SFG2444 V6

The World Bank Financed

Jingan Water Environment Management Project

Environmental Assessment Report

CERI Eco Technology Co., Ltd.

August, 2016 Nanchang

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1 Overview

1.1 Project Introduction

Project name	World-Bank-Financed Jingan Water Environment Management Project				
construction unit	Leading Group Office of Jingan County Water Environment Management Project				
legal representative	/		Contact person	Xiong Yuxiang	
Tel.	13576906989	Fax	/	Zip code	330600
construction site	Jingan County of Yichun City				
approval department	/		Registered Number of Approval	/	
Type of construction	New construction■ Transformation and expansion□ Technical innovation□		Industrial category and code	E4852 for pipeline project construction, N7820 for environmental sanitation management	
Occupied area (m2)	/		Green area (m2)	/	
Total Investment (10,000 yuan)	15774.58	Environmental investment (10,000 yuan)	172.4	Environmental investment/total investment	1.1%
EIA Cost (RMB 10,000)	/	Expected commissioning date	December, 2021		

1.2 Project Background

Jingan County, located at northwestern Jiangxi, falls into Beiliao River Basin of Xiushui Water System of Poyang Lake Basin. With a territorial area of 1,377.49km^2, the county takes

up 90.8% of Beiliao River Basin. Since Beiliao River represents one of the sources of Xiuhe River, the ecological environment of Jingan county is directly related with the ecological safety of Poyang Lake Basin.

In order to decrease the pollutants flowing from Beiliao River Basin to Poyang Lake and improve the water quality management capability of Jingan, the leading group office of the World-Bank-Financed Poyang Lake Water Environment Management Project of Jingan County plans to utilize the World Bank loan to carry out Jingan Water Environment Management Project.

The existing pollution sources of Jingan County include mainly the urban living and secondly the industry, agriculture and concentrated management facilities. Since the agricultural pollutants are discharged in scattered manner, and soil testing and fertilizer recommendation as well as utilization of organic fertilizer are simultaneously promoted within the whole county, the agricultural pollutant control is not included in the scope of the project. Since the environmental issue is quite outstanding in the county with concentrated population, the selected project area is Jingan County. The goal of the project is to construct relatively improved urban drainage system, guarantee the ecological security of urban water environment, promote rainwater and sewage separation transformation in urban area, improve the treatment rate for sewage collection and effectively and stably solve the outlet and treatment issue of residents' daily household garbage so as to decrease the pollution to the water body of Poyang Lake from the source, enhance the water environment management and solid waste management level, and realize sustainable urbanization.

In accordance with the stipulations of the *Environmental Protection Law of the People's Republic of China*, *Regulations on Administration of Environmental Protection in Construction Projects* and *Circular on Strengthening Administration for Environmental Impact Assessment for Construction Projects Financed by International Finance Corporation Loan* as well as the requirements of the World Bank Safeguard Policies, it is necessary for World-Bank-Financed Jingan Water Environment Management Project to carry out environmental impact assessment. Therefore, the development unit entrusts CERI Eco Technology Co., Ltd. to prepare the environmental impact report for the project. After accepting the entrusted task, our company immediately organized a technical team to implement an on-the-spot survey and collect relevant information, prepared the environmental assessment report for the project in accordance with relevant technical guidance and specifications, and submitted the report to the construction unit for the approval of the administrative department in charge of environmental protection and for the

utilization as bases for the pollution control construction.

1.3 EIA Objectives

Comment on the positive environmental impact; identify, screen and make predictive analysis on the possible negative environmental impact of the project; and put forward targeted and effective mitigation measures and environmental management plan for the main unavoidable negative environmental impact so as to provide bases for the independent evaluation to the project by World Bank, and for the decision-making and management by the governmental comprehensive and environmental management departments through environmental impact assessment.

1.4 Basis for EIA Preparation

1.4.1 State Environmental Protection Laws, Regulations and Policies

(1) *Environmental Protection Law of the People's Republic of China* (April, 2014);

(2) *Environmental Impact Assessment Law of the People's Republic of China* (September, 2003);

(3) *Law of the People's Republic of China on Water Pollution Prevention and Control* (June, 2008);

(4) *Law of the People's Republic of China on Atmospheric Pollution Prevention and Control* (August, 2015);

(5) *Law of the People's Republic of China on Prevention and Control of Ambient Noise Pollution* (March, 1997);

(6) *Law of the People's Republic of China on Prevention and Control of Solid Waste Pollution* (June, 2013);

(7) *Law of the People's Republic of China on Land Administration* (August, 2004);

(8) *Law of the People's Republic of China on the Protection of Wildlife* (August, 2004);

(9) *Law of the People's Republic of China on the Protection of Cultural Relics* (Revision, June, 2015);

(10) *Water Law of the People's Republic of China* (August, 2002);

(11) *Law of the People's Republic of China on Flood Control* (Revision, April, 2015);

(12) *Law of the People's Republic of China on Soil and Water Conservation* (December, 2010);

(13) *Law of the People's Republic of China on Urban and Rural Planning* (October, 2007);

(14) *Enforcement Regulations for Law of the People's Republic of China on Water and*

Soil Conservation (August, 1993);

(15) *Regulations of the People's Republic of China for Nature Reserve Areas* (October 9, 1994);

(16) *Regulations on Scenic Spots* (State Council Decree No.474, September 19, 2006);

(17) *Administrative Measures for National Wetland Parks (Tentative)* (Lin Shi Fa [2010] No. 1, February 21, 2010);

(18) *Administrative Regulations on Wetland Protection* (State Forestry Bureau Decree No. 32, March 28, 2013);

(19) *Regulations on Basic Farmland Protection* (State Council Decree No.257, December, 1998);

(20) *Regulations of the People's Republic of China on Watercourse Management* (State Council Decree No.3, March, 1988);

(21) *State Ecological Environmental Protection Outline* (Guo Fa [2000] No. 38, November, 2000);

(22) *Regulations on Administration of Environmental Protection in Construction Projects* (State Council Decree No. 253, November, 1998);

(23) *classification Management Directory of Environmental Impact Assessment for Construction Projects* (April, 2015);

(24) *Tentative Measures for Public Participation in Environmental Impact Assessment* (SEPA Huan Fa 2006 [28], March 18, 2006);

(25) *State Council Decision on Implementing Scientific Outlook on Development and Strengthening Environmental Protection* (Guo Fa 2005 [39]);

(26) *Opinions on Strengthening Supervision over Ecological Environmental Protection for Resource Development* (SEPA Huan Fa 2004 [24]);

(27) *Administrative Regulations on Pollution Prevention and Control in Potable Water Source Protection Areas* (Revision, October, 2010);

(28) *Industrial Restructuring Guidance List (2011)* (Revised in 2013);

(29) *Circular on Strengthening Administration for Environmental Impact Assessment for Construction Projects Financed by International Finance Corporation Loan* (June, 1993).

1.4.2 **Local Environmental Regulations**

(1) *Jiangxi Regulations on Environmental Protection for Construction Projects* (Revision, September 17, 2010);

(2) *Jiangxi Regulations on Environmental Pollution Prevention and Control* (January 1,

2009);

(3) *Jiangxi Measures for Domestic Drinking Water Source Pollution Prevention and Control* (August 1, 2006);

(4) *Jiangxi Surface Water (Environmental) Functional Zoning (Official Reply)* (Jiangxi People's Government Gan Fu Zi [2007] No. 35, June 29, 2007);

(5) *Regulations on Environmental Protection of Poyang Lake Ecological Economic Zone* (May 1, 2012);

(6) *Jiangxi Administrative Measures for Land Acquisition* (December 22, 2001).

1.4.3 **Technical Guides and Regulations for Environmental Impact Assessment**

(1) *Technical Guide for Environmental Impact Assessment—General* (HJ2.1-2011);

(2) *Technical Guide for Environmental Impact Assessment—Atmospheric Environment* (HJ2.2-2008);

(3) *Technical Guide for Environmental Impact Assessment—Surface Water Environment* (HJ/T2.3-93);

(4) *Technical Guide for Environmental Impact Assessment—Underground Water Environment* (HJ610-2016);

(5) *Technical Guide for Environmental Impact Assessment—Acoustic Environment* (HJ2.4-2009);

(6) *Technical Guide for Environmental Impact Assessment—Ecological Impact* (HJ19-2011);

(7) *Technical Guide for Environmental Risk Assessment of Construction Projects* (HJ/T 169-2004);

(8) *Technical Regulations on Ecological Environment Evaluation* (HJ/T 192-2006);

(9) *Technical Regulations on Acoustic Environment Functional Zoning* (GB/T15190-2014).

1.4.4 **World Bank Safeguard Policies**

The environmental assessment task has analyzed the relevance between the project and the World Bank safeguard policies/ procedures with the results listed in Table 1-1.

Table 1-1 World Bank Safeguard Policies

World Bank business policies/ procedures	Relevant or not	Reasons for the relevance with World Bank business policies
OP/BP4.01 Environmental Evaluation	√	The project is relevant to the policy since it is a water environment management project that aims at decreasing the pollutants flowing into the surface water body and improving local environmental

		quality, and a project that would bring about positive environmental benefits and some negative impact.
OP/BP4.04 Natural Habitat	×	The project is irrelevant to the policy since its construction site is located in urban areas without any natural habitat.
OP/BP 4.36 Forestry	×	The project is irrelevant to the policy since it would not have any influence on forestry health and quality, the forest owners' interests or the forest owners' dependency with the forest.
OP/BP 4.09 Insect and Disease Management	×	The project is irrelevant to the policy since the project involves no purchase of pesticides and would not lead to use increase of pesticides.
OP/BP 4.11 Physical Cultural Resources	×	The project is irrelevant to the policy since its construction site is located in urban areas and involves no physical cultural resources in accordance with the on-the-spot survey and research.
OP/BP 4.10 Minority Ethnic	×	The project is irrelevant to the policy since the project area involves no aborigine and does not belong to the minority ethnic district.
OP/BP 4.12 Involuntary Resettlement	√	The project is relevant to the policy since its construction activities would temporarily or permanently occupy some land.
OP/BP 4.37 Dam Security	×	The project is irrelevant to the policy since its construction content involves no dam project and does not rely on any existing or under-construction dam.
OP/BP 7.50 International Waters	×	The proposed project, located in Jingan County of Jiangxi Province, involves no international waters.
OP/BP 7.60 Disputable Area	×	The project construction site, all located within Jiangxi Province, involves no disputable area.
BP17.50 Information Disclosure	√	Public consultation and information disclosure has been implemented for the environmental assessment documents of the project.
Environmental, Health and Safety General Guidance for International Finance Corporation	√	The policy is applicable to the project activities.
Water & Sanitation Environmental, Health and Safety General Guidance	√	The policy is applicable to the project activities.

for International Finance Corporation		
Environmental, Health and Safety General Guidance for Waste Management Facilities for International Finance Corporation	√	The policy is applicable to the project activities.

1.4.5 **Project-related Documents**

(1) Project Feasibility Study Report;

(2) Project Plan for Resettlement of Inhabitants;

(3) Project Social Impact Assessment.

1.5 EIA Contents and Key Points

In accordance with the technical guidance for environmental impact assessment of China and requirements of World Bank safeguard policies, the environmental impact report of the project focuses on providing answers for the following questions:

(1) The project characteristics of the project and main possible environmental issues;

(2) The site-selection feasibility of the project and main environmental protection goals (sensitive spots);

(3) Possible positive environmental benefits and negative environmental impact after implementing the project;

(4) Countermeasures for mitigating possible negative impact of the project;

(5) Analysis on alternative solutions;

(6) Environmental management plan (EMP).

1.6 Standards for EIA

The *Environmental, Health and Safety General Guidance* (EHS) for International Finance Corporation includes the standards and requirements related with the atmospheric emission, noise and sound environment quality, waste water, waste management, occupational health and safety, etc.

The evaluation standards for the project are finally determined after comparison and analysis of the domestic standards applicable to the project and the standards from the World Bank *Environmental, Health and Safety General Guidance*. Please see the following for the

concrete comparison and analysis as well as relevant results.

1.6.1 **Environmental Quality Standards**

1.6.1.1 Ambient air

In accordance with EHS, the standards stipulated by national legislation shall be implemented for the ambient air quality. If there exists no standard regulated by national legislation, the latest *WHO Air Quality Standard* or other internationally-recognized reference basis would be executed. Please see Table 1-2 for details. China has already issued the *Ambient Air Quality Standard* (GB3095-2012). Since the project is located at Class II of Chinese ambient air in terms of functions, Class II of *Ambient Air Quality Standard* (GB3095-2012) shall be executed. Please see Table 1-3 for details. Meanwhile, since the project involves garbage transfer, relevant standards of NH_3 and H_2S from the *Sanitary Standard of Industrial Enterprise Design* (TJ36-79) shall be executed. Please see Table 1-2 for the specific standard value.

Table 1-2 Ambient Air Quality Standard (μg/m^3)

Item	Average period	Guidance value	Standard
SO_2	24h	125 (target value of Phase I) 50 (target value of Phase II) 20 (guidance value)	*Global Air Quality Guidance* of WHO
	10min	500 (guidance value)	
NO_2	1a	40 (guidance value)	
	1h	200 (guidance value)	
PM_{10}	1a	70 (target value of Phase I) 50 (target value of Phase II) 30 (target value of Phase III) 20 (guidance value)	
	24h	150 (target value of Phase I) 100 (target value of Phase II) 75 (target value of Phase III) 50 (guidance value)	
$PM_{2.5}$	1a	35 (target value of Phase I) 25 (target value of Phase II) 15 (target value of Phase III) 10 (guidance value)	
	24h	75 (target value of Phase I)	

		50 (target value of Phase II) 37.5 (target value of Phase III) 25 (guidance value)	

Table 1-3 Ambient Air Quality Unit: μg/m^3

Item	Average in one hour	Average in twenty-four hours	Average in a year	Standard
SO_2	500	150	60	Grade II of *Ambient Air Quality Standard* (GB3095-2012)
NO_2	200	80	40	
TSP	-	300	200	
PM_{10}	-	150	70	
$PM_{2.5}$	-	75	35	
NH_3	200 (one-time value)	-	-	*Sanitary Standard of Industrial Enterprise Design* (TJ36-79)
H_2S	10 (one-time value)	-	-	

Comparison and analysis shows that the hourly and yearly mean values of Chinese standard forNO_2 are consistent with the guidance value of EHS; the hourly and yearly mean values of Chinese standard for $PM_{2.5}$ are consistent with the target value of Phase I of EHS; the mean values in 24 hours and a year of Chinese standard for PM_{25} are consistent with the target value of Phase I of EHS; and the mean value in 24 hours for SO_2 is lower than the target value of Phase I of EHS.

In accordance with EHS, the standard regulated by national legislation shall be executed for the ambient air quality. Therefore, relevant standards from Table 1-3 are executed for the project.

1.6.1.2 Water environment

The water bodies involved in the project include the southern branch of Beiliao River (Shuangxi section), southern branch of Beiliao River (Xiangtian section) and northern branch of Beiliao River (Renshou section). Category IV of *Surface Water Environmental Quality Standard* (GB3838-2002) is applied for the southern branch of Beiliao River (Shuangxi section) since the function of the water body is industrial consumption; Category III is applied for the southern branch of Beiliao River (Xiangtian section) since the function of the water body is landscape and entertainment consumption; Category IV is applied for the northern branch of Beiliao River (Renshou section) since the function of the water body is industrial consumption. Please see Table 1-4 for details.

Table 1-4 Surface Water Environmental Quality Standard (mg/L, excluding the pH)

Assessment factor	*Surface Water Environmental Quality Standard* (GB3838-2002)	
	Category Ⅲ	Category Ⅳ
pH	6-9	6-9
Dissolved Oxygen	≥5	≥5
Permanganate index	≤6	≤6
COD	≤20	≤20
BOD_5	≤4	≤6
TN	≤1.0	≤1.0
NH_3-N	≤1.0	≤1.0
TP	≤0.2 (for lake and reservoir, 0.05)	≤0.2
Petroleum type	≤0.05	≤0.05
Sulfide	≤0.2	≤0.2
Fecal coliform	≤10000	≤10000
Involved water body	Southern branch of Beiliao River (Xiangtian section)	Southern branch of Beiliao River (Shuangxi section) and northern branch of Beiliao River (Renshou section)

1.6.1.3 Acoustic environment

Please see Table 1-5 for the noise standard of EHS and standard limit of China national standards related with acoustic environment quality indexes.

Table 1-5 Comparison of Acoustic Environment Quality Standards (dB(A))

Acoustic Environment Quality Standard (GB3096-2008)				Noise standard of EHS		
Implemented area	Category of functional zone	Daytime 6:00~22:00	Nighttime 22:00~6:00	Receptor	Daytime 7:00~22:00	Nighttime 22:00~7:00
Comprehensive area for residential, commercial and industrial purposes	Category 2	60	50	Residential, office and cultural &educational area	55	45
Both sides of high street	Category 4a	70	55	Industrial and commercial facilities	70	70

The project is located in the urban area of Jingan County which belongs to the comprehensive area for residential, commercial and industrial purposes. It is determined to execute *Acoustic Environment Quality Standard* (GB3096-2008) for the project after comparison and analysis. Please see Table 1-6 for the executive standard of acoustic environment quality of the project.

Table 1-6 Acoustic Environment Quality Standard (dB(A))

Item	Category	Implemented area	*Acoustic Environment Quality Standard* (GB3096-2008)	
			Daytime	Nighttime
Acoustic environment	Category 2	outside Category-4a areas	60	50
	Category 4a	areas within 35m to both sides of roads; the sections of a structure facing roads if the structure is higher than (equal to) 3 stories.	70	55

1.6.2 **Pollutant Discharge Standards**

1.6.2.1 Atmospheric pollutant

Comprehensive Atmospheric Pollutant Emission Standards (GB16297-1996) is applied for dust from construction. Please see Table 1-7 for the concentration limit of fugitive emission monitoring.

Table 1-7 Comprehensive Atmospheric Pollutant Emission Standards (Excerpt)

Pollutant name	Concentration limit of fugitive emission monitoring	
Particulate matter	Monitoring point	Concentration (mg/m$^{3)}$
	maximum concentration point outside boundary	1.0

1.6.2.2 Water pollutant

The percolate from garbage transfer, washing waste water and household sewage from the water quality monitoring system management house as well as the waste water from industrial park shall reach Grade B of *Water Quality Standard for Sewage to Be Discharged to Urban Sewer* (GJ343-2010) before being discharged to the pipes. Please see Table 1-8 for details. The sewage collected by the pipe network would be discharged to Jingan Sewage Treatment Plant for disposal, and the water discharged from the sewage treatment plant would be discharged to the southern branch of Beiliao River after reaching Grade I B of *Pollutant Discharge Standard of Urban Sewage Treatment Plant* (GB18918-2002). Please

see Table 1-8 for details.

Table 1-8 Water Quality Standard for Sewage to Be Discharged to Urban Sewer (Unit: mg/L)

No.	Item	Grade B	No.	Item	Grade B
1	COD	500	9	Total lead	1
2	BOD_5	350	10	Total chromium	1.5
3	SS	400	11	Total nickel	1
4	Ammonia nitrogen	45	12	Total zinc	5
5	pH	6.5~9.5	13	Total copper	2
6	Total nitrogen	70	14	Total manganese	5
7	Total phosphorus	8	15	Total iron	10
8	Total cadmium	0.1	16	Total arsenic	0.5

Table 1-9 Pollutant Discharge Standard of Urban Sewage Treatment Plant (mg/L, excluding pH)

Standard basis / Pollution factor	Grade I B of *Pollutant Discharge Standard of Urban Sewage Treatment Plant* (GB18918-2002)
COD	60
BOD_5	20
SS	20
Ammonia nitrogen	8（15）
pH	6-9
Total nitrogen	20
Total phosphorus	1

Note: the numerical value outside the bracket refers to the control index for water at a temperature >12℃, and the numerical value in the bracket the control index for water at a temperature ≤12℃.

1.6.2.3 Noise

Standards for Ambient Noise Emission at Construction Site Boundary (GB12523-2011) is applied for the building construction noise of the project. Please see Table 1-10 for the specific standard value.

Table 1-10 Executive Standard of Noise Emission Unit: dB(A)

Item	*Standards for Ambient Noise Emission at Construction Site Boundary* (GB12523-2011)
	Noise emission standard of construction site
Daytime	70
Nighttime	55

1.6.2.4 Solid waste

The *Standard for Pollution Control on the Storage and Disposal Site for General Industrial Solid Wastes* (GB18592-2001) would be referenced and applied for the storage and disposal of household garbage of the project; and the *Standards for Pollution Control at Hazardous Waste Storage Site* (GB18597-2001), EHS and other relevant World Bank safeguard policies would be applied for the hazardous wastes from the laboratory of the monitoring room of the project.

1.7 Environmental Impact Factors and Assessment Factors

The assessment adopts the matrix method to identify the main environmental issues of the project first. Please see Table 1-11 for details.

Table 1-11 Environmental Impact Identification Matrix Table

Environmental element	pollutant	Construction period			Operation period		
		Pipe network project	Garbage collection and transfer project	Water monitoring system	Pipe network project	Garbage collection and transfer project	Water monitoring system
Atmosphere	Particulate matter	△	△	△	—	△	—
	Stink	—	—	—	—	△	—
Water	COD	—	—	—	●	●	—
	BOD_5	—	—	—	●	●	—
	SS	—	—	—	●	●	—
	Ammonia nitrogen	—	—	—	●	●	—
	Total phosphorus	—	—	—	●	●	—
Noise	Noise	△	△	△	—	—	—
Solid waste	Solid waste	△	△	△	—	●	△

Environmental element	pollutant	Construction period			Operation period		
		Pipe network project	Garbage collection and transfer project	Water monitoring system	Pipe network project	Garbage collection and transfer project	Water monitoring system
Social impact	Impact on the transportation and municipal facilities	▲	—	—	●	●	—

Note: ▲remarkable negative impact; △general negative impact; ●remarkable positive impact; ○general positive impact;—no impact.

The above table shows that the main environmental impacts of the project include:

(1) Construction period: general construction impacts like the construction dust, sewage, noise and solid waste; and the social impact of the pipe network project on the transportation and municipal facilities;

Operation period: mainly the positive impact on the environment; and the negative impacts are mainly the impact of the percolate from the garbage collection and transfer project and the waste from the laboratory of the management room of the water monitoring system.

In accordance with the environmental impact identification, the assessment factors for the assessment are listed in Table 1-12.

Table 1-12 List of Assessment Factors

Element	Current situation assessment factor	Impact prediction factor
Atmosphere	SO, NO_2, PM_{10}, TSP	—
Surface water	pH, COD, BOD_5, NH_3-N, TN, TP	COD, BOD_5, NH_3-N, TN, TP
Noise	Equivalent sound level Leq(A)	Equivalent sound level Leq(A)
Ecological environment	Animal and plant resources	—
Solid waste	—	Garbage transfer amount

1.8 Environmental Protection Targets

1.8.1 Protection Targets of Acoustic and Atmospheric Environment

In accordance with the field investigation of the project team, the protection targets of acoustic and atmospheric environment related with all projects are listed in Table 1-13.

Table 1-13 List of Protection Targets of Acoustic and Atmospheric Environment

project content	Impact stage	Impact factor	Name of sensitive spot	Location	Distance(m)	Number of household /people
1) General environmental sensitive spots						
Pipe network	Construction period	Construction dust and mechanical noise	Liao He Hua Yuan	Northern side of Hougang Road	50	100 households
			Min Sheng Fu Yuan	Northern side of Huanchengnan Road	100	300 households
			Mei Lu Hua Yuan	Western side of Shima Road	10	80 households
			Luo Jia Xin Cun	Western side of Shima Road	100	100 households
			Finance Bureau Dormitory	Eastern side of Shima Road	10	200 households
			Feng Huang Hua Yuan	Eastern side of Nan'gang Road	50	80 households
			Nan Hong Xiao Qu	Southern side of Neighborhood Alley 2	20	80 households
			Wei Lan Jia Yuan	Southern side of Neighborhood	10	325 households

project content	Impact stage	Impact factor	Name of sensitive spot	Location	Distance(m)	Number of household /people
				Alley 2		
			Xin Yuan Hua Yuan	Southeastern side of Denggao Road	10	60 households
			Jin Ling Guo Ji	Southeastern side of Denggao Road	10	200 households
			Qing Hua Yuan	Southern side of Baofeng Road	10	10 households
			Ri Jing Hua Yuan	Southern side of Baofeng Road	10	80 households
			Gui Du Xuan	Southern side of Baofeng Road	50	20 households
			Hai Li Hua Ting	Southern side of Baofeng Road	200	50 households
			Mei Lu Hua Ting	Southern side of Baofeng Road	10	135 households
			Shui An Yu Yuan	Southern side of Baofeng Road	30	245 households
			Dian Li Xin Cun	Eastern side of Shuangxi Road	20	300 households
			Houses built on funds collected by buyers from National Tax Bureau	Western side of Xuefu Road	20	20 households

project content	Impact stage	Impact factor	Name of sensitive spot	Location	Distance(m)	Number of household /people
			Feng Xi Hua Yuan	Western side of Zi'an Road	20	20 households
			Shuang Long Hua Yuan	Western side of Zi'an Road	20	20 households
			Governmental public rental housing	Western side of Zi'an Road	20	/
			Settlement houses of Agricultural Bureau I and II	Western side of Zi'an Road	20	/
2) Key environmental sensitive spots						
Pipe network	Construction period	Construction dust and mechanical noise	Jingan Vocational School	Southern side of Hougang Road	20	1500 people
			Jingan Hospital of Traditional Chinese Medicine	Southern side of Hougang Road	10	200 people
			Jingan No. 1 Primary School	Eastern side of Shima Road	10	700 people
			Jingan No. 3 Middle School	Eastern side of Yabei Road	10	400 people
			Jingan Middle School	Northern side of Xuefu Road	15	1000 people
			Jingan No. 2 Primary School	Western side of the intersection between Xuefu Road and Chengbei Road	20	1000 people

1.8.2 **Protection Targets of Water Environment**

The protection targets of water environment for the project are listed in Table 1-14.

Table 1-14 List of Protection Targets of Water Environment

No.	Name of protection target	Water quality target	Water body function
1	Southern branch of Beiliao River (Shuangxi section)	Category Ⅳ	For industrial consumption
2	Southern branch of Beiliao River (Xiangtian section)	Category Ⅲ	For landscape and entertainment consumption
3	Northern branch of Beiliao River (Renshou section)	Category Ⅳ	For industrial consumption

1.8.3 **Protection Targets of Ecological Environment**

The protection targets of ecological environment for each project are listed in Table 1-15.

Table 1-15 List of Protection Targets of Ecological Environment

No.	Environmental element	Protection target	Protection target
1	Ecological environment	Terrestrial plant	Plant loss caused by permanent and temporary land occupation of the project
		Wild animal	Wild animals within the project impact scope

1.8.4 **Protection Targets of Social Environment**

The protection targets of social environment are listed in Table 1-16.

Table 1-16 List of Protection Targets of Social Environment

No.	Impact factor	Protection target
1	Infrastructure	Existing road and buildings
2	Transportation, security, etc.	The travel and security for the residential area, school and hospital along the existing road as well as the business along the street during the project construction
3	Municipal facilities	Facilities for the municipal services like water and electricity supply

2 Project Description

2.1 Project Overview

2.1.1 Project Components

(1) Project name: The World-Bank-Financed Jingan Water Environment Management Project

(2) Construction unit: Leading Group Office of the World-Bank-Financed Jingan County Water Environment Management Project

(3) (3) Construction site: Jingan County, Yichun City, Jiangxi Province. Please see the attached Map I for the geological location map of the project.

(6) Project components: the project includes the transformation project of drainage pipe network in urban area, garbage collection and transfer project and other non-engineering measures.

