88	157.72	765.76	191.44	873.12	218.28	-	-
	large car	98.4	24.6	157.72	39.43	191.44	47.86	218.28	54.57	-	-

300. The ground subgrade height of the predicted road section is considered as 0 m, the height of the sound source is calculated as 1 m above the road surface, and the height of the predicted point is taken as 1.2 m, considering the distance attenuation correction and ground effect correction, and not considering the road surface, longitudinal slope, finite length section correction, and sound shadow area correction, occlusion shielding effects of front row buildings and forests.

① Prediction on the main road, Xinghe Street

301. Table 6-10 shows the prediction of traffic noise at different distances on both sides of the main road in this project. See Table 6-11 for the up-to-standard status of acoustic environment functional areas on both sides of the road.

**Table 6-10 prediction of noise attenuation on both sides of the road**

period of time distance	Influence value (dB(A))					
	Recent (2025)		Midterm (2035)		Long term (2045)	
	during the day	at night	during the day	at night	during the day	at night
from the center line (m)						
20	55.51	50.41	57.24	51.71	60.14	54.13
30	48.64	45.15	50.38	46.45	54.87	48.87
40	45.12	42.56	46.85	43.86	52.28	46.27
50	42.92	40.98	44.65	42.28	50.71	44.7
60	41.29	39.82	43.02	41.12	49.54	43.54
80	38.86	38.1	40.29	39.4	47.82	41.82
120	35.56	35.76	37.29	37.06	45.48	39.48
140	34.31	34.87	36.04	36.17	45.19	38.59
160	33.22	34.08	34.96	35.38	43.8	37.8
180	32.25	33.38	33.98	34.68	43.09	37.1
200	31.37	32.74	33.11	34.04	42.45	36.46

**Table 6-11 Table of up-to-standard distance from the center line of the areas on both sides of the road**

period of time	Category 3 area	
	during the day	at night
Near future (2025)	<20	<30
Mid-term (2035)	<20	<30
Long term (2045)	<30	<30

302. It can be seen from the prediction results that, without considering the sound insulation of buildings:

303. In the near future (2025), the daytime compliance distance for Category III districts of Xinghe Street in this project is within 20 m from the road centerline, and the nighttime compliance distance is within 30 m from the road centerline.

304. In the mid-term (2035), the daytime compliance distance of the Xinghe Street Category III area of this project is within 20 m from the road centerline, and the nighttime compliance distance is within 30 m from the road centerline.

305. In the long-term (2045), the daytime compliance distance of the Xinghe Street Category III area of this project is within 30 m from the road centerline, and the nighttime compliance distance is within 30 m from the road centerline.

## ② Prediction on the Secondary road, Jiachen Avenue

306. Table 6-12 shows the contribution value of traffic noise at different distances on both sides of the Jiachen Avenue, and Table 6-13 shows the up-to-standard status of the acoustic environment functional areas on both sides of the road.

**Table 6-12 Prediction of noise attenuation on both sides of the Jiachen Avenue**

period of time distance	Influence value (dB(A))					
	Near future (2025)		Mid-term (2035)		Long term (2045)	
Distance from the center line (m)	during the day	at night	during the day	at night	during the day	at night
20	56.71	50.3	61.9	51.71	62.14	54.13
30	54.12	47.6	56.3	46.45	59.49	48.87
40	49.29	46.27	58.1	43.86	58.83	44.65
50	48.82	44.70	51.5	42.28	56.90	43.02
60	41.20	35.54	52.4	41.12	56.32	40.29
80	39.86	33.82	51.5	39.4	55.10	37.29
120	34.56	30.48	45.19	37.06	52.5	36.04
140	33.31	31.59	43.8	36.17	45.19	44.65
160	32.25	31.27	42.5	35.38	43.8	37.8
180	31.22	30.36	43.09	34.68	37.1	35.6
200	30.97	30.33	42.45	34.04	36.46	35.1

**Table 6-13 The distance from the center line of the areas on both sides of the Jiachen Avenue reaches the standard**

Period	Category III area	
	during the day	at night
Near future (2025)	<20	<20
Mid-term (2035)	<20	<20

Long term (2045)	<20	<20
------------------	-----	-----

307. It can be seen from the prediction results that, without considering the sound insulation of buildings:

308. In the near future (in 2025), the daytime compliance distance of the Jiachen Avenue category III area is within 20 m from the road centerline, and the nighttime compliance distance is within 30 m from the road centerline.

309. In the mid-term (2035), the daytime compliance distance of the Jiachen Avenue category III area is within 20 m from the road centerline, and the nighttime compliance distance is within 30 m from the road centerline.

310. In the long-term (2045), the daytime compliance distance of the Jiachen Avenue category III area is within 30 m from the road centerline, and the nighttime compliance distance is within 30 m from the road centerline.

### ③ Prediction on the main road, Planned No.6 Road

311. The noise contribution values on both sides of the Planned No. 6 Road for this project at different distances are listed in Table 6-14, and the compliance status with the noise environmental functional zones on both sides of the road is presented in Table 6-15.

**Table 6-14 Prediction of noise attenuation on both sides of the Planned No.6 Road**

period of time distance	Influence value (dB(A))					
	Near future (2025)		Mid-term (2035)		Long term (2045)	
Distance from the center line (m)	during the day	at night	during the day	at night	during the day	at night
20	57.95	53.51	58.61	51.87	60.74	56.67
30	50.10	46.14	51.59	46.59	55.42	49.36
40	46.47	43.50	47.97	43.99	52.80	46.73
50	44.21	41.88	45.72	42.41	51.22	45.15
60	42.53	40.70	44.05	41.24	50.04	43.98
80	40.03	38.94	41.26	39.52	48.30	42.24
120	36.63	36.55	38.18	37.17	45.93	39.87
140	35.34	35.64	36.90	36.28	45.64	38.98
160	34.22	34.83	35.80	35.49	44.24	38.18
180	33.22	34.11	34.80	34.78	43.52	37.47
200	32.31	33.46	33.90	34.14	42.87	36.82

**Table 6-15 The distance from the center line of the areas on both sides of the Planned No. 6 Road reaches the standard**

Period	Category III area	
	during the day	at night
Near future (2025)	<20	<20
Mid-term (2035)	<20	<20
Long term (2045)	<20	<20

312. It can be seen from the prediction results that, without considering the sound insulation of buildings:

313. In the near future (in 2025), the daytime compliance distance of the Planned No.6 Road category III area is within 20 m from the road centerline, and the nighttime compliance distance is within 30 m from the road centerline.

314. In the mid-term (2035), the daytime compliance distance of the Planned No.6 Road category III area is within 20 m from the road centerline, and the nighttime compliance distance is within 30 m from the road centerline.

315. In the long-term (2045), the daytime compliance distance of the Planned No.6 Road category III area is within 30 m from the road centerline, and the nighttime compliance distance is within 30 m from the road centerline.

④ Prediction on the Planned No.4 Road

316. The noise contribution values on both sides of the Planned No.4 Road for this project at different distances are listed in Table 6-16, and the compliance status with the noise environmental functional zones on both sides of the road is presented in Table 6-17.

**Table 6-16 Prediction of noise attenuation on both sides of the Planned No.4 Road**

period of time distance	Influence value (dB(A))					
	Near future (2025)		Mid-term (2035)		Long term (2045)	
Distance from the center line (m)	during the day	at night	during the day	at night	during the day	at night
20	44.84	38.16	48.37	41.28	51.87	44.36
30	41.78	35.06	45.24	38.19	48.68	41.27
40	39.88	33.14	43.30	36.27	46.70	39.35
50	38.46	31.71	41.86	34.84	45.23	37.92
60	37.30	30.54	40.67	33.67	44.03	36.75
80	35.41	28.63	38.75	31.76	42.06	34.84
120	32.55	25.74	35.83	28.87	39.08	33.28
140	31.40	24.57	34.65	27.70	37.88	31.95
160	30.37	23.53	33.60	26.66	36.81	30.78
180	29.44	22.59	32.65	25.72	35.85	29.74
200	28.58	21.74	31.79	24.86	34.97	28.80

**Table 6-17 The distance from the center line of the areas on both sides of the Planned No. 4 Road reaches the standard**

Period	Category III area	
	during the day	at night
Near future (2025)	<20	<20
Mid-term (2035)	<20	<20
Long term (2045)	<20	<20

317. It can be seen from the prediction results that, without considering the sound insulation of buildings:

318. In the near future (2025), for the Planned No.4 Road in this project, the Class 3 area complies with the daytime standard within 20 meters from the road centerline and the nighttime standard within 20 meters from the road centerline. Similarly, for the Qibao Middle Road and Planned No.4 Road, both being secondary trunk roads, the 200-meter range has no noise-sensitive points, and the distances from noise-sensitive points are relatively

far. Therefore, the Class 3 area for secondary trunk roads complies with the daytime standard within 20 meters from the road centerline and the nighttime standard within 30 meters from the road centerline.

319. In the mid-term (2035), the daytime compliance distance of the Planned No.4 Road category III area is within 20 m from the road centerline, and the nighttime compliance distance is within 30 m from the road centerline.

320. In the long-term (2045), the daytime compliance distance of the Planned No.4 Road category III area is within 30 m from the road centerline, and the nighttime compliance distance is within 30 m from the road centerline.

⑤ Prediction on the brunch road, Xingyi Road

321. The noise contribution values on both sides of the Xingyi Road for this project at different distances are listed in Table 6-18, and the compliance status with the noise environmental functional zones on both sides of the road is presented in Table 6-19.

**Table 6-18 Prediction of noise attenuation on both sides of the Xingyi Road**

period of time distance	Influence value (dB(A))					
	Near future (2025)		Mid-term (2035)		Long term (2045)	
Distance from the center line (m)	during the day	at night	during the day	at night	during the day	at night
20	49.28	41.90	48.84	41.68	62.24	53.14
30	45.92	38.49	45.68	38.56	58.41	49.44
40	43.83	36.39	43.72	36.63	56.04	47.14
50	42.27	34.82	42.27	35.18	54.28	45.43
60	40.99	33.53	41.07	34.00	52.83	44.03
80	38.92	31.44	39.12	32.07	50.48	41.74
120	35.78	28.27	36.18	29.15	46.90	39.87
140	34.51	26.98	34.99	27.97	45.46	38.27
160	33.38	25.84	33.92	26.92	44.18	36.88
180	32.36	24.81	32.97	25.98	43.02	35.63
200	31.41	23.87	32.09	25.10	41.96	34.51

**Table 6-19 The distance from the center line of the areas on both sides of the Xingyi Road reaches the standard**

Period	Category III area	
	during the day	at night
Near future (2025)	<20	<20
Mid-term (2035)	<20	<20
Long term (2045)	<20	<20

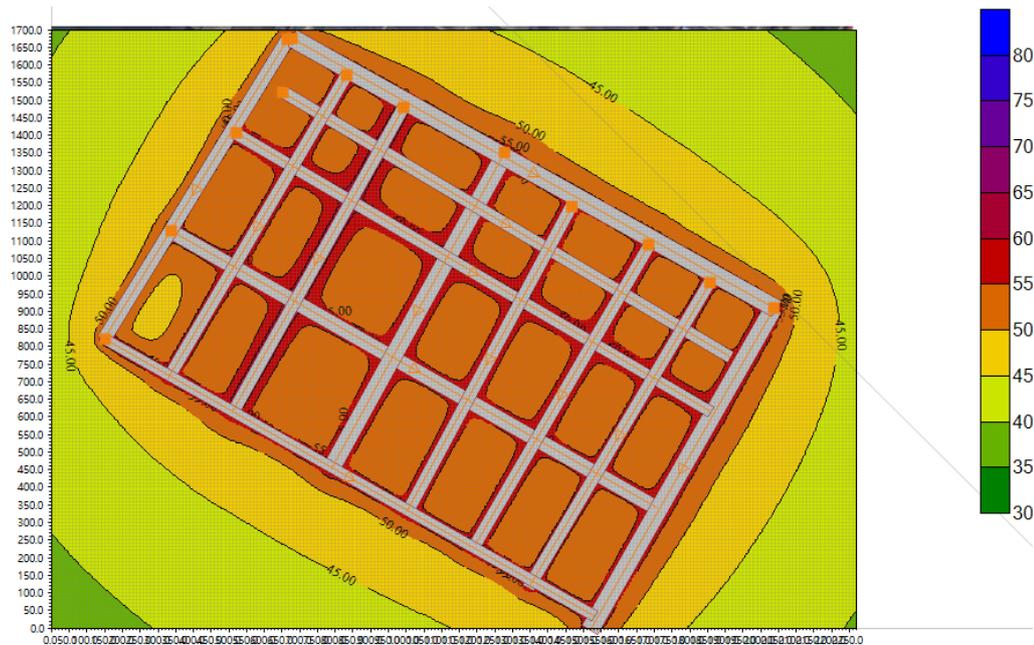
322. It can be seen from the prediction results that, without considering the sound insulation of buildings:

323. In the near future (2025), for the Xingyi Road in this project, the Class 3 area complies with the daytime standard within 20 meters from the road centerline and the nighttime standard within 20 meters from the road centerline. The 200-meter range of the seven brunch roads has no noise-sensitive points, and the distances from noise-sensitive points are relatively far. Therefore, the Class 3 area for secondary trunk roads complies with the

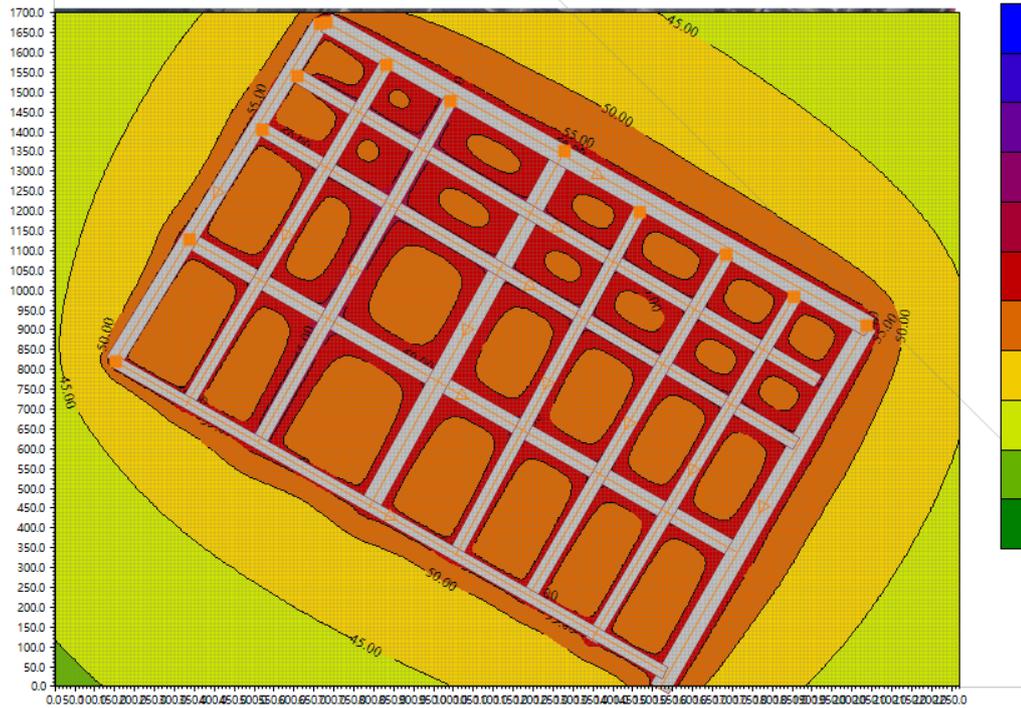
daytime standard within 20 meters from the road centerline and the nighttime standard within 30 meters from the road centerline.

324. In the mid-term (2035), the daytime compliance distance of the Xingyi Road category III area is within 20 m from the road centerline, and the nighttime compliance distance is within 30 m from the road centerline.

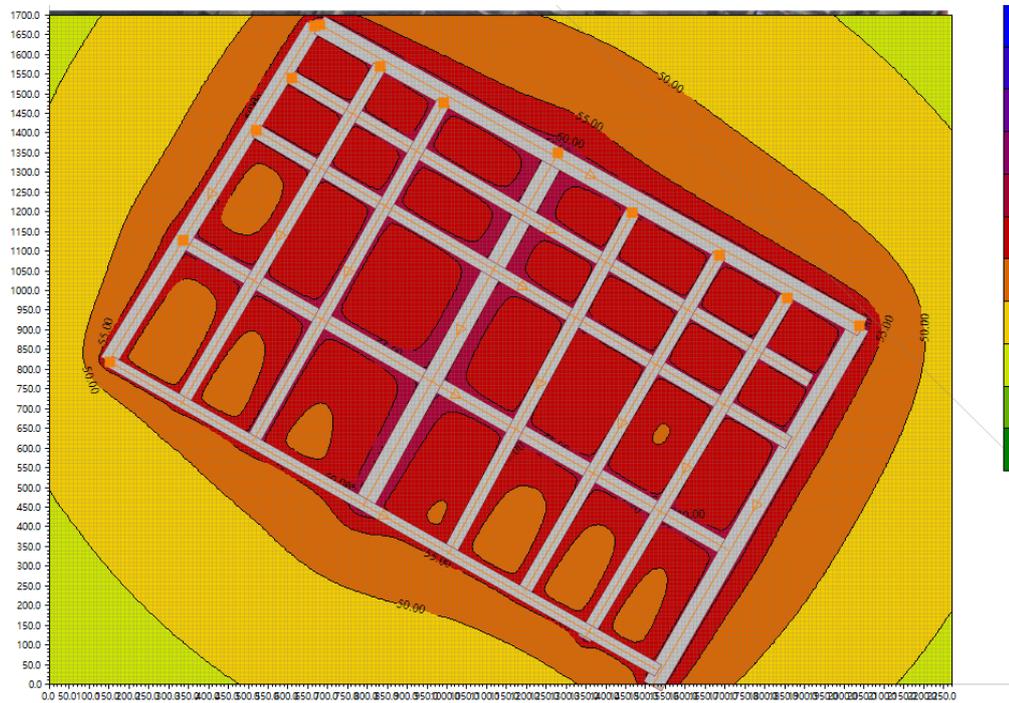
325. In the long-term (2045), the daytime compliance distance of the Xingyi Road category III area is within 30 m from the road centerline, and the nighttime compliance distance is within 30 m from the road centerline.



**Figure 6-2 Contour diagram of noise levels during the day in the near future (2025)**



**Figure 6-3 Contour diagram of noise levels during the mid-term (2035) in the daytime**



**Figure 6-4 Contour diagram of noise levels during the long-term (2045) in the daytime**

**Mitigation measures:**

326. There are currently no noise environmental protection targets within 50 meters of the sub-project, but with the development of the surrounding area, there may be factories or office spaces along the future road. Therefore, corresponding noise control measures are proposed:

327. Corresponding environmental protection measures and traffic controls should be actively taken, such as controlling the time and quantity of vehicle passage in special periods and sections; it is proposed to strictly enforcing speed limits and prohibiting overloading and other traffic rules; setting no-honking signs in noise-sensitive areas; using electronic monitoring, big data technology, and intelligent adjustment of traffic lights can accelerate vehicle circulation and reduce traffic congestion..

328. Reasonable planting of green belts. Setting up reasonable green forest belts within a certain range around the road can play a very good noise reduction effect. Take trees and shrubs with densely planted and lush green forest belts. According to calculations, when the width of the forest belt is 10 m, the noise can be reduced by 1-3 dB(A), and when the width reaches 30 m, the noise can be reduced by 3-5 dB(A). Therefore, the width of forest belt should be reasonably designed according to the terrain and geomorphology of the area where the road is located.

329. In addition, corresponding management measures should be taken to reduce the impact of road traffic noise on the acoustic environment. The specific management measures are as follows:

330. In view of the inevitable errors in the calculation results of the noise prediction model, it is recommended to monitor the environmental noise of the acoustic environmental protection targets involved in the project and the road sections where they are located during the operation period. If the limit is seriously exceeded, effective measures should be taken in time to reduce noise.

331. Municipal departments should maintain the road surface frequently to ensure good road conditions.

**ii. FTZ railway project****A. Noise prediction of special railway lines****(i) Prediction model**

332. This project is a special railway line, the tracks are all ballasted tracks, and the running trains are freight trains. There is no crossing along the special line, and wireless dispatching communication equipment is used for receiving and departing trains, and whistles are generally not used. The noise prediction model method in "Technical Guidelines for Environmental Impact Assessment Acoustic Environment" HJ2.4-2021 is used for prediction.

333. The model calculation method is based on the law of sound wave propagation, and the predicted value is the equivalent continuous A sound level within the predicted period. In the prediction calculation, the train operation noise source is mainly considered. The noise source of train running is regarded as the sound source of finite length moving line.

334. Then the equivalent continuous A sound level of railway noise at a prediction point is calculated as follows:

$$L_{Aeq,p} = 10 \lg \left[ \frac{1}{T} \left( \sum_{i=1}^n n_i t_{eq,i} 10^{0.1(L_{p0,i} + C_{i,j})} + \sum_{i=1}^n t_{f,i} 10^{0.1(L_{p0,i} + C_{f,i})} \right) \right]$$

335. In the formula:

$L_{Aeq,p}$  - Equivalent A sound level of train running noise, dB(A);

$T$ —The specified evaluation time, s; this evaluation is during the daytime from 6:00-22:00 (total of 16 hours), and at night from 22:00-6:00 (total of 8 hours);

$n_i$  —the number of trains of the  $i$  class passing within  $T$  time;

$t_{eq,i}$  —the equivalent time for the train of class  $i$  to pass, s;

$L_{p0,t,i}$ —the noise radiation source intensity at the reference point position of the specified class  $i$  train, which can be A-weighted sound pressure level or frequency band sound pressure level, dB(A);

$C_{t,i}$  —the noise correction item of the  $i$ -class train, which can be A-weighted sound pressure level or frequency band sound pressure level correction item, dB(A);

$t_{f,i}$  —action time of fixed sound source, s;

$L_{p0,f,i}$ —Noise radiation source intensity of fixed sound source, which can be A-weighted sound pressure level or frequency band sound pressure level, dB(A);

$C_{f,i}$  — noise correction item of fixed sound source, which can be A-weighted sound pressure level or band sound pressure level correction item, dB(A).

336.i) The action time of train running noise adopts the equivalent time  $t_{eq,i}$  of train passing, and its approximate value is calculated by the following formula.

$$t_{eq,i} = \frac{l_i}{v_i} \left( 1 + 0.8 \frac{d}{l_i} \right)$$

337. In the formula:

$t_{eq,i}$  —the equivalent time for the train of class  $i$  to pass, s;

$l$ —train length, m;

$v$ —train running speed, m/s;

$d$ —horizontal distance from the prediction point to the center line of the line, in m.

338.ii)  $C_{t,i}$  of train running noise is calculated according to the following formula.

$$C_{t,i} = C_{t,v,i} + C_{t,\theta} + C_{t,l} - A_{t,div} - A_{atm} - A_{gr} - A_{bar} - A_{hous} + C_{hous} + C_w$$

339. In the formula:

$C_{t,i}$  —the correction item of train running noise, dB(A);

$C_{t,v,i}$  - speed correction of train running noise, dB(A);

$C_{t,\theta}$  —Vertical directivity correction of train running noise, dB(A);

$C_{t,t}$  —the correction of the influence of line and track structure on noise, dB(A);

$A_{t,div}$  —geometric divergence loss of train running noise, dB(A);

$A_{atm}$  —atmospheric absorption of train running noise, dB(A);

$A_{gr}$  —the attenuation of train running noise caused by ground effect, dB(A);

$A_{\text{bar}}$  —insertion loss of sound barrier to train running noise, dB(A);

$A_{\text{hous}}$  —the attenuation of train running noise caused by building groups, dB(A);

$C_{\text{hous}}$  —reflection correction caused by buildings on both sides, dB(A);

$C_w$  — frequency weighting correction, dB(A).

340.iii) Each correction item is calculated according to the following formula.

① When the train speed is less than 35 km/h:

$$c_{t,v} = 10 \lg\left(\frac{v}{v_0}\right)$$

Train running noise speed correction  $C_{vi}$

$$c_{vi} = 30 \lg\left(\frac{v}{v_0}\right)$$

341. In the formula:

$v$  —predicted speed, km/h;

$v_0$  —reference speed, km/h.

② Vertical directivity correction  $C_{t,\theta}$  of train running noise

342. When the ground line or overhead line has no baffle structure ( $\theta$  is 0.5m above the rail surface, that is, the position of the sound source, as the horizontal reference):

$$C_{t,\theta} = \begin{cases} -2.5 & \theta > 50^\circ \\ -0.0165(\theta - 21.5^\circ)^{1.5} & 21.5^\circ \leq \theta \leq 50^\circ \\ -0.02(21.5^\circ - \theta)^{1.5} & -10^\circ \leq \theta < 21.5^\circ \\ -3.5 & \theta < -10^\circ \end{cases}$$

③ Correction  $C_{t,t}$  for the influence of line and track structure on noise

343. The whole line of the project is laid with 50 kg/m steel rails, ballasted and seamed lines, and the design speed of freight trains is 30 km/h. The correction  $C_{t,t}$  of line conditions is taken as 3dB(A). In this project, the noise correction in the curved road section will increase by 3dB(A). Line and track structure corrections are shown in the table below.

**Table 6-20 Different line and track conditions**

line type		Noise correction value/dB
Line Plane Circle Curve Radius	R<300m	+8
	300m≤R≤500m	+3
	R>500m	+0
seam line		+3
Turnouts and Crossings		+4
Ramp (uphill, slope > 6‰)		+2

④ Geometric divergence attenuation  $C_{t,\text{div}}$  of train running noise

344. The geometric divergence loss  $C_{t,\text{div}}$  of train running noise radiation can be calculated by the following formula

$$A_{t,\text{div}} = 10 \lg \frac{\frac{4l}{4d_0^2 + l^2} + \frac{1}{d_0} \arctan\left(\frac{l}{2d_0}\right)}{\frac{4l}{4d^2 + l^2} + \frac{1}{d} \arctan\left(\frac{l}{2d}\right)}$$

In the formula:

$d_0$ —the reference distance of source strength, the unit is m;

$d$  — the distance from the predicted point to the line, in m;

$l$ —the length of the train, in m.

⑤ Air absorption attenuation  $C_{atm}$

345. The air absorption attenuation  $C_{atm}$  is calculated according to the following formula:

$$C_{atm} = (r-r_0)/1000 \text{ (Equation 4.2-10)}$$

346. In the formula:

— Atmospheric absorption and attenuation coefficient related to temperature, humidity and sound wave frequency. In the prediction calculation, the corresponding atmospheric absorption and attenuation coefficient is generally selected according to the annual average temperature and humidity of the area where the construction project is located, and the unit is dB(A)/m;

$r$ —the distance between the predicted point and the sound source;

$r_0$ —the distance from the reference position to the sound source.

⑥ Ground effect sound attenuation absorption  $C_{t,g,i}$

347. Ground attenuation is mainly caused by the interference of direct sound and ground reflected sound from the sound source to the receiving point. When the sound wave passes through the loose ground or the mixed ground with mostly loose ground, the ground attenuation is calculated according to the following formula:

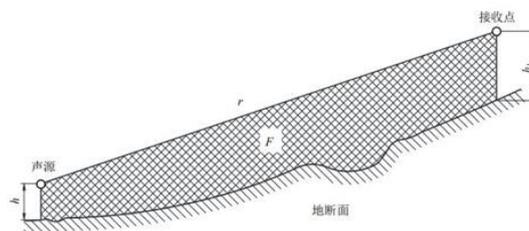
$$A_{gr} = 4.8 - \left( \frac{2h_m}{d} \right) \left[ 17 + \left( \frac{300}{d} \right) \right]$$

In the formula:

$h_m$  — the average height of the propagation distance from the ground, in m, the method of estimating the average height is shown in Figure 5.4-1.

$d$  — the distance from the sound source to the receiving point, m.

Loose ground refers to the ground covered by grass, trees or other plants, and other ground suitable for plant growth, such as farmland.

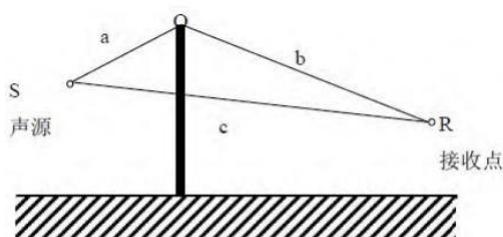


**Figure 6-5 Method for estimating the mean height  $h_m$**

Source: Environmental Impact Assessment Form of the Yingkou FTZ subproject

⑥ Sound barrier insertion loss  $C_{bar}$

The sound barrier and the sound propagation path are shown in the figure below Source:



source: Environmental Impact Assessment Form of the Yingkou FTZ subproject

**Figure 6-6 Sound barrier and sound propagation path diagram**

348. Consider the train noise source as an infinitely long line sound source, and determine the insertion loss value of the sound barrier according to HJ/T90-2004 "Specifications for the Design and Measurement of Sound Barriers". The calculation formula is as follows:

$$C_{t,bi} = \begin{cases} -10 \lg \left[ \frac{3\pi\sqrt{1-t^2}}{4 \arctg \sqrt{\frac{1-t}{1+t}}} \right], t = \frac{40f\delta}{3c} \leq 1 \\ -10 \lg \left[ \frac{3\pi\sqrt{t^2-1}}{2 \ln(t + \sqrt{t^2-1})} \right], t = \frac{40f\delta}{3c} > 1 \end{cases}$$

In the formula:

f—sonic frequency, Hz;

δ — sound path difference, δ = a+bc , m;

c—Sound velocity, m/s, c=340m/s.

⑧ Sound attenuation caused by buildings

349. The sound attenuation caused by building groups depends on the specific situation. The area where the line passes through is less sensitive to noise. This prediction and evaluation does not consider the sound attenuation caused by building groups.

iv) Environmental noise prediction formula

Ambient noise prediction mode at the prediction point daytime or nighttime

$$L_{Aeq环境} = 10 \lg [10^{0.1 L_{Aeq铁路}} + 10^{0.1 L_{Aeq背景}}]$$

350. In the formula:

$L_{Aeq}$  Railway—predicted daytime or nighttime railway noise at the predicted point, dB(A);

$L_{Aeq}$  Background—the ambient noise background value of the predicted point, dB(A).

(ii) Forecast technical conditions

i) Forecast year

351. Short-term: 2035 years; long-term: 2045 years. During the day, it is calculated according to 06:00-22:00; at night, it is calculated according to 22:00-06:00.

## ii) Traction type

352. The recently recommended model of this line is HXD series, with a traction quality of 10,000t.

## ③ Train running speed

353. According to the design of this project and the current actual situation, the predicted speed of the truck for this evaluation is 40 km /h.

## ④ Track conditions, track bed conditions

354. The whole line adopts seamed steel rail and ballasted track.

## ④ Train flow

**Table 6-21 Short-term and long-term train operation planning unit: pair/day**

year	Average number of pairs of trains per day	
	Send	Arrive
Recently	10	10
forward	14	14

source: Environmental Impact Assessment Form of the Yingkou FTZ subproject

## (iii) Prediction results

**Table 6-22 Unshielded noise equivalent sound level unit along the railway: dB(A)**

Period	Noise equivalent sound level (dBA)											
	30m		60m		90m		120m		150m		200m	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
Recently	53.2	52.5	48.3	47.7	44.5	43.8	42.4	41.8	39.6	39.0	37.6	36.9
Forward	58	57.3	53.4	52.7	50.6	49.9	48.6	47.9	47.0	46.4	45.0	44.3

source: Environmental Impact Assessment Form of the Yingkou FTZ subproject

355. In the near future: the maximum value at day and night is located 30m outside the railway, which are 53.2dB(A) and 52.5dB(A) respectively, and the equivalent sound level of regional noise meets the category III in the "Environmental Quality Standard for Noise" (GB3096-2008), which is  $\leq 65$  dB(A) during the day; At night, the area 60 m away meets the requirements of Category III in the "Environmental Quality Standard for Acoustics" (GB3096-2008), that is,  $\leq 55$  dB(A) at night;

356. Long-term: It is located 30 m outside the railway at day and night, with the maximum values of 58 dB(A) and 57.3 dB(A) respectively, and the equivalent sound level of regional noise during the daytime meets Category III in the *Environmental Quality Standard for Noise (GB3096-2008)* Standard requirements, that is, daytime  $\leq 65$  dB(A); The equivalent sound level of regional noise meets the requirements of category III in the *"Environmental Quality Standard for Acoustics" (GB3096-2008)* in the area 90 m away at night, that is,  $\leq 55$  dB(A) at night;

## B. Noise prediction of stations, sections and institutes

## (i) Prediction model

357. According to the noise emission characteristics of this project, the requirements of *"Technical Guidelines for Environmental Impact Assessment Noise Environment" (HJ2.4-2021)* and combined with the surrounding environmental conditions of this project, the

prediction formula of this assessment is as follows:

① The sound pressure level of the outdoor point sound source at the predicted point in the octave band

a. The octave band sound pressure level of a point source at the predicted point

$$L_{oct}(r) = L_{oct}(r_0) - 20 \lg(r/r_0) - \Delta L_{oct}$$

358. In the formula:  $L_{oct}(r)$  - the octave band sound pressure level produced by the point sound source at the predicted point;

$L_{oct}(r_0)$  - the octave band sound pressure level at the reference position  $r_0$ ;

$r$ —the distance between the predicted point and the sound source, m;

$r_0$ —the distance from the reference position to the sound source, m;

$\Delta L_{oct}$ —the amount of attenuation caused by various factors, including sound barrier, air absorption and

359. The attenuation caused by the ground effect is calculated as:

$$A_{oct\ bar} = -10 \lg \left[ \frac{1}{3 + 20N_1} + \frac{1}{3 + 20N_2} + \frac{1}{3 + 20N_3} \right]$$

$$A_{oct\ atm} = \alpha (rr_0)/100;$$

$$A_{exc} = 5 \lg(rr_0);$$

b. If the octave band sound power level  $L_w$  of the sound source is known  $cot$ , and the sound source can be regarded as located on the ground, then:

$$L_{cot} = L_{w\ cot} - 20 \lg r - 8$$

c. Calculate the A sound level  $L_A$  produced by the sound source by combining the sound pressure levels of each octave band:

$$L_A = 10 \lg \left[ \sum_{i=1}^n 10^{0.1(L_{pi} - \Delta L_i)} \right]$$

360. In the formula,  $\Delta L_i$  is the correction value of A-weighting network.

d. Synthesis of sound levels produced by each sound source at the predicted point

$$L_{TP} = 10 \lg \left[ \sum_{i=1}^n 10^{0.1L_{pi}} \right]$$

② Prediction of indoor point sound sources

a. The sound pressure level of the octave band near the enclosure structure in the room:

$$L_{oct,1} = L_{w\ cot} + 10 \lg \left( \frac{Q}{4\pi r_1^2} + \frac{4}{R} \right)$$

361. In the formula:  $r_1$  is the distance from a certain indoor source to the enclosure structure;

R is the room constant;

Q is the directional factor.

b. The total octave band sound pressure level generated by the indoor sound source near the enclosure structure:

$$L_{oct,1}(T) = 10 \lg \left[ \sum_{i=1}^n 10^{0.1L_{oct,1(i)}} \right]$$

c. The total sound pressure level near the enclosure structure outdoors:

$$L_{oct,1}(T) = L_{oct,1}(T) - (Tl_{oct} + 6)$$

d. The outdoor sound pressure level is converted into an equivalent outdoor sound source:

$$L_{w\ oct} = L_{oct,2}(T) + 10 \lg S$$

362. In the formula: S is the sound transmission area.

e. The position of the equivalent outdoor sound is the position of the enclosure structure, and its octave band sound power level is  $L_{w\ oct}$ , so the sound level produced by the equivalent outdoor sound source at the predicted point is calculated according to the outdoor sound source method.

(ii) Noise equipment source strength

**Table 6-23 Main noise sources during project operation period**

name	Sound pressure level dB (A)	amount	location	emission characteristics
Gantry Crane	61	4	Stations	Intermittent
loader (grab)	70	1	Stations	Intermittent
forklift	65	5	Stations	Intermittent
Manual hydraulic pallet truck	65	5	Stations	Intermittent

source: Environmental Impact Assessment Form of the Yingkou FTZ subproject

(iii) Prediction results

363. The contribution value of the environmental noise impact prediction is mainly to predict the impact of the noise source of the proposed project on the factory boundary. After the project is put into production, the noise prediction results are shown in the table below.

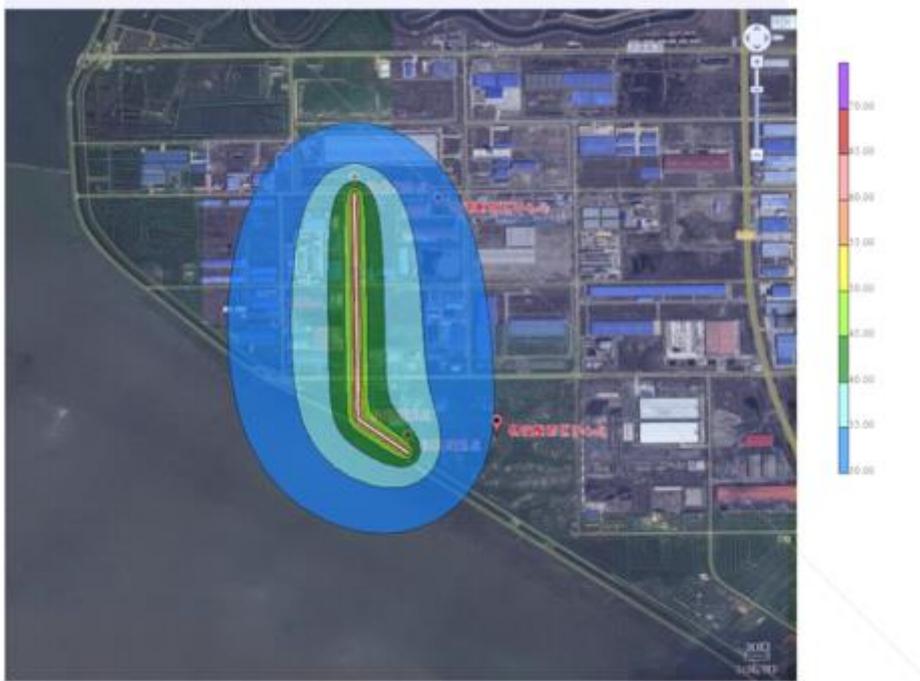
**Table 6-24 Project site boundary noise prediction results Unit: dB (A)**

Measuring point location	during the day	at night
	Contribution	Contribution
East Field	41.34	41.34
South Field Boundary	43.38	43.38
West field boundary	45.92	45.92
North Field	40.57	40.57
(GB12348-2008) Class 3	6 5	5 5

source: Environmental Impact Assessment Form of the Yingkou FTZ subproject

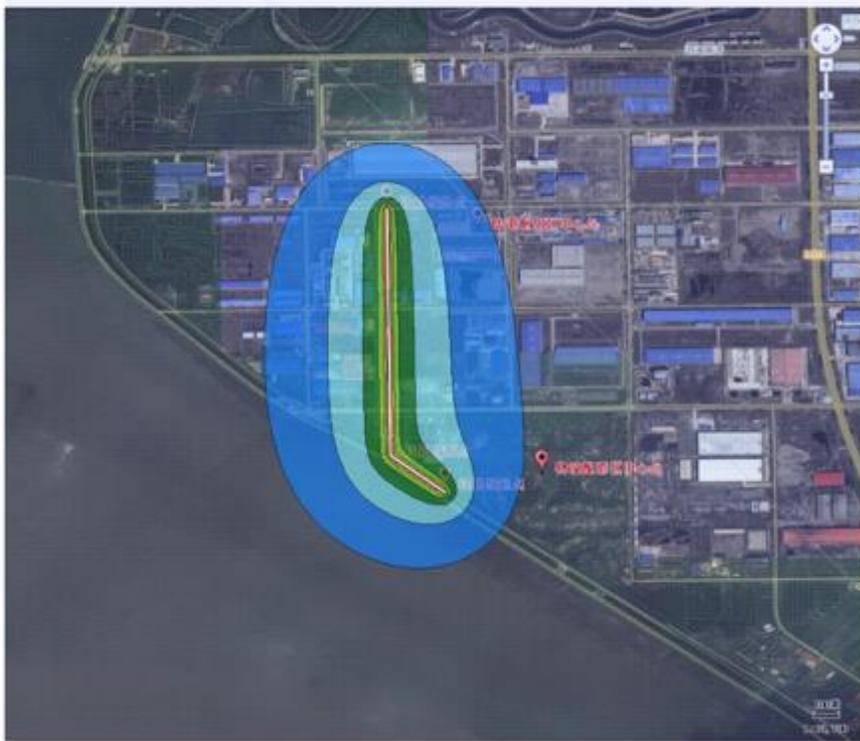
364. According to the prediction results, after the completion of the project, the noise value of the four sides of the project can meet the three types of standards in the "Environmental

*Noise Emission Standards at the Boundary of Industrial Enterprises" (GB12348-2008):  $\leq 65$  dB(A) during the daytime, and  $\leq 65$  dB (A) at nighttime.  $\leq 55$ dB (A). And after the project is completed, there will be no residential areas within 200 m nearby, the impacts of Noise on birds refer to Chapter 6.3.2.5 Impacts on birds.*



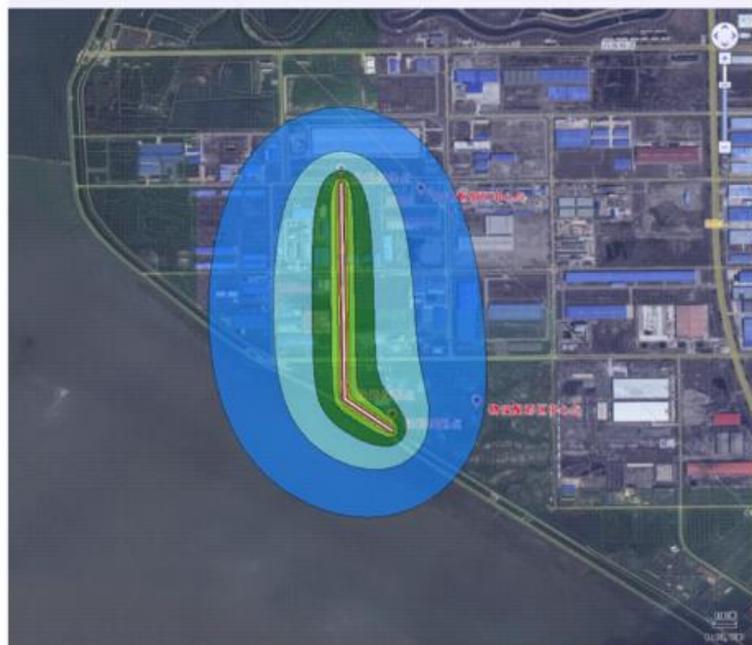
source: Environmental Impact Assessment Form of the Yingkou FTZ subproject

**Figure 6-7 Near-term diurnal forecast map of railway connection line**

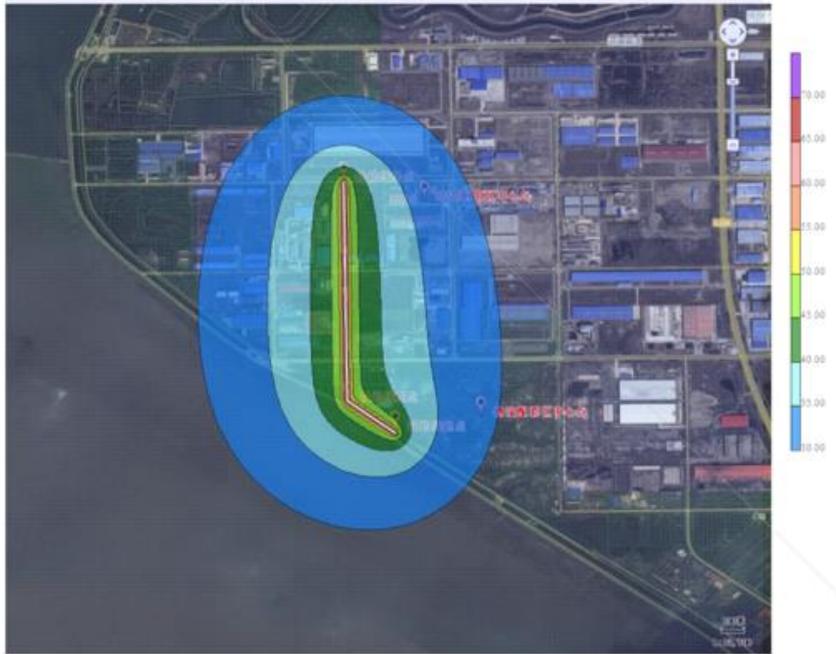


source: Environmental Impact Assessment Form of the Yingkou FTZ subproject

**Figure 6-8 Near-term night forecast map of railway connection line**



source: Environmental Impact Assessment Form of the Yingkou FTZ subproject

**Figure 6-9 Long-term diurnal forecast map of railway connection line**

source: Environmental Impact Assessment Form of the Yingkou FTZ subproject

**Figure 6-10 Long-term night forecast map of railway connection line**

### C. Vibration prediction analysis

#### (i) Prediction method

365. According to existing research results at home and abroad, railway vibration is mainly generated by wheel-rail excitation during train operation, and it is directly related to factors such as line conditions, train speed, train type, train axle load, and geological conditions. Due to the complexity of the vibration environment impact mechanism during the operation of railway trains, this vibration impact prediction is based on the *Ministry of Railways' Guiding Opinions on the Value of Noise and Vibration Source Strength and Treatment Principles for Environmental Impact Assessment of Railway Construction Projects (2010 Revised Draft)*, combined with the project and the characteristics of the environment, the following prediction model is adopted:

a) Calculation formula for the environmental vibration level  $VL_z$  of the ground railway at the prediction point:

$$VL_z = \frac{1}{n} \sum_{i=1}^n (VL_{z0,i} + C_i)$$

In the formula:  $VL_{z0,i}$ —vibration source intensity, the maximum Z-weighted vibration level (dB) during the train passing period;

$C_i$ —vibration correction term of train  $i$  (dB);

$n$ —the number of trains passing through, where  $n$  takes 1.

b) Calculation of vibration correction items

Calculate according to the formula

$$C_i = C_v + C_D + C_W + C_G + C_L + C_R + C_B$$

In the formula:  $C_v$  — speed correction, (dB);

$C_D$  — distance correction, (dB);

$C_W$  — axle load correction, (dB);

$C_G$  — geological correction, (dB);

$C_L$  — line type correction, (dB);

$C_R$  — track type correction, (dB);

$C_B$  — building type correction, (dB).

i) Speed correction  $C_v$

366. The vibration source strength should be determined according to the corresponding speed source strength value given in Document No. 44 (2010 Revised Draft). When the operating speed exceeds the value range, it should be corrected according to the following formula:

$$C_v = 10n \lg(v / v_0)$$

In the formula:

$C_v$  — vibration correction amount caused by speed, dB;

$n$  — speed correction parameter, when the vehicle speed is 20-160km/h,  $n=2$ ;

$V$  — train running speed, km/h;

$V_0$  — reference speed, km/h.

367. When the vehicle speed is above 160 km/h, directly use the interpolation method to obtain the value according to the vibration source strength table. Calculate  $C_v = -0.9$  for this project.

ii) Distance attenuation correction  $C_D$

$$c_D = -10K_R \lg(d / d_0)$$

In the formula,  $d_0$  — reference distance (30 m in this forecast);

$d$  — the distance from the predicted point to the center line of the line, (m);

$K_R$  — distance correction coefficient, related to the line structure, for subgrade lines, when  $d \leq 30m$ ,  $K_R = 1$ , when  $30m < d \leq 60m$ ,  $K_R = 2$ ; for bridge lines, when  $d \leq 60m$ ,  $K_R = 1$ .

iii) Axle load correction  $C_w$

368. This project is considered based on the freight train axle load of 25 t, which is different from the reference axle load given in the source strength table, and its corrected  $C_W$  is calculated according to the following formula.

$$C_w = 20k \lg(w / w_0)$$

where,  $W_0$  — reference axle load;

$W$  — predicted axle load of the vehicle;

After calculation, the axle load correction of this project is  $C_w = 0.79$

iv) Geological Correction  $C_G$

369. Different geological conditions have a certain attenuation on the propagation of environmental vibration. According to the degree of influence on vibration propagation, geological conditions can be divided into three categories, namely soft soil geology, alluvium, and diluvial.

Diluvial geology correction relative to alluvial geology:  $C_G = -4\text{dB}$

Corresponding to alluvial geology, soft soil geology correction:  $C_G = 4\text{dB}$

370. According to the engineering geological data, the road section along which the proposed line passes is basically alluvial layer geology, so the geological correction  $C_G = 0\text{dB}$ .

v) Line type correction CL

371. Within the range of 30~60 m from the center line of the line, for the alluvial layer geology, the cutting vibration relative to the embankment line  $CL = 2.5\text{dB}$ .

vi) Track type correction CR

372. According to Document No. 44 (2010 revision), the source strength value of ordinary trucks is selected for different line types, and the track type correction CR is taken as 0 dB.

vii) Building type correction CB

373. Different buildings have different responses to vibration at 0.5m outside. At present, various buildings are generally divided into three types for correction:

Class I buildings are good foundation, frame structure, high-rise buildings,  $CB = -10\text{dB}$ ;

374. Class II buildings are better foundations, brick wall structures, and middle-rise buildings,  $CB = -5\text{dB}$ ;

375. Class III buildings are general foundation and one-story buildings,  $CB = 0\text{dB}$ .

376. Most of the vibration-sensitive points of this project are brick-concrete buildings, which belong to Class II buildings, so the building type correction  $CB = -5\text{dB}$ .

## **(ii) Forecast technical conditions**

a) Traction type

377. The whole line adopts internal combustion traction, and the train type is ordinary freight cars.

b) train length

378. The effective length of train loading is 650 m.

c) Train running speed

379. The train speed target value of this project is 40 km /h, and the predicted calculation speed is determined according to 90% of the design maximum speed, taking into account the impact of acceleration and deceleration of trains entering and leaving the station.

d) track engineering

① Train model: HXD.

② Railway grade: V grade.

③ Rail : adopt 50kg/m standard new rail with a length of 25 m.

## ④ Sleepers and fasteners

Sleepers: Lay XII type reinforced concrete sleepers, 1600 per kilometer in general areas;

Fasteners: I-shaped fasteners with elastic strips and insulating buffer pads.

## ⑤ track bed

380. The main line adopts a single layer of first-class crushed stone ballast, the thickness of which is not less than 0.25m, and the slope ratio of the ballast bed is 1:1.5. Integral ballast bed is used in the loading and unloading range, and the thickness is not less than 0.25m.

## e) Geological conditions

381. The surface layer is covered with Quaternary Holocene artificial accumulation layer ( $Q_4^{ml}$ ) filling soil, Quaternary Holocene alluvial-diluvial layer ( $Q_4^{al+pl}$ ) muddy silty clay, silty clay, Quaternary slope residual layer ( $Q_4^{dl-el}$ ) silty clay; the underlying Upper Cretaceous System (K21) siltstone, fully weathered to weakly weathered.

382. Address Caledonian cycle, Indosinian tectonic cycle and Himalayan-Yanshan tectonic cycle. No active faults have been found to pass near the site, and the regional structural stability is relatively good. The geological conditions are relatively simple, the site stability is good, and there are no adverse geological effects such as landslides, debris flows, and collapses.

## f) Traffic flow

383. According to the information provided by the owner, a train has a total of 42 carriages, and the load capacity of each carriage is 64 t. The annual load of a train is 42 knots x 64 t/section x 365 days = 98.11t/a. Open row 2 columns.

**Table 6-25 Short-term and long-term train operation planning unit: pair/day**

year	Average number of pairs of trains per day
Recently	10
forward	14

source: Environmental Impact Assessment Form of the Yingkou FTZ subproject

## i) Day and night traffic flow distribution

Day and night operation.

**(iii) Environmental vibration prediction results and evaluation**

384. According to the relative positional relationship between the sensitive points along the line and the line, design engineering conditions, vehicle operation status, etc., according to the site survey, there is no vibration sensitive point within 200 m of the project. After correcting the vibration source intensity, different line forms are obtained through prediction and calculation. The speed of the truck is 40 km/h.

**Table 6-26 Impact of Railway Vibration and Standard Distance**

segment	year	Predicted vibration levels at different distances (VLzmax, dB)				Achievement distance (m)
		15m	20m	30m	60m	
across the board	Recently	80.5	79.3	77.5	74.5	17
	forward	83.0	81.8	80.0	77.0	30

source: Environmental Impact Assessment Form of the Yingkou FTZ subproject

**(iv) Environmental vibration conclusion**

385. According to the environmental vibration standards and engineering characteristics of this evaluation, the vibration standard distance for typical line forms and geological conditions is calculated to be 30 m from the centerline of the outer rail. When the urban planning management department makes reasonable planning and utilization of the areas on both sides of the line, Sensitive buildings such as residential buildings, schools, nursing homes and hospitals will be newly built within 30 m from the line.

**iii. FTZ road works****(i) Noise prediction results of typical road sections during the operation period**

386. according to the design speed of 60 km/h. The ground subgrade height of the predicted road section is considered as 0 m, the sound source height is calculated as 1 m above the road surface, and the height of the predicted point is taken as 1.2 m. The distance attenuation correction and ground effect correction are considered, and the road surface and longitudinal slope are not considered. , Correction of limited length road section, correction of sound and shadow area, shielding effect of front row buildings and forests, the contribution value of traffic noise at different distances on both sides of the route of this project is shown in the table below.

**Table 6-27 Noise Prediction Results of Typical Sections of Proposed Roads**

Period of time distance	Influence value (dB(A))					
	Near future (2025)		Mid-term (2031)		Long term (2039)	
Centerline distance (m)	during the day	at night	during the day	at night	during the day	at night
10	68	62	69	63	70	64
20	63	57	64	58	66	59
30	60	54	61	55	63	56
40	59	52	60	53	61	54
50	57	51	58	52	60	53
60	57	50	57	51	59	52
80	55	49	56	50	57	51
120	53	47	54	48	55	49
140	52	46	53	47	55	48
160	52	45	53	46	54	47
180	51	45	52	45	53	46
200	50	44	51	45	53	45

source: Environmental Impact Assessment Form of the Yingkou FTZ subproject

**Table 6-28 Standards on both sides of the road centerline Unit: m**

Period of time	Class 4b area		Class 4a area		Category 2 area	
	during the day	at night	during the day	at night	during the day	at night
Recent	<10	14	<10	26	31	60
mid term	<10	16	<10	30	39	81
Long term	11	19	11	37	50	97

source: Environmental Impact Assessment Form of the Yingkou FTZ subproject

387. According to the above prediction, the acoustic environment prediction results during the operation period of the project are as follows:

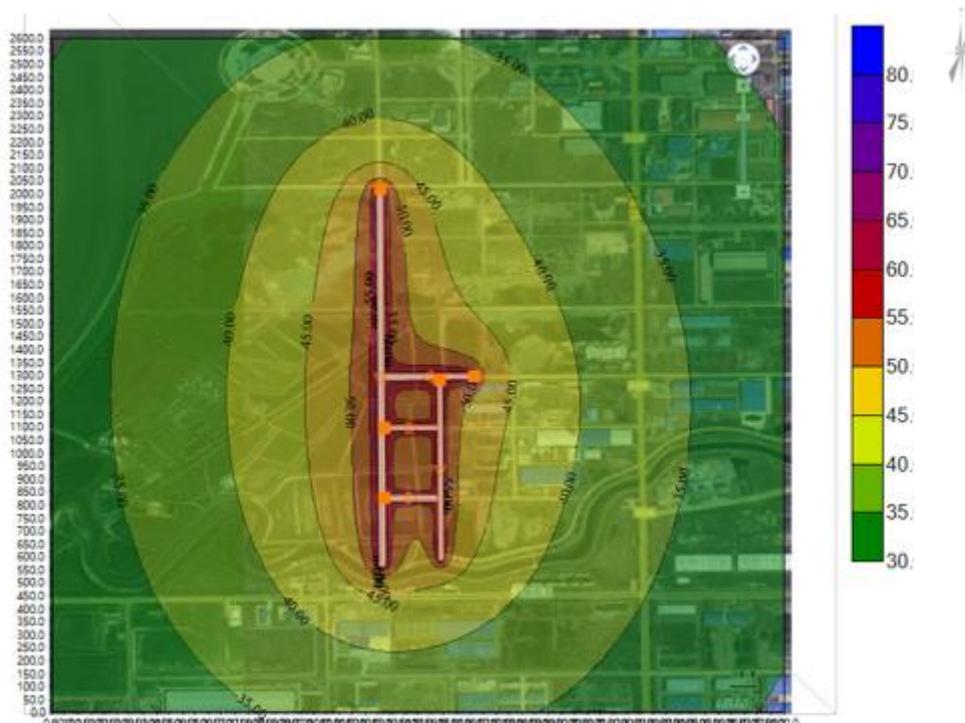
- ① Recent: The daytime standard distance of category 4b area of this project is less than 10 m, and the nighttime standard distance is 14 m from both sides of the road centerline; The up-to-standard distance between roads is 31 m on both sides of the center line, and the up-to-standard distance at night is 60 m on both sides of the center line of the highway.
- ② Mid-term: In the mid-term of this project, the daytime standard distance of category 4b areas is less than 10 m, and the night-time standard distance is 16 m from both sides of the road centerline; The up-to-standard distance between roads is 39 m on both sides of the center line, and the up-to-standard distance at night is 81 m on both sides of the center line of the highway.
- ③ Long-term : In the long-term of this project, the daytime standard distance of Category 4b area is 11 m on both sides of the highway centerline , and the nighttime standard distance is 19 m from both sides of the highway centerline; the daytime standard distance of Category 4a is 11 m on both sides of the highway centerline, and the nighttime standard distance It is 37 m on both sides of the center line of the highway; the daytime standard distance of Class 2 areas is 50 m on both sides of the center line, and the standard distance at night is 97 m on both sides of the road center line.

**(ii) Noise prediction results of sensitive points**

388. Background value selection: This project is a new project, and there are no sensitive targets within 200 m on both sides of the road.

389. For this Type II functional areas, the day-time noise meets the requirements of the category II standard of the "Acoustic Environment Quality Standard" (GB3096-2008); The volume is 3dB(A).

390. The iso-sound level line of road engineering in the FTZ is shown in the figure below.



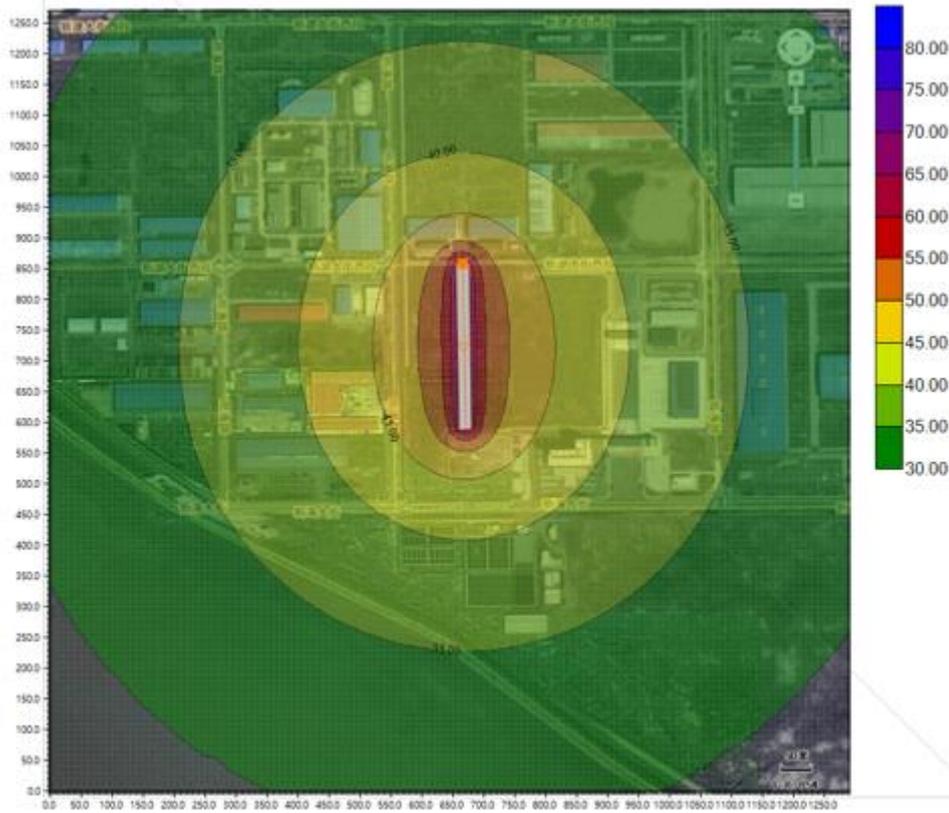
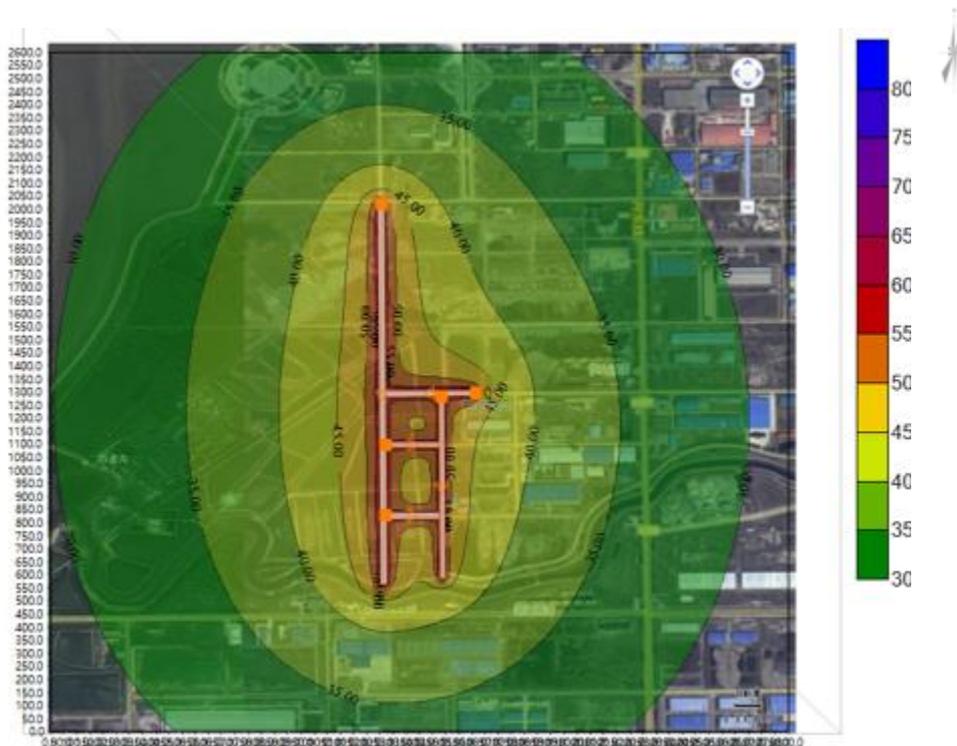


Figure 6-11 Isophonic map of recent daytime road works in the FTZ



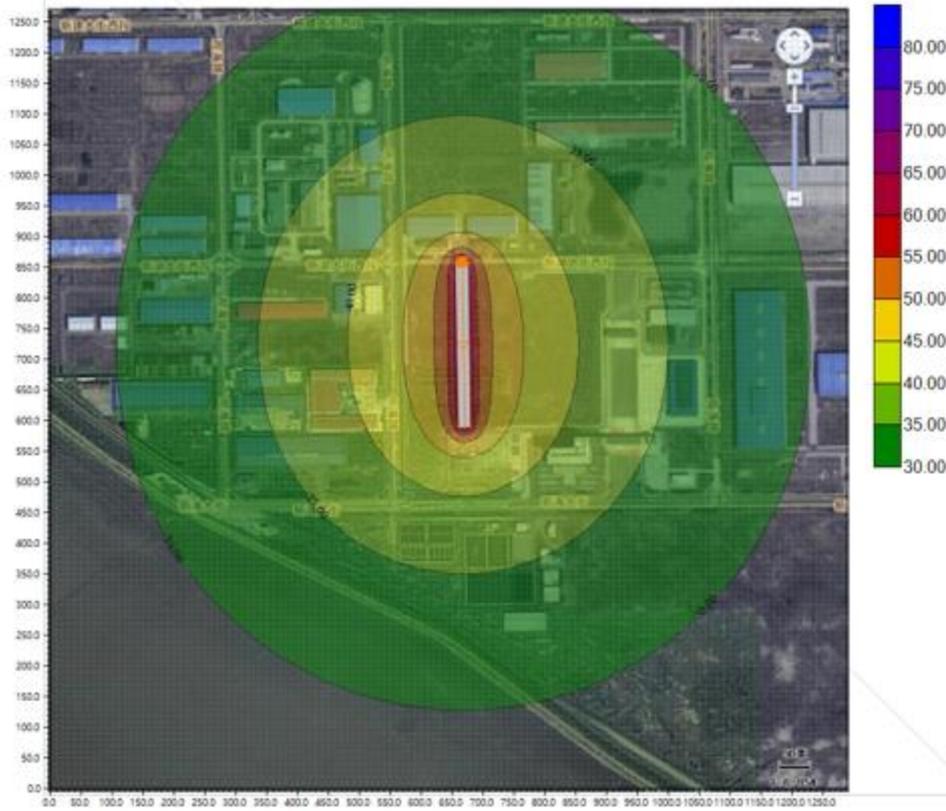
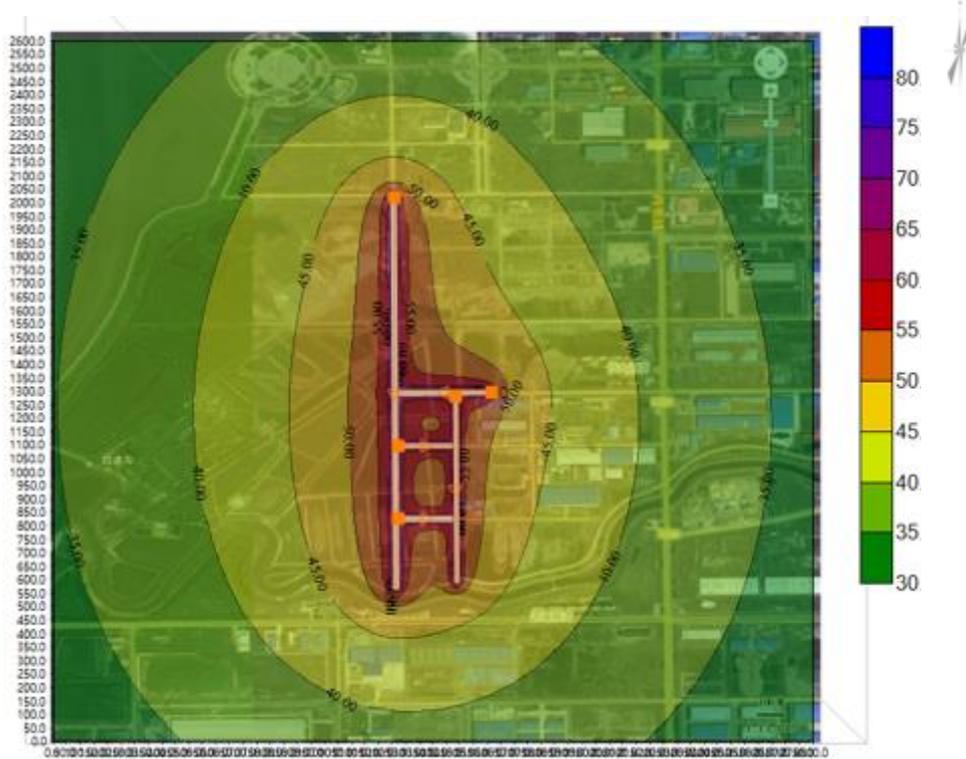


Figure 6-12 Isophonic map of recent night road works in the FTZ



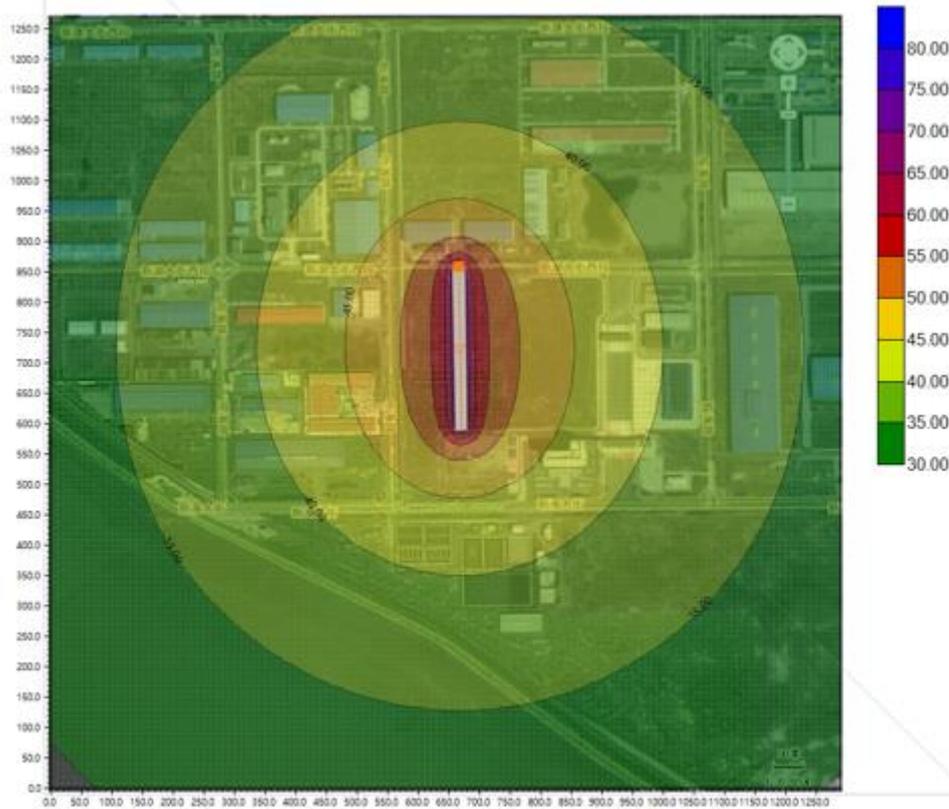
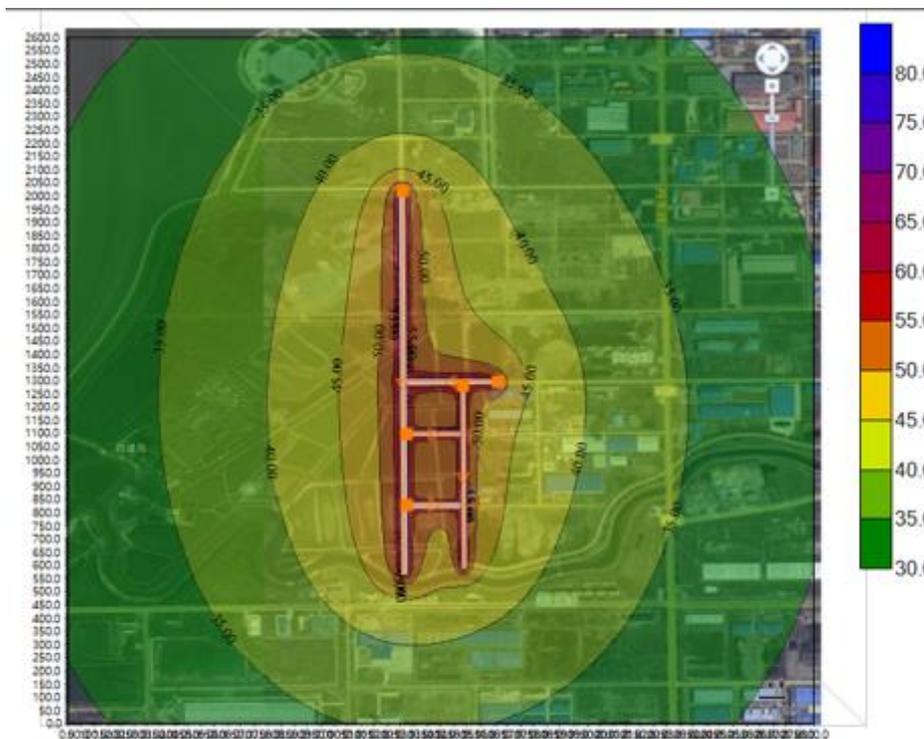


Figure 6-13 Daytime isoacoustic diagram of the road project in the FTZ in the middle period



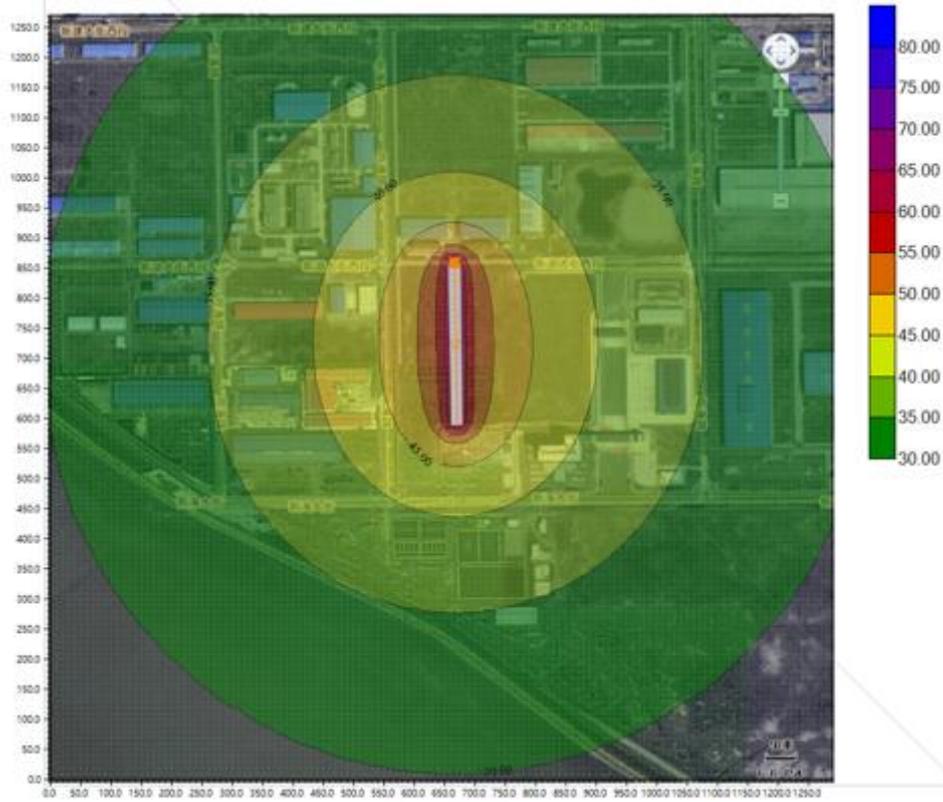
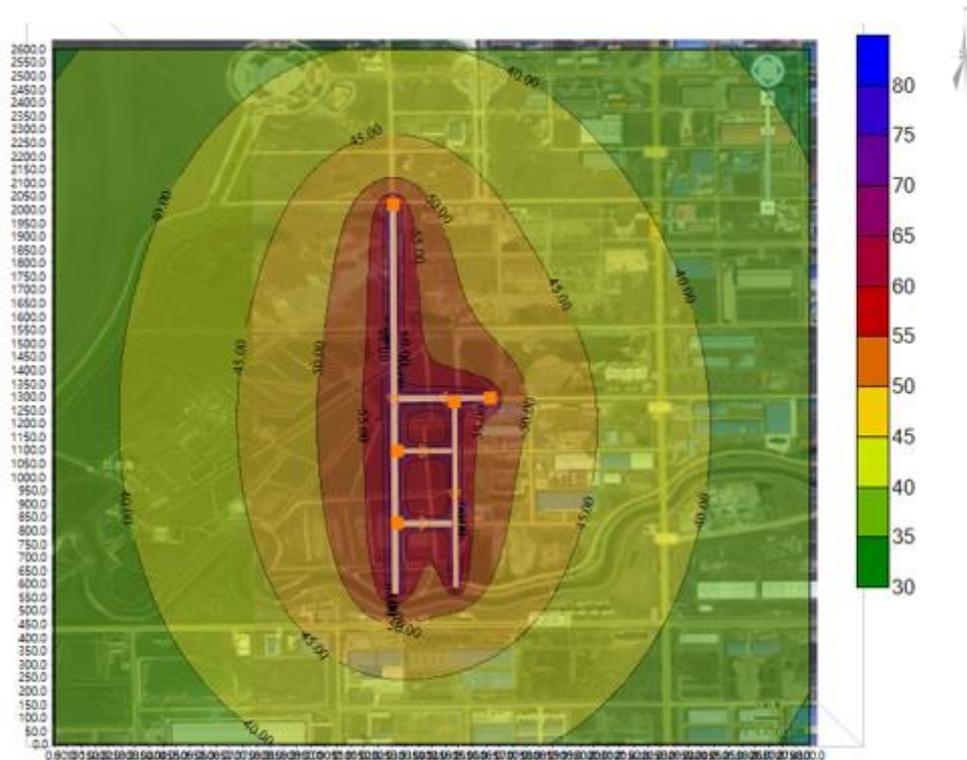


Figure 6-14 Isoacoustic map at night in the mid-term of road construction in the FTZ



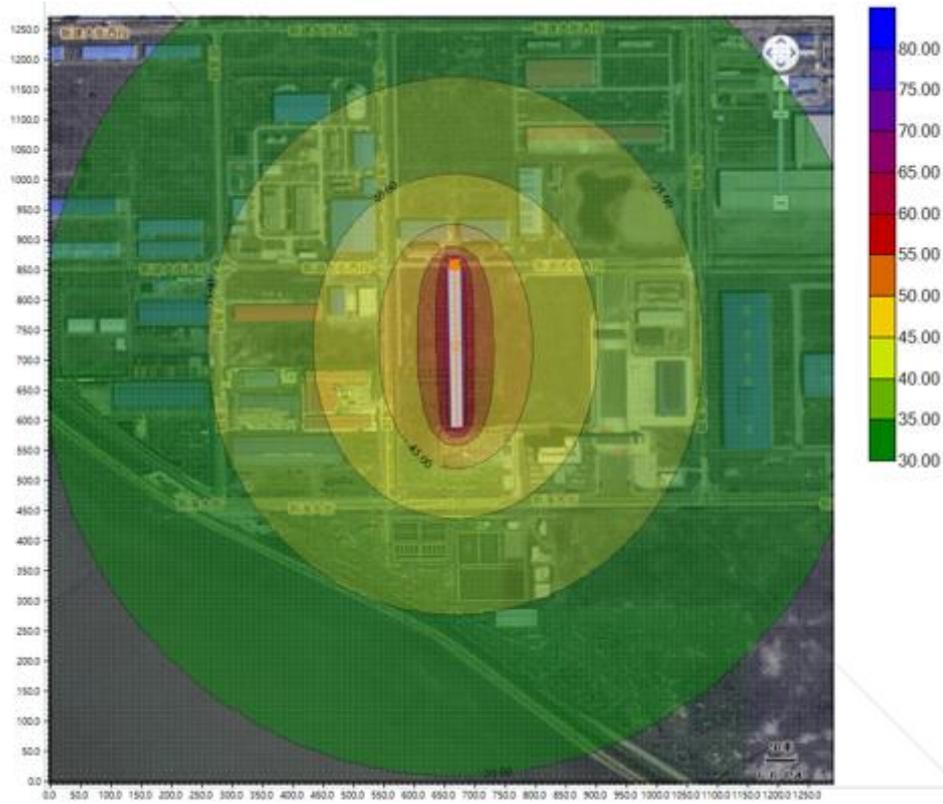
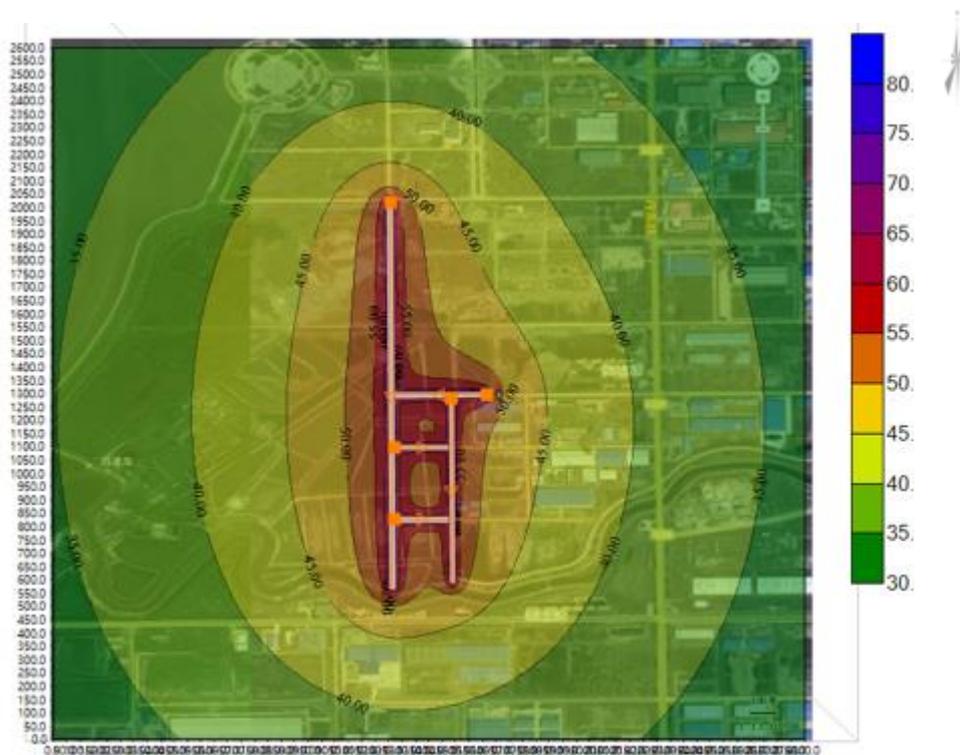
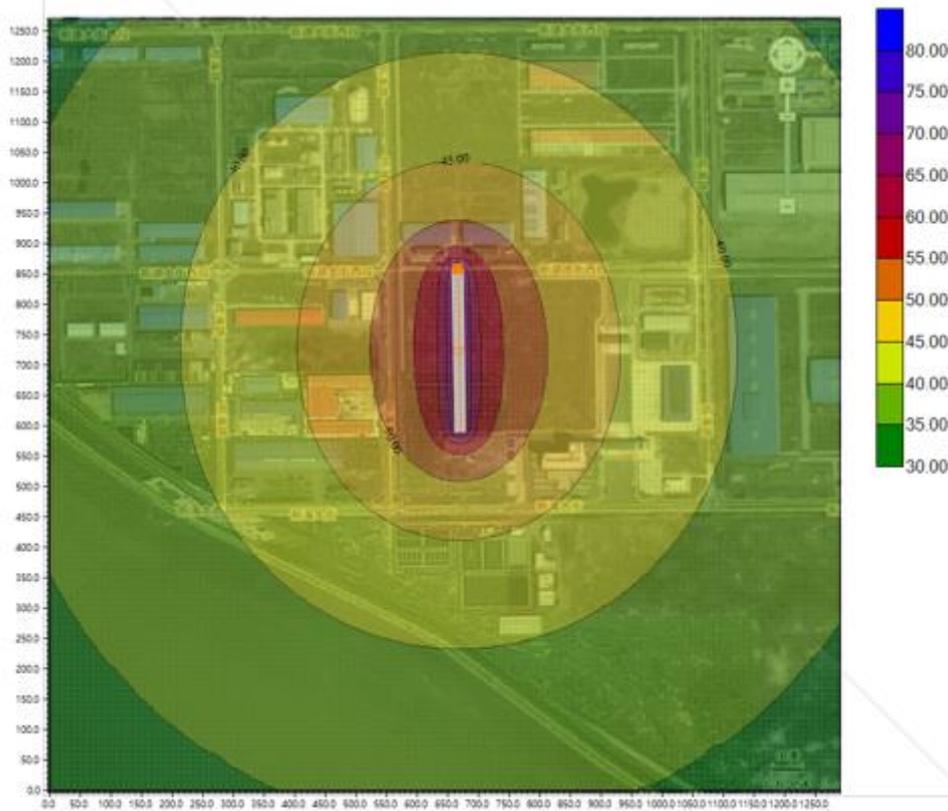


Figure 6-15 Long-term diurnal isoacoustic diagram of road engineering in the FTZ

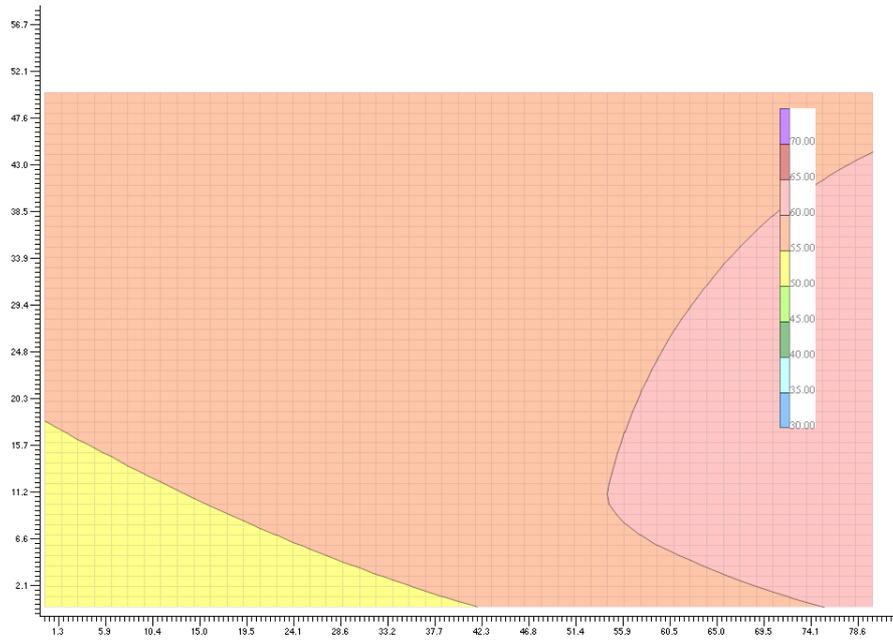




**Figure 6-16 Long-term night-time contour map of road works in the FTZ**

source: Environmental Impact Assessment Form of the Yingkou FTZ subproject

391. At different distances in the evaluation range, the prediction results of vertical near-, mid-, and long-term noise contribution values are as follows:



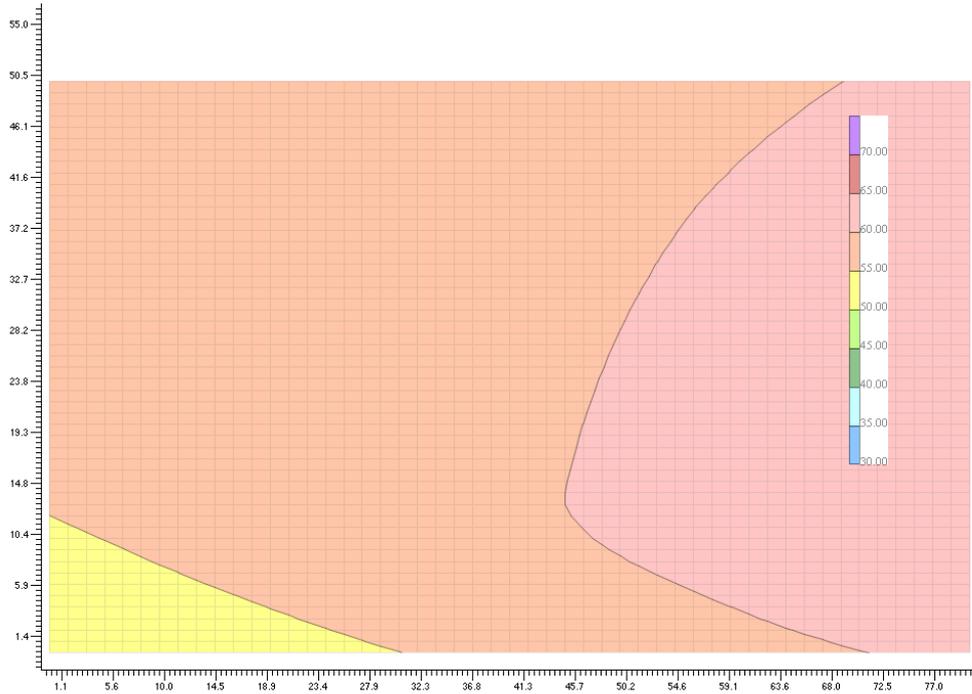
source: Environmental Impact Assessment Form of the Yingkou FTZ subproject

**Figure 6-17 The recent daytime vertical isoacoustic diagram of the road project in the FTZ**



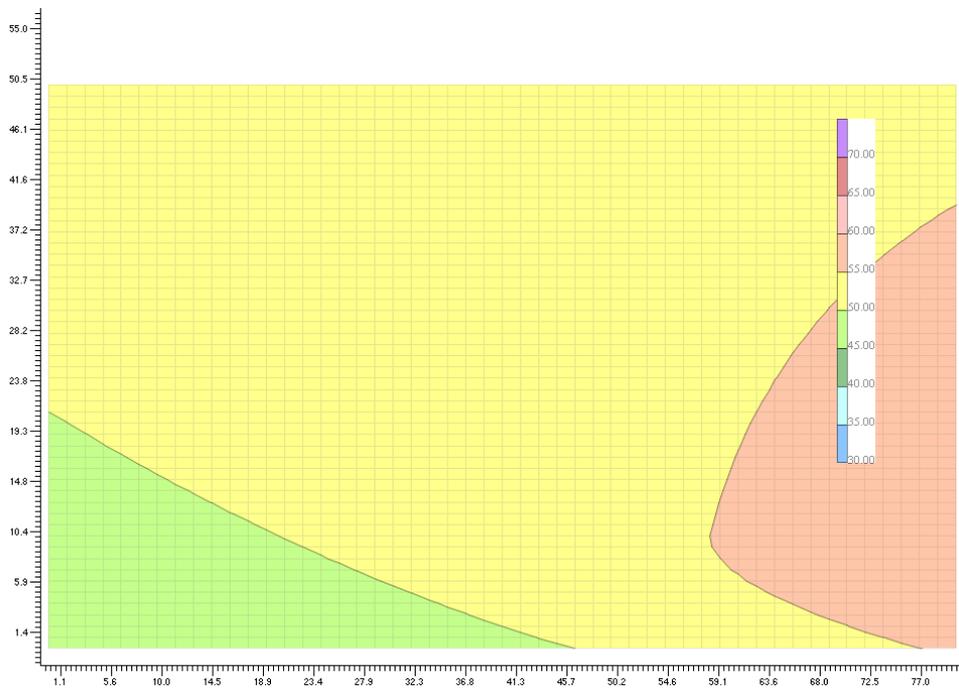
source: Environmental Impact Assessment Form of the Yingkou FTZ subproject

**Figure 6-18 Vertical isophonic diagram of recent night-time road works in the FTZ**



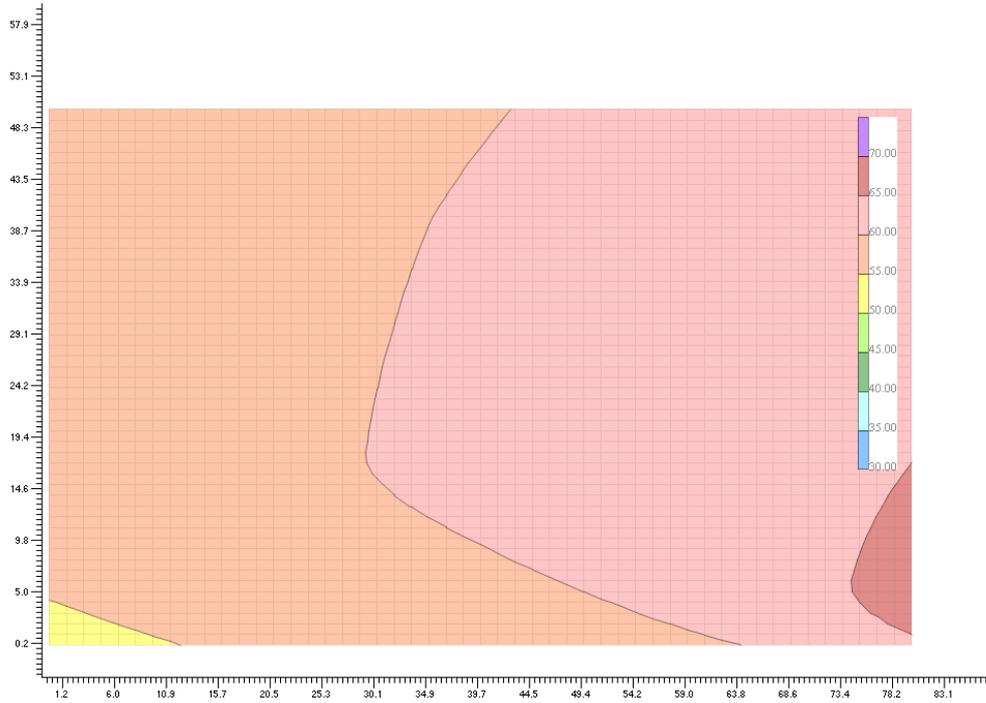
source: Environmental Impact Assessment Form of the Yingkou FTZ subproject

**Figure 6-19 Daytime Vertical Isophone Diagram of Road Project in the FTZ**



source: Environmental Impact Assessment Form of the Yingkou FTZ subproject

**Figure 6-20 Vertical isoacoustic diagram at night in the mid-term of road construction in the FTZ**



source: Environmental Impact Assessment Form of the Yingkou FTZ subproject

**Figure 6-21 Long-term diurnal vertical isochorogram of road engineering in the FTZ**



source: Environmental Impact Assessment Form of the Yingkou FTZ subproject

**Figure 6-22 Long-term night-time contour map of road works in the FTZ**

**(iii). Analysis of vibration impact on sensitive targets during operation period**

392. Studies have shown that when the vehicle speed is high, the road surface is uneven, and the distance from the building is close, the vibration generated by the structure of the vehicle itself will spread to the distance through the road surface, roadbed and surrounding strata. The magnitude of road vehicle vibration is related to many factors, including some particularities of the vehicle itself, such as the weight of the vehicle, the speed of the vehicle when driving on the road, the performance of the damping system designed by the vehicle itself, etc., as well as the road's own factors. Such as the levelness of the road, the roughness of the road surface, etc.

393. The axle load of a medium-sized truck is 35 KN, and the distance between the vibration source and the building is 14 m, and the vehicle speed is 90 km/h as the research object. The vibration levels of the building at different vibration source distances are as follows:

**Table 6-29 Vibration levels on the top floor of buildings under different vibration source distances**

distance (m)	14	16	18	20	22	24	26	28	30	32
Vibration level (dB)	58.7	57.9	55.7	53.3	51.9	51.3	50.3	49.2	48.4	48.2

source: Environmental Impact Assessment Form of the Yingkou FTZ subproject

394. Studies have shown that the vibration level of buildings decreases with the increase of distance, and the relationship between the two is nonlinear. The vibration level decreases in a step-like manner. When the vibration source is between 14 and 22 m away from the building, the vibration level drops rapidly, with a drop range of about 7dB; when the vibration source is between 22 and 30 m away from the building, the drop speed becomes slow, and the drop range is about 4dB. When the vibration source is 30 m away from the building, the vibration level drops the slowest. The increase of vehicle axle load and speed will cause the increase of building vibration response. When the axle load increases by 10 KN, the vibration level increases by about 1.5 dB, and when the speed increases by 30 km/h, the vibration level of the top layer increases by about 1 dB.

395. There are no buildings within a 30-meter range of the proposed construction roads centerline of the FTZ sub-project, resulting in minimal vibration impact. After the implementation of this project, the daily maintenance of the road should be done well to ensure the smoothness of the road and prevent the increase of the impact of vibration due to the deterioration of the smoothness of the road..

**6.2.2.3 Water Environment Impact Analysis and Mitigation Measures****(i) Impact analysis**

396. This project is a non-production project, and no production wastewater will be generated during the operation period. During the operation phase of the project, the domestic wastewater generated in the LEDZ is planned to be treated by the sewage treatment plant to be built in the park, and the domestic sewage in the FTZ is treated by the third sewage treatment plant in the south, which has little impact on the surface water environment.

397. Road surface runoff is non-recurring sewage generated during the operation period. It is mainly produced by rainwater washing the road surface. Pollutants deposited on the road enter the rainwater runoff and are discharged into the Minxing River through the rainwater collection system. Road surface runoff pollutants are mainly suspended solids, petroleum, and organic matter. The concentration of pollutants is affected by factors such as rainfall intensity, traffic flow, vehicle type, dust deposition, and previous drought time. Therefore, there is a certain degree of uncertainty and the road surface water quality varies

greatly. Studies have shown that the concentration of floating objects and petroleum substances washed by the road surface in the early stage of rainfall is relatively high, and the concentration of pollutants decreases as the rainfall process progresses.

398. The road surface runoff during the operation period will contain a certain amount of SS, petroleum, and BOD<sub>5</sub>, which will have a certain impact on the water quality of the surrounding water bodies. After the pollutants are diluted by precipitation and adsorbed by sand, the concentration of pollutants in the road surface runoff will be reduced, which will have little adverse impact on the water quality of Minxing River and will not cause pollution to the environment. However, when vehicles are in bad condition, breakdowns and accidents, motor vehicle gasoline and engine oil leakage may occur. In such scenarios, after rainfall, pollutants such as fossil fuels and COD will enter the surrounding water bodies with road surface runoff, resulting in water pollution and environmental pollution.

399. Road rainwater can infiltrate into the ground through the asphalt concrete on the road surface. Due to the low concentration of pollutants in the road rainwater itself, coupled with the filtration and adsorption of the surface soil, the impact on the groundwater environment during the operation period is small.

#### **(ii) Mitigation measures**

400. During the operation period, the drainage system will be deposited and clogged due to the erosion of rainwater on the side slope of the roadbed or the road. Therefore, the drainage system and the side ditches along the entire line should be cleaned regularly to ensure that the drainage system is unblocked.

401. In order to reduce the impact of water pollutants in road surface runoff during the operation period, measures such as grit chambers should be added to the rainwater pipe network system to reduce the impact of water pollutants on water bodies to a certain extent.

402. Strengthen traffic management, strictly prohibit all kinds of leaking, bulk and overloaded vehicles from running on the road, so as to prevent water pollution along the road caused by lost goods on the road; regularly maintain and check the status of transport vehicles in the park to avoid traffic accidents.

403. Execute the water quality monitoring plan during the operation period, and determine the supplementary surface water environmental protection measures that need to be taken according to the water quality monitoring results.

### **6.2.2.4 Solid Waste Impact Analysis and Mitigation Measures**

#### **(i) Impact analysis**

404. This project does not set up a living area, and the domestic waste generated by the project during the operation period is generated in the daily work process, and the amount of domestic waste generated is not large. It is collected and processed by the environmental sanitation department of Yingkou City, and has a small impact on the environment.

405. The enterprises in the project are not involved in the storage of hazardous chemicals, and there is no risk of hazardous solid waste. The general solid waste generated during the operation period is the waste discarded by people passing by (such as skins, paper scraps, etc.), the waste dumped by transport vehicles, and the road construction waste generated by road maintenance or railway maintenance.

406. The green industrial park in the FTZ plans to absorb equipment manufacturing, mechanical processing and environmentally friendly new material industries during the operation period; the newly built logistics storage area plans to absorb cross-border e-commerce, and the stacked goods are generally fast-selling. Therefore, the solid waste generated during the operation period of the park may be equipment parts, express

packaging, plastic film, etc.

407. If the organic solid waste such as fruit peels is not treated in time, it will produce odor during the microbial decomposition process and cause certain pollution to the environment; general solid waste such as paper scraps and plastics may enter Minxing River through the rain drainage system with the road runoff after the rainfall occurs rivers, causing water pollution. The accumulation of a large amount of solid waste will encroach on the land space of the park.

408. The FTZ sub-project incorporates a total of 10,263 photovoltaic modules with a capacity of 570,000 kilowatts, covering green standard factory buildings, high-standard smart warehouses, international express centers, and cloud warehouses. The lifespan of these photovoltaic modules is approximately 25 years. These modules contain harmful substances such as lead, cadmium, sulfides, and fluorides. If the discarded photovoltaic modules are disposed of improperly or discarded recklessly, these harmful substances may permeate the soil and water sources, causing environmental pollution.

#### **(ii) Mitigation measures**

409. The park prohibits the chemical industry, high energy-consuming industries and other industries that are likely to produce hazardous chemicals and hazardous waste from entering the park, avoiding hazardous solid waste from the source.

410. Industrial production enterprises themselves are responsible for proper disposal (should be recycled as much as possible), and the environmental protection department is responsible for supervision and management. According to the planning requirements, the solid waste of enterprises must be reduced, harmlessly disposed and recycled.

411. General waste must be disposed in accordance with the regulations of relevant departments such as sanitation, environmental protection, and urban management, and solid waste should be transported to designated locations in a timely manner, and waste should not be scattered, piled up, or transferred along the road.

412. Household waste is collected in a centralized manner and transported to the waste treatment station. Household waste transportation is basically containerized and sealed.

413. The cleaning staff in the park cleaned the public areas in time, and cleaned up the fruit peel and confetti in time.

414. Strengthen the management of Liaohe LEDZ and FTZ project parks and the education of staff, prohibit littering and sundries, and keep the working and living environment clean.

415. Retired photovoltaic modules must not be buried or discarded at will, and they should not be mixed with household waste for disposal. Retired photovoltaic modules should be handed over to a third party with the qualification and capability for recycling or returned to the manufacturer for unified recycling.

### **6.2.2.5 Biodiversity Impacts and Mitigation Measures**

#### **(i) Analysis of impact on terrestrial vegetation**

416. During the operation period of the project, the surrounding terrestrial vegetation is mostly street trees and green shrubs in the green belt. After the project is put into operation, the transportation volume and traffic flow will increase, resulting in road dust and vehicle exhaust, which will have adverse effects on plants. Road dust adheres to the surface of plant leaves, which will block the stomata of the leaves, reduce the photosynthesis, respiration and transpiration of plants, and lead to a decline in plant productivity and disease resistance; at the same time, a large amount of pollutant-containing exhaust generated by vehicle transportation will cause Leaf chlorosis can cause cell rupture in severe cases and inhibit vegetation growth and development; heavy metals and organic compounds flow into the soil with rainwater runoff and are absorbed by vegetation,

affecting vegetation growth.

417. In addition to the direct impact on vegetation, the spatial distribution pattern of native vegetation has been changed after the operation of the project, forming marginal habitats. The greening tree species planted in the project also replaced the original dominant populations of the project, resulting in new community succession, resulting in the reduction of native vegetation populations, species degradation, and affecting vegetation diversity.

418. The increase in the flow of people and vehicles during the operation period has also created conditions for invasive alien species. The seeds of light-loving and cold-resistant invasive vegetation can be carried in by crowds and transport vehicles, encroaching on the living space of native vegetation, and the remaining native vegetation may be eliminated due to low competitiveness.

#### (ii) Impact on birds

419. The coastline near the FTZ railway station project is the habitat of Siberia-Australia migratory birds. Migratory birds will stop here every May and September -October to supplement food and reproduce. After the operation of the project, the linear distance between the coastal habitat of migratory birds and the railway lead line is within 300 m, where the closest distance is approximately 50m. The impact of the railway on migratory birds during the operation period is as follows:

**420. Noise source and impact:** The impact of rail noise and sudden whistle noise produced by trains on birds is long-term and non-continuous. During the breeding season of birds, excessive or prolonged noise will cause birds to abandon their nests and startle their parents, which may affect the breeding rate of birds. Different bird species react differently to noise pollution, and traffic noise can indeed impact bird reproductive rates. When the equivalent noise level exceeds 50dB, it may have adverse effects on bird reproduction. According to the prediction and analysis of railway noise, without considering the noise attenuation effect of green isolation belts, in the near future, the daytime railway noise will be 53.2dB(A) at 30 m outside the railway; in the long-term, the daytime railway noise will be 58 dB(A) at 30 m outside the railway, meeting the requirements of Category III standards in the "Environmental Quality Standard for Noise" (GB3096-2008). The railway connecting line is isolated from the coastal tidal wetlands by a protective forest belt with a width of 30-40 meters. After the noise attenuation effect of the protective forest, the noise level can be reduced to 45.4dB(A) at a distance of 30 meters in the near term and 49.9dB(A) in the long term. Therefore, the railway has a relatively small noise impact on the coastal wetland bird habitat. Birds will gradually adapt over time, and the impact of noise on birds will decrease year by year.

**421. Vibration source and impact:** The vibration generated by trains mainly affects the foraging and perching activities of birds. By optimizing the wheel-rail system and using anti-vibration elastic materials, it is possible to reduce the vibrations transmitted to the ground during train operation. Considering that this line is an enterprise dedicated line and is used for shunting operations, the speed during idle traction operation should not exceed 40 km/h, and during pushing operation, it should not exceed 30 km/h, resulting in minimal vibration impact.

**422. Effects of light:** The birds in the Yinkgou coastal wetland are dominant by diurnal birds, such as Bar-Tailed Godwit and other Sandpipers, Red-Head Gull and Saunder Gull and other Gullidae, Nosed Shelduck and other ducks. Diurnal birds conduct activities such as foraging, nesting and courting during the day, while sleep and rest at night. Strong light stimulation when trains pass at night will make the wary bird feel fear, and make abnormal reactions to the light such as fly, circle or whistle, affecting the sleep of birds, thereby affecting the biological rhythm of birds, resulting in a range of negative impacts including decline of reproductive success and survival rate and behavior changes. The mitigation of

birds is influenced by light duration, mainly reflecting on gonad development. When the gonad gets mature and light duration reaches above the critical value, birds begin to mitigate. The night train lighting changes the natural light length, which can affect the physiological changes of birds and confuse birds on the breeding or migration season. Studies have shown that the intensity of light gradually decays with the increase of distance, and the impact on birds is also reduced. After the train passes, the effect of the lights on the birds disappears. At the same time, the existing green protection forest between the railway connection line and the coastal wetland plays a certain role in shielding the light.

423. **Electromagnetic influence:** This project is a freight line that uses a diesel internal combustion engine, causing no electromagnetic impact on birds.

424. **Collisions:** In addition to the above impacts, the operation of trains also poses a certain threat to the safety of birds, and there is a risk of collisions between birds and train carriages. Because the train's speed does not exceed 40 km/h, the risk of bird collisions is relatively low.



**Figure 6-23 The location relationship between the new railway lead and the coastal habitat of migratory birds**

**(iv) Mitigation measures**

425. The facility operator shall take the following measures to mitigate the impacts on birds:

426. **Training and Awareness:** Train drivers and other relevant personnel to raise awareness about bird conservation. Training content should include bird identification, behavioral observation, and response measures.

427. **Buffer Zones Establishment and Maintenance:** Set up and maintain a 30-40-meter-wide protective forest buffer zone to isolate light and reduce noise, thereby minimizing the impact on birds.

428. **Adjustment of Operating Times:** During the bird migration seasons in spring and autumn, particularly during the breeding period in May and June, adjust operating times to avoid sensitive periods of bird activity, such as early morning and evening. Since the birds in the Yingkou coastal wetlands are mainly diurnal, nighttime train noises cause more disturbance, and nighttime passage should be prohibited. Measures such as banning train horns should also be taken to reduce the operational noise during the railway phase.

429. Lighting Control: During the bird migration periods (March-May and September-November), reduce lighting levels appropriately, and implement light control during the breeding period (May-June) to lessen the impact on birds' biological rhythms.

430. Strict Adherence to Designed Speeds: During shunting operations, do not exceed 40 km/h when pulling trains in idle, and do not exceed 30 km/h when pushing operations, to reduce the risk of bird strikes.

431. Track Maintenance: Regularly maintain the tracks, including inspections for wheel-rail wear and ballast repair, to ensure the good condition of the track system and reduce vibrations.

432. Noise Control: Mitigate noise produced by station transport vehicles and personnel, such as minimizing horn use to prevent noise overlap with railway noise and expand the impact range of noise.

433. Wetland Resource Management and Protection: Based on site surveys, the coastline far from the railway near the project area has rich wetland resources suitable for the survival and wintering of local birds. It is recommended to continue existing conservation measures to protect the surrounding coastal tidal wetlands, increase suitable habitats for wetland birds, attract disturbed birds, and provide backup habitat resources for the birds in the project area.

#### **6.2.2.6 Soil Impacts and Mitigation Measures**

434. The project has no high-pollution industries, and has no obvious direct impact on the soil after operation. After operation, the freight volume increases, and organic compounds such as fuel and engine oil leaked from automobile breakdowns and accidents will seep into the soil with rainwater runoff, causing certain pollution to the soil. Strictly monitor and inspect vehicles carrying dangerous goods during the operation period to prevent soil pollution caused by accidents.

435. After the road is completed, the contractor should implement the greening project on both sides of the line in time, plant trees, grass and other greening in strict accordance with the design requirements, especially the vegetation protection project on the excavated road section must be implemented. During the operation period, the management and maintenance of greening plants should be strengthened to ensure their survival. Plants that have not survived due to natural or human factors should be replanted to ensure that the greening project can exert its due ecological benefits.

### **6.3 Climate change risk assessment**

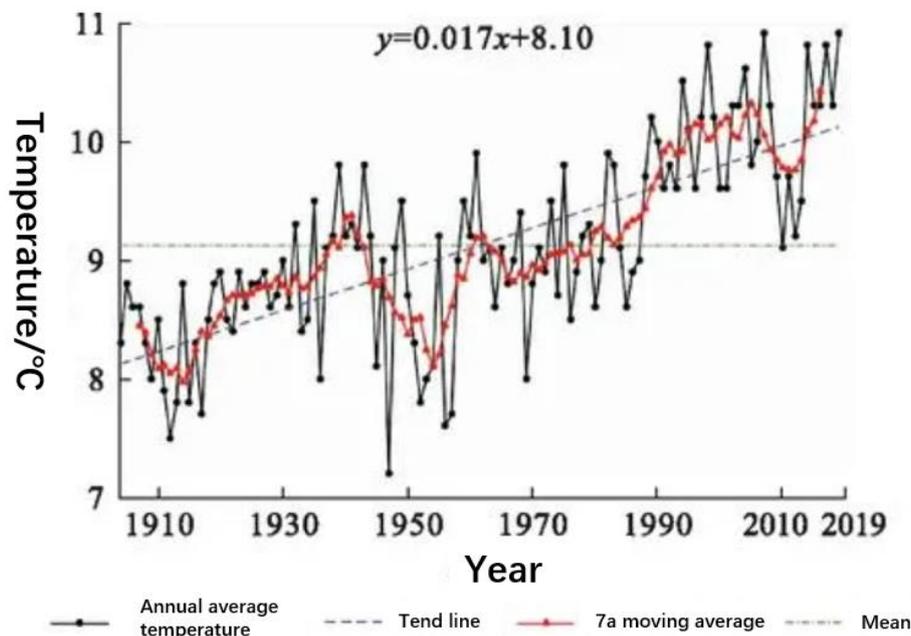
436. The purpose of climate change risk assessment is to ensure that project facilities can operate sustainably and stably in the face of the challenges of climate change. Climate change risk analysis first needs to identify potential risks based on historical observational data and future climate change predictions, such as increased energy demand due to rising temperatures and the impact of extreme weather events on communication systems. Based on possible risks, it is necessary to develop appropriate adaptation strategies to enhance facility resilience and reduce greenhouse gas emissions. Detailed climate risk assessment is documented in a standalone climate risk and vulnerability assessment report.