The transformation of drainage pipe network in urban area would construct 47.78km new drainage pipe network, including: 29.24km sewage pipe at the diameter of DN200-DN600; 17.59km rainwater pipe at the diameter of d600-d1800; 0.94km confluence pipe at the diameter of DN600-DN800; the household garbage collection and transfer system project in urban area mainly includes the supporting garbage transfer vehicles, garbage collection vehicles, garbage cans, other auxiliary facilities and the transformation of two existing garbage collection points.

The project components and construction contents are listed in Table 2-1.

Table 2-1 List of Project components and Construction Contents

Project name	Item	Construction content	Construction nature	Construction site	Service scope
Transformation of drainage pipe network	Sewage pipe network project	Lay 29.24km DN200-DN600 sewage pipe along the road. Send the collected sewage to the existing Jingan sewage treatment plant for disposal. Realize the sewage collection capacity of 9,800m^3/d in recent period and 16,600m^3/d in long-term period.	New construction	new north district, old south district and Leigongjian Industrial Park (Chengdong Industrial Park)	new north district, old south district and Leigongjian Industrial Park (Chengdong Industrial Park)

Project name	Item	Construction content	Construction nature	Construction site	Service scope
	Rainwater pipe network project	Lay 17.59km d200-d1800 rainwater pipe along the road. Discharge the collected rainwater to Beiliao River and drainage canal.	New construction	new north district, old south district and Leigongjian Industrial Park (Chengdong Industrial Park)	
Garbage collection and transfer	Garbage collection and transfer	Transform the garbage pit of Nangang Road and garbage bin of Qinghu Road and choose the garbage cans with better leakproofness; deploy 1,620 garbage cans, 2 compression-type garbage trucks, 4 bucket-type tricycles, 2 waste recycling vehicles, 1 bucket hanging garbage truck, etc.	Transformation	/	new north district, Leigongjian Industrial Park (Chengdong Industrial Park), old south district and New Industry &Trade Town (Chengnan Industrial Park). The disposal object is the household garbage.
Other project	Water environment monitoring system house	One building; three stories; floor area of 1,250m^2; mainly including the laboratory, control room, etc.	New construction	County	Mainly be responsible for the water quality monitoring, remote monitoring of automatic monitoring station, data collection and transmission, data statistics and utilization.
	Automatic water environ	Two buildings; all two stories; floor area of 154m^2 for each; the main buildings consist of the	New constructio	Station I is located beside Beiliao gate dam, Liaohe irrigated area,	Station I monitors the water quality of southern branch of

Project name	Item	Construction content	Construction nature	Construction site	Service scope
	ment monitoring station for the monitoring section of river boundary	instrument room, quality control room, etc.	n	Chexiachenjia, Xiangtian Township, Jingan County; Station II at the eastern side of Changhua Bridge, Mentouyaojia, Renshou Town, Jingan County.	Beiliao River at the intersection between Jingan and Fengxin County; Station II the water quality of northern branch of Beiliao River at the intersection between Jingan and Anyi County.
	Automatic water environment observation and prediction point	Set 7 machine cases for automatic water environment observation and prediction points	New construction	River junctions in each township within the jurisdiction of Jingan County	Water quality at the river junctions in each township within the jurisdiction of Jingan County
project cost	About RMB 157.7458 million in total, including USD 17.5 million (RMB 115.5 million) loan of World Bank and RMB 43.5345 million of counterpart funding from the superior support and the local government's self-raised fund.				

2.1.2 **Project Scale**

2.1.2.1 Prediction of sewage amount

In accordance with the feasibility study report of the project, the sewage amount is predicted through the combination of per capita comprehensive index method, site area comprehensive index method, classification water utilization prediction method and water consumption calculation method. The predicted population is adopted as the population, and the northern city and southern city within the service scope of the county household sewage treatment plant adopted as the site.

Table 2-2 Prediction Table of Sewage Amount through Per Capita Comprehensive Index Method

Prediction year / Calculation item	Year 2023	Year 2030
Predicted population (10,000 people)	5.16	5.55
Maximum daily water demand in the city (10,000 m^3/d)	2.06	2.78
Average daily sewage amount of the city (10,000 m^3/d)	1.18	1.59
Underground water infiltration quantity (10,000 m^3/d)	0.12	0.16
Calculated total sewage amount (10,000 m^3/d)	1.30	1.74

Table 2-3 Prediction Table of Sewage Amount through Site Area Comprehensive Index Method

Prediction year / Calculation item	Year 2023	Year 2030
Planning site area（km^2）	5.81	8.81
Maximum daily water demand in the city (10,000 m3/d)	2.32	4.41
Average daily sewage amount of the city (10,000 m3/d)	1.33	2.52
Underground water infiltration quantity (10,000 m3/d)	0.13	0.25
Calculated total sewage amount (10,000 m3/d)	1.46	2.77

Table 2-4 Prediction Table of Sewage Amount through classification Water Utilization Prediction Method

Prediction year / Calculation item	Year 2023	Year 2030
Average daily comprehensive household sewage amount (10,000 m3/d)	0.70	0.75
Average daily industrial sewage amount (10,000 m3/d)	0.12	0.25
Underground water infiltration quantity (10,000 m3/d)	0.08	0.10
Calculated total sewage amount (10,000 m3/d)	0.90	1.10

Table 2-5 Prediction Table of Sewage Amount through water Consumption Calculation Method

Prediction year / Calculation item	Year 2023	Year 2030

Average daily water demand (10,000 m3/d)	1.41	2.00
Average daily sewage amount (10,000 m3/d)	1.13	1.60
Underground water infiltration quantity (10,000 m3/d)	0.11	0.16
Calculated total sewage amount (10,000 m3/d)	1.24	1.76

Table 2-6 Sewage Amount Calculation Summary Based on Different Prediction Methods

Prediction year / Prediction method	Year 2023	Year 2030
Sewage amount predicted through per capita comprehensive index method (10,000 m3/d)	1.30	1.74
Sewage amount predicted through site area comprehensive index method (10,000 m3/d)	1.46	2.77
Sewage amount predicted through classified water utilization prediction method (10,000 m3/d)	0.90	1.10
Sewage amount predicted through water consumption calculation method (10,000 m3/d)	1.24	1.76
Average sewage amount (10,000 m3/d)	1.23	1.84
Collection amount of the project	0.98	1.66

2.1.2.2 Prediction of garbage amount

In accordance with the feasibility study of the project, the project, based on the yearly decreasing trend of per capita daily garbage output in the urban area of Jingan County, adopts the garbage amount gradually decreasing from 1.31kg/person/d to 1.20kg/person/d and 100% calculation for the years after 2020. Please see the following table for the predicted garbage output of the project.

Table 2-7 Analysis of Garbage Output

No.	Year	Year-end population (people)	Per capita output (kg/person/d)	Daily output (t/d)	Recyclable garbage amount (t/d)	Unrecyclable garbage amount (t/d)
1	Year 2017	53014	1.25	66.3	5.3	61.0
2	Year 2020	54442	1.20	65.3	5.2	60.1
3	Year 2023	55908	1.20	67.1	5.4	61.7
4	Year 2030	59486	1.20	71.4	5.7	65.7

The long-term unrecyclable garbage output in the urban area of Jingan County is about

65.7t/d, including 37.7t/d of collection and transfer amount of the project which would be cleared by Jingan Urban Management Bureau and 28t/d of collection and transfer amount which would be cleared by Shenzhen Baozhengtong Cleaning Service Co., Ltd. Please see the following table for the collection and transfer situation of the project.

Table 2-8 Disposal Scale of Different Type of Collection Vehicles for the Project (t/d)

No.	Type	Garbage disposal scale	Responsible area
1	Bucket-type tricycle	5.4	House compact district of old area
2	Bucket-type garbage vehicle	8.1	Urban by-pass and street
3	Compression-type garbage vehicle	24.2	Urban high street, artery and industrial park
4	Total	37.7	

2.1.2.3 Project quantities

1. Drainage pipe network transformation project

Table 2-9 Bill of Quantities for Sewage Pipe Network Transformation Project

No.	Road name	Starting point	End point	Pipe diameter (mm)	Pipe length (mm)	Pipeline laying location	Construction method
1	Dongfang Road	Zhong Street	Shuangxi Road	DN400	988	Kerb edge of western-side road	Pipe-jacking
2	Hougang Road	Huanchengxi Road	Shima Road	DN300	460	Kerb edge of southern-side road	Excavation
				DN400	583		
3	Shima Road	Huanchengnan Road	Yanhenan Road	DN300	704	Non-motorized vehicle lane on both sides	Pipe-jacking
				DN400	1022		
4	Shuangxi Road	Qinghua Road	Yanhenan Road	DN300	1479	Non-motorized vehicle lane on both sides	Pipe-jacking
5	Baofeng Road	Qinghua Road	Yanhenan Road	DN300	1261	Non-motorized vehicle lane on southern side	Excavation
				DN400	420		
6	Denggao Road	Huanchengnan Road	Qinghua Road	DN300	388	Kerb edge of eastern-side road	Excavation

No.	Road name	Starting point	End point	Pipe diameter (mm)	Pipe length (mm)	Pipeline laying location	Construction method
7	Jiaoyu Road	Baofeng Road	20m planning road of southern city	DN300	616	Northern-side sidewalk	Excavation
8	Neighborhood Alley 1	Shuangxi Road	Yanhenan Road	DN400	303	Southern side of alley	Excavation
9	Neighborhood Alley 2	Denggao Road	County inland river	DN300	1171	Northern side of alley	Excavation
				DN400	482		
10	Neighborhood Alley 3	Denggao Road	South Road of Baimu Fishpond	DN300	781	Housing estate road	Excavation
				DN400	229		
11	Neighborhood Alley 4	Huanchengnan Road	Hougang Road	DN300	742	Western side of alley	Excavation
				DN400	546		
12	20m planning road of southern city	Qinghua Road	Yanhenan Road	DN300	410	Northern-side sidewalk	Excavation
				DN400	672		
13	Gongye Road	Huanchengbei Road	Binhedong Road	DN300	1112	Original arrangement location of confluence pipe on both sides	Excavation
				DN400	3084		
14	Zi'an Road	Chengbei Road	Binhedong Road	DN300	807	Eastern-side sidewalk	Excavation
				DN400	956		
15	Xuefu Road	Huanchengbei Road	Fuqiandong Road	DN300	885	Kerb edge of western-side road	Pipe-jacking
16	Fuqian Road	Xianfudong Road	Xuefu Road	DN500	730	Southern-side sidewalk	Excavation
17	Binhe Road	Huanchengxi Road	Fuqianzhong Road	DN400	1191	Northern-side sidewalk	Excavation
				DN500	844		
				DN600	1503		
18	Building			DN200	1949		

No.	Road name	Starting point	End point	Pipe diameter (mm)	Pipe length (mm)	Pipeline laying location	Construction method
	unite pipe			DN300	2924		
Total					29242		

Table 2-10 Bill of Quantities for Rainwater Pipe Network Transformation project

No.	Road name	Starting point	End point	Pipe diameter (mm)	Pipe length (mm)	Pipeline laying location	Construction method
1	Dongfang Road	Zhong Street	Shuangxi Road	d1000	266	Original cover-plate channel location	Pipe-jacking
				d1200	443		
2	Hougang Road	Huanchengxi Road	Shima Road	d800	798	Original cover-plate channel location	Excavation
				d1000	331		
3	Shima Road	Huanchengnan Road	Yanhenan Road	d600	220	Non-motorized vehicle lane on both sides	Pipe-jacking
				d800	1364		
4	Shuangxi Road	Qinghua Road	Yanhenan Road	d800	1432	Non-motorized vehicle lane on both sides	Pipe-jacking
5	Baofeng Road	Qinghua Road	Yanhenan Road	d800	690	Non-motorized vehicle lane on both sides	Excavation
				d1000	1026		
6	Jiaoyu Road	Baofeng Road	20m planning road of southern city	d600	240	Road axis	Excavation
				d800	378		
7	Neighborhood Alley 1	Shuangxi Road	Yanhenan Road	d800	345	Northern side of alley	Excavation
8	Neighborhood Alley 2	Baofeng Road	County inland river	d600	204	Northern-side sidewalk	Excavation
9	20m planning road of	Qinghua Road	Yanhenan Road	d600	340	Southern-side sidewalk	Excavation
				d800	658		

	southern city						
10	Qinghu Road	Chengnan Road	Hougang Road	d800	325	Eastern side of road	Pipe-jacking
11	Xuefu Road	Huancheng bei Road	Fuqiandong Road	d800	232	Kerb edge of western-side road	Pipe-jacking
				d1000	553		
12	Fuqian Road	Xianfudong Road	Xuefu Road	d800	631	Northern-side sidewalk	Excavation
13	Gongye Road	Huancheng bei Road	Binhedong Road	d800	1136	Kerb edge on both sides	Excavation
				d1000	1654		
				d1200	1430		
14	Zi'an Road	Chengbei Road	Binhedong Road	d600	490	Western-side sidewalk	Excavation
				d800	317		
				d1200	266		
				d1500	343		
				d1800	347		
15	Binhedong Road	Fuqian Road	Gongye Road	d800	1134	Road axis	Excavation
Total					17593		

Table 2-11 Bill of Quantities for Confluence Pipe Network Transformation project

No.	Road name	Starting point	End point	Pipe diameter (mm)	Pipe length (mm)	Pipeline laying location	Construction method
1	Xin Street	Neighborhood Alley 1	Hougang Road	d600	199	Kerb edge of western-side road	Pipe-jacking
				d800	248		
2	Yabei Road	Neighborhood Alley 1	Dongfang Road	d800	299	Western side of road	Pipe-jacking
3	Neighborhood Alley 1	Yabei Road	Shuangxi Road	d600	198	Southern side of alley	Excavation
Total					944		

2. Garbage collection and transfer project

Please see the following table for the bill of quantities for household garbage collection and transfer project.

Table 2-12 Bill of Quantities for Household Garbage Collection and Transfer System

Item name	Scale/ specification	Quantity	Remarks

Item name	Scale/ specification	Quantity	Remarks
Cleaner instrument and equipment		121 sets	Besom, shovel, handcart and reflective vest
Garbage can	240L	1620	Recyclable garbage and unrecyclable garbage
Bucket-type electro-tricycle	500kg	4	
Waste recycling vehicle	1700kg	2	
Garbage collection vehicle with bucket at the back	3t	1	There are three existing 1.5t garbage collection vehicles.
Compression-type garbage vehicle5.5t	6000kg	2	
Transformation of current-situation garbage collection pit		2	
Intelligent Cloud Platform of Household Garbage Collection, Transfer and Disposal System		1 set	

3. Water quality monitoring center and automatic monitoring station

Please see the following table for the bill of quantities for the water quality monitoring center and automatic monitoring station.

Table 2-13 Bill of Quantities for Monitoring and Dispatching Center and Automatic Monitoring Station

Project name	Item	Quantity	Unit	Remarks
Water environment monitoring system house	Quantity	1	Building	Located at northern city of the county
	Number of story	2	Story	The main building consists of the monitoring center, quality control room, laboratory, etc. The center would be equipped with monitoring platform, large-screen TV-wall and laboratory equipment.
	Story height	The first story 3; the second story 3.3	m	
	Floor area	1250	m^2	
Automatic	Quantity	2	Buildin	Station I is located beside Beiliao

water environment monitoring station for monitoring section of river boundary			g	gate dam, Liaohe irrigated area, Chexiachenjia, Xiangtian Township, Jingan County; Station II at the eastern side of Changhua Bridge, Mentouyaojia, Renshou Town, Jingan County.
	Number of story (single station)	2	Story	The automatic water quality monitoring station is mainly used for the main building carrying the system instrument and equipment and for the external safeguard conditions. The main building consists of the instrument room, quality control room, etc.
	Story height (single station)	The first story 3; the second story 3.3	m	
	Floor area (single station)	154	m^2	

2.1.3 **Implementation Schedule**

It is planned to launch the project in January of 2018 and carry out the completion acceptance for all projects by the end of December of 2022. Therefore, the project construction period is five years.

2.1.4 **Project Cost**

1. Total project cost

The estimated total investment for the project is RMB 157.7458 million.

2. Fund raising

The project plans to apply for a loan of US$ 17.50 million (equal to RMB 115.5 million, calculated based on USD 1=RMB 6.6) from World Bank and ask for a supporting fund of RMB 42.5345 million which would be solved through the combination of assistance from the superior government and self-finance of local government.

2.2 Project Analysis

2.2.1 **Pollution Source Analysis during Construction Period**

(1) Sewage in construction period

The sewage of project construction period mainly includes the household and construction sewage produced by the constructors.

① Household sewage

During the construction peak of the project, we assume that there would be 120 constructors scattered in each construction section of the pipeline on average. In the assessment, we adopt 50L/day/person as the constructors' water consumption and 0.8 as the

discharge coefficient. Therefore, the constructors' household sewage output is 4.8m^3/d. Also, we adopt 250mg/L for the amount of COD, 150mg/L for the amount of BOD_5, 200mg/L for the amount of SS, 35mg/L for the amount of ammonia nitrogen from the sewage. Therefore, the outputs of the pollutants are 1.2kg/d for COD, 0.72kg/d for BOD_5, 0.96 kg/d for SS and 0.18kg/d for ammonia nitrogen respectively.

The household sewage produced during the construction period would be collected and disposed by local residents' existing household sewage collection and disposal facilities rather than being discharged directly.

② Construction sewage

The construction sewage of the project mainly includes two types: the first is the muddy water discharged by pipeline excavation as well as machinery and vehicle washing, output of which would not be much; the second is the sewage produced from the construction process at the construction site like the sand and stone flushing, agitation and concrete placement. The pollutants from the construction sewage mainly include SS, petroleum, etc. After sedimentation, the construction sewage would be used for watering for dust suppression.

(2) Waste gas in construction period

The dust pollution of construction represents the main source of waste gas pollution during the construction period, and includes the dust from the transportation of construction vehicles and construction site (such as the pipe channel excavation, earthwork stacking, loading and unloading of building materials, etc.).

According to relevant document literature, during the construction, the dust produced by vehicle travel takes up over 60% of all dust and is related with the road surface and vehicle running speed. In general, the impact scope of dust produced by natural wind on the construction road is within the scope of 100m. If watering for dust suppression is implemented 4-5 times each day on the road during the construction period, the amount of dust in the air would be reduced by about 70%, and the pollution distance of TSP be reduced to the scope of 20-50m. Please see the following table for the test result of watering.

Table 2-14 Test Result of Dust Suppression by Watering Cart during Construction Period

Distance from the roadside (m)		5	20	50	100
TSP concentration (mg/m^3)	No watering	10.14	2.810	1.15	0.86
	Watering	2.01	1.40	0.68	0.60

Another main source of dust during the construction period is the dust blown by wind power from the open storage ground and bare site. Since such kind of dust is under the

influence of the humidity and wind speed of the storage yard, effective ways to suppress the dust include watering to the road and storage yard, prohibition of relevant operation in very windy day and decrease of open stacking.

Moreover, the motor vehicle exhaust produced during the construction period and exhaust gas of fuel oil from the construction machines also constitute the source of waste gas from the construction, main pollutants of which include HC, CO, NOx and the like and feature low output.

(3) Noise in construction period

The noise in construction period mainly comes from the material transportation, pipe channel excavation, pipe loading and unloading as well as back-filling machines like the loader, bulldozer, excavator and lorry. Since the noise emission is intermittent and the equipment noise value is about 75dB (A)-90dB (A), the noise may affect the ambient environment without good control.

Table 2-15 Noise Source Intensity of Main Construction Machines (dB(A))

No.	Machine type	Distance from the measure point to the machine (m)	Maximum sound level
1	Loader	5	90
2	Road roller	5	81
3	Bulldozer	5	86
4	Excavator	5	84
5	Large-capacity lorry	—	86
6	Light truck	—	75

(4) Solid waste

The solid wastes produced during the construction period mainly include the constructors' household garbage as well as the spoil, construction waste and the like of the construction period.

① Household garbage

We assume that the household garbage produced by the constructors is 0.5kg per person per day and the number of constructors 120. Therefore the output of household garbage is about 60kg/d. It is suggested to set garbage collection box and environmental protection signboard at the construction site and entrust the environmental protection authority to clear and transfer the household garbage after unified collection.

② Construction waste and spoil

The earthwork of the project mainly comes from the pipe network construction and

includes 132,789m^3 of excavation amount, 104,836m^3 of filling amount and 27,953m^3 of spoil amount. Meanwhile, the project construction would produce certain amount of construction waste, including about 1,490 m^3 cement concrete, brick rubble, sand-gravel material, etc.

(5) Ecological impact and water and soil loss

The transformation project of drainage pipe network of the project basically involves no residents' removal and resettlement in accordance with the on-the-site survey along the recommended arrangement line of pipe network. However it involves temporary land requisition. Since a water environment monitoring system and two automatic water quality monitoring stations would be newly constructed for the project, new land would be required and the land to be requisitioned is all uncultivated land left unused.

The construction might damage some vegetation and affect the ecological environment. Therefore necessary project and vegetation measures would be required to afforest the exposed surface or slope to decrease the environmental impact and prevent and control the water and soil loss.

2.2.2 **Pollution Source Analysis during Operation Period**

In the operation period of the project, the transformation project of drainage pipe network would not produce any industrial sewage or pollutant basically. The garbage collection and transfer project would mainly produce the garbage percolate, washing waste water for garbage transfer vehicles, transportation noise and stink from garbage collection and transfer vehicles; the water environment monitoring system house project would produce the experimental waste water and workers' household sewage and garbage.

(1) Waste gas

Since the collected household garbage includes varied types of fermentative organics. Especially in summer when the temperature is high, the household garbage would emit odorous and foul gas during the storage, loading and transfer process which mainly includes such odorous gas as ammonia and hydrogen sulfide. The odor pollutants mainly affect the environment through people's smell and mainly come from the odorous gas produced from the garbage transfer vehicles and garbage collection points.

Meanwhile, garbage transfer would also produce some dust pollution.

(2) Waste water

During the operation period of the project, the waste water mainly comes from the percolate from the garbage transfer process, waste water from washing garbage transfer vehicles and garbage bins at the collection points as well as workers' household sewage from

the water environment monitoring system house.

① Garbage percolate

The garbage percolate refers to the fluid discharged from the garbage in the fermentation and decomposition process. The garbage compression process would produce percolate from the moisture bearing garbage and putrid fermentation. Relatively speaking, the putrid fermentation would produce relatively small amount of moisture and the moisture bearing garbage relatively large amount. Also, the concentration of organic pollutant and ammonia nitrogen is high.

In general, the percolate amount produced by garbage compression is 1% of the disposed garbage amount. The percolate produced by the compression of compression-type garbage vehicle would be stored in the percolate collection box, discharged to the sewage collection tank of the existing garbage transfer station in the washing process and drained to Jingan sewage treatment plant for disposal through the municipal sewage pipe network.

② Washing waste water

It is planned to wash varied types of garbage transfer vehicles and garbage bins from the garbage collection points of Nangang Road and Qinghu Road in the existing garbage transfer stations of the county. The process would produce certain amount of washing waste water which is usually 10% of the garbage transfer amount. After mixing with the percolate, the washing waste water would be discharged to the sewage collection tank and drained to Jingan sewage treatment plant for disposal through the municipal sewage pipe network. After mixing, the concentration of varied pollutants from the percolate and washing waste water would reach Grade B of *Water Quality Standard for Sewage to be Discharged to Urban Sewer* (GJ343-2010). Please see the following table for details.

Table 2-16 Waste Water Produced for Garbage Transfer of the Project

Pollutant source		Sewage amount (t/a)	Concentration of water pollutant (mg/L)					Treatment measures to be adopted
			pH	COD	BOD_5	SS	NH_3-N	
Output	Percolate	137.605	4~5	2500	1000	1000	180	Discharged to Jingan sewage treatment plant for disposal through the municipal pipe network after
	Washing waste water	1376.05	6~8	280	250	300	30	
After mixing		1513.66	/	481.82	318.18	363.64	43.64	

							being collected.
Grade B of *Water Quality Standard for Sewage to be Discharged to Urban Sewer* (GJ343-2010)	/	6.5~9.5	500	350	400	45	/

③Household sewage from water environment monitoring system house

There would be ten workers in the water environment monitoring system house whose number of workdays in a year is 255. If the household water consumption is 50L/person/d, the household water consumption would be 0.5m^3/d. And if the drainage rate is 80%, the laboratory sewage amount would be 0.4 m^3/d and 102 t/a.

(3) Solid waste

① Household garbage

The solid waste from the operation period of the project is mainly the household garbage from the workers in the water environment monitoring system house. Please see the following table for the output of household garbage.

Table 2-17 Output of Household Waste

Location	Number of people (people)	Number of workdays in a year (day)	Per capita output (kg/person/d)	Daily output (kg/d)	Yearly output (t/a)
Water environment monitoring system house	10	255	0.5	5	1.28

② Liquid waste from the laboratory of the water environment monitoring system house

During the operation period, the laboratory of the water environment monitoring system house would produce waste acid (HW34), alkali (HW35) and organic solvent (HW42) which belong to hazardous wastes. According to the situation of the laboratory of similar scale, the output of the above-mentioned liquid waste is about 300kg which would be sent to the unit with the disposal qualification of the hazardous wastes after unified collection.

(4) Noise

During the operation period of the project, the noise mainly includes the noise from the transportation vehicle, source intensity of which is about 80dB(A)-85dB(A). Please see the following table for the main noise source.

Table 2-18 Main Noise Source (dB(A))

No.	Noise source	Quantity	SPL (Sound Pressure Level) source intensity
1	Bucket-type tricycle	4	80
2	Bucket-type garbage vehicle	1	80
3	Compression-type garbage vehicle	2	85

2.3 Production and Predicted Emission of Main Pollutants

Table 2-19 Production and Predicted Discharge of Main Pollutants of the Project

Item \ Content		Discharge source (No,)	Pollutant name	Production concentration and output	Discharge concentration and amount
Water pollutant	Construction period	Household sewage	Waste water amount COD BOD_5 SS Ammonia nitrogen	$4.8m^3/d$ 250mg/L, 1.2kg/d 150mg/L, 0.72 kg/d 200mg/L, 0.96kg/d 35mg/L, 0.18 kg/d	Through local residents' household sewage treatment facilities; no discharge to the outside
		Construction waste water	SS	Small amount, fugitive emission	Small amount, fugitive emission
	Operation period	Washing waste water and percolate	Waste water amount COD BOD_5 SS NH_3-H	1513.66t/a 478.41mg/L, 0.73t/a 317.03mg/L, 0.48t/a 362.56mg/L, 0.55t/a 43.41mg/L, 0.07t/a	Discharged to the municipal sewage pipe network and Jingan sewage treatment plant for disposal
		Household sewage from water environment monitoring system house	Waste water amount COD BOD_5 SS NH_3	102t/a 0.025t/a，250mg/L 0.022t/a，220mg/L 0.020t/a，200mg/L 0.003t/a，25mg/L	Discharged to Jingan sewage treatment plant for disposal through the municipal sewage pipe network
Air	Constru	Constructio	TSP	Small amount, fugitive	Small amount, fugitive

Item \ Content		Discharge source (No,)	Pollutant name	Production concentration and output	Discharge concentration and amount
pollutant	ction period	n raise dust		emission	emission
		Exhaust gas of fuel oil from constructio n machines	HC, CO, NOx	Small amount, fugitive emission	Small amount, fugitive emission
	Operation period	Garbage collection points and transfer vehicles	NH_3, H_2S	Small amount, fugitive emission	Small amount, fugitive emission
Noise	Construction period	Constructio n machines	Sound pressure level	75 dB(A)~90dB(A)	
	Operation period	Transportation vehicles	Sound pressure level	80 dB(A)~85dB(A)	
Solid waste	Construction period	Engineering construction	construction waste	1490 m^3	1490 m^3
			Engineering spoil	27953m^3	27953m^3
		Daily life	Household garbage	60kg/d	Cleared and transferred by the environmental protection authority in an unified manner
	Operation period	Daily office work	Household garbage	2.01t/a	Transferred to Jingan garbage landfill after collection
		Laboratory liquid waste	Waste acid (HW34), alkali (HW35) and organic solvent (HW42)	300kg/a	Sent to the unit with qualification for disposal

Main ecological impact: The project is under typical urban ecological environment, and the construction

Item \ Content	Discharge source (No,)	Pollutant name	Production concentration and output	Discharge concentration and amount
and operation of the project have little impact on the ecological environment. During the construction period, the activities like surface excavation may damage the original surface and therefore easily lead to water and soil loss of the exposed friable soil under the washing of overland runoff.				

3 Environmental Status Quo

3.1 Natural Environment

3.1.1 Geographical Location

Located at northeastern Yichun, 114°55′-115°32′ E and 28°46′-29°03′ W, Jingan County is adjacent to Anyi County to the east, Fengxin County to the south, Xiushui County to the west, Wuning County to the north and Yongxiu County to the northeast. The whole county features a E-W length of 59.1km, S-N width of 35.3km and county territory area of 1,377.49km^2 which accounts for about 0.83% of the total area of the whole province. The county is located at the southeastern part of the county territory, 84km from the provincial capital Nanchang, 216km from Yichun City, and 60km from Nanchang Changbei International Airport. The project is located at the urban area of Jingan County. Please see the attached Map I for the geological location map of the project.

3.1.2 Landform

Because of the influence from the internal and external geological agents, Jingan territory shows rise in the northwestern fold mountain and subsidence in the southeastern basin formed with Anyi and Fengxin County. The whole county has formed the landform characteristic of mountain peaks in three sides, dual water in the middle, hills mixed mountains and small area of Gangbu Plain in the southeastern part. All the mountains within the county territory are Jiuling Mountain Chain and its mountain extension in Huaxia strike. Since the southern river and northern river run through the territory almost parallelly, the mountain chain shows the character pattern of Chinese “Zhao” and zigzags from the west to the east in three branches—southern, middle and northern branch. There are 378 main mountains with the elevation sign over 500 m in the whole county and the highest peak is the western Jiuling Mountain peak which is 1,794m high.

3.1.3 Geology

Jingan County is located at Jiuling of Jiangnan Tailong, Yantze Platform—the western section of Jiuling Vault Fault Bundle of Gaotai Mountain Vault. It extends to Yongxiu—Nanchang region with deep fracture and Boyang Sinking as the boundary. Its folds can be classified into two kinds, i.e., the basement fold and caprock fold. The former includes Dawutang Anticlinorium and the synclinorium from Gangkou to Zaoxia, and the latter mainly consists of Jingan Baiyashan—Wuning Synclinorium. The fractures, mainly in NEE direction, extend for ten to more than a hundred kilometer and consist mainly of Jingan—Jiujiang Fracture, Fengxin Zaoxia—Yongxiu Yunshan Fracture, Fengxin

Shangfu—Jingan Gaohu Fracture, Gaohu—Xiangwu Fracture and Guanzhuang—Zaodu Fracture. The downfaulted basin is formed mainly of Anyi Basin which is located at southeastern Jingan, extends in the direction of NE—NNE and consists mainly of Lower Tertiary System.

3.1.4 **Weather and Climate**

Jingan County, located at the humid climate zone of mid-subtropical area, features moderate climate, four distinctive seasons, abundant rainfall and sunshine, short frost season and long growing season of plant. The forest season of the county is varied in different areas. The first frost is usually in the last ten-day of November in the city and mountain plain area and middle ten-day of November in the mountainous area. The county usually has 84d of frost season and 281d of frost-free season in a whole year.

Temperature: within the whole county, the daily mean temperature is 17℃ in a whole year, 27.7-31.7℃ in July—August and 4.9℃ in January. The extreme maximum temperature is 39.9℃ (August 11, 1966) and extreme minimum temperature -11℃ (January 30, 1977). In the county, the higher the terrain is, the lower the temperature would be. There would be an average temperature decrease of 0.5℃ for every elevation increase of 100m. The accumulated temperature throughout the year in the county is 6300℃.

Precipitation: the whole county features abundant rainfall and a yearly average precipitation of 1,731.1mm. Year 1975 represents the year with maximum rainfall which is 2,197.7mm and Year 1978 minimum rainfall which is only 1,166mm in the county. The rainfall in the mountainous region is more than that in the mountain plain, and the rainfall difference between the eastern part and western part is nearly 500mm. The precipitation is unevenly distributed in the whole year and mean annual precipitation of the county is 1,617.5mm.

Light: in the whole county, the mean annual sunshine duration is 1,773.7h for many years. Year 1983 represents the year with the longest sunshine duration which is 2,754.8h and Year 1975 the shortest which is 945.7h. In each year, the third quarter usually has the most abundant sunshine which lasts for 690.2h on average and accounts for 36.9% of the sunshine duration of the whole year; while the first quarter usually has the least abundant sunshine which lasts for only 310.6h and accounts for 16.6% of the sunshine duration of the whole year. The northwestern mountainous region of the county, full of high mountains as well as cloud and mist, has 5% less of sunshine than the mountain plain region.

Wind direction and speed: in Jingan, the wind is mainly in NW direction throughout the year and mostly in SW direction in August in the central part. The wind speed change is

not large in the four seasons, and the average wind speed for years in succession is about 1.8m/s. The wind speed is relatively low in the western part with more mountains. However, in the high level ground in the mountains or hills, the strong wind may reach Category 7 to the highest.

3.1.5 **River System and Hydrology**

Jingan falls into Beiliao basin of Xiushui river system and is located within the scope of 114°35′-115°37′E and 28°46′-29°06′N. Its basin involves the four counties of Xiushui, Jingan, Fengxin and Anyi. The county is adjacent to Xiuhe River to the west and north and Beiliao River to the south which covers a basin area of 1,518km^2. The basin area within Jingan County is 1,378.49 km^2, accounting for 90.8％ of Beiliao River basin. With developed river system as well as densely covered branches of different sizes, the average water yield for years in succession is 1.433 billion m^3. The main streams of the county consist of the southern and northern branches which are named as the South River and North River by the county people since ancient times. The two branches run through the whole territory nearly parallelly from the west to the southeast, and converge to form Beiliao River and flows into Anyi County territory at Zhouweihuangjia, Maobu Village, Renshou Town.

The South River represents the main river of Beiliao River, secondary branch of Xiuhe River and primary branch of Liaohe River, and originates from Hanpofen of Maozhushan Mountain within Xiushui County territory and Baishaping of southwestern Jiuling Mountain Chain of Jingan County. The river source is located at 114°54′E and 28°50′N. From the source, water flows eastward into Jingan County territory after a distance of about 1000m, and through nine towns or townships like Zhongyuan, Luowan, Gaohu, Shuikou, Shuangxi, Leigongjian, Xiangtian, Ganzhou Town of Fengxin County and Renshou Town. The water then converges to form Beiliao River at Maobu of Renshou and flows into Anyi County. The river within the county territory is 130km long. The part above Shaokou of Gaohu represents the upstream which is 59.5km long; the part from Shankou to Jingan County represents the midstream which is 25.2 km long; and the part below Jingan County represents the downstream which is 40.4km long. The downstream within Jingan County is about 18.5 km long and basin area 633.02 km^2. From the head-stream to the convergence of South River and North River, the gross head is 995m, longitudinal impedance river slope of main channel 2.85‰, basin average elevation 426m, basin average slope 0.53m/km^2, mean annual precipitation for years 1,717mm and mean annual water yield 744 million m^3.

Fig. 3-1 River System Distribution Map of Jingan County

3.2 **Social Environment**

1. Administrative division

Jingan County, under the jurisdiction of Yichun, Jiangxi, governs five towns, six townships and seventy-five administrative villages. With a land area of 1,377km^2 and urbanization rate of 45.04%, the whole county has a total population of 151,500, including 41,339 non-agricultural people (27.3% of the total) and 110,161 agricultural people (72.7% of the total). The whole county features a male population of 78,803 and female population of 72,697. Therefore the sex ratio is 108.4: 100.

2. Economic position

The whole county has realized a gross production value of RMB 3.3938 billion in 2014 which represents a year-on-year growth of 10.0% based on the comparable price, including RMB 588.34 million for the primary industry, RMB 1.72785 billion for the secondary industry and RMB 1.07761 billion for the tertiary industry. The industrial structure ratio is therefore 17.3: 50.9: 31.8. The per capita gross production value reaches RMB 23,093.

3.3 **Ecological Environment**

The project, located at Jingan County, may involve and affect human activities for a long time. Currently, within the region, the protophyte has basically disappeared and the plants are mainly secondary plants and vegetation like the grass and bush fallow, cedar, metasequoia, masson pine, bamboo, elm, camphor tree, privet, quercus sclerophylla, willow,

Chinese ash, paraffin, sweetgum and Chinese chestnut as well as the economic forests cultivated by people like the bamboo, citrus and tea garden. The nearby cropland mainly contains the oilseed rape, nursery stock and small amount of vegetables. No precious wild plant has been discovered in the project area.

Due to frequent human activities, currently the region has little activities from the precious and rare animals. Besides the common species like the sparrow, rat, rabbit and snake, no animal population under national protection has been detected within the project area.

3.4 Current Situation of Land Utilization

In accordance with the current situation investigation, the land utilization situation of the project is listed in Table 3-1.

Table 3-1 Current Situation of Land Utilization of Project Area

No.	Item type	Location	Land type
1	Pipe network project	Urban area	Land for construction
2	Water environment monitoring system house	Northern city	Uncultivated land
3	Automatic water environment monitoring station for monitoring section of river boundary	Northern branch of Beiliao River at the intersection between Jingan and Anyi County	Uncultivated land
		Southern branch of Beiliao River at the intersection between Jingan and Fengxin County	Uncultivated land

3.5 Park Enterprises

3.5.1 Leigongjian Industrial Park (Chengdong Industrial Park)

Leigongjian Industrial Park (Chengdong Industrial Park), located at the eastern part of northern Jingan County, has accommodated about 20 enterprises.

(1) Company scale and type

The companies within the park, mainly in small and medium size, consist of one large, six medium-sized and thirteen small-sized enterprises. Also, these companies are mainly of processing industry, including the processing of metal, lighting fixture, wood ware, bamboo ware, lithium battery, food, etc.

(2) Water consumption

According to the water consumption data provided by the water supply company, the average daily consumption of water in Leigongjian Industrial Park is about 1100t/d. Most of the companies, because of their company nature or small scale, have no large consumption of water and have their water supplied by the water supply company. Only a few companies are equipped with self-drilled well.

(3) Rainwater and sewage treatment and discharge

Some of the companies have pretreatment for their industrial sewage discharged to the outside through the treatment process of sedimentation. Such companies include Jiangxi Jiangwu Cemented Carbide Co., Ltd., Jiangxi Heli Lighting Electrical Appliance Co., Ltd. , Jingan Youlemei Food Co., Ltd. , Jingan Hongda Food Co., Ltd., Jiangxi Shanyou Industry Co., Ltd., Jiangxi Yihui Industry Co., Ltd., Jingan Dexin Carton Industry Co., Ltd., Jiangxi Youhe Food Co., Ltd. and Jiangxi Chaowei New Energy Technology Co., Ltd. Some companies in the park have implemented separation of rainwater and sewage. All such companies except for Jiangxi Xiyangyang Cloth Co., Ltd. which discharges its rainwater and sewage to Shuanglong Road, discharge their rainwater and sewage to the confluence pipe of Baofeng Road. The rainwater and sewage, flowing from the north to the south, are discharged to Branch Pipe II of the main sewage intercepting pipe (located at Section B of Liaohe River) on the northern side of Qinghua Bridge, and finally converge to flow into the main sewage intercepting pipe. Please see Table 3-2 for the enterprises survey of Leigongjian Industrial Park.

Table 3-2 Enterprise Survey of Leigongjian Industrial Park

No.	Company name	Business type	Floor area (mu)	Number of people (people)	Water consumption (t/month)	Drainage direction of rainwater and sewage
1	Jiangxi Jiangwu Cemented Carbide Co., Ltd.	Sectional material and numerical control piece	373	378	5654	Discharged to Baofeng Road
2	Jiangxi Jinfa Cooper Industry Co., Ltd.	Copper rod, pipe and sectional	93	136	300	Discharged to Baofeng Road

		material				
3	Jiangxi Deng Garden & Park Co., Ltd.	Garden woodwork	121	97	2531	Discharged to Baofeng Road
4	Jiangxi Heli Lighting Electrical Appliance Co., Ltd.	Energy saving lamp	229	1175	10280	Discharged to Baofeng Road
5	Jiangxi Far South Bamboo Group Co., Ltd.	Outdoor bamboo flooring and bamboo cutting board	108.6	228	610	Discharged to Baofeng Road
6	Jingan Youlemei Food Co., Ltd.	Ice cream	8	50		Discharged to Baofeng Road
7	Jingan Hongda Food Co., Ltd.	Preserved fruit	16	26	260	Discharged to Baofeng Road
8	Jiangxi Shanyou Industry Co., Ltd.	Bamboo flooring	40	160	320	Discharged to Baofeng Road
9	Jiangxi Dasenlin Artware Co., Ltd.	Wooden toys	37	62	500	Discharged to Baofeng Road
10	Jiangxi Yihui Industry Co., Ltd.	Bee product	20	125	2000	Discharged to Baofeng Road
11	Jiangxi Weiyuan Grinding Apparatus Co., Ltd.	Grinding wheel	20	22	200	Discharged to Baofeng Road
12	Jiangxi Shengda Machinery Co., Ltd.	Flywheel, exhaust pipe, etc.	13	32	200	Discharged to Baofeng Road
13	Jingan Dexin Carton Industry Co., Ltd.	Carton, printing	8	18	50	Discharged to Baofeng Road
14	Jiangxi Youhe Food Co., Ltd.	Rice flour	37.5			Discharged to Baofeng Road
15	Jiangxi Chaowei New Energy Technology Co., Ltd.	Lithium ion battery	54.94	203	1500	Discharged to Baofeng Road
16	Jiangxi Xiyangyang Cloth Co., Ltd.	Knitwear	15		64	Discharged to Shuanglong Road
17	Jiangxi Jingjin project Machinery Co., Ltd.	Machine parts			7550	Discharged to Baofeng Road
18	Jiangxi Rui Hua Zhan Ye	Medical			185	Discharged to

	Medical Technology Co., Ltd.	examination reagent				Baofeng Road
19	Jingan Shengyi Plastics Co., Ltd.	Plastics			865	Discharged to Baofeng Road
20	Jiangxi Ou'rui Industry Co., Ltd.	Environmental water-based paint			193	Discharged to Baofeng Road
Total			1194.04	2712	33262	

3.5.2 **New Industry &Trade Town (Chengnan Industrial Park)**

Located at the southeastern corner of Jingan County, New Industry &Trade Town is about 3km from the main urban area of southern city. The park would be transformed from an industrial park to a new ecological industry and trade town in future and bring about the benefits of "one industrial base as a city". Currently, within New Industry &Trade Town, there are two residential communities, i.e., Placement Houses of Hongxing Community and Xinshiji Community. The former, located at the intersection between Shiji Road and Hongxing Road, features a planned number of households of 420 and current occupancy rate of 20%; the latter, located at the western side of Shiji Road, features a planned number of households of 592 and current occupancy rate of 0%. Since New Industry &Trade Town has its own sewage treatment plant in the industrial park whose drainage pipe network system is relatively independent from that of the main urban area, the district is not included in the drainage pipe network transformation project of the project. The project only includes the collection and transfer system of household garbage for the district.

3.6 **Drainage and Sewage Treatment**

3.6.1 **Current Situation of County Drainage**

1. Sewage

The existing drainage system of Jingan County features the coexistence of confluence system, intercepting-type confluence system and separation system. In the urban area, the sewage pipes are mainly the main intercepting pipes, the drainage pipes are concentrated mainly under the newly-constructed road and cover-plate channels mainly set under the street constructed in early years.

In new north district, Chengbei Road and Shuangxi Road constructed in recent years have laid the rainwater and sewage pipes based on separation of rainwater and sewage, and

the original Gongye Road has laid the confluence pipes on both sides. Currently, the sewage pipes of northern city are mainly distributed along Xuefu Road and Gongye Road. However, only the sewage pipes of Gongye Road have been connected with the main sewage intercepting pipe system and others haven't been connected with the pipe network.

In old south district, Qinghua Road, southern section of Baofeng Road, South Road of Baimu Fishpond and Huanchengnan Road (partly) newly constructed (or transformed) in recent years have laid sewage pipes based on separation of rainwater and sewage. Other municipal roads have all adopted confluence pipe duct, and most of the residential communities, enterprises and public institutions have also adopted confluence pipes. Currently, the county population is mainly concentrated in the southern city. The sewage from the southern city is collected through the main sewage intercepting pipes of the inland river and Liaohe River, and finally discharged to the county sewage treatment plant for disposal. In the southern city, there are still several discharge outlets of confluence that haven't been connected with the main sewage intercepting pipe and therefore have their sewage discharged directly to the inland river.

2. Rainwater

In the northern city, the terrain is higher in the north and west and lower in the south and east, the water channels are densely distributed and water system developed. The narrow water channels are about 2-4m and wide channels about 6-10m wide. The rainwater from the plots along Gongye Road is discharged to Beiliao River through the confluence pipes on both sides, and that from other plots naturally discharged to the water channel, pond, farmland or sinkage first and finally to Beiliao River.

In the southern city, the terrain is higher in the south and west and lower in the north and east. The rainwater is mainly discharged to the water channel, inland river and Jiefang Weir, and finally to Beiliao River. The outlets of the original confluence pipes on Liaohe River have been equipped with intercepting wells during the construction of main sewage intercepting pipes. In rainy days with large amount of rainwater, the rain sewage exceeding the pipe discharge capacity would be discharged to Beiliao River through the overflow port and flap door.

3.6.2 **Sewage Treatment Plant**

Currently Jingan County has two sewage treatment plants. One is the county sewage treatment plant and the other the sewage treatment plant of New Industry &Trade Town. The drainage pipe network transformation project of the project, located at new north district and old south district, falls into the service area of the county sewage treatment plant under

current situation. Therefore, the collected household sewage of the project would finally be discharged to the county sewage treatment plant. Due diligence has been implemented to the county sewage treatment plant for the assessment. Please see Chapter V for details.

3.6.3 **Existing issues**

1. Drainage facilities lag behind the urban construction. The rainwater and sewage separation rate for the drainage pipe network of the built-up area is only 25.7%. The existing drainage pipe network is mostly of confluence system. There exists serious disordered and random connection of rainwater and sewage pipes and discharge of rainwater and sewage. The old pipe ditches have been out of repair for years and showed serious leakage and silting. The small pipe diameter and slope, serious leakage and blocked drainage may easily lead to waterlogging affecting residents' normal travel. Some sewage that is discharged directly to the water body without any treatment would affect the water environment of the urban area. Some communities and streets lack the drainage facilities.

2. The construction of the sewage treatment plant and main sewage intercepting pipes has already been completed. Although branch pipes for the intercepting confluence system along the river have been constructed, there are still rainwater and sewage confluence being discharged to Liaohe River in rainy season which would have certain impact on the water body environment. The rainwater from rainy day, water from the inland river in sunny day, the passing stream and underground water may flow to the sewage intercepting pipes. The water quality concentration at the sewage outlets of the residential community would be lowered after being sent to the sewage treatment plant through the pipes. Meanwhile, the rainwater and sewage separation rate at the sewage source of the urban area is low. So is the coverage rate of the sewage collection pipe network. The existing pipes lack normal maintenance and management. All of these would affect the treatment effect and emission reduction efficiency of the sewage treatment plant.

3. Lack of management. Due to lack of funds and many other factors, the maintenance and management of drainage facilities as well as functional organization of drainage management are still incomplete. Efficient management of urban drainage still faces great difficulty. In daily operation of the pipe network, the blocked, leaking, damaged or collapsed pipes or channels could not be repaired timely and the drainage facilities would therefore be in improper operation state for a long time.

3.7 **Solid Waste Management**

3.7.1 **Current Situation of County Environmental Sanitation**

1. Environmental sanitation management and division of labor

The administrative organization of environmental sanitation is the Environmental Sanitation Institute under the jurisdiction of Jingan Urban Management Bureau who has introduced the cleaning task of some streets to the market. Shenzhen Baozhengtong Cleaning Service Co., Ltd. is responsible for the cleaning task of Yanhenan Road, Shima Road, Hougang Road, Qinghua Road and the like, and the Environmental Sanitation Institute responsible for paying certain amount of money to the company for the task.

As a model county of national ecological construction, the household garbage of the eleven towns and townships of the whole county would be collected in accordance with the pattern of being "collected to different garbage bins at each household—collected in unified manner at each county—cleared, compressed and transferred at each township (or town)".

2. Environmental sanitation facilities

The county has constructed one garbage compression and transfer station and one garbage landfill. The existing transfer station, located besides the county household sewage treatment plant and about 4.3km from the center of southern city, has two compressor units with a treatment capacity of 100t/d.

Fig. 3-2 Existing Garbage Transfer Station of Jingan County

3.7.2 **Household Garbage Landfill of Jingan County**

Currently Jingan County has constructed one household garbage landfill which is located at Lijiawa of Huanglong Village, Xiangtian Township, Jingan and responsible for the

household garbage treatment of the whole county. After the construction of the project, the household garbage would be collected and transferred to the landfill for disposal. Due diligence has been implemented to the garbage landfill for the assessment. Please see Chapter V for details.

3.7.3 **Existing issues**

The urban area of Jingan County adopts the garbage collection method of combining handcart by manpower and mini-sized motor vehicle which features low level of mechanization and waste of large amount of manpower and material resources. 60% of the garbage cans in the county have the issues of serious aging, damaged can body and absence of can cover. In rainy day, the rainwater may increase the garbage weight and percolate. The percolate flowed from the crevice would pollute the ambient environment. In some garbage collection points, the insufficient garbage cans have led to overflow of the cans and affected the nearby residents' disposal of garbage. As the garbage pits have no cover, in rainy day, the flowing sewage would affect nearby residents' normal life and pollute the surface water system of Jingan County. These pollutants would finally flow to Poyang Lake through Liaohe River and affect the water quality of Poyang Lake.

3.8 Current Situation of Environmental Quality

3.8.1 Current Situation Evaluation of Atmospheric Environment

In order to understand the current situation of the ambient air quality of the project area, the assessment quotes and adopts the results of the routine monitoring (once in every two months) carried out by Jingan environmental monitoring station in October of 2015 to the ambient air quality of Jingan County in accordance with *Ambient Air Quality Monitoring of Jingan Provincial-level Key Ecological Function Zones*. Please see Annex I for the monitoring report.

(1) Monitoring factor

The monitoring factors of atmospheric environment quality include: SO_2, NO_2 and PM_{10}.

(2) Monitoring point location

Table 3-3 Air Monitoring Point Distribution

No.	Site	Location of monitoring point in the county
A1	Qinghu Square	Southern city
A2	Jingan Middle School	Northern city

(3) Evaluation method

The evaluation of current situation of air quality adopts the single standard index approach, namely:

$$I_{ij} = C_{ij} / C_{si}$$

In which, Iij—the index of the i^{th} pollutant at the j^{th} monitoring point;

Cij—the average monitoring value of the i^{th} pollutant at the j^{th} monitoring point (mg/m^3);

Csi—the evaluation standard of the i^{th} pollutant (mg/m^3).

(4) Evaluation standard

Category II of *Ambient Air Quality Standard* (GB3095-2012) is applied for the project area.

(5) Monitoring and evaluation results

Table 3-4 Statistics of Monitoring Results

Factor \ Item		Mean time	Monitoring value scope ($\mu g/m^3$)	Maximum concentration ($\mu g/m^3$)	Secondary standard ($\mu g/m^3$)	Over standard rate (%)	Standard index	Reach the standard or not
Jingan Qinghu Square	PM_{10}	Daily mean value	35~40	40	150	0	0.27	Reach the standard
	NO_2	Daily mean value	13~19	19	80	0	0.24	Reach the standard
	SO_2	Daily mean value	19~26	26	150	0	0.17	Reach the standard
Jingan Middle School	PM_{10}	Daily mean value	31~35	35	150	0	0.23	Reach the standard
	NO_2	Daily mean value	11~15	15	80	0	0.19	Reach the standard
	SO_2	Daily mean value	21~26	26	150	0	0.17	Reach the standard

(6) Analysis of results

According to the above statistics, the standard indexes of SO_2, NO_2 and PM_{10} at the two monitoring points of Jingan Qinghu Square and Jingan Middle School are all lower than 1, and the monitoring results are consistent with the requirements of Category II of *Ambient Air Quality Standard* (GB3095-2012). It means that the air quality of the area is good.

3.8.2 **Current Situation Evaluation of Surface Water Environment**

1. Investigation of pollutant source

Please see Table 3-5 for the sewage discharge details in recent five years of Jingan provided by Jiangxi Department of Environmental Protection.

Table 3-5 Sewage Discharge Data in Recent Five Years of Jingan County (10,000t)

Year	Total amount of discharged sewage	Industrial source	Urban living source	Concentrated management facilities
2011	538.59	137.96	399.01	1.62
2012	592.28	101.60	489.06	1.62
2013	318.94	41.57	261.17	16.20
2014	299.20	23.47	259.53	16.20
2015	510.78	63.25	431.43	16.10
Total	2259.79	367.85	1840.20	51.74

The above table shows that the statistics for the sewage discharged in 2011-2015 in Jingan county only include the sewage from the industrial source, urban living source and concentrated management facilities and exclude that from agricultural source. The pollutant sources included in the statistics are the urban living source, industrial source and concentrated management facilities by descending order of total amount of discharged sewage. Please see the following figure for the proportion of the sewage amount discharged from each type of pollutant source.

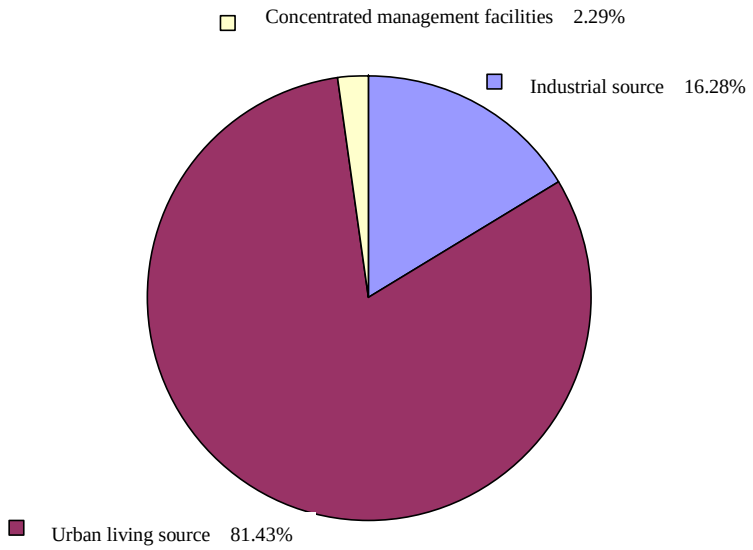

Fig. 3-3 Proportion of Sewage Amount Discharged from Each Type of Pollutant Source in Recent Five Years of Jingan County

Please see Table 3-6 and Table 3-7 for the COD and ammonia nitrogen discharged from each type of pollutant source in recent five years of Jingan county.