#### **6.3.1 Observed historical climate change trends**

437. Yingkou City is located in the northwest of the Liaodong Peninsula, on the left bank of the Daliao River estuary, and has a warm temperate continental monsoon climate. Observed historical climate change trends are referred to published literature.

438. **temperature.** According to the monthly average temperature data of Yingkou City from 1904 to 2019 from the Yingkou Meteorological Observation Station, the average

temperature change in Yingkou City from 1904 to 2019 showed an obvious upward trend, and its climate tendency rate was  $0.17^{\circ}\text{C} / 10\text{a}$ <sup>25</sup>.



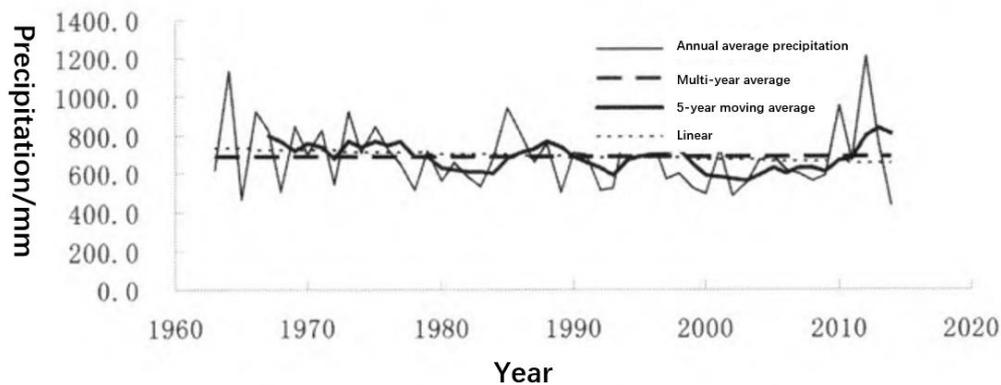
**Figure 6-24 Changes in average temperature in Yingkou City from 1904 to 2019**

**439.Precipitation.** By analyzing the precipitation data from <sup>26</sup>18 rainfall stations in Yingkou City from 1963 to 2014, it was found that the precipitation in Yingkou City showed large inter-annual changes in 52 years, with alternating periods of wet and dry seasons. The average annual precipitation from 1963 to 1976 was slightly higher than the multi-year average annual precipitation. The average annual precipitation from 1978 to 1984 showed a downward trend, and it showed an upward trend from 1985 to 1988. The average annual precipitation from 1989 to 2009 was slightly lower than the multi-year average precipitation and showed a downward trend and an upward trend from 2009 to 2013.

440.The maximum 24-hour precipitation of multi-year average -precipitation in Yingkou City from 1963 to 2014 was 93.8 mm. Overall, it showed a slight upward trend but was not obvious.

<sup>25</sup> Li Li, Cui Yan, Wang Haoyu, et al. (2021). Study on the centennial temperature change characteristics of Yingkou City, *Journal of Meteorology and Environment*, 37(3):73-80.

<sup>26</sup> Cong Meimei.(2016). Analysis of spatiotemporal changes in precipitation in Yingkou areas, *Heilongjiang Water Conservancy Science and Technology*, 2016 (3).



**Figure 6-25 Distribution of average annual precipitation in Yingkou City from 1963 to 2014**

### 6.3.2 Future climate change predictions

441. SSP126, SSP245, SSP370 and SSP585 are a new set of climate change emission scenarios used by the IPCC (International Organization for the Assessment of Climate Change) for its Sixth Assessment Report. These scenarios are called SSP, which means "Shared Socioeconomic Pathways". Each SSP represents a future greenhouse gas emission scenario corresponding to a specific social, economic and technological development path, which are used to model and predict possible trends in climate change and its potential impacts.

442. There is a brief description of these four SSP scenarios:

- SSP126: This is a low emissions scenario. In this scenario, the world has taken active measures and the global community has cooperated to achieve sustainable development goals and reduce greenhouse gas emissions. By 2100, radiative forcing (an indicator to describe the impact of greenhouse gas concentrations) is predicted to be  $2.6 \text{ W/m}^2$ .
- SSP245: This is a medium emissions scenario. Although some steps have been taken to reduce emissions, global efforts are not entirely consistent. The world in this scenario is diverse, with some regions paying more attention to sustainable development and others caring more about national benefits.
- SSP370: This is a medium to high emissions scenario. In this scenario, economic development and growth are top priorities, resulting in high energy demand and greenhouse gas emissions. While there are some efforts to reduce emissions at the regional level, these efforts are not well integrated globally.
- SSP585: This is a high emissions scenario. This scenario describes a world that values economic growth and technological development while paying little attention to sustainable development and environmental protection, leading to a significant increase in greenhouse gas emissions, with radiative forcing expected to exceed  $8.5 \text{ W/m}^2$  by 2100.

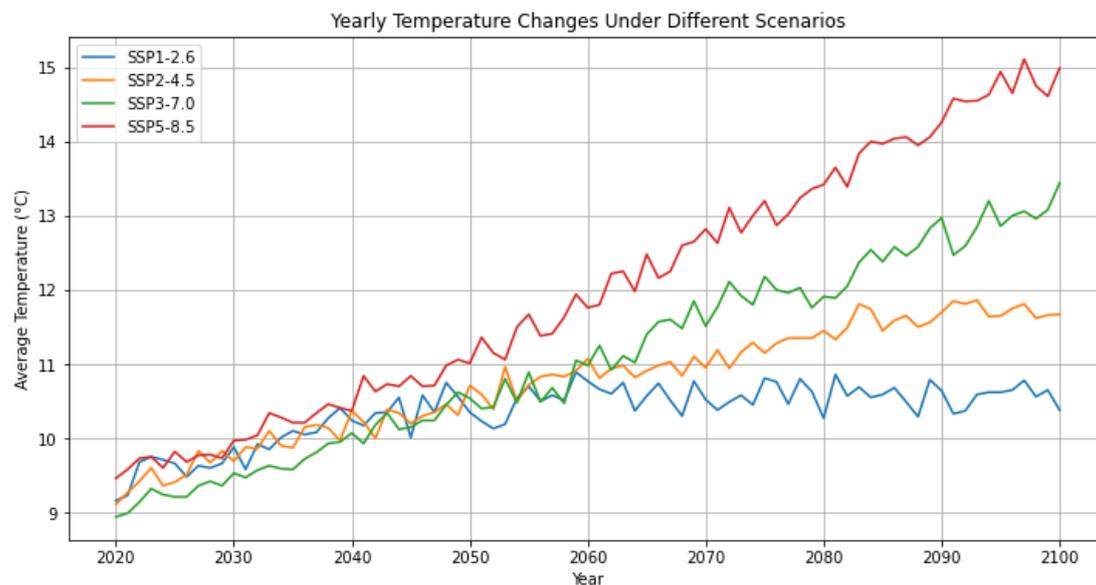
443. The forecast data for this assessment is derived from CMIP6 (Coupled Model Intercomparison Project Phase 6), and the indicators analyze climate change trends under

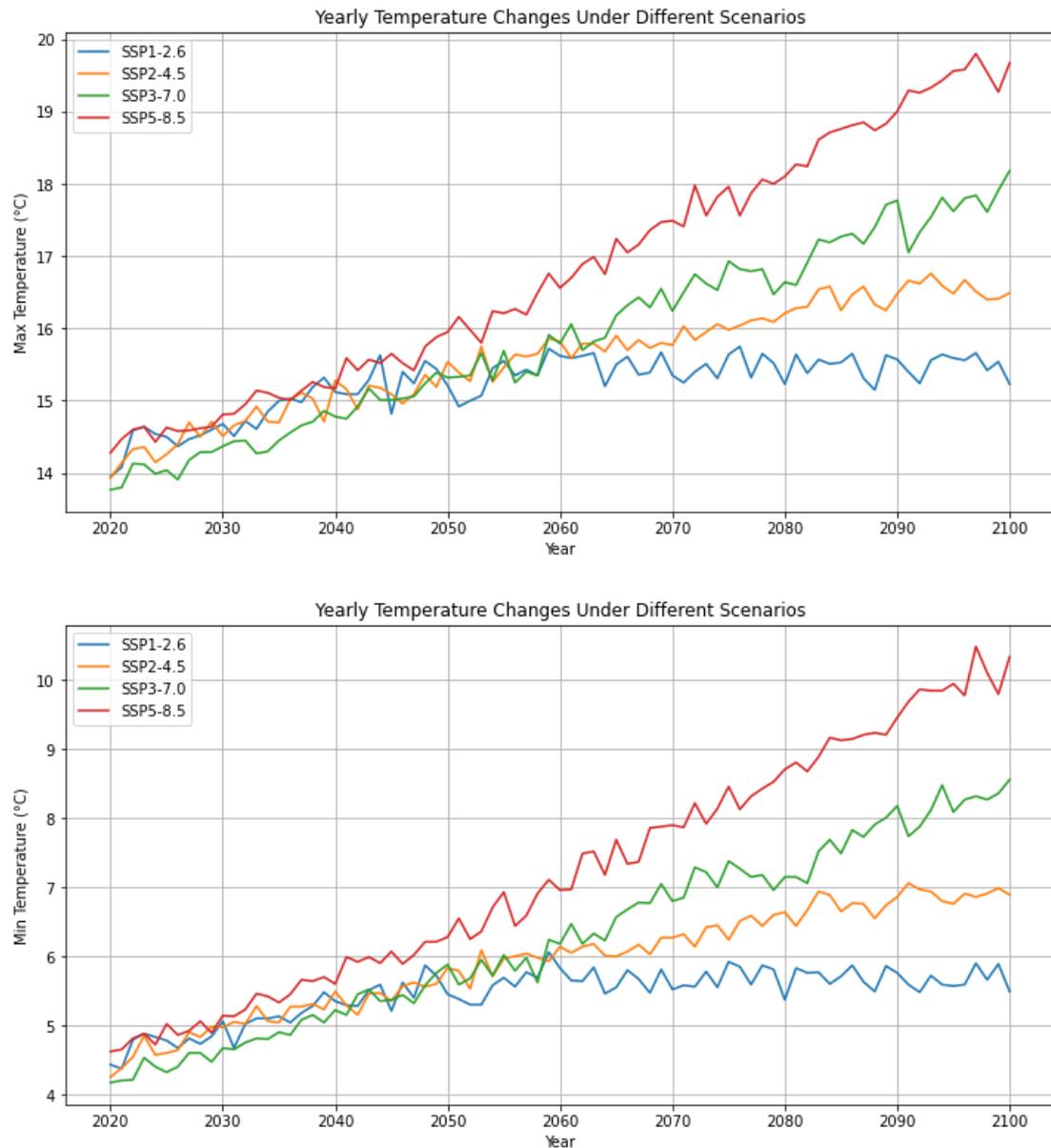
four SSPs with a multi-model assemblage. Despite adopting the multi-model assemblage approach by integrating results from multi-models to improve the reliability of predictions, climate predictions are still inherently uncertain.

**444. Temperature.** The predicted temperature change data of Yingkou City provides linear tendency values of the maximum temperature (Tasmax), average temperature (Tas), and minimum temperature (Tasmin) under different scenarios in the future, reflecting temperature change trends per decade under different scenarios.

- Maximum temperature ( Tasmax) change rate: Under different climate scenarios, the temperature increase per decade ranges from 0.133°C (SSP1-2.6, the lowest emissions scenario) to 0.703°C (SSP5-8.5, the highest emissions scenario).
- Average temperature ( Tas) change rate: the temperature increase per decade ranges from 0.126°C (SSP1-2.6) to 0.718°C (SSP5-8.5).
- Minimum temperature (Tasmin) change rate: the temperature increase per decade ranges from 0.123°C (SSP1-2.6) to 0.724°C (SSP5-8.5).

445. All scenarios show future temperature increases, but the amount of the increase varies. The lowest emissions scenario (SSP1-2.6) shows relatively mild temperature changes with an insignificant upward trend. The medium emissions scenario (SSP2-4.5) shows gradually increasing temperature changes, but less dramatic than the highest emissions scenario. The highest emissions scenario (SSP5-8.5) shows significant temperature increases, especially in the second half of the century.





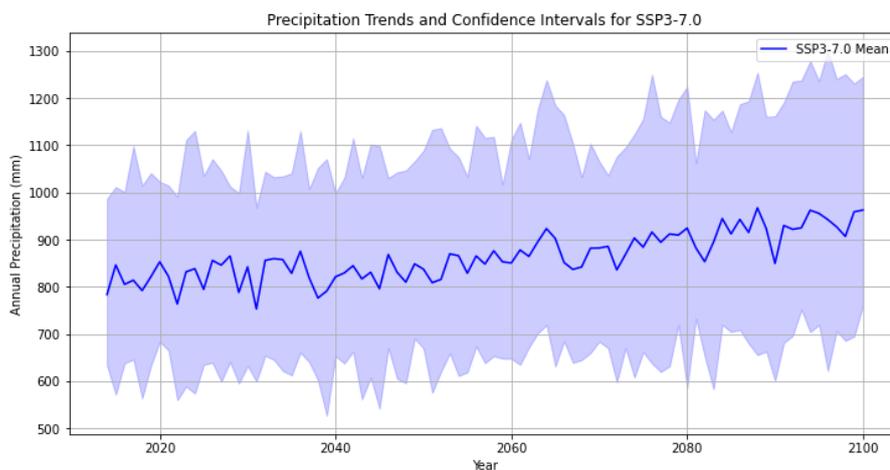
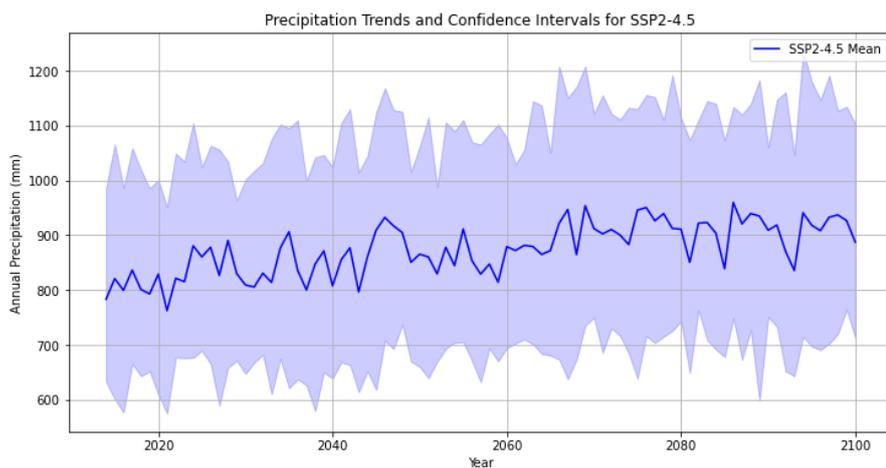
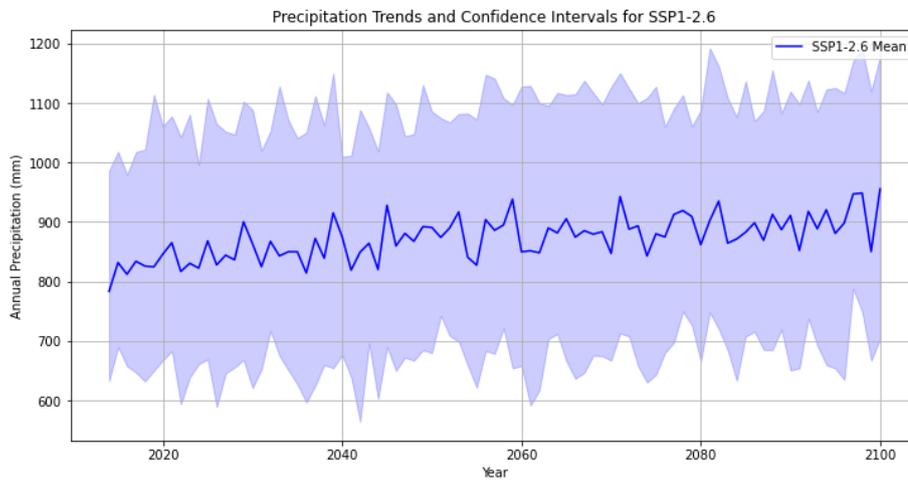
**Figure 6-26 Predicted temperature changes (2020-2100)**

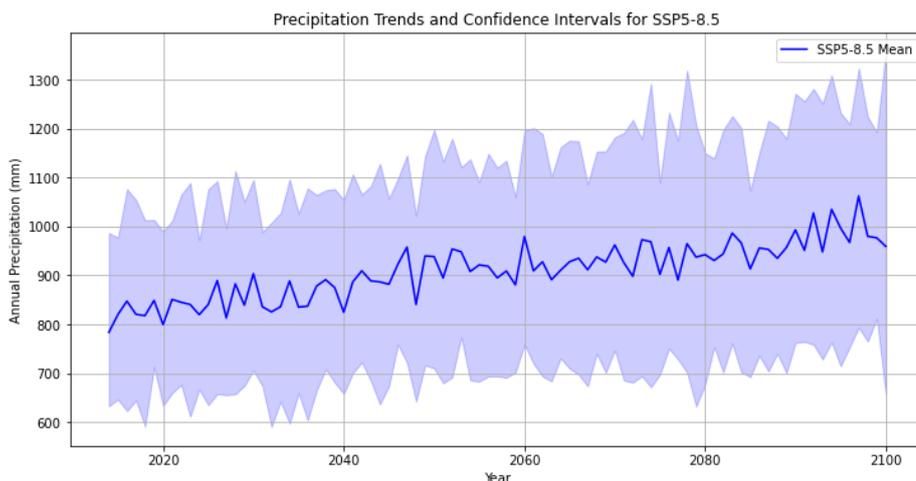
**446.Precipitation:** All scenarios show increases in future precipitation relative to the historical reference period (1950-2014). Projected precipitation increases as emission scenarios intensify, and SSP5-8.5 (the highest emissions scenario) generally shows the largest precipitation increases. The longer return periods (such as once-50-year and once-100-year) have more significant increase in precipitation, especially in the high-emission scenarios.

- SSP1-2.6 (minimum emission scenario): the precipitation increase is relatively small, ranging from 6.88% to 10.51%, showing a relative mild precipitation increase trend.
- SSP2-4.5 (medium emission scenario): the precipitation increase is moderate, ranging from 7.78% to 11.41%.
- SSP3-7.0 (high emission scenario): it shows a larger precipitation increase in

longer return periods, especially in the 50-year and 100-year return periods, with increases reaching 16.27% and 16.38%.

- SSP5-8.5 (very high emissions scenario): it shows the largest precipitation increasing trend, especially in the 10-year, 50-year and 100-year return periods, with an increase of more than 19%, reaching 20.49%.





**Figure 6-27 Predicted annual precipitation changes (2020-2100)**

**Table 6-30 Predicted daily maximum precipitation frequency (2020-2100) (baseline 1950-2014)**

Daily maximum precipitation frequency	SSP1-2.6	SSP2-4.5	SSP3-7.0	SSP5-8.5
Once in 2 years	9.41%	11.41%	13.11%	18.08%
Once in 5 years	10.51%	11.34%	13.45%	20.09%
Once in 10 years	10.40%	11.02%	14.47%	21.04%
Once in 20 years	8.39%	9.60%	13.60%	19.35%
Once in 50 years	6.88%	7.78%	16.27%	19.10%
in 100 years	7.52%	8.55%	16.38%	20.49%

### 6.3.3 Climate impact, vulnerability and risk assessment

447. FTZ Railway and Station Construction Project: According to temperature projections, from 2020 to 2100, the maximum temperature will increase per decade by 0.133°C (SSP1-2.6, the lowest emissions scenario) to 0.703°C (SSP5-8.5, the highest emissions scenario). This indicates that temperatures will rise, and extreme heat will occur more frequently. The risk of track deformation due to extreme heat is expected to be high.

448. Intense Rainfall and Flood Damage: According to future projections, from 2020 to 2100, the maximum precipitation in Yingkou is projected to increase by 6.88% to 10.51% under the SSP126 scenario, by 7.78% to 11.41% under the SSP245 scenario, and by 13.11% to 16.38% and 18.08% to 21.04% under the SSP370 and SSP585 scenarios, respectively. The potential climate risks to railway tracks and facilities mainly come from variations in extreme temperatures and precipitation. Increased precipitation may increase the risk of flooding on railways and loading docks. Railway tracks are sensitive to high temperatures. Extreme heat can lead to track warping due to uneven thermal expansion, causing reduced speeds and derailment.

449. Higher-intensity rainfall will generate concentrated stormwater runoff on impermeable surfaces, potentially leading to flooding and damage to infrastructure. Additionally, according to the geographical survey from the feasibility study report, the terrain of the railway site is a coastal plain, and soil types include clay, silty clay, silt, and fine sand. The bearing capacity of the railway foundation bed is insufficient, and the weak layer is 19-30 meters deep. Higher-intensity rainfall may flush and erode the foundation bed of the railway, posing a threat to operational safety.

450. FTZ Building and Municipal Infrastructure: Increased rainfall and rising temperatures

may negatively impact the durability of building and road materials, shortening the lifespan of buildings and roads. Inadequate drainage could lead to water accumulation and waterlogging on FTZ roads. Under scenarios with increased precipitation, potential risks include flooding of warehouses and standard factories in the logistics hub, industrialization zone, and logistics support areas.

451. LEDZ (Phase II) South Expansion Area Municipal Infrastructure Construction Project: LEDZ Municipal Infrastructure: Possible risks to municipal construction in the Economic Development Zone due to increased precipitation and rising temperatures include: Poor drainage causing water accumulation and potential waterlogging on roads; Instability of roadbed, road surface, and slopes; and adverse effects on road greening projects.

452. The measures taken by this Project to enhance climate resilience are summarized as follows:

**Table 6-31 Summary of climate risk and resilience measures**

Project Activities	Climate Vulnerability	Potential Adaptation Measures	Justifications
<b>Subproject 1: FTZ Land Port Hub and Industrial Park Subproject</b>			
<b>A. FTZ railway station sub-project</b>			
A new 1.73 km railway will be built to connect the Binhai Railway Station; a new loading and unloading yard, container storage and customs supervision area will be built.	Extreme precipitation events can lead to subsidence, raising the risk of flooding on railroads and loading docks due to the increased frequency and intensity of precipitation. Estimates under the IPCC's future low emission scenario (SSP126) project that future precipitation in Yingkou will increase by 6.88% to 10.51%, raising the likelihood of flood disasters and requiring adaptive measures to address potential warping of railway tracks due to extreme heat. Extreme precipitation events cause subsidence.	<p>Improve the adaptability of the railway roadbed by implementing measures such as strengthening drainage, using rubble or gravel for reinforcement, and constructing a 4% drainage slope along the track bed.</p> <p>Install double-sided drainage ditches outside the main line embankment and use a dredging pipe to divert floodwater away from the roadbed to prevent erosion.</p> <p>Railway subgrade adopt Class C packaging. For gravel soil, gravel soil, sandy soil, and silt soil with a fine soil content greater than 30%, the plasticity index should not be greater than 12, and the liquid limit should not be around 32%. For low liquid limit clay, its plasticity index 76 should not be greater than 12, and its liquid limit should not be greater than 32% to adapt to areas with average annual precipitation greater than 500mm.</p> <p>The FSR design team adopts the higher heat-resilient joint bolts and materials.</p>	By enhancing infrastructure, we will improve the ability of the Lukang hub and industrial park in the Yingkou Free Trade Zone to adapt to extreme precipitation events (such as floods) caused by future climate change, reduce the risks that may be brought about by climate change, and improve the bonded zone railway station drainage system. The ability to unblock, improve railway flood prevention capabilities and loading and unloading areas flood discharge capacity.
<b>B. FTZ construction facilities and municipal infrastructure</b>			
The construction of logistics hub areas, industrialization areas and logistics supporting areas,	Based on predictions for the future Yingkou area under the IPCC low emission scenario, there	<ul style="list-style-type: none"> <li>During the construction and operation of facilities in the free trade zone, strengthen infrastructure maintenance to improve flood discharge capacity by 15-20%. Use insulation and mechanical systems to reduce the</li> </ul>	Enhance urban drainage systems and alleviate waterlogging through advanced standards and practices.

<p>including warehouses, road projects and supporting projects.</p> <p>International express center and warehouse construction, including supporting water supply and drainage, electricity, HVAC, fire protection, greening and other projects.</p>	<p>will be a significant increase in the frequency and intensity of extreme weather events and rainfall. The increase in frequency is expected to reach 9.39 cubic meters per second, while rainfall intensity is anticipated to be 17.48 mm per hour, which represents a 20% increase compared to historical rainfall intensity.</p> <p>Extreme high-temperature events have also been projected to rise significantly. The temperature increase per decade ranges from 0.133°C under the low emissions scenario (SSP1-2.6) to 0.703°C under the high emissions scenario (SSP5-8.5). The increased precipitation and rising temperatures may negatively impact the durability of building and road materials, shortening the lifespan of buildings and roads. Inadequate drainage could lead to water accumulation and waterlogging on free trade zone roads.</p> <p>Under scenarios with increased precipitation, potential risks include: Flood</p>	<p>impact of extreme heat and enhance adaptability of buildings and infrastructure.</p> <p>Design drainage systems according to national standards, accommodating a 20% increase in rainfall intensity. Adjust drainage standards by 10-20% to adapt to future climate change impacts.</p> <p>Use SBS-modified asphalt for road construction, known for its high temperature resistance (-25 to +100°C), high elasticity, and fatigue resistance. It offers strong puncture and tear resistance.</p> <p>The Free Trade Zone Management Committee should assess the effects of extreme events under different emission scenarios and develop emergency plans for floods and heavy rainfall.</p> <p>The free trade zone has 3.92 hectares of green space, all linked to roads. To mitigate flood risks in logistics and industrial areas, consider the following adaptation measures:</p> <p>Improve surface runoff with grass bricks along roads to enhance rainwater retention and smooth flow. Construct drainage ditches to boost rainwater dredging. Create rainwater collection gardens to concentrate excess water, reducing flood risks and enhancing landscaping. Use permeable materials like bricks and concrete to increase ground penetration and reduce water accumulation. Pave pedestrian paths with permeable materials for better water seepage. Design road greening projects to respect and adapt to nature, revitalizing urban road space with suitable plant communities.</p>	<p>Promote sustainable water use with rainwater recycling and sponge city design.</p> <p>Collect surface runoff via catchment basins and discharge through storm drains to nearby rivers, which may increase downstream flood levels and pollute waters. Use SBS-modified asphalt for roadways to handle high temperatures and improve road longevity.</p> <p>Employ sponge city technology like permeable paving and bioretention strips for better drainage and water purification.</p> <p>Incorporate innovative “sponge” infrastructure to mitigate stormwater damage, support landscaping, and promote soil stability and cooling.</p> <p>Install photovoltaic modules on building rooftops for cleaner energy and to meet one-star green building standards.</p> <p>Utilize rock wool sandwich panels for superior thermal insulation and improved building energy efficiency.</p>
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	risks in warehouses and standard factories located in logistics hubs, industrialized areas, and logistics support areas.		
<b>Subproject 2: LEDZ (Phase II) South Expansion Area Municipal Infrastructure Construction Project</b>			
12 roads including Planning No. 6 Road and Jiachen Avenue are planned, with a total length of approximately 22.67 km. Including road engineering, traffic engineering, water supply and drainage, gas, communications, lighting, greening, sponge city and smart municipal administration, etc.	<p>In the future, the Yingkou area will experience a significant increase in extreme weather and rainfall frequency, with an intensity increase of 20%. The frequency of precipitation will increase by 9.39 cubic meters/second, and rainfall intensity is expected to be 21.66 mm/hour. Temperature increases per decade range from 0.133°C to 0.703°C.</p> <p>Possible risks to municipal construction in the South Extension Area due to increased precipitation and rising temperatures include:</p> <p>Poor drainage causing water accumulation and potential waterlogging on roads. Instability of roadbed, road surface, and slopes. Adverse effects on road greening projects.</p>	<p>Pave all roads with asphalt concrete and build drainage pipelines to handle extreme precipitation events.</p> <p>Increase rainwater drainage capacity by 10% and use specified insulation materials and mechanical systems for future impacts.</p> <p>Design municipal construction in the southern extension area with cooling systems to adapt to potential extreme heat events.</p> <p>Enhance drainage system design by increasing rainfall intensity standards by 8% over the national standard.</p> <p>Improve drainage design standards by 6-10% considering future climate change impacts.</p> <p>Use SBS-modified asphalt for roadways, providing high temperature resistance (-25 to +100°C), high elasticity, fatigue resistance, and strong puncture and tear resistance.</p> <p>Enhance rainwater retention and surface runoff control by planting grass bricks on roads and creating rain gardens.</p> <p>Pave pedestrian paths with permeable materials to improve water seepage capacity.</p>	<p>Collect surface runoff via catchment basins and discharge it through storm drains to nearby rivers. This practice can alter ecological conditions, increase downstream flood levels, and pollute receiving waters, leading to urban flooding during heavy rains.</p> <p>The protective green space and road-affiliated green space constructed in this project offer sustainable, high-level carbon sequestration services, which significantly aids in addressing future climate change and enhances the city's livability and business environment.</p>

## 6.4 Carbon analysis

### 6.4.1 FTZ subproject

453. Considering the power generation capacity of the photovoltaic power generation facilities and the annual electricity consumption saved by each building unit after applying the intelligent management platform and intelligent monitoring platform, the annual carbon dioxide CO<sub>2</sub> emission reduction of the sub-projects of the FTZ Dry Port Hub and Industrial Park is 6869746kg, i.e., 6869.75 tons, and the carbon C emission reduction is about 1875686kg, i.e., 1875.69 tons.

**Table 6-32 Energy Saving and Emission Reduction Statistics**

Category	Annual Energy Consumption (Ordinary)	Annual Energy Consumption (After Smart Control)	Annual Savings	Unit	CO <sub>2</sub> Emission Reduction (kg)	Carbon Emission Reduction (kg)	Unit
Power System (excluding air conditioning)	351.05	330.58	20.47	10,000 kWh	204,086	55,678	kg
HVAC System	174.104	156.6936	17.41	10,000 kWh	173,582	47,356	kg
Water Supply and Drainage	1.551.25	1.24	0.31	10,000 kWh	20,252	7,018	kg
Photovoltaic Power Generation Facilities			649.13	10,000 kWh	6,471,826	1,765,634	kg
<b>Total</b>	<b>525.15</b>	<b>488.51</b>	<b>687.32</b>	10,000 kWh	<b>6,869,746</b>	<b>1,875,686</b>	kg

Source: FSR *November, 2023*

454. The total amount of carbon fixation and oxygen release is obtained by multiplying the area of various green spaces and the amount of carbon and oxygen changes per unit area of green space, and the calculation formula is as follows:

$$S=A*(T+Q)$$

455. In the formula, S represents the amount of carbon sequestration and oxygen release in urban green space, A represents the area of green space, T represents the amount of carbon absorbed per unit area of green space, Q represents the amount of oxygen released per unit area of green space, and their reference values are 8.73 t/hm<sup>2</sup>·a and 23.27t/hm<sup>2</sup>·a.

456. The green area of the FTZ project is 39,202 m<sup>2</sup> (3.92 hm<sup>2</sup>), so the carbon fixation and oxygen release index of the green space is  $S= 3.92 * (8.73 +23.27) = 125.44$  t.

457. The water conservation index can measure the ability of urban green space to maintain soil and water conservation, thus providing data support for urban green space system planning to improve urban hydrology through greening. This paper uses the water balance method (i.e., calculating the difference between the average precipitation and the average evaporation of a city in a year), combined with the national regulations of the charges for surface water resources in each city to calculate the value of urban green space for water conservation, and its calculation formula is as follows:

$$W=(R-E) *A$$

458. Where W denotes the amount of urban green space to contain water, R denotes the average annual rainfall in the city, E denotes the average annual evapotranspiration in the city, and A denotes the area of the urban area.

459. The average annual rainfall of this project is 693.4 mm, and the average annual evaporation is 1606.9 mm, so the index of green space for water conservation is  $W=(1,606.9-693.4) *0.040636=37.12 \text{ m}^3/\text{ha}$ .

460. The carbon emission reduction benefit after the project is completed is quantified by the fuel consumption saving benefit. The calculation of the benefit of fuel consumption saving adopts the "comparison method with or without". The fuel savings of this new project mainly include: (1) The fuel consumption savings resulting from the shortened mileage of newly built roads; (2) The fuel consumption savings resulting from the reduction of motor vehicle travel by the slow traffic lane system;

(i) Fuel consumption savings due to shortened mileage of new roads

461. The current design scope of the project is a whole piece of wasteland. After the opening of these 12 roads, the travel routes of vehicles and pedestrians have been optimized and the mileage has been shortened, thereby directly saving the fuel consumption of running vehicles and achieving the effect of energy saving and emission reduction.

Its calculation method is:

$$R_1 = (L_o - L_N) \times Q_N \times Co_1 \times 365$$

In the formula:

$R_1$  —— The amount of fuel saved by shortening the mileage (litres);

$L_o$  - the mileage of the old road (km);

$L_N$  —— the whole distance of the new project (km);

$Q_N$  —— annual average daily traffic volume of new projects (vehicles / day);

$Co_1$  —— average fuel consumption on old roads without this item (liter/km · vehicle)

**Table 6-33 Table of Fuel Savings from Shortened Mileage of New Roads in the Dry Port Industrial Park**

road name	Lo (kilomete r)	LN (kilomete r)	QN (vehicle/da y)	Co1 (liter/km·ve hicle)	R1 (Lift)
Haixing Road	3.6	2.1	3,850	0.1	205,869
Planned No.9 Road	2.2	1.0	2,435	0.1	106,653
Yingchuan Street (East Section)	2.7	0.2	4,280	0.1	387,426
Linchuan Street (East Section)	3.2	0.2	2,825	0.1	310,369
Linhe Street (East Section)	2.1	0.2	1,883	0.1	127,150
summary					1,137,466

Source: FSR, November, 2023

**Table 6-34 Table of Fuel Savings from Reduced Mileage of New Roads in the Comprehensive Bonded Area**

	road name	Lo (kilometer)	LN (kilometer)	QN (vehicle/day)	Co1 (liter/km·vehicle)	R1 (Lift)
Comprehensive bonded area	Planned No. 3 Road	1.3	0.6	525	0.1	13,298
	Planned No. 4 Road	0.8	0.4	685	0.1	9,251
	summary					22,550

Source: FSR, November, 2023

(ii) Non-motorized transportation system reduces the fuel consumption generated by motor vehicle travel

462. Non-motorized transportation runs through every corner of urban public space, and has obvious advantages in short-distance travel. In this design, non-motorized lanes are reserved, which provides convenience for citizens who choose green travel, and increases the proportion of people who choose this travel mode. In addition to self-driving cars, the main modes of transportation for people in the park include walking and cycling. Among them, bicycles include human-powered bicycles and electric bicycles. Compared with the traffic volume of the two bicycles, the proportion of electric bicycles is higher. Two kinds of bicycles can be considered as green, and the carbon emission is regarded as 0. Slow traffic uses manpower as the ability to move in space, and the travel speed is low. The walking speed is 0.5-2.16 m/s, and the bicycle speed is generally around 10 km/h; the travel distance is relatively short, generally less than 3 km.

463. It is predicted that for the five roads in the dry port industrial park of this project, there will be 400 people /km day use green travel, and if converted to 100 vehicles / day for motor vehicle travel, the amount of fuel that can be saved after the project is completed is:  $R_{2a} = 100 \times 365 \times 10 = 365,000$  L.

464. There are 200 people/km·day, travel greenly by two roads in the comprehensive bonded area which is converted into 50 vehicles/day for motor vehicle travel. After the project is completed, the amount of fuel that can be saved is:  $R_{2b} = 50 \times 365 \times 10 = 182,500$  liters.

465. Green travel in the LEDZ is 400 people/km·day, converted to 100 vehicles/day for motor vehicle travel, and the amount of fuel that can be saved after the project is completed is:  $R_2 = 100 \times 365 \times 10 = 365,000$  liters.

Via calculation,

Driving carbon dioxide emissions (kg) = fuel consumption (L) × 0.785

On average, one liter of fuel can run 10 km.

Save 1L gasoline = reduce 2.3kg " carbon dioxide " = reduce 0.627kg " carbon "

The dry port industrial park predicts that the average annual emission reduction  $A_1 = (R_{1a} + R_{2a}) \times 0.627\text{kg} = 942046.14\text{kg} = 942$  tons

The average annual emission reduction  $A_2 = (R_{1b} + R_{2b}) \times 0.627\text{kg} = 128566.16\text{kg} = 129$  tons is predicted for the comprehensive bonded area

The average annual emission reduction  $A_3 = (R_1 + R_2) \times 0.627\text{kg} = 957375\text{kg} = 957.4$

In total, the average annual emission reduction predicted by this project is:

$A=A_1+A_2+A_3=942+129+957.4=2028.4$  tons, with considerable energy saving benefits.

466. The lighting design of street lighting adopts the more mature high-efficiency and energy-saving LED light source street lamp products. Compared with traditional high-pressure sodium lamps, although the difference in luminous efficiency of LED light sources is not obvious, the luminous efficiency of domestic high-pressure sodium lamps is 120~130 lm/W, and the luminous efficiency of LED street lamps is 120~140 lm/W, but the high-pressure sodium lamp is a 360° diffuse light source, and the direct light to the ground is only 50%, and the rest needs to be reflected twice by the reflector to illuminate the ground, even considering the cleanness of the reflector and lampshade under normal circumstances, its effective luminous efficiency is only about 70%. While, the LED light source is directional, and after considering the secondary optical design of the lens, its effective luminous efficiency can still reach 90%. The power factor of high-pressure sodium lamp inductive ballast is only 0.6. In order to improve the power factor, single lamp compensation will have to be carried out, resulting in the loss of the ballast and compensation capacitor itself as high as 15~20% of the apparent power, while LED street lamps use electronic switches driven by power supply, its power factor is as high as 0.95 or more, and its own loss does not exceed 10%. Therefore, the overall energy efficiency of LED street lamps is about 30% higher than that of traditional high-pressure sodium lamp street lamps.

467. At the same time, this street lamp design adopts a dimmable design. After 0 o'clock, the LED street lamp will run at reduced power, which can achieve a power saving effect of more than 10%.

468. Based on this calculation, the calculated power of street lamps in the whole road section of the FTZ subproject is 38.49kW. Compared with traditional high-pressure sodium lamps, the use of LED street lamps can save 67,400 kwh of electric energy throughout the year, and the equivalent annual reduction of carbon emissions is 18.34 tons. The effect of energy saving and carbon reduction is obvious.

#### 6.4.2 LEDZ subproject

469. The green area of this sub-project is 412,223 m<sup>2</sup> (41.22 hm<sup>2</sup>), so the carbon sequestration and oxygen release index of the green area is  $S=41.22*(8.73+23.27)=1,319.04t$ , and the water conservation index of the green area is  $W=(1,800-674)*50.35=56.64$  m<sup>3</sup>/ha.

470. This sub-project can reduce carbon emissions by 957 tons per year from the optimization of the traffic road network to reduce car trips and the traffic guidance of intelligent transportation, etc., of which the fuel consumption savings generated by shortening mileage II through new roads is 1161913.9 liters, and the fuel savings through the induction of green trips is:  $R2 = 100 \times 365 \times 10 = 365,000$  liters. This sub-project predicts an average annual emission reduction of  $A = (R1 + R2) \times 0.627kg = 957,375$  kg = 957 tons. The calculated power of street light of the whole road section of this project is 325 kW, and the adoption of LED street light can save 569,400 kwh of electricity compared with traditional high-pressure sodium lamps throughout the year, which is equivalent to an annual reduction of carbon emission of 154.8 tons, and the energy-saving and carbon reduction effect is obvious.

**Table 6-35 Table on fuel savings from reduced mileage on new roads**

road name	Lo (kilometer)	LN (kilometer)	QN (vehicle/day)	Co1 (liter/km·vehicle)	R1 (Lift)
Plan No.6 roads	4.5	1.6	4,044	0.1	420,677.1

road name	Lo (kilomete r)	LN (kilomete r)	QN (vehicle/da y)	Co1 (liter/km·ve hicle)	R1 (Lift)
(Demonstration Road)					
Jiachen Avenue	1.6	1.6	4,030	0.1	0
Xinghe Street	4.8	2.5	2,781	0.1	240,866.26
Planned No.4 Road	2.1	1.6	2,470	0.1	47,331.375
Qi Bao Zhong Lu	3.0	1.6	2,453	0.1	125,813.07
Yantian Road	2.7	1.6	1,110	0.1	43,014.009
Plan five roads	3.3	1.6	1,107	0.1	69,557.32
Qi Baoyi Road	3.6	1.6	1,113	0.1	83,052.222
Longshan Road	2.4	1.6	1,085	0.1	30,097.9
Xingyi Street	2.8	2.5	1,006	0.1	11,382.89
Donghai South Street	3.3	2.5	1,240	0.1	38,742.56
Minxing North Street	3.7	2.5	1,175	0.1	51,379.225
summary					1,161,913.9

Source: FSR, November, 2023

## 7 Social Impact and Risk Analysis and Mitigation Measures

### 7.1 Social Risks and Mitigation Measures Before Construction

#### 7.1.1 Social risks triggered by policy planning and approval procedures and Mitigation Measures

##### 7.1.1.1 Risk Identification

471. Through field investigation, three social risk factors that may be triggered by policy planning and approval procedures were identified (Table 7-1):

**Table 7-1 Risk Factors in Policy Planning and Approval Procedures**

No,	Risk Factors	Risk Level	
		FTZ	LEDZ
1	Project Proposal risk	Low	Low
2	Project Planning Risk	Low	Low
3	Project Approval Risk	Low	Low

##### 7.1.1.2 Risk Analysis

###### (i) Project Proposal Risk

472. During the project initiation and decision-making stages, there may be uncertainties and obstacles that may have a negative impact on the successful implementation of the project and the achievement of expected goals.

473. In September 2022, Yingkou Green Smart Trade Zone Development Project was approved by the State Council and included in China's 2022-2024 Alternative Project Plan for Using Asian Infrastructure Investment Bank Loans. There are two parts of the project planning, namely the Dry Port Hub and Industrial Park Subproject in FTZ and the Supporting Project for Industrial Cooperation in LEDZ. Both subprojects have submitted their proposals.

474. The overall project and the two sub-projects meet the national and regional development demands and policy orientation, and is identified as low-risk in terms of project proposal risk.

###### (ii) Project Planning Risk

475. Project planning risk refers to the compatibility of project planning with local overall planning and special planning, the compliance of the project with regional development planning, the compliance with the nature of the plot, the positional relationship and distance between surrounding sensitive targets and the project, and the planning site selection.

476. The construction content of this project includes roads, transportation, water supply, drainage, communication, lighting, gas, greening, smart municipal administration, sponge city, etc., aligning with the relevant requirements and functional positioning of the overall urban planning and transportation development planning. This project is aligned with the planning requirements, aligned with the national, Liaoning provincial and Yingkou municipal "14th Five-Year Plan" and the policy planning involved in Table 7-2. Therefore, the overall project and the two subprojects are identified as low risk in terms of project planning risk.

**Table 7-2 Project Planning Risk Factors**

No.	Name	Does it meet	
		FTZ	LEDZ

1	China's 2022-2024 Alternative Project Planning Using Asian Infrastructure Investment Bank Loans	yes	yes
2	The 14th Five-Year Plan for the National Economy of the Yingkou Area of China (Liaoning) Pilot Free Trade Zone and Outline of Long-term Objectives for 2035	yes	yes
3	"Regulatory Detailed Planning of Yingkou Area of China (Liaoning) Free Trade Zone (North of Minxing River)"	yes	no
4	"Yingkou Liaohe Economic Development Zone (Phase II) Regulatory Detailed Planning"	no	yes
5	"Yingkou City Master Plan" (2011-2030)	yes	yes
6	The "14th Five-Year Plan" for The Development of Private Economy in Yingkou City	yes	yes
7	The "14th Five-Year Plan" for the Development of Industrial Economy in Yingkou City	yes	yes
8	"Yingkou City Old Industrial Base Adjustment, Transformation and Revitalization Plan"	yes	yes
9	"Yingkou City "14th Five-Year Plan" Science and Technology Innovation Plan	yes	yes
10	"Liaoning Province Main Functional Area Planning"	yes	yes
11	"14th Five-Year" Opening-up Plan of Liaoning Province	yes	yes

## (iii) Project Approval Risk

477. Project approval risk refers to the risk that the project may face delays, rejections or additional requirements before the project obtains the necessary approvals and permits, which will hinder the progress of the project or cause the project cannot be implemented.

478. This project is in strict accordance with land management laws and regulations and the "Decision of the State Council on Deepening Reform and Strict Land Management" (Guofa [2004] No. 28), the Ministry of Land and Resources' "Land Pre-examination and Management Measures for Construction Projects" (Decree No. 42 of the Ministry of Land and Resources) and other relevant regulations to handle the land use approval procedures.

479. In September 2022, the Yingkou Green Smart Trade Zone Development Project was approved by the State Council, and have completed the project FSR, environmental impact assessment (EIA), social stability risk assessment, and ESIA, see Table 7-3.

**Table 7-3 Project completed evaluations**

Category	Evaluation Unit		Complete time
	dry port hub and industrial park sub-project in FTZ	Supporting Subproject for Industrial Cooperation in LEDZ	
FSR	China Urban Construction and Design Research Institute Co., Ltd.	China Urban Construction and Design Research Institute Co., Ltd.	November 2023
EIA	Liaoning Biyun Environmental Engineering Co., Ltd.	Yingkou City environmental engineering development Co., LTD	October 2023
Social Stability Risk Assessment	Yingkou Environmental Engineering Development Co., Ltd.	Yingkou Environmental Engineering Development Co., Ltd.	January 2023
ESIA	China Urban Construction and Design Research Institute Co., Ltd.	China Urban Construction and Design Research Institute Co., Ltd.	November 2023

480. The project is continuing to advance the post-approval process, so the overall project and the two sub-projects are identified as low-risk in terms of project approval factors.

### 7.1.1.3 Mitigation Measures

#### (i) Completeness of pre-approval procedures

481. The management committees of the two sub-projects shall review in full accordance with the pre-approval rules and regulations to ensure that qualified entities obtain construction qualifications; the approval results should be publicized to protect the public's right to know. In addition, the management committee should formulate a compensation and resettlement plan of land acquisition, discussing the basis and foothold of the project implementation, so that the public can accurately know whether their own benefits can be guaranteed after land acquisition.

#### (ii) Compliance with project preparation, review and decision-making procedures

482. Before the project is implemented, the management committee shall ensure the integrity and compliance of the project preparation, review, and decision-making procedures. Specifically, during the project preparation period, it is necessary to fully understand the opinions of the public; during the project review period, it is necessary to fully adopt the opinions of professionals; and during the project decision-making period, it is necessary to ensure the effectiveness and democracy of decision-making; After decision-making, it is necessary to orderly proceed in accordance with legal procedures.

#### (iii) Review completeness

483. The management committee of the project should fully pay attention to the importance of the review, understand the procedure and content of the review, and ensure the completeness of the review. It is necessary to promulgate relevant regulations to clarify review responsibilities; and it shall formulate corresponding compensation and resettlement plans of land acquisition when evaluating expropriation decisions to ensure legal and reasonable procedures.

## 7.1.2 Social Risks Caused by the Rationality of Preparation of Engineering Schemes and Mitigation Measures

### 7.1.2.1 Risk Identification

484. The rationality of preparation of engineering schemes for the Yinkou Green Smart Trade Zone Development Project may lead to some risks. Through on-site investigation, two risk factors that may be faced by the rationality of preparation of the engineering scheme were identified (Table 7-4):

**Table 7-4 Risk Factors for preparation of Engineering Scheme**

No.	Risk Factors	Risk Level	
		FTZ	LEDZ
1	Technical Risk	Low Risk	Low Risk
2	Economic Risk	Low Risk	Low Risk

### 7.1.2.2 Risk Factor Analysis

#### (i) Technical Risk

485. Technical risk means that the preparation of engineering schemes must be based on scientific technical standards and advanced technical schemes. However, there may be a risk that the technical solution is not mature enough or suitable for this particular project, which can lead to slow progress, engineering quality issues or technical difficulties.

486. The sub-project of dry port hub and industrial park in FTZ has prepared FSR on the new construction of the sub-project of railway station construction in FTZ, building facilities in FTZ, and municipal infrastructure projects. In December 2022, the Shenyang Railway Survey and Design Institute compiled an FSR on the new construction of the railway station

construction sub-project. In December 2022, the CUCD compiled an FSR on the construction of FTZ building facilities; in January 2023, the CUCD compiled an FSR on the construction of municipal infrastructure projects. However, the report pointed out that there may be unexpected changes in engineering geology and hydrogeological conditions, and major changes in engineering design will lead to increased engineering quantity, increased investment, and extended construction period; due to insufficient pre-preparation work, it will lead to the change of construction plans in the implementation stage of the project. Therefore, there are certain technical risks in the preparation of the engineering scheme of the project.

487. In September 2022, the CUCD prepared an FSR on the infrastructure construction of the southern expansion zone of the LEDZ (Phase II) for the sub-project of the industrial cooperation supporting project of the LEDZ in Yingkou. However, the report pointed out that there may be unexpected changes in engineering geology and hydrogeological conditions, and major changes in engineering design will lead to increased engineering quantity, increased investment, and extended construction period; due to insufficient pre-preparation work, it will lead to the change of construction plans in the implementation stage of the project. Therefore, there are certain technical risks in the preparation of the engineering scheme of the project.

#### (ii) Economic Risk

488. Economic risk means that the preparation of the engineering scheme must fully consider the economic feasibility and sustainability of the project. However, there may be risks that the project may not proceed as planned or achieve expected benefits due to factors such as inaccurate cost estimates, insufficient funds, or changes in the economic environment.

489. The sub-projects of dry port hub and industrial park in FTZ have prepared FSR on the new construction of the sub-project of railway station construction in FTZ, building facilities in FTZ, and municipal infrastructure projects. Detailed demonstrations have been made on investment estimation and fund raising, financial and economic analysis, and the use and repayment of AIIB bank loan funds. However, the project still has uncontrollable risks such as exchange rate, interest rate, and foreign debt, so the economic risk of the project is identified as low risk. In addition, the FTZ project plans to add photovoltaics to all building roofs and convert Haixing Road to a landscaped roadway design, a component that may add additional costs. Since the project counterpart funds meet the proportionality requirement and the loan funds are fully utilized, so the economic risk is low.

490. For the sub-project of industrial cooperation supporting projects of LEDZ in Yingkou, CUCD compiled an FSR on the infrastructure construction of the southern expansion zone of LEDZ (Phase II). Detailed demonstrations have been made on investment estimation and fund raising, financial and economic analysis, and the use and repayment of AIIB bank loan funds. However, the project still has uncontrollable risks such as exchange rate, interest rate, and foreign debt, so the economic risk of the project is identified as low risk.

### **7.1.2.3 Mitigation Measures**

#### (i) Technical Risk Mitigation Measures

491. The management committees shall conduct sufficient technical research and experimental verification, select feasible technical solutions and establish alternative solutions to deal with possible technical difficulties. At the same time, it shall establish a technical risk management mechanism to regularly evaluate and monitor the technical progress and quality of the project. In addition, it is necessary to strengthen geological and hydrological surveys, fully consider engineering risk factors in the design stage, and take targeted measures to avoid or reduce engineering risk hazards.

#### (ii) Economic Risk Mitigation Measures

492. The management committees shall carry out detailed cost estimation and economic benefit evaluation, taking into account uncertainties to ensure the economic feasibility of the project. It is necessary to establish a flexible fund-raising mechanism to adjust and deploy funds in a timely manner to cope with possible changes in the economic environment.

### 7.1.3 Social Risks Caused by Land Acquisition, Demolition and Compensation Plan and Mitigation Measures

#### 7.1.3.1 Risk Identification

493. Through field investigation, two (2) social risk factors that may be caused by land acquisition, demolition and compensation schemes have been identified (Table 7-5):

**Table 7-5 Risk Factors of Land Acquisition, Demolition and Compensation Scheme**

No.	Risk Factors	Risk Level	
		FTZ	LEDZ
1	Land Acquisition Risk	Low Risk	Low Risk
2	Resettlement Compensation Risk	Low Risk	Low Risk

#### 7.1.3.2 Risk Factor Analysis

##### (i) Land acquisition risk

494. The procedural risks of land acquisition include: land acquisition compensation procedures and plans; whether the project land acquisition plan carries out land acquisition compensation in accordance with the procedures stipulated by national and local regulations; whether the land acquisition compensation plan has solicited public opinions, etc. Information asymmetry and injustice may exist in the process of land acquisition and demolition, resulting in some enterprises not being able to obtain fair compensation. In the process of demolition compensation, there may be problems such as unreasonable compensation standards and unequal distribution, which lead to increased social dissatisfaction.

495. FTZ Dry Port Hub and Industrial Park Sub-Project. (i) Logistics supporting area: the construction of the railway connection line (800 m) at the end of the Bianhai railway line will introduce the railway into the dry port hub area. The railway needs to pass through some buildings of the western sewage treatment plant, which is owned by Yingkou Coastal Development and Construction Group Co., Ltd that is a stated-owned enterprise, and Xinhai Street. It is planned to demolish the aeration tank on the west side of the sewage treatment plant. After on-site investigation, it was found that the aeration tank of the sewage plant has been abandoned, and the land transfer has been agreed (31,508 m<sup>2</sup> of land for the demolition of the sewage plant, and the building covers an area of 10,995 m<sup>2</sup>). The FTZ Management Committee has signed a state-owned land use rights recovery and transfer and compensation agreement with Yingkou Coastal Development and Construction Group Co., Ltd on December 18, 2020. (ii) Dry port hub area: the construction of the project requires the demolition of an office building and a factory building (land area of 25813.46 m<sup>2</sup>, building area of 7603.08 m<sup>2</sup>), which is owned by the Yingkou Comprehensive Bonded Zone Bonded Logistics Group Co., Ltd, 100% controlled by Liaoning FTZ Yingkou Area Assets Management Co., Ltd., a wholly-owned company of the Free Trade Zone Management Committee. Other land for the project is the state-owned blank land. 3) Industrialization area: The project site is state-owned construction land, which basically covered with weeds and abandoned shrimp ponds and the shrimp ponds within the road range need to be dredged. The land acquisition and demolition risk level of the project construction is low risk. Therefore, the land acquisition risk level of the FTZ subproject is mild risk.