Table 3-6 COD Discharged from Each Type of Pollutant Source in Recent Five Years

of Jingan county (t)

Year	Total amount of discharged COD	Industrial source	Agricultural source	Urban living source	Concentrated management facilities
2011	1842.91	272.15	223.46	1328.00	19.30
2012	1877.10	215.00	197.44	1445.36	19.30
2013	1071.10	190.69	101.10	760.00	19.30
2014	1037.22	178.74	103.31	735.88	19.30
2015	1018.60	180.90	83.88	734.53	19.30
Total	6846.93	1037.48	709.19	5003.77	96.5

Table 3-7 Ammonia Nitrogen Discharged from Each Type of Pollutant Source in Recent Five Years of Jingan county (t)

Year	Total amount of discharged ammonia nitrogen	Industrial source	Agricultural source	Urban living source	Concentrated management facilities
2011	237.78	9.30	53.98	174.00	0.50
2012	248.93	7.94	52.55	187.94	0.50
2013	142.27	9.25	41.55	91.00	0.50
2014	136.67	4.72	40.45	91.00	0.50
2015	133.24	7.26	35.90	89.58	0.50
Total	898.88	38.43	224.43	633.52	2.50

The above tables show that the pollutant sources are the urban living source, industrial source, agricultural source and concentrated management facilities by descending order of total amount of discharged COD; and the urban living source, agricultural source, industrial source and concentrated management facilities by descending order of total amount of discharged ammonia nitrogen. Please see the following figure for the proportion of discharged COD and ammonia nitrogen from each type of pollutant source.

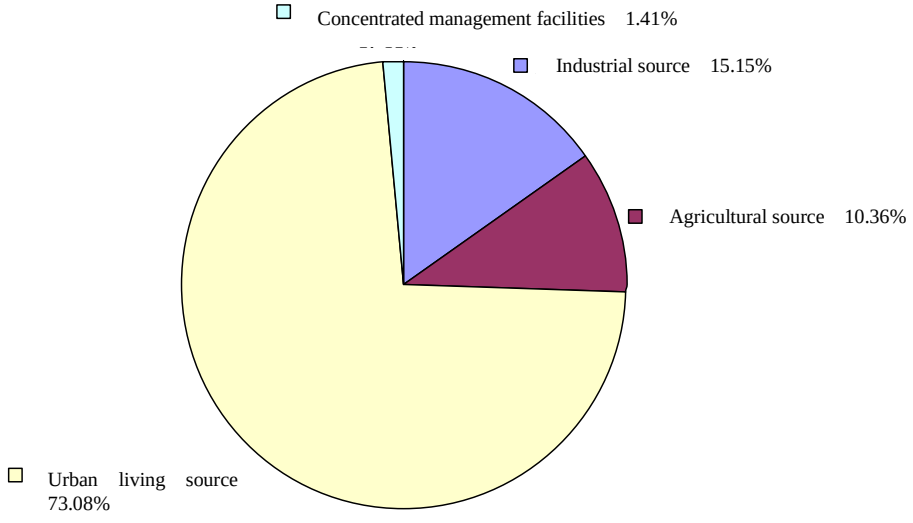

Fig. 3-4 Proportion of Discharged COD from Each Type of Pollutant Source in Recent Five Years of Jingan County

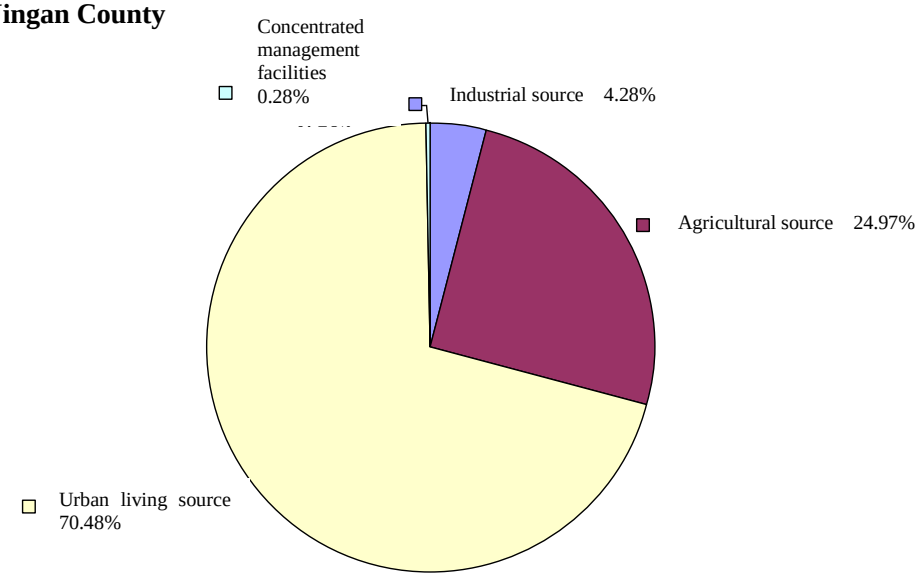

Fig. 3-5 Proportion of Discharged Ammonia Nitrogen from Each Type of Pollutant Source in Recent Five Years of Jingan County

According to the above analysis, the main of the existing pollutant sources of Jingan county is the urban living source. The pollutant discharge from the agricultural source is scattered. The agriculture of the county is mainly organic agriculture and aquaculture usually adopts the form of artificial spread and natural cultivation of fish fry. Also soil testing and fertilizer recommendation as well as utilization of organic fertilizer are being simultaneously promoted within the whole county. Therefore, the pollutant treatment for the agricultural source is excluded in the project scope. Since the environmental issue is quite outstanding in the county with concentrated population, the selected project area is Jingan County. Since the new Industry and Trade Town (Chengnan Industrial Park) has been provided with a sewage treatment plant of industrial park, the project mainly solves the sewage collection and treatment issue for Chengbei New Area, Chengnan Old Area and Leigongjian Industrial Park (Chengdong Industrial Park). Meanwhile, the project would improve the garbage collection and treatment system of Jingan county and decrease the garbage amount of Poyang Lake basin.

2. Current situation of water environment quality

In order to research and investigate the current situation of the water quality for the southern branch of Beiliao River, the project has implemented a current situation monitoring for the water quality of the river.

(1) Monitoring factors: COD, BOD_5, NH_3-N, TN and TP; five factors in total.

(2) Monitoring time and frequency

The monitoring time is November 9, 2015 and March 11, 2016. Sampling has been implemented once on each of the two days.

(3) Monitoring method

Technical Specifications for Monitoring Surface Water and Sewage (HJ/T91-2002) is executed for the monitoring items, sample collection methods, transfer and storage as well as monitoring analysis method.

(4) Monitoring point location

Please see Table 3-8 for the monitoring point locations.

Table 3-8 List of Monitoring Point Location for Current Situation of Water Environment Quality from Beiliao River

No.	Monitoring point location
SW_1	Upstream of the county
SW_2	Jingan Bridge
SW_3	Downstream of sewage plant

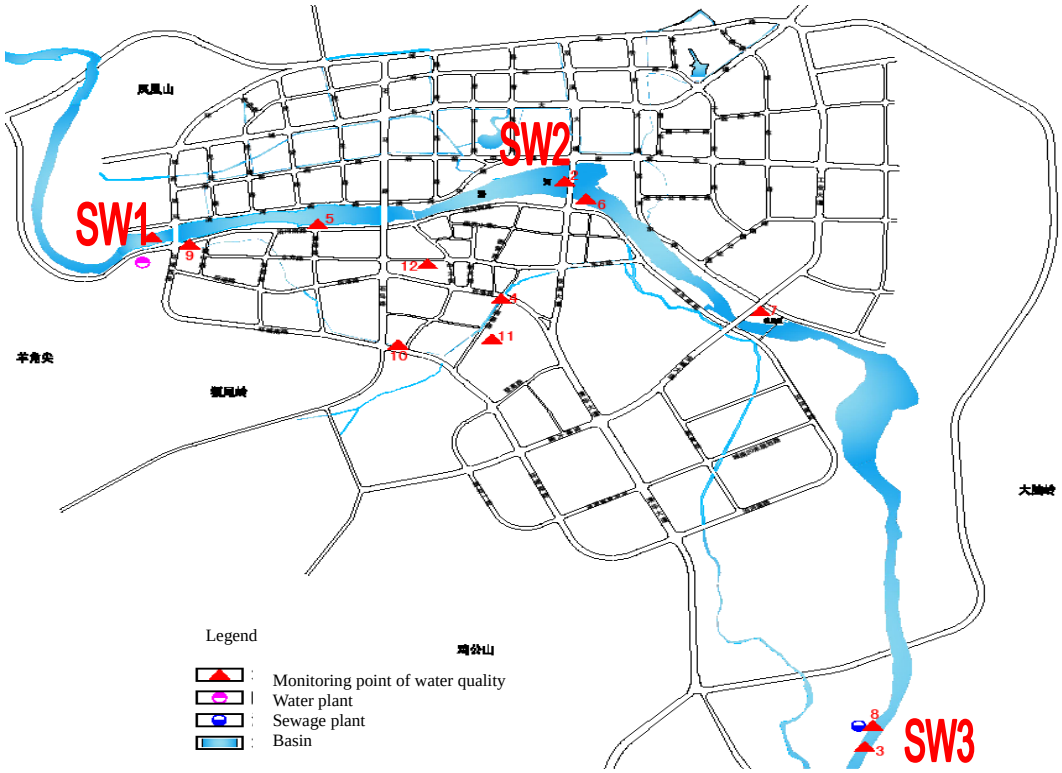

Fig. 3-6 Monitoring Point Locations for Current Situation of Water Quality from Beiliao River of Jingan

(5) Evaluation method

Adopt the standard index method to evaluate single water quality parameter for varied evaluation factors and the calculation method is as follows:

$$S_{ij}=C_{i,j}/C_{si}$$

Of which, S_{ij}—the standard independence of Pollutant i at Point j;

$C_{i,j}$—the concentration of Pollutant i at Point j (mg/L);

C_{si}—the surface water quality standard of Pollutant i (mg/L).

The standard index of pH value:

$$S_{pH,j}=\frac{7.0-pH_j}{7.0-pH_{sd}}\left(pH_j \le 7.0\right)$$

$$S_{ppH,j}=\frac{pH_j-7.0}{pH_{su}-7.0}\left(pH_j > 7.0\right)$$

Of which, $S_{pH,j}$—the standard index of pH value at Point j;

pH_j— pH value at Point j;

pH_{sd}—lower limit of pH value specified in the surface water quality standard;

pH_{su}—upper limit of pH value specified in the surface water quality standard.

The standard index of DO value:

If $DO_j \ge DO_{oi}$, $P_i=|DOs-DO_j|/(DOs-DO_{0i})$

If $DO_j < DO_{oi}$, $P_i=10^{-9}DO_j/DO_{0i}$

Of which, DOs—the saturated dissolved oxygen value under the monitoring water temperature (T℃), $DO_S=\frac{468}{31.6+T}$, of which, T refers to the monitoring water temperature;

DO_j—the measured value;

DO_{0i}—the standard value.

The concentration index of water quality parameter is greater than 1. It means that the water quality parameter has exceeded the specified standard limit of water quality and the function requirement of water quality can no longer be satisfied. The higher the concentration index of water quality is, the more serious exceeding-standard situation of water quality would be.

(6) Evaluation standard

Class III of *Surface Water Environment Quality Standard* (GB3838-2002) is executed for the water quality of southern branch of Beiliao River.

(7) Monitoring and evaluation results

Please see the following table for the monitoring and evaluation results of the

monitoring factors.

Table 3-9 Current Situation Monitoring and Evaluation Results for Water Quality of Southern Branch of Beiliao River (mg/L)

No.	Item	COD	BOD_5	Ammonia nitrogen	TN	TP
SW_1	Monitoring value	2.1 0.5	Not detected Not detected	Not detected 0.2	Not detected 0.2	0.02 0.02
	Evaluation standard	≤20	≤4	≤1.0	≤1.0	≤0.2
	Exceeding-standard rate (%)	0	0	0	0	0
	Standard index	0.105 0.025	<1	0.2	0.2	0.1
	Reaching-standard state	Reach the standard	Reach the standard	Reach the standard	Reach the standard	Reach the standard
SW_2	Monitoring value	8.3 1.2	7.0 /	0.1 0.3	6.5 0.3	0.35 0.01
	Evaluation standard	≤20	≤4	≤1.0	≤1.0	≤0.2
	Exceeding-standard rate (%)	0	50	0	50	50
	Standard index	0.415 0.06	1.75	0.1 0.3	6.5 0.3	1.75 0.05
	Reaching-standard state	Reach the standard	Exceed the standard	Reach the standard	Exceed the standard	Exceed the standard
SW_3	Monitoring value	/ 0.4	2.6 /	/ 0.6	/ 0.7	0.19 0.02
	Evaluation standard	≤20	≤4	≤1.0	≤1.0	≤0.2
	Exceeding-standard rate (%)	0	0	0	0	0
	Standard	0.02	0.65	0.6	0.7	0.95

	index					0.1
	Reaching-standard state	Reach the standard	Reach the standard	Reach the standard	Reach the standard	Reach the standard

Note: for each sampling point in the table, the upper row of data are corresponding with the water sample taken on the sunny day of November 9, 2015 (9: 00-13: 00), and the lower row of data corresponding with the water sample taken on the sunny day of March 11, 2016 (9: 00-13: 00).

According to the monitoring results, each monitoring index for the water quality of upstream and downstream section from Jingan section of southern branch of Beiliao River satisfies the requirement of Class III of Surface Water Environment Quality Standard (GB3838-2002). The BOD_5, TN and TP at the midstream county section shows the exceeding-standard state and could not satisfy the requirement of Class III standard. Based on the investigation of pollutant sources, the exceeding-standard state is mainly caused by the untreated sewage discharge and imperfect household garbage collection and transfer in urban area. With the acceleration of urbanization and concentration of township population in the county, the solid waste produced in daily life and pollutants discharged to the water body would continuously increase. If we don't adopt relevant measures or strengthen the environmental management, the environmental population from Jingan county to the water environment of Beiliao River would be aggravated and water ecology would be further deteriorated. The above-mentioned issues may be solved through the implementation of the project.

3.8.3 **Current Situation Evaluation of Acoustic Environment**

In order to comprehensively understand and analyze the current situation of acoustic environment of the project area, we have carried out current situation monitoring for the surrounding acoustic environment of the project area in the assessment.

Type of sound level meter: HS5618A integrating-type sound level meter;

Monitoring time: May 5th, 2016;

Meteorological condition of outdoor monitoring: no rain, snow or thunder; wind power less than Category IV (5m/s);

Four noise monitoring points have been distributed in total and the monitoring results are listed in the following table.

Table 3-10 Current Situation Monitoring Results of Acoustic Environment Quality Unit: dB(A)

No. of	Monitoring location	Monitoring value	Standard	Assessment

monitoring point		Daytime	Nighttime		
N1	Dian Li Xin Cun	53.9	43.7	Category II of *Acoustic Environment Quality Standard* (GB3096-2008): Daytime 60 and Nighttime 55	Reach the standard
N2	Mei Lu Hua Ting	53.7	43.6		Reach the standard
N3	Jingan Middle School	54.1	44.5		Reach the standard
N4	Luo Jia Xin Cun	54.6	43.5		Reach the standard

According to the field monitoring results, the surrounding acoustic environment quality of the project complies with the limiting value requirements of Category II of *Acoustic Environment Quality Standard* (GB3096-2008).

4 Alternatives Analysis

The comparison and selection analysis of alternative solutions for the project is carried out mainly from two aspects: the first is the comparison and selection analysis on zero-alternative; and the second the comparison and selection analysis on technical alternatives for garbage collection and transfer.

The general principles for the comparison and selection of alternative solutions include:

(1) The comparison and selection principle of quantification: try best to quantify the environmental impact of the project implementation for each alternative solution.

(2) The comparison and selection principle of comprehensiveness: carry out comprehensive comparison analysis from varied aspects like the environment, technology, economy and society.

(3) The comparison and selection principle of compliance: the selected alternative needs to comply with relevant development planning and standard requirements and adapt itself to local conditions.

4.1 Comparison and Selection of Zero Alternative

We have carried out a comparison and selection analysis on the zero alternative from the perspectives of environmental profit and loss as well as social economy for the environmental impact assessment of the project and listed the analysis results in Table 4-1.

Table 4-1 Comparison and Selection of zero alternative

Type	Alternative with the project	Alternative without the project (zero alternative)
Main advantages	(1) Comply with Chinese urban household sewage treatment and pollution prevention and control technical policies; (2) Contribute to the protection of water quality of Poyang Lake basin. The predicted annual decrease of pollutants discharged to the water body of Poyang Lake by 2023 includes: 5.84 t for TN, 0.58 t for TP and 52.56 t for COD; (3) Decrease 2448.8t garbage flowing to Poyang Lake basin each year; (4) Further improve the urban infrastructure.	(1) Maintain the current situation. For example, the vegetation would not be damaged; (2) Create no change to the land utilization value (occupy no land); (3) Create no issue of environmental impact like the vegetation damage or dust.
Main disadvantages	(1) The construction may damage the vegetation and generate the pollution like the dust, construction sewage and construction noise, and the pipe network	(1) The sewage directly discharged to the surface water without any treatment would seriously pollute

	construction may affect the transportation and travel safety during the construction period; (2) The sewage and stink generated in the operation period may affect the environment.	the surface water; (2) The backwardness of the existing discharge system could not be fundamentally solved; (3) Lack of household garbage collection and random throwing of some garbage would affect the city appearance, residential environment and safety of water and ecological environment.
Comprehensive analysis	From the social and environmental perspectives, the alternative of implementing the project is better than the alternative without the project.	

According to Table 4-1, although the zero-alternative involves no environmental impact issue of construction and operation, the existing sewage and garbage directly discharged to the environment would definitely exert serious pollution on the environment. Although the alternative implementing the project may bring about certain environmental impact, the impact may be avoided or mitigated through corresponding environmental measures. Moreover, the environmental impact in the construction period is just temporary, but the implementation and operation of the project would bring about long-term social and environmental benefits, and especially play positive role in protecting and enhancing the water quality of Poyang Lake basin and improving the urban infrastructure. Therefore, from the perspectives of promoting social-economic development and protecting environment, the alternative implementing the project is better than the zero-alternative and the project construction is quite necessary.

4.2 Comparison and Selection of Technical Alternatives

4.2.1 Selection Criterion of Technical Alternatives

The selection of technical alternatives shall conform to the following principles:

(1) Cost saving. It is necessary to give full play to the cost benefits and adopt the most economical technology alternative on the premise of satisfying the requirement of garbage disposal.

(2) Convenient management and low operating cost. It is necessary to take into account local management level and daily operating cost after putting into operation, and choose the technology alternative featuring convenient management and low operating cost.

(3) Little adverse impact on the environment.

4.2.2 **Technical Alternatives**

In accordance with current situation of Jingan garbage collection and transfer system, four alternatives have been designed and considered.

Alternative I: construct one garbage transfer station in northern and southern city respectively; and collect the garbage from Chengnan Industrial Park with compression-type garbage vehicles;

Alternative II: construct one concentrated garbage transfer station in southern city; use mini-sized motor vehicles to collect some household garbage from northern city to the garbage transfer station in southern city for disposal; send other household garbage from northern city directly to the garbage landfill after collecting them with compression-type garbage vehicles, and collect the garbage from Chengnan Industrial Park with compression-type garbage vehicles;

Alternative III: construct no new garbage transfer station; expand the existing garbage transfer station; and increase the garbage collection vehicles in urban area appropriately;

Alternative IV: maintain the current situation of garbage transfer station; increase the compression-type garbage vehicles in urban area; and send most of the garbage from urban area directly to the garbage landfill after collecting them with garbage compression vehicles.

4.2.3 **Comparison and Determination of Technical Alternative**

Please see Table 4-2 for the comparison and selection of technical alternatives.

Table 4-2 Comparison and Selection of Garbage Collection and Transfer System Alternatives

Item	Alternative I	Alternative II	Alternative III	Alternative IV (recommended alternative)
cost	RMB 14.632 million	RMB 12.067 million	RMB 10.005 million	RMB 8.293 million
Annual operation cost	RMB 5.927 million /a	RMB 5.862 million /a	RMB 5.976 million /a	RMB 5.753 million /a
Net present value of total amount of construction cost +operation cost	RMB 73.886 million	RMB 70.693 million	RMB 69.787 million	RMB 65.85 million

Item	Alternative I	Alternative II	Alternative III	Alternative IV (recommended alternative)
cost	RMB 14.632 million	RMB 12.067 million	RMB 10.005 million	RMB 8.293 million
Communication and transportation	Average haul distance of 3km for garbage collection; reasonable arrangement of garbage collection and transfer route; little influence of garbage transfer on transportation	Reasonable arrangement of garbage collection and transfer route; little influence of garbage transfer on transportation	Garbage transfer station located at suburban area; little influence of garbage transfer on transportation	Collect garbage along the road with compression-type garbage vehicles; garbage transfer has certain influence on transportation
Saving of energy consumption	Appropriate haul distance of garbage collection and relatively short distance of collection route have decreased the cost of collection vehicles and saved the collection and transfer expenses	Appropriate haul distance of garbage collection and relatively short distance of collection route have decreased the cost of collection vehicles and saved the collection and transfer expenses	Longer distance of garbage collection requires more garbage collection vehicles and higher transportation cost	Heavy weight, long haul distance and large fuel consumption for garbage compression vehicles
Environmental impact	Certain impact on surrounding environment	Certain impact on surrounding environment	Expand the existing garbage transfer station and have little impact on surrounding environment	Set no fixed transfer station, involve no waste gas impact of transfer station and have the least impact on surrounding environment
Advantage	Shorten the haul distance of garbage collection and save transfer cost	Shorten the haul distance of garbage collection and save transfer cost	Save construction cost and decrease land occupation	Save construction cost and decrease land occupation

Item	Alternative I	Alternative II	Alternative III	Alternative IV (recommended alternative)
cost	RMB 14.632 million	RMB 12.067 million	RMB 10.005 million	RMB 8.293 million
Disadvantage	Large number of transfer stations; great difficulty of land requisition; high construction cost; and more human resources for management	Large number of transfer stations; great difficulty of land requisition; high construction cost; and more human resources for management	Relatively long haul distance of garbage collection and larger fuel consumption	Relatively long haul distance of garbage collection and larger fuel consumption

According to the above table, compared with the other three alternatives, Alternative IV has obvious advantages from the aspects of economy, management and environmental impact. Since Jingan features small population and limited land in urban area, and Alternative IV, without the requirement of land requisition for station construction, could not only avoid public dispute of site selection and environmental impact of odorous pollutants in the operation period, but also satisfy the transfer requirements, Alternative IV is recommended for the project. In other words, it is recommended to maintain the current situation of the garbage transfer station and increase the garbage compression vehicles in urban area which would be responsible for the main garbage collection task.

5 Environmental Impact Analysis and Mitigation Measures

5.1 Environmental Impact Analysis and Mitigation Measures during Construction Period

5.1.1 Water Environment Impact Analysis and Mitigation Measures during Construction Period

5.1.1.1 Water environment impact analysis for construction period

The sewage produced in the construction period mainly includes the constructors' household sewage and construction waste water. The former, with an output of 4.8m^3/d, mainly includes such pollutants as COD, BOD_5, SS and ammonia nitrogen; the latter, with a relatively small output, mainly includes the muddy water discharged from pipeline excavation and washing of mechanical vehicles. The latter also includes the construction sewage produced from the construction operational process like the sand and stone washing, agitating and concreting at the construction site, main pollutants of which are SS, petroleum, etc.

The above-mentioned production and household sewage in the construction period, if being discharged randomly, would pollute the surrounding water body. The constructors' household sewage of the project would be disposed by the existing household sewage treatment system for the residential building surrounding the construction site rather than discharged directly to the outside. The construction sewage would be used for watering for dust suppression after sedimentation. After the above-mentioned measures, no adverse impact would be exerted to the surrounding water environment by the sewage from the construction period.

5.1.1.2 Mitigation measures

The following protection measures would be adopted for the water environment in the construction period:

1. Construction sewage

In the sand and stone processing system, the sewage, after being processed in the sedimentation basin, would be used for concrete agitating, watering for dust suppression and the like rather than discharged directly to the water body along the line. The mud produced in the construction period would be pumped to the sedimentation basin through the mud pump and put into solidification through water draining and evaporation rather than discharged directly to the water body along the line. The sewage produced from washing of

mechanical equipment would be used for watering for dust suppression at the construction site after being processed in the sedimentation and oil separation basin rather than discharged directly to the water body along the line.

The arrangement of the construction site should take into full consideration the drainage requirements and try best to stay away from the water body of river. The construction site, warehouse, site for storing diesel and asphalt and equipment for manufacturing asphalt shall not be arranged within the 500m scope of the river. Moreover, it is necessary to prevent the pollutants from flowing to the river during the operation period, especially prevent the leakage through the land or surface water in rainy season.

During the construction period of the project, it is necessary to maintain the sanitation of the operational section and prevent the sewage and pollutants from entering the excavation groove.

If it is necessary to store any oil or fuel at the site, it would be necessary to implement anti-seepage treatment for the storeroom and adopt corresponding measures for the storage and utilization of the oil or fuel so as to prevent the oil or fuel from leaking and polluting the water body.

Try best to carry out the site foundation construction in the non-flood season so as to decrease the influence of small burial depth of underground water to the construction.

2. Household sewage

The constructors' household sewage of the project would be disposed by the existing household sewage treatment system for the residential building surrounding the construction site rather than discharged directly to the outside. Necessary anti-seepage and anti-drainage measures would be adopted for the temporary storage room of household garbage in accordance with relevant requirements.

5.1.2 **Ambient Air Impact Analysis and Mitigation Measures during Construction Period**

5.1.2.1 Ambient air impact analysis for construction period

(1) Dust from construction vehicle transport

According to relevant document literature, in the construction process, the dust from vehicle transport would take up over 60% of total dust. Under the bone dry condition, the dust produced from vehicle transport could be calculated in accordance with the following empirical formula:

$$Q = 0.123(V/5)(W/6.8)^{0.85}(P/0.5)^{0.75}$$

Of which: Q—dust from vehicle transport, kg/km/vehicle;

V—vehicle speed, km/h;

W—vehicle load capacity, t;

P—blown dust amount on road surface, kg/m^2.

Table 5-1 lists the dust amount from a 10t truck passing through a road as long as l km under different cleanness degrees of road surface and driving speeds. According to the table, under the same degree of cleanness, the higher the driving speed is, the larger the dust amount would be; and under the same driving speed, the dirtier the road surface is, the larger the dust amount would be. Therefore, limiting the driving speed of vehicles and keeping the cleanness of road surface represent the most effective means to decrease the dust from the construction vehicles.

Table 5-1 dust of Vehicle under Different Driving Speeds and Cleanness Degrees of Road Surface

Unit: kg/vehicle/km

dust amount / Driving speed	0.1 kg/m^2	0.2 kg/m^2	0.3 kg/m^2	0.4 kg/m^2	0.5 kg/m^2	1.0 kg/m^2
5（km/m^2）	0.0511	0.0859	0.1164	0.1444	0.1707	0.2871
10（km/m^2）	0.1021	0.1717	0.2328	0.2888	0.3414	0.5742
15（km/m^2）	0.1532	0.2576	0.3491	0.4332	0.5121	0.8613
25（km/m^2）	0.2553	0.4293	0.5819	0.7220	0.8536	1.4355

Meanwhile, in case of frequent watering (4-5times per day) for the road surface during the construction period, the dust in the air could be reduced by about 70% and good dust suppression effect could be realized.

(2) Dust from construction site

Another main source of the dust during the project construction period is the blown dust from the open storage ground and bare site. Because of construction requirement, the building materials are stacked outdoors, and the surface soil at some construction operational points needs hand excavation and temporary storage. Therefore, dust may be generated in dry and windy days. The amount of such dust may be calculated in accordance with the empirical formula for the dust of storage yard:

$$Q = 2.1(V_{50} - V_0)^3 e^{-1.023W}$$

Of which: *Q*—dust amount, kg/t/y;

V_{50}—wind speed at the level 50m from the ground, m/s;

V_0—wind speed for dust, m/s;

W—moisture content of dust particle, %.

Since the wind speed for dust is related with the particle size and moisture content, reducing open storage, guaranteeing certain moisture content and decreasing bare ground all constitute effective means to decrease the blown dust. The diffusing dilution of dust in the air is also related with the meteorological conditions like wind speed as well as the sedimentation velocity of the dust itself. Please see Table 5-2 for the sedimentation velocities for the dust of different diameters. According to the table, the sedimentation velocity of dust would increase along with the increase of particle size. When the particle size is 250μm, the sedimentation velocity would be 1.005m/s. Therefore, it can be assumed that when the particle size is larger than 250μm, the main sphere of dust influence would fall into the short-range scope at the downwind direction of the dust source. Thus, the dust that actually has influence on external environment is that of fine particle size.

Table 5-2 Sedimentation Speeds of Dust in Different Particle Sizes

Dust particle size (μm)	10	20	30	40	50	60	70
Sedimentation speed (m/s)	0.003	0.012	0.027	0.048	0.075	0.108	0.147
Dust particle size (μm)	80	90	100	150	200	250	350
Sedimentation speed (m/s)	0.158	0.170	0.182	0.239	0.840	1.005	1.829
Dust particle size (μm)	450	550	650	750	850	950	1050
Sedimentation speed (m/s)	2.211	2.614	3.016	3.418	3.820	4.222	4.624

(3) Tail gas of construction machine and transport vehicle

Such construction machines as the bulldozer, excavator and haulage truck would generate certain amount of exhaust gas in their operation process which includes such pollutants as HC, CO and NOx and has certain influence on the ambient air. The discharge value of tail gas and the discharge concentration of pollutants are relatively low for the general vehicles running in reducing speed. To decrease the influence of automobile exhaust gas, the transport vehicle, bulldozer, excavator and the like shall run in reducing speed when passing through villages or entering the construction area. Meanwhile, it is necessary to implement good maintenance for the construction machines to ensure their normal operation and reduce exhaust gas emission.

5.1.2.2 Mitigation measures

The waste gas of construction period consists mainly of the dust of construction and exhaust gas from the construction machines and vehicles. The following main protective measures would be adopted for the ambient air of the construction period:

1. Adopt advanced construction technology. Adopt wet crushing and provide dust collection equipment for the sand and stone system as well as concrete system; control the vehicle speed, exhaust gas and coal combustion exhaust; water the construction area in accordance with requirements (4-5times per day); ask the construction team to adopt such clean energy as liquefied gas and electricity and strengthen the afforestation of construction area and constructors' labor protection to decrease the impact of the project on ambient air.

2. Arrange a vehicle washing platform at the inner side of the passageway of transport vehicles for materials and water soil. The facilities shall conform to the following requirements: anti-overflow stand shall be arranged around the vehicle washing platform to prevent waste water overflow. Before leaving the construction site, the vehicles shall have their tires and bodies washed on the vehicle washing platform and shall have no mud attached on their surface. The materials and waste soil loaded on the transport vehicles shall not be higher than the top edge of the vehicle ledge and the car hopper be covered with tarpaulin or enclosed.

3. The construction site would adopt commercial concrete and asphalt and set no concrete agitating station or asphalt mixing station.

4. The transport vehicle, bulldozer, excavator and the like shall run in reducing speed when passing through villages or entering the constriction site; meanwhile, it is necessary to implement good maintenance for the construction machines to ensure their normal operation and reduce exhaust gas emission.

5. Arrange dust-proof screen around the constriction area, especially at the place close to the residential area, hospital and school.

6. Try best to reduce the generation of dust and particulate matter so as to avoid the influence on the surrounding residential life and commercial activity. Emphasize the protection of the susceptible population (such as the children, senior citizens, etc.).

5.1.3 **Acoustic Environment Impact Analysis and Mitigation Measures during Construction Period**

5.1.3.1 Acoustic environment impact analysis for construction period

The construction noise would disappear along with the termination of the construction.

However, the strong noise may have serious impact on the surrounding acoustic environment, especially on the key sensitive spots like the hospital and school. Therefore, it is necessary to emphasize the noise control in the construction period. As the location of the pipeline construction equipment is under constant change and the number of operating equipment at different time of the same construction stage is also varied, it is difficult to precisely predict the noise value of each field of the construction site. The noise value of construction machines at different distances may be calculated in accordance with the following noise reduction mode of point acoustic source:

$L_P = L_{PO} -20Lg(r/ro) - \Delta L$

Of which: L_P—the sound pressure level at the place r(m) from the sound source, dB(A);

L_{PO}—the sound pressure level at the place ro(m) from the sound source, dB(A);

ΔL—varied reduction amount (except for the emission reduction), dB(A). Set the outdoor noise source ΔL as zero.

Please see the following table for the predicted noise values (no superposition on the status quo value) for each type of construction machine at different distances based on no consideration for the noise reduction caused by trees and buildings.

Table 5-3 Predicted Noise Values for Each Type of Construction Machine at Different Distances

Unit: dB(A)

No.	Machine type	Predicted noise value								
		5m	10m	20m	40m	50m	80m	100m	150m	200m
1	Loader	90	84.0	78.0	72.0	70.0	66.0	64.0	60.5	58.0
2	Road roller	81	75.0	69.0	63.0	61.0	57.0	55.0	51.5	49.0
3	Bulldozer	86	80.0	74.0	68.0	66.0	62.0	60	56.5	54.0
4	Excavator	84	78.0	72.0	66.0	64.0	60.0	58.0	54.5	52.0
5	Large-capacity lorry	86	80.0	74.0	68.0	66.0	62.0	60	56.5	54.0
6	Light truck	75	69.0	63.0	57.0	55.0	51.0	49.0	45.5	43.0

According to the above table, the predicted noise value could reach the requirement of *Standards for Ambient Noise Emission at Construction Site Boundary* (GB12523-2011) for the place beyond 50m scope of the construction machines (daytime 70 dB(A) and nighttime 55 dB(A)) and could barely reach that for the place within 200m scope of the construction machines in nighttime. It shows that the construction noise would have large acoustic environment impact on the place within 50m scope of the construction site in daytime, and that nighttime construction would have more serious impact within the 200m scope.

However, such noise impact is short-term and temporary. The construction noise would disappear upon the termination of the construction activities. Therefore, no construction would be implemented for the project in nighttime, and the key sensitive points within the scope of noise impact in daytime are listed in the following table.

Table 5-4 Key Sensitive Points under the Impact of Construction Noise

No.	Name of sensitive spot	Location	Distance	Number of affected people
1	Jingan Vocational School	Southern side of Hougang Road	20	1500
2	Jingan Hospital of Traditional Chinese Medicine	Southern side of Hougang Road	10	200
3	Jingan No. 1 Primary School	Eastern side of Shima Road	10	700
4	Jingan No. 3 Middle School	Eastern side of Yabei Road	10	400
5	Jingan Middle School	Northern side of Xuefu Road	15	1000
6	Jingan No. 2 Primary School	Western side of the intersection between Xuefu Road and Chengbei Road	20	1000

Therefore, certain measures are required for decreasing the impact of construction noise on the environmental sensitive points.

5.1.3.2 Mitigation measures

The following main protective measures would be adopted for the acoustic environment in the construction period:

1. Set No-Tooting warning sign on the sensitive sections of acoustic environment like the hospital, school, kindergarten and old people's home; adopt low-noise equipment and control the noise point source, noise transmission channel and traffic noise; provide the constructors with anti-noise earplugs; and reasonably arrange the construction time.

2. In accordance with *Environmental Noise Emission Standard of Building Construction Field Scope* (GB12523-2011), reasonably arrange the construction time; try best to avoid simultaneous operation of large amount of high-noise equipment; pay attention to and keep away from the sensitive time of surrounding environment to noise; try best to arrange the construction of high-noise equipment in daytime; decrease nighttime transport; and strictly

prohibit construction in nighttime (22: 00-6: 00). For the construction activities that must be carried out in nighttime, it is necessary to seek for approval from relevant local environmental protection authority and communicate with local residents in advance. Meanwhile, noise reduction measures (such as noise-proof screen) should be adopted to minimize the impact of construction noise on the residents.

3. The driving speed of all construction vehicles on the road outside the site shall not be higher than 25km/h.

4. The driving speed of vehicles in the construction site shall not be higher than 15km/h.

5. Try best to keep the machine and equipment noise under 90db.

6. Arrange temporary noise-proof screen at the side of the sensitive point when carrying out construction of high-noise equipment in the sensitive areas (including the school, hospital, sanatorium, etc.).

7. Adopt correct measures to decrease the impact of the construction noise and vibration on the surrounding environment of the construction site.

8. Communicate actively with the school and unit around the construction section; and adjust the construction time or adopt other measures to minimize the disturbance of construction noise on their teaching and work.

9. The construction unit must choose the construction equipment and transport vehicles complying with relevant national standards.

The development unit shall instruct the construction unit to indicate the construction circular and complaints hotline at the construction site, and shall timely contact with local environmental protection authority after receiving any relevant report so as to deal with varied environmental disputes in time and ensure smooth construction.

5.1.4 **Solid Waste Impact Analysis and Mitigation Measures during Construction Period**

5.1.4.1 Solid waste impact analysis for construction period

The solid waste generated in the construction period mainly includes the constructors' household garbage as well as spoil, construction waste and the like generated in the construction period.

(1) Impact of the constructors' household garbage

The amount of the household garbage generated in the construction period is about 60kg/d. Such garbage mainly includes the organic refuse which would easily lead to

decomposition and fermentation, pollute the water body environment and create stink and waste gas if being discarded randomly. Therefore, during the construction period, it is recommended to set garbage collection box at the construction site so as to collect the household garbage in a unified manner and then entrust the environmental protection authority to clear and transfer the collected garbage.

(2) Impact of construction waste

The earthwork of the project mainly comes from the pipe network construction and includes 132,789m^3 of excavation amount, 104,836m^3 of filling amount and 27,953m^3 of spoil amount. Meanwhile, the project construction would produce certain amount of construction waste, including about 1,490 m^3 cement concrete, brick rubble,sand-gravel material, etc. Some of the construction waste may be recycled and re-utilized and others that could not be recycled would be transferred to local construction waste landfill.

If no spoil ground is reasonably arranged for the construction waste, or if the construction unit randomly stacks the generated waste, the waste earthwork and slag would easily be distributed along the two sides of the construction area in an unplanned manner, occupy certain amount of urban land, and lead to great difficulty for controlling the water and soil loss caused by the waste slag and for recovering the temporarily-utilized land at the waste slag point as well as adverse impact on the ecological system surrounding the waste slag point and the landscape environment along the line. Therefore, the construction unit shall clear and transfer the spoil to the designated place in time and send the spoil to the Environmental Sanitation Institute of the county for unified deployment or for other project of the county that requires the earthwork. The construction waste shall be transferred to Yichun construction waste landfill for disposal in time.

5.1.4.2 Mitigation measures

The solid waste generated in the construction period mainly includes the constructors' household garbage as well as spoil, sludge and the like generated in the construction period. The following main mitigation measures would be adopted for the solid waste from the construction period:

1. Construction spoil

The construction spoil would be stacked at both sides of the pipeline excavation temporarily. The construction unit shall clear and transfer the spoil to the designated place in time and send the spoil to the Environmental Sanitation Institute of the county for unified deployment or for other civil project of Jingan County. The temporary spoil ground of the

project and environmental sanitation authority of Jingan County shall adopt the following measures:

①Arrange a temporary storage field for the earthwork and try best to stay away from such environmental sensitive points as residential areas and schools as well as water bodies. It would be better to arrange the temporary storage field at the downwind direction or side-wind direction in terms of the leading wind direction in summer for the urban area and residential areas;

②Minimize the occupied land and recover the temporarily-occupied are in accordance with the original utilization type of the land after completing the construction;

③Compact, grind and cover the temporarily-stacked earthwork with felt cloth and implement good waterproof and windproof measures;

④Arrange a drainage ditch of soil property around the temporary spoil dump site and sedimentation tank of soil property at the outlet of the drainage ditch so as to decrease the flow velocity of the catchment in the sedimentation tank and sediment the soil.

⑤Seal the earthwork to avoid scattering in the transfer process.

⑥Earthwork stacking operation should be commanded by specially-assigned persons responsible for different areas. Non-operating personnel are prohibited from entering into the operating area. All workers, vehicles and machines entering into the operating area must follow the command from the administrative staff. The transfer vehicles must stack the earthwork in accordance with route, area and order designated by the administrative staff. It shall be forbidden to discard the spoil within or outside the temporary earthwork storage field randomly to affect normal discarding of spoil.

⑦It is necessary to implement good waterproof and drainage treatment around the spoil ground and on the working face to ensure unblocked drainage of the site and avoid water and soil erosion as well as environmental pollution.

⑧Relevant construction standards must be executed for the protection and construction safety of the temporary spoil ground.

⑨Send specially-assigned person for patrol and inspection after general off-duty time, and timely deal with and report any potential safety hazard detected and set obvious warning mark for the hazard. Try best to dispose the spoil on the same day when it is generated.

⑩After completing the project, remove the temporary facilities on the construction site, clear the waste soil, level the ground and recover the ambient environment timely. Be responsible for maintaining the sanitation of the construction site and ambient environment during the engineering construction and lockout period.

①While stacking the earthwork, it is necessary to carry out the construction in strict accordance with the paving and grinding procedures rather than paving new soil layer directly without any rolling compaction. While paving the soil layer, it is necessary to form a slope that is high in the middle and low in the outer sides in accordance with the construction progress, set certain number of runoff gathering pits on the confluence channel and deposit the soil from the flow. Learn about the weather change and local flood situation timely, implement good dredging for the drainage ditch and runoff gathering pit in advance and improve such facilities as the drainage ditch.

②Clear the equipment, remaining materials, garbage and varied temporary facilities timely after completing the earthwork engineering.

2. Construction waste

Integrated classification and recycle shall be implemented for the recyclable waste (iron and steel scrap, packing bag and the like would be sold to the waste purchasing station; and crushed brick be used as the substrate material of road). The unrecyclable waste shall be cleared and transferred timely to Yichun construction waste landfill, and be sealed during the transfer process to avoid scatter of the waste. Waterproof and windproof measures shall be adopted for temporary storage of the waste.

3. Household garbage

Collection bins would be set for the household garbage in the construction area which would be cleared, collected and classified by specially-assigned persons each day and cleared and transferred by the environmental sanitation authority.

5.1.5 **Ecological Impact Analysis and Mitigation Measures during Construction Period**

5.1.5.1 Ecological impact analysis for construction period

(1) Impact on the plants in the construction area

The drainage pipes of the project are mainly laid along the urban road and have little influence on the vegetation in the area. No old tree or famous wood species has been discovered in the construction area. The temporarily-occupied land would be recovered in accordance with the original land utilization type upon the completion of the construction. Therefore, the construction basically has no impact on the vegetation in the construction area.

(2) Impact on the animals in the construction area

The animals in the project area are mainly the poultry. No key protected species of wildlife or concentrated habitat for the key protected species of wildlife has been discovered

in the construction area. Therefore, the project construction basically has no impact on the animals in the construction area.

(3) Aggravation of water and soil loss

During the construction process, the setting of construction site would damage the ground vegetation and lead to increase of the soil erosion modulus. The temporary storage yard would crush and bury the ground vegetation, and stacked waste slag may form new water and soil loss area in rainy season.

The damage of the project construction period on the ecology and landscape is limited and temporary. As long as the constructors implement good management and recovery work for the temporary site after the construction, the impact of the project construction period on the ecological and landscape environment would be acceptable.

5.1.5.2 Mitigation measures

1. Arrange the construction site scientifically, try best to minimize the occupied land and recover the temporarily-occupied land in accordance with the original land utilization type after completing the construction.

2. Strengthen the publicity and education. Report any valuable and rare threatened wild plant, old tree and famous wood species, local endemic plant and the like discovered to relevant authority and adopt in situ conservation measures for them; control the construction noise and reduce the disturbance of construction noise to the animals.

3. Carry out excavation and stacking by layer for stripping the surface soil in the construction process; remove the temporary facilities, loosen the hardened soil, back-fill the surface soil by layer and recover the vegetation timely after completing the construction. Choose appropriate vegetation type in accordance with local climate features, side slope gradient and geological conditions.

4. Control measures for water and soil loss

(1) Choose the construction period reasonably. Try best to avoid construction in rainy season or days and set fencing block for the construction operational belt to prevent the construction materials and waste from entering the surface water.

(2) Based on the terrain conditions of the construction site, set drainage ditches of soil property around the site and grit basin of soil property at the outlet of the drainage ditch so as to reduce the flow velocity of the catchment in the grit basin and deposit the silt.

(3) Combine major improvement of water and soil conservation and surface protection and integrate project measures and plant measures. Adopt the project measures as the guide

to give play to the fast-acting property and security effect of project measures; and adopt the plant measures as the auxiliary measures of water conservation to play the role of permanently stable conservation of water and soil and to afforest and beautify the ambient environment of the project area.

(4) Protect the leaf litter and organic matter on the top soil, and back-fill them to the damaged area so as to simulate the growth of local plants.

(5) Cover the eroded barren area with local grass and vegetation, and harden the soil surface of the area.

(6) Implement good erosion control measures before the rainy season for better implementation of the following construction. Provide corresponding erosion measures after completing the project of each construction point.

(7) Set sedimentary control facilities at all construction sites to reduce the runoff velocity, change the flow direction, and deposit the silt before recovering the vegetation. The sedimentary control facilities include the material pile, stone road, sand basin, straw package, shrub fence, sludge slag muck, etc.

(8) Prevent the flow from entering or disturbing the construction site through such measures as setting ditches, berms and fresh grass fences as well as stacking tones.

(9) Maintain and continue to adopt the erosion control measures till full recovery of the vegetation.

(10) Water the dirt road, excavation area, packing and soil storage area if necessary so as to reduce the wind erosion.

5.1.6 **Social Environment Impact Analysis and Mitigation Measures during Construction Period**

5.1.6.1 Social environment impact analysis for construction period

1. Impact of land occupation

The temporarily-occupied land for the construction, mainly the road and vacant land within the county, would be recovered in accordance with the original land utilization type upon the completion of the construction and therefore have no influence on the land utilization within the area basically.

2. Impact on municipal facilities and services

The pipes of the project are mainly laid under the original cover plate ditches, non-motorized vehicle lanes, sidewalks or near kerbs. The construction process may lead to temporary interruption of water, electricity and gas supply as well as bus route and exert

influence on residents' living.

3. Impact on the commerce along the street

During the pipe network construction, the traffic congestion caused by road excavation would have certain influence on normal operation of the stores facing the street. For example, the congestion may affect the customers' access to the stores and lead to inconvenience for the stores to load and unload goods.

4. Impact on the traffic and security

The pipe network construction would have obvious impact on the road traffic. Although the construction may be implemented by sections and stages, there would definitely be some earthwork that needs temporary storage in the project construction process which would have influence on the traffic of the road along the construction line. When the pipeline passes through a road, the grooving method adopted may easily lead to traffic congestion on the road. Therefore, if the geological and land conditions permit, the construction method of pipe-jacking would decrease the impact of road excavation during the construction period. However, in the construction period, the carrying power (supporting capacity) of the road would decrease. It would be necessary to temporarily prohibit the passing of lorries. Besides, the transport of construction materials would also affect the municipal traffic and security. It is estimated that over 20 days of construction would be required for the pipeline to pass through a road. Therefore, the impact on the road traffic would last for about 20 days. The impact of pipe network construction has especially obvious impact on the high street, school, hospital and other sections of key sensitive point.

Table 5-5 List of Urban High Streets Involved in the Pipe Network project of the Project

No.	Road name	Road Category	Width of red line (m)	project content of the section	Pipeline laying location	Construction method	Key sensitive points
1	Shima Road	High street	35	rainwater and sewage pipe network	Non-motorized vehicle lane on both sides	Pipe-jacking	Finance Bureau Dormitory, Jingan No. 1 Primary School
2	Hougang Road	High street	40	rainwater and	Near the kerb of	Excavatio	Jingan Vocational School, Jingan Hospital of Traditional

				sewage pipe network	southern-side road	n	Chinese Medicine

Therefore, the civil construction contractor shall implement thorough planning, minimize the construction period and try best to adopt the construction method of pipe-jacking. Meanwhile, the contractor shall, before the construction, consult with local traffic management authority, formulate a traffic management plan, inform the residents within the construction impact zone in advance, set signboards at the construction site and arrange specially-assigned person to ease the traffic jam. Moreover, it is also necessary to adopt some measures for preventing traffic congestion like further strengthening the management in the construction period and shortening the construction cycle.

5.1.6.2 Mitigation measures

1. Mitigation measures for project land occupation

Arrange the construction site scientifically, try best to minimize the land occupation and recover the temporarily-occupied land in accordance with the original land utilization type upon the completion of the construction.

Arrange the temporary storage field of earthwork reasonably and try best to keep away from such environmental sensitive points as the residential area and school.

2. Mitigation measures for the impact of pipe network project construction on municipal services

(1) Put up a notice to inform the public at the project point, bus stop and residential area to be under influence at least five days before the interruption of services (including the water, electricity and gas supply as well as bus route);

(2) Based on good construction organization, ensure the construction progress and try best to shorten the construction cycle and implement safe construction so as to complete the construction and recover the municipal services as soon as possible.

3. Mitigation measures for impact on commerce along the street

Set fences at the side facing the commercial stores and reserve a passageway for the pedestrians to ensure little influence on the stores along the street.

4. Mitigation measures for impact on the traffic and security

(1) The civil construction contractor would consult with local traffic management authority and formulate a traffic management plan before the construction. The construction unit would provide such information as the construction and project schedule, detour route,

temporary bus route and demolition on the construction nameplate;

(2) Set warning signboards at the places before entering each construction section, intersection, road curve, lane change, traffic aisle and the like, and mark the entrance of construction area, speed limit, height limit and other relevant traffic restrictions.

(3) Construction in nighttime (22: 00-6: 00) is forbidden in principle. For the construction activities that must be carried out in nighttime, it is necessary to seek for approval from relevant local environmental protection authority and communicate with local residents in advance. Meanwhile, noise reduction measures (such as noise-proof screen) should be adopted to minimize the impact of construction noise on the residents.

(4) To reduce the traffic pressure of surrounding road, the earthwork vehicles shall try best to avoid the urban traffic peak and travel in nighttime unless under special circumstances. Other construction vehicles entering or exiting the construction site shall reasonably adjust their operation time in accordance with the factors affecting the traffic flow like the season, weather, holiday and emergency.

(5) For construction project with construction period longer than 30 days, fences would be set on the boundary of the construction site or the construction site would be enclosed in accordance with local conditions. The fences shall adopt color plates, and shall be higher than or equal to 2.5m at general section of the construction site, and higher than or equal to 3m at the sensitive point section of the construction site.

(6) The fences arranged shall be straight, upright, orderly, clean and beautiful without any damage. Their appearance shall be coordinated with the ambient environment.

(7) The fences for construction with occupied road shall be within the 5m scope of sight distance at the intersection, and metal halftone with straight and upright stiffness shall be arranged so as to ensure no blockage or cover to the drivers' and pedestrians' sight and traffic safety. No articles would be allowed to be stacked within the 5m scope of sight distance of the fences.

(8) Noise reduction measures like higher fences shall be adopted when the fences are no more than 5m away from the residential area or when the construction operational point is no more than 15m from such sensitive buildings as the residential area, hospital and school. The fences shall not be lower than 3m for the sensitive areas, and the 5m scope outside the fences shall be always clean.

(9) No materials like the equipment or earthwork shall be stacked within the 1m scope inside the fences.

(10) No fences shall be used as the retaining wall or the support for other facilities.

(11) Minimize the impact on nearby residents' and vehicles' travel, organize half-range construction and try best to shorten the construction period when the construction along the line passes through residents' access. Recover the soil timely after completing the half-range construction and cover steel plate on the groove that could not be totally constructed in one day to ensure normal traffic and security.

(12) Set full-time "traffic order maintaining post" and organize full-time traffic safety and civilized construction team to take charge of implementing the traffic management support measures, manage and maintain the traffic security measures in the construction period, maintaining the traffic order of the construction section and providing assistance for solving the traffic issues in the construction period.

(13) The vehicles and personnel entering and exiting the construction site shall strictly conform to the traffic laws and obey the order from the traffic management authority in the construction period. Accept the supervision and inspection from the traffic management authority and rectify any traffic issues detected in time.

(14) Pay attention to the implementation of safe and civilized construction measures and preventive measures of disturbance to residents in the construction period, especially the prevention and control measures for dust, noise control measures as well as mud and earthwork management measures. Contact with the units and communities along the line in advance and strive for their understanding and support so as to ensure smooth construction.

layout

(15) While preparing the construction organization design, list the coordinated traffic measures as one item of the construction organization design. Contact with the traffic authority actively before implementing relevant type of work; introduce and report the project profile, construction plan, general and project materials and earthwork transport plan; ask the traffic authority to provide support and guidance; improve the traffic plan; and formulate the implementation rules.

(16) If it is necessary to open or lift a blind shaft cover for operation on the urban road with traffic, the boundary of the operation area shall adopt folding construction curb fender.

(17) It is strictly prohibited to replace the construction curb fender with safety isolation rope with red and white flags or other materials.

(18) When setting the construction fences, it is necessary to make the long side section of the base box iron facing the construction operational area. If it is necessary to set a construction passageway between the construction fences and construction areas, the passageway shall not be narrower than 0.6m.

(19) If it is necessary to implement coating, refreshing or cleaning operation for the building (or structure) surface, construction fences would be required for totally-enclosed fencing on the boundary of the operation area. Each type of mechanical equipment, tools and materials shall be placed within the fencing scope.

(20) It is forbidden to remove the construction fences before completing the project or when no temporary traffic measure has been adopted for the road construction.

(21) Within key areas, the construction method of "excavating, laying and recovering one section at one time" shall be implemented for the road pipeline construction. Excavation of all sections along the line at one time shall be strictly prohibited.

(22) For the construction that occupies urban road, it is necessary to follow relevant regulations from the public security traffic authority and road administrative management authority, complete relevant approval formalities and set temporary passageway in accordance with the standard.

(23) During the construction period, it is necessary to strictly follow the permission regulations. No construction without permission shall be implemented.

(24) If the construction needs to occupy urban road or may have influence on vehicles' or residents' travel, temporary passageway shall be set in accordance with relevant regulations, especially for the hospital to provide convenience for safety traffic of hospital ambulances. After setting temporary passageway in the construction section near a kindergarten or school, the construction site shall be strictly enclosed so as to prevent babies or children from entering the construction areas.

(25) If the construction needs to occupy a sidewalk, it would be necessary to set a firm, smooth and continuous pedestrian access road with side security enclosure at the side of the access door for the neighboring commerce, enterprise, office building or residential houses to ensure pedestrians' safe travel.

(26) When excavating ditches or pipeline grooves on urban road, if the work could not be completed in one day and the road still has traffic, the construction unit shall implement the construction through steel plate covering approach.

(27) The bracing reinforcement plan shall go through safety confirmation and be reported to the construction unit for approval. The steel plate covering the road shall not be thinner than 0.03m. The steel plate and selected metal slope shall have their edges polished to ensure the absence of acute angle and burr so as to guarantee the passing vehicles' and people's safety.

(28) If the excavated ditch (groove) is wider than or equal to 0.8m,, metal sections shall be adopted for bracing reinforcement at the lower end of the covering steel plate.

5.1.7 **Health and Safety in Construction Period**

The project features small quantities and amount of constructors, but the poor living conditions and sanitation at the construction site and great labor intensity for workers may easily lead to prevalence of disease. To ensure construction safety, it is necessary to implement comprehensive medical examination for the constructors and prohibit any people with communicable disease from entering the construction site. It is also necessary to implement regular physical examination for the canteen workers and transfer and treat any canteen worker with epidemic disease detected in time so as to prevent the outbreak of infectious diseases. The construction site shall construct the facilities for unified supply of water or adopt the municipal water supply, and shall be equipped with medical treatment and public health facilities and medical care personnel. Also, it is necessary to implement good labor protection for the constructors to guarantee the constructors' health and safety and smooth operation of the project.