496. Subproject for Yingkou LEDZ Industrial Cooperation Supporting Engineering. The land acquisition of this subproject involves the Yingkou Salt Industry Co., Ltd. According to the "Guidelines for the Classification of Land and Marine for Land Space Survey, Planning, and Use Control" (Ministry of Natural Resources, November 2020), the land belongs to the industrial and mining land and salt field, and the land is state-owned construction land. The planned area of this project is 4.12 km<sup>2</sup>, all of which occupy the production land of salt fields, which belong to low-yield salt fields. The demolition work of this project involves the ground structures of the salt field, including salt ponds, houses, cables, equipment, etc. The compensation agreement for the expropriation of ground attachments of this project has been signed, so the risk level of the LEDZ subproject is low. In addition, the project is planned to build a WWTP, which is located in Yingkou LEDZ Phase II, within the block surrounded by Planned Road 4, Xingda Street, Yantian Road and Donghai Street, with a total planning area of 60,263 m<sup>2</sup>, of which 47,200 m<sup>2</sup> are occupied recently. There is no building inside the site, which is a blank site with no housing expropriation, so the risk of land expropriation is low.

(ii) Resettlement and Compensation Risk

497. The risk of resettlement and compensation refers to the risk in land acquisition and demolition involving the relocation and resettlement of enterprises and enterprise employees, employment promotion plans, resettlement plans, implementation plans and satisfaction, which may trigger social instability, including protests, demonstrations and even violence events.

498. FTZ Dry Port Hub and Industrial Park Sub-Project. This project does not involve the relocation and resettlement of enterprises and enterprise employees.

499. Yingkou LEDZ Industrial Cooperation Supporting Project sub-project. The subproject affects two production teams with a total of about 15 daily operation employees, including two production team leaders, six maintenance workers, and about sixty workers during the concentrated production operation period. Because salt workers are special types of work, employees of salt companies are generally elder people, and there will be more retirees in the next three years. Employees within the occupied area will be transferred to other teams to compensate the employee gap, so as to reduce the employment pressure caused by retirement. The employees transferred occupation remain the existing types of work and benefits with the same working environment., and the employees in the survey did not feel dissatisfied with the job transfer. Therefore, the resettlement and compensation risk level of the subproject is mild risk.

500. According to Table 7-6, most of interviewees from the FTZs chose to have a basic understanding of land acquisition, demolition, compensation and resettlement policies, accounting for 55.22%. The most popular option selected by interviewees from the Economic Development Zone was not know much, accounting for 29.91%. According to Table 7-7, most of interviewees thought that the transparency of this project and resettlement information disclosure was good.

**Table 7-6 Do you know the compensation and resettlement policies for land acquisition and demolition? (unit:%)**

Options	FTZ	LEDZ
Know very well	5.22	14.02
Basic understanding	55.22	25.23
Heard about it	23.88	26.17
Don't know much	14.18	29.91
Don't understand at all	1.49	4.67

**Table 7-7 What do you think is the transparency of resettlement information**

**disclosure? (unit:%)**

Options	FTZ	LEDZ
Completely transparent	21.64	37.38
More transparent	60.45	23.36
Generally	5.97	13.08
Less transparent	2.24	3.74
Not much transparent	0.00	0.93
Don't know	9.70	21.50

501. The interviewees in the FTZ generally have basic understanding to the resettlement policies for land acquisition and demolition, and have a relatively high evaluation of information disclosure transparency, which may reflect the active efforts of the FTZ in policy promotion and information disclosure as well as the relative higher public acceptance of policies. LEDZ has spaces for improvement in the policy promotion and information disclosure. There is relatively great proportion for the lower understanding of the resettlement policies for land acquisition and demolition, showing that some of residents has doubts of the project information acquisition and transparency. It may require to enhance policy promotion and interpretation to improve the information disclosure mechanism. Overall, interviewees have relatively great understanding of the land acquisition and demolition of the project.

### 7.1.3.3 Mitigation Measures

(i) **Fair and transparent decision-making mechanism:** An open and transparent decision-making mechanism shall be established in the project, to ensure that compensation standards and distribution plans are fair and reasonable, fully solicit opinions and suggestions from enterprises and employees, and provide them with relevant information in a timely manner. The publicity of the land project approval documents, planning indicators, land use approval and other materials shall be strengthened, so as to the expropriated people understanding the necessary of project construction, the scale and content of construction, and the planning sequence of construction. It is more important to strengthen the exchange of information between the government and the expropriated persons, and inform the expropriation subject in a timely manner, so that the owners can clarify the legitimacy of the expropriation subject.

(ii) **Full communication and consultation:** During the process of recovery and transfer of the right to use state-owned land and the acquisition and removal of ground attachments, the project proposed to maintain full communication and consultation with enterprises and enterprise employees, respect their legitimate rights and interests, solve problems and disputes in time, in order to reduce the accumulation of dissatisfaction.

(iii) **Optimization of the resettlement plan:** In formulating the compensation plan for land acquisition, the management committee fully negotiate with the enterprise and its employees, and comprehensively consider various factors to formulate the compensation and resettlement plan for land acquisition; it shall hire experts and third-party agencies to assess the formulated compensation and resettlement plan; and it shall ensure the consistence of policy implementation on the basis of a reasonable compensation plan.

## 7.2 Social Risks and Mitigation Measures During Construction Period

### 7.2.1 Social risks caused by the impact on the ecological environment and Mitigation Measures

#### 7.2.1.1 Risk Identification

502. Through on-site investigation, three risk factors that may be faced in the impact on the

ecological environment were identified (Table 7-8):

**Table 7-8 Ecological environment impact risk factors**

No.	Risk Factors	Risk Level	
		FTZ	LEDZ
1	Ecological Damage	Low Risk	Low Risk
2	Pollutants Discharge	Low Risk	Low Risk
3	Dust and Noise	Low Risk	Low Risk

### 7.2.1.2 Risk Analysis

#### (i) Ecological Damage

503. Ecological damage refers to the large scale of the project, which requires the development and utilization of land resources, which may lead to the destruction of land and the deterioration of the ecological environment. The destruction of the ecological environment may lead to the deterioration of the living environment of the residents, and the loss of the original methods of livelihood dependent on natural resources. According to the standard of the scope of environmental impact, the impact on the ecological environment is mainly in the extension of 300m from the center line of the project to both sides. The impact on the ecological environment mainly involves two enterprises and one police station, with a total of 66 people. According to the survey results in the table below, only 5.97% and 19.63% of the people in FTZ and LEDZ respectively chose to worry about the impact on ecology, but they are still a small part, so the social risk caused by the destruction of the ecological environment is relatively low.

#### (ii) Emission of Pollution

504. Pollution discharge refers to a large amount of waste water, exhaust gas and solid waste that may be generated during the construction and operation of the project. The scope of influence of solid waste may involve all enterprises in the project area.

#### (iii) Dust and Noise Pollution

505. During the construction of the project, activities such as land excavation, land leveling and building construction may generate a large amount of dust. The scope of influence of the dust is mainly 100 m outside the construction area, which mainly has one enterprise with 10 employees.

506. In addition, during the construction and operation of the project, activities such as the use of heavy machinery and equipment, transportation vehicles and building construction may be involved, all of which will generate noise. Noise may have a certain impact on the quality of life and health of surrounding residents. The scope of noise impact is mainly within 200 m on both sides of the road centerline, which mainly has one enterprise and police station, with a total of 24 people.

507. Table 7-9 show that 54.48% of the respondents in FTZ chose that the project would have no impact on the environment during the construction period, followed by those who were worried about dust and noise, accounting for 36.57% and 30.6% respectively; 52.34% of respondents in LEDZ chose to worry about the impact of dust during construction, followed by noise, accounting for 34.58%. 26.87% of FTZ and 23.36% of LEDZ are worried about the impact of construction solid waste.

508. From the table, it can be seen that dust and noise are the main environmental impact factors focused by the interviewees from FTZ and LEDZ during the construction period. The interviewees from LEDZ are relatively more concerned about construction solid waste, waste water and ecological impact, which may be related to the local nature environment and project nature.

509. As shown in Table 7-10, during the operation of the project, the public is more concerned about noise pollution, 32.09% in FTZ, and 44.86% in LEDZ. Therefore, the two subprojects are identified as low risk in term of dust and noise pollution. Noise is a common concern of interviewees during the operation period in the two zones, which may be related to equipment operation, traffic flow and other factors. The interviewees from LEDZ are more concerned about waste water, which may reflect differences in the industry structure and environmental protection and governance.

**Table 7-9 What do you think is the main impact on the environment during the construction of this project (unit: %)**

Options	FTZ	LEDZ
Dust	36.57	52.34
Noise	30.60	34.58
Construction Solid Waste	26.87	23.36
Waste Water	12.69	19.63
Exhaust Gas	4.48	7.48
Asphalt Smoke	4.48	8.41
Ecological Impact	5.97	19.63
No Effect	54.48	28.04

**Table 7-10 What do you think is the main impact on the environment during the operation of this project (unit: %)**

Options	FTZ	LEDZ
Noise	32.09	44.86
Waste Water	20.15	24.30
Exhaust Gas	16.42	16.82
Solid Waste	23.13	19.63
Other	0.00	0.00
No Major Effect	55.97	34.58

### 7.2.1.3 Mitigation Measures

#### (i) Ecological Protection and Restoration

510. It is necessary to formulate and implement ecological protection and restoration plans to minimize ecosystem damage and restore damaged ecosystems through ecological restoration measures. According to the investment budget of environmental protection and water and soil conservation, two subprojects shall invest in the construction of protection measures, conduct various prevention and control, centralized pile up waste raw materials, and uniformly discharge waste water to designated places as well as spray water on the road surface to deal with dust; and construction works shall be carried out during the day, which basically has little impact on the surrounding environment, and no noise nuisance phenomenon is caused; it is necessary to strengthen management during operation to prevent pollutions on sound, air and water, and avoid chemical and dangerous goods accidents. In this way, the environmental problems that may be caused by the project can be dealt with in advance, to reduce their occurrence.

#### (ii) Environmental Monitoring and Management

511. It is necessary to establish a completed environmental monitoring and management mechanism to ensure that the construction and operation of the project comply with environmental regulations and standards, and to discover and solve pollution problems timely. The project shall strictly implement the relevant laws and regulations on environmental protection, and take necessary environmental protection measures during

the construction period, and shall formulate the environmental civilization construction management system on the construction site as well as strengthen the education of construction personnel to provide environmental protection awareness.

## 7.2.2 Social Risks Caused by the Impact on Surrounding Traffic and Mitigation Measures

### 7.2.2.1 Risk Identification

512. Through on-site investigation, one risk factor that may be faced in the surrounding traffic impact was identified (Table 7-11):

**Table 7-11 Surrounding Traffic Impact Risk Factors**

No.	Risk Factors	Risk Level	
		FTZ	LEDZ
1	Risk Of Traffic Impact	Low Risk	Low Risk

### 7.2.2.2 Risk Analysis

513. The risk caused by the surrounding traffic means that the implementation of the project may lead to an increase in the traffic flow around the construction area, causing traffic congestion or traffic accidents, and causing inconvenience to the travel and logistics of surrounding residents and enterprises. The increase in traffic flow and construction noise may cause disturbance and discomfort to the living environment of residents in the surrounding communities, which may lead to social dissatisfaction and complaints.

514. The sub-project of dry port hub and industrial park in FTZ involves logistics hub area, industrialization area, and logistics supporting area, but all of them are in the industrial park. Table 7-12 showed that most of the respondents live more than 5 km away from the project site. Only 2.99% of the respondents lived less than 1 km away from the project site.

515. The supporting project of industrial cooperation in LEDZ is located in the south expansion area of the second phase of LEDZ, in the southwest of the second phase start-up area. Table 7-12 showed that the residence and work place of most respondents are more than five kilometers away from the project site. And there is no one living within 1 kilometer away from the project site. Although there are still respondents whose workplaces are within 1 kilometer away from the project site, according to the interview results, employees do not pass through the project area when starting and quitting work.

**Table 7-12 What is the distance between your place of residence, place of work and project place? (unit: %)**

Options	Distance between residential places and the project site		Distance between working place and the project site	
	FTZ	LEDZ	FTZ	LEDZ
<1km	2.99	0.00	5.22	13.08
1-3km	4.48	6.54	22.39	22.43
3-5km	2.99	17.76	15.67	52.34
>5km	89.55	75.70	56.72	12.15

516. In addition, according to Table 7-13, 82.84% of the respondents in the FTZ thought that the project has no negative impact on the area where they are located, and 64.49% of the respondents in the LEDZ thought that the project has no negative impact on the area where they are located. Among them, 8.21% of the respondents in the FTZ and 14.02% of the respondents in the LEDZ believed that it will cause traffic congestion, so this factor is risky.

517. Overall, residents in the FTZ are mainly concerned about traffic congestion and

environment issues, but most of them think that the project will bring no negative impacts on this area. Residents in the LEDZ are relatively more concerned about social security, environmental issues and traffic congestion, and the proportion of residents in the LEDZ who think the project will bring no negative impact is less than that in the FTZ. It may reflect some concerns about the potential risks of the project.

**Table 7-13 What negative impact do you think the project will bring to your area (unit: %)**

Options	FTZ	LEDZ
Unequal Employment Opportunities	5.97	5.61
Public pressure	2.99	0.93
Social Security	1.49	6.54
Traffic Congestion	8.21	14.02
Environmental Issues	5.22	26.17
Epidemic Disease	2.99	2.80
No Negative Impact	82.84	64.49
Other	1.49	1.87

### 7.2.2.3 Mitigation Measures

(i) Traffic Control and Organization: During the construction period, implement temporary traffic control measures shall be implemented, such as setting up temporary traffic lights, restricting the passage of large vehicles, etc., to reduce traffic congestion and the risk of traffic accidents.

(ii) Environmental Protection Measures: it is necessary to take measures to reduce the impact of construction on the surrounding environment, such as strengthening dust and noise control, to ensure minimize the disturbance caused by construction process to surrounding enterprises.

## 7.2.3 Social Risk Caused by Project Management Rationality and Mitigation Measures

### 7.2.3.1 Risk Identification

518. Through on-site investigation, four possible risk factors in project management were identified (Table 7-14):

**Table 7-14 Project Management Risk Factors**

No.	Risk Factors	Risk Level	
		FTZ	LEDZ
1	Project Management System Risk	Low Risk	Low Risk
2	Public Participation Risk	Low Risk	Low Risk
3	Schedule and Time Risk	Low Risk	Low Risk
4	Security Risk	Low Risk	Low Risk

### 7.2.3.2 Risk Analysis

#### (i) Project Management System Risk

519. Project management system risk refers to potential risks caused by uncompleted, unreasonable or inapplicable project management systems or regulations during project implementation. These risks may negatively affect the progress, efficiency and outcome of the project.

520. Yingkou Green Smart Trade Zone Development Project has set up a project team from the municipal PMO to the sub-PMO, which is mainly responsible for the highest decision-

making and overall coordination and management of the project construction. Therefore, the project has low risk in the project management system.

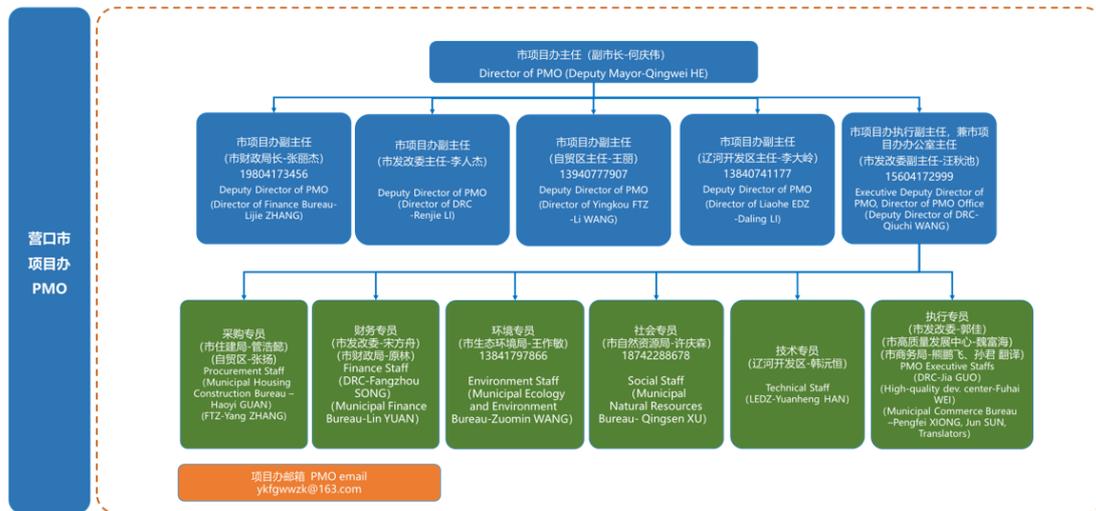


Figure 7-1 Organization Chart of Yingkou Municipal PMO

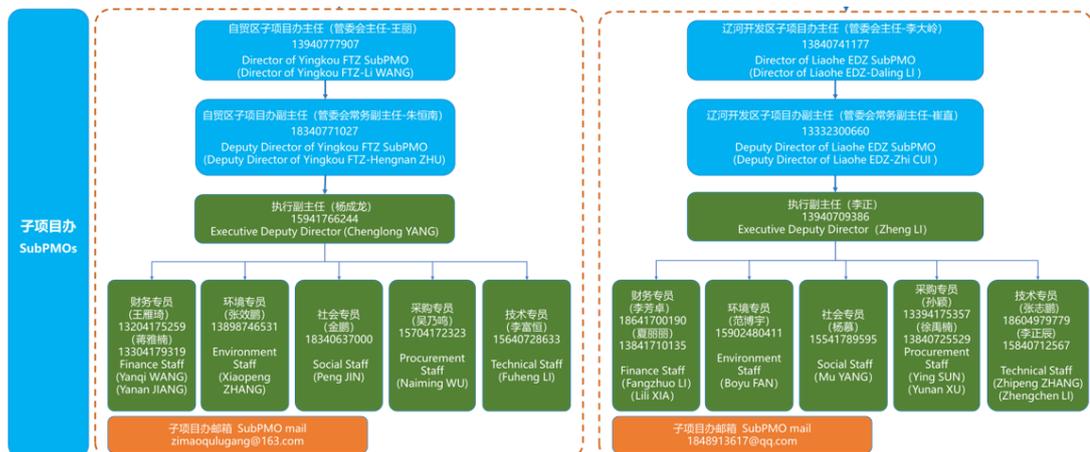


Figure 7-2 Organizational Structure of Yingkou Sub-PMO

(ii) Risk of Public Participation

521. The public may face the problem of information asymmetry in the process of project decision-making and implementation, and cannot fully understand the project's goals, impacts, and possible benefits and risks. This can lead to public mistrust of the project, increasing the potential for conflict and controversy.

522. As shown in Table 7-15, a total of 21 people from the FTZ and 70 people from the LEDZ participated in the workshop of this environmental and social survey, a total of 91 people including the management personnel of the PMO, representatives of the affected enterprises, and consulting agencies. And the number of women has reached more than 40%.

Table 7-15 Number of Participants in the workshop on Society and Environment

	Number of participants	Time	Female
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Workshop on the society and environment of the FTZ sub-projects	10	Morning of May 25	33.33%
	11	Afternoon of May 25	35.29%
Workshop on the society and environment of the subprojects of LEDZ	22	Afternoon of May 23	35.29%
	20	Morning of May 24	35.48%
	28	Afternoon of May 24	45.10%

523. As shown in Table 7-16, a total of 134 people participated in the survey in the FTZ, of which 102 were employees of the affected enterprises; there were 107 people in the LEDZ, of which 43 were employees of the affected enterprises.

**Table 7-16 Number of Participants in the Questionnaire Survey on Society and Environment**

Category	FTZ	LEDZ
Municipal PMO	3	1
Subproject PMO	3	3
Management Committee	8	46
Enterprises in the Park	102	43
Platform Company	14	14
Consulting agency	4	0
The number of people who effectively filled out this question	134	107

524. The public participation in this environmental and social impact assessment survey can reduce the risk of public participation in the Yingkou Green Smart Trade Zone Development Project, and is conducive to the establishment of a transparent and inclusive decision-making and implementation mechanism that fully considers the public's concerns, opinions and concerns, protect the rights and interests of the public, and ensure the sustainable development of the project. Therefore, the public participation risk level of the project is identified as low risk.

### (iii) Progress and Time Risk

525. Schedule and time risk refers to possible delays in the project schedule due to unreasonable project plans, insufficient resources, unclear work tasks, or technical problems.

526. The completion period of the civil works of the dry port hub and industrial park sub-project in FTZ is 60 months; the project preparation is expected to be completed before March, 2024; the construction is expected to start in March, 2024 and completed in October, 2028. At present, there is only a preliminary schedule, and the possibility of delays in the construction period due to various reasons cannot be ruled out. Therefore, the project has low risk in terms of time schedule.

527. Supporting project on Industrial Cooperation in the LEDZ is planned to be implemented from the beginning of September 2024 to the end of October 2028. At present, there is only a preliminary schedule, and the possibility of delays in the construction period due to various reasons cannot be ruled out. Therefore, the project has low risk in terms of time schedule.

### 7.2.3.3 Mitigation Measures

#### (i) Establish a Completed Project Management System

528. The project shall establish a management system that adapts to the characteristics of the project, including rules and regulations for project planning, control, change management, communication and coordination, etc., also shall clarify responsibilities and authorities, to ensure the orderly progress of the project. It shall regularly carry out project

management performance evaluation and testing, timely discover problems and risks, and take corresponding corrective measures to ensure the effective implementation of the project management system.

(ii) Strengthen Public Participation

529. The management committee shall provide comprehensive, transparent and easy-to-understand information, and ensure timely disclosure of information. By holding public hearings, community meetings and information sessions, the public can engage in and provide feedback. It is necessary to establish appropriate participation mechanisms to ensure that the public can express their opinions and make suggestions in the project decision-making process. For example, it shall set up an independent public participation committee, including representatives of various stakeholders, to ensure that public opinions are fully heard and considered.

(iii) Develop a Detailed Project Plan

530. A clear project schedule, including key nodes and milestones shall be set up, arranging resources and tasks reasonably, to ensure that the project is completed on time. An effective project monitoring mechanism shall be established, through reporting project progress regularly and communication meetings, to obtain the project progress, solve problems and risks, and ensure project progress control and adjustment.

**7.2.4 Social Risks Caused by Safety Issues and Mitigation Measures**

**7.2.4.1 Risk Identification**

531. Through on-site investigation, one risk factor that may be faced in the surrounding traffic impact was identified (Table 7-17):

**Table 7-17 Surrounding Traffic Impact Risk Factors**

No.	Risk Factors	Risk Level	
		FTZ	LEDZ
1	Safety Risks during Construction	Low Risk	Low Risk
2	Labor Influx and Risks to Community Safety and Health	Low Risk	Low Risk
3	The Risk of Safe Production	Low Risk	Low Risk

**7.2.4.2 Risk Analysis**

(i) Safety Risks during Construction

532. There are potential safety hazards in the construction process of large-scale construction projects, such as high-altitude operations, mechanical operations, and use of electrical equipment, which may cause workers to be injured or accidents to occur. Various types of equipment used during construction, such as hoisting machinery, excavators, etc., have risks such as improper operation and equipment failure. In addition, there are risks of accidents such as fire, explosion, and collapse, which may cause casualties and property damage.

(ii) The Risk of Labor Influx

533. The implementation of the project will be in the form of bidding. If the winning contractor is a local contractor, more local workers may be hired, and the risk of labor influx is greatly reduced. However, there will be the possibility of non-local contractors accessing, bringing a large number of non-local construction workers, which may cause social security risks, such as wage disputes, labor disputes, illegal and criminal acts, etc., as well as more noise and dusts. Mitigation measures are still needed.

## (iii) The Risk of Community Safety and Health

534. The project construction may also cause conflicts between the workers and local residents and affect the personal and property safety of local residents. In addition, the interaction between workers and local residents may lead to the spread of epidemic diseases and HIV, etc.

## (iv) The Risk of Building Safety

535. During the construction of the project, there may be risks of construction safety accidents, such as high-altitude operation accidents, mechanical equipment failures, etc. Human factors such as unsafe operating behaviors, lack of safety awareness, and equipment failures and failures may lead to accidents and casualties. After the project is completed, potential safety hazards may arise, such as fire, accidental oil spills, chemical spills, etc. At the same time, it is also a challenge for the safety management and maintenance of transportation facilities, such as the safe operation of railway facilities and cargo stacking. According to Table 7-18, most of the interviewees in the FTZ chose not to have safety problems. However, 27.61% of the respondents in the FTZ chose that there may be construction safety problems, and 43.93% of the respondents in the LEDZ chose that there will be construction safety problems. 10.54% of the respondents in the FTZ and 15.1% in the LEDZ are worried that the influx of foreign labor will bring epidemic diseases. Secondly, 7.46% of the respondents in the FTZ and 10.28% in the LEDZ are worried about conflicts between outsiders and local residents. 5.22% of the respondents in the FTZ and 11.21% in the LEDZ are worried about illegal activities by foreigners. And there are still a small number of people who worry about personal and property safety issues. It shows that residents are mainly concerned about the construction safety issues while relatively less concerned about the social conflicts and illegal activities caused by foreign labor. Most of them believe that the project will bring no security issues, reflecting their trust in project management and local public security.

536. According to the on-site investigation, it is known that within 500 m of the project area, there are mainly 5 enterprises, a police station, and the Comprehensive Service Building of Yingkou Comprehensive Bonded Zone, with a total of 920 people, especially 100 employees including security, logistics staffs and foreign employees who are scattered in the park for temporary accommodation (see Table 7-18). Therefore, the project has safety risks in terms of safety during construction, labor influx, and community safety and health, but the risk level is identified as low.

**Table 7-18 What safety issues do you think will be brought about during the construction and operation of the project (unit: %)**

Options	FTZ	LEDZ
Conflict between outsiders and local residents	7.46	10.28
Foreign personnel engaged in illegal activities	5.22	11.21
Safety of life and property	3.73	5.61
Women's personal safety	2.24	6.54
Construction safety issues	27.61	43.93
Epidemic disease	10.54	15.10
No security issues	66.42	45.79

### 7.2.4.3 Mitigation Measures

(i) Conduct Necessary Training and Education for Construction Personnel, to improve their security awareness and skill levels.

537. The construction site shall implement a strict management system for working at heights, including the use of safety belts, safety nets and other protective facilities. The

management committee shall strengthen supervision and inspection to ensure that the construction site meets safety requirements. Conducting professional training for operators will ensure that they are proficient in equipment operation skills. Equipment shall be carried out regular inspection and maintenance to ensure it is functioning properly. Also, it is necessary to strengthen the monitoring of equipment usage, to discover and eliminate potential failures in time.

(ii) Establish a Completed Labor Management Mechanism

538. The labor management mechanism shall include strict recruitment and employment procedures to ensure the legality of workers. It is necessary to strengthen the training and education of labor, and improve their safety awareness and compliance with laws and regulations. The effective communication channels shall be established, which can solve labor problems and disputes in a timely manner, and safeguard labor rights and interests.

(iii) Strengthen Community Health Education

539. The preventive education on AIDS/COVID-19 and other infectious diseases and public health among migrant workers and park employees shall be conducted, and jointly pay attention to community safety and health issues.

(iv) Formulate a Detailed Safety Management Plan

540. For staffs who live in temporary accommodation scattered in the park, before project implementation, formulating a comprehensive and systematic safety management plan will clarify responsibilities and tasks, and ensure the implementation and supervision of the plan. Necessary safety training and education for project participants shall be conducted; It is necessary to ensure sufficient safety equipment during project construction and operation, and establish effective safety protection measures; regular safety inspection and evaluation mechanisms shall be established.

541. At the same time, community communication will be strengthened by maintaining close contact with nearby businesses and communities, providing regular briefings on construction progress and possible disruptions, and ensuring that they are kept up to date with the project. Set up a hotline or contact person to handle complaints and issues from the community and businesses. Develop a detailed emergency response plan to respond quickly to any possible accidents or emergencies and to protect the safety of the construction site and nearby areas. Work with law enforcement agencies, such as the local Police Department, to ensure that safety and order are maintained in the community.

### 7.3 Social risks and mitigation measures during the operation period

#### 7.3.1 Social Risks Caused by Operations and Mitigation Measures

##### 7.3.1.1 Risk Identification

542. The compliance of operation in the AIIB loaned Yingkou Green Smart Trade Zone Development Project during the operation period may lead to some risks. Through on-site investigation, two risk factors that may be faced during the operation period were identified (Table 7-19):

**Table 7-19 Operational risk factors during the operation period**

No.	Risk Factors	Risk Level	
		FTZ	LEDZ
1	Operational Performance Risk	Low Risk	Low Risk
2	Risk of Impact on Residents' Lives	Low Risk	Low Risk

### **7.3.1.2 Risk Analysis**

#### **(i) Operational Effectiveness Risk:**

543. it mainly includes the benefits generated during the project operation, such as the risks arising from employment promotion, enterprise settlement, and impact on municipal facilities companies. During the operation of the project, it may have an impact on the municipal facilities company. For example, the amount of production and domestic waste and sewage treatment may increase during the project operation period.

544. Dry Port Hub and Industrial Park sub-project in the FTZ hope to promote the integration and innovative development of Yingkou's modern logistics industry and advanced manufacturing industry, optimize Yingkou's industrial structure; also expect to support the settlement of high-tech, recycling, economic and trade circulation, high-end manufacturing and other industries in the FTZ ; Through intelligent supply chain logistics infrastructure, warehousing, distribution services, etc., the project is expected to reduce logistics costs, extend the industrial chain, and upgrade the industrial chain. During the on-site investigation, some enterprise employees have concerns about efficiency, because Yingkou is a fourth-tier city, and its attraction to high-tech enterprises is limited. There is a low risk of performance issues during the operation of the project.

545. The construction of the supporting sub-project of industrial cooperation in LEDZ hopes that with the construction of the road project, the plots along the road will be developed and appreciate in value, which will generate certain economic benefits and drive more enterprises to settle in. In the on-site investigation, some enterprise employees had concerns about benefits. Because the enterprises settled in the LEDZ are already approaching saturation, the development of roads will reduce the production land and reduce the economic income of enterprises. Therefore, there is a low risk of effectiveness issues during the operation of the project.

#### **(ii) Risk of impact on residents' lives:**

546. the noise during operation will impact on the social environment and the production and life of surrounding people, emergency treatment of traffic accidents, countermeasures for operation on holidays, relationship between road surface drainage system and cultivated land, management's Severe weather management, the impact of travel patterns of residents on both sides of the road on road safety, protection measures for water and electricity consumption, safety measures for maintenance personnel and vehicles, etc.

547. During the operation of the dry port hub and industrial park sub-project in FTZ, the main impacts are the peculiar smell produced by the workshop and the mechanical noise produced by the equipment, which may have an impact on surrounding enterprises. Therefore, there is low risk during the operation of this project.

548. The subproject of supporting project on industrial cooperation in LEDZ is far away from enterprises and residential areas, so the possibility of impact on residents' lives is small. Sewage pollution, noise sources and bad odors may occur during the operation period of the WWTP, causing impacts on the lives of the surrounding residents. However, the main equipment in the design of this project has a high level of automatic monitoring and control, and can achieve the corresponding requirements of the effluent water quality, and the effluent water is sterilized by ultraviolet rays, which is in line with the national provisions of the drainage standards, and will not pollute the discharged water body. At the same time, after the completion and operation of the WWTP, the discharge of pollutants will be greatly reduced every day, which will play a good role in protecting the environment of the surrounding areas. Therefore, the risk is low during the operation of the project.

### **7.3.1.3 Mitigation Measures**

#### **(i) Strengthening market analysis and response**

549. Carrying out market research and competition analysis in the process of project planning and execution can obtain information on market changes timely so that project strategies and plans will be flexibly adjusted to adapt to changes in market demand.

(ii) Optimize design schemes

550. In project design, design schemes with mature technology, convenient construction, fast construction progress and less impact on the production and life of surrounding people should be adopted, and design schemes that affect construction progress should be dynamically improved. The design scheme is people-oriented, and the design of the factory area focuses on environmental protection. At the same time, the protection and greening settings are considered to reduce the impact on the surrounding environment.

(iii) Strengthening operations management coordination

551. The PMO will cooperate with other relevant departments to increase investment attraction, optimize the business environment of the park, attract enterprises to settle in, and increase economic benefits and employment opportunities.

### 7.3.2 Social Risks Caused by the Soundness of the GRM and Mitigation Measures

#### 7.3.2.1 Risk Identification

552. Grievance Redress Mechanism (GRM) is an important mechanism in Asian Infrastructure Investment Bank (AIIB) loan projects, which provides affected parties with a way to resolve disputes and grievances. An uncompleted GRM may prevent project stakeholders from providing key information or evidence timely, thereby affecting accurate analysis and evaluation of the problem. Without an effective GRM, it may lead to information asymmetry and lack of information, making it impossible for decision makers to fully understand the risk status of the project and increase the operational risk of the project. Through field investigation, four possible risk factors were identified (Table 7-20).

**Table 7-20 Risk Factors of GRM**

No.	Risk Factors	Risk Level	
		FTZ	LEDZ
1	Unfair Decision	Low Risk	Low Risk
2	Investment Risk	Low Risk	Low Risk
3	Risk of Communication Disorders	Low Risk	Low Risk
4	Risk of Delay	Low Risk	Low Risk

#### 7.3.2.2 Risk Analysis

(i) Unfair decision-making:

553. The lack of an effective GRM may lead to unfair project decisions. When project participants believe that certain decisions are unfair, unreasonable, or inconsistent with the requirements of the agreement, they cannot file a complaint timely, which may hinder the progress of the project or generate dissatisfaction, and have a negative impact on the long-term stability of the project.

(ii) Investment risk:

554. An uncompleted GRM may increase investment risk, if the project participants have doubts about the implementation of the investment project or the use of funds and cannot effectively appeal and get a solution.

(iii) Risk of communication barriers:

555. The lack of an effective GRM may lead to communication barriers among project participants. The two sub-projects of the Yingkou Green Smart Trade Zone Development

Project financed by the AIIB are both to establish a GRM. And, according to Table 7-21, most of the respondents said they knew how to appeal. Most of residents knows how to appeal when they are dissatisfied with the environmental impact of the project, indicating some effects have been achieved in the information disclosure and promotion. Meanwhile, the lower proportion of LEDZ in knowing how to appeal compared with FTZ indicates that there are still spaces for improvement in the public promotion and information disclosure. The awareness of residents on appeal channels is relatively weaker, which need to enhance the public promotion. If there is no effective GRM, most of the public will appeal in their own way, which will lead to certain risks.

**Table 7-21 If you are dissatisfied with the environmental impact of the project during the project implementation or operation period, do you know how to appeal? (unit:%)**

Options	FTZ	LEDZ
Know Very Well	8.96	23.36
Know	70.15	35.51
Generally Know	15.67	28.97
Do Not Know Much	3.73	12.15
Do Not Know	1.49	0.00

### 7.3.2.3 Mitigation Measures

(i) Establish a sound grievance channel and mechanism:

556.It can ensure that project participants can raise questions, report objections and grievances timely, and establish an effective GRM to ensure timely handling and resolution of grievances.

(ii) Provide information transparency:

557.An open and transparent mechanism for project-related information shall be established to ensure that all parties can fully understand the project situation, policies and decision-making process, and avoid information asymmetry and lack.

(iii) Strengthen communication and coordination:

558.It is necessary to strengthen communication and coordination among all parties, establish a good cooperative relationship and communication mechanism, to ensure that problems can be resolved and coordinated timely, and reduce risks caused by poor communication.

(iv) Establish an appeal and supervision agency:

559.The subprojects shall set up a grievance mechanism to be responsible for grievances handling results supervision to ensure a fair, objective grievance handling process.

## 7.3.3 Risks Caused by the Orientation of Media and Public Opinion and Mitigation Measures

### 7.3.3.1 Risk Identification

560.The social risks caused by the orientation of media and public opinion mainly include the attitudes of different stakeholders towards project operation (the support rate of social conditions and public opinion) and tolerance, and whether the construction, implementation, operation and development of the project can adapt the social environment, economic environment and other environments and development of the region.. Through field investigation, three possible risk factors were identified (Table 7-22).

**Table 7-22 Risk Factors of Media Public Opinion**

No.	Risk Factors	Risk Level	
		FTZ	LEDZ
1	Recognition of Project Operation	Low Risk	Low Risk
2	Surrounding Environmental Governance Doubts Lead to Public Opinion Risks	Low Risk	Low Risk
3	Management Doubts During the Project Operation Period Lead to Public Opinion Risks	Low Risk	Low Risk

**7.3.3.2 Risk Analysis**

(i) The recognition degree of project operation

561. It refers to the degree of support and recognition obtained by project operation from relevant stakeholders and the general public.

562. According to Table 7-23, it can be seen that the stakeholders of the two sub-projects of AIB Loan Yingkou Green Smart Trade Zone Development Project have a high degree of support for the project, reaching more than 90%. It indicates that interviewees believe the benefits of the implementation of the project are more than the adverse effects of that and the implementation of the project will be beneficial for the development of enterprises and the region. The interviewees have high recognition of the project, laid a great foundation for successful implementation of the project.

**Table 7-23 Do you support this project? (unit:%)**

Options	FTZ	LEDZ
Very Support	32.84	64.49
Support	61.94	20.56
Doesn't Matter	5.22	12.15
A Bit Against	0.00	1.87
Very Against	0.00	0.93

563. According to Table 7-24, it can be seen that 43.28% of the respondents in the FTZ chose not to know the negative impact, and 40.30% chose that the negative impact is relatively large, and effective preventive measures should be taken. 43.92% of the respondents in the LEDZ chose that the negative impact is relatively large, and effective preventive measures should be taken, and 34.58% of the respondents chose not to know the negative impact. It can be seen that interviewees have relatively separate opinion for the potential negative impacts brought by the project: part of interviewees supports the project and accepts some negative impacts, while some interviewees believe the negative impact is large, and part is not aware of the negative impact. Therefore, the project still has certain risks, which requires adopt effective prevention and protection measures as well as enhance the public information promotion.

**Table 7-24 What do you think of the possible negative impact of this project on your area (unit: %)**

Options	FTZ	LEDZ
Some negative effects but acceptable	16.42	21.50
The negative impact is relatively large, and effective preventive measures should be taken	40.30	43.92
Don't know	43.28	34.58

(ii) The risk of public opinion caused by doubts about the governance of the surrounding environment

564. The doubts about the governance of the surrounding environment may involve issues such as the impact of the project on the environment, the effectiveness of environmental protection measures, and governance responsibilities.

565. According to Table 7-25, if the construction period and operation period of the project pollute the local environment and affect your work and life, the respondents in the FTZ tend to complain to the environmental protection department, accounting for 51.59%; respondents in the LEDZ tend to negotiate with construction units or management departments, accounting for 55.14%. In the FTZ, residents prefer to solve problems by complaining to the environmental protection department, reflecting their trust and expectation in the environmental protection department. In the LEDZ, residents prefer to solve problems by negotiating with the construction unit or management department, to reach solutions through cooperation and negotiation, indicating the negotiation work has achieved marked results.

566. The employees of the enterprises in the sub-project area of the industrial cooperation supporting project in the LEDZ in Yingkou reported that the protection of the ecological environment not only requires the leadership of the government, but also requires the participation of the public. If the publicity of ecological and environmental protection is not in place, the public will question the relevant measures and have resistance, which will not only make it difficult to implement relevant protection actions, and the public will lack a sense of participation, but will also cause the public to doubt the government's ability to govern and trigger public opinion risk.

**Table 7-25 If the construction and operation of the project pollute the local environment and affect your work and life, what will you do? (unit:%)**

Options	FTZ	LEDZ
Complain to the environmental protection department	53.73	33.64
Through Legal Means	11.19	10.28
Negotiate with the construction unit or management department	34.33	55.14
Other	0.75	0.93

(iii) The risk of public opinion caused by management doubts during the project operation period

567. Management doubts during the project operation period may involve issues such as project implementation efficiency, quality, and safety. These doubts may cause public opinion risks and damage the reputation and credibility of the project.

568. Table 7-26 shows that 61.19% of the respondents in the FTZ have no opinion on the project, and those who have opinions preferred to report directly to the higher-level government and the construction unit. 37.38% of the respondents in the LEDZ have no opinion on the project, and those who have opinions preferred to report directly to the higher-level government and the construction unit. Those who choose to reflect through the media accounted for a minority, but this risk still exists.

569. Enterprise employees in the dry port hub of the FTZ and the sub-project area of the industrial park worried that if the initial investment in resources fails to obtain sufficient returns and fail to drive the surrounding economy and the economy of Yingkou as a whole, they doubt the rationality of the government's decision-making, which may cause public opinion risks.

570. Enterprise employees in the sub-project area of the Industrial Cooperation Supporting Project of the LEDZ in Yingkou have certain concerns about the future operation and management of the project, for instance they worried about the suspension of project operation, pessimistic expectations about the prospect of local investment; there are also concerns about the presence of too many enterprises in the region, affecting resource management and allocation. Some employees believed that the project has brought challenges to the operating efficiency of the salt farm. The reduction of the salt farm will be accompanied by the reduction of the benefit of the salt farm. If it cannot be effectively dealt

with, the salt farm may face operational difficulties, reduce employees, and cause public opinion risks.

**Table 7-26 What channels did you use to express your personal opinions and opinions during the entire planning implementation process (unit: %)**

Options	FTZ	LEDZ
Don't know who to talk to	2.24	5.61
Not expressed	7.46	9.35
Report directly to the cadres	8.21	18.69
Report to the cadres via intermediary	1.49	3.74
Report directly to higher-level government	15.67	21.50
Reflect to the media	2.99	12.15
Report to the project construction unit	14.18	14.95
Report to the project owner	5.97	3.74
Report to people who have been investigating	8.21	21.50
No comment	61.19	37.38

### 7.3.3.3 Mitigation

571. Taking environmental governance as an important part of building a responsible government. Improve the administrative responsibility system, the response to relevant content should focus on the content and clarify the solution.

572. Establish an institutional system for public opinion monitoring, guidance and control. Set up related mechanisms, set up a high-quality public opinion management team, and set up a rapid response team to improve the public opinion emergency response plan in the face of rapidly changing and sudden online public opinion.

573. Utilizing multiple media to increase the information transparency. The management committee can make full use of WeChat, Weibo and other new media platforms to gain a deep understanding of the public's understanding, opinions and suggestions on relevant policies, strengthen the comprehensive collection, scientific analysis and accurate research and judgment of public information feedback, and effectively expand the community of citizens. Participation to enhance policy transparency and openness.

574. Combined with the existing labor supervision and rights protection mechanisms of government departments, the worker's grievance redress mechanism should be established, with the increase information publicity and labor rights knowledge education to ensure that workers are informed about how to complain when their labor rights and interests are infringed.

## 7.4 Social and Gender Analysis

### 7.4.1 Current Status of Women's Development in The Project Area

575. Yingkou FTZ has established 186 trade union organizations, with a total of more than 4,500 female employees and more than 200 female employees in government agencies.

576. In order to empower female employees and protect the rights and interests of female employees, Yingkou FTZ combined with its own reality to carry out the female employees' rights protection action month. Yingkou FTZ carried out a series of activities including knowledge competitions on the protection of female employees' rights and interests, labor rights protection in new employment forms; the popularization of labor safety and health knowledge for female employees, the creation of family-friendly workplaces, and legal supervision of the protection of female employees' rights and interests, etc. Actively carry out the activities of "delivery, management and service". "Sending" means sending legal knowledge, giving lectures, and sending warmth. "Management" strengthens management and gradually improves the rights protection mechanism for female employees. "Service" relies on FTZs to manage enterprises in a grid, serving enterprises and grassroots. At the

same time, adhere to innovative forms, enrich the content, and enhance the flexibility of training work. According to the actual work of different groups, integrate various education and training resources, innovate ways, and carry out education and training work in different fields.

577. Yingkou LEDZ has a total of 7,889 employees, including 2,030 women. There are 55 enterprise trade unions established in the jurisdiction, involving 1,439 employees, including about 500 women. The trade union involves 8 employees, including 3 women.

578. In order to empower female workers and protect the rights and interests of female workers, LEDZ has also taken active actions: first, strengthen learning and education, and comprehensively improve the overall quality of female workers; Ideological and political education for employees to improve the ability and level of women to protect their own rights and interests according to law; the third is to guide professional women to make contributions to their posts, stimulate innovation vitality, encourage them to continuously improve their adaptability, competitiveness and innovation ability in the market economy, and strive to become the industry leader; the fourth is to participate in various cultural and sports activities and cultivate a positive and enterprising spirit.

#### 7.4.2 Survey sample

##### (i) Sample size

579. The number of female samples in the FTZ is 87, accounting for 64.93% of the total sample in the FTZ; The number of female samples in the LEDZ is 67, accounting for 62.62% of the total sample.

##### (ii) Age

580. According to Table 7-27, among the female samples in this survey, 46.27% of the female samples in the FTZ are 31-40 years old, 31.34% are 19-30 years old, 19.40% are 41-50 years old, and 2.99% are 51-65 years old. 43.67% of the female samples in the LEDZ were 31-40 years old, 27.44% were 19-30 years old, 26.44% were 41-50 years old, and 2.45% were 51-65 years old.

**Table 7-27 Age Distribution of Female Survey Samples (Unit: %)**

age	FTZ	LEDZ
18 and under	0	0
19-30 years old	31.34	27.44
31-40 years old	46.27	43.67
41-50 years old	19.40	26.44
51-65 years old	2.99	2.45
66 years and over	0	0
total	100	100

##### (iii) Ethnic Minority Groups

581. As shown in Table 7-28, among the female samples in this survey, 98.85% of the FTZs are Han, 1.15% are Manchu, and there are no other ethnic groups; the female samples in the LEDZ are all Han.

**Table 7-28 Ethnic Distribution of Female Survey Samples (Unit: %)**

Ethnic Minority Groups	FTZ	LEDZ
Han	98.85	100
Manchu	1.15	0
Chinese Korean	0	0
Hui	0	0
other	0	0
total	100	0

## (iv) Education level

582.As shown in Table 7-29, 49.43% of the samples in the FTZ have undergraduate education, followed by 41.37% of junior colleges, 5.75% of technical secondary schools, and 3.45% of masters and above; In the district, 67.16% of the samples received a bachelor's degree, followed by 23.89% of junior college students, and 1.49% of master's degree and above samples . It shows that more than half of the female samples in the two project areas have received undergraduate education, and the proportion of education in the LEDZ, junior high school, technical secondary school, high school and junior high school is higher than that in the FTZ.

**Table 7-29 Educational Level of Female Survey Samples (Unit: %)**

Education Level	FTZ	LEDZ
primary school and below	0	0
junior high school	0	4.48
high school	0	1.49
secondary school	5.75	1.49
junior college	41.37	23.89
undergraduate	49.43	67.16
Master degree and above	3.45	1.49

## (v) Division of labor and decision-making

## i) Division of labor

583.As shown in Table 7-30 , according to the survey results in the FTZ, more than half of the respondents choose the husband and wife to work together in the following household division of labor, and the proportion of child care, housework, and daily necessities purchased by the wife is higher than that of the husband; the proportion of daily water and electricity maintenance at home, going out to work, and going out to do business taken by the husband is higher than that of the wife.

**Table 7-30 Which members are mainly doing the following household division of labor (FTZ) (unit: %)**

Options	Husband	Wife	Husband And Wife	Elderly (Male)	Elderly (Female)	Not Applicable
Take care of the elderly	5.22	6.72	70.15	0.75	2.99	18.66
Take care of children	5.22	11.19	67.16	1.49	4.48	17.16
Housework (washing, cooking, cleaning, etc.)	5.22	13.43	71.64	0	8.21	5.22
Take out the trash	11.19	11.94	67.91	2.24	5.97	5.97
Daily plumbing maintenance at home	26.87	2.99	56.72	5.97	1.49	8.21
Purchase of daily necessities	5.22	19.40	65.67	0.75	6.72	5.22
Migrant workers	13.43	1.49	61.94	1.49	2.99	23.13
Go out for business	7.46	2.24	50.75	0.75	2.24	38.81
Participate in community meetings	4.48	7.46	55.22	0.75	2.99	30.60
Participate in technical training	8.96	4.48	57.46	0	1.49	29.85

584.As shown in Table 7-31 , according to the survey results in FTZ, more than half of the respondents choose to husband and wife work together in taking care of the elderly, taking care of children, housework, and taking out garbage. The proportion of child care, housework, and daily necessities purchase taken by the wife is higher than that of the husband; the proportion of daily water and electricity maintenance at home, going out to work, and going out to do business taken by the husband is higher than that of the wife.

**Table 7-31 Which members are mainly doing the following household division of labor (in LEDZ) (unit: %)**

Options	Husband	Wife	Husband And Wife	Elderly (Male)	Elderly (Female)	Not Applicable
take care of the elderly	9.35	10.28	53.27	1.87	3.74	32.71
take care of children	4.67	11.21	56.07	1.87	1.87	27.10
housework	6.54	16.82	63.55	1.87	2.80	14.02
take out the trash	14.02	9.35	62.62	3.74	1.87	14.95
Daily plumbing maintenance at home	46.73	6.54	29.91	3.74	0	16.82
Purchase of daily necessities	11.21	27.10	48.60	2.80	2.80	13.08
migrant workers	16.82	5.61	23.36	0.93	2.80	55.14
go out for business	14.02	4.67	16.82	0.93	1.87	63.55
Participate in community meetings	14.95	5.61	22.43	0	0	58.88
Participate in technical training	15.89	5.61	23.36	0	0	57.01

585. Overall, in the interviewed households of the FTZ and LEDZ, traditional social gender role division is the main model of the division of labor.

#### ii) Decision making

586. As shown in Table 7-32, according to the survey results of the FTZ, among the following family affairs decisions, more than 70% of them choose husband and wife work together. In terms of children's education and the purchase of daily consumer goods, the proportion of wives making decision is much higher than that of husbands making decision. In terms of major family expenditures and other important matters (borrowing, investment), the proportion of husbands making decision is slightly more than wives making decision.

**Table 7-32 Which members make the following family affairs decisions (unit: %)**

options	husband	wife	Husband and wife	Elderly/Male	elderly/female	not applicable
Human relationship	6.72	8.21	78.36	2.24	5.22	7.46
Children's education	4.48	11.94	71.64	0.75	1.49	14.93
Major household expenses (buying a house, buying a car, etc.)	6.72	4.48	79.85	2.24	5.22	7.46
Purchase of daily consumer goods	5.97	14.93	70.90	2.24	5.22	7.46
Other significant matters (loans, investments)	5.97	3.73	77.61	2.24	2.24	11.94

587. As shown in Table 7-33, according to the survey results of the LEDZ, more than 60% of the decision-making on human relations, children's education, and major family expenditures choose couples to work together. In terms of children's education and the purchase of daily consumer goods, the proportion of wives is much higher than that of husbands. In terms of human relations, major family expenditures, and other important matters, the husband's decision-making is slightly higher than that of the wife.

**Table 7-33 Which members make the following family affairs decision-making (in LEDZ) (unit: %)**

options	husband	wife	Husband and wife	Elderly/Male	elderly/female	not applicable
Human relations	11.21	7.48	67.29	3.74	2.80	13.08
Children's education	7.48	10.28	65.42	0.93	0	20.56
Major household expenses (buying a	10.28	8.41	68.22	4.67	3.74	13.08

house, buying a car, etc.)						
Purchase of daily consumer goods	9.35	20.56	56.07	2.80	1.87	13.08
Other significant matters (loans, investments)	8.41	4.67	57.94	3.74	3.74	27.10

588. Overall, in the interviewed households in the FTZ and LEDZ, wife and husband make decision together in family affairs, while wife takes more decision-making responsibilities in daily consumption and children's education, reflecting female and male trends to be equal on household decision making power at present.

589. As shown in Table 7-34, regarding the question "from the perspective of gender, who contributes more to your family income", 67.16% of the respondents in the FTZ think that men and women account for half, and 24.63% think that there are more men than women. ; 55.14% of the respondents in the LEDZ believed that men and women accounted for an equal share, and 27.1% believed that men were more than women and women were less. It can be seen that in the two project areas, men and women contributes equally in terms of household income, reflecting woman has more significant contribution to family economy.

**Table 7-34 From the perspective of gender, who contributes more to your household income? (unit:%)**

Options	FTZ	LEDZ
100% from men	2.99	7.48
More men, less women	24.63	27.10
50% male, 50% female	67.16	55.14
Less men, more women	2.24	4.67
100% from women	2.99	5.61%

### 7.4.3 Gender Impact Analysis

#### 7.4.3.1 Description of Affected Female Groups

590. In this project, since there is no residence within 4 km<sup>2</sup> around the project, the women affected by the project do not involve the surrounding residents, but are mainly divided into two categories:

(i) **Female employees of affected enterprises in the park.** In LEDZ project, as mentioned above, the affected enterprises are mainly the salt factory of Yingkou Salt Industry Co., Ltd. The total number of employees in the two teams affected by the occupation of the production land by the project is about 15 male workers. Within 500 m of the environmental impact range of the FTZ project, there are 5 enterprises, the total number of female employees who may be directly affected by the environment and safety is 99, and 18 women have accommodation in the park. The basic information is shown in Table 7-35:

**Table 7-35 Basic Information of Affected Female Employees (Unit: %)**

Comprehensive Bonded Zone Enterprise	Number of employees	Number of female employees	Total number of people living in the factory area	Number of female employees
Yingkou Sanzheng New Technology Chemical Co., Ltd.	55	10	0	0
Yingkou Futai Technology Co., Ltd.	42	10	0	0
Liaoning Zhengdian Aluminum Building System Co., Ltd.	149	44	18	6

Yingkou FTZ Land Port Hub Industrial Park	Number of employees	Number of female employees	Total number of people living in the factory area	Number of female employees
Yingkou Fangyuan Mold Co., Ltd.	12	5	12	3
Liaoning Xinhongyuan Environmental Protection Material Co., Ltd.	650	30	70	10

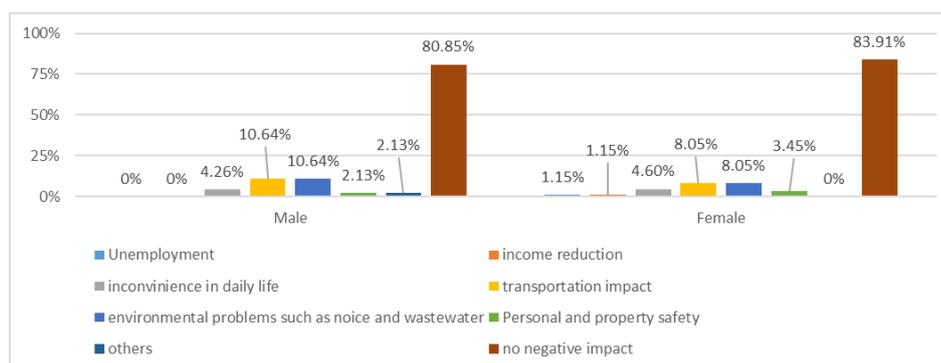
(ii) **Female employees involved in project management and implementation.** Such employees are indirectly affected groups (mainly referring to opportunities for awareness and ability improvement), mainly from the municipal PMO, sub-project PMOs, management committee, platform companies, consulting agencies, etc.

### 7.4.3.2 Analysis of Women's Affected Situation

591. In general, firstly, female groups think that the project has little direct impact on themselves, and generally accept a certain degree of negative impact. Second, women have more doubts about the negative impact of the project and its consequences than men. Third, the impact of the FTZ project is distributed differently within the female group, and women in the enterprises may be more affected.

#### (i) LEDZ Projects

592. As shown in Figure 7-3, about 80% of the respondents think that there is no negative impact on the question "What negative impact do you think the project will bring to you personally", and the proportions of men and women are 80.85 % and 83.91% respectively.