5.2 **Environmental Impact Analysis and Mitigation Measures during Operation Period**

The project, as a water environment management project, includes the pipe construction project, household garbage collection and transfer project and other non-engineering projects. The environment impact analysis for the operation period in the assessment mainly includes the analysis on the positive environmental impact and other impacts on the environment, including the stink from household garbage collection and transfer, garbage percolate, waste water from washing of garbage transfer vehicles, noise impact of garbage transfer vehicles, experimental effluent from the water environment monitoring system house in the operation period as well as the household sewage and garbage from the workers.

5.2.1 **Positive Impact**

Upon the completion of the project in 2023, according to estimation, the urban sewage amount would be 123,000m^3/d, collection amount 9,800m^3/d and sewage collection rate higher than 80%. There would be about 4,010 new households being connected with the sewage collection system. The newly-constructed urban area and high streets would adopt the flow separation system and part of the old urban area that has great transformation difficulty would maintain its original confluence system. It is estimated that the amount of decreased pollutants discharged to the water body of Poyang Lake in each year would reach:

5.84 t for TN, 0.58 t for TP and 52.56 t for COD respectively. The innocent treatment rate of urban household garbage would reach more than 90%. After the prohibition of random abandonment of household garbage and gradual implementation of garbage separate collection, the amount of decreased garbage flowing into Poyang Lake basin in each year would reach 2448.8t.

The project would also strengthen the basin management of Jingan river and lake water environment and establish effective water quality monitoring system and public participation. The project construction is related with not only the sustainable development of Jingan economy and society, but also the drinking water safety for over 50,000 people. After the environmental improvement measures, there would be 41,700 immediate beneficiaries, including 20,900 female beneficiaries.

5.2.2 **Water Environment Impact Analysis and Mitigation Measures during Operation Period**

5.2.2.1 Water environment impact analysis for operation period

1. Drainage pipe network transformation project

(1) Normal operating conditions

Upon the completion of the drainage pipe network transformation project, since the sewage is collected through the pipes, the channels for the sewage to pollute the water body through cross flow and infiltration would have been eliminated. Upon the operation of the pipe network, the urban sewage would flow to the sewage treatment plant in an unified manner. This would greatly reduce the sewage leakage to the underground water, basically avoid the original sewage infiltration and gradually improve the underground and surface water environment.

Upon the completion of the project in 2023, according to estimation, the urban sewage collection amount would be 9,800m^3/d and sewage collection rate reach more than 80%. There would be about 4,010 new households being connected with the sewage collection system. The newly-constructed urban area and high streets would adopt the flow separation system and part of the old urban area that has great transformation difficulty would maintain its original confluence system. It is estimated that the amount of decreased pollutants discharged to the water body of Poyang Lake in each year would reach: 5.84 t for TN, 0.58 t for TP and 52.56 t for COD respectively.

(2) Impact of the sewage from Leigongjian Industrial Park to the sewage treatment plant

In accordance with the requirements of the *Opinions on Sewage Treatment Plant for Urban Area and Industrial Park* from Jiangxi Department of Environmental Protection, in order to take full advantage of the treatment capacity of the existing urban sewage treatment plant and avoid repeated construction, in principle, the sewage from the industrial parks except for such specialized industrial parks as the chemical project and electroplating park may be discharged to the urban sewage treatment plant for disposal. In accordance with the treatment capability and technology of the existing urban sewage treatment plant in our province, the industrial sewage discharged to the urban sewage treatment plant shall take up no more than 30% of total sewage disposed.

The sewage pipe network of the project would also collect sewage from Leigongjian Industrial Park (Chengdong Industrial Park) besides new north district and old south district. The companies within the park, mainly in small and medium size, consist of one large, six medium-sized and thirteen small-sized enterprises. Also, these companies are mainly of processing industry, including the processing of metal, lighting fixture, wood ware, bamboo ware, lithium battery, food, etc. The amount of generated sewage from Leigongjian Industrial Park is 1,200m^3/d in the near term and 2,500m^3/d in the long term which account for 12% (near term) and 15% (long term) of total collection amount respectively.

The water quality monitoring results for the main outlets of the industrial park are shown in the following table.

Table 5-6 Water Quality Monitoring Results for Outlets of Leigongjian Industrial Park (1) (mg/L)

Item / Location	COD	BOD_5	TN	NH_3-N	TP	Remarks
Outlet of Leigongjian Industrial Park	834.8	298.7	11.4	15.0	0.16	Samples taken on November 9th, 2015, Sunny
	1715.0	190.5	19.0	123.8	2.45	Samples taken on March 11th, 2016, Sunny
Grade B of *Water Quality Standard for Sewage Discharged to Urban Sewer* (GJ343-2010)	500	350	70	45	8	/

Table 5-7 Water Quality Monitoring Results for Outlets of Leigongjian Industrial Park (2) (mg/L)

Item / Location	Total cadmium	Total lead	Total chromium	Total nickel	Total zinc	Total copper	Total manganese	Total iron	Total arsenic
Outlets of Leigongjian Industrial Park	0.004	0.0215	0.002	0.0115	0.167	0.079	0.903	2.878	0.0555
Grade B of *Water Quality Standard for Sewage to be Discharged to Urban Sewer* (GJ343-2010)	0.10	1.00	1.50	1.00	5.00	2.00	5.00	10.00	0.50

Note: the sampling time is July 22, 2016 (9:00-10:00) and the water sample is taken on a sunny day.

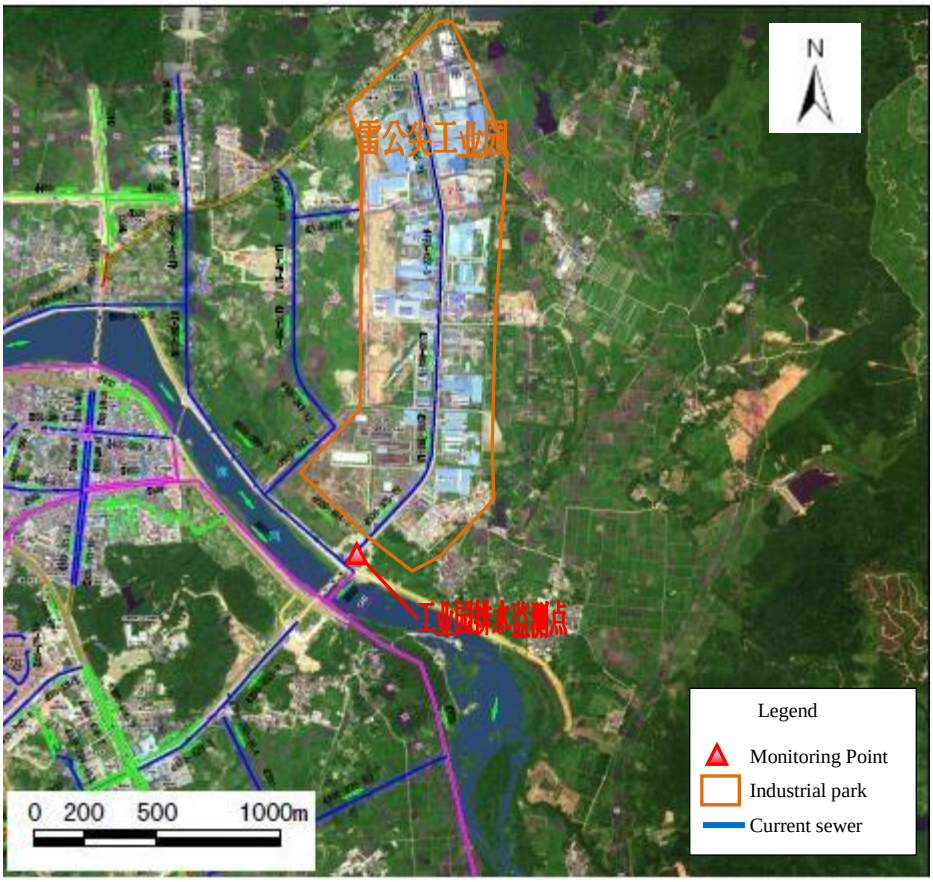

Fig. 5-1 Location of Monitoring Points at Outlets of Industrial Park

According to the above data, the concentration of COD and NH3-N at the outlets of Leigongjian Industrial Park exceeds the limiting value of Category B of *Water Quality Standard for Sewage Discharged to Urban Sewer (*GJ343-2010), and the requirements for other indexes and heavy medal can all be satisfied. Therefore, the industrial sewage from the companies in the industrial park must go through pre-treatment and reach the national and

industrial discharge standards. An urban sewage discharge license shall be applied and processed in accordance with relevant regulations and implemented under the supervision of the county environmental protection authority. Meanwhile, the environment authority shall take samples for monitoring at the outlets of the industrial park regularly. In case of any abnormal water quality, it is necessary to search for causes from the main pollution sources of the water catchment system. Besides, relevant enterprises shall adopt emergency measures and control the discharge amount of microorganism and poisonous or hazardous substances. Since the industrial sewage from Leigongjian Industrial Park accounts for no more than 30% of total sewage disposed, the sewage may enter the county sewage treatment plant for disposal on the premise that the water quality requirements of collection pipe could be satisfied.

2. Garbage collection and transfer project

The garbage percolate and waste water form washing of transport vehicles contain high concentration of organic pollutants and ammonia nitrogen which would infiltrate and pollute the underground water in case of any inappropriate disposal during the garbage collection, storage and transfer process. In order to reduce the pollution to the water body, all the garbage transfer vehicles of the project would adopt closed vehicles and install the collection equipment for garbage percolate. In this way, the garbage would not be exposed, drop or produce percolate in the transfer process and could be transferred to Jingan household garbage landfill for disposal. The garbage transfer vehicles would be washed in the existing garbage transfer station and the waste water generated in the washing process would, after mixing with the percolate, be discharged to the municipal sewage pipe network and drained to the sewage treatment plant of Jingan County for disposal. Therefore, no pollution would be exerted to the water environment.

The project would implement separate collection for the county household garbage through such measures as setting closed garbage can and collecting and transferring garbage. It will greatly enhance the old environmental sanitation facilities and improve the collection and transfer system and equipment and therefore decrease such circumstances as overflow of garbage can and sewage cross-flow at the sewage station in rainy days.

3. Water environment monitoring system house

The household sewage amount of the water quality monitoring center would be 0.4 m^3/d and 102 t/a. The household sewage would enter into the municipal sewage pipe network and be disposed in the sewage treatment plant and discharged after reaching

relevant standards.

The project represents both the urban public utilizes and environmental protection facilities. The pipe network project implemented would prevent urban sewage from entering the watercourse. The sewage would flow into the sewage treatment plant through the sewage pipe network and be discharged after reaching relevant standards. Reasonable disposal of household garbage would greatly reduce the pollutants discharged to the water body and contribute to improving the water quality of Beiliao River and the ecological environment as a whole.

To sum up, the engineering would contribute to eliminating the pollution channels to water environment and protecting the water environment.

5.2.2.2 Mitigation measures

1. Pipe network project

(1) Unchoke the pipe and replace the damaged pipe in time to prevent the sewage leakage from polluting the surrounding water body and underground water.

(2) Implement regular sampling and monitoring at the outlets of the industrial park. In case of any abnormal water quality, it is necessary to search for causes from the main pollution sources of the water catchment system. Besides, relevant enterprises shall adopt emergency measures and control the discharge amount of microorganism and poisonous or hazardous substances.

(3) The environment authority shall inspect the pre-treatment measures for the sewage from the companies in the industrial park and strictly implement the discharge license system.

(4) Attention should be paid to the following during the maintenance and clearing process:

①Before clearing the inspection well, it is necessary to set a warning mark in advance and eliminate the barriers on the pool surface. Before uncovering the pool cover, it is necessary to evacuate the non-operation staff.

②It is forbidden to use steel chisel, anvil and the like to pry the cover plate for the manhole cover so as to avoid combustion and explosion caused by spark.

③When using electrical machine to pump the sewage, it is necessary to check whether the electrical machine, power supply, circuit, switch blade and the like has electrical leakage to avoid electric shock accident.

④Before going down to the well and clearing the silt, it is necessary to use natural

ventilation to eliminate such hazardous gases as the carbon monoxide, carbon dioxide, hydrogen sulfide and methane, and utilize instruments for detection to ensure safety without any hazard before the operation under the well.

⑤The operator going down to the well shall wear anti-static clothes. It is forbidden for the operators to go down to the well with such hard metal objects as keys.

⑥The operator over the well shall hold the safety belt in his/her hands and always keep contact with the operator going down to the well.

⑦After the clearing task, it is necessary to recover and repair the manhole cover. If the task could not be completed in a day, it would be necessary to set a warning mark or protection fence.

(5) Attention should be paid to the following for the maintenance and management:

①Clear and remove slag from the inspection well regularly and implement frequent inspection and timely maintenance to ensure the smoothness and completeness of the sewage intercepting pipe and inspection well.

②It is forbidden to pour any garbage, sewage or sundries to the inspection well, stack sundries or build houses on any inspection well, or reconstruct the discharge pipe without authorization.

③The inspection well cover shall be completely covered to prevent the stink or accident.

④Working with naked fire shall be strictly forbidden besides the inspection well.

⑤The sludge cleared and transferred from the inspection well shall be transferred to the specialized treatment plant designated by the municipal environmental sanitation authority for disposal, and shall be marked to avoid cross contamination.

2. Garbage collection and transfer project

The garbage transfer vehicles shall all adopt closed style.

The compression-type garbage vehicles shall be equipped with percolate collection box and the percolate generated after compression would, after mixing with the washing waste water, be discharged to the collection tank of the existing garbage transfer station in Jingan county and drained to Jingan sewage treatment plant for disposal through the pipe network;

The garbage transfer vehicles and garbage bins at the garbage collection points would be washed regularly at the existing garbage transfer station and the waste water from the washing process discharged to the municipal sewage treatment plant through the municipal sewage pipe network.

5.2.3 **Ambient Air Impact Analysis and Mitigation Measures during Operation Period**

5.2.3.1 Ambient air impact analysis for operation period

Since the collected household garbage includes varied types of fermentative organics. Especially in summer when the temperature is high, the household garbage would emit odorous and foul gas during the storage, loading and transfer process which mainly includes such odorous gas as ammonia and hydrogen sulfide. The odor pollutants mainly affect the environment through people's smell and mainly come from the small amount of odorous gas produced from the garbage transfer vehicles and garbage collection points.

1. Garbage collection points

The project would transform the two garbage collection points, i.e., the garbage pit of Nangang Road and garbage can of Qinghu Road. Garbage cans with better leakproofness would be provided and no garbage transfer station or compression equipment would be constructed or supplied in the project. Provide deodorant at the garbage collection points and spray the deodorant regularly. The garbage bin may be transferred to the existing garbage transfer station for washing. After adopting the above-mentioned measures, the odorous pollutant generated from the garbage collection points would be in small amount and have little influence on the environment.

2. Garbage transfer vehicles

The bucket-type tricycles and bucket-type garbage vehicles contain no compression equipment and therefore feature relatively small amount of stink. While the compression-type garbage vehicles are equipped with percolate collection boxes. The vehicles would be washed at the existing garbage transfer station each day. The percolate, after mixing with the washing waste water, would be discharged to the sewage collection tank of the existing garbage transfer station and finally drained to Jingan sewage treatment plant for disposal through the municipal sewage pipe network. Since the garbage would be collected and transferred everyday and varied types of transfer vehicles would be washed regularly, the generated stink pollution is in relatively small amount.

The garbage may also produce raise dust pollution during its transfer process. The garbage collection and transfer vehicles of the project would all adopt closed style and cover design. The completely closed structure may eliminate the secondary pollution of garbage, solve the garbage leakage issue and avoid the raise dust and stink impact produced by garbage loading and transfer.

5.2.3.2 Mitigation measures

1. Wash the garbage transfer vehicles and garbage bins at the garbage collection points regularly to decrease the odorous pollutants.

2. Choose the vehicles and containers that could minimize the discharged waste gas during the garbage reception, unloading, disposal and storage process.

3. Clean the garbage collection station and neighboring road frequently and implement watering for dust suppression if necessary.

4. Clear and dispose all household garbage quickly and strictly implement daily clearance.

5. The garbage transfer vehicles shall adopt closed style to avoid garbage leakage.

6. Formulate and optimize the garbage transfer route to prevent the vehicle exhaust gas from affecting such sensitive points as the residential area, school and hospital on both sides of the route.

5.2.4 **Acoustic Environment Impact Analysis and Mitigation Measures during Operation Period**

5.2.4.1 Acoustic environment impact analysis for operation period

The noise of the project mainly comes from the transfer vehicles and its source intensity is about 80dB(A)-85dB(A). Up-to-standard emission of noise and small influence on the ambient environment may be realized by providing reasonable arrangement, selecting low-noise equipment, strengthening equipment maintenance and adopting vibration attenuation and building sound insulation measures.

The noise source of the garbage transfer vehicles is 80dB(A)-85 dB(A). The prediction and calculation results are listed in the following table based on the line sound source and conditions without any protective facilities.

Table 5-8 Noise Value on Both Sides of High Street

Distance (m)	5	10	15	20	30	35	40	45
Noise value (dB(A))	71.7	68.4	66.3	64.7	62.3	59.5	58.7	57.4

Category 4a of *Acoustic Environment Quality Standard* (GB3096-2008) (daytime 70dB(A) and nighttime 55dB(A)) would be applied for the 35m scope on both sides of high streets; and Category 2 (daytime 60dB(A) and nighttime 50dB(A)) for other areas.

According to the calculation based on the assumption that there exists no barrier on both sides or any background noise, the equivalent continuous sound level at the place beyond the 10m scope of both road sides is 68.4dB(A). It means that at the place beyond the

10m scope of both road sides, the traffic noise could comply with the requirement of equivalent continuous sound level on both sides of high streets in daytime less than 70dB(A). There would be no transport in nighttime. According to similar calculation, the equivalent continuous sound level at the place 35m away from the road is 59.5dB(A). It means that at the place beyond the 35m scope of both road sides, the traffic noise could comply with the standard value requirement of equivalent continuous sound level on both sides of high streets in daytime less than 60dB(A). Therefore, the function division requirements of acoustic environment could be satisfied.

5.2.4.2 Mitigation measures

1. It is necessary to strengthen the management and maintenance for the garbage transfer vehicles and decrease the vehicle accident rate.

2. The people transferring the garbage shall be employed with certificates after professional training.

3. Formulate and optimize the garbage transfer route and try best to prevent the traffic noise from affecting such sensitive points as the residential area, school and hospital on both sides of the route.

5.2.5 **Solid Waste Impact Analysis and Mitigation Measures during Operation Period**

5.2.5.1 Solid waste impact analysis for operation period

1. Household garbage

The solid waste of the project in the operation period consists mainly of the household garbage from the workers from the water environment monitoring system house and features an output of 5 kg/d and 1.28 t/a. Such waste would be collected and transferred to the garbage landfill for disposal.

2. Experimental effluent

The laboratory would produce waste acid (HW34), alkali (HW35) and organic solvent (HW42) which belong to hazardous wastes and feature an output of 300kg/a. The hazardous wastes would be collected and transferred to the unit with the disposal qualification of hazardous wastes for disposed rather than discharged directly.

5.2.5.2 Mitigation measures

1. Implement separate collection for the household garbage from the water environment monitoring system house workers. The environmental protection authority would be responsible for regularly collecting the garbage and transfer the garbage to Jingan garbage landfill for disposal.

2. Experimental effluent

During the operation period, the laboratory would produce waste acid (HW34), alkali (HW35) and organic solvent (HW42) which belong to hazardous wastes. The prevention and control measures for the hazardous waste are as follows:

(1) Implement separate collection for the hazardous wastes, put them in seepage-proof and leakage-proof sealed containers and marked them with distinct colors.

(2) Set seepage-proof and leakage-proof temporary storage room for hazardous wastes which shall never be stored in the open air.

(3) The hazardous wastes shall be collected, transferred and disposed by the unit with the business certificate for hazardous wastes and expenses shall be paid for such disposal.

(4) Implement the licensing system for hazardous waste transfer and transfer double draft system.

(5) It is forbidden to discard or abandon any hazardous waste during the transfer process; pour or stack the hazardous wastes or mix the hazardous wastes with the household sewage or garbage; or carry out the collection, storage, transfer or disposal activities of hazardous wastes without business certificate or based on any violation to the business certificate regulations.

5.2.6 **Social Environment Impact Analysis and Mitigation Measures during Operation Period**

5.2.6.1 Social environment impact analysis for operation period

The operation of the urban drainage pipe network transformation project of the project would effectively solve the current issue of sewage directly discharged to nearby surface water body without being collected to the sewage pipe network system for disposal as well as the water accumulation and waterlogging problems in some sections of urban area. The construction of each garbage transfer station would improve the garbage collection and clearing capability, greatly increase the clearing amount, effectively solve the garbage clearing and transferring issue, change the situation of garbage occupying urban area, contribute to the renovation of Jingan appearance and create a good human settlement for the residents' living in Jingan County. The project, with obvious social and environmental benefits, represents a livelihood project in favor of the public.

Meanwhile, attention should be paid to the environmental sanitation inside the garbage transfer vehicles. To prevent the transfer vehicles of the project from becoming the breeding place of mosquitoes, flies and diseases, the varied types of vehicles shall maintain their

cleanness and collection containers be washed regularly. Also, insecticide shall be sprayed regularly for elimination of mosquito.

5.2.6.2 Mitigation measures

1. Garbage transfer stations shall make safe operation procedures for operation and maintenance, and operate according to the operation procedures;

2. The transfer vehicles shall maintain their cleanness and collection containers be washed regularly so as to ensure their clean surface without any dirt or percolate attached. Spray biological bacteria for the treatment of bacteria, mosquitoes and files, eliminate the bacteria, mosquitoes and files regularly through biological method and adopt light and liquid sterilization system.

3. The garbage collection and transfer administers and operators must receive pre-job training to master the technology procedures, technical requirements as well as main technical indicators and operation management requirements of relevant facilities and equipment.

4. Operators shall randomly inspect waste content, and any hazardous waste and forbidden object are prohibited from entering the stations;

5. Collected materials and organic waste is classified for the purpose of easy collection and compost;

6. Messes are strictly prohibited from being piled up in garbage transfer stations;

5.3 **Due Diligence**

5.3.1 **Jingan Sewage Treatment Plant**

The service scope of the drainage pipe network transformation project of the project includes new north district and old south district. The household sewage collected by the project would enter the county sewage treatment plant in the end. The due diligence to the county sewage treatment plant for the assessment is as follows.

1. Location of the sewage treatment plant

The county sewage treatment plant is located within the county garden spot, downstream of southern branch of Beiliao River in urban area and about 3km from the city.

2. Construction of the sewage treatment plant

The sewage treatment plant launched its construction in December, 2008, and was put into operation in December, 2009 and transferred to Jiangxi Hongcheng Water Industry Environmental Protection Co., Ltd. affiliated to Nanchang Water Industry Group for its operation management.

3. Scale of the sewage treatment plant

The plant is close to the Liao River to the east with a land occupation of 1.71ha for its first phase. The land for long-term development of the plant has been reserved at the eastern part of the plant area. The constructed scale of the plant is 10,000m^3/d and total design capacity in future 20,000m^3/d. The current water inflow of the plant is 8,000m^3/d.

4. Environmental assessment and environmental protection acceptance check

The original Jiangxi Environmental Protection Bureau has given an official written reply to the environmental assessment of Jingan sewage treatment plant (Phase I) in September of 2008 under the reference number of GHDZ [2008] No. 418 (Annex II). The plant has passed the environmental protection acceptance check now. Jiangxi Department of Environmental Protection has given an official written reply for the acceptance check of Phase I (Step I) in August of 2011 under the reference number of GHPH [2011] No. 111 (Annex III). Yichun Department of Environmental Protection has given an official written reply for the acceptance check of Phase I (Step II) in October of 2015 under the reference number of YHPYZ [2015] No. 113 (Annex IV).

5. Service scope

The service scope of the county sewage treatment plant includes Chengbei District, Chengdong Industrial Park and south District. A sewage treatment plant for industrial park has been constructed in 2013 for Chengnan Industrial Park which is therefore not included in the service scope of the county sewage treatment plant.

6. Treatment process

The sewage treatment process adopts the improved oxidation ditch technology with the function of biological removal of nitrogen and phosphorus. The process flowchart is as follows:

Influent → Coarse Grid and Pumping house → fine Grid and vortex Grit chamber → modified oxidation ditch →secondary sedimentation tank → UV sterilizing tank → effluent pumping → Discharge

Fig. 5-2 Process Flowchart of County Sewage Treatment Plant

The design of the sewage treatment plant has taken into account the intercepting-type drainage system issue. When the rainwater and sewage confluence enters into the sewage plant in rainy season, after the pre-treatment of coarse screen, fine screen and grit basin, the confluence water beyond the design flow may be discharged to the outlet through the

exceeding pipe of the grit basin.

7. Operation situation

In accordance with the data provided by the sewage treatment plant, Jingan sewage treatment plant, currently in good operation, features an average daily treatment capacity of about 8,000t, power consumption of 0.28Kw/h for each ton of water and sludge output of 70t/m. The sludge is transferred to the county environmental sanitation authority for unified disposal and mainly used for landscaping.

Fig. 5-3 Jingan County Household Sewage Treatment Plant

In accordance with the *Inflow and Outflow Water Quality Investigation and Monitoring Report of Jiangxi Jingan Sewage Treatment Plant* (monitoring date: January 12, 2015) from Jingan environmental monitoring station, the outflow water from the sewage treatment plant would be discharged to the southern branch of Beiliao River when the water quality reaches Category B and Category I of the *Pollutant Discharge Standard of Urban Sewage Treatment Plant* (GB18918-2002) (please see the following table for details).

Table 5-9 Inflow and Outflow Water Quality Current Situation of Jingan Sewage Treatment Plant (mg/L; Chrominance: degree; pH: dimensionless)

No.	Monitoring item	Designed inflow	Monitoring result		Category B and Category I of GB18918—2002	Whether the discharged water quality reaches the standard
			Inlet	Outlet		
1	Chrominance	/	25	15	30	Reach the standard
2	pH	/	6.98	7.05	6~9	Reach the standard
3	SS	/	38	12	20	Reach the

						standard
4	Ammonia nitrogen (calculated by N amount)	25	10.1	3.49	8	Reach the standard
5	COD	220	80.4	14.1	60	Reach the standard
6	BOD_5	120	40.6	5.9	20	Reach the standard
7	TN	35	18.1	12.1	20	Reach the standard
8	TP	3	1.06	0.16	1	Reach the standard

8. Match analysis of treatment capacity

Upon the completion of the pipe network transformation project in 2023, the amount of collected sewage in the county would be 9,800 m^3/d. In other words, the project may enable the sewage treatment plant to reach its designed treatment scale and satisfy the recent treatment requirement of the project. The long-term sewage collection amount of the project is 16,600m^3/d. It is recommended to realize the total designed long-term scale of 20,000m^3/d as soon as possible for the sewage treatment plant.

To sum up, in accordance with the due diligence of Jingan sewage treatment plant, the treatment capability and process of the plant can satisfy the requirements of the project. And the plant, in good operation, can implement effective treatment to the sewage collected through the pipe network of the project.

5.3.2 **Jingan Household Garbage Landfill**

The project would collect the household garbage from the county which would finally be transferred to Jingan household garbage landfill for disposal. The garbage percolate would be transferred to the percolate treatment station of the landfill for disposal. The due diligence to the landfill for the assessment is as follows.

1. Location of the garbage landfill

Jingan household garbage landfill, covering an area of 123mu, is located at Lijiawa, Huanglong Village, Xiangtian Township, Jingan, 7.5km (straight-line distance) away from the city and 12km (range of driving) away from the county garbage transfer station. Please see the following figure for the location plan of the landfill.

Fig. 5-4 Location Plan of Jingan Household Garbage Landfill

2. Construction of of the garbage landfill

The landfill launched its consumption in October of 2012 and implemented its trial operation in September of 2014. The percolate treatment station of the landfill launched its commissioning in July of 2015. Total cost of the project is about RMB 46.22 million.