**Figure 7-3 Gender evaluation of the negative impact of the project on individuals**

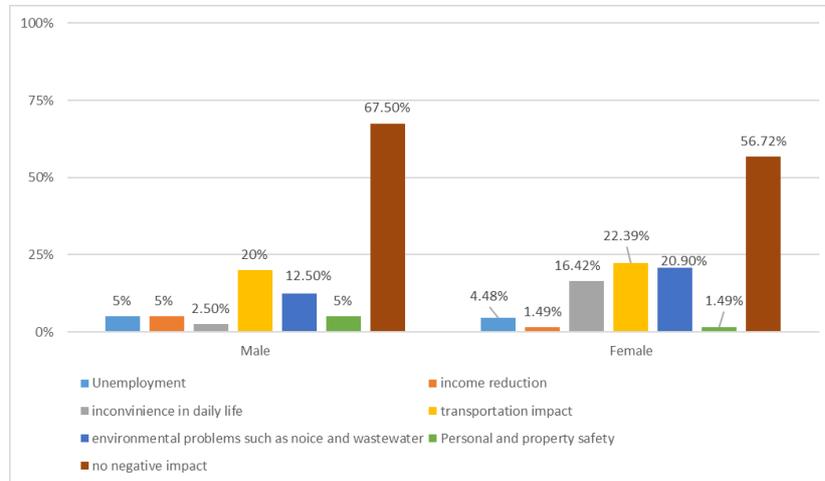
593. As shown in Table 7-36, 50.75% of women and 80% of men think that there are negative impacts which are acceptable, but 47.76% and 20% of women and men choose "unclear". Information disclosure should also pay more attention to the participation of women groups, and improve women's awareness of the project's environmental and social impact measures.

**Table 7-36 Gender-specific attitudes towards negative impacts of the project (unit: %)**

Options	Some negative effects but acceptable	The negative impact is relatively large, and effective preventive measures should be taken	Don't know
male	80	0.00	20
female	50.75	1.49	47.76

#### (ii) FTZ project

594. Figure 7-4, about 60% of the respondents think that there will be no negative impact on the question "What negative impact do you think the project will bring to you personally", and the proportion of women is about 10% lower than that of men. Since more enterprises are directly affected by the FTZ projects, the respondents are generally more concerned about environmental issues than those in the LEDZ. Compared with men, more women are concerned about the environmental issues caused by construction and inconvenience caused by daily life.



**Figure 7-4 Gender evaluation of the negative impact of the project on individuals**

595. As shown in Table 7-37, 45.98% of women and 61.7% of men think that there are negative impacts, but they are acceptable, but 51.72% and 38.3% of women and men choose "unclear". The situation in the LEDZ is similar. It can be seen that project information disclosure should also pay more attention to the participation of women groups, and focus on publicizing the negative impact mitigation measures of the project to women groups.

**Table 7-37 Gender-specific attitudes towards negative impacts of the project (unit: %)**

Gender	Some negative effects but acceptable	The negative impact is relatively large, and effective preventive measures should be taken	Don't know
male	61.7	0.00	38.30
female	45.98	2.30	51.72

596. In addition, as mentioned above, since 5 enterprises within the FTZ project area will receive direct environmental and construction safety impacts, among which 99 are female employees, among the female groups interviewed in the FTZ, the number of affected enterprises is female. There are differences in the degree of cognition and concern of the negative impacts of the project among the enterprise employees and the female employees of the management institutions. As shown in Table 7-38, the proportion of women in management institutions who believe that the project has no negative effects is about 30% more than that of affected enterprises. Environmental issues such as sewage, and the impact of construction on traffic and daily life are more concerned. Therefore, the FTZ project has a more direct impact on female employees of affected enterprises, and their concerns and needs should be specially considered during implementation.

**Table 7-38 Evaluation of perceptions of negative impacts (unit: %)**

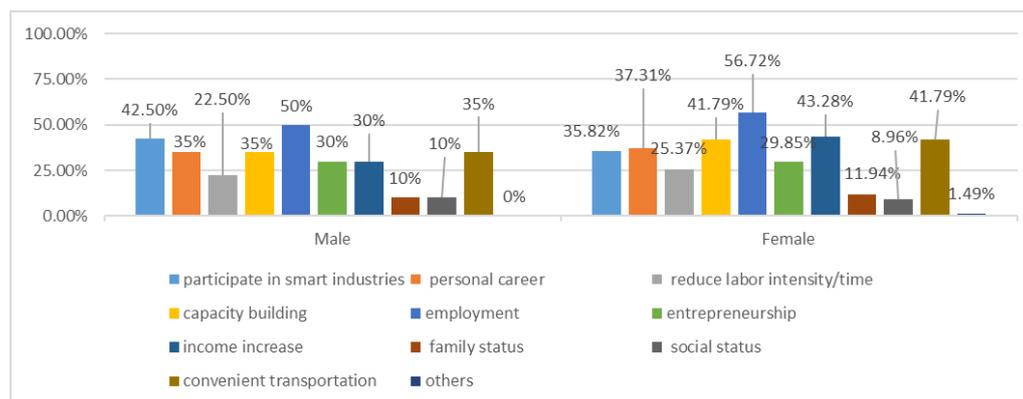
Gender	Unit Type	Unemployment	Reduced economic income	Construction brings inconvenience to daily life	Construction affects traffic	Environmental problems such as noise and sewage caused by construction	Personal and property safety issues	No downside
Male	Management Agency	9.52	9.52	4.17	4.17	19.05	9.52	7.19
	Affected Enterprises	0	0	0	36.84	5.26	0	57.89
Female	Management Agency	0	0	9.30	16.28	11.63	2.33	69.77
	Affected Enterprises	12.50	4.17	29.17	33.33	37.50	0	33.33

**7.4.4 Women's Awareness, Capacity Building and Project Opportunities**

597. Women in the project area has high expectation on awareness improvement, capacity improvement and opportunities probably brought by the project, the project shall consider to benefit women in the above terms as possible, especially in the job opportunities, development opportunities of personal career, capacity improvement in communication and coordination, and improvement of environmental protection awareness, which are more concerned by women.

**(i) LEDZ Projects**

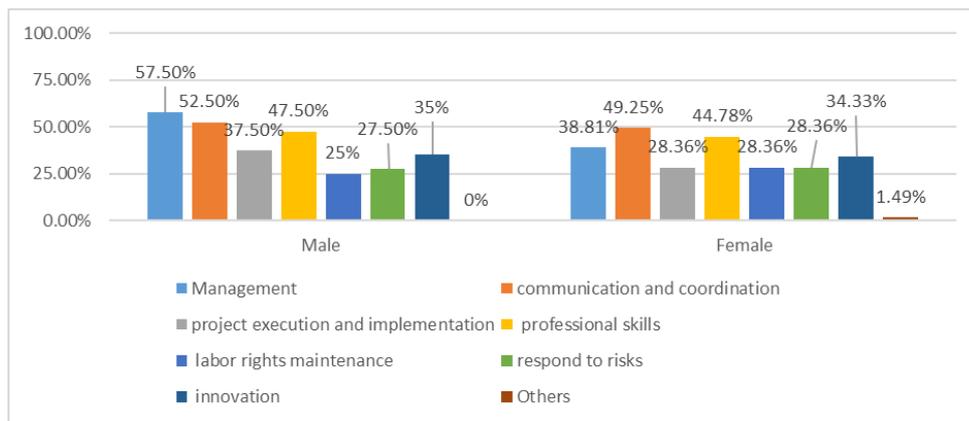
598.Regarding the question of what opportunities women can obtain from the project, as shown in Figure 7-5, the three options most chosen by female respondents are employment opportunities (56.72%), opportunities to increase income (43.28%) and abilities Opportunities for improvement (41.79%) and opportunities for improving roads and increasing travel convenience (41.79%). The top three choices of male respondents are slightly different from those of female respondents, they are employment opportunities (50%), opportunities to participate in the development of smart industries (42.5%), opportunities for personal career development (35%), ability Opportunity for improvement (35%), opportunity for road improvement, opportunity for increased mobility (35%). It can be seen that the female group has higher expectations for capacity improvement opportunities from the project than men.



**Figure 7-5 Gender-disaggregated views on project opportunities**

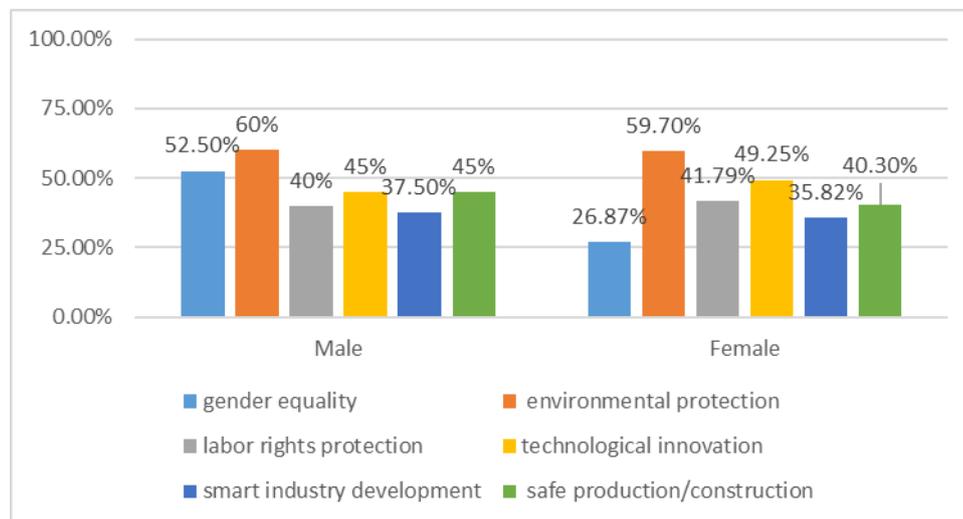
599.In addition, in terms of capacity improvement, as shown in Figure 7-6, female respondents believe that the top three capacity improvements that the project can bring about are communication and coordination (49.25%), professional skills (44.78%) and management capabilities (38.81%), while the top three items selected by male respondents are management ability (57.5%), communication and coordination ability

(52.5%), and professional skills (47.5%). Women have lower expectations for management ability improvement than men.



**Figure 7-6 Gender-disaggregated views on capacity building**

600. In terms of awareness raising, as shown in Figure 7-7, among the awareness that women think the project can improve, the three most selected are environmental protection awareness (59.70%), technological innovation awareness (49.25%) and labor rights protection awareness (41.79%), while male respondents chose the most three items as environmental protection awareness (60%), gender equality awareness (52.5%) and technological innovation awareness (45%), and the male group chose "gender equality awareness" more. The reason may be related to the information disclosure and project explanation activities carried out in the preparation stage of the project. These activities publicized the project's concerns about gender equality issues and popularized relevant knowledge.

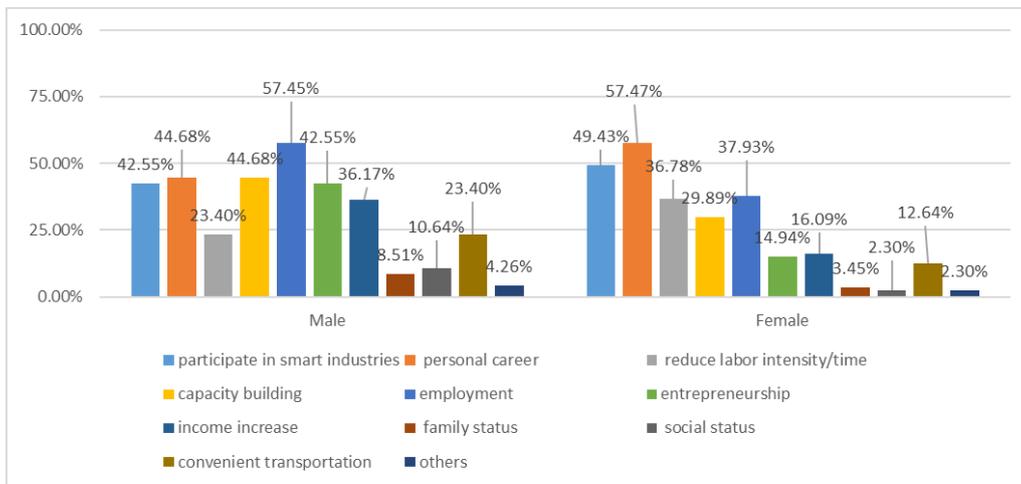


**Figure 7-7 Gender-disaggregated views on awareness raising**

**(ii) FTZ project**

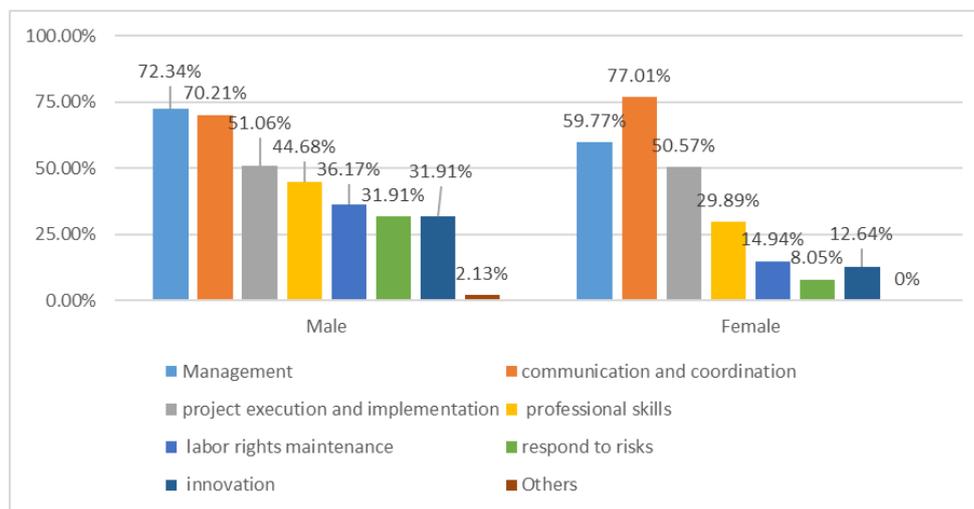
601. Regarding the opportunities that female groups can obtain from the project, as shown in Figure 7-8, the three options that female respondents choose the most are opportunities for personal career development (57.47%), opportunities to participate in the development of smart industries (49.43%) and job opportunities (37.93%). The top three items selected by male respondents are employment opportunities (57.45%), personal career

development opportunities (44.68%), entrepreneurial opportunities (42.55%), and employment opportunities (42.55%). It can be seen that women have higher expectations for personal career development opportunities from careers than men, but lower expectations for entrepreneurial opportunities than men.



**Figure 7-8 Gender-disaggregated views on project opportunities**

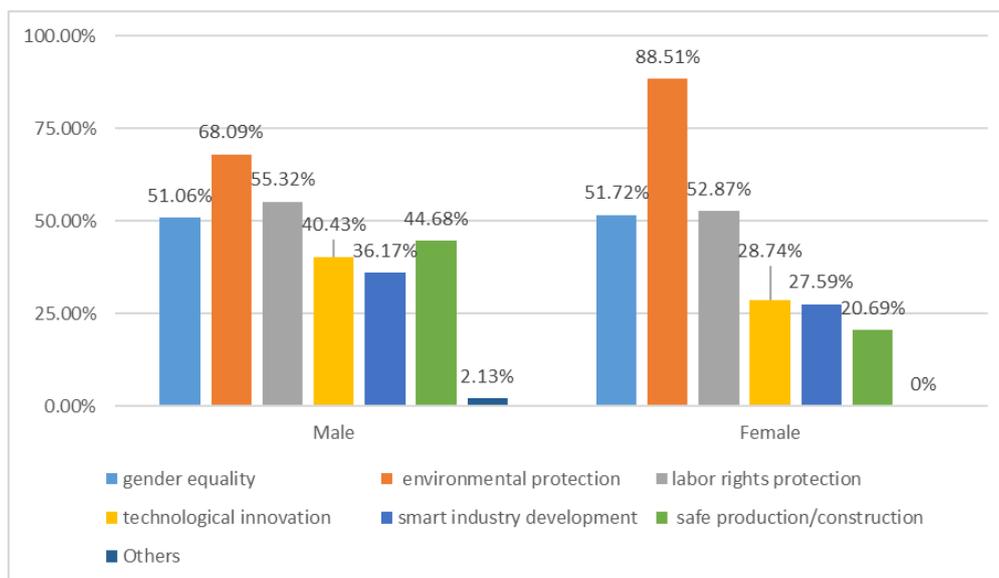
602. In terms of capacity improvement, as shown in Figure 7-9, female respondents believe that the top three capacity improvements that the project can bring about are communication and coordination (77.01%), management capabilities (59.77%) and project execution and implementation capabilities (50.57%), while the top three items selected by male respondents are management ability (72.34%), communication and coordination ability (70.21%), and project execution and implementation ability (51.06%). Similar with LEDZ, the expectation of advancing management capacity is lower than that of men.



**Figure 7-9 Gender-disaggregated views on capacity building**

603. In terms of awareness raising, as shown in Figure 7-10, among the awareness that women think the project can improve, the three most selected are environmental protection awareness (88.51%), labor rights protection awareness (52.87%) and gender equality awareness (51.72%) and, while the three most selected by male respondents are consistent with females, the proportions are 68.09%, 55.32% and 51.06% respectively, which may also be related to the information disclosure and project explanation activities

carried out in the early stage of the project. The project raised concerns and popularized knowledge about environmental, labor and gender equality issues.



**Figure 7-10 Gender-disaggregated views on awareness raising**

#### 7.4.5 Female engagement

604. The survey shows that respondents generally believe that women can contribute to the project, but female respondents have a more positive view of female group undertaking skilled activities. Furthermore, some female and male respondents believe that the way for women to participate in the project is to take care of the family and support the participation of their husband, which reflects the social gender awareness of the project affected people and project participants can be improved.

##### (i) LEDZ Projects

605. More than 80% of the respondents believe that women can contribute as much as men to the LEDZ project. As shown in Table 7-39, female respondents and male respondents hold the proportions of positive attitudes were 85.07% and 80% respectively, but there were still 11.94% and 15% of interviewed women and men who expressed “uncertainty”.

**Table 7-39 Gender-disaggregated evaluation of whether women can contribute to the project (unit: %)**

Gender	Options		
	Can	Cannot	Uncertain
Male	80	5	15
Female	85.07	2.99	11.94

606. Regarding how women play a role in the project, as shown in Table 7-40, 64.18%, 56.72% and 46.29% of the female respondents think that women can play a role in the project and bring new working methods to their positions. Three options with the largest number of people are participating in the discussion, negotiation and decision-making in the early stage of the project, undertaking technical activities after participating in various technical ability training provided by the project. The three most chosen by men are to bring new working methods to their positions; participate in the discussion, negotiation and decision-making in the early stage of the project, and participate in manual labor and construction construction that do not require special skills in this project. It can be seen

that women and men have different views on how women can play a role in projects, and female respondents have a more positive view on women's technical activities.

607. It is worth noting that 44.78% and 32.5% of the female and male respondents believed that the way for women to participate in the project is to take care of the family and support the participation of their husband, which still reflects the prevalence of traditional gender stereotypes among the respondents. The social gender awareness of affected groups and project participants needs to be improved.

**Table 7-40 Gender-disaggregated evaluation of specific contributions to women (unit: %)**

Gender	Options							
	Participate in pre-project discussions, negotiations and decision-making	Participate in manual labor and construction for which no specialized skills are required in this program	Undertake technical activities after participating in various technical ability training provided by the project	Undertake the operation and maintenance management of facilities and equipment after the project is put into production, and provide public services	Take advantage of project training opportunities to bring new working methods to your position	Participate in project operation management	Take good care of the family and support the other half to participate in the project construction	Other
Male	60	47.80	50	35	47.50	40	32.50	0.00
Female	56.72	34.33	46.29	44.78	64.18	46.27	44.78	1.49

**(ii) FTZ project**

608. More than 90% of the respondents believe that women can make the same contribution as men in the FTZ project. As shown in Table 7-41, the proportion of female respondents and male respondents who hold a positive attitude were 93.10% and 82.98% respectively, but 12.77% of male respondents still chose "cannot", while only 1.15% of female respondents chose this option. Thus, women have a more positive attitude towards women's contributions in projects.

**Table 7-41 Gender-specific evaluation of whether women can contribute (unit: %)**

Gender	Options		
	Can	Cannot	Uncertain
Male	82.98	12.77	4.24
Female	93.10	1.15	5.75

609. On the issue of how women can play a role in the project, there is a clear difference in the opinions of male and female respondents in the FTZ. As shown in Table 7-42, 64.37%, 55.17% and 51.72% of the female respondents respectively believe that women can participate in the discussion, negotiation and decision-making in the early stage of the project; After the various technical ability trainings provided by the project, they will undertake technical activities. These three options are the options with the largest number of people. The proportions of men who choose these three items are 40.43%, 34.04% and

44.68%. It can be seen that female respondents generally have a more positive opinion of female groups undertaking technical activities.

610. Different from the situation in the LEDZ, the proportion of respondents who believe that "the way for women to participate in the project is to take care of the family and support the participation of their husband" is not high, with only 16.09% of female and 25.53% of male respondents.

**Table 7-42 Gender-specific evaluation of women's specific contributions (unit: %)**

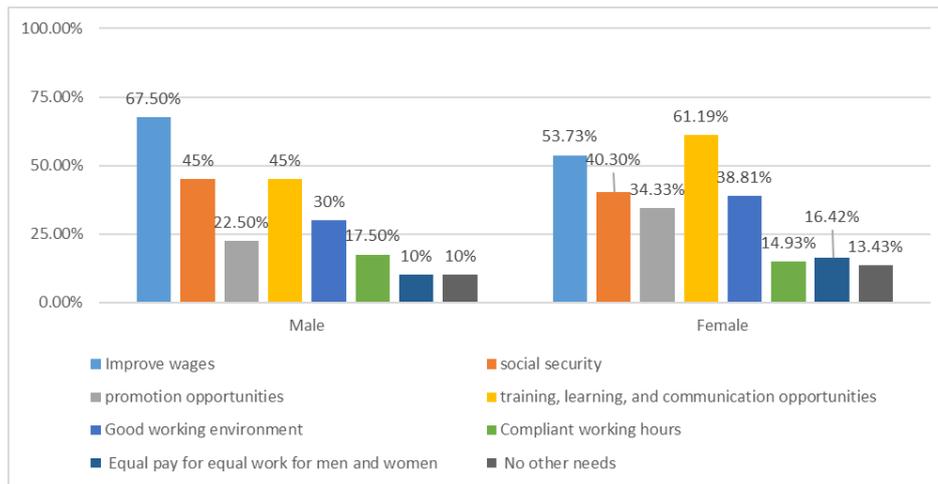
Gender	Options							
	Participate in pre-project discussions, negotiations and decision-making	Participate in manual labor and construction for which no specialized skills are required in this program	Undertake technical activities after participating in various technical ability training provided by the project	Undertake the operation and maintenance management of facilities and equipment after the project is put into production, and provide public services	Take advantage of project training opportunities to bring new working methods to your position	Participate in project operation management	Take good care of the family and support the other half to participate in the project construction	other
Male	40.43	25.53	44.68	34.04	34.04	31.91	25.53	2.13
Female	64.37	22.99	51.72	55.17	55.80	50.57	16.09	0.00

#### 7.4.6 Female Needs

611. The survey shows that at the work level, the main needs of women in the project area are training, learning and exchange opportunities, and increased wages. The main needs of the project are to reduce the negative impact of the project on the environment and provide employment opportunities. Requirements require special attention during project implementation.

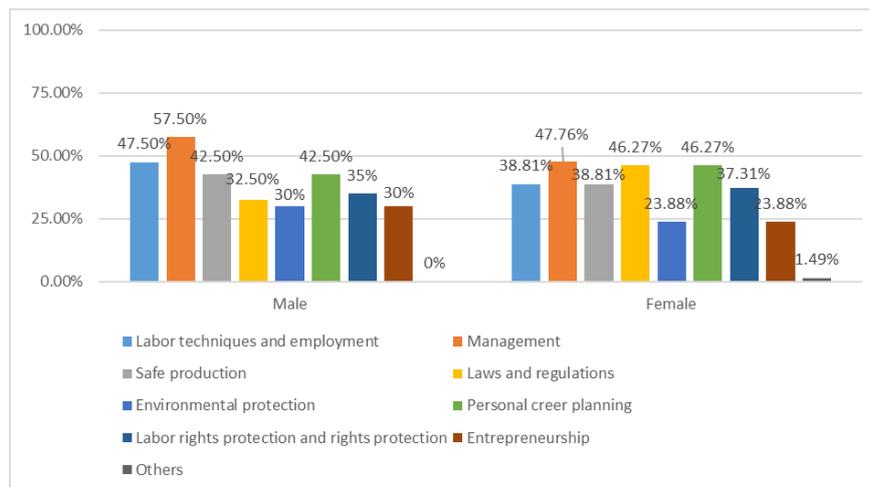
##### (i) LEDZ

612. In terms of work, as shown in Figure 7-11, the biggest needs of female respondents are training, learning and exchange opportunities (61.19%), higher wages (53.73%) and social security (40.30%), while male respondents The first option for women is to increase wages (67.5%), and their attention to training, learning and exchange opportunities, and social security is similar to that of women.



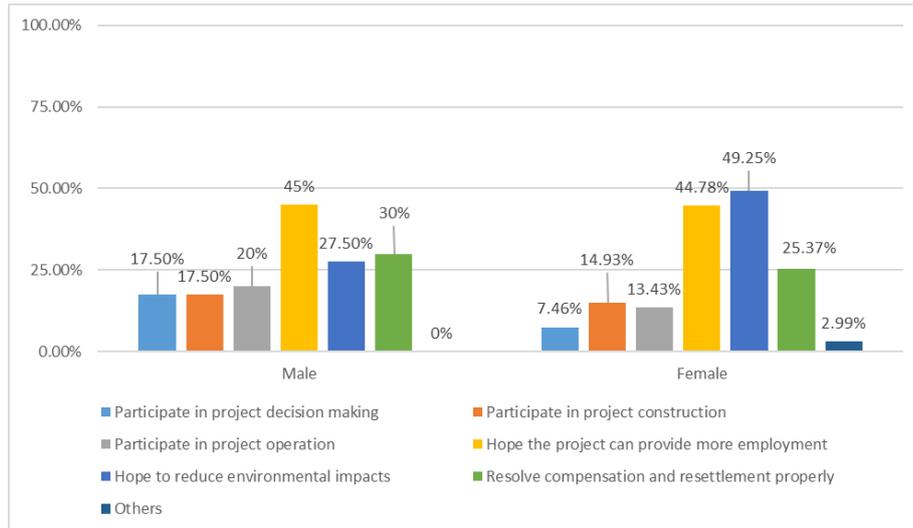
**Figure 7-11 Gender-disaggregated views on job demand**

613. In terms of training needs, as shown in Figure 7-12, the three most popular options for women are management (47.76%), laws and regulations, and personal career planning (46.27%). The options are evenly distributed, while men prefer the labor skills, employment and safety production training besides the management training. The different needs of women and men should be considered in the design and implementation of the project's future training plan.



**Figure 7-12 Gender-disaggregated perceptions of training needs**

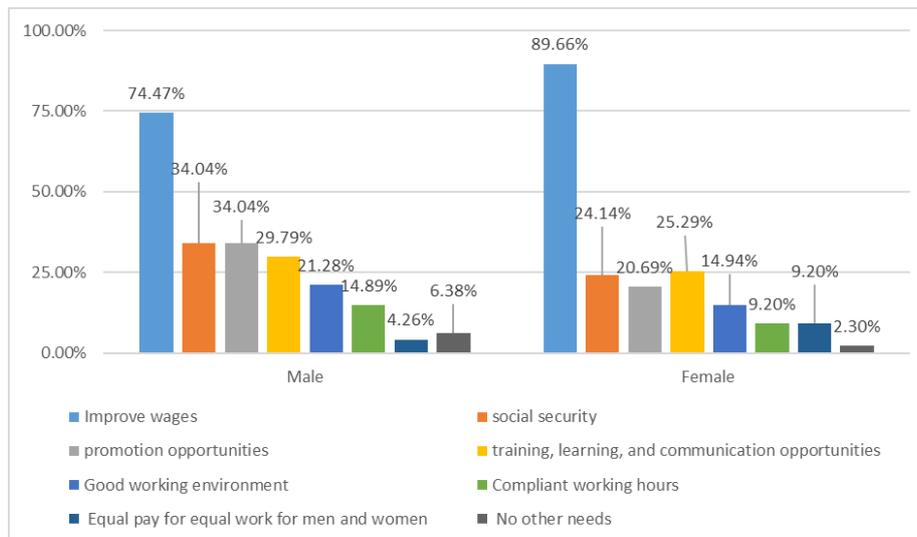
614. In terms of demand for the project, as shown in Figure 7-13, there is a big difference in the first choice of male and female groups, 49.25% of females want to reduce the impact of the environment, while only 27.5% of males choose this option. For other options, such as providing employment opportunities and properly solving compensation and resettlement issues, the concerns of male and female respondents are relatively consistent. The project should take measures to dispel the doubts of the female group about the impact on the environment.



**Figure 7-13 Gender-disaggregated views on project needs**

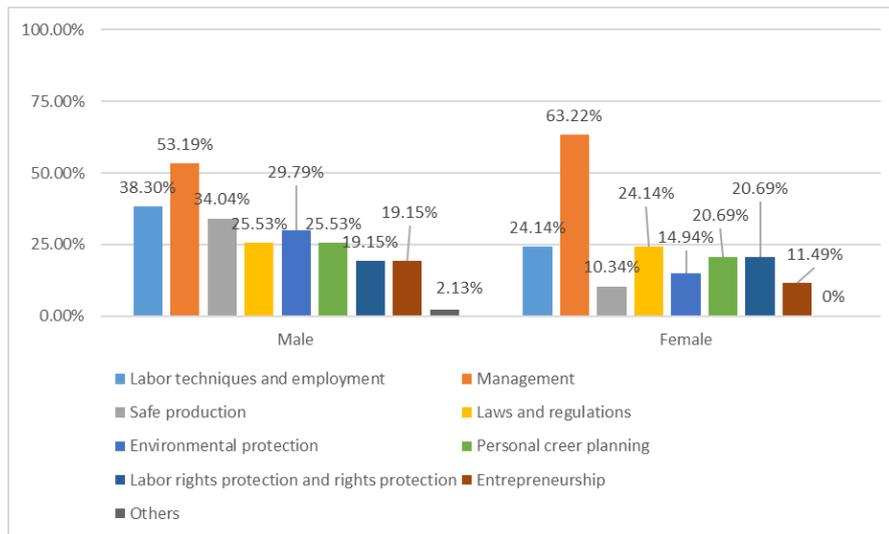
(ii) FTZ

615. In terms of work needs, as shown in Figure 7-14, the demands of female respondents are very concentrated. The biggest demand is to improve wages (89.66%), followed by training, learning and exchange opportunities (25.29%) and social security (24.14%), the first option for male respondents is to increase wages (74.47%), followed by social security (34.34%) and promotion opportunities (29.79%).



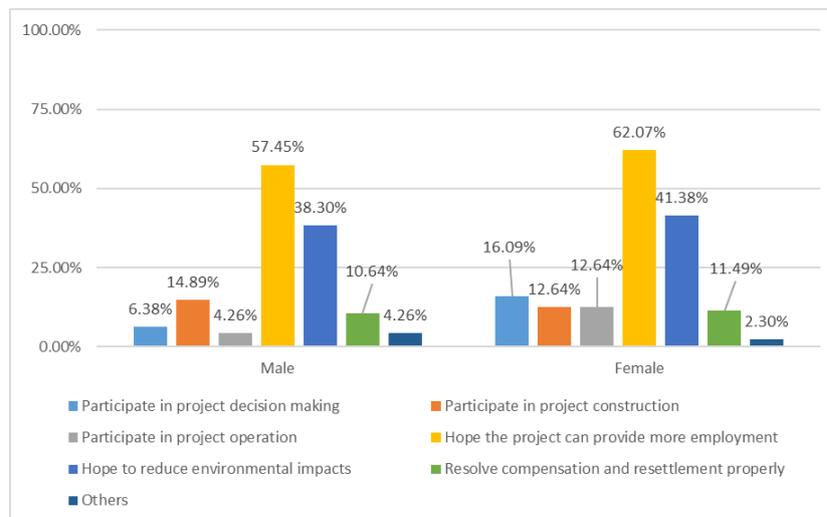
**Figure 7-14 Gender-disaggregated views on job demand**

616. In terms of training needs, as shown in Figure 7-15, the largest number of women choose management (63.22%), followed by laws and regulations and labor employment skills (24.14%), while male respondents hope to obtain labor skills, employment and safety production training other than the management training. The different needs of women and men should be taken into account in the design and implementation of the project's future training plan.



**Figure 7-15 Gender-disaggregated views on training needs**

617. In terms of demand for projects, as shown in Figure 7-16, the first and second choices of male and female groups both are providing employment opportunities (57.45% and 62.07%) and reducing environmental impacts (38.3% and 41.38%), but the third choice for men is to participate in project construction (14.89%), and for women to participate in project decision-making (16.09%). The different needs of the interviewees should be considered during the project implementation.



**Figure 7-16 Gender-disaggregated views on project needs**

### 7.4.7 Gender Equality Challenges and Solutions

#### **Gender awareness of project-related personnel needs to be improved**

618. Gender awareness is crucial to ensure the participation of women groups in the project implementation process and to benefit equally from the project. However, during the survey, some staff members of PMOs, platform companies and other institutions and the affected people have showed the problem of insufficient social gender awareness. They still have traditional gender stereotypes for women groups, and do not understand that the project pays attention to women's participation and protection of women's interests. Due to the importance of benefits, some female groups also lack the willingness to participate in project decision-making and management. The subjectivity of women's participation in

public affairs has not been fully utilized, and their value has not been fully reflected.

619. Based on this, attention should be paid to gender awareness training for project management and implementation agency staff and affected people, so that project management and implementation agency staff realize the importance of gender perspective and the necessity of implementing social gender plans in projects. And during the project preparation and implementation, keep sensitive to women's experience and needs, pay attention to the protection of women's interests, and at the same time promote the awareness of gender equality among the affected people, create respect for women's experience and needs, support and encourage women to protect their own rights and actively participate in public affairs, and to ensure that women benefit from the project.

**The protection of labor rights and interests of female employees needs to be improved**

620. The protection of labor rights and interests of female employees is an indispensable content in the protection of labor rights and interests. Since the main affected groups and women in the participating groups of this project are all employees, their labor rights and interests also need special attention.

621. However, as shown in Tables 7-43 and 7-44, only about 20% of the interviewees' organizations and enterprises believe that their units have realized labor protection for female employees during menstruation, and less than 40% and 50% of them think the employer can guarantee parental leave and maternity leave without salary and position change. About 30% think gender discrimination in recruitment and sexual harassment in the workplace can be avoided. It indicated that gender discrimination exists in the enterprises and institutions related to this project. In addition, although the interviewees did not mention there is any GBV case in the interview, its risk cannot be completely eliminated. In the future, measures should be taken to establish a complaint mechanism for female employees to ensure that gender discrimination and GBV are eliminated in the workplace. And trainings on laws, regulations, rights protection knowledge and skills on women's labor rights, GBV prevention should be provided to create a gender-equal and safe employment environment.

**Table 7-43 The rights and interests of female employees that the unit can guarantee (unit: %)**

Options	LEDZ	FTZ
Labor protection during pregnancy	80.05	85.07
Labor protection during menstruation	25.23	23.88
Guaranteed statutory maternity leave days	80.37	73.13
Guaranteed basic benefits during maternity leave	75.7	81.34
Preserve the jobs of female workers who give birth	60.75	67.91
Guarantee that there will be no salary adjustment due to childbirth	48.6	46.27
Guaranteed parental leave	38.32	36.57
Guaranteed leave on statutory holidays	77.57	44.78

**Table 7-44 Degree of gender equality achieved by the unit (unit: %)**

Options	LEDZ	FTZ
Equal pay for equal work	91.59	92.54
Men and women have the same opportunities for advancement	67.29	45.52
Men and women have the same training opportunities	69.16	44.03
Eliminate gender discrimination in recruitment	29.91	31.34
Stop Sexual Harassment in the Workplace	28.04	29.1

**The safety of female workers staying in the park needs to be paid attention to**

622. As mentioned above, within the scope of the construction of the FTZ park project,

there are currently employee accommodation for three companies, in which are provided to some female employees. Due to the long duration of the construction period, a number of workers from other counties or cities will work in FTZ. HIV and other diseases may spread, as well as sexual harassment and sexual violence against female workers, which will endanger the personal safety and health of female workers. HIV and other diseases and GBV prevention should be included in the project design. and other activities, and require the project IA to formulate and implement effective security measures to protect the safety of female employees.

### 7.5 Vulnerable Group Analysis

623. According to the survey results, only 0.93% of the respondents were named urban low-income households. The vulnerable groups of the project mainly involve informal workers in the park, as well as temporary workers who will flow in after the implementation of the project. These workers are often in vulnerable labor relationships. They may lack stable job security and benefits, and are prone to wage arrears, long working hours, and poor safety conditions. During the implementation of the project, it is necessary to pay attention to the protection of the rights and interests of these workers to ensure that they can obtain reasonable wages, a safe working environment and social security benefits.

**Table 7-45 Has your family ever (in the past 3 years) or is one of the following types of families supported by the government ? (unit:%)**

Options	FTZ	LEDZ
Urban low-income households	0	0.93
Temporary hardship relief for families	0	0
Neither	100	90.65

(i) High mobility of workers:

624. The existing workers in the park are highly mobile, which will also pose challenges to workers' labor security. Due to the characteristics of mobility, these workers may face difficulties in housing and transfer of social security, making it difficult for their labor rights to be effectively protected. During project implementation, it is necessary to establish a sound management mechanism for worker mobility, provide reasonable housing arrangements, social security transfer channels, etc., to ensure that workers' rights and interests are protected.

(ii) Lack of labor security and resources:

625. The existing non-employed workers in the park and the subsequent construction personnel are facing the problem of lack of labor security and public affairs resources. In terms of labor security, there may be a lack of effective supervision mechanisms and legal protection, resulting in insufficient protection of workers' rights and interests. In terms of public resources, there may be a lack of appropriate public service facilities such as medical care, education, and social welfare, which limits the development opportunities of vulnerable groups. Therefore, in the implementation of the project, it is necessary to strengthen labor supervision, improve laws and regulations, and provide sufficient public affairs resources to improve the quality of life and development opportunities of vulnerable groups.

(iii) Lack of opportunities to participate in public affairs:

626. Vulnerable groups have relatively few opportunities to participate in public affairs among existing workers in the park and subsequent construction workers. Due to the lack of information channels and social resources, they may not be able to fully understand the development dynamics of the project and participate in the decision-making process. At the same time, they also face the problem of access to higher salaries, limited opportunities

for skill improvement and promotion. During project implementation, it is necessary to establish a fair and open participation mechanism to ensure the voice and participation of vulnerable groups, provide training and career development opportunities, and promote their all-round development.

627. In summary, during the implementation of the coordinated development project of Liaoning Yingkou Green Smart Trade Zone Development Project financed by the AIIB, it is necessary to pay attention to and solve the problems faced by vulnerable groups such as informally employed workers, high mobility, labor security, and participation in public affairs. By strengthening regulation, providing social protection, improving public services, promoting participation and providing opportunities, projects can be made sustainable and promote the inclusion and development of vulnerable groups.

## 7.6 Indigenous People Analysis

628. According to the sixth national census data (since the ethnic information in the seventh census data released by Yingkou City is not available, the data from the sixth census is used), Yingkou City has 40 ethnic groups, including Han, Manchu, Hui, Korean, Mongolian, Tibetan, Xibe, Uighur, Miao, Yi, Zhuang, Buyi, Dong, Yao, Bai, Tujia, Hani, Li, Gaoshan, Daur, Russian, Evenki, Ewenki, Oroqen, Hezhe, Lisu, She, Shui, Dongxiang, Tu, Qiang, Kyrgyz, Wa, Jingpo, Mulao, Blang, Sala, Maonan, Gelao, Pumi, and Jino. The minority population is 154,000, accounting for 6.33% of the total population. The most populous minority groups are Manchu (122,479), Hui (13,703), Korean (9,737), Mongolian (5,525), and Xibe (1,156).

629. Minority-inhabited villages (49 villages):

- (i). Hongqi Manchu Town, Bayuquan District (12 Manchu): Hongqi Bao, Manshoushan, Longhua, Shengtai, Wentun, Donglanqi, Xilanqi, Daying, Donglengshui, Jinlengshui, Songtun, Jintun;
- (ii). Xiongyue Town, Bayuquan District (9 Manchu, 1 Hui): Yuyuanzi, Xianghuangqi, Tangtun, Huoshan, Guotun, Wang'ershan, Wenquan, Datie, Lihua, Xiguan (Hui).
- (iii). Guizhou Office, Gaizhou City (12 Manchu): Santaizi, Fangshen Village, Huaishufang, Baishawan, Pozi, Yangshan, Guizhou, Xier tai, Lanqi, Donggou, Tuanpu, Longbozi;
- (iv). Jiulongdi Office, Gaizhou City (9 Manchu): Dongdaying, Zhenghuangqi, Headtaizi, Jiulongdi, Lianhe, Xiaoyingzi, Zhenghongqi, Xianghongqi, Xianrendao;
- (v). Xihai Office, Gaizhou City (1 Korean): Shuangquanyan Village;
- (vi). Wanfu Town, Gaizhou City (1 Korean): Wanfu Village;
- (vii). Huzhuang Town, Dashiqiao City (1 Manchu): Shiqiao Manchu Village;
- (viii). Shuiyuan Town, Dashiqiao City (2 Korean): Xinguang Village, Xinjian Village;
- (ix). Biancun Town, Laobian District (1 Korean): Shuanghe Korean Village.

630. The project locates in the West District of Yingkou City, and does not involve villages and city communities inhabited by ethnic minorities.

## 7.7 Resettlement Analysis

631. The physical impact of land acquisition and resettlement (LAR) of this project includes: recovery and transfer of state-owned land use rights of 459.3729 hectares (4593729 square meters); Land acquisition by the Project will cause demolition of buildings and structures with a total area of 4078598 square meters, of which, 18598 square meters are

buildings and 4060000 square meters are aboveground structures of the salt field. Specifically:

- (i) Yingkou Liaohe Economic Development Zone (EDZ) sub-project: Transfer of 406000 square meters of state-owned land, with the original ownership being Yingkou Asset Management Group Co., Ltd. It is planned to demolish 406000 square meters of above ground structures in salt fields, whose ownership is Yingkou Salt Industry Co., Ltd. The affected employees are 15 people, all of whom are employees of Yingkou Salt Industry Co., Ltd. (hereinafter referred to as Yingkou Salt Industry).
- (ii) China (Liaoning) Pilot Free Trade Zone Yingkou Area (FTZ) sub-project: Transfer of state-owned land of 533,729 square meters. Among them, 2.5813 hectares (25,813 square meters) are state-owned land with land use right of Yingkou Comprehensive Bonded Logistics Group Co., Ltd., 9.5339 hectares (95,339 square meters) are state-owned land with land use right of Yingkou Coastal Development and Construction Group Co., Ltd., and the land use right of the remaining belongs to Yingkou Municipal Natural Resources and Planning Bureau. A building area of 10,995 square meters of one (1) WWTP will be demolished, and the asset ownership belongs to Yingkou Coastal Development and Construction Group Co., Ltd. A structure with an area of 7,603 square meters will be demolished, and its asset ownership belongs to Yingkou Comprehensive Bonded Logistics Group Co., Ltd.
- (iii) The affected population of this project is 15 employees of the Salt Industry Company, who will be affected by the demolition of above ground structures. The Salt Industry Company will change the work teams of the affected employees, and there will be no livelihood impact on the affected employees. During the preparation period of the RP, a comprehensive socio-economic survey has been conducted on 15 affected employees, among whom there are no vulnerable populations such as ethnic minorities, elderly people, or poverty.

## **8 Community and Occupational Safety and Health**

### **8.1 Community Health and Safety**

#### **8.1.1 Potential Risk Assessment**

632. There are no residential areas or villages within 200 m around the project site, and the exhausted gas, dust and noise generated during the construction and operation stages will not affect the health of residents in the surrounding communities. However, the trucks transporting construction materials and equipment passing through the surrounding communities, pose a threat to the travel safety of residents in the surrounding communities; after the project is put into operation, the increased traffic flow also increases the risk of traffic accidents on the roads in the surrounding communities.

633. It shall be noted that there will be more than 100 construction personnel for the project, and the personnel are relatively concentrated, and the construction area is likely to cause cross-infection of diseases. If food hygiene and environmental sanitation in residential areas are not taken seriously, bacteria, mosquitoes and flies will be easy to grow and reproduce in the season of increased rainfall and high humidity, and people may be infected with bacillary dysentery and malaria. At the same time, since the construction camps do not provide dormitories, the construction workers from other places rent houses in the surrounding communities, and the construction workers commute between the community and the project site. The mobility of personnel will be high, which will be easy to cause the outbreaks and prevalence of infectious diseases in the community, such as flu, intestinal infectious diseases, viral infections, hepatitis and tuberculosis.

#### **8.1.2 Management Measures**

634. In order to reduce the risk of traffic accidents when transport vehicles pass through surrounding community roads, truck drivers should be trained with travel safety, stipulating driving speeds, and slowing down when passing residential areas; overloading transport vehicles are strictly prohibited, and regular maintenance shall be carried out for vehicles to reduce the risk of failures causing traffic accidents;

635. Necessary sanitation and epidemic prevention measures shall be taken for construction personnel, and regular physical examinations shall be carried out. However, according to the practical experience of the project in recent years, as long as various sanitary and epidemic prevention measures are implemented, the incidence of diseases among construction workers can be effectively controlled;

636. The sanitation of food and drinking water for construction workers shall be secured;

637. Temporary toilets set up on the construction site and toilets equipped during the operation phase should be regularly cleaned and disinfected;

638. The contractors and project management department in the construction area should specify the persons responsible for sanitation and epidemic prevention, carry out the publicity and education of employees' sanitation and disease prevention. Regarding seasonal epidemics, infectious diseases, etc., knowledge and methods of disease prevention and treatment should be introduced to construction personnel through broadcasting, promotional manuals, bulletin boards, and other forms;

639. Construction personnel must take health checks and quarantine before entering the site, and personnel with infectious diseases are not allowed to enter the construction team;

640. If a new infectious disease is found, the patient must be isolated and treated to cut off the transmission route to avoid spreading to the surrounding communities, and at the same time establish the health records of the construction personnel.

## 8.2 Occupational Health and Safety

### 8.2.1 Potential Risk Assessment

(i) Potential risk assessment of construction machinery and equipment:

641. Construction sites present considerable dangers, and thousands of people are injured on construction sites each year. The construction process of this project involves a large amount of engineering and complex construction operations. The heavy construction machinery used in the construction process of the project will pose a considerable risk to the personal safety of workers if the workers use them improperly or the management of the contractor is not in place. Misuse of heavy machinery such as excavators, motor graders, loaders, and skip loaders including accidental start-up, false touches, breakdowns, operating errors, and movement can result in injury or death to workers. In addition, during the process of transporting construction materials, engineering vehicles may have traffic accidents with workers on the construction site, resulting in injury or death of workers.

(ii) Potential risk assessment of occupational diseases

642. Exposed to noise, dust, exhaust gas and other factors that may affect health on the construction site, workers have a certain risk of occupational diseases.

643. Most of the dust formed on the construction site is falling dust, with a particle size of 10  $\mu\text{m}$  to 100  $\mu\text{m}$ , among which the particle size of cement dust is about 100  $\mu\text{m}$ <sup>27</sup>, causing air pollution on the construction site. There are three ways for dust to enter the human body: respiratory inhalation, digestive tract ingestion, and skin contact. Inhalation of dust in the respiratory tract has the most serious harm to the human body. Workers exposed to the dust environment for a long time are prone to diseases that can cause upper respiratory tract inflammation, chronic bronchitis, bronchial asthma, coronary heart disease, arteriosclerosis, high blood pressure, and even cancer.

644. This project involves the construction of several road works, using asphalt for road paving. Asphalt contains a variety of organic volatiles, including acridine, phenols, benzene, pyridine, anthracene, naphthalene, etc., which are harmful to the human body<sup>28</sup>. Organic volatiles will volatilize from asphalt into the air at a certain temperature, and cause acute poisoning of workers through skin or mucous membrane contact. The general symptoms include acute erythema, dermatitis and ophthalmia, or cause headache, nausea, and elevated body temperature.

645. In addition, construction machinery and transport vehicles on the construction site will generate continuous and frequent noise, which will cause noise pollution to the construction site and the surrounding environment. Exposure to high noise environments for long time without any effective protective measures can lead to irreversible hearing damage and even occupational deafness. In addition to causing physical injury, high noise can also threaten the mental health of workers. Exposure to loud environments can easily upset workers and cause distraction, which can lead to improper operation that can lead to work-related injuries or fatal accidents.

(iii) Potential risk assessment of electric shock

646. There are often complex circuits and a certain number of electrical equipment on the construction site, so electric shock is a common accident on the construction site. Exposed

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<sup>27</sup> Safety Management. (2012, June 5). Occupational Health Hazards for Construction Workers and Self-Prevention Measures.

<sup>28</sup> Occupational Health and Sanitation. (2023, June). What are the dangers of asphalt? Symptoms and treatment and prevention measures of asphalt poisoning.

or faulty electrical equipment, such as circuit breaker panels, cables, cords, and hand tools, can pose a serious risk to workers.

- (iv) Potential risk assessment of high temperature burns

647. The road construction of this project requires asphalt paving, which needs to be carried out at high temperature, the highest temperature can reach 175 °C, and the lowest temperature is 80 °C. If operated improperly or lacking protection, workers are in danger of being burned by high temperature.

### 8.2.2 Management Measures

648. To mitigate potential health and safety risks to workers during project construction and operation, the following measures will be taken:

- (i) Comply with relevant domestic regulations on occupational health and safety, such as *General Specifications for Safety, Hygiene and Occupational Health at Building and Municipal Construction Sites*;
- (ii) Follow the requirements of *Occupational Exposure Limits of Hazardous Factors in the Workplace*, *Catalogue of Occupational Diseases* and *Catalogue of Occupational Hazardous Factors*, and establish a regular monitoring system for occupational diseases and occupational hazards;
- (iii) Establish and improve the construction supervision and management system, and set up construction safety supervisors at the construction site;
- (iv) Develop an emergency response plan;
- (v) Strengthen workers' awareness of occupational health and safety, and post occupational health and safety promotional materials in conspicuous places on the construction site;
- (vi) Regularly organize occupational health and safety and emergency response training for workers;
- (vii) Provide PPE (Personal Protective Equipment) that meets Chinese national standards, including gloves, goggles, safety shoes, and provide earplugs for employees exposed to high noise environments;
- (viii) Supervise the proper use of personal protective equipment by workers;
- (ix) Before construction starts, use low-noise equipment and processes instead of high-noise equipment and processes when selecting construction machinery and equipment, such as low-noise vibrators, fans, electric air compressors, electric saws, etc., and install mufflers at the sound source muffled. After the construction machinery is used for a period of time, it may produce more noise, and the noise can be properly reduced through repair and maintenance;
- (x) Take safe traffic control measures, set up eye-catching road signs and warnings on the construction site; limit the speed of transport vehicles, and regularly maintain vehicles and mechanical equipment to minimize the risk of accidents.

### 8.3 Traffic and Road Safety

649. Throughout the project lifecycle, it is necessary to identify, assess and monitor traffic and road safety risks to project workers and affected communities, develop responses and plans, and incorporate feasible road safety components in technology and finance into project design (if applicable), so as to prevent and mitigate potential road safety impacts on affected communities. If the project involves the operation of construction equipment and other mobile equipment on public roads, or if the use of project equipment may have

an impact on public roads or other public infrastructure, measures shall be taken to avoid accidents and injuries associated with the operation of such equipment whether to workers or the public. If appropriate, road safety auditing shall be conducted and measures to address identified risks and impacts shall also be taken. In addition, appropriate training in driver and vehicle safety shall be provided to project workers, and all project vehicles (owned or leased) shall be maintained regularly.

#### 8.4 Protection of Labor Rights and Interests

(i) The labor security rights and interests of employees of state-owned enterprises are better

650. There are state-owned enterprises (SOE) and large-scale enterprises in the project park, which generally comply with relevant national labor laws and regulations, and provide relatively good protection of labor rights and interests for employees. SOEs often have a completed human resource management system, including regulations on salary and benefits, working hours, and vocational training. Employees enjoy certain benefits and a stable working environment. According to the survey results in Table 8-1, it shows that most of the respondents have five insurances and one housing credit fund, and labor rights and interests are guaranteed.

**Table 8-1 Which of the following guarantees does your organization provide you? (unit:%)**

Options	FTZ	LEDZ
Injury Insurance	92.54	89.72
Accident Insurance	88.81	83.18
Unemployment Insurance	96.27	85.05
Medical Insurance (Maternity)	97.01	90.65
Pension	97.76	92.52
Housing Credit Fund	45.52	72.90
Company Annuity	19.40	7.48
Other	0.00	0.00
None of the Above	1.49	4.67

(ii) The labor security of informal workers may be insufficient

651. According to the survey results in Table 8-2, it shows that most of the respondents have signed a labor contract with the employer, but there were six respondents that haven't signed. It shows that there are still informally employed workers in the park such as contract workers, temporary workers or outsourced workers. The labor security of these workers may not be as completed as that of employees of SOEs. Informal workers often lack stable job contracts and security. They may face problems such as low wages, lack of social insurance, and inability to enjoy legal leave.

**Table 8-2 Have you signed a labor contract with the employer? (Unit: %)**

Options	FTZ	LEDZ
Yes	98.51	91.59
No	1.49	3.74
Don't Know	0.00	4.67

(iii) The labor security of future influx of workers during the project construction may be insufficient

652. During the construction phase of the project, a large number of workers will flow in, which are often employed temporarily. The labor security of these workers may face greater

challenges such as delaying wages, illegal work overtime, and the risk of industrial accidents. The construction unit needs to assume the responsibility of protecting the rights and interests of workers, including paying wages on time, providing a good working environment and safety facilities, and ensuring workers' social insurance and welfare benefits.

(iv) The labor or working condition of supply chain may be neglected

653. The Project will support installing a photovoltaic power system, involving procurement of panels and other parts. To prevent potential labor security problems suffered by employees hired by contractors or sub-contractors such as wage arrears, illegal overtime, accident work injury, contractors or sub-contractors should be responsible to protect the rights of workers through the procurement processes, including wage payment on time, providing good work environment and safety equipment, and ensuring insurance and welfare benefits of workers.

(v) Channels of maintaining legal rights

654. According to Table 8-3, when asked what channels would be used to protect their own rights and interests if their labor security were damaged, 73.13% of the respondents in the FTZ chose the Labor Arbitration Department, and 67.91% of the respondents chose the Labor Inspectorate. 55.14% of the respondents in the LEDZ chose to report to the unit leader, and 67.91% of the respondents chose the Labor Union. Those who chose to defend their rights via the Women's Federation and the media accounted for a small proportion.