3. Environmental assessment and acceptance check

Yichun Department of Environmental Protection has given an official written reply to Jingan urban garbage landfill in July of 2009 under the reference number of YHDZ [2009] No. 128 (Annex V). Currently the landfill is going through the acceptance check of environmental protection.

3. Scale of of the garbage landfill

The storage capacity of the landfill area is 730,000m^3 including 317,500m^3 for No. 1 landfill area and 412,500m^3 for No. 2 landfill area. The designed service scope is Jingan County and service length 20.2 years.

The landfill mainly consists of the main work like the garbage dam, seepage-proof

system, rainwater guidance and drainage system, percolate guidance and drainage system, adjustment and treatment system, landfill gas export and treatment system and road as well as corresponding supporting facilities. The seepage-proof system adopts high-density polyethylene (HDPE) geomembrane in a thickness of 2.00mm as the main seepage-proof measures.

4. Service scope

Household garbage from Jingan County

5. Treatment process

The garbage treatment process of Jingan garbage landfill adopts the improved anaerobic sanitary landfill technology and landfill operational method of operation by units and layers with daily earthing. The percolate treatment process adopts anaerobic treatment+ FEO reactor+ A/O biological membrane oxidation pond+ coagulation air flotation+ sterilization.

6. Main equipment

The current equipment of the landfill can satisfy the requirements of daily earthing operation and the designed capacity satisfy the garbage treatment requirements of the project. Please see the following table for the equipment of the landfill.

Table 5-10 Main Equipment List of Jingan Household Garbage Landfill

No.	Name	Specification	Quantity
1	Crawler-type bulldozer	165HP	2
2	Excavator	0.8m^3	1
3	Dump truck	4.5t	2
4	Mobile protection fence net within the operation area	m	400
5	Loader	1.0 m^3	1
6	Spraying vehicle	5t	1

7. Matching of garbage treatment capacity

The service scope of Jingan garbage landfill is Jingan County and the collection and transfer scope of the project new north district, Leigongjian Industrial Park (Chengdong Industrial Park), old south district and New Industry &Trade Town (Chengnan Industrial Park) which all falls into the service scope of the landfill. The collection and transfer capacity of the project is 37.7 t/d and the storage capacity of the landfill area 730,000m^3, including 317,500m^3 for No. 1 landfill area and 412,500m^3 for No. 2 landfill area. The service length of the landfill is 20.2 years. The storage capacity of the landfill can satisfy the

project requirements. Since the designed treatment capacity of the percolate station is 90t/d, current treatment amount 70t/d and percolate output of the project 0.242 t/d, the percolate treatment amount requirements of the project can be satisfied.

To sum up, it is feasible to transfer the household garbage collected and transferred from Jingan County within the project scope to Jingan garbage landfill for disposal.

6 Environment Risk Analysis and Mitigation Measures

6.1 Identification of Environment Risks

According to analysis on the project's engineering features and pollution effects, its environment risks are mainly identified as follows:

1. Transformation of drainage pipeline network

(1) For pipelines are buried under the ground, sewage may be leaked in the process of pipeline conveyance in case of inappropriate seepage control measures at pipe joints or pipe rupture.

(2) Sewage collection pipeline network of the project includes Leigongjian Industrial Park. If an emergent incident happens to industrial enterprises in the park, it may cause accidental discharge of industrial wastewater.

(3) Health and safety of maintenance workers are concerned at the time of pipeline maintenance and repair.

2. Waste collection and transportation

Waste and leachate may be leaked in the process of collection, transportation or by transporter rollover during carriage.

6.2 Impact Analysis of Environmental Risks

6.2.1 Transformation of Drainage Pipeline Network

1. Leakage of pipelines

When sewage is leaked from pipelines into underground, it not only pollutes surrounding soil and hygienic environment, but also makes negative influence on the quality of groundwater. According to operation conditions of existing rainwater and sewage pipe network, pipelines are less likely to leak, except for worn-down pipe without repair, illegal construction or sabotage.

2. Accidental discharge of industrial wastewater

In case of industrial equipment failure of enterprises within Leigongjian Industrial Park, sewage may be discharged into the city sewers without treatment. Accidental discharge of wastewater gives rise to sudden changes in quality and quantity of the influent water of sewage treatment plant, such as excessive impact load of influent wastewater, the pH range beyond 6~9 and exceed of refractory organic toxicants. Such changes will lead to activity decline of biochemical microorganisms in the sewage treatment plant, even to biota destruction and sludge expansion, and ultimately to the deterioration of the effluent water that does not meet the national sewage emission standards and makes a greatly negative

impact on the water environment and ecosystem.

3. Health and safety of maintenance workers

When the sewer blockage or an accident of any structure needs to be immediately resolved, maintenance operators have to go into the sewer, sump pit or cesspool where high concentrations of toxic gases, such as hydrogen sulfide, methane, carbon dioxide and others are tend to be produced and accumulated. If no protective measures are taken during maintenance, workers may get dizzy or short of breath or even dead due to poor ventilation and inhalation of toxic gases. Accident endangering people's life may also be caused by explosion of flammable gas methane with open fire in the pipe.

6.2.2 **Waste Collection and Transportation Project**

If leakage of leachate and flushing water is not taken care of on time in the process of collection or transportation, they will pollute the ground water environment. Odor of the leachate and flushing water will make adverse effects on the air and social sanitary environment.

6.3 **Risk Mitigation Measures**

6.3.1 **Transformation of Drainage Pipeline Network**

1. Pipeline leakage prevention measures

(1) In pipeline design, appropriate pipe material should be determined to maintain the quality and duration of pipelines in accordance with specific conditions and characteristics of the city. Foundation of the drainage pipe must meet the requirements of mechanics design. Corresponding measures should be taken if such design requirements are not met. Construction of the foundation should strictly follow the width, thickness and intensity as required on design Figures to ensure its quality.

(2) Before pipes are installed under the ground, corresponding examination should be carried out properly. On one hand, pipes that are about enter the site should be examined carefully to avoid that pipes with cracks or holes are placed in the ditch. On the other hand, design Figures should be carefully reviewed to check the eligibility of the centerline, sideline, size and intensity of pipeline foundation. Finally, national standards should be checked in the well location, well distance, concrete strength level and impermeable mortar mixture at joints.

(3) In pipeline installation, the demanded cement mortar should be made and rendered under the defined mix ratio. When the joint of two drainpipes is installed, a concave joint is often resulted from extrusion, which should be handled in time to maintain the smooth

water flow in drainpipes, and to avoid decrease in stream cross sections, influence on flow velocity and even pipe blockage due to debris accumulated in pipes.

(4) Trench backfill should be carried out after concrete cradles and rendered mortar reach a certain strength. Aggregates are not allowed to load directly on pipes, and no large chunk stone or other hard objects should be included in aggregates. Two sides of pipes should be backfilled simultaneously, while the section above the pipe top should be backfilled and compacted by layer to make the filled square an entirety of force bearing, in which its vault is to unload force to ensure the safety of pipes.

(5) During operation, the construction unit should formulate a comprehensive set of pipeline network monitoring system to unblock the pipe network and replace the damaged pipes so as to avoid wastewater running, oozing and leaking out to pollute surrounding waters and groundwater.

In summary, the project is feasible. In spite of wastewater, noise, solid wastes and other pollutants produced during construction of this work, few impacts will be made on quality of ambient air, waters and acoustic environment as long as corresponding measure are taken.

2. Prevention measures for accidental discharge of industrial wastewater

(1) Take routine samples at drainage outlets in the industrial park for monitoring.

(2) If something abnormal concerned with water quality appears, its causes should be investigated at major pollution sources of catchment system. The enterprises involved take emergency measures to control the emission of microorganisms and toxic substances.

3. Prevention and treatment measures for maintenance workers' health and safety

Safety guarantee measures should be taken for operators, which is important to prevent toxic gases from doing harm to the staff. Ventilation measures should be taken to get toxic and harmful gases completely out and fresh air filled in the work space, which is the most effective way to prevent poisoning. If adequate ventilation is not available, staff should avoid entering the dangerous space. If they have to do so, it is necessary to wear effective protective equipment, including gas masks, air-fed masks and others, together with inspection equipment such as gas detectors and testing equipment and detection test paper.

6.3.2 **Waste Collection and Transportation Project**

Prevention measures for leakage of waste and leachate are as follows:

(1) Sealable plastic buckets should meet a certain standard in physical strength with good sealability.

(2) Regular examination, repair and maintenance should be done for garbage transporters to ensure that they are in normal conditions.

(3) Leakage of garbage transporters should be blocked in no time with warning signs hung out.

(4) Drivers must be licensed and drive below the speed limit with no fatigue.

6.4 Emergency Institutions and Plans

For this project, emergency measures for unexpected environmental accidents involve various units and departments, including environmental protection bureau, departments of public security, health administration, fire departments and others. If accidents take place, emergency plans should be immediately launched in accordance with “Jiangxi Provincial Contingency Plans for Environmental Emergencies”, “Contingency Plans for Environmental Emergencies of Jingan County” and “Contingency Plans for Environmental Emergencies of Environmental Protection Bureau of Jingan County”.

Emergency institutions of the project mainly consist of the office affiliated to the leading group and various emergency teams of rescue, liaison, logistics and vehicles. Responsibilities of every team are as follows and institutions in charge are referred in Figure 6-1.

(1) The leading group should coordinate the formulation and implementation of emergency plans according to the environmental risks. It is in charge of the holistic direction at site and coordination with external units.

(2) The office is to support the leading group in work distribution, supervision and review.

(3) The rescue team, at the leading group’s unified command, is responsible for implementation of accident treatment measures, repair of relevant equipment and others.

(4) The liaison team is responsible for communications among the rescue team, the logistics team and the vehicle team.

(5) The logistics team is in charge of rescuing poisoned staff, providing them with first-aid measures, sending them to the hospital for observation and treatment procedures, offering nursing care and collecting relevant rescue items.

(6) The vehicle team is responsible for the deployment and use of cars in sending poisoned staff to the hospital, carrying rescue items and others.

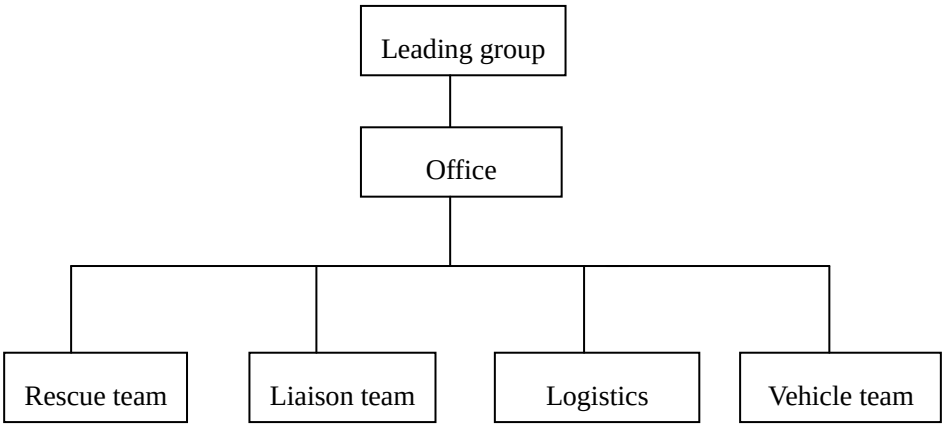

Figure 6-1 Layout of the project emergency institutions

7 Analysis of Industrial Policy and Location Rationality

7.1 Industrial Policy Compliance Analysis

The project, involving pipeline engineering construction (E4852) and environment and health management (N7820), which has been included in Section XXII (XXII. City Infrastructure: 9. Water supply and drainage pipe network in cities and towns, water supply source and water treatment plant project) and Section XXXVIII (XXXVIII. Comprehensive Utility of Environmental Protection and Energy Saving: 20. Reduction, resources, innocuous treatment and comprehensive utility of garbage and other solid waste in cities and towns) of Encouragement of *Catalogue for Guiding Industry Restructuring (2011 Version) (2013 Amendment),* conforms to national policies of the relevant industry.

7.2 Urban Planning Compliance Analysis

The project will transform the pipeline network of Jingan County and implement collection and transfer of garbage, in which the construction is in line with "Urban Master Plan of Jingan County (2006-2020)", "Control Detailed Planning of Chengbei New District of Jingan County", "Special Drainage Plan of Jingan County (2010-2020)", "Special Plan for Environmental Health of Jingan County" and "Urban Master Plan of Jingan County (2006-2020)".

7.3 Location Rationality Analysis

The project conforms to "Urban Master Plan of Jingan County (2006-2020)", "Control Detailed Planning of Chengbei New District of Jingan County", "Special Drainage Plan of Jingan County (2010-2020)", "Special Plan for Environmental Health of Jingan County" and "Urban Master Plan of Jingan County (2006-2020)". Upon its completion, the project will make few impacts on surrounding environment by taking corresponding treatment measures. Thus, its site selection is reasonable.

8 Public Consultation and Information Disclosure

8.1 Purpose and Approaches

According to the requirements of Tentative Methods for Public Participation in Environmental Impact Assessment (Huan Fa No. 28 [2006]), "Notice of Environmental Protection Department of Jiangxi Province on Further Strengthening Public Participation, Supervision and Management in Environmental Impact Assessment of Construction Works" (Gan Huan Ping Zi No. 145 [2014]) and the World Bank Operation Policy (OP4.01), two rounds of public consultation and information disclosure have been launched concerning the World Bank financed Jingan water environment management project during construction and operation. The first round, prior to the completion of the project's EIA outline, was mainly to provide the affected mass with project overview and possible environmental impacts, and to ask for their opinions. The second round, subsequent to the completed first draft of EIA report, was to publish the complete report and conduct public consultation on the main content and conclusion of the report so as to gain the public support for its construction and mitigation measures adopted.

Public consultation and information disclosure are a type of two-way information sharing between the project implementing agency and the public, and an important component of environmental impact assessment and plays a critical role in improving decision-making. The purposes of public consultation and information disclosure are to disclose relevant project information to the project areas and the public who are concerned about the project, keeping the public informed of the project's main contents, its implementation and operation features and significant environmental issues or problems related to the project; help assessment staff identify issues or problems, confirm all significant environmental issues or problems triggered by the project have been analyzed and assessed in the EIA; confirm the feasibility of environmental protection measures and implementation of optimal measures. Public consultations highlights the importance of linkages and communications between all project-related parties with the public, can directly reflect views of the public and enable decision-makers to timely identify potential issues or problems and timely revise and improve design so that concerns of the public can be adequately addressed,

thereby contributing to further improvements and stronger rationality of the project's planning, design, environmental monitoring and management, as well as the most optimal coordination between the project's environmental, social and economic benefits.

8.2 Public Consultation

Two rounds of public consultation have been launched for the project. Consultation dates, subjects and manners are presented in the following table. Minutes and relevant documents for the Symposium are presented in Annex VI.

8.2.1 The first round of public consultation

8.2.1.1 The first round of public consultation

Prior to the completion of the project's EIA outline, the first round of public consultation was conducted mainly to provide the affected mass with project overview and possible environmental impacts and ask for their opinions. Detailed information is listed as follows.

Table 8-1 Date, subject and manners of the first round of public consultation

Stage	Manners of consultation	Date	Location	Consultation subject and the number	Consultation Content
The first round	①Site visit ②Questionnaire	December 2015, January 2016	Jingan County	Residents in sensitive locations such as Jingan Vocational School, Jingan County Hospital of TCM, the First Primary School of Jingan County, Jingan No.3 High School, Jingan High School, the Second Primary School of Jingan County, Qinghua Meijun, Qinghuayuan, and Dianli New Village, and representatives of Shuangxi Town	To provide the affected public with project overview and possible environmental impacts and seek for their opinions and advice.

Stage	Manners of consultation	Date	Location	Consultation subject and the number	Consultation Content
				Government, Public Traffic Bureau of Jingan County, Environmental Protection Bureau of Jingan County county County Sewage Treatment Plant and other units.	

8.2.1.2 Public opinions and feedback

The table below presents public opinions and feedback collected in the first round of public consultation.

Table 8-2 Public opinions and feedback of the first round of public consultation

Stage	Manners of consultation	Public questions and opinions	Construction units' feedback on public opinions
The first round	①Site visit ②Questionnaire	1. The public all support construction of the project with no objections. 2. Currently, water logging due to poor road drainage makes it inconvenient for traffic and people's life. They hope that the project starts and finishes as soon as possible at one time to avoid repeated work.	According to construction units and environmental assessment departments, thanks to public support and understanding, the project design and preliminary work will be further improved to strive for an earlier start of one-time construction, avoid repeated work and complete it as soon as possible.

8.2.2 The second round of public consultation

8.2.2.1 The second round of public consultation

The second round, subsequent to the completed first draft of EIA report, was to publish the complete report and conduct public consultation on the main content and conclusion of the report. Detailed information is listed as follows.

Table 8-3 Date, subject and manners of the second round of public consultation

Stage	Manners of consultation	Date	Location	Consultation subject and the number	Consultation Content

Stage	Manners of consultation	Date	Location	Consultation subject and the number	Consultation Content
The second round	①Site visits ②Questionnaire ③Symposium	May 2016	Jingan County	Residents in sensitive locations such as Jingan Vocational School, Jingan County Hospital of TCM, the First Primary School of Jingan County, Jingan No.3 High School, Jingan High School, the Second Primary School of Jingan County, Qinghua Meijun, Qinghuayuan, and Dianli New Village, and representatives of Shuangxi Town Government, Public Traffic Bureau of Jingan County, Environmental Protection Bureau of Jingan County county County Sewage Treatment Plant and other units. Symposium: once, attended by representatives of the affected residents and relevant departments.	To conduct public consultation on the main content of the EIA draft to gain the public support and understanding of the project construction and its mitigation measures.

8.1.2.2 Public opinions and feedback

Table 8-4 Public opinions and feedback of the first round of public consultation

Stage	Manners of consultation	Public questions and opinions	Construction units' feedback on public opinions

Stage	Manners of consultation	Public questions and opinions	Construction units' feedback on public opinions
The second round	①Site visits ②Questionnaire ③Symposium	The pubic support the construction work and recognize environmental protection measures to be adopted.	According to construction units and environmental assessment departments, thanks to public support and understanding, all the environmental protection measures will be strictly implemented as designed in the environmental management plan of the project.

8.3 **Information Disclosure**

8.3.1 The first round of information disclosure

The table below illustrates the date, location and manners of the first round of information disclosure.

Table 8-5 Date, location and manners of the first round of information disclosure

Stage	Manners of disclosure	Date	Location	Content
The second round	On-site notice	January 2016	Bulletin of Shuangxi Town Government	1. Project overview 2. Information of construction and assessment departments 3. Environmental impact assessment procedures and major work 4. Major items that need public opinions 5. Major manners in which public opinions are proposed.

8.3.2 The second round of information disclosure

The table below illustrates the date, location and manners of the second round of information disclosure.

Table 8-6 Date, location and manners of the second round of information disclosure

Stage	Manners of consultation	Date	Location	Content
The second	Report disclosure	May 2016	Qinghu Community Library of Shuangxi Town	The whole EIA draft

Stage	Manners of consultation	Date	Location	Content
round			of Jingan County	
	On-site notice	May 2016	Bulletin of Shuangxi Town Government, Liaohe Huayuan, Weilan Jiayuan, Jingan Vocational School and others	1. Project overview 2. Environmental protection measures to be taken 3. Conclusion of the EIA draft 4. Where and how to check the whole draft of the project

The first round of public notice at site

The second round of public notice at site

Figure 8-1 Photos of on-site notices

Figure 8-1 Photos of report disclosure

9 Resettlement and Social Assessment

The content below is a part of "Resettlement Plan for the World-Bank-Financed Jiangxi Poyang Lake Basin Water Environment Management Project" and "Social Assessment Report for World-Bank-Financed Jiangxi Poyang Lake Basin Water Environment Management Project" made by Hohai University.

9.1 Resettlement Plan

9.1.1 Impacts of Land Occupation

Jingan County in Yichun City is involved in land acquisition. This project involves permanent land acquisition and temporary land occupancy while no house demolition or minority communities are involved within the land to be acquired. The project impacts are illustrated in Table 9-1.

Table 9-1 Summary of the Project Impacts on Migrants

County	Project Name	Township and Town (in number)	Village (in number)	Acquired Collective Land (hectare)		Acquired State-owned Land (hectare)	Temporary Land Occupation (hectare)		Directly Affected Population		Indirectly Affected Farmer and Shop	
				Total	Paddy Field/Arid Land Included		Collective Land	State-owned Land	Household (by household)	People(by number of person)	Number (by household)	People(by number of person)
Jingan County	Drainage network reconstruction project in urban areas	1				3		211.04			187	3211
	Domestic Garbage Collection and Transfer	1				3						

County	Project Name	Township and Town (in number)	Village (in number)	Acquired Collective Land (hectare)		Acquired State-owned Land (hectare)	Temporary Land Occupation (hectare)		Directly Affected Population		Indirectly Affected Farmer and Shop	
				Total	Paddy Field/Arid Land Included		Collective Land	State-owned Land	Household (by household)	People(by number of person)	Number (by household)	People(by number of person)
	Project in urban areas											
	Water Environment Monitoring system											

9.1.2 Measures to Reduce Impacts

In the planning and design stage, in order to reduce the impact of project construction on the local socio-economic and people's life, the design agency and Project owner had adopted several effective measures:

(1) In the planning stage, when optimized selection for schemes was conducted, much consideration was put into the impact of project construction on the local socioeconomic , which was set as a key factor in the optimized selection for schemes;

(2) Design was optimized. To reduce the demolition immigrants, existing national and local roads were used to connect planned construction area.

(3) The design was optimized to occupy wasteland and state-owned land and reduce the occupancy of arable land.

In the Resettlement and the implementation stage, when the land acquisition and resettlement are unavoidable, in order to reduce the impact of construction projects, the following measures will be taken:

(1) The collection of basic material shall be strengthened and thorough analysis shall be conducted concerning the current situation of local socioeconomic and future development. Practical resettlement action plan shall be established according to local situation. The people affected by the project shall be prevented from suffering loss for

project construction.

(2) The public participation shall be actively encouraged and information disclosure shall be strengthened and surveillance by the masses shall be accepted.

(3) Internal and external monitoring shall be reinforced and effective and unblocked feedback mechanism and channels shall be established. The information processing cycle shall be minimized to ensure the various problems in project implementing process be settled in time.

(4) Project sites are arranged in a scientific way by occupying as less land as possible. When construction is completed, temporarily occupied area will be recovered as provided by its original land use type.

(5) Temporary storage area of earthwork is properly arranged so that it is far from environmentally sensitive points such as residential quarters, schools and the like.

9.2 **Social Assessment**

9.2.1 Social Assessment

Based on the systematic inspect and evaluation of sewage collection pipeline network and garbage treatment subprojects, the Social assessment of this project is shown as below:

(1) Generally, the project is of high economic and social benefit, consistent with medium or long-term development plan for representative counties of each sub-project. Meanwhile, it will have positive impacts on improving regional environment and boosting regional economic and social development.

(2) Most farmers/residents of representative counties will benefit directly from the project, since the project has extensive covering rate and inclusive beneficiaries.

(3) Disadvantaged groups will be direct beneficiaries of the project. Generally, the project has little adverse impact on their livelihood, but creates some jobs for them to live a better life.

(4) Because the project is in line with the region's customs, culture and religion, there is no relevant risks.

(5) Project management system of high enforcement capability provides institutional guarantee for the project's smooth operation and implementation.

The project will alleviate pollution in Poyang Lake Basin and improve living, ecological and social environment for residents in the project area. Purposes of the project are in line with China's plan of utilizing foreign investment and pollution

control. Local governments of various levels and beneficiary groups are all supportive to the project.

Sewage treatment and ecological restoration projects have been spreading in China's provinces for years. The technology is relatively mature. Moreover, the project areas have conducted similar pollution control projects and formed full-time technological teams, boasting a good working foundation. And staffs of project offices of all levels are experienced in project management. All of these are favorable for successfully completing the project.

Implementation of the project will bring favorable social benefits, including: improving people's living environment and their livelihood; creating more jobs for vulnerable groups and farmers; decreasing incidence of disease and improving people's health conditions, promoting rural urbanization and transforming farmers into urban residents, and facilitating industrial restructuring and green economic development.

Any project may encounter risks in the implementation. This project will face risks in the construction, difficult land acquisition and subsequent maintenance. Therefore, the project has to pay attention to the development of beneficiary groups and also attend to social equity. Undoubtedly, a more integral project design and high-quality project management will reduce potential social risks and prevent negative social impacts in the area.

9.2.2 **Suggestions**

Due to differences and complexity of project contents in various cities or towns and distinct economic and social development, we have to face potential risks brought by project construction. Those risks can be avoided through two methods. Firstly, optimize engineering design on the basis of no extra quantity. Secondly, owners should consult with stakeholders before, during and after the project construction to know their needs and desires, and communicate with different departments. To this end, the social assessment group proposes the following suggestions:

1. General Advice

(1) Optimize the design

Project owners and feasibility study agencies should minimize the scale of land acquisition and demolition in design, and adopt advanced measures of environmental protection to avoid secondary pollution brought by environmental projects;

(2) Conduct participatory activities

Major stakeholders should be involved in the design, implementation, management and supervision of the project. Project owners, the PMO/PPMO and social assessment group formulate outline for beneficiary participation and initiate monitoring and evaluation to ensure that major stakeholders join in the whole process of the project, including the preparation, design, implementation, monitoring and supervision, and equip them with the awareness of environmental protection;

(3) Carry out training on environmental knowledge and public health education

Relevant government departments should organize public training on national and regional laws and regulations on environmental protection as well as environment indicators under the assistance of the publicity department, Bureau of Education, Environmental Protection Bureau, Bureau of Radio and Television, newspaper offices, and sub-district/town/township/village level residents' committees; launch training on water conservation, treatment of sewage and waste, control of point pollution, prevention of water-mediated diseases and recycle of waste; and publicize life-styles that may affect surrounding environment and help residents in the project area to realize that their way of living may have impacts on surrounding environment;

(4) Formulate a reasonable resettlement action plan

On the basis of public consultation, the PMO/PPMO, resettlement plan group and project owners should ensure that migrants' livelihood will not deteriorate due to the project construction;

(5) Create jobs opportunities

The PMO/PPMO, project owners, construction agency with the assistance of the Bureau of Civil Affairs and the Social Security Bureau will provide jobs opportunities for migrants, poverty-stricken families and women in cities and rural areas to involve them in the project construction;

(6) Formulate and implement preferential charging policy for impoverished groups

The PMO/PPMO, project owners and the Price Bureau should establish local charging policy for impoverished groups on the basis of public hearing;

(7) Safety and convenience maintenance during the construction

The project owners and construction agencies should schedule the construction progress by taking residents' need and habits into consideration;

(8) Institutional capacity building

The project managers and constructors should launch training on World Bank social and safeguard policies to better implement the project;

(9) Mechanism of follow-up project management

Residents should be involved in the follow-up management. It is proposed to establish a community team of follow-up project management based on the management group during the construction. Members of follow-up management team (women included) will be elected by villagers. Environmental institutions should strengthen the legislation and law enforcement on environmental protection and enhance environmental education for residents in the project area for sustainability of the project effects.

2. Suggestions on sub-projects

(1) Sewage pipelines subproject

① Pipeline network construction will affect residents rest, shop business and industry operation on the two sides of roads. Therefore, laying pipe should shorten construction duration as much as possible to reduce unfavorable impacts. If possible, offer certain compensation to affected residents and shop owners; ② Try to connect sewage of households within the construction and residential area from the source; ③ Since the project area enjoys developed water system and abundant water, drainage project should be in line with local conditions to ensure construction quality and life time.

(2) Garbage treatment subproject

①It is proposed that residents' inclination of "NIMBY" should be taken into consideration. The sites of waste collection, transfer, and treatment facilities shall not be either too near or too far from residential areas to avoid high cost of waste transportation. The core principle is to conduct more consultation and communication with residents to ensure their recognition of waste treatment project; ②Technology plays a crucial role in improving the efficiency of waste treatment. Scientific treatment of waste should be conducted in terms of technology either in simple garbage landfill sites or in new garbage treatment plants, to prevent leakage and pollution.