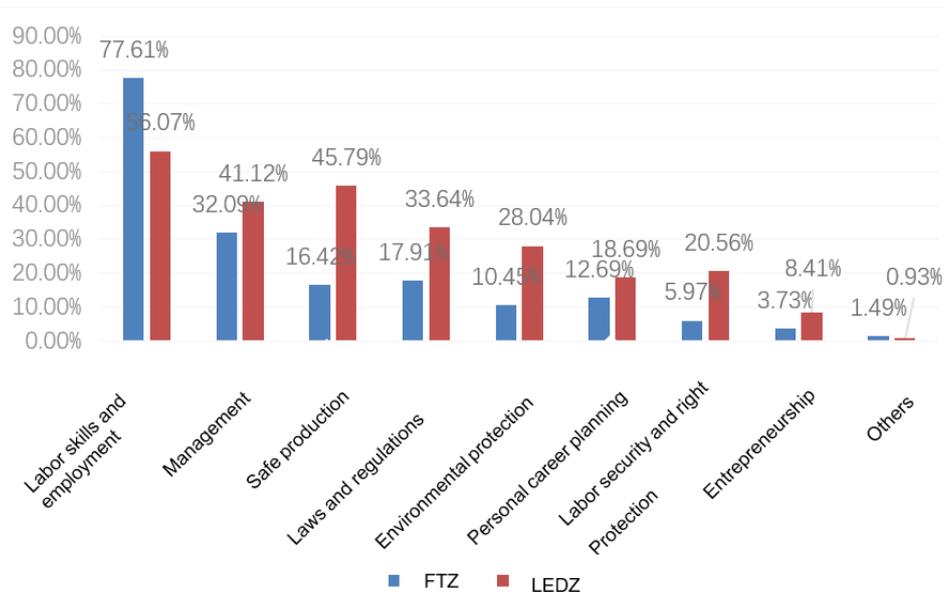
**Table 8-3 If your labor rights and interests are damaged, what channels will you use to protect your own rights and interests (unit: %)**

Options	FTZ	LEDZ
Women's Federation	19.40	31.78
Labor Union	56.72	47.66
Labor Inspectorate	67.91	30.84
Labor Arbitration Department	73.13	35.51
Unit leader	40.30	55.14
Media	13.43	20.56
Other	0.00	0.00

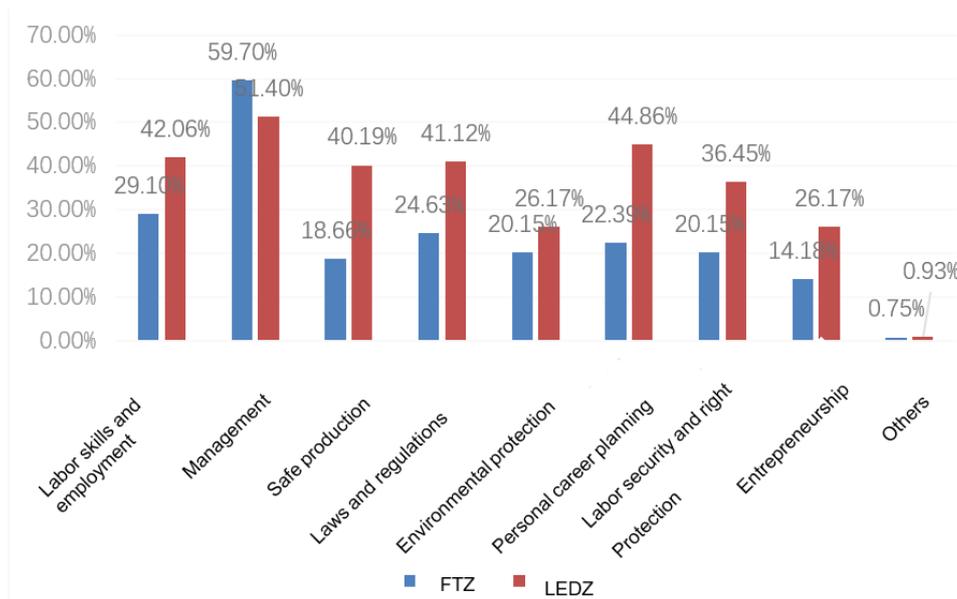
(vi) Skills training

655. According to Figure 8-1, 77.61% of the respondents in the FTZ chose to trainings on labor skills and employment that they have participated in, followed by trainings on management and on law and regulation trainings. There were few trainings on labor security and rights protection, entrepreneurship, and environmental protection. In the LEDZ, 56.07% of the respondents chose to training on labor skills and employment trainings that they have participated in, and 45.79% chose to trainings on safety production training, followed by management training and environmental protection training. There were few trainings on labor security and rights protection, entrepreneurship, and personal career planning for providing to employees in the LEDZ.

656. According to Figure 8-2, for the future expected trainings, 59.7% of the respondents in the FTZ chose the training on management, followed by training on labor skills and on employment, and laws and regulations. 51.4% of the respondents in the LEDZ chose trainings on management, 44.86% chose trainings on personal career planning, 40.19% chose trainings on safe production, and 36.45% chose trainings on labor security and rights protection.



**Figure 8-1 Which of the following trainings have you participated in?**



**Figure 8-2 Which of the following trainings do you expect to participate in in the future**

657. In response to the above problems, some measures can be taken to strengthen the labor security of employees:

i) Establish a labor contract system: it is necessary to encourage enterprises to sign formal labor contracts with their employees, clarify the rights and responsibilities of both parties, and ensure that workers' labor rights are protected.

ii) Improve the social insurance system: it is proposed to ensure that all workers can participate in social insurance, including endowment insurance, medical insurance, work-related injury insurance, etc., and provide necessary protection and benefits.

iii) Strengthen work safety supervision: Construction units and enterprises should strengthen safety management of workplaces to ensure compliance with relevant standards for workers' personal safety and working conditions.

iv) Strengthen training and skills improvement: it is necessary to provide professional training opportunities to help workers improve their skills, increase their employment opportunities and protect their labor rights and interests. The trainings on labor skills and employment, management, safety production, laws and regulations, environmental protection, personal career planning, labor security and rights protection, and entrepreneurship shall be provided with employees.

(vii) Establish worker-GRM

658. Combined with the existing labor supervision and rights protection mechanisms of government departments, the worker's grievance redress mechanism should be established, with the increase information publicity and labor rights knowledge education to ensure that workers are informed about how to complain when their labor rights and interests are infringed.

(viii) Evaluate and monitor the labor conditions of supply chain

659. It is necessary to evaluate and monitor the labor conditions of workers hired by contractors or sub-contractors of supply chain. The responsibility of contractors or sub-contractors to labor conditions and labor security should be clarified in the procurement process as an essential condition, including labor contract mechanism establishment, insurance and security improvement, work environment optimization and worker-GRM establishment, ensuring protect the working conditions and labor rights of workers.

## 9 Environmental and Social Management Plan

660. A feasible Environmental and Social Management Plan (ESMP) has been formulated for the impacts and potential risks on the environment, society and women, after environment and social impact assessment and full consultation and discussion with relevant agencies and residents in the project area. It clarifies the implementation time, budget, and implementation and supervision agencies of various measures, and sets monitoring indicators and monitoring frequency to monitor the implementation effects of corresponding measures, so as to formulate and take necessary actions in time to strengthen or adjust the measures for ensure meeting the environmental and social goals of this project.

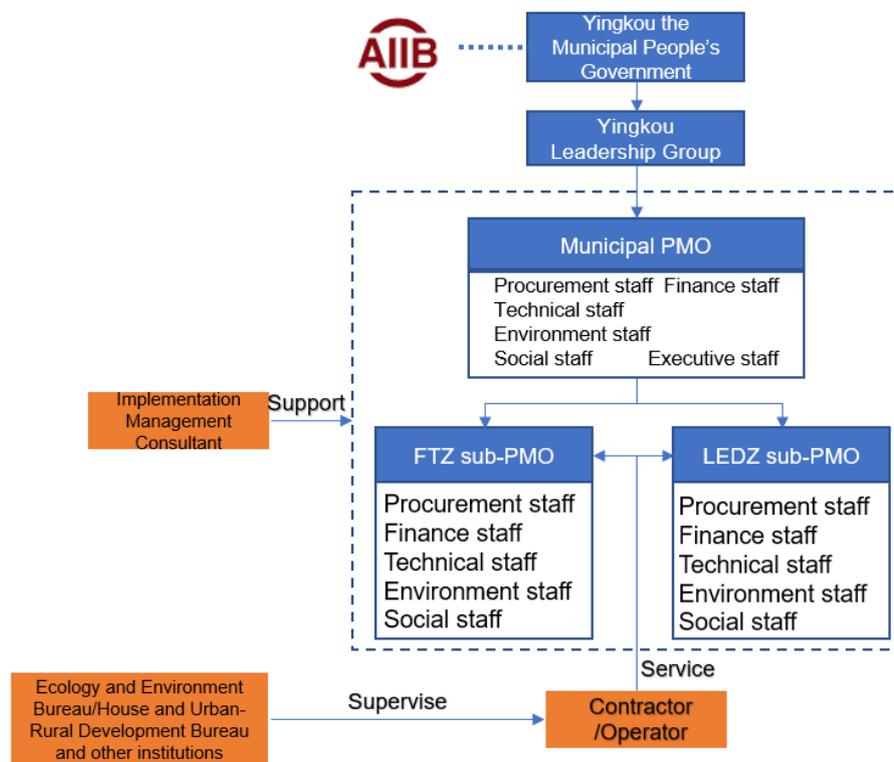
### 9.1 Institutional Arrangement and Responsibilities of Environmental and Social Management

661. In order to ensure that the environmental and social management work of the project is carried out smoothly and achieves the expected effects, a set of top-to-bottom organizational structures must be set up during project implementation to facilitate the planning, implementation, coordination and monitoring of environmental and social management plan. The Yingkou Municipal Government has established a Project Management Office (Yingkou PMO) at Yingkou DRC. The FTZ Sub-PMO and the LEDZ Sub-PMO are established under two implementation agencies (IAs), FTZ Management Committee and LEDZ Management Committee, in charge of the guidance and monitoring of the project implementation units (PIUs). Two PIUs are Yingkou FTZ Construction Development Co., Ltd. and Yingkou Liaohe Urban Construction Investment Development Co., Ltd., who will implement their respective sub-projects.

662. The IA is the first responsible body for environmental and social management during the construction period, and is responsible for the implementation of the ESMP under the guidance and supervision of the Yingkou PMO and the sub-PMOs, with the main responsibilities of the various relevant organizations as listed below. The Yingkou PMO will engage external environmental and social monitoring agencies to monitor the environmental and social performance of the project during implementation.

663. Environmental and social responsibility during the operational period will be transferred to the operation and maintenance unit of the facility. Among them:

- The new construction of the railroad yard in the FTZ is planned to be managed by a state-controlled joint venture operating company established by Yingkou City and Shenyang Railway Bureau Group.
- The Logistics Hub Zone high-standard warehouses, cargo yards and Planned No. 4 Road will be managed by the Comprehensive Bonded Group.
- The international express mail processing center is managed by Wantong as the operating body of Yingkou International Express Mail Supervision Center.
- Industrialization Zone: The operating body of Green Standard Factory is Yingkou Free Trade Development Co. LTD. The municipal infrastructure is operated and maintained by Yingkou Free Trade Development Co.
- LEDZ Sub-project: The Administrative Committee of LEDZ is responsible for the operation and maintenance of municipal facilities in the zone.



**Figure 9-1 Organizational Structure Chart of Environmental and Social Management**

664. The Yingkou PMO will utilize ADB loan funds to hire a project management consulting firm to provide support. The project management firm's environmental and social experts will assist the Yingkou PMO, sub-PMOs and PIUs in assuming their responsibilities in environmental and social risk management. Table 9-1 summarizes the implementation responsibilities of each party.

**Table 9-1: Implementation Responsibilities on Environment and Society**

Organization	Responsibility
Yingkou Municipal Project Management Office (Yingkou PMO)	<ul style="list-style-type: none"> <li>Day-to-day supervision and management of project implementation;</li> <li>Designation of a full-time staff responsible for environmental and social matters;</li> <li>Communicate with A.I.B. and submit biannual monitoring reports on the implementation of the environmental and social management plan to A.I.B.;</li> <li>Hiring an external environmental and social monitoring agency;</li> <li>Organize training related to environmental and social management;</li> <li>Organize training related to environmental and social management;</li> <li>be responsible for the operation of the grievance mechanism.</li> </ul>
Yingkou Free Trade Zone Administrative Committee Liaohé Economic Development Zone Administrative Committee (IAs) Implementing the projects by FTZ	<ul style="list-style-type: none"> <li>Designate an appropriately trained employee as the Environmental and Social (E&amp;S) Coordinator;</li> <li>Submit the internal semi-annual environmental and social monitoring reports to Yingkou PMO;</li> <li>Operate the grievance redress mechanisms (GRMs).</li> </ul>

sub-PMO and LEDZ sub-PMO	
Yingkou FTZ Construction Development Co., Ltd. and Yingkou Liaohu Urban Construction Investment Development Co., Ltd. (PIUs)	<ul style="list-style-type: none"> <li>• -Designate a dedicated staff member for environmental and social matters;</li> <li>• Ensure that environmental and social management, monitoring and mitigation measures are included in contractor bidding documents and contracts;</li> <li>• Oversee the implementation of environmental and social mitigation measures during the construction of the project;</li> <li>• Coordinate the operation of the grievance mechanism;</li> </ul>
Facilities Operation and Maintenance Unit	<ul style="list-style-type: none"> <li>• Environmental and social management during operation stage.</li> </ul>
Contractor	<p>Throughout the entire construction phase, ensure there is sufficient funding and manpower to implement the mitigation measures outlined in the ESMP</p> <ul style="list-style-type: none"> <li>• Prepare site ESMP.</li> <li>• Operation of grievance mechanisms during the construction phase.</li> </ul>
Construction Supervision Company	<ul style="list-style-type: none"> <li>• Ensure that there is enough funding and manpower to supervise and guide the contractor, including at least the Environmental Staff and the Occupational Health and Safety Staff, and to require the contractor to implement the mitigation measures in accordance with the requirements in ESMP;</li> <li>• Monitor the contractor's ESMP implementation performance and submit monthly ESMP Monitoring Reports to the PIUs.</li> <li>• Implement construction supervision and quality control;</li> <li>• Supervise the performance of the contractor in the implementation of the ESMP;</li> <li>• Simple quantitative field measurements using basic hand-held equipment to periodically check construction compliance with environmental monitoring pollutant discharge standards.</li> </ul>
External Monitoring Agency	<ul style="list-style-type: none"> <li>• Monitor environmental and social management performance during the implementation period. Submit semi-annual environmental and social monitoring reports to Yingkou PMO and AIIB.</li> </ul>

## 9.2 Mitigation Measures to Negative Impacts and Risks

665. Table 9-2 lists specific environmental and social mitigation measures to avoid and mitigate the adverse impacts of the project's implementation and operation on the environment and society. Given that Yingkou is an important stopover and transit point on the East Asia-Australasia Flyway, the biodiversity management plan for bird conservation is detailed in Section 9.3.

**Table 9-2 Proposed Environmental and Social Mitigation Measures**

Item	Mitigation measures and/or safeguards	Implementation party	Supervisor	Budget (RMB)	Monitoring indicators
Design and construction preparation stage					
Update ESIA and ESMP	<ul style="list-style-type: none"> <li>In case of major changes, the PMO must first inform the AIIB of the changes and consulting AIIB for advice. If the AIIB approves the changes, then the PMO need revise ESIA and ESMP and submit to the relevant management agency of the local government and AIIB for approval and disclosure.</li> </ul>	Municipal PMO project management consultant (PMC)	AIIB Ecology and Environment Bureau (EEB)	100,000	Approved updated ESIA and ESMP
Environmental and Social Mitigation Measures	<ul style="list-style-type: none"> <li>Incorporate environmental and social mitigation measures into project design;</li> <li>Minimize negative environmental and social impacts through the technology and process optimization and arrangement of construction organization plan;</li> </ul>	Design Institute (DI)	Sub-PMO	Include in the DI contract	Detailed design
Bidding documents and contracts	<ul style="list-style-type: none"> <li>Ensure that the requirement of hiring local labour particularly disadvantaged groups as preferred is incorporated into the bidding document and civil contracts;</li> <li>Include environmental and social mitigation measures in tender documents and civil works contracts</li> </ul>	Procurement agency (PA) PIUs	Municipal PMO	-	Environmental and social mitigation measures in bidding documents and civil works contracts
Environmental Management Organization	<ul style="list-style-type: none"> <li>The Yingkou PMO, sub-PMOs and PIUs has designated full-time personnel to carry out environmental and social management and coordination. If the personnel changes, the municipal PMO shall report to AIIB in the progress report.</li> </ul>	Municipal PMO, sub-PMOs, PIUs	AIIB	-	full-time personnel in place
Environmental and social external institutions	<ul style="list-style-type: none"> <li>Hire environmental and social external institutions prior to construction;</li> <li>According to the monitoring plan identified in the ESMP, develop a detailed environmental and social monitoring plan.</li> </ul>	Municipal PMO	AIIB		Environmental and social external institutions in place
PMO project management consultant (PMC)	<ul style="list-style-type: none"> <li>Procure project implementation technical assistance consulting services to provide project management support to the PMO, including environmental and social aspects.</li> </ul>	Municipal PMO	AIIB	-	Hire and start PMC
Training Project Staff	<ul style="list-style-type: none"> <li>Training on environmental and social management in construction provided by PMC or invited environmental and social experts and (or) officials of provincial or local</li> </ul>	Municipal PMO,	AIIB	include in the PMC contract	a.) Provide social and gender awareness and project management

Item	Mitigation measures and/or safeguards	Implementation party	Supervisor	Budget (RMB)	Monitoring indicators
	<p>environmental protection bureaus, as well as training on the implementation and supervision of environmental and social mitigation measures carried out by the contractor, supervision company according to the training plan in this ESMP;</p> <ul style="list-style-type: none"> <li>• Training on RP, gender action plan (GAP), public consultation plan, GRM and internal and external social monitoring evaluation provided by implement management consultants or invited social/resettlement experts or independent monitoring and evaluation institutions.</li> </ul>	experts from PMC		and the training budget of the project	<p>training for 20 staff members of the municipal PMO, sub-PMOs, and PIUs, 20% of whom are women.</p> <p>b) . Provide training on ESMP and GAP for 20 staff members of the municipal PMO, sub-PMOs, and PIUs, 20% of whom are women.</p>
Establish and maintain an effective Grievance Redress Mechanism (GRM)	<ul style="list-style-type: none"> <li>• Establish a separate complaint handling center to handle complaints lodged by workers working on construction sites with contractors. The center will set up a complaint committee to deal with any complaints raised by construction workers, including workers directly or indirectly involved. The members of the appeal committee include: the environmental and social staffs of PMOs, supervision engineers, representatives of workers and contractors.</li> <li>• Publish the contacts of each channel to the public on the website of the municipal PMO, PIU and the information display board of each construction site.</li> <li>• Record grievances and complaints from affected persons and other stakeholders.</li> <li>• Document the solution.</li> </ul>	PIU, Contractors of construction and supply chain	Municipal PMO, sub PMOs	-	<p>a). Establish and disclose GRM;</p> <p>b). Number of complaints received and recorded by gender, age, occupation;</p> <p>c). Record appeal resolved.</p>
Disclosure of project information	<ul style="list-style-type: none"> <li>• Publish the ESIA, ESMP and RP to the public on the website of Municipal government, ecology and environment bureau, FTZ and LEDZ before the project evaluation;</li> <li>• Before construction, the sub-PMOs shall hold meetings in affected enterprises and communities to disclose detailed project information, and 50% of the participants are women.</li> </ul>	Municipal PMO & Sub-PMO	Supervision department, complaint department, labor union, etc.	4000	
Stakeholder Engagement Plan	<ul style="list-style-type: none"> <li>• Identify project stakeholders, including affected and interested parties;</li> </ul>	Under the support of the	Municipal PMO, AIIB	-	The type of consultations held;

Item	Mitigation measures and/or safeguards	Implementation party	Supervisor	Budget (RMB)	Monitoring indicators
	<ul style="list-style-type: none"> <li>Develop engagement activities for targeted stakeholders, develop communication methods, monitoring metrics and timelines.</li> <li>Conduct underground facilities survey and protection as necessary, to avoid disruption to utilities.</li> <li>Disclose construction activity information to park units through the media in advance, taking into account the date and duration of anticipated disruptions</li> </ul>	implementation on management consultant, the sub-PMO			Number of key stakeholders consulted; Number of residents consulted by gender; A construction organization plan was drawn up.
Site ESMP	<ul style="list-style-type: none"> <li>Each contractor shall prepare a site ESMP (CS-ESMP) based on this ESMP, including the following plan:                             <ul style="list-style-type: none"> <li>-Site drainage and erosion management;</li> <li>-Spill containment and management;</li> <li>-Waste management plans (including construction and polluting waste);</li> <li>-Construction site access control plan;</li> <li>-Temporary traffic management plan;</li> <li>-Occupational and community health and safety management programs;</li> <li>-For local employment, recruitment and employment strategy promotes (through quotas, training, facilities, etc.) equal opportunities, especially for women and disadvantaged groups;</li> <li>- Construction camp management plan.</li> </ul> </li> </ul>	contractor	Supervision company	-	Develop site-specific ESMP and be approved by the supervision company and sub-PMO
Avoid disputes caused by land acquisition and demolition	<ul style="list-style-type: none"> <li>The municipal PMO and sub-PMOs hold consultative meetings prior to construction to address any issues arising from land acquisition and demolition and develop mitigation measures</li> </ul>	SubPMO, municipal PMO	Housing and Urban-Rural Development Bureau, Municipal Bureau of Planning and Natural Resources, etc.	2000	
<b>• Construction stage</b>					
Air pollution	<ul style="list-style-type: none"> <li>There should be a continuous and airtight steel frame advertising enclosure, the height of which should not be lower than 1.8 m;</li> </ul>	Contractors	PIUs, Supervision Company	includes in work contracts	Implement mitigations and document them in monitoring reports

Item	Mitigation measures and/or safeguards	Implementation party	Supervisor	Budget (RMB)	Monitoring indicators
	<ul style="list-style-type: none"> <li>• When winds exceeding level 4<sup>29</sup>, soil excavation or building demolition should be stopped;</li> <li>• Clear and transport construction waste timely. Measures such as covering with tarpaulin should be taken for those that cannot be cleared. Vehicles transporting dust-prone materials such as sand, stone, cement, and earthwork must be tightly sealed and leakage is strictly prohibited;</li> <li>• In order to reduce the amount of dust generated, the car washing station shall be set up at the entrance and exit, and the speed of the vehicle shall be limited at the same time.</li> <li>• During the excavation process, sprinkle water to keep the work at a certain humidity ;</li> <li>• Strengthen the management of backfilled earthwork storage yards ;</li> <li>• Construction material transport vehicles shall be equipped with anti-sprinkling equipment according to regulations ;</li> <li>• Measures such as covering dust-proof nets, spraying dust inhibitors or sprinkling water shall be taken for the stacking of materials that are prone to dust generation , and the temporary spoil ground shall be covered with tarpaulin;</li> <li>• During the construction process, it is strictly forbidden to burn waste building materials as fuel</li> <li>• Pay attention to changes in wind direction when laying asphalt. Asphalt paving shall only be carried out when the work area is in the downwind direction of sensitive points.</li> </ul>				
Sewage	<ul style="list-style-type: none"> <li>• The main construction waste water of this project is vehicle flushing water, and waste water sedimentation tank should be set up, after oil separation, sedimentation</li> </ul>	Contractors	PIUs, Supervision Company	includes in work contracts	Implement mitigations and document them in monitoring reports

<sup>29</sup> Generally, based on various phenomena caused by wind blowing on the ground or water surface, wind force is categorized into 13 levels, ranging from 0 to 12. A wind force of four levels indicates wind speeds in the range of 5.5 to 7.9 meters per second.

Item	Mitigation measures and/or safeguards	Implementation party	Supervisor	Budget (RMB)	Monitoring indicators
	<p>and purification, it can be reused for dust reduction, with little impact on the surrounding area;</p> <ul style="list-style-type: none"> <li>• Construction materials should not be stacked near the Minxing River to prevent them from entering the water due to heavy rain;</li> <li>• Regularly clean the toilet after the domestic sewage of the construction workers of this project is discharged into the environmental protection toilets along the line, which has little impact on the surface water;</li> <li>• In order to ensure the implementation of water pollution control measures in the project, all project contracts should include water environment protection measures clauses, and environmental supervision during the construction period should be strengthened.</li> <li>• Use advanced equipment and machinery to reduce the number of leaking and dripping of oils and the number of mechanical maintenance, thereby reducing the amount of oily sewage produced.</li> </ul>				
Construction waste and municipal solid waste	<ul style="list-style-type: none"> <li>• The solid waste during the construction period is mainly the domestic garbage of the construction workers, which is collected uniformly and cleared and transported by the sanitation department;</li> <li>• The soil and rocks produced by the excavation can be used as the filling of the roadbed, and the spoil generated is piled up in the temporary soil dump;</li> <li>• During and after construction, any important residual materials, waste and polluted soil remaining on the ground shall be removed and disposed to designated locations timely. Any planned paving or vegetation covering of the area should be undertaken as soon as material is removed to protect and stabilize the soil;</li> <li>• Open burning of garbage at construction sites is strictly prohibited;</li> <li>• Provide adequate litter boxes at strategic locations, ensure they are away from birds and pests, and are emptied regularly ;</li> </ul>	Contractor	PIUs, Supervision Company	Includes in work contracts	Implement mitigations and document them in monitoring reports

Item	Mitigation measures and/or safeguards	Implementation party	Supervisor	Budget (RMB)	Monitoring indicators
	<ul style="list-style-type: none"> <li>Reuse and recycle materials such as pipes, wires and wood;</li> <li>Hire a licensed company to dispose of hazardous waste, such as used oil and paint containers.</li> </ul>				
Noise pollution	<ul style="list-style-type: none"> <li>Choose low-noise construction machinery and equipment;</li> <li>Set up temporary sound insulation screens;</li> <li>Reasonable layout of the construction site;</li> <li>Arrange construction work time reasonably, nighttime construction (22:00-6:00) is prohibited. If nighttime construction is necessary for the construction process, a nighttime construction permit will be obtained in advance and notified to neighboring businesses.</li> <li>Reasonably arrange the travel route and time of construction transport vehicles.</li> </ul>	Contractors	PIUs, Supervision Company	Includes in work contracts	Implement mitigations and document them in monitoring reports
Water and soil loss	<ul style="list-style-type: none"> <li>Construction site: The construction site of this project adopts the principle of nearby layout. The FTZ subproject is proposed to set up 3 construction sites, and the LEDZ subproject is proposed to set up 1 construction site for parking of construction machinery and material stacking. After the construction is completed, the temporary facilities should be demolished in time, the waste in the temporarily occupied area should be cleared, and the vegetation on the site should be restored. The planting method should be natural scattered planting, and local common species should be selected to reduce and compensate for the adverse impact caused by the construction.</li> <li>Temporary soil storage yard: During the construction process, the surface soil shall be stripped and piled up in the temporary storage yard, the ground shall be cleaned in time, and water shall be properly sprinkled. The temporary storage yard should be protected from wind and rain. The construction spoil will be used for covering soils of greening in the later stage, and the rest of the spoil will be transported to the spoil yard designated by the construction department for disposal. After the</li> </ul>	Contractors	PIUs, Supervision Company	Includes in work contracts	Implement mitigations and document them in monitoring reports

Item	Mitigation measures and/or safeguards	Implementation party	Supervisor	Budget (RMB)	Monitoring indicators
	<p>construction is completed, the vegetation rehabilitation shall be conducted on the site to restore the original land use function. The vegetation restoration will use local common species to reduce and compensate for adverse effects caused by the construction.</p> <ul style="list-style-type: none"> <li>• Excavation and backfilling of the project should be avoided in rainy seasons to prevent secondary soil erosion.</li> <li>• Construction sites and temporary soil dumps should be equipped with special cut-off ditches, diversion cofferdams, and temporary anti-seepage sedimentation tanks to divert rainwater into the sedimentation tanks and reuse them after sedimentation to prevent soil erosion caused by rainwater erosion. .</li> </ul>				
Cultural Heritage Protection	<ul style="list-style-type: none"> <li>• If cultural heritage is found during excavation, construction should be stopped, and the site should be reported to the heritage management department and the site should be protected, and construction can only be resumed after investigation and approval by the heritage management department.</li> <li>• Provide workers with awareness training on the protection of cultural and historical relics.</li> </ul>	Contractors	PIUs, Supervision Company, Yingkou Culture, Tourism, Radio, Film and Television Bureau	Included in the work contract	Implement mitigations and document them in monitoring reports; Heritage Discovery Cases Number of workers trained (by gender); Examples of archaeological finds during construction.
Worker and Community Safety	<ul style="list-style-type: none"> <li>• Strictly implement all national laws, regulations and guidelines on work safety;</li> <li>• Establish safety signs on the construction site and access roads;</li> <li>• Make sure pedestrians cannot be blocked by vehicles entering or leaving the site.</li> <li>• Designate security personnel to direct traffic to keep the community safe;</li> <li>• Disclosure of safety measures and emergency contact information on construction sites;</li> <li>• The operation of engineering vehicles must comply with relevant safety regulations. Vehicles should be stored in</li> </ul>	Contractor	PIUs, Supervision Company	Included in the civil contract	Implement mitigations and document them in monitoring reports; Number and type of grievances or complains by local residents

Item	Mitigation measures and/or safeguards	Implementation party	Supervisor	Budget (RMB)	Monitoring indicators
	<p>designated areas within the construction site, and shall set up secure fencing and warning signs;</p> <ul style="list-style-type: none"> <li>• Provide personal protective equipment such as safety boots, helmets, gloves, protective clothing, goggles and ear protection in accordance with relevant worker health and safety regulations;</li> <li>• Emergency response plans will be developed in the accidents and emergencies, including environmental and public health emergencies related to hazardous material releases and similar incidents. The plan should be submitted to the local Environmental Protection Bureau for review and evaluation. Emergency telephone links will be established with hospitals in the three project towns. A fully equipped first aid base will be organized in each construction camp;</li> <li>• A records management system will be established to store and maintain records including records and reports of occupational accidents, diseases and accidents to protect from loss or damage. Records will be reviewed during compliance monitoring and audits;</li> <li>• Ensure occupational health and safety issues are highly publicized to all on every construction site, either regularly or occasionally. The poster will be prominently displayed in the relevant area of the website;</li> <li>• All construction workers are trained in basic sanitation, general health and safety issues, and the specific hazards of their work; Also, implement gender-based violence prevention training for local communities and construction workers, and</li> <li>• Develop, distribute and train workers on the Labor Code of Conduct</li> </ul>				
Protect workers from HIV /AIDS, COVID- 19 and other infectious diseases	<ul style="list-style-type: none"> <li>• Health education for COVID-19 and other communicable diseases shall be provided to contractors and affected employees in the project area to improve their health and safety awareness. The proportion of women should not be less than 50%.</li> </ul>	PIUs	Health Commission, Labor unions , Women's federations , etc.	20000	

Item	Mitigation measures and/or safeguards	Implementation party	Supervisor	Budget (RMB)	Monitoring indicators
Traffic disturbance	<ul style="list-style-type: none"> <li>• Develop traffic diversion plans before construction</li> <li>• Coordinate traffic management with traffic police during construction;</li> <li>• Develop a material movement plan to minimize traffic disruption;</li> <li>• Set up temporary pedestrian passages and provide appropriate safety measures (e.g. fencing, night lights, etc.)</li> </ul>	Contractor	Sub-PMO, Supervision Company	Included in the civil contract	Implement mitigations and document them in monitoring reports; Construction organization plan before construction starts; Number and type of grievances or complaints about traffic safety issues from affected people and groups. Number and type of traffic safety awareness programs held and number of participants by gender.
Stakeholder engagement	<ul style="list-style-type: none"> <li>• Set up a poster board on the construction site to inform project information, safety and environmental protection measures, fire protection and on-site safety measures, management personnel and complaint telephones;</li> <li>• Establish and maintain environmental and social safeguards grievance mechanisms and keep records;</li> <li>• Publish project information through the media;</li> <li>• Pay attention to the opinions of vulnerable groups (such as women and poor groups) to ensure the openness, fairness and transparency of the project;</li> <li>• Conduct training on GRM, public consultation methods, communication skills, and monitoring methods.</li> </ul>	Contractors, sub-PMOs	Municipal PMO, Supervision Company, AIB	Included in the civil contract and the O&M costs of the sub-PMO and the municipal PMO	Public Complaint Records
Labor and working conditions	<ul style="list-style-type: none"> <li>• Strictly comply with the requirements of the "Labor Law" and "Labor Contract Law", and ensure that the labor protection regulations are incorporated into the contract;</li> <li>• Employ labor force in accordance with relevant laws and regulations;</li> <li>• Sign labor contracts with workers;</li> <li>• Provide labor health and safety measures and equipment;</li> </ul>	Contractor of construction and supply chain	Sub-PMO, supervision company, Human Resources and Social Security Bureau, etc.	Included in the civil contract	Labor protection provisions in work contracts; Labor complaint records; Number of workers with labor contracts by gender;

Item	Mitigation measures and/or safeguards	Implementation party	Supervisor	Budget (RMB)	Monitoring indicators
	<ul style="list-style-type: none"> <li>• Provide employment opportunities for the local workforce, with particular attention to vulnerable groups of women and low-income groups;</li> <li>• Ensure that workers shall have basic insurance, shall be paid wages on time, and ensure equal pay for men and women for equal work.</li> <li>• Provide labor rights related laws and rights protection knowledge and skills training. The proportion of women should not be less than 50%.;</li> <li>• Establish the worker's grievance redress mechanism.</li> </ul>				Number of women employed; The amount and type of safety equipment provided to workers. Amount and type of safety training assistance. Number of workers trained by gender.
Reduce the impact of the project on local businesses and employees	<ul style="list-style-type: none"> <li>• Shorten the construction period as much as possible;</li> <li>• Arrange construction time reasonably to avoid noise and dust impact on residents;</li> <li>• Properly arrange entrances and exits along the fence to ensure the access of enterprises employees in the park;</li> <li>• Provide employment opportunities to those affected people, especially those whose businesses may be affected or whose income will be reduced in some way;</li> <li>• Establish a sound management system for foreign construction workers to prevent the influx of foreign labor from affecting community safety.</li> </ul>	Contractor	Municipal PMO, supervision company, AIIB	Included in the civil contract	Number of local employees
Avoid conflicts with surrounding communities and residents (outside the project area)	<ul style="list-style-type: none"> <li>• Disclose project details to non-local household registration personnel and provide the same skills training.</li> </ul>		Human Resources and Social Security Bureau, etc.	2000	
Disruption of utility services	<ul style="list-style-type: none"> <li>• Assess construction sites in advance to prevent service interruptions and identify risks before construction begins;</li> <li>• If a temporary interruption cannot be avoided, work with relevant local agencies such as electric companies,</li> </ul>	Contractors, PIUs	Sub-PMO, supervision company, municipal PMO, AIIB	Included in the civil contract	Number of interruptions and complaints; Resident Satisfaction with the Solution

Item	Mitigation measures and/or safeguards	Implementation party	Supervisor	Budget (RMB)	Monitoring indicators
	water companies, etc. to develop a plan to minimize the interruption, and inform all affected people of the date and duration of the interruption in advance.				
Attract local labor to participate in construction	<ul style="list-style-type: none"> <li>Contractors shall provide local residents with information on temporary employment needs and qualification requirements.</li> <li>1,000 local laborers shall be employed in the construction, 10% of the employees shall be women, and 10% shall be low-income residents.</li> </ul>	Contractors	Human Resources and Social Security Bureau, Labor Unions, Women's Federations, etc.	35,000	
Relevant enterprises provide job opportunities for local residents	<ul style="list-style-type: none"> <li>Provide 300 temporary employment positions including construction and cleaning, and women's positions shall not be less than 20% during the construction period</li> </ul>	Contractors	Human Resources and Social Security Bureau, Labor Unions, Women's Federations, etc.	-	
<ul style="list-style-type: none"> <li>Operation stage</li> </ul>					
Water pollution	<ul style="list-style-type: none"> <li>Regularly clean the drainage system and the side ditches along the whole line to ensure that the drainage system is unblocked.</li> <li>Add grit chambers and other measures to the rainwater pipe network system.</li> <li>Strengthen traffic management, strictly prohibit all kinds of leaking, and overloaded vehicles from running on the road;</li> <li>Carry out regular maintenance and status inspection on transport vehicles in the park to avoid traffic accidents.</li> <li>Implement the water quality monitoring plan during the operation period, and determine the supplementary or applicable environmental protection measures for surface water according to the water quality monitoring results.</li> </ul>	Facility operation and maintenance unit	Municipal PMO	-	Comprehensive Sewage Discharge Standard (8978-1996) Water quality monitoring
Solid waste	<ul style="list-style-type: none"> <li>Prohibits chemical industries, high energy-consuming industries and other industries that are prone to producing hazardous chemicals and hazardous waste from entering the park to avoid hazardous solid waste.</li> </ul>	Facility operation and	Yingkou Municipal PMO	-	Waste disposal by the landfill

Item	Mitigation measures and/or safeguards	Implementation party	Supervisor	Budget (RMB)	Monitoring indicators
	<ul style="list-style-type: none"> <li>• Industrial production enterprises themselves are responsible for proper disposal (should be recycled as possible), and the environmental protection department shall be responsible for supervision and management. According to the planning requirements, the solid waste of enterprises must be reduced, harmless and recycled.</li> <li>• Household waste shall be centralized collected and be transported to the waste treatment station. Household waste transportation shall be basically containerized and sealed.</li> <li>• Clean the public areas in time, and cleaned up the fruit peel and confetti in time.</li> <li>• Strengthen the park management of LEDZ and FTZ subprojects and strengthen the education of staff, prohibit littering and sundries, and keep the working and living environment clean.</li> <li>• Retired photovoltaic modules must not be buried or discarded at will, and they should not be mixed with household waste for disposal. Retired photovoltaic modules should be handed over to a third party with the qualification and capability for recycling or returned to the manufacturer for unified recycling.</li> </ul>	maintenance unit			
Noise	<ul style="list-style-type: none"> <li>• Control the passing time and quantity of vehicles in special time periods and road sections;</li> <li>• Strictly enforce traffic rules such as speed limit and prohibition of overloading;</li> <li>• Set up no-sounding signs in sensitive areas of the acoustic environment;</li> <li>• Through electronic monitoring, big data technology, and intelligent adjustment of indicator lights, accelerate vehicle circulation to reduce traffic jams;</li> <li>• Reasonable planting of green belts.</li> <li>• Set up soundproof walls and soundproof barriers along the railway lines in the FTZ.</li> <li>• Enterprises should implement sound insulation and shock absorption measures for equipment.</li> </ul>	Facility operation and maintenance unit	Yingkou Municipal PMO		Noise monitoring

Item	Mitigation measures and/or safeguards	Implementation party	Supervisor	Budget (RMB)	Monitoring indicators
Air pollution	<ul style="list-style-type: none"> <li>• The environmental protection department should strengthen the vehicle exhaust inspection system and prohibit vehicles whose exhaust gas does not meet the emission standards from driving on the road.</li> <li>• Strengthen road management and road surface maintenance to maintain good road operation and reduce traffic jams.</li> <li>• Plant fast-growing tree species along the edge of the site, and set up a green belt with a certain width to prevent the diffusion of exhaust gas and reduce the impact of exhaust gas on the surrounding environment.</li> <li>• Clean the road surface in time, and sprinkle water on the road surface in time to suppress the generation of secondary dust.</li> <li>• Conduct greening on both sides of the road, to reduce the area of bare land, and block as well as absorb dust.</li> <li>• Speed limit for road vehicles.</li> <li>• Establish road dust monitoring procedures and methods, and regularly monitor the dust content of the atmospheric environment.</li> <li>• Strengthen the management of logistics transportation vehicles, clearly require them to take closed transportation measures such as covering with tarpaulins, and prohibit vehicles without protective measures from going on the road.</li> <li>• The tarpaulins shall cover 15cm below the upper edge of the vehicle groove, and open-top transportation is not allowed.</li> <li>• A special site for vehicle cleaning is set up at the exit of the logistics warehouse, equipped with washing and cleaning facilities for transport vehicles, and each vehicle shall be rinsed.</li> <li>• The cleaning range must cover the parts below 1.5 m high on both sides of the car body and the chassis of the whole car. It is strictly forbidden to go on the road with dust and soil.</li> </ul>	Facility operation and maintenance unit	Yingkou PMO		Air Quality Monitoring

Item	Mitigation measures and/or safeguards	Implementation party	Supervisor	Budget (RMB)	Monitoring indicators
	<ul style="list-style-type: none"> <li>The exhaust gas from railway freight loading shall be treated by the oil and gas recovery facilities equipped on the loading platform, and then shall be sent to the catalytic combustion system in the plant for further treatment. After the treatment reaches the standard, it shall be discharged through the 15m high exhaust pipe, which has little impact on the surrounding environment</li> </ul>				
Vulnerable Groups	<ul style="list-style-type: none"> <li>Prioritize providing employment opportunities for vulnerable groups</li> </ul>	Facility operation and maintenance unit	Yingkou Municipal Government	-	Employ local staff during project operation
Community Environmental Risk	<ul style="list-style-type: none"> <li>Develop a public health emergency plan</li> </ul>	Yingkou Municipal Health Commission	Yingkou Municipal Government	-	Contingency plans in place
Public consultation	<ul style="list-style-type: none"> <li>Establish and maintain a public consultation mechanism, and arrange staff to accept public complaints and opinions, so as to ensure the rights of those affected by the project.</li> </ul>	LEDZ Management Committee, FTZ Management Committee	Yingkou Municipal Government	-	Public Complaint Records
Provide job opportunities for local residents by relevant enterprises	<ul style="list-style-type: none"> <li>100 new non-temporary jobs shall be provided for the local area by relevant institutions and enterprises, and the proportion of women shall not be less than 40%, within half a year after operation.</li> </ul>	LEDZ Management Committee, FTZ Management Committee	Human Resources and Social Security Bureau, Labor Unions, Women's Federations, etc.		

### 9.3 Biodiversity Management Plan

666. Although the project does not involve key habitats or ecological red lines, given that Yingkou is an important stopover and transit point on the East Asia-Australasia Flyway, a biodiversity management plan has been developed to avoid and reduce adverse impacts on birds. This plan includes mitigation measures, monitoring indicators, and training. Contractors and facility operation and maintenance units should strictly adhere to the requirements set out in the biodiversity management plan.

**Table 9-3 Biodiversity management plan**

Content	Sub-item	Specific Measures	Implementing Unit	Supervisory Unit	Monitoring Indicators
Construction Phase					
Construction Time Management	Construction Time Management	During the peak periods of bird breeding and migration (March-May, September-November), schedule low noise and vibration operations in the early morning (6:00-8:00) and evening (17:00-19:00), and avoid large machinery and high-noise construction.	Contractor	PMO, EEB, FB	Noise Monitoring During Construction
Environmental Protection and Education	Training	Train construction workers and managers on environmental and wildlife protection, including bird identification, habitat needs, and how to reduce the impact on birds during construction.	Contractor	PMO, EEB, FB	Training Records
	Publicity	Display educational materials about local birds and their conservation measures at the construction site.	Contractor	PMO, EEB, FB	Coverage of Publicity Materials
Sewage Management	Sewage Treatment	Prohibit direct discharge of untreated sewage into Minxing River and the bay, establish	Contractor	PMO, EEB, FB	Operation Records of Sewage Treatment Facilities; Water Quality Monitoring

		sewage treatment facilities, and ensure wastewater is treated to meet environmental standards before discharge.			Reports
Habitat Protection	Coastal Tidal Flat Protection	All project activities must not occupy coastal tidal flats; set up clear signage and warning signs.	Contractor	PMO, EEB, FB	Signage and Warning Signs Setup
Noise Control	Sound Barriers	Install sound barriers at the construction site, designate work areas, and strictly control construction activities within these areas using temporary and permanent noise barriers.	Contractor	PMO, EEB, FB	Sound Barrier Setup; Noise Level Monitoring
Light Pollution Control	Directional Lighting and Shading	Use low-intensity, directional lighting during construction to ensure light only targets necessary areas and avoid direct illumination of coastal zones. Install light shields on lamps to reduce light scatter and bird disturbance. Vehicles entering coastal roads should reduce speed and use low-energy lights at night to avoid strong direct lighting. Turn off unnecessary lights at night.	Contractor	PMO, EEB, FB	Implementation of Measures
Vehicle Management and Maintenance	Vehicle Management and Fixed Routes	Strengthen the management and maintenance of transport vehicles to ensure they are in good	Contractor	City Project Office, Ecological Environment Bureau, Forestry Bureau	Vehicle Maintenance Records; Transport Routes and Timing Monitoring

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		condition, reducing noise and emissions. Designate fixed transport routes to avoid bird habitats and minimize harmful impacts.			
Waste and Waste Material Management	Waste Collection and Disposal	Set up adequate waste collection points, sort and dispose of waste promptly to prevent birds from ingesting it. Regularly clean the construction site and surrounding areas to ensure no waste accumulation.	Contractor	PMO, EEB, FB	Waste Collection and Disposal Records; On-site Waste Management Status
Operational Period					
Training and Awareness Raising	Operational Training	Train train drivers and related personnel on bird identification, behavior observation, and response measures to enhance conservation awareness.	Operating Unit	PMO, EEB, FB	Training Records; Training Effectiveness Assessment
Buffer Zone Setup and Maintenance	Protective Forest Buffer Zone	Set up and maintain a 30-40 meter wide protective forest buffer zone.	Operating Unit	PMO, EEB, FB	Buffer Zone Setup and Maintenance Records; Buffer Zone Effectiveness Assessment
Adjustment of Operating Times	Adjust Train Operating Times	During the bird migration seasons in spring and autumn and the breeding period (May-June), adjust train operating times to avoid mornings and evenings, and prohibit nighttime operation.	Operating Unit	PMO, EEB, FB	Train Operating Time Records; Correlation Analysis of Train Times and Bird Activity
Lighting Control	Lower Lighting Levels and Directional Lighting	During the bird migration and breeding periods (March-May,	Operating Unit	PMO, EEB, FB	Lighting Control Measures Implementation

		September-November, May-June), appropriately lower lighting levels and implement lighting controls using directional lighting and light shields.			
Strict Speed Control	Speed Control	During shunting operations, do not exceed 40 km/h in idle traction and 30 km/h in pushing operations, reducing the risk of bird strikes.	Operating Unit	PMO, EEB, FB	Train Speed Monitoring Records
Track Maintenance	Track System Maintenance	Regularly maintain the track system, including checks for wheel-rail wear and ballast repair, using vibration-damping materials and optimized track design.	Operating Unit	PMO, EEB, FB	Track Maintenance Records; Track System Status Assessment
Noise Control	Operational Noise Management	Minimize the use of horns in station transport and construction vehicles to reduce noise overlap. Use low-noise equipment and set up noise barriers.	Operating Unit	PMO, EEB, FB	Noise Level Monitoring; Noise Barrier Setup
Wetland Resource Management and Protection	Protect Existing Wetlands	Regularly monitor changes in bird populations and encourage community participation in protection.	Operating Unit	PMO, EEB, FB	Bird Population Change Monitoring Records

PMO=project management office; EEB=ecology and environment bureau; FB=forestry bureau.

### 9.4 Construction Camp Management Plan

667. The construction process of this project may involve the establishment of multiple construction camps. Therefore, this Construction Camp Management Plan is formulated to outline general management requirements concerning the construction camp's establishment, infrastructure, living conditions for workers, camp air and wastewater treatment, solid waste disposal, construction material storage and management, machinery/equipment use and management, labor influx management, and occupational

health and safety management. Contractors should develop specific construction camp management plans based on the construction organization plan and site conditions.

**Table 9-4 Construction camp management plan**

No.	Items	Camp Management Plan	
1	Background	Currently the project is in the feasibility study phase, the establishment of construction camps will need to be determined by the constructor based on the construction program. If a construction camp is required, it will need to meet the requirements of this Construction Management Camp.	
2	Infrastructure	Water supply	The project area has an office area, and the domestic water supply is mainly based on the urban pipe network, which can meet the domestic water needs of the project.
		Power supply	The project area is rich in power resources, the power supply network system is relatively complete, which can be connected to the work area as the construction power supply.
3	Living conditions of workers	<ul style="list-style-type: none"> <li>➤ Living camps should be set up with janitorial rooms, dormitories, canteens, toilets, washroom facilities, showers, laundries, water boiler rooms or drinking water holding tanks, closed garbage cans and other adjacent houses and facilities.</li> <li>➤ The living camp must be reasonably hardened, green, set up effective drainage measures, rainwater and sewage drainage is smooth, and no water shall accumulate in the site.</li> <li>➤ Living camp canteens should be single-story buildings and should be kept at a safe distance from dormitories.</li> <li>➤ The living camp room shall meet the requirements of resisting class 10 wind and local seismic intensity, and the fire-fighting requirements shall be carried out in accordance with the Technical Regulation for Fire Safety at Construction Sites of Construction Projects (GB50720-2011).</li> <li>➤ Living camps should establish flush toilets, set up special persons in charge of them, and carry out regular flushing and cleaning and disinfection to prevent mosquitoes and flies from breeding.</li> <li>➤ Dormitories need to be set up with single beds or upper and lower double beds, with a living area of not less than 2 m<sup>2</sup> per person, prohibiting workers from sleeping in bunks, leaving space for workers to store their personal belongings, keeping dormitories hygienic, clean and ventilated, and preventing summer heat and mosquitoes and flies in summer, and preventing winter cold and keeping warm in winter.</li> <li>➤ Drinking water must meet the national health standards, set up temporary water points, must assign a person to supply water and special drinking buckets, it is strictly prohibited to share a vessel for drinking water.</li> <li>➤ Strictly strengthen the management of labor protection for employees, equip employees with helmets, safety belts, labor clothing and other labor protection items that meet the requirements according to the regulations, improve labor conditions, and ensure the physical and mental health of employees.</li> <li>➤ Comply with the relevant state regulations, reasonably arrange the work and rest time of employees, achieve the combination of work and rest, and pay wages and benefits on time to ensure the living needs of workers.</li> </ul>	
4	Camp exhaust gas treatment	<ul style="list-style-type: none"> <li>➤ The camp is supporting the construction of canteen, which requires that the oil smoke of the canteen be treated by high-efficiency electrostatic oil smoke purifier, which is required to meet the requirements of <i>Oil Smoke Emission Standard for Catering Industry (Trial) (GB 18483-2001)</i> and be discharged through the flue that is higher than the roof of the building.</li> </ul>	
5	Camp wastewater treatment	Life camp personnel life produces domestic sewage, requiring each camp supporting grease trap, septic tank, domestic sewage to take grease trap, septic tank to and other measures, after treatment to achieve the <i>Comprehensive Emission Standards for Sewage</i> level 3 standards discharged into the surrounding municipal pipeline network.	
6	Camp solid waste disposal	<ul style="list-style-type: none"> <li>➤ A number of garbage cans are set up in each construction camp, and the domestic garbage is collected by the sanitation department and sent to Yingkou waste incinerator for coordinated treatment.</li> </ul>	
7	Material storage	<ul style="list-style-type: none"> <li>➤ The canteen in the construction camp involves the use of liquefied petroleum gas (LPG), and the back-up generator at the construction site involves the use of diesel fuel, so the construction camp should be set up with storage</li> </ul>	

No.	Items	Camp Management Plan
		<p>rooms for LPG tanks and diesel fuel drums.</p> <ul style="list-style-type: none"> <li>➤ The storage room should be separated from the workers' dormitory, kept cool and ventilated, with signs prohibiting smoking and the use of open flames.</li> <li>➤ The storage room is arranged to be managed and inspected by specialized personnel and equipped with fire-fighting measures such as fire-fighting appliances for use.</li> <li>➤ The storage containers and the drums for adding diesel oil in the diesel oil storage room should be kept clean. In order to minimize the contact between diesel oil and air, it should be stored in airtight condition to reduce unnecessary inverting; if the diesel oil drums are found to be leaking, the diesel oil should be transferred to other empty drums and absorbed with sand or other inert materials in a timely manner.</li> <li>➤ LPG storage room requires empty tanks to be placed separately from the real tanks, and no other items shall be stored in the storage room; it is strictly prohibited to knock, collision and dragging on the ground; it is strictly prohibited to heat up the tank; it is prohibited to use the tanks upside down, and it is strictly prohibited to conduct gas between tanks; it is strictly prohibited to privately deal with and pour out the LPG in the tanks and deal with the residual liquids; if a leakage is found, identify the leakage part quickly, take effective measures to eliminate the leakage as soon as possible, and check the leakage. Take effective measures to eliminate the leak as soon as possible, check the leak should be used to brush the method of soapy water, is strictly prohibited fire leakage test; for a moment can not be immediately eliminated leakage, the tank should be quickly transferred to an open, ventilated outdoor place, set up a good guard, immediately notify the professionals to check the treatment.</li> </ul>
8	Labor influx management	<ul style="list-style-type: none"> <li>➤ Specify that the employment process adheres to the principles of equal opportunity and fair treatment in the hiring of project staff, and in addition, does not discriminate against personal characteristics unrelated to inherent job requirements.</li> <li>➤ 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; assist workers in forming workers' organizations in compliance with national laws, and workers have the right to form and join workers' organizations of their choosing and are guaranteed non-interference in their collective bargaining.</li> <li>➤ Establishing and clarifying mechanisms for the handling of labor complaints and reports on grievances and complaints, clarifying mechanisms for the supervision of labor protection, and protecting personal privacy in accordance with the law when dealing with complaints of sexual harassment;</li> </ul> <p><b>Strengthening the protection of women's labor rights and interests</b></p> <ul style="list-style-type: none"> <li>➤ Provide female laborers with regular mental health counseling and training on the protection of female labor rights;</li> <li>➤ Construction companies should strengthen supervision of construction sites to avoid harmful behaviors such as gender violence, sexual exploitation and abuse, and sexual harassment.</li> <li>➤ Establish clear channels for complaints, set up a site complaints team that includes at least two female members, and guarantee the safety of the members of the complaints team to avoid prejudice and fear of retaliation.</li> </ul>
9	Occupation Health Safety Management	<ul style="list-style-type: none"> <li>➤ Adequate lighting is set up in office and living areas, and electricity equipment for production camps is regularly inspected, and insulation strength is measured quarterly for lightning protection, grounding protection, and transformers.</li> <li>➤ The use of non-standard heating and heating equipment is prohibited in the office and living areas, and the power supply must be cut off when personnel leave the office and living places.</li> <li>➤ In the living area, special persons are arranged to conduct frequent inspections of the production camps as well as the living camps where fires and electricity are easily triggered to prevent fires from occurring, and fire extinguishers, etc. are deployed in accordance with the requirements of the relevant regulations.</li> <li>➤ Cooks must hold health certificates, canteens should be equipped with ventilation, exhaust and sewage drainage facilities, raw and cooked food should be strictly stored and marked, and cooking utensils in canteens should be disinfected in a timely manner and stored in an orderly manner; and reliable and</li> </ul>

No.	Items	Camp Management Plan
		<p>effective fly- and rodent-proof facilities should be configured.</p> <ul style="list-style-type: none"> <li>➤ Flush toilets should be set up, with special personnel responsible for regular flushing, cleaning and disinfection to prevent mosquitoes and flies from breeding.</li> <li>➤ Drinking water in the campsite must meet the national hygiene standards, and temporary water points must be set up with specialized water supply and special drinking buckets, and it is strictly prohibited to share a vessel for drinking water.</li> </ul>
10	Use and management of construction machinery/equipment	<ul style="list-style-type: none"> <li>➤ The personnel, the machine and the responsibility must be clear and fixed for the use of machinery and equipment, assign specific person to manage large-scale equipment operated by many people; small-scale equipment can be set up by a person who also manages several units. Construction work must be accepted before the technical safety instructions can be operated; and must be licensed to operate.</li> <li>➤ Operators check the condition of the equipment before the shift, keep the internal and external appearance of the equipment clean, and ensure no pollution, no bruises, no corrosion, no leakage of water, no leakage of oil, no leakage of electricity, no leakage of gas.</li> <li>➤ After the operation, the equipment should be parked in a safe place to prevent non-productive damage, and the spare parts and random accessories of the machinery should not be disassembled or lent out at will.</li> </ul>

## 9.5 Labor Management Plan

668. Based on investigations, as the FTZ construction and municipal engineering sub-project is expected to have about 500 workers during the peak construction period, 50 for the railway subproject and 180 for the LEDZ subproject, it exists risks on worker personal safety, occupational diseases, community security, public health, and sexual violence. Contractors should prepare and implement specific labor management plan according to construction organization plans and site conditions.

**Table 9-5 Labor Management Plan**

Potential Impacts	Proposed Measures	Responsible agencies	Budget (yuan)
Construction stage			
Risk on construction safety	<ul style="list-style-type: none"> <li>(i) Establish and improve the construction supervision and management system, and set up construction safety supervisors at the construction site;</li> <li>(ii) Develop an emergency response plan;</li> <li>(iii) Before construction starts, use low-noise equipment and processes instead of high-noise equipment and processes when selecting construction machinery and equipment, such as low-noise vibrators, fans, electric air compressors, electric saws, etc., and install mufflers at the sound source muffled. After the construction machinery is used for a period of time, it may produce more noise, and the noise can be properly reduced through repair and maintenance;</li> <li>(iv) Take safe traffic control measures, set up eye-catching road signs and warnings on the construction site; limit the speed of transport vehicles, and regularly maintain vehicles and mechanical equipment to minimize the risk of accidents.</li> <li>(v) Truck drivers should be trained with travel safety,</li> </ul>	PMO, contractors, Department of Housing and Urban-Rural Development	20,000

	stipulating driving speeds, and slowing down when passing residential areas; overloading transport vehicles are strictly prohibited, and regular maintenance shall be carried out for vehicles to reduce the risk of failures causing traffic accidents;		
Risk on occupational diseases	<ul style="list-style-type: none"> <li>(i) Establish a regular monitoring system for occupational diseases and occupational hazards;</li> <li>(ii) Strengthen workers' awareness of occupational health and safety, and post occupational health and safety promotional materials in conspicuous places on the construction site;</li> <li>(iii) Regularly organize occupational health and safety and emergency response training for workers;</li> <li>(iv) Provide PPE (Personal Protective Equipment) that meets Chinese national standards, including gloves, goggles, safety shoes, and provide earplugs for employees exposed to high noise environments;</li> <li>(v) Supervise the proper use of personal protective equipment by workers;</li> </ul>	PMO, contractors, Department of Human Resources and Social Security	20000
Risk on public health	<ul style="list-style-type: none"> <li>(i) Necessary sanitation and epidemic prevention measures shall be taken for construction personnel, and regular physical examinations shall be carried out.</li> <li>(ii) The sanitation of food and drinking water for construction workers shall be secured;</li> <li>(iii) Temporary toilets set up on the construction site and toilets equipped during the operation phase should be regularly cleaned and disinfected;</li> <li>(iv) Carry out the publicity and education of employees' sanitation and disease prevention. Regarding seasonal epidemics, infectious diseases, etc., knowledge and methods of disease prevention and treatment should be introduced to construction personnel through broadcasting, promotional manuals, bulletin boards, and other forms;</li> <li>(v) Construction personnel must take health checks and quarantine before entering the site, and personnel with infectious diseases are not allowed to enter the construction team;</li> <li>(vi) If a new infectious disease is found, the patient must be isolated and treated to cut off the transmission route to avoid spreading to the surrounding communities, and at the same time establish the health records of the construction personnel.</li> </ul>	PMO, contractors, Department of Health	20000
Risk on community security	<ul style="list-style-type: none"> <li>(i) Conduct legal and safety training and education for workers;</li> <li>(ii) Strengthen cooperation with public security departments and establish an irregular investigation and early warning mechanism for potential security hazards in construction camps</li> </ul>	PMO, contractors, Department of Public Security	6000
Risk on Sexual violence	<ul style="list-style-type: none"> <li>(i) Set up and clear labor the worker GRM, for complaint reporting and handling, clear labor protection supervision mechanism, when dealing with sexual harassment complaints, protect individual privacy in</li> </ul>	PMO, contractors, Women's Federation,	6000

	<p>accordance with the law;</p> <p>(ii) For female workers provide regular mental health counseling and trainings on protection of the rights and interests of women workers;</p> <p>(iii) The construction unit should strengthen the supervision of construction site, avoid gender violence, sexual exploitation and sexual abuse, sexual harassment and other harmful behavior.</p>	<p>Department of Public Security</p>	
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### 9.6 Social and Gender Action Plan

669. Based on the survey results presenting the basic situation of women in the project area, their concerns and needs regarding the project, and the social gender analysis, the project has developed a Gender Action Plan. The aim is to ensure the fair participation of women in the project, accessibility to resources and opportunities provided by the project, and to enhance the overall well-being and gender equality of women in the project area. As shown in Table 9-6, the Gender Action Plan primarily focuses on eight aspects: enhancing the social gender awareness of institutional personnel, improving institutional management capacity, enhancing women's participation in the smart industry, improving the protection of women's labor rights, increasing women's employment opportunities in the smart industry, ensuring the personal and health safety of women affected in the project area, ensuring women's rights to information and participation in the project, conducting satisfaction surveys for all project construction, and comprising 18 specific activities.

**Table 9-6 Social and Gender Action Plan**

Action	Indicator/Targets	Time	Responsible Unit	Assisting Unit	Cost Estimate (Yuan)
1. Improvement of gender awareness among institutional personnel	1a. Provide gender awareness improvement training to 20 staff members of the municipal project office, sub-project office, and implementation unit, 50% of whom are women.	before the project	PMO, IA, PIU		10,000
2. Improvement of organizational management capabilities	2a. Carry out training for 20 staff members of the municipal PMO, sub-PMO, and PIU on the environmental and social management plan and GAP, 50% of whom are women.	before the project			10,000
	2b. The municipal PMO, sub-PMO and the PIU assign a staff member to be responsible for the implementation and coordination of the GAP.	before the project			
	2c. Among the platform companies, evaluation units, consulting agencies, PIU, and personnel involved in project management, 40% must be women.	2023-2028			
3. Improvement of women's ability to participate in smart industries	3a. Provide training on employment and entrepreneurship skills that must be no less than 600 people per day in the project area on smart industries such as e-commerce, technology, and trade, and the participation rate of women should not be lower than 50%.	2024-2028	PMO, IA, PIU	Women's Federation, Labor Union, Human Resources and Social Security Bureau, Industry and Information Technology Bureau, etc.	100,000
	3b. Provide no less than three gender awareness improvement trainings in the project area, and the participation rate of women shall not be lower than 50%.				
	3c. Provide training on management skill improvement, no less than 600 people/day, including career planning, skills of communication and coordination, and leadership, and the participation rate of women shall not be lower than 50%.				
	3d. Provide training on environmental awareness improvement, including climate change, energy transition, and low carbon lifestyle, and the participation rate of women shall not be lower than 50%.				

Action	Indicator/Targets	Time	Responsible Unit	Assisting Unit	Cost (Yuan)	Estimate
4. Improvement of protection of women's labor rights	4a. Provide training on labor rights, no less than 600 people /day, including laws and regulations related to women, and career planning in the project area, and the participation rate of women shall not be lower than 50%.	2024-2028			30,0000	
	4b. In existing jobs and newly provided jobs, 70% of the existing employees are guaranteed to sign labor contracts and purchase social insurance.					
	4c. In existing jobs and new jobs, it is guaranteed to eliminate gender discrimination in employment (including preferential recruitment of men, different pay for equal work between men and women, dismissal or salary adjustment due to pregnancy, non-implementation of special labor protection policies for female employees, non-implementation of breastfeeding leave and maternity leave policies, and sexual harassment in the workplace).					
	4d. The employer shall formulate and publish a complaint and handling mechanism for the protection of labor rights and interests (including the protection of the special rights and interests of female employees and the elimination of gender discrimination in employment), and have a complaint and complaint handling record.					

Action	Indicator/Targets	Time	Responsible Unit	Assisting Unit	Cost Estimate (Yuan)
	4e. Ensure that new facilities in the project area are female-friendly, including permanent or temporary parent's rooms; When a new toilet is built, the ratio of female toilets to male toilets should not be less than 3:2.				
5. Increase employment opportunities for women in smart industries	4a. Within half a year after the start and completion of the project, relevant institutions and enterprises will provide no less than 100 new non-temporary employment positions for the local area, and the proportion of women shall not be less than 40%; provide 1,000 temporary employment positions including construction and cleaning, and women's positions shall not be less than 20%.	Within half a year after the start to the end of the project		Women's Federation, Human Resources and Social Security Bureau, etc.	300,000
6. Ensure the physical and health safety of affected women in the project area	5a. Provide health knowledge lectures on HIV and other communicable diseases to the PMO, PIU, project construction personnel and affected workers in the project area to improve their health and safety awareness. The proportion of women should not be less than 50%.	During project construction	PMO, IA, PIU	Women's Federation, Labor Union, Human Resources and Social Security Bureau, Health Commission, Police Station, etc.	20,000
	5b. Relevant functional departments such as the police station where the project area is located formulate project security measures.				
	5c. Establish a complaint mechanism for female employees to ensure that gender discrimination and GBV are eliminated in the workplace.	2024-2028			
	5d. Provide trainings on laws, regulations, knowledge and skills on prevention of gender discrimination and GBV to the PMO, PIU, project construction personnel and affected employees. The proportion of women should not be less than 50%.				
		Before project implementation			2,000

Action	Indicator/Targets	Time	Responsible Unit	Assisting Unit	Cost Estimate (Yuan)
7 Ensuring women's right to know and participate in projects	6a. Hold consultation meeting and information disclosure meeting before project implementation to understand the views and needs of local people. The participation rate of women shall not be lower than 50%.				
8. Carry out satisfaction surveys for all engineering construction	80% of the respondents are satisfied with the project construction and facility renovation report, 50% of them are women.	After the project construction is completed			50,000

## **9.7 Resettlement Plan**

670. The preparation and implementation of the "Resettlement Plan" adhere to the relevant laws of the People's Republic of China and the relevant regulations of Liaoning Province, and comply with the requirements of the Asian Infrastructure Investment Bank (AIIB) regarding involuntary resettlement policies as stated in the "Safeguard Policy Statement." The compensation standards and restoration measures adopted in the "Resettlement Plan" will be implemented during the land acquisition and demolition process.

671. Since resettlement and relocation activities will not occur only during a specific period of the implementation phase, updated and higher standards of policies and regulations will be applied when preparing detailed engineering designs and updating resettlement plans for specific sub-projects. This chapter provides a summary of the impact and mitigation measures of resettlement and relocation activities, with detailed resettlement plans available in the Resettlement Plan report.

### **9.7.1 Preparation of the Resettlement Plan**

672. The preparation of the "Resettlement Plan" is based on the construction plan determined by the feasibility study reports of the two sub-projects, identifying and analyzing the resettlement impact of the project, including permanent land acquisition, demolition compensation for above-ground structures, affected units, and affected individuals. In accordance with the relevant laws, regulations, and policies related to land acquisition and resettlement, the land acquisition compensation standards for the project are determined, and corresponding land acquisition compensation measures, resettlement measures, investment estimates, schedule plans, complaint appeals, and implementation monitoring and evaluation plans are formulated.

### **9.7.2 Permanent Land Acquisition Restoration Plan**

673. The Project involves permanent LA of 459.3729 hectares of state-owned land, of which the FTZ subproject involves the permanent LA of 53.3729 hectares of state-owned land, and LEDZ subproject involves permanent LA of 406 hectares of state-owned land from some enterprises and affected employees. After consultations and agreements among all parties, measures such as cash compensation, employment in secondary and tertiary industries and skill training are taken to minimize the impacts of permanent LA to the stakeholders.

#### **9.7.2.1 Monetary Compensation**

674. The Project involves the transfer of state-owned construction land. China (Liaoning) Free Trade Experimental Zone Yingkou Area Management Committee, Yingkou Liaohe Economic Development Zone Management Committee and their platform companies are affected by permanent LA. There are 15 employees of Yingkou Salt Industry Co., Ltd. effected by the permanent LA of this project- they will just need to change their work-place to work in other groups so their employment and income will not be affected.

675. Due to the involvement of the transfer and mortgage replacement of state-owned construction land use rights in this project, permanent LA compensation costs will be incurred. In the FTZ, the railway and station and railway running lines of the new construction of railway station sub-project, and the logistics hub area and industrialization area of dry port hub and industrial park sub-project involve the transfer of state-owned construction land. The Anlida land acquisition for construction of the railway station sub-project and the logistics supporting area of the dry port hub and industrial park sub-project involve the transfer of state-owned construction land. The LEDZ project involves the mortgage replacement of state-owned construction land.

676. The project has a total planned cash compensation of 303.456 million Yuan. Among them, FTZ plans cash compensation of 151.2066 million Yuan. LEDZ plans to transfer 406 hectares of state-owned construction land, with a planned monetary compensation of 152.25 million Yuan.

### **9.7.2.2 Employment Opportunities**

677. There are only 15 salt workers in No. 16 and No. 24 production teams in the salt crystallization area affected as their production land area will be recovered for the Project. Yingkou Salt Industry Co., Ltd will provide job transfer measures for the employees. The affected employees include 2 production team leaders, 6 maintenance workers and 7 operators. The staff transfer plan is arranged as follows: the team leaders of the No. 16 and No. 24 teams are transferred to the No. 11 and No. 20 teams of the salt plant respectively, and 6 maintenance workers are transferred to the maintenance teams of No. 3 and No. 4 work area. 3 people of each team will be transferred. 7 operators were transferred to No. 11, No. 12, No. 16 and No. 20 class as needed to supplement the vacancies in the field and alleviate pressure of employment. After transfer, the employees will have their current jobs and salary unchanged and there will be no impacts on their livelihoods. It has also been confirmed by the affected employees during the consultations and by management of Yingkou Salt Industry Co., Ltd that the working conditions in the new working groups are the same with these in the working groups before being affected.

678. The Yingkou Salt Industry Co., Ltd. consulted with 15 affected employees in June 2023 about the proposed arrangements to adjust their work after the project occupies the land, and promised that their work positions would be secured and all the welfare benefits remain unchanged.

679. Except for the affected employees of the EDZ subproject, the project does not involve other APs. Although the impact of resettlement in the project is minor, China (Liaoning) Free Trade Experimental Zone Yingkou Area Management Committee and Yingkou Liaohe EDZ Management Committee encourage employees or other staff in the area to engage in the related supporting measures that will be provided by the Project. During the construction period, the PMO and the EA will provide 30 temporary job opportunities per year, such as sand and gravel mining, construction material transportation, earth and sand, etc. After construction, workers or other staff in the area will be given priority in employment recruitments. These jobs are more suitable for local labors. Employees or other personnel in the area will have priority in obtaining these employment opportunities..

### **9.7.2.3 Skills Training**

680. The project will provide training for 350 individuals, including 177 women. Park employees can choose from a variety of training types, including labor skills and employment, management, safety production, laws and regulations, environmental protection, personal career planning, labor rights protection and safeguarding, entrepreneurship, etc. Affected individuals, local workers, and other personnel can participate in free technical and employment training provided by these institutions. Based on current surveys, the project has prepared corresponding training plans.

### **9.7.3 Compensation Plan for Above-Ground Structure Demolition**

681. The project involves the demolition and relocation of three above-ground structures in the FTZ subproject railway station subproject, namely: (1) demolition and relocation of the sewage treatment plant; (2) demolition and relocation of Comprehensive Bonded Group Co., Ltd. (Anlida building) and (3) demolition and relocation of the salt field.

682. Among the FTZ subprojects, No. 1 WWTP of Yingkou Coastal Development and Construction Group Co., Ltd. is affected by permanent LA, and will demolish the onland structures; the Anlida building of Comprehensive Bonded Group Co., Ltd. will be affected by permanent LA as it is planned to be demolished. After full consultations and evaluation in the FTZ, Yingkou Coastal Development and Construction Group Co., Ltd., the owner of the No. 1 Sewage Treatment Plant, will receive 24.02 million Yuan in demolition compensation. Yingkou Comprehensive Security Group, the owner of the Anlida building, will receive 13.1117 million Yuan in demolition compensation. The FTZ Management Committee will entrust a third-party appraisal company to conduct a final assessment of the two above-ground structures in the FTZ, which will meet the requirements of the owners

and comply with the policies of the AIIB.

683. In the EDZ sub-project, Yingkou Salt Industry Co., Ltd. is affected by permanent LA and plans to demolish 406 hectares of the crystallization area of the salt production land. After full consultation and evaluation by the Economic Development Zone Management Committee, Yingkou Salt Industry Co., Ltd. will obtain the demolition compensation of 142.1 million Yuan. The EDZ Management Committee will entrust a third-party appraisal company to conduct a final assessment of the above-ground structures in the EDZ, which fully meets the requirements of the owners and conforms to the policies of the AIIB.

## **9.8 Implementation Budget and Capacity Building of Environmental and Social Management Plan**

### **9.8.1 Implementation Budget of Environmental and Social Management Plan**

684. The officials in charge of environmental and social protection of the PMO are paid by the PMO's operational budget, and the expenses of experts are paid by the project management consulting package, so these expenses are not listed separately. The total estimated cost of the project implementing the ESMP is 13.813 million yuan, including i) 12.543 million yuan for the cost of implementing mitigation measures (2.044 million yuan for construction of the FTZ subproject, 1.356 million yuan for municipal project of the FTZ subproject, 1.782 million yuan for the railway engineer of the FTZ subproject, and 7.342 million yuan for the LEDZ subproject) , ii) 600,000 yuan for the environmental and ecological monitoring, iii) 70,000 yuan for training , and iv) 600,000 yuan for the social monitoring cost.

### **9.8.2 Capacity Building**

685. The capacities of Yingkou municipal PMO, FTZ Sub-PMO, LEDZ Sub-PMO, construction supervision company and contractor personnel will be strengthened for the implementation and supervision of ESMP. All parties involved in implementing and supervising the ESMP must understand the objectives, methods and practices of the environmental and social management in this project. The training program will also address long-term capacity building needs, covering the needs of the operational phase of the project. Training will be provided by relevant regulatory agencies (such as local Ecological Environment Bureaus) or hired experts.

686. During a long project implementation period, contractors and supervision companies are usually not hired at the same time, and are usually procured in stages during the project implementation process. In addition, there are usually personnel changes in the PMO, and training may be increase appropriately during the implementation process with the personnel changes. The training cost is estimated at 70,000 yuan.

**Table 9-7 Training plan**

Training Period	Topic	Content	Frequency	Trainee	Estimated Number of People
Construction Period	Environmental and Social Policies and Regulations	<ul style="list-style-type: none"> <li>Domestic environmental and social related regulations and policy requirements</li> </ul>	Once: inception stage	<ul style="list-style-type: none"> <li>Yingkou municipal PMO;</li> <li>FTZ sub-PMO;</li> <li>LEDZ sub-PMO;</li> <li>Contractors;</li> <li>Construction supervision companies,</li> <li>Other relevant parties</li> </ul>	30
	Implementation and adjustment of ESMP	<ul style="list-style-type: none"> <li>Environmental and social management responsibilities during the project construction period;</li> <li>The main environmental and social effects and mitigation measures during the project construction period;</li> <li>environmental and social management monitoring and report requirements;</li> <li>Implementation effect and update of ESMP;</li> <li>Wildlife identification and protection, especially bird protection</li> </ul>	<ul style="list-style-type: none"> <li>2 times during inception stage;</li> <li>1 time during project implementation</li> </ul>		50
	Emergency treatment	<ul style="list-style-type: none"> <li>Emergency plan, emergency treatment measures</li> </ul>	Once		30
	Grievance and Dispute Resolution, stakeholder's engagement	<ul style="list-style-type: none"> <li>GRM, including GRM structure, responsibilities and timetable, common grievance types and solutions;</li> <li>Requirements and plan of stakeholder's engagement during construction period</li> </ul>	<ul style="list-style-type: none"> <li>Twice: <ul style="list-style-type: none"> <li>1 time during project inception</li> <li>1 time during project implementation</li> </ul> </li> </ul>		30
Operation period	Environment and social management	<ul style="list-style-type: none"> <li>Wildlife identification and conservation, especially birds;</li> <li>Environmental and social monitoring and reporting requirements;</li> <li>Transportation safety and occupational health and safety;</li> <li>- Project environmental and social performance assessment.</li> </ul>	Once	<ul style="list-style-type: none"> <li>Yingkou Municipal Government;</li> <li>Subproject government agencies;</li> <li>Facility operation units;</li> <li>GRM acceptance point;</li> <li>Other relevant local institutions.</li> </ul>	30
Total			7		220

## **9.9 Environmental and Social Management Performance Monitoring and Reporting Plan**

### **9.9.1 Monitoring Mechanism**

687. The main objective of environmental and social monitoring in implementing projects is to ensure the environmental and social sustainability of the investment project, to ensure that the projects comply with the requirements of domestic environmental and social regulations and standards as well as the requirements of the AIIB's environmental and social policies, and to promote the long-term sustainable development of the regions in which the projects are located. Enhance project transparency through monitoring and reporting to ensure that interested parties are kept informed of the project's progress and impacts. Based on the results of monitoring, determine the need for improvement measures. The project's environmental and social monitoring mechanisms are categorized into internal and external monitoring.

688. **Internal monitoring:** The internal monitoring of the ESMP is undertaken by the Yingkou municipal PMO, sub-PMOs and PIUs, under the assistance of environmental and social experts from the PMC during the project implementation period. They will monitor and evaluate the implementation progress of the project, the implementation of the ESMP, the progress of the stakeholders engagement plan, the complaints received and handled, the use of ESMP budget, the capacity building activities and results, and the implementation of E&S rules and regulations. The environmental and social performance monitoring results will be recorded in the environmental and social monitoring report and prepared as the appendix of the progress report, submitted to the AIIB semi-annually, and the environmental and social performance will be reviewed as part of the project completion report.

689. In addition, the construction supervision company is required to conduct frequent internal monitoring of the environment, health and safety aspects of the construction site, and report to the Yingkou municipal PMO, the FTZ Sub-PMO, and the LEDZ Sub-PMO in the monthly progress reports.

690. **External monitoring:** External environmental and social monitoring will cover the entire construction and the first year of the project operation phase. Among them, (i) the social external monitoring institution will monitor the progress of the activities described in the project documents; the satisfaction of relevant individuals or units with the project consultation or disclosure; and the resolution of various complaints caused by the project. External monitoring will be conducted through a combination of sample surveys, interviews with key stakeholders and group discussions. Relevant district agencies will be visited, and participate in public consultation meetings, evaluate the effectiveness of public participation, collect opinions, and make suggestions for improvement. The external monitoring will also review the records of the GRM to determine whether it is operating effectively. (ii) External environmental monitoring will be conducted by hiring a local qualified environmental testing organization. A preliminary monitoring program, including monitoring indicators, frequency and location, is provided in this section. The external environmental monitoring agency will develop a specific monitoring program based on the final detailed design prior to conducting the monitoring.

691. The third-party monitoring and evaluation agency will prepare environmental monitoring reports, social and resettlement monitoring reports, including monitoring methods, process and monitoring results, and submit the semi-annual monitoring reports (Chinese and English versions, with the English version prevailing) to the FTZ sub-PMO, LEDZ sub-PMO, municipal PMO and AIIB.

### **9.9.2 Monitoring Plan and Content**

692. Based on the characteristics of this project, environmental and social monitoring plans have been developed separately for the construction phase and the operational phase, including both internal and external monitoring. The testing of environmental data should

be entrusted to units with the corresponding qualifications. Detailed environmental monitoring plans for the construction phase and the operational phase are provided in Table 9-8.

**Table 9-8 Environmental and Social Monitoring Program**

Monitoring Project	Monitoring Parameters	Sampling Location	Monitoring Frequency	Implementation Party	Supervisor	Cost Estimate (RMB)
<b>Before Construction (Baseline)</b>						
Ambient air quality	TSP、PM <sub>10</sub>	At the boundaries of each construction site	Before construction, 7 consecutive days	External environment monitoring agency	Municipal PMO	include in the contract of External environment monitoring agency
Acoustic environment	LAeq	At the boundary of each construction site and the Niaolang Square	One-time before construction, include day and night	External environment monitoring agency	Municipal PMO	
Surface water environment	COD, BOD5, ammonia nitrogen, TP, SS, petroleum, fecal coliform group	Minxing River	One-time before construction, 3 consecutive days	External environment monitoring agency	Municipal PMO	
<b>Construction Stage</b>						
Internal monitoring - supervision company, PMC, and environmental and social safeguard specialists of Municipal PMO and sub-PMOs are responsible						
Ambient air quality	<ul style="list-style-type: none"> <li>Implementation of Mitigation Measures: Visual inspection of dust mitigation measures (watering, covering of conveyance, etc.), inspection of fencing, and maintenance of vehicles and construction equipment</li> <li>Performance indicator: implementation of Mitigation measures in place</li> </ul>	<ul style="list-style-type: none"> <li>All construction sites</li> </ul>	<ul style="list-style-type: none"> <li>Everyday;</li> <li>Every six months</li> </ul>	<ul style="list-style-type: none"> <li>Supervision company,</li> <li>Environment expert of PMC</li> </ul>	IA	<ul style="list-style-type: none"> <li>Included in the contracts with supervision company</li> </ul>
Noise	<ul style="list-style-type: none"> <li>Implementation of noise reduction measures</li> </ul>	<ul style="list-style-type: none"> <li>Installation of online dust and noise monitoring devices at construction sites</li> <li>Municipal works at construction site boundaries</li> </ul>	<ul style="list-style-type: none"> <li>Everyday;</li> <li>Every six months</li> </ul>	<ul style="list-style-type: none"> <li>Supervision company,</li> <li>Environment expert of PMC</li> </ul>	IA	<ul style="list-style-type: none"> <li>Included in the contracts with contractors, supervision company and PMC</li> </ul>
Soil erosion and pollution	<ul style="list-style-type: none"> <li>The adequacy of measures to prevent soil runoff;</li> <li>Adequacy of measures to prevent soil contamination.</li> </ul>	<ul style="list-style-type: none"> <li>Conduct site surveys on construction sites and spoil sites</li> </ul>	<ul style="list-style-type: none"> <li>Weekly;</li> <li>Every six months (In case of heavy rain, immediately conduct after the rain stops)</li> </ul>	<ul style="list-style-type: none"> <li>Supervision company,</li> <li>Environment expert of PMC</li> </ul>	IA	<ul style="list-style-type: none"> <li>Included in the contracts with supervision company and PMC</li> </ul>

Monitoring Project	Monitoring Parameters	Sampling Location	Monitoring Frequency	Implementation Party	Supervisor	Cost Estimate (RMB)
Solid Waste	<ul style="list-style-type: none"> <li>Collection, storage and management of construction waste and domestic waste</li> <li>Performance Indicator: 100% waste is transferred at the end of the day</li> </ul>	<ul style="list-style-type: none"> <li>Visual inspection of construction sites and construction camps</li> </ul>	<ul style="list-style-type: none"> <li>Everyday;</li> <li>Every six months</li> </ul>	<ul style="list-style-type: none"> <li>Supervision company,</li> <li>Environment expert of PMC</li> </ul>	IA	<ul style="list-style-type: none"> <li>Included in the contracts with supervision company and PMC</li> </ul>
Ecological environment (Birds)	<ul style="list-style-type: none"> <li>Implementation of protection measures for birds (the specific measures are provided in Table 9-3)</li> </ul>	<ul style="list-style-type: none"> <li>Visual inspection of construction sites</li> </ul>	<ul style="list-style-type: none"> <li>Every day during bird migration season</li> <li>Spring (Mar. to May) &amp; Autumn (Sep. to Nov.)</li> </ul>	<ul style="list-style-type: none"> <li>Supervision company,</li> <li>Environment expert of PMC</li> </ul>	IA	<ul style="list-style-type: none"> <li>Included in the contracts with supervision company and PMC</li> </ul>
Construction site health and safety	<ul style="list-style-type: none"> <li>Camp sanitation, issuance and wearing of personal protective equipment, safety warning signs, implementation of on-site protective measures</li> </ul>	<ul style="list-style-type: none"> <li>Visual inspection of construction sites and camps,</li> <li>Interviews with construction workers and contractors</li> </ul>	<ul style="list-style-type: none"> <li>Everyday;</li> <li>Every six months</li> </ul>	<ul style="list-style-type: none"> <li>Supervision company</li> <li>Environment expert of PMC</li> </ul>	IA	<ul style="list-style-type: none"> <li>Included in the contracts with supervision company and PMC</li> </ul>
Community Health and Safety	<ul style="list-style-type: none"> <li>Adequacy of site signs and fencing;</li> <li>Adequacy of temporary noise mitigation measures;</li> <li>Accidents involving the public and workers;</li> <li>Emergency situations and response;</li> <li>Public complaints about noise, air pollution, safety of construction sites and traffic safety, etc.</li> </ul>	<ul style="list-style-type: none"> <li>Visual inspection</li> <li>Random interviews with surrounding enterprise employees at the construction site</li> </ul>	<ul style="list-style-type: none"> <li>Everyday;</li> <li>Every six months</li> </ul>	<ul style="list-style-type: none"> <li>Supervision company</li> <li>Environment expert of PMC</li> </ul>	IA	<ul style="list-style-type: none"> <li>Included in the contracts with supervision company and PMC</li> </ul>
GRM	<ul style="list-style-type: none"> <li>Implementation of the GRM</li> </ul>	<ul style="list-style-type: none"> <li>Interview affected people and workers near the construction site and check public complaint records</li> </ul>	<ul style="list-style-type: none"> <li>Quarterly</li> <li>Semi-annually</li> </ul>	<ul style="list-style-type: none"> <li>Supervision company</li> <li>Environment expert and social expert of PMC</li> </ul>	IA	<ul style="list-style-type: none"> <li>Included in the contracts with supervision company and PMC</li> </ul>
<b>External monitoring - the third-party monitoring agency hired by the PMO is in charge</b>						
Ambient Air	<ul style="list-style-type: none"> <li>TSP, PM 2.5, PM 10</li> </ul>	<ul style="list-style-type: none"> <li>All construction sites</li> </ul>	<ul style="list-style-type: none"> <li>Once a quarter, 3</li> </ul>	<ul style="list-style-type: none"> <li>External</li> </ul>	Municipal	<ul style="list-style-type: none"> <li>Included in the</li> </ul>

Monitoring Project	Monitoring Parameters	Sampling Location	Monitoring Frequency	Implementation Party	Supervisor	Cost Estimate (RMB)
Quality	<ul style="list-style-type: none"> <li>Performance indicators: Liaoning Province Construction and Storage Yard Dust Emission Standard (DB21/2642-2016)</li> </ul>	(at least one upwind and downwind) and nearby sensitive points	consecutive days each time	environmental monitoring agency	PMO	contracts with external environmental monitoring agency
Noise	<ul style="list-style-type: none"> <li>LAeq</li> <li>Performance indicators: Environmental Noise Emission Standard for Construction Site Boundary (GB12523-2011)</li> </ul>	<ul style="list-style-type: none"> <li>The boundaries of all construction sites, 200 m outside the boundaries, and surrounding sensitive points</li> </ul>	<ul style="list-style-type: none"> <li>Once a quarter, each time for 2 consecutive days, once in the morning and evening</li> </ul>	<ul style="list-style-type: none"> <li>External environmental monitoring agency</li> </ul>	Municipal PMO	<ul style="list-style-type: none"> <li>Included in the contracts with external environmental monitoring agency</li> </ul>
Overland Runoff	<ul style="list-style-type: none"> <li>SS, COD, BOD5, ammonia nitrogen, SS, dissolved oxygen, total nitrogen, total phosphorus, petroleum</li> </ul>	<ul style="list-style-type: none"> <li>Drains of construction site</li> </ul>	<ul style="list-style-type: none"> <li>Once a quarter, for 3 consecutive days each time</li> </ul>	<ul style="list-style-type: none"> <li>External environmental monitoring agency</li> </ul>	Municipal PMO	<ul style="list-style-type: none"> <li>Included in the contracts with external environmental monitoring agency</li> </ul>
Ecological environment (Birds)	<ul style="list-style-type: none"> <li>Population structure, bird diversity, habitat disturbance (intensity of anthropogenic disturbance, changes in suitable habitat)</li> </ul>	<ul style="list-style-type: none"> <li>Construction area and its surroundings within a 500-meter radius;</li> <li>The area between the railway connecting line and the coastal tidal flat wetlands;</li> <li>Habitats within the project impact area.</li> </ul>	<ul style="list-style-type: none"> <li>Bird breeding and migration seasons: Monitored twice annually during March-May and September-November.</li> <li>Each monitoring session lasts 5-7 days, with observations conducted once in the morning (6:00-9:00) and once in the evening (17:00-19:00) each day, lasting 30 minutes per observation session.</li> </ul>	<ul style="list-style-type: none"> <li>External environmental monitoring agency</li> </ul>	Municipal PMO	<ul style="list-style-type: none"> <li>Included in the contracts with external environmental monitoring agency</li> </ul>
Social	<ul style="list-style-type: none"> <li>The implementation process of</li> </ul>	<ul style="list-style-type: none"> <li>Project area,</li> </ul>	<ul style="list-style-type: none"> <li>Semi-annually</li> </ul>	<ul style="list-style-type: none"> <li>Social and</li> </ul>	Municipal	<ul style="list-style-type: none"> <li>Included in the</li> </ul>

Monitoring Project	Monitoring Parameters	Sampling Location	Monitoring Frequency	Implementation Party	Supervisor	Cost Estimate (RMB)
management plan implementation	social management	surrounding areas and related units		resettlement monitoring agency	PMO	contracts with external social and resettlement monitoring agency
Land acquisition and resettlement plan implementation	<ul style="list-style-type: none"> <li>Implementation of the RP</li> </ul>	<ul style="list-style-type: none"> <li>Project areas and units involving construction land, demolition of above-ground attachments, and resettlement</li> </ul>	<ul style="list-style-type: none"> <li>Semi-annually (once a year after the completion of collection compensation and resettlement activities)</li> </ul>	<ul style="list-style-type: none"> <li>Social and resettlement monitoring agency</li> </ul>	Municipal PMO	<ul style="list-style-type: none"> <li>Included in the contracts with external social and resettlement monitoring agency</li> </ul>
<b>Operation stage</b>						
Internal monitoring, environmental and social safeguard specialists of municipal PMO and sub-PMOs, facility operation and maintenance unit are responsible						
Ambient air quality	<ul style="list-style-type: none"> <li>The implementation of mitigation measures, including the planting and maintenance of green belts and green trees, the timeliness of road cleaning and vehicle washing</li> </ul>	<ul style="list-style-type: none"> <li>Roads in the factory area</li> </ul>	<ul style="list-style-type: none"> <li>Once a month</li> </ul>	<ul style="list-style-type: none"> <li>Facility operation and maintenance unit</li> </ul>	Municipal PMO	<ul style="list-style-type: none"> <li>Included in the daily management budget of facility operation and maintenance unit</li> </ul>
Solid Waste	<ul style="list-style-type: none"> <li>Collection, storage and management of production waste and domestic waste, collection and treatment of hazardous solid waste</li> </ul>	<ul style="list-style-type: none"> <li>Factory area</li> </ul>	<ul style="list-style-type: none"> <li>Once a month</li> </ul>	<ul style="list-style-type: none"> <li>Facility operation and maintenance unit</li> </ul>	Municipal PMO	<ul style="list-style-type: none"> <li>Included in the daily management budget of facility operation and maintenance unit</li> </ul>
Ecological environment (Birds)	<ul style="list-style-type: none"> <li>Implementation of mitigation measures (including whether to slow down or ban whistles when the trains drive near bird habitats, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>Railway connections and storage yards</li> </ul>	<ul style="list-style-type: none"> <li>Once a week</li> <li>Spring (March-May)</li> <li>Autumn (September-November)</li> </ul>	<ul style="list-style-type: none"> <li>Facility operation and maintenance unit</li> </ul>	Municipal PMO	<ul style="list-style-type: none"> <li>Included in the daily management budget of facility operation and maintenance unit</li> </ul>
GRM	<ul style="list-style-type: none"> <li>Implementation of the GRM</li> </ul>	<ul style="list-style-type: none"> <li>Interview enterprise employees, nearby affected people, check public complaint records</li> </ul>	<ul style="list-style-type: none"> <li>Semi-annually</li> </ul>	<ul style="list-style-type: none"> <li>Facility operation and maintenance unit</li> </ul>	Municipal PMO	<ul style="list-style-type: none"> <li>Included in the daily management budget of facility</li> </ul>

Monitoring Project	Monitoring Parameters	Sampling Location	Monitoring Frequency	Implementation Party	Supervisor	Cost Estimate (RMB)
						operation and maintenance unit
Operation stage - the third-party monitoring company hired by the PMO is responsible						
Ambient air quality	<ul style="list-style-type: none"> <li>• NO<sub>2</sub>, SO<sub>2</sub>, CO, PM<sub>10</sub>, PM<sub>2.5</sub></li> </ul>	<ul style="list-style-type: none"> <li>• 200 m from the road centerline</li> </ul>	<ul style="list-style-type: none"> <li>• Once a quarter, each time for 3 consecutive days</li> </ul>	<ul style="list-style-type: none"> <li>• External environmental monitoring agency</li> </ul>	Municipal PMO	<ul style="list-style-type: none"> <li>• Included in the contract with external environmental monitoring agency</li> </ul>
Noise	<ul style="list-style-type: none"> <li>• LAeq</li> <li>• Environmental Noise Emission Standard for Industrial Enterprise Boundary (GB12348-2008)</li> </ul>	<ul style="list-style-type: none"> <li>• Factory boundary, 200 m from the centerline of the road, 100 m from the centerline of the railway, and the Niaolang Square</li> </ul>	<ul style="list-style-type: none"> <li>• Twice a year, each time for 2 consecutive days, twice a day (morning and evening)</li> </ul>	<ul style="list-style-type: none"> <li>• External environmental monitoring agency</li> </ul>	Municipal PMO	<ul style="list-style-type: none"> <li>• Included in the contract with external environmental monitoring agency</li> </ul>
Ecological environment (Birds)	<ul style="list-style-type: none"> <li>• Population structure, bird diversity, habitat disturbance (human-induced disturbance intensity, suitable habitat changes)</li> </ul>	<ul style="list-style-type: none"> <li>• Sample lines are set according to habitat types within the project impact area.</li> </ul>	<ul style="list-style-type: none"> <li>• Migration season; April and September each year</li> </ul>	<ul style="list-style-type: none"> <li>• External environmental monitoring agency</li> </ul>	Municipal PMO	<ul style="list-style-type: none"> <li>• Included in the contract with external environmental monitoring agency</li> </ul>
Social management plan	<ul style="list-style-type: none"> <li>• Implementation activities of the social management plan</li> </ul>	<ul style="list-style-type: none"> <li>• Factory area</li> </ul>	<ul style="list-style-type: none"> <li>• Once every quarter</li> </ul>	<ul style="list-style-type: none"> <li>• External Social and resettlement Monitoring Agency</li> </ul>	Municipal PMO	<ul style="list-style-type: none"> <li>• Included in the contract with external social and resettlement monitoring agency</li> </ul>

LAeq = Equivalent continuous A -weighted sound pressure level

If any excess is found: (1) Immediately report to the Yingkou PMO; (2) Take corresponding actions; (3) Carry out follow-up monitoring to determine whether the relevant standards are met after taking actions; (4) All problems will be included in the "Environmental and Social Performance Monitoring Report" submitted to the AIIB.

### 9.9.3 Report

693. The Environmental and Social Internal Monitoring Report includes: (i) Implementation progress of the Environmental and Social Management Plan (ESMP) during the reporting period, and improvements and corrective actions taken in response to non-compliances noted in the previous reporting period. (ii) Overall effectiveness of the ESMP implementation, including public and occupational health and safety. (iii) Environmental monitoring and compliance. (iv) Institutional strengthening and training, including training topics related to environment, social issues, health, and safety, the training audience, and a summary of the training effects. (v) Stakeholder engagement: Summarize the stakeholder engagement activities, including meetings and consultation activities, record the opinions and feedback from stakeholders, and describe how these inputs were addressed. (vi) Operation of grievance mechanism: Compile and analyze the grievances received, including the number, types, handling processes, and outcomes. (vii) Labor statistics related to the operation of grievance mechanisms: the number of workers (including subcontractor workers), nationalities, local or foreign, gender ratios, and the number of new employees. (viii) Any issues encountered during the construction and operational phases, and the related corrective actions taken, with suggestions and plans for further improvements. The environmental and social experts of PMC will assist the Yingkou municipal PMO, FTZ sub-PMO and LEDZ sub-PMO to prepare internal monitoring report, and submit it as part of progress report to the AIIB for review and disclosure.

694. The third-party monitoring and evaluation institutions will prepare environmental monitoring and assessment reports, resettlement and social monitoring and assessment reports, including monitoring methods, monitoring processes, monitoring results and evaluation, and submit the monitoring reports (in both Chinese and English versions, the English version shall be the criterion) to the FTZ sub-PMO, LEDZ sub-PMO, Yingkou PMO and AIIB every six months.

695. If major environmental and safety incident occurs resulting in injuries or fatalities, the reporting mechanism should be immediately activated. On-site personnel must promptly notify the management, municipal PMO, and relevant authorities, and compile a preliminary incident report within 24 hours. This report should describe the time, location, cause, and response measures of the incident. The municipal PMO is required to prepare an accident investigation report within 48 hours and submit it to the AIIB.

696. For non-compliances identified during monitoring, contractors and facility operation and maintenance units should analyze the causes of the non-compliance and take immediate corrective actions. All corrective measures must be documented and tracked to ensure the effectiveness of the measures and continuous improvement.

**Table 9-9 Environmental and Social Reporting Program**

Report Name	Prepared By	Submit To	Reporting Frequency
A. Construction period			
Construction Progress Report	Supervision company	Sub-PMOs and municipal PMO	Every month
Project Progress Report (including internal environmental and social performance monitoring)	Municipal PMO	AIIB	Every six months
External Environmental Monitoring Report External Social Monitoring Report	External monitoring company	Sub-PMOs, municipal PMO and AIIB	Every quarter or every six months (in consultation with AIIB)
B. Operation period (until completion report is completed)			
Project Progress Report (including internal environmental and social performance monitoring)	Municipal PMO	AIIB	Every six months

External Environmental Monitoring Report External Social Monitoring Report	Municipal PMO	AIB	Every six months
C. Project Completion Report			
Environmental and Social Completion Report	Municipal PMO	AIB	Once

### 9.10 Estimated Cost for Environmental and Social Management Plan

697. The officials responsible for environmental and social safeguards in the project management office are paid from the operational budget of the project office, and the expenses for experts are covered by the project management consulting package, so these costs are not separately listed here. The total estimated cost for implementing the Environmental and Social Management Plan project is 15.913 million RMB, including:

- (i) Implementation costs of environmental and social mitigation measures totaling 12.543 million RMB (Free Trade Zone construction section 2.044 million RMB, municipal section 1.356 million RMB, railway engineering section 1.782 million RMB; Liaodong River Economic Development Zone sub-project 7.342 million RMB);
- (ii) Environmental and ecological monitoring expenses of 2.7 million RMB;
- (iii) Training expenses of 70,000 RMB;
- (iv) Social monitoring expenses of 600,000 RMB.

## 10 Stakeholder Consultation

698. This chapter presents the public and stakeholder consultations conducted during the development of the current ESIA, and the stakeholders engagement plan during project implementation process.

699. In the process of project feasibility study, design and implementation, meaningful public participation and consultation are important. The *Environmental Protection Law of the People's Republic of China, Regulations on Environmental Protection Management of Construction Projects* (Decree No. 253 of the State Council) and *Measures for Public Participation in Environmental Impact Assessment* (Decree No. 4 of the Ministry of Ecology and Environment, April 2018) require EIA agency solicits opinions from relevant organizations, as well as villagers and residents in and near the project site. In August 2012, National Development and Reform Commission (NDRC) issued the requirements for *Social Risk Assessment of Large-scale Investment Projects*, emphasizing the importance of effective public consultation and requiring a clear summary of the results of the public consultation in the domestic EIA report, including the date of consultation, the number of interested parties, APs, and public comments and requests received.

700. The AIIB's environmental and social management policies also require meaningful public participation and information disclosure. The public participation process of this project complies with the laws/regulations of the PRC and the environmental and social management policies of the AIIB.

### 10.1 Objectives of Public Participation

701. Stakeholder consultation/participation during all stages of a development project helps to improve decision-making and ultimately achieve sustainable development.

702. Stakeholder consultation is a two-way process. For stakeholders, the consultation process is an opportunity to obtain information about the project, understand its potential impacts, and raise questions and concerns. For project owners, the consultation process provides an opportunity to learn about stakeholders and their concerns about the project, their needs and expectations, and their suggestions that may help shape the project and its design. Listening to stakeholder concerns and feedback can be a valuable source of information that can improve project design and outcomes, and help project owners identify and control external risks.

703. The specific objectives of the ESIA are listed below.

- Sharing information about the project and key findings of the EIA with stakeholders;
- Obtaining feedback on the project, expected impacts, and preferred mitigation measures, and gathering information on the environmental, ecological, and socioeconomic baselines of the project area;
- Understanding stakeholder concerns regarding various aspects of the project, including the status, potential impact of construction works and construction-related activities;
- Establishing and maintaining communications between project owners and stakeholders;
- Ensuring that stakeholders' views and concerns are incorporated into project design and implementation as much as possible, with the goal of reducing or offsetting negative impacts and improving the benefits of the project;
- Managing expectations and misconceptions related to the project;

- Obtaining support from local ethnic minorities of residents in the project area;
- Interaction with project APs and other stakeholders to collect primary and secondary data related to project activities;
- Collaborating with stakeholders to maximize project benefits.

## 10.2 Stakeholder Identification

704. **Primary stakeholders** (also referred to as direct stakeholders) are grassroots stakeholders such as those affected by the project and the public including women living in the project area. These people are directly exposed to the impact of the project, although in some cases they may not have received any direct benefits from the project. Specifically include:

- Yingkou Salt Industry Company
- Yingkou Comprehensive Bonded Zone Bonded Logistics Group Co., Ltd.
- Enterprises near the construction area of the FTZ sub-project
- Staff dormitory in the zones

705. **Secondary stakeholders** are people, departments, agencies and /or organizations who may not be directly affected by the project but who may influence the project and its design. They include project owners, other relevant departments that may play a role in various stages of the project, regulators, social organizations and citizens of Yingkou. Specifically include:

- Enterprises settled in the first and second phases of LEDZ
- Staff of FTZ and LEDZ Management Committee
- Project contractors, subcontractors, supervision companies
- Project consultants
- Municipal corporations in Yingkou City, such as WWTPs and waste-to-energy plant operators

Table 10-1 Stakeholder Analysis Matrix

Location	Stakeholder	Interests of Concern	Project Impact	Concern/Prioritization of Impact
Main Stakeholders				
LEDZ Subproject	Yingkou Salt Industry Company	Can adequate compensation be given for project land acquisition?	The project will be constructed on the low-yield salt fields owned by the Company	Formulate a resettlement plan and implement it according to the plan
FTZ sub-project - comprehensive bonded area	Yingkou Comprehensive Bonded Zone Bonded Logistics Group Co., Ltd	Procedures for the transfer and acquisition of state-owned construction land use rights for new construction projects of railway station construction subprojects		
	Yingkou Futai Technology Co., Ltd.	The project brings new enterprises settled in the zone to cooperate with enterprises to extend the industrial chain	Traffic, noise and dust impacts from equipment, installation and civil works for infrastructure upgrades	Minimize disruption to the daily activities of established businesses around the project by requiring contractors to take mitigation measures at the site.  During the construction period, electricity and water supply will be provided for the settled enterprises
	Yingkou Sanzheng New Technology Chemical Co., Ltd.	Increase the scope of land that can be rented and purchased.  Increase jobs and employment opportunities.		
	Liaoning Zhengdian Aluminum Building System Co., Ltd	Provide convenient municipal infrastructure and a better working environment		
FTZ sub-project - dry port hub industrial park	Yingkou Fangyuan Mold Co., Ltd.			
	Liaoning Xinhongyuan			

Location	Stakeholder	Interests of Concern	Project Impact	Concern/Prioritization of Impact
	Environmental Protection Material Co., Ltd			
	Xinhai Defense Police Station	Provide convenient municipal infrastructure and a better working environment		
Free trade sub-project - railway	Shenyang Railway Bureau Group	Successful construction of the railway subproject	Optimize business benefits	The industrial development of the zone in the future and the demand for railway logistics
	Staff in dormitory of two zones		Traffic, noise and dust impacts from equipment, installation and civil works for infrastructure upgrades	Contractors implement environmental and social mitigation measures
Secondary Stakeholder				
Indirect APs	Citizens of Yingkou	<p>Improve the accessibility of urban public services.</p> <p>Better living conditions.</p> <p>Access to more diverse employment opportunities.</p>		Details of project implementation, such as key activities, duration, and implementation start date
	Employees of enterprises that have settled in the FTZ and LEDZ	<p>More convenient infrastructure at the workplace.</p> <p>A better working environment.</p> <p>Access to more diverse job opportunities.</p>	Traffic and environmental impacts from equipment, installation and civil works for infrastructure upgrades	<p>Implementation should be done regionally, but simultaneously.</p> <p>Construction work will not last more than one year.</p>

Location	Stakeholder	Interests of Concern	Project Impact	Concern/Prioritization of Impact
Project Participating Organizations	FTZ and LEDZ management committees and sub-PMOs	Successful project implementation	Institutional capacity strengthening	The project is successfully implemented
	Contractors and Subcontractors	Successful project construction work.	Strengthen project management capabilities and enrich project experience	Minimize disruption to the daily activities of established businesses around the project by requiring contractors to take mitigation measures at the site.  During the construction period, electricity and water supply will be provided for the settled enterprises.  Safety issues in the workplace.
	Consulting firm	Successful project construction work.	Strengthen project management capabilities and enrich project experience.	Construction can be carried out according to the implementation plan.  Assist the PMO in managing all impacts and risks during construction.
Municipal facilities operating company	Yingkou Yuefeng Power Environmental Protection Co., Ltd.	Benefits of waste-to-energy plants.	The increase in production and solid waste treatment that may be caused during the project operation period.	Waste quality of construction enterprises and operation period.
	Yingkou Eastern Wastewater Treatment Plant	Benefits of WWTP	Increase in sewage treatment volume that may be caused during the project operation period.	Proper pretreatment of industrial wastewater in the zone.

<b>Location</b>	<b>Stakeholder</b>	<b>Interests of Concern</b>	<b>Project Impact</b>	<b>Concern/Prioritization of Impact</b>
	Southern Wastewater Treatment Plant of Yingkou City	Benefits of WWTP	Increase in sewage treatment volume that may be caused during the project operation period.	Proper pretreatment of industrial wastewater in the zone.

### 10.3 Public Participation Activities Organized by Each Sub-Project

706. In order to enhance public understanding of the project and to address community concerns about mitigating adverse impacts of the two subprojects, meetings were held with groups of possible APs, communities and other stakeholders during the on-site investigations. The investigation is part of the detailed project report. Table 10-2 summarizes information on these activities.

707. From May 23 to 25, 2023, the FTZ Sub-PMO, the LEDZ Sub-PMO and consultants held meetings, questionnaires, focus group interviews and other activities. A total of 21 people from the FTZ and 70 people from the LEDZ participated in the meeting for this environmental and social survey, making a total of 91 people. Among them are the management personnel of the PMOs, representatives of the affected enterprises, and consulting agencies, and the number of women has reached more than 40%.

**Table 10-2 Information on public consultation activities**

No.	Meeting	Time	Location	No of participants	Female ratio
1	FTZ Subproject Public Consultation Meeting I	Morning of May 25, 2023	Conference Room 651, FTZ Management Committee Building	10	33.33%
2	FTZ Subproject Public Consultation Meeting II	Afternoon on May 25, 2023		11	35.29%
3	LEDZ Subproject Public Consultation Meeting I	Afternoon on May 23, 2023	LEDZ meeting room	22	35.29%
4	LEDZ Subproject Public Consultation Meeting II	Morning of May 24, 2023		20	35.48%
5	LEDZ Subproject Public Consultation Meeting III	Afternoon on May 24, 2023		28	45.10%

708. In the public consultation activity in May 2023, the consultants distributed questionnaires to representatives of stakeholders in FTZ and LEDZ who participated in the meeting and those who failed to attend the meeting. There were 134 valid questionnaires for stakeholders of the FTZ subproject, and female participants accounted for 65%; there were 108 valid questionnaires for stakeholders of the LEDZ subproject, and female participants accounted for 63%.



**Figure 10-1 Discussion with relevant departments of the FTZ Management**



**Figure 10-2 Discussion with business representatives in the FTZ**

### Committee



**Figure 10-3 Discussion with LEDZ Salt Industry Company**



**Figure 10-4 Discussion with enterprise representatives in LEDZ**



**Figure 10-5 Female representatives filling out the questionnaires**



**Figure 10-6 Representatives of female enterprises in LEDZ**

## 10.4 Main findings

### 10.4.1 Stakeholder attitudes towards the project

709. In general, 85% of stakeholders expressed full support for the project, 12% think the project had little to do with them, and expressed indifference to the project. According to the questionnaire survey, 98% of the participants believe that the project is beneficial to the country and the collective, and 95% of the participants believe that the project is beneficial to personal development, which will improve communication and coordination ability, management ability, project execution and implementation, professional skills, labor right maintenance, ability to deal with risks and innovation. Participants believe that through the construction and implementation of the project, the participants' awareness of environmental protection, labor rights protection, gender equality, technological innovation, smart industry development, and safe production and construction can be enhanced. In terms of personal development opportunities, better and more diversified employment opportunities and entrepreneurial opportunities can be obtained, income can be increased, personal career development can be promoted, and participation in the development of smart industries can be achieved. Regarding the working environment, the participants believe that the project can improve the road environment and increase opportunities for convenient travel. 83% of the participants think that the project has no negative impact, and 9% of the participants think that the project may affect traffic, bring about environmental problems such as noise and sewage.

### 10.4.2 Key Stakeholder Needs

710.45% of the project stakeholders hope that the project can provide more job opportunities, 41% hope to reduce the impact on the environment, 27% hope that the project can properly solve the compensation and resettlement issues, 16% hope to participate in project construction and post-operation, and 11% hope to participate in project decision-making.

711. Through the questionnaire survey, it is found that the public hopes that this project can improve wages and social security, obtain opportunities for promotion, opportunities for training, learning and exchanges, and obtain a good working environment and atmosphere. 15 % of the public hope to have compliant working hours and realize the balance between men and women.

### 10.5 Information Disclosure

712. According to the *Environmental Impact Assessment Law of the People's Republic of China*, the *Interim Measures for Public Participation in Environmental Impact Assessment* promulgated by the Ministry of Environmental Protection, the requirements of the AIIB's Environmental and Social Framework (revised in 2021) and the 2021 AIIB's Environmental and Social Framework (ESF), the Municipal PMO, sub-PMOs, and relevant construction units have organized and carried out a series of information disclosure work, including posting announcements and website announcements.

713. On November 7, 2022, the Yingkou Liaohe Sub-PMO posted an announcement on the project site, mainly announcing the general situation of the project, the impacts during construction and operation, and the measures to avoid it. As of today, no feedbacks were received. The main announcement content is shown in the figure below:



Figure 10-7 Poster announcements on site

714. On January 16, 2023, the LEDZ Management Committee announced the project on the official government website. During the announcement period, no feedbacks from the public were received. See Figure 10-8 for the main announcement content.



Figure 10-8 Website publicity

715. On February 16, 2023, the project information was disclosed through the website of the Yingkou Municipal People's Government, and the project information was informed to the public through the Yingkou News Channel (Figure 10-9 and Figure 10-10).



Figure 10-9 Screenshot of Yingkou news reporting project information



**Figure 10-10 Screenshot of government website news**

716. Stakeholders were disclosed with the following project information during the preparation process: (i) the purpose, nature and scale of the project; (ii) the duration of project components and activities; (iii) potential impacts and risks to the community.

717. During the preparation of the Stakeholder Engagement Plan, stakeholders have been consulted through focus group discussions, key informant interviews, in-depth interviews with APs and workshops. Project impacts and risks have been discussed with different stakeholders. Measures taken to avoid or minimize these impacts and risks as reported by them have been addressed during the formulation of the Stakeholder Engagement Plan.

718. The PMO will continue to disclose information to stakeholders in various ways, such as working meetings, project information posters in public areas, WeChat public accounts, media news and other easily acceptable forms, and publicize the construction implementation schedule and work site at the construction site activities, etc. Information disclosure will focus on the implementation of mitigation measures, project activities, any changes to implementation plans, and responses to issues or grievances raised by APs and affected groups.

## 10.6 Public Engagement Plan

719. Throughout the project implementation process, in order to ensure continuous public participation with project stakeholders, the project has developed a stakeholder engagement plan framework. The public participation in this project should meet the following requirements: (i) It should be carried out after the starting and completion of important projects, so as to ensure that stakeholders can obtain relevant information, and they will give opinions and get responses to possible problems, (ii) Conduct broader public engagement on project progress to ensure stakeholders have access to relevant information. The FTZ and LEDZ sub-PMOs will carry out stakeholder engagement activities through questionnaire surveys, household surveys, seminars and hearings.

720. Project-wide public engagement and citizen engagement is an ongoing process that will continue throughout project implementation. Public participation with stakeholders can be held on a regular basis. Stakeholders include but are not limited to relevant government departments of Yingkou City, management committees of FTZ and LEDZ, and business representatives around the project. Particular attention is paid to the empowerment of women's participation.

721. This report formulates a framework for the stakeholder engagement plan carried out during project implementation, see Table 10-3 below for details.

722. Public consultation activities during construction and operation will be included in the semi-annual monitoring report submitted by the Yingkou PMO and the two sub-PMOs to the AIIB. These consultations will focus on mitigation measures being implemented and their effectiveness.

Table 10-3: Stakeholder Engagement Plan

No.	Activities	Target Stakeholders	Communication Method	Monitoring indicators	Sources of funds	Schedule
1	Discuss traffic safety and road safety issues construction may pose to businesses near the site	<ul style="list-style-type: none"> <li>• Yingkou Comprehensive Free Trade Zone Company</li> <li>• Yingkou Futai Technology Co., Ltd.</li> <li>• Yingkou Sanzheng New Technology Chemical Co., Ltd.</li> <li>• Liaoning Zhengdian Aluminum Building System Co., Ltd.</li> <li>• Yingkou Fangyuan Mold Co., Ltd.</li> <li>• Liaoning Xinhongyuan Environmental Protection Material Co., Ltd.</li> <li>• Xinhai Defense Police Station</li> <li>• Employees of enterprises that have settled in the Free Trade Zone and Zone 1/2 of the Economic Development Zone</li> </ul>	Interviews with key informants of business leaders, employees and construction management.	<ul style="list-style-type: none"> <li>• Type of communication</li> <li>• Number of key stakeholders consulted by gender</li> <li>• Developed traffic and road safety management plan</li> <li>• Number of businesses of concern proposed in the plan</li> </ul>	Project Civil Works Budget	Before a construction permit is issued
2	Disclose project-based GRM, including terms, procedures, and response systems to the public (especially affected people or groups).	All stakeholders	Publish the terms, procedures and response system of the GRM, such as the contact information of the contractor, CSC and two sub-PMOs.	<ul style="list-style-type: none"> <li>• Understand GRM provisions, procedures and number of stakeholders in response systems by gender</li> <li>• Number of channels through which the GRM is published</li> </ul>	Project Management Budget	Before civil works start

No.	Activities	Target Stakeholders	Communication Method	Monitoring indicators	Sources of funds	Schedule
3	Receive and respond to grievances or complaints from interested parties	All stakeholders	<ul style="list-style-type: none"> <li>• Record the number of complainants by gender, age, occupation, number of specific complaints, results of responses.</li> <li>• Conduct seminars or personal interviews or other communicable means with the complainant to disseminate the complainant's claims.</li> </ul>	<ul style="list-style-type: none"> <li>• Number of grievances received and recorded by sex, age, occupation.</li> <li>• Number of grievances or complaints received and recorded.</li> <li>• Resolution of documented grievances.</li> <li>• The type of communication for release resolution.</li> </ul>	Project Management Budget	The entire project implementation period
4	Discuss the implementation of mitigation measures, especially traffic and road safety management, enhancement of GRM, potential problems and impacts of project construction and other activities with stakeholders.	<ul style="list-style-type: none"> <li>• Employees of enterprises that have settled in the Free Trade Zone and Zone 1/2 of the Economic Development Zone</li> <li>• Contractor</li> <li>• Sub-PMOs</li> <li>• Implementation Management Consultant</li> </ul>	<ul style="list-style-type: none"> <li>• Public meetings with different stakeholders.</li> <li>• Personal interviews with business representatives, especially women, people with disabilities, etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Type and number of communication methods used</li> <li>• Number of stakeholders involved by gender, age and occupation</li> <li>• Amount of stakeholder feedback</li> </ul>	Project Management Budget	The entire project implementation period
5	Continue to disclose information to stakeholders, including the main activities of each subcontract and sub-project of the project, implementation progress, potential risks and impacts; monitoring results of social risks and impacts.	All stakeholders	<ul style="list-style-type: none"> <li>• Public meetings with different stakeholders.</li> <li>• Especially female employees and people with disabilities</li> <li>• Disclose project information at the office of the management committee and other accessible sites.</li> </ul>	<ul style="list-style-type: none"> <li>• Type and number of communication methods used</li> <li>• Number of stakeholders involved by gender, age and occupation</li> </ul>	Project Management Budget	The entire project implementation period

## 11 Grievance Redress Mechanism

### 11.1 Objectives and Principles

723. During project construction and operation, issues/complaints may be related to land acquisition and resettlement, traffic disturbance, dust emissions, construction noise, improper waste disposal, damage to private property, safety measures to protect the public and construction workers, etc. Project stakeholders have been and will be fully aware of their grievance rights and oral and written procedures when it comes to consultation, investigation and compensation.

724. For the smooth implementation of the grievance redress mechanism (GRM), the following principles must be fulfilled:

(i) The principle of equal treatment: the principle of treating all complainants equally. No discrimination or privilege shall be accorded to any complainant in filing, conducting or participating in any form of complaint.

(ii) Time limit principle: Once the complainant files a complaint, the relevant agency must proceed quickly after accepting the complaint and entering the complaint procedure.

(iii) Confidentiality principle: In order to prevent retaliation by the respondent and protect the rights and interests of the complainant, the name of the complainant must be kept confidential.

### 11.2 Grievance Redress Channels

#### 11.2.1 Existing Channels

725. In the process of project preparation, construction, and operation, in order to understand and solve the impact and problems brought by the project to stakeholders in a timely manner, to ensure residents' demand for information disclosure and as wide a public participation as possible, established various and effective channels for complaints and complaints can be utilized (Table 11-1).

726. The existing channels are:

**Table 11-1 Existing GRM channels**

No.	Complaint Feedback Channel
1	Yingkou City 12345 Government Service Convenience Hotline and Website Complaints
2	Complaints at the manual window and website of Yingkou Municipal Public Complaints and Proposals Administration
3	12369 Environmental Protection Complaint Reporting Hotline and Website Complaint by Yingkou City Ecological Environment Bureau
4	The public complaints and proposals departments of various government agencies

(i) Yingkou City 12345 Government Service Convenience Hotline

727. The 12345 hotline mainly accepts various non-emergency demands from enterprises and the general public, including consultation, help, complaints, reports, and suggestions in the fields of economic regulation, market supervision, social management, public services, and ecological and environmental protection. The 12345 hotline is managed by the Yingkou Business Environment Construction Bureau, and other departments are responsible for cooperating with and responding to citizens' complaints. The complaint channel on the website is directly linked to the unified management platform of Liaoning Province<sup>30</sup>



Figure 11-1 Screenshot of Liaoning Government Service Website

(ii) Complaints at the manual window and website of Yingkou Municipal Public Complaints and Proposals Administration

728. Yingkou citizens can express their complaints through manual windows and online channels<sup>31</sup>. The Yingkou Municipal Public Complaints and Proposals Administration has publicized its unit address and provided complaint channels on its website, clarified the online petition process, and provided complaint progress inquiry and evaluation services.

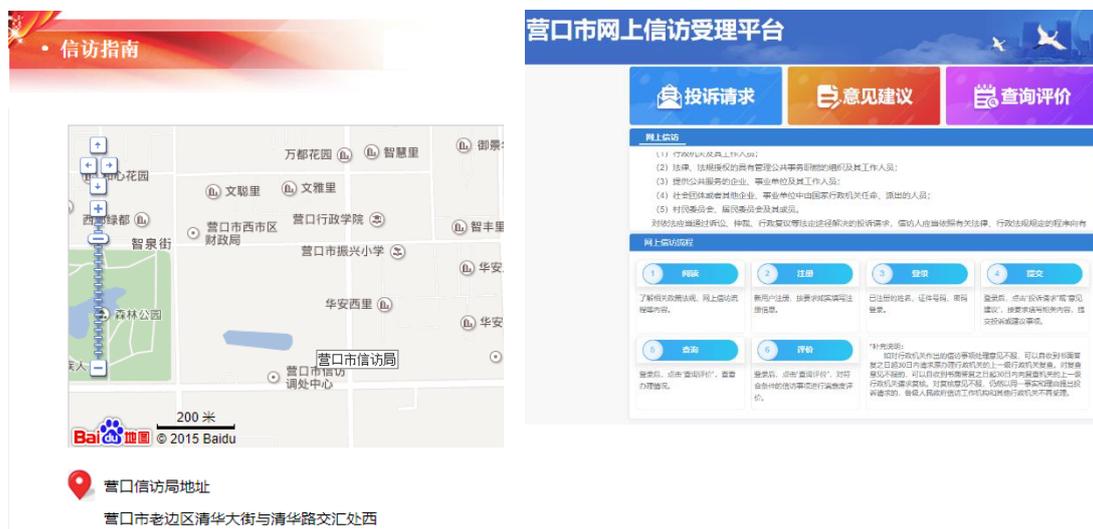


Figure 11-2 Service addresses and website complaint channels disclosed by

<sup>30</sup> Yingkou Government Service Website, <http://zfwf.yingkou.gov.cn/ykzwdt/epointzwmhwz/pages/default/index>

<sup>31</sup> Website of Yingkou City Complaint Bureau, <http://www.ykxfj.gov.cn/index.html>

## Yingkou Municipal Public Complaints and Proposals Administration

(iii) 12369 Environmental Protection Complaint Reporting Hotline and Website Complaint by Yingkou City Ecological Environment Bureau

729. The 12369 hotline mainly accepts complaints related to environmental protection, and the Citizen Complaint Center of the Municipal Bureau of Ecology and Environment is responsible for accepting and handling complaints, and its call seats are merged into the 12345 platform at the same level. In 2021, 9 people will be set up to handle complaints, and there were about 60 complaints<sup>32</sup> per quarter in 2021. The Yingkou Ecological Environment Bureau also set up a complaint channel on the website<sup>33</sup>

The screenshot displays the 'Interactive Communication' (互动交流) page of the Yingkou Municipal Ecological Environment Bureau website. The page features a navigation bar with links for 'Home', 'Government Information Disclosure', 'Government Services', 'Interactive Communication', 'Work Dynamics', and 'Party Building and Discipline Inspection'. The main content area includes a sidebar with 'Interactive Communication' and 'Leadership Mailbox' (领导信箱) sections. The 'Interactive Communication' section contains a form for submitting information, with fields for name, E-mail, postal code, contact phone, city (Yingkou), and district (Dianqian District). Below the form are buttons for 'Submit Information', 'Processing Status', 'My Mailbox', and 'Query Reply'. The 'Leadership Mailbox' section contains a form for submitting suggestions or reflecting on situations, with fields for title and content, and buttons for 'Reset' and 'Send'.

Figure 11-3 Complaint channels on the website of Yingkou Ecological Environment Bureau

(iv) The public complaints and proposals departments of Various Government Agencies

730. The Yingkou Municipal People's Government has a Bureau of the public complaints and proposals, and government agencies such as natural resources planning, housing and urban-rural construction, and transportation all have departments of the public complaints and proposals to receive complaints and petitions in their respective areas of operation.

### 11.2.2 Project Channels

731. Yingkou Project Office, Yingkou Free Trade Zone and the sub-project offices of Liaohe Economic Development Zone have all arranged environment and social staffs to collect residents' opinions, including complaints. The complaint telephone number and email address of the Yingkou City Project Office and sub-project offices have been publicized at the time of project information disclosure to ensure smooth channels for appeal and redress. Contact information for contractors, construction supervisors and external monitoring and evaluation agencies will also be disclosed during the project construction

<sup>32</sup> Data Source: People's Government of Yingkou. (2021, January). The results of the two rounds of rankings conducted by the Municipal Business Bureau.

<sup>33</sup> Website of Yingkou Municipal Bureau of Ecology and Environment <http://sthj.yingkou.gov.cn/hdjl/015001/interactivecommunication.html>

period.

**Table 11-2 Contact information of full-time personnel**

unit	Complaint mailbox	Contact name	contact number
Yingkou Project Office	ykdzmb@163.com	Mr. XU Qingsen	+86 18742288678
Yingkou Free Trade Zone Subproject Office	zimaqulugang@163.com	Mr. JIN Peng	+86 183 4063 7000
Liaoh Economic Development Zone Subproject Office	lhkfqmb@163.com	Mr. YANG Mu	+86 15541789595

732. The PMOs should ensure that stakeholders understand the GRM and conflict resolution mechanism at an early stage of the project. Before construction, the contact persons at the access points of different channels will be identified, including contractors, construction supervision companies, Yingkou PMO and 2 Sub-PMOs, FTZ and LEDZ Ecological Environment Bureau and other relevant agencies. Their contact details (telephone number, address, email address) will be publicly disclosed on an information board at the construction site.

733. GRM channels will be open to all members of the public, including vulnerable groups (women). Anyone can make an appeal by phone, letter, email and other media. Publish specific contact information (e.g. phone number, address, email address, etc.)

734. Yingkou PMO, sub PMOs or contractors need to properly record all complaints and solutions, and make them public for public inspection and supervision. The Environmental and social staffs of the Yingkou PMO will be responsible for the overall coordination of the GRM, record keeping and reporting to the AIIB.

### 11.2.3 AIIB Channel

735. In addition, AIIB set up the PPM for people affected by AIIB projects. This mechanism is adapted to the following situations: those affected by the project believe that they have been or may be negatively affected by the AIIB project, and the reason for these negative effects is that the AIIB project failed to implement the AIIB's "Environmental and Social Policy" (ESP) as required. If the project-level GRM or the management process of the AIIB cannot satisfactorily resolve the concerns of the project-affected people and obtain the approval of the project-affected people, then the project-affected people can put forward corresponding opinions through this mechanism, which can ensure comments from those affected by the project are independently and impartially reviewed. Specific information on the AIIB's complaint mechanism can be found on the AIIB's website<sup>34</sup>

### 11.2.4 Grievance Redress Mechanism for Workers

736. Based on experience, establish a separate complaint handling center to handle complaints lodged by workers working on construction sites with contractors. These complaints include wages, overtime pay, timely payment of wages, problems with accommodation or facilities related to drinking water, sanitation and medical services.

737. The project will set up a complaint committee to deal with any complaints raised by construction workers, including workers directly or indirectly involved. The members of the appeal committee include: the environmental and social staffs of PMOs, supervision engineers, representatives of workers, contractors, and suppliers. The environmental and social staffs of the project IA will be responsible for handling complaints and ensuring that affected workers will not be dismissed due to complaints, nor will they withdraw their complaints due to intimidation before a formal hearing.

738. To ensure fairness and openness, formal hearings will be held in a safe environment

<sup>34</sup> AIIB. (2018, Dec 7), AIIB Policy on the Project-affected People's Mechanism.

and open to other workers. The Grievance Committee records the following information at the hearing: (i) Detailed content of the complaint, (ii) Reasons and number of complaints accepted and rejected, and the number of complaints accepted and rejected: (iii) Solutions agreed with affected persons. The Grievance Committee will keep records of all complaints and resolution results, and report to the AIB through semi-annual environmental or social monitoring reports. These records should be made available to interested parties and to the AIB for review as necessary.

### 11.3 The Role of the Appeals Procedure and The Filing Process for Appeals Cases

#### 11.3.1 The Role of The Grievance Procedure

739. The setting of the complaint procedure reflects the protection of the rights and interests of the complainant. The appeal handling procedure is the core link of the entire appeal system. Only by constructing an appeal handling procedure conducive to supervision can the legal rights of the complainant be fully respected and rational decisions can be made.

#### 11.3.2 Grievance Case Filing Process

740. The GRM uses the following procedure:

(i) Stage 1: Complain to the contractor and/or construction supervision company. Complainants can lodge a complaint with the contractor and/or construction supervision company. The contractor shall keep the records and provide a response to the complainant within 5 working days;

(ii) Stage 2: Potentially affected persons are not satisfied with the disposal in the first stage, they can complain to the Sub-PMOs. Records shall be kept and a response shall be provided to the complainant within 5 working days;

(iii) Stage 3: Complain directly to the Municipal PMO. If the potential affected person is still dissatisfied with the treatment of the stage 2, he/she can file a complaint to the Municipal PMO. The Municipal PMO shall keep records and provide a response to the complainant within 2 weeks;

(iv) Stage 4: If the complainant does not accept the resolution proposed by the neighborhood committee, the contractor or the PMOs, he/she can report to the relevant department (12369 environmental hotline and/or 12345 government service convenience hotline / Yingkou Municipal Public Complaints and Proposals Administration). Relevant regulators will respond within the time frame specified in the regulations.

(v) Stage 5: If the potentially affected person is still dissatisfied with the disposition of the stage 4, he/she may file a lawsuit in a civil court within 15 days after receiving such disposition.

741. The complainant also has the right to use other channels at any time, such as: making an administrative complaint in accordance with the "Administrative Procedure Law of the People's Republic of China", or directly appealing to the people's court.

742. The sample complaint record form below has been provided to the two sub-PMOs and the Yingkou PMO.

**Table 11-3 Public Complaint Record Form**

No.		date / time	
Complainant		anonymous	
Gender			

Mail	
Telephone	
Address	
time of the event	
Location	
Details	<p>Brief description of the problem:</p> <p>Type of complaint (e.g. noise, dust, utility disruption, traffic disruption, community health and safety, resettlement)</p> <p>reason</p>
	Investigation status:
	<p>Proposed solution:</p> <p>corrective action taken</p> <p>remedy</p>
	Coordinated results:
	<p>Actual handling</p> <p>Changes in management or operations</p> <p>To prevent recurrence of changes to the environmental management plan</p>
Are multiple stakeholder meetings required?	
Provide detailed instructions if required:	(additional instructions if required)
Feedback to Complainants	
Assignee – Name and Signature	

## 12 Conclusions

(i) The construction of the project will improve the regional industrial and economic development, and promote the sustainable development of the local social economy. The project has received support from the staffs of the two subproject management committees, settled enterprises and relevant departments.

(ii) The negative impacts of the project on the management committees of Yingkou FTZ and Liaohe LEDZ and the employees of the settled enterprises are mainly the impacts of air pollution and noise pollution generated during construction. These impacts are short-term and controllable. After taking mitigation measures, these impacts are within the acceptable range.

(iii) The main negative impact of the project on the environment includes noise and construction dust during the construction phase, and the noise and vibration impact of the railway subproject during the construction and operation phases on the migratory passages of migratory birds on the west coast in May and September each year. The report proposes a series of mitigation measures based on economic and technical feasibility to eliminate or slow down these environmental impacts. After taking measures, these negative impacts will not hinder the implementation of the project.

(iv) The government staffs and enterprise employees of Yingkou FTZ and LEDZ expect that the project can provide more employment opportunities, build better municipal infrastructure and thus have a more harmonious working environment, and hope to participate in the project construction and post-operations, etc.

(v) Establish an environmental information feedback platform to realize the right of the public to participate in investment projects, eliminate the doubts and confusion of the public about whether there are environmental problems in investment projects, and guarantee the better implementation of project.

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# 14 APPENDIX

## 14.1 Stakeholders engagement record

### 14.1.1 Attendance List of Public Consultation

辽河开发区子项目社会环境座谈会签到表

时间：2023年5月23日 星期二 下午 14:00 地点：辽河开发区八楼会议室

序号	姓名	性别	职位	单位	联系方式	签名
1	李正	男	局长(执行副主任)	辽河开发区规划建设局		李正
2	孙颖	女	董事长(采购专员)	营口辽河城市建设投资有限公司	1594272027	孙颖
3	张嘉	男	董事长	营口铝业公司	1580178923	张嘉
4	魏树刚	男	市自然资源局局长	自然资源局	15120291166	魏树刚
5	李开成	男	副局长(财务专员)	辽河开发区财政局		李开成
6	魏树刚	男	科长(财务专员)	辽河开发区财政局		魏树刚
7	魏树刚	男	科长(环境专员)	辽河开发区生态环境局	15120291166	魏树刚
8	魏树刚	男	副局长(社会专员)	辽河开发区营商环境局	1550795955	魏树刚
9	张忠鹏	男	科长(技术专员)	辽河开发区规划建设局		张忠鹏
10	刘康	男	科长(执行专员)	辽河开发区经济发展服务局		刘康
11	齐琳	女	主席	辽河开发区关工委	1510076100	齐琳

序号	姓名	性别	职位	单位	联系方式	签名
12				营口市铝业公司		
13	魏树刚	男	教授 社会环境专家	中国城建院	1529557057	魏树刚
14	魏树刚	男	社会环境专家	中国城建院		魏树刚
15	陶静	女	社会环境专家	中国城建院	042817805	陶静
16	梁兵	男	社会环境专家	中国城建院		梁兵
17	陶树刚	男	社会环境专家	中国城建院	1529577520	陶树刚
18	魏树刚	女	社会环境专家	中国城建院	1511919814	魏树刚
19	马耀宇	女	环境专家	中国城建院	1301888950	马耀宇
20	朱野野	女	环境专家	中国城建院	1501052526	朱野野
21	苏东	男	项目经理	中国城建院		苏东
22					15342514001	
23				辽河自然保护局	18742288718	
24				营口市疾控中心	15044701695	

辽河开发区子项目社会环境座谈会签到表

时间：2023年5月24日 星期三 上午 9:00 地点：辽河开发区八楼会议室

序号	姓名	性别	职位	单位	联系方式	签名
1	李正	男	局长(执行副主任)	辽河开发区规划建设局		李正
2	孙颖	女	董事长(采购专员)	营口辽河城市建设投资有限公司		孙颖
3	李开成	男	副局长(财务专员)	辽河开发区财政局		李开成
4	魏树刚	男	科长(环境专员)	辽河开发区生态环境局		魏树刚
5	魏树刚	男	科长(技术专员)	辽河开发区规划建设局		魏树刚
6	魏树刚	男	副局长(社会专员)	辽河开发区营商环境局		魏树刚
7	张忠鹏	男	科长(技术专员)	辽河开发区规划建设局		张忠鹏
8	刘康	男	科长(执行专员)	辽河开发区经济发展服务局		刘康
9				营口光川新材料科技有限公司		
10				辽宁鑫盛泰有限公司企业代表		
11				伊图河(营口)水利系统有限公司		

歌工单位

序号	姓名	性别	职位	单位	联系方式	签名
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26	李仁	男	医生	业	152021915	李仁
27	魏树刚	男	业	业	150492018	魏树刚
28	魏树刚	男	业	业	1524150560	魏树刚
29	魏树刚	女	业	业	1500781608	魏树刚
30	魏树刚	女	业	业	1370897958	魏树刚
31	魏树刚	男	业	业	1896990224	魏树刚
32	魏树刚	男	业	业	1370897958	魏树刚
33	魏树刚	男	业	业	1370897958	魏树刚
34	魏树刚	男	业	业	1370897958	魏树刚
35	魏树刚	男	业	业	150077777	魏树刚

序号	姓名	性别	职位	单位	联系方式	签名
12	齐琳	女	主席	辽河开发区关工委		齐琳
13	魏树刚	男	科长(环境专员)	营口市疾控中心	150492018	魏树刚
14	魏树刚	女	科长(技术专员)	营口市疾控中心	150492018	魏树刚
15	魏树刚	女	科长(技术专员)	营口市疾控中心	150492018	魏树刚
16	魏树刚	女	科长(技术专员)	营口市疾控中心	150492018	魏树刚
17	魏树刚	女	科长(技术专员)	营口市疾控中心	150492018	魏树刚
18	魏树刚	女	科长(技术专员)	营口市疾控中心	150492018	魏树刚
19	魏树刚	女	科长(技术专员)	营口市疾控中心	150492018	魏树刚
20	魏树刚	女	科长(技术专员)	营口市疾控中心	150492018	魏树刚
21	魏树刚	女	科长(技术专员)	营口市疾控中心	150492018	魏树刚
22	魏树刚	女	科长(技术专员)	营口市疾控中心	150492018	魏树刚

辽河开发区子项目社会环境座谈会签到表

时间：2023年5月24日 星期三 下午 14:00 地点：辽河开发区八楼会议室

序号	姓名	性别	职位	单位	联系方式	签名
1				辽河开发区管委会		
2	李正	男	局长(执行副主任)	辽河开发区规划建设局		李正
3	孙颖	女	董事长(采购专员)	营口辽河城市建设投资有限公司		孙颖
4	李开成	男	副局长	辽河开发区生态环境局		李开成
5	魏树刚	男	局长	辽河开发区应急管理局		魏树刚
6	魏树刚	男	副局长(财务专员)	辽河开发区财政局		魏树刚
7	魏树刚	女	科长(财务专员)	辽河开发区财政局		魏树刚
8	魏树刚	男	科长(环境专员)	辽河开发区生态环境局	15120291166	魏树刚
9	魏树刚	男	副局长(社会专员)	辽河开发区营商环境局		魏树刚
10	魏树刚	男	科长(技术专员)	辽河开发区规划建设局		魏树刚
11	魏树刚	男	科长(执行专员)	辽河开发区经济发展服务局		魏树刚

序号	姓名	性别	职位	单位	联系方式	签名
12				营口市铝业公司		
13				辽宁泰科科技有限公司		
14				营口康隆物资集团有限公司	150492018	
15				辽宁金天专用车制造有限公司		
16				辽宁康隆物资集团有限公司	150492018	
17	魏树刚	男	教授 社会环境专家	中国城建院		魏树刚
18	陶树刚	男	社会环境专家	中国城建院	18409217885	陶树刚
19	梁兵	男	社会环境专家	中国城建院	1529577520	梁兵
20	陶树刚	男	社会环境专家	中国城建院	1529577520	陶树刚
21	魏树刚	男	社会环境专家	中国城建院		魏树刚
22	马耀宇	女	环境专家	中国城建院		马耀宇
23	朱野野	女	环境专家	中国城建院		朱野野
24	苏东	男	项目经理	中国城建院		苏东

序号	姓名	性别	职位	单位	联系方式	签名
25	魏树刚	男	业	业		魏树刚
26	魏树刚	女	业	业	150492018	魏树刚
27	魏树刚	男	业	业	150492018	魏树刚
28	魏树刚	女	业	业	150492018	魏树刚
29	魏树刚	男	业	业	150492018	魏树刚
30	魏树刚	男	业	业	150492018	魏树刚
31						
32						
33						
34						
35						
36						
37						

序号	姓名	性别	职位	单位	联系方式	签名
37	高正楠	女	副主任	辽河开发区	1357232257	高正楠
38	沈冰	女	副主任	辽河开发区	1350220520	沈冰
39	徐海平	女	副主任	辽河开发区	1890007160	徐海平
40	李丹	女	主任科员	辽河开发区	1877177893	李丹
41	沈冰	女	主任科员	辽河开发区	1350007166	沈冰
42	徐海平	女	主任科员	辽河开发区	14740687	徐海平
43	李丹	女	主任科员	辽河开发区	182072492	李丹
44	李丹	女	主任科员	辽河开发区	1820712226	李丹
45	李丹	女	主任科员	辽河开发区	1514735225	李丹
46	李丹	女	主任科员	辽河开发区	182072492	李丹
47	李丹	女	主任科员	辽河开发区	151471001	李丹

序号	姓名	性别	职位	单位	联系方式	签名
23	魏国兴	男	教授 社会移民专家	中国城建院		魏国兴
24	陶惠芳	女	社会移民专家	中国城建院		陶惠芳
25	魏国兴	男	社会移民专家	中国城建院		魏国兴
26	陶惠芳	女	社会移民专家	中国城建院		陶惠芳
27	魏国兴	男	社会移民专家	中国城建院		魏国兴
28	陶惠芳	女	社会移民专家	中国城建院		陶惠芳
29	魏国兴	男	社会移民专家	中国城建院		魏国兴
30	陶惠芳	女	社会移民专家	中国城建院		陶惠芳

自贸区子项目社会环境座谈会签到表

时间: 2023年5月25日星期四 上午9:00 地点: 自贸管委大楼453 房间

序号	姓名	性别	职位	单位	联系方式	签名
1	刘松鑫		副局长 (执行副主任)	自贸管委经济发展局局长		
2	杨成光		执行副主任	营口自贸建设发展有限公司		
3	郑新		副局长 (规划)	自贸管委规划建设局		
4	李 翀		副主任 (社会专员)	自贸管委综合执法支队		
5	徐海平	女	主任科员	项目环评单位	1514713225	徐海平
6	王岩	女	主任科员	项目环评单位	1367017075	王岩
7	李丹	女	主任科员	项目环评单位		
8	李丹	女	主任科员	项目环评单位	186072066	李丹
9	李丹	女	主任科员	项目环评单位	174072807	李丹
10				污水厂代表		
11	魏国兴		教授 社会移民专家	中国城建院		

序号	姓名	性别	职位	单位	联系方式	签名
12	魏国兴		教授 社会移民专家	中国城建院		
13	陶惠芳		社会移民专家	中国城建院		
14	魏国兴		社会移民专家	中国城建院		
15	陶惠芳		社会移民专家	中国城建院		
16	魏国兴		社会移民专家	中国城建院		
17	陶惠芳		社会移民专家	中国城建院		
18	魏国兴		社会移民专家	中国城建院		
19	陶惠芳		社会移民专家	中国城建院		
20	李丹	女	主任科员	项目环评单位	1890007160	李丹
21	徐海平	女	主任科员	项目环评单位	1877177893	徐海平
22	李丹	女	主任科员	项目环评单位	186072066	李丹
23	李丹	女	主任科员	项目环评单位	174072807	李丹
24	李丹	女	主任科员	项目环评单位	1367017075	李丹
25	李丹	女	主任科员	项目环评单位	1514713225	李丹

序号	姓名	性别	职位	单位	联系方式	签名
12	高秋	女	主任科员	营口自贸建设发展有限公司	1860720184	高秋
13	徐海平	女	主任科员	辽河开发区	1890007160	徐海平
14				新南地源派出所		
15				营口自贸建设发展有限公司		
16	张光阳	女	办公室主任	先丰化工(营口)有限公司	1306290766	张光阳
17	李丹	女	主任科员	营口自贸建设发展有限公司	1860720184	李丹
18	李丹	女	主任科员	辽宁汇泰环境系统有限公司	1560070886	李丹
19	魏国兴		教授 社会移民专家	中国城建院		
20	陶惠芳		社会移民专家	中国城建院		
21	陶惠芳		社会移民专家	中国城建院		
22	魏国兴		社会移民专家	中国城建院		
23	陶惠芳		社会移民专家	中国城建院		
24	魏国兴		社会移民专家	中国城建院		

序号	姓名	性别	职位	单位	联系方式	签名
25	陶惠芳		环境专家	中国城建院		
26	魏国兴		环境专家	中国城建院		
27	李丹		环境专家	中国城建院		
28	李丹	女	主任科员	项目环评单位	1367017075	李丹
29						
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## 14.1.2 Public participation questionnaire



### 辽宁省营口市陆港枢纽重点产业园区协同发展项目- -营口辽河开发区（二期）南扩区园区基础设施建设 项目问卷调查表

尊敬的受访者，

您好！感谢您抽出宝贵的时间参与我们的调查。本次调查旨在了解公众对于“辽宁省营口市陆港枢纽重点产业园区协同发展项目——营口辽河开发区（二期）南扩区园区基础设施建设项目”的看法及意见。该项目主要涉及：

对辽河开发区（二期）南扩区园区进行基础设施建设，以进一步拓展辽河开发区产业的发展空间。南扩区位于二期启动区的西南侧，具体范围北起东海大街，南至民兴河北街，西至边海铁路东侧控制线，东至嘉晨大道，总占地面积为412.13公顷。

建设内容涵盖规划六路、嘉晨大道等12条道路。道路总长约22.67km，项目将完成区域内的道路工程、交通工程、给排水工程、燃气工程、通信工程、照明工程、绿化工程、海绵专项及智慧市政等。

项目施工期采取的环境保护措施如下：

1. 扬尘：本项目施工期主要的大气污染物为TSP，其次为沥青摊铺时的烟气和机械排出的尾气污染物。在施工现场执行防止扬尘措施，设立围挡，覆盖散装物料，土方执行湿挖作业，保证施工现场地面硬化，渣土车出入冲洗和密闭运输。对于易扬尘路段，采用洒水等抑尘措施。经采取上述措施后，施工扬尘对本项目周围环境影响控制在最小范围。
2. 尾气：施工建设期间，废气主要来自施工机械排放的废气、各种运输车辆排放的汽车尾气。主要污染物为NO<sub>x</sub>、CO及CH<sub>x</sub>等。施工期车辆尾气的防治措施为：选用优质施工机械，加强施工机械、车辆运行管理与维护保养。
3. 沥青烟：本项目施工期间缩短沥青料在摊铺现场的时间，采用洒水等措施，降低摊铺过程中沥青烟的浓度。
4. 废水：施工期废水污染源主要为施工区的生产废水、施工队伍的生活污水等。对于生产废水和生活污水采取不外排的措施，设置沉淀池，对生产废水进行沉淀处理，达标后循环用于施工生产。
5. 噪声：本项目施工期对于噪声采取的缓解措施是减少夜间作业。
6. 固体废物：本项目对施工期产生的土方进行回填，产生的生活垃圾集中由当地环卫部门处理。

项目运营期采取的环境保护措施如下：

1. 大气：加强对于运输物料的车辆管理，道路两侧种植绿化带，净化空气，定期对道路进行清扫洒水。
2. 水环境：完善排水系统，加强管理，避免固体废物倾倒入水体，制定应急处理方案。
3. 噪声：设置绿化带等隔声，设置禁止鸣笛等标志，加强道路交通管制等。
4. 固体废物：施工完成后在道路两侧设置分类垃圾箱。

您的宝贵意见将有助于项目的优化和改进。再次感谢您的支持和配合！

\* A1. 您的性别是：

男

女

\* A2.您的年龄:

\* A3.您的民族是?

- 汉族
- 满族
- 朝鲜族
- 回族
- 其他民族, 请列出

\* A4.您的受教育水平是?

- 小学及以下
- 初中
- 高中
- 中专
- 大专
- 本科
- 硕士及以上

\* A5.1.您的单位属于以下哪一类? (如有重合, 请选择一个)

- 市项目办
- 子项目办
- 管委会
- 园区企业
- 平台公司
- 咨询机构

\* A5.2 您的工作单位名称是?

\* A6. 您工作地点和项目地点的距离是多少?

- <1km
- 1-3km
- 3-5km
- >5km

\* A7. 您居住地点和项目地点的距离是多少?

- <1km
- 1-3km
- 3-5km
- >5km

\* A8. 您的家庭人口是:  其中, 男性有多少?  女性有多少?

\* A9. 请问以下的家庭分工主要是哪些成员在做? (请打“√”) 【多选题】

	丈夫	妻子	夫妻共同	老年人 (男性)	老年人 (女性)	不适用
照顾老人	<input type="checkbox"/>					
照顾孩子	<input type="checkbox"/>					
家务 (洗衣做饭, 打扫卫生等)	<input type="checkbox"/>					
倒垃圾	<input type="checkbox"/>					
家里日常水电维修	<input type="checkbox"/>					
日常生活用品购买	<input type="checkbox"/>					
外出务工	<input type="checkbox"/>					
外出经商	<input type="checkbox"/>					
参与社区开会	<input type="checkbox"/>					
参加技术培训	<input type="checkbox"/>					

\* A10. 请问以下的家庭事务决策由哪些成员做主? (请打“√”)【多选题】

	丈夫	妻子	夫妻共同	老人/男性	老人/女性	不适用
人情往来	<input type="checkbox"/>					
子女教育	<input type="checkbox"/>					
家庭大项支出 (买房、买车等)	<input type="checkbox"/>					
日常生活消费品购买	<input type="checkbox"/>					
其它重大事项 (借贷、投资)	<input type="checkbox"/>					

\* A11. 2022年您的家庭年收入是  ?

\* A12 . 2022年您的家庭年支出是  ?

A13. 您家总收入中, 主要贡献人的比例大概是多少? 丈夫  %; 妻子  %; 子女  %; 老人  %; 其他  %

\* A14. 从性别角度看, 谁为您的家庭收入贡献更多?

- 100%来自男性
- 男性多, 女性少
- 男、女性各占一半
- 男性少, 女性多
- 100%来自女性

A15. 您的家庭是否曾经 (在过去3年中) 或者现在为政府支持的以下类型的家庭之一?

- |             |                       |
|-------------|-----------------------|
|             | 是                     |
| 1) 城市低保户    | <input type="radio"/> |
| 2) 临时困难救助家庭 | <input type="radio"/> |
| 3) 均不是      | <input type="radio"/> |

A16. 如果属于以上家庭, 造成您家庭经济困难的主要原因是? 【多选题】

- 家庭成员的疾病
- 家庭成员的残疾
- 缺劳动力
- 受教育程度低
- 缺乏资金
- 就业和创收信息不足
- 缺乏技能
- 频繁自然灾害或环境危害影响
- 道路等基础设施不足或者质量差
- 其他(请注明)

\*B项目与环境问题

B1. 您对本地区交通状况是否满意?

- 非常满意
- 满意
- 一般
- 不满意
- 非常不满意

\*B2. 您对本地区道路路网状况是否满意?

- 非常满意
- 满意
- 一般
- 不满意
- 非常不满意

\* B3. 您对本地区市政、给排水状况是否满意?

- 非常满意
- 满意
- 一般
- 不满意
- 非常不满意

\* B4. 您对本地区产业园区规划是否满意?

- 非常满意
- 满意
- 一般
- 不满意
- 非常不满意

\* B5. 您了解本项目施工过程中产生的环境影响吗?

- 非常了解
- 了解
- 一般
- 不太了解
- 非常不了解

\* B6. 您认为本项目施工期间对环境产生的主要影响是什么? 【多选题】

- 扬尘
- 噪声
- 施工固废
- 废水
- 尾气
- 沥青烟
- 生态影响
- 没有影响

\* B7. 项目施工期间，您最关注的问题是

- 扬尘
- 噪声
- 施工固废
- 废水
- 尾气
- 水土流失
- 植被破坏
- 无
- 其他

\* B8. 根据环评单位的论述和材料，您是否了解本项目的影响减缓措施？

- 非常了解
- 了解
- 一般
- 不太了解
- 不了解

\* B9. 如果项目施工期和运行期对本地环境造成污染，影响到您的工作和生活，您会：

- 向环保部门投诉
- 通过法律途径解决
- 与施工单位或管理部门交涉
- 其他

\* B10. 您了解本项目运行过程中产生的环境影响吗?

- 非常了解
- 了解
- 一般
- 不太了解
- 不了解

\* B11. 您认为本项目运行期间对环境产生的主要影响是什么? 【多选题】

- 噪声
- 废水
- 废气
- 固体废弃物
- 其他
- 没有主要影响

\* B11. 项目运营期间, 您最关注的问题是【多选题】

- 噪声
- 废水
- 废气
- 固体废弃物
- 其他
- 无

\* B12. 您对项目运行期要实施的环保措施满意吗?

- 非常满意
- 满意
- 一般
- 不满意
- 非常不满意

\* B13.您对项目运行期间对社区健康和安全影响的减缓措施满意吗?

- 非常满意
- 满意
- 一般
- 不满意
- 非常不满意

\* B14.在了解了运行期间的环保措施之后, 您是否接受本项目在运行期间的环境影响?

- 非常接受
- 接受
- 一般
- 不接受
- 非常不接受

\* B15.若您在项目实施期或运行期对项目环境影响不满, 您知道如何申诉吗?

- 非常了解
- 了解
- 一般
- 不太了解
- 不了解

\* C.项目对个人影响的看法

C1.您认为建设本项目对谁有利(可多项选择)

	是	否
国家	<input type="radio"/>	<input type="radio"/>
集体	<input type="radio"/>	<input type="radio"/>
个人	<input type="radio"/>	<input type="radio"/>

\* C2. 您觉得本项目会为您带来哪些方面的提升? 【多选题】

- 管理能力
- 沟通协调能力
- 项目执行和实施能力
- 专业技能
- 劳动权利维护的能力
- 应对风险的能力
- 创新能力
- 其他

\* C3. 您觉得本项目会为您增强哪些方面的意识? 【多选题】

- 性别平等的意识
- 环境保护的意识
- 劳动权益保障的意识
- 科技创新的意识
- 智慧产业发展的意识
- 安全生产/施工的意识
- 其他

\* C4. 您觉得本项目能给您带来哪些机会? 【多选题】

- 参与智慧产业发展的机会
- 个人事业发展的机会
- 降低劳动强度/时间的机会
- 能力提升的机会
- 就业机会
- 创业机会
- 提高收入的机会
- 提高家庭地位的机会
- 提高社会地位的机会
- 改善道路, 增加出行方便的机会
- 其他

\* C5. 您认为该项目会为您个人带来什么负面影响? 【多选题】

- 失业
- 经济收入减少
- 施工给日常生活带来不便
- 施工影响交通
- 施工带来的噪音污水等环境问题
- 人身和财产安全问题
- 其他
- 没什么负面影响

C6. 如果有, 您怎样看待这个项目给您个人可能带来的负面影响?

- 有部分负面影响但是可以接受
- 负面影响较大, 应采取有效的防范措施
- 不清楚

\* D对项目整体的态度和意见

D1. 您认为，整体上这个项目对您所在的地区带来的正面影响主要是？【多选题】

- 能增加创收和就业机会
- 能促进产业发展，带动区域经济发展
- 能改善基础设施和人居环境，增强居民生活幸福感
- 没有太大正面影响
- 其他(具体说明):

\* D2. 您认为该项目会为您所在地区带来什么负面影响？【多选题】

- 就业机会不平等
- 舆论压力
- 社会治安
- 交通拥堵
- 环境问题
- 流行性疾病
- 没有负面影响
- 其他

D2.1如果有，您怎样看待这个项目对您所在地区可能带来的负面影响？

- 有部分负面影响但是可以接受
- 负面影响较大，应采取有效的防范措施
- 不清楚

\* D3. 您认为该项目建设和运营过程中会带来哪些安全问题？【多选题】

- 外来人员与当地居民的冲突
- 外来人员从事违法活动
- 生命财产安全
- 女性人身安全
- 施工安全问题
- 不会有安全问题

\* D4. 您认为女性如何从本项目中受益？【多选题】

- 女性可以在项目建设和运营中获得更多工作机会，从而增加收入
- 女性可以获得电商、创业等技能培训，能力得到提升
- 生活环境改善
- 通过参与项目协商与决策，提升领导力
- 获得创业支持
- 其他(请注明)

\* D5. 您认为在营口辽河开发区(二期)南扩区园区基础设施建设项目中女性可以与男性一样做出贡献吗？

- 能
- 不能
- 不确定

D5.1. 如果选择了1) 或3) , 您认为女性能在营口辽河开发区(二期)南扩区园区基础设施建设项目中起到什么作用? (多选) 【多选题】

- 1) 参与项目前期的讨论、协商和决策
- 2) 参加本项目中没有专门技能要求的体力劳动和施工建设
- 3) 参加项目提供的各种技术能力培训后承担有技术的活动
- 4) 承担项目投产后的设施设备运行维护管理, 提供公共服务
- 5) 利用项目培训机会, 学习新的技能和创业机会
- 6) 参与项目运营管理
- 7) 照顾好家庭, 支持另一半参与项目建设
- 8) 其他(请注明)

D5.2. 如果选择了1) 或3) , 您认为男性能在营口辽河开发区(二期)南扩区园区基础设施建设项目中起到什么作用? (多选) 【多选题】

- 1) 参与项目前期的讨论、协商和决策
- 2) 参加本项目中没有专门技能要求的体力劳动和施工建设
- 3) 参加项目提供的各种技术能力培训后承担有技术的活动
- 4) 承担项目投产后的设施设备运行维护管理, 提供公共服务
- 5) 利用项目培训机会, 学习新的技能和创业机会
- 6) 参与项目运营管理
- 7) 照顾好家庭, 支持另一半参与项目建设
- 8) 其他(请注明)

\* E 信息披露E1. 在本次公众参与之前, 您是否听说过辽宁省营口陆港枢纽重点产业园区协同发展项目——营口辽河开发区(二期)南扩区园区基础设施建设项目? [单选]

- 非常了解
- 基本了解
- 听说过
- 不怎么了解
- 完全不了解

\* E2. 您是通过哪种途径获得此项目的信息? 【多选题】

- 工作人员开会宣传
- 广播电视新闻
- 报纸
- 公告栏
- 网络新闻
- 听其他人说的
- 抖音、微信、微博等社交媒体
- 其他

\* E3. 您更愿意以哪种方式了解这个项目的信息? 【多选题】

- 手机短信
- 社区公告栏
- 微信群
- 员工会议
- 报纸新闻
- 工作人员开会宣传
- 广播电视新闻
- 报纸
- 其他形式
- 不清楚

\* E4. 您了解征地拆迁补偿安置政策吗?

- 非常了解
- 基本了解
- 听说过
- 不怎么了解
- 完全不了解

\* E6. 请问, 在整个规划实施过程中, 您通过什么途径来表达个人意见与看法? (除1、2)外最多选两项)【多选题】

- 不知道找准表达
- 没有表达过
- 直接向干部反映
- 托人向干部反映
- 直接向上级政府反映
- 向传播媒介反映
- 向项目施工单位
- 向项目业主
- 向来调查的人员
- 没有意见

\* E7. 您认为, 您的意见和看法得到有关部门的重视或考虑?

- 很多意见都考虑了
- 有一些意见考虑了
- 很少有意见被重视
- 一点也不被重视
- 没有意见

\* E8. 您对该项目有哪些需求?【多选题】

- 参与项目决策
- 参与项目建设
- 参到项目后期运营
- 希望项目能够提供更多就业机会
- 希望降低环境带来的影响
- 妥善解决补偿和安置问题
- 其它

E10.您对本项目有什么建议?

\* F劳工问题 F1.您每天工作几小时

\* F2.您每个月的工资是多少?

- 0元
- 0-3000元
- 3000-5000元
- 5000-10000元
- 10000-20000元
- 20000元以上

\* F3.您对工资的满意度?

- 非常满意
- 满意
- 一般
- 不满意
- 非常不满意

\* F4.您对工作环境的满意度

- 非常满意
- 满意
- 一般
- 不满意
- 非常不满意

\* F5. 您是否与用人单位签订劳动合同?

- 是
- 否
- 不清楚

\* F6. 您单位为您提供了以下哪些保障? 【多选题】

- 工伤保险
- 意外保险
- 失业保险
- 医疗保险 (生育)
- 养老保险
- 住房公积金
- 企业年金
- 其他
- 以上都没有

\* F7. 您单位能保障女职工的哪些权益? 【多选题】

- 孕期劳动保护
- 经期劳动保护
- 保证法定产假天数
- 保证产假期间的基本待遇
- 保留生育女职工的岗位
- 保证不会因为生育调薪调岗
- 保证育儿假
- 保证法定节假日的休假
- 其他

\* F8. 您觉得您单位在促进性别平等方面做到了以下哪些? 【多选题】

- 男女同工同酬
- 男女拥有同样的晋升机会
- 男女拥有同样的培训机会
- 杜绝招聘中的性别歧视
- 杜绝工作场所的性骚扰

\* F9. 您参加过以下哪类培训? 【多选题】

- 劳动技能和就业
- 管理类
- 安全生产
- 法律法规
- 环保
- 个人职业规划
- 劳动权益保障与维权
- 创业
- 其他

\* F10. 今后您想参加以下哪种培训? 【多选题】

- 劳动技能和就业
- 管理类
- 安全生产
- 法律法规
- 环保
- 个人职业规划
- 劳动权益保障与维权
- 创业
- 其他

\* F11. 您在工作方面有什么需求? 【多选题】

- 提高工资待遇
- 社会保障
- 晋升机会
- 培训、学习与交流机会
- 良好的工作环境与氛围
- 合规的工作时长
- 男女同工同酬
- 其他
- 没什么需求

\* F12. 如果您的劳动权益受损, 您会通过以下什么渠道维护自身权益? 【多选题】

- 妇联
- 工会
- 劳动监察部门
- 劳动仲裁部门
- 单位领导
- 媒体
- 其他

### 14.1.3 Transcripts of interviews with salt farm workers

Interview date: May 24, 2023

Interviewee: Salt company employees

Interview location: Management Committee of Yingkou Economic Development Zone

Q: Do you understand the resettlement of employees within the area occupied by this project

Yes, the company held a meeting and told us that we would be transferred to other shifts afterward.

Q: Are you satisfied with the resettlement?

A1: Yes, we are still satisfied. I think this program provides us with better opportunities.

A2: Yes, I am also very satisfied.

Q: So, after the transfer, did your job type change?

A3: No, our type of work did not change.

Q: Did any of you have any grievances about the transfer?

A4: We don't have any dissatisfaction with the transfer, we understand that it is for the betterment of the project.

Q: What is your current approximate monthly salary?

The current monthly income is between \$4001-4500.

Q: Will the monthly income increase after the job change?

A3: Yes, it could probably be more than 5,000 RMB.

Q: And what do you know about the program?

A5: We all know quite a bit about the program. We know that it is a program that has the potential to bring growth opportunities to our area.

Q: Do you support this project?

A6: We all support this project.

I think this project is good for the country because it helps the economy of the region. Also, it is beneficial for individuals.

A7: I agree that it is good for the country and for individuals. It provides more entrepreneurial and employment opportunities.

Q: What benefits do you think this program will bring to you personally?

A8: The biggest benefit for me is that it will improve my financial income. An increase in monthly income is a significant improvement.

A3: The program will also provide some skills training opportunities so that I can improve myself.

Q: Are you concerned about some negative impacts?

A5: Indeed, negative impacts may include inconvenience to daily life caused by the construction, especially in terms of transportation. But this is understandable.

A1: The construction may cause some disturbances in our daily lives, but I think measures can be taken to mitigate these impacts.

A6: I think some negative impacts are acceptable as long as they are not too serious. We

can adapt.

A4: If the negative impacts are significant, I think effective precautions should be taken to mitigate them to ensure that our quality of life is not compromised too much.

Q: Thank you very much for your detailed answers and for sharing your views and experiences. This information is very helpful for us to understand your situation.

## 14.2 Code of labor conduct

Article 1 This code is formulated to regulate the safety behavior of workers, improve their safety awareness and strengthen their preventive ability.

Article 2 This specification applies to all personnel at the construction site.

Article 3 Principles

Adhere to the "four-perfect" safety management of full staff, full process, all-round and all-weather.

Operation of the six strict

1. Strictly implement the shift handover system
2. Strictly carry out inspection tours
3. Strictly control process indexes.
4. Strictly implement the operation law.
5. Strictly abide by labor discipline.
6. Strictly implement safety regulations

Article 4 Safety Code for Construction Workers

(a) It is strictly prohibited to enter the production or construction site without wearing labor protection articles;

(ii) It is strictly prohibited to enter the operation site with bare feet, wearing slippers, sandals or high-heeled shoes;

(iii) It is strictly prohibited for those who drink alcohol to enter the production and construction areas;

(iv) It is strictly prohibited to bring children and strangers into the production area;

(e) Laborers must abide by labor discipline and obey the command of leaders and safety managers; do not take other people's belongings and protect their own property

(vi) It is strictly forbidden to sleep, leave the post, string together, or do things not related to production during working hours;

(vii) It is strictly prohibited to bring fire and flammable, explosive, toxic and corrosive substances into; it is strictly prohibited to use open fire at construction sites at will;

(viii) It is strictly prohibited to sit, lie down, run or jump on running equipment, racks, walking boards and railings, and it is strictly prohibited to cross walking boards and railings;

(ix) It is strictly prohibited to play, frolic and fight or brawl at the operation site;

(x) Ride the elevator to safeguard safety, prevent falling, and prevent falling objects;

(xi) Laborers must comply with all kinds of safety warning signs, stickers and warning instructions

(xii) Damage caused by their own factors; all the parties concerned to bear all the consequences

Article 5 Protective safety

(a) All kinds of labor protective equipment shall be worn according to the requirements before operation;

(b) Work clothes shall be fastened and cuffs, pants legs and lapels shall be tightened;

- (iii) Female workers shall arrange their long hair and put it into the helmet;
- (d) Helmets shall be fastened; sitting on or pressing the helmet is strictly prohibited;

#### Article 6 Operational safety

- (A) Post laborers must strictly implement the post handover system
- (B) post laborers must seriously implement the post operation law, to perform job safety duties, control parameters in the target range
- (C) non-electrical staff are strictly prohibited to move electrical equipment at will
- (D) Electrical equipment must be kept dry and ventilated, and wet hands are strictly prohibited from touching switches and electrical equipment; it is strictly prohibited to use water to clean electrical facilities;
- (e) In the event of a fire in electrical equipment, it is prohibited to use water and foam to extinguish the fire without cutting off the power supply;
- (f) It is strictly prohibited to connect and pull the power supply indiscriminately, and install all kinds of electrical equipment privately;
- (vii) It is strictly prohibited to conduct temporary power supply without cutting off the power supply;
- (viii) Strictly prohibit the use of iron wire, copper wire as a fuse; isolation switch, drop insurance is strictly prohibited with load operation;
- (ix) It is strictly prohibited to operate the electrical switches with warning signs; it is strictly prohibited to remove the warning signs on the electrical switches at will; (x) The team leader must give a safety briefing to the team members before operation;

#### Article 7 Accommodation safety

- (a) Please respect the restrictions and instructions of the accommodation area. Do not enter or stay in unauthorized areas.
- (ii) Please respect the established curfew and avoid going out at night. This helps to ensure the tranquility and safety of the accommodation area at night.
- (iii) If unauthorized persons are noticed in the accommodation area, report them immediately to security or management.
- (iv) Comply with all accommodation rules and safety procedures on the construction site.