10 **Environmental Management Plan**

Please see the independent Environmental Management Plan (EMP) of the World-Bank-financed Jingan water environment management project for details.

11 Analysis of Economic Cost-Benefit of Environmental Impacts

11.1 Cost Estimate for Environmental Protection

The total investment of the project is 157.7458 million yuan. Estimated environmental protection investment, a total of 1.724 million yuan, is listed in Table 10-1, including expenses for measures, monitoring and training of environmental protection. Environmental investment accounts for 1.1% of the total dynamic investment of the project .

Table 10-1 Estimated Environmental Protection Investment (thousand yuan)

Environmental management cost	Environment monitoring cost		Training expense	The total execution cost of EMP
	During construction	During operation		
1510	74	90	80	1724

11.2 Analysis of Economic Cost-Benefit of Environmental Impacts

11.2.1 Environmental Benefits

This is a water environment management project, of which its main benefits are concerned with environment, including pollutant load reduction, water quality improvement and enhancement of environmental management capability and others.

(1) Pollutant load reduction

When the project is completed in 2023, sewage collected in urban areas will be 9800 m^3/d, sewage collection rate up to 80% and additional 4010 households will be included in the sewage collection system. Separate sewer system will be adopted at newly built urban areas and main streets, while combined sewer system stays will be kept at some parts hard to transform in the old town. Annually, pollutants emitted into Poyang Lake such as TN, TP and CODCr are estimated to reduce by 5.84 t, 0.58 t and 52.56 t respectively. Innocuous treatment rate of domestic garbage will reach over 90%. Littering is banned and waste sorting collection system is implemented step by

step. Waste flowing into Poyang Lake Basin will reduce by 2448.8 t every year.

(2) Water quality improvement

Implementation of this project will achieve both the control in river pollution sources and purification of water quality as well as conservation of water. It reduces a great number of pollutants discharged into Beiliao River. Thus, pollutants will make fewer impacts on local surface water bodies. The goal is to improve water quality of the basin, protect water bodies at the source and greatly improve the environment of Jingan County.

(3) Enhancement of environmental management capacity

Implementation of environmental monitoring and management capacity projects will provide local environmental protection with such powerful technical measures and supervision tools that local environmental protection can achieve sound development and pollution accidents and risks can be prevented in an effective way. Measures can be taken at multiple levels such as management or technique to reduce pollution of regional surface water bodies at the greatest extent and improve regional environment.

(4) To provide favorable environmental conditions for social and economic development in the region.

Implementation of the project has accelerated local infrastructure construction. Infrastructure network has been established and improved, which further eases the imbalance between basin or regional urban development and environmental constraints, improves environmental quality of the basin where the project is located, increases water environment functions, enhances urban functions, and creates corresponding environment for local and provincial social economic development in a rapid and healthy way.

11.3 **Social Benefits**

(1) It improves residents' health and life quality of the people living along the river basin.

This project solves the problem concerning poor environmental infrastructure in

the project area. On one hand, it purifies water bodies. On the other hand, it also eliminates the proliferation environment of disease vectors such as mosquitoes and flies, promoting the protection and improvement of residents' living conditions, decrease in disease incidence rate, public health and further development of life quality.

(2) It creates more employment for residents.

As the project is carried out by phase, it will create employment opportunities. First, during construction, it offers some temporary and dispersing job opportunities. Second, during operation, it will provide some long-term stable jobs, including technical and management staffs who directly participate in the work. Also, the project will better the investment environment to attract capital and accelerate industrial and agricultural development as well as the tertiary industry, which means more job opportunities.

(3) It enhances residents' awareness of environmental protection.

Construction of the project also serves as a profound and vivid opportunity to promote environmental protection. Through specific actions of environmental protection, people can get deeply aware of the significance of environmental protection and serious consequences of environmental damages, including those in economy, health, resources, etc. This move is much more effective and acceptable than mere promotion. In the meantime, it can be built into a pilot base for environmental scientific education that provides environmental protection education for the public in the long term, which facilitates the growth in the overall awareness of environmental protection.

(4) It provide basic data for regional pollution treatment.

Implementation of environmental monitoring and management capacity project will meet growing social demands for environmental monitoring and better support regional economic development. At the same time, it further provides basic data for analysis of pollution sources, scientific basis for integrated treatment decisions of regional pollution, reliable references for accurate evaluation on regional pollution treatment projects, effective tools for the government functional departments' legal

supervision of pollution treatment facilities. It helps strengthen environmental management in the regional basin.

11.4 Economic Profits

This can be referred to as a common welfare project of water environment management with no significant direct profits from investment. Its economic profits are indirect including the following aspects:

(1) Economic profits of pollution control

This is presented by reducing economic losses due to pollutants in sewage as follows:

For industrial enterprises, it helps reduce their additional investment on operation and management of sewage treatment as separated individuals. It eases the burden on enterprises.

For agriculture, husbandry and fishery, water pollution may lead to the quantity and quality decline of crops, livestock products, and aquatic products. Such economic losses will be reduced when the project is completed.

For physical health, water pollution increases people's disease incidence rate and their medical care costs, and decreases the productivity. The project will improve people's living environment and relatively reduce medical costs.

(2) Income growth

City land value will grow as urban infrastructure and environment get better.

11.5 Summary

This project is a part of phased plan that aims for improving environmental conditions of Jingan County and propelling water environment management of Poyang Lake Basin. Engineering and non-engineering construction will make a significant influence on urban infrastructure and ecological environment protection in the region, and even on national economy and social development.

The project facilitates: ① consolidation of regional environmental governance achievements and further improvement of the local environmental quality, ② improvement of local residents' working and living conditions, their life quality and

physical conditions, ③infrastructure construction and market-oriented administration of Jingan County by introducing and Figure upon advanced techniques and management expertise at home and abroad to achieve the positive self-development of urban infrastructure construction, ④ water environmental security construction of Poyang Lake Basin, so that sustainable environmental development maintains such development in economy and society, providing favorable conditions for sustainable strategic development and ecological civilization at Poyang Lake Ecological Economic Zone with better environmental, social and economic benefits.

12 **Conclusions**

Following conclusions can be made on the project environmental impact assessment:

(1) This project will improve the water environment in Liao River Basin, enhance the infrastructure, change the current situation in which household sewage in Jingan County is directly discharged into neighboring surface water bodies without any treatment and properly treat garbage. It will protect the receiving water quality of Beiliao River, improve environmental health conditions in Jingan County to some extent and greatly better residents' living conditions so as to protect the adjacent headwaters, to beautify surrounding environment, to build a more comfortable and beautiful living environment and to enhance residential environment for people.

(2) The project construction conforms to national laws and regulations as well as the urban master plan and environmental protection plan at the project site, which serves as policy and law basis of the project.

(3) This project construction involves some environmental protection targets (sensitive points) such as residential areas, schools and hospitals. In the environmental assessment, unfavorable impacts of the project on such environmental protection targets (sensitive points) can be further reduced and eliminated through mitigation measures, formulation and implementation of environmental management plans and public participation. Also, possible impacts can be controlled in compliance with national environmental laws, regulations and standards.

(4) This project may make some adverse effects on the surrounding environment, including those during construction and operation.

1) During construction, its negative impacts include impact of dust on ambient air quality, impact of construction vehicles and machinery noise on the surrounding environment, impact of the construction sewage, impact of soil erosion brought by collecting and abandoning earth, excavation and fill and temporary piling of earthwork, impact of sewage pipe network construction on traffic, impact of construction on vegetation, etc. .

2) During operation, its negative impacts include impact of flushing waste water, ordor and noise of garbage transfer on the surrounding environment, etc. .

(5) Possible negative impacts of the project can be controlled within the range and level as permitted the national laws, regulations and standards through mitigation measures, formulation and implementation of environmental management plans and public participation.

In conclusion, after adopting the countermeasures proposed in the project such as mitigation measures, implementation of environment management plan and public participation and consultation, the implementation of the project is feasible in terms of environment.

Annex I: Ambient Air Quality Monitoring Report of Jingan Provincial-level Key Ecological Function Zones 20151021

靖 安 县 环 境 监 测 站

监 测 报 告

靖环监字（2015）第 LK05 号

项目名称：靖安县省级重点生态功能区环境空气质量监测

委托单位: 靖安县环境监测站

监测类别： 例 行 监 测

报告日期： 2015 年 11 月 10 日

（ 业 务 专 用 章 ）

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邮政编码：　330600

电　　话：　0795-7191880

1、监测依据

为加强对本县省级生态功能区环境空气质量调查监督，2015 年 10 月 21 日至 10 月 25 日靖安县环境监测站对靖安县环境空气质量进行每两个月一次的例行监测。

2.评价标准

《环境空气质量标准》（GB 3095—1996）一级标准

3、监测内容

监测点位：清湖广场、靖安中学，

监测项目：SO_2、NO_2、PM_{10}，

监测频次：进行一期监测，连续监测 5 天。NO_2、SO_2 监测采用每日连续监测 18 小时；PM_{10} 监测采用每日连续监测 12 小时。

4、分析方法和仪器编号（见表 1）

5、分析结果（见表 2）

6、结论

从表 2 可知，靖安县环境空气质量达到《环境空气质量标准》（GB3095-1996）中一级标准。

表 1 分析方法和仪器编号

监测项目	分 析 方 法	方 法 来 源	仪器名称	站内编号
SO_2	甲醛吸收-盐酸副玫瑰苯胺分光光度法	HJ 482-2009	TH-150C智能大气采样器	JAHJ/YQ-12 JAHJ/YQ-53
NO_2	盐酸萘乙二胺分光光度法	HJ 479-2009	1100D可见分光光度计	JAHJ/YQ-34
PM_{10}	重量法	GB/T 15432-1995	FA 214 电子天平	JAHJ/YQ-01

表 2 监测结果

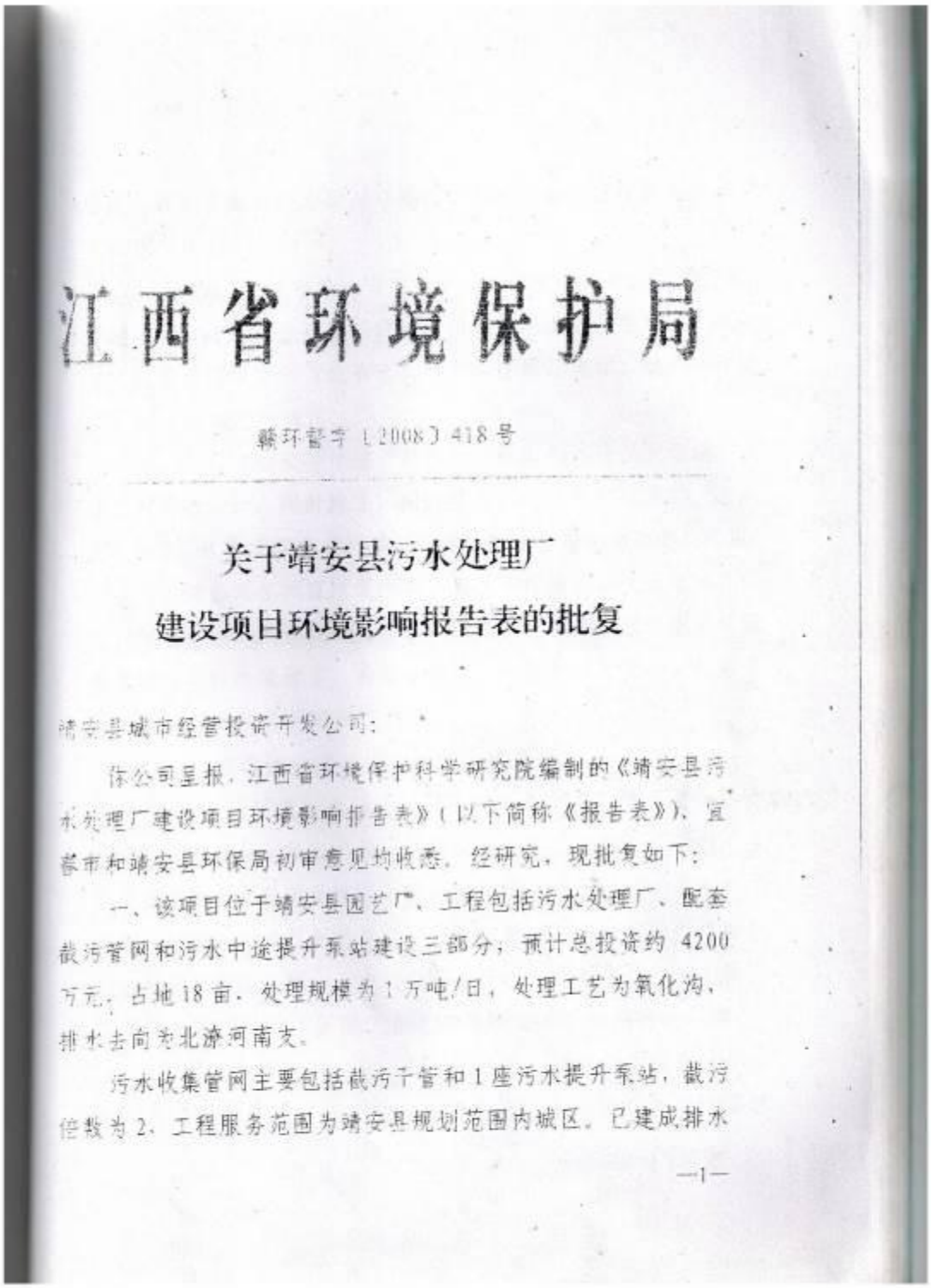
(单位：mg/Nm^3)

序号	监测点位	监测日期	可吸入颗粒物（PM_{10}）日均值	二氧化硫（SO_2）日均值	二氧化氮(NO_2)日均值
1	靖安县清湖广场	2015. 10.21	0.036	0.026	0.016
2	靖安县清湖广场	2015. 10.22	0.037	0.022	0.019
3	靖安县清湖广场	2015. 10.23	0.035	0.023	0.016
4	靖安县清湖广场	2015. 10.24	0.036	0.024	0.013
5	靖安县清湖广场	2015. 10.25	0.040	0.019	0.015
6	靖安中学	2015. 10.21	0.033	0.024	0.015
7	靖安中学	2015. 10.22	0.031	0.026	0.013
8	靖安中学	2015. 10.23	0.035	0.023	0.012
9	靖安中学	2015. 10.24	0.034	0.021	0.012
10	靖安中学	2015. 10.25	0.032	0.021	0.011
一级标准(mg/Nm^3)			0.050	0.050	0.080

报告编写：_____报告审核：_____报告签发：

日　　期：_____日　　期：_____日　　期：

Annex II Official Reply to the Environmental Assessment of Jingan Sewage Treatment Plant (Phase I)



江西省环境保护局

赣环督字〔2008〕418号

关于靖安县污水处理厂
建设项目环境影响报告表的批复

靖安县城市经营投资开发公司：

你公司呈报，江西省环境保护科学研究院编制的《靖安县污水处理厂建设项目环境影响报告表》（以下简称《报告表》），宜春市和靖安县环保局初审意见均收悉。经研究，现批复如下：

一、该项目位于靖安县园艺厂，工程包括污水处理厂、配套截污管网和污水中途提升泵站建设三部分，预计总投资约4200万元，占地18亩，处理规模为1万吨/日，处理工艺为氧化沟，排水去向为北潦河南支。

污水收集管网主要包括截污干管和1座污水提升泵站，截污倍数为2，工程服务范围为靖安县规划范围内城区。已建成排水

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管网区域排水逐步改为雨污分流制，未开工排水管网区域排水采用雨污分流制。

根据《报告表》结论以及宣春市、靖安县环保局的初审意见，该建设项目选址符合靖安县城镇总体规划及土地利用规划，我局原则同意建设项目按《报告表》所列的性质、规模、地点和环境保护对策措施进行建设。

二、工程建设必须依法严格执行“配套的环境保护设施与主体工程同时设计、同时施工、同时投入使用”的环境保护“三同时”制度，认真落实各项污染防治措施，环保投资必须专款专用。

三、你公司在项目建设中要认真落实环评报告表提出的各项污染防治措施，严格执行宣春市、靖安县环保局提出的有关环境质量和污染物排放标准，确保污染物达标排放。工程建设应重点做好以下不同阶段的环保工作：

（一）在设计和建设中落实环保有关要求。

1、优化项目选址选线及厂区平面布置。合理选择截污管网线路，污水提升泵房应尽量远离周围环境敏感目标，厂区内产生恶臭污染物和高噪声设施应尽量远离周边环境敏感点，采取封闭系统、绿化等措施控制恶臭的产生和扩散；当地政府应严格控制污水处理厂周边规划，污水处理厂卫生防护距离（200 米）内不得新建住宅、学校、医院、养老院等环境要求较高的建筑物。

2、落实在线监测装置。与主体工程同步设计和建设污水处理厂进水水质自动在线监控系统及排放口污水水量自动计量装

置，自动比例采样装置和主要水质指标在线监测装置。根据国家和省排污口规范化整治的要求规范合理设置各类排污口，污水在线监测装置应与环保部门联网，接受各级环保部门的实时监控。

3、完善污泥安全处置。妥善考虑污泥去向，严禁污水处理厂污泥随意处置。污泥临时堆场和卫生填埋场的选址建设须满足《生活垃圾填埋污染控制标准》（GB16889-1997）要求，并与污水处理工程同步建设，同步投入使用，确保污泥得到妥善处理，防止产生二次污染。

4、实施施工期环境监理。按照《报告表》的要求，制定并实施施工期环境监理计划，施工招标文件，施工合同和工程监理文件中应明确环保条款和责任，落实施工期污染防治措施，并定期向我局和当地环保局报告。

（二）强化运行期间环境管理。。

1、有条件接纳工业废水。为保证污水设施的正常运行，必须按照《报告表》中提出的接纳工业废水限制措施要求对工业废水进行有条件接纳，禁止含有《污水综合排放标准》（GB8978-1996）表1中第一类污染物的工业废水排入污水管网，严格限制排水量大于2000吨/日的工业废水排入污水管网，严格控制含有重金属，持久性有机污染物，病源体和有毒有害物质的工业废水排入污水管网，各类工业废水预处理达到入水管网要求方能送污水处理厂进行集中处理。

2、防止事故性排放。在污水处理厂事故排放时，尾水排放

口以下将出现较长的超标污染带，因此污水处理厂要加强运营管理，同时建立事故应急预案并报当地环保部门备案，并采取有效措施保证电力供应及处理设施正常运行，建设事故应急池，严禁事故废水排放。

3、强化环境管理，应设立专门环保管理机构，建立健全日常环保管理制度，落实岗位责任，建立污水处理厂运行台帐制度，并定期向当地环保部门汇报污水处理厂的运行情况。

4、加强化学危险品环境风险防范，消毒剂液氯属有毒有害物质，事故泄漏时对环境会产生较严重的危害，氯库及加氯间应设置漏氯检测仪、泄氯报警器，并制定风险防范措施和事故应急预案，防范使用中的环境风险。

5、污水处理厂的污泥应进行稳定化和脱水处理，污泥稳定化应满足《城镇污水处理厂污染物排放标准》(GB18918-2002)"污泥稳定化控制指标"要求，脱水后的污泥含水率应小于 80%，采用卫生填埋方式处置。

6、污水处理厂运行时自身产生的生活污水、构筑物放空或维修时的污水和排放的上清液等均回送至污水处理入口进行处理，不得直接外排。生活垃圾由环卫部门统一收集处理，严禁随意倾倒。

（三）运行期间，外排污染物必须达到以下要求：

1、外排废水必须达到《城镇污水处理厂污染物排放标准》（GB18918-2002）一级 B 标准后方可排入北潦河南支。

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2、应采取封闭系统、绿化等措施控制恶臭的产生和扩散，厂界排放气必须达到《城镇污水处理厂污染物排放标准》（GB18918-2002）二级标准，污水处理厂周围应同期建设绿化隔离带。

3、选用低噪声设备，并对设备采取隔声减震、密闭等措施，降低噪声的影响。工程建成后，污水处理厂和污水提升泵站厂界噪声必须达到《工业企业厂界噪声标准》（GB12523-90）II类标准。

四、项目建成试运行前必须向宜春市环保局书面报告（抄报我局），并经市环保局现场检查并书面同意（抄报我局）后方可投入试运行。项目竣工3个月内必须向我局申请办理竣工环境保护验收手续，验收合格后，项目方能投入正式生产。

五、以上批复仅限于《报告表》确定的建设内容，若建设地点、项目内容、规模、工艺、性质，拟采用的防治污染措施等发生变化或自批准之日起超过5年方开工建设必须重新向我局申请环境影响评价行政许可。

六、你局应在接到本批复后20个工作日内，将批准后的环境影响报告表分别送宜春市环保局和靖安县环保局，并按规定接受各级环境保护行政主管部门的监督检查。请省环境监察局加强对项目实施环境保护“三同时”过程中的环境监察。

二00八年九月十五日

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主题词：环评　污水处理厂　报告表　批复

抄送：省污水处理设施建设领导小组办公室，省发改委、省建设厅，宜春市环保局，靖安县政府，靖安县环保局，污染控制处、政策法规处，规划财务处，省环境监察局，省环境监测中心站，省固体废物管理中心。

江西省环境保护局办公室　　2008年9月15日印发

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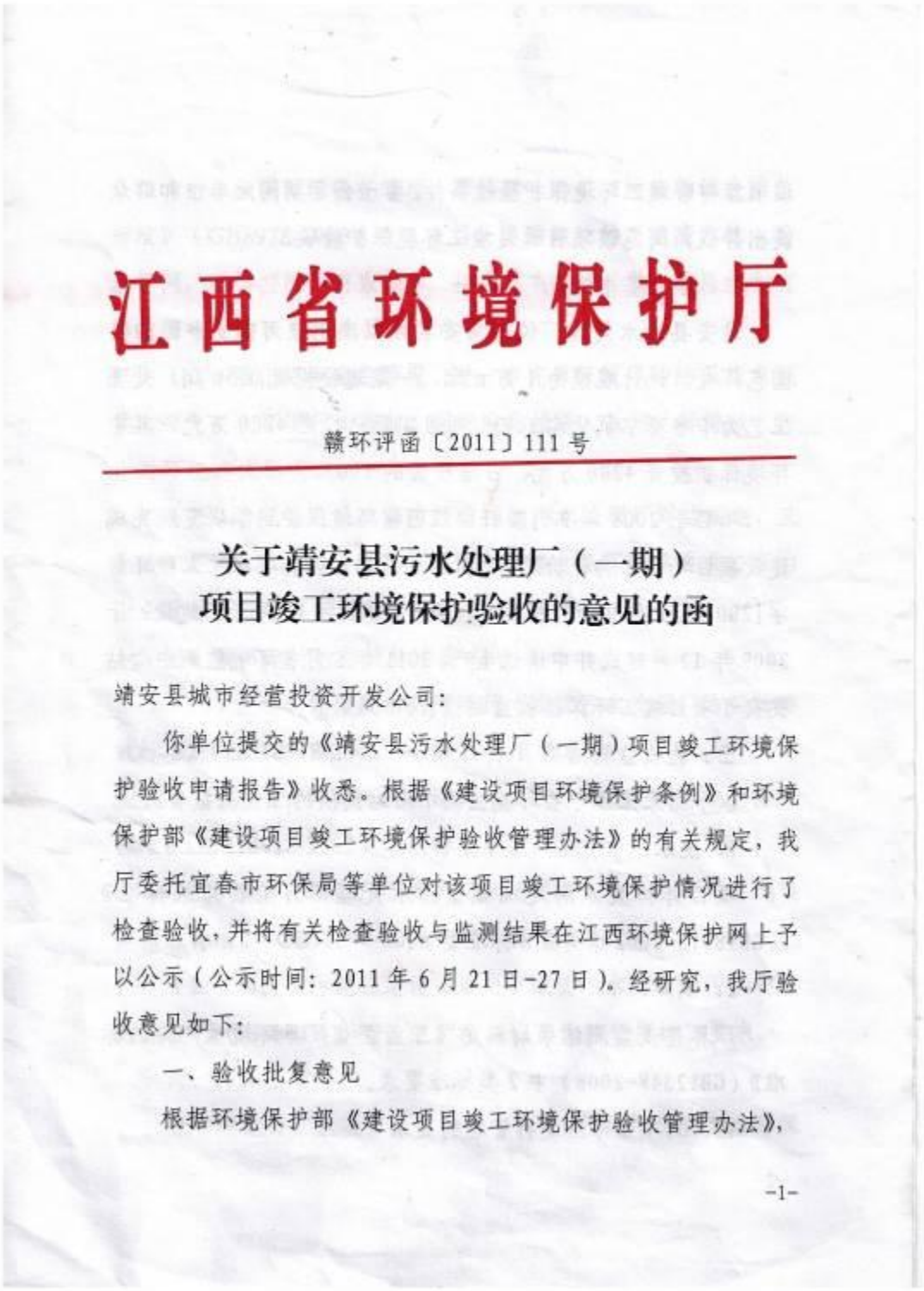
Annex III Official Reply to the Environmental Acceptance of the Environmental Assessment of Jingan Sewage Treatment Plant (Step I of Phase I)



江西省环境保护厅

赣环评函〔2011〕111号

关于靖安县污水处理厂（一期）项目竣工环境保护验收的意见的函

靖安县城市经营投资开发公司：

你单位提交的《靖安县污水处理厂（一期）项目竣工环境保护验收申请报告》收悉。根据《建设项目环境保护条例》和环境保护部《建设项目竣工环境保护验收管理办法》的有关规定，我厅委托宜春市环保局等单位对该项目竣工环境保护情况进行了检查验收，并将有关检查验收与监测结果在江西环境保护网上予以公示（公示时间：2011年6月21日-27日）。经研究，我厅验收意见如下：

一、验收批复意见

根据环境保护部《建设项目竣工环境保护验收管理办法》，

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该项目符合竣工环境保护验收条件，鉴于公示期间无单位和群众提出异议，同意该项目通过竣工环境保护验收。

二、项目基本情况

靖安县污水处理厂位于靖安县城以南北潦河南支下游的县园艺厂处，设计规模为 1 万 m^3/d，一期建设规模 $0.5m^3/d$，处理工艺为卡鲁赛尔氧化沟工艺。项目实际总投资 4280 万元，其中环境保护投资 4280 万元，占总投资的 100%。

项目于 2008 年 9 月委托由江西省环境保护科学研究院完成建设项目环境影响评价工作，同年 9 月原江西省环保局以赣环督字[2008]418 号文予以批复，项目于 2008 年 12 月开工建设，于 2009 年 12 月建成并申请试生产，2011 年 8 月省环境监测中心站提交了项目竣工环保验收监测报告。

三、验收监测结果

以下结果来源于省环境监测中心站提供的《监测报告》。

1、废水

项目外排废水满足《城镇污水处理厂污染物排放标准》（GB18918-2002）一级 B 标准要求。

2、噪声

厂界昼夜监测结果均满足《工业企业厂界环境噪声排放标准》（GB12348-2008）中 2 类标准要求。

四、对项目今后运行管理的要求

（一）加强环境保护管理。严格禁止含有《污染物综合排放标准》（GB8978-1996）表1中第一类污染物的工业废水排入污水管网，严格控制含有重金属、持久性有机污染物、病原体和有毒有害物质的工业废水排入污水管网。

（二）强化环境应急管理。进一步完善环境风险防范应急预案，避免发生环境污染事故。强化应急措施，做到达标排放，防止对环境造成影响。

（三）靖安县人民政府应严格控制污水处理厂周边规划，卫生防护距离（200米）内不得规划和新建食品等环境要求较高的企业及居民住宅等建筑物。

五、项目运行的排放标准要求

（一）废水：外排废水必须满足《城镇污水处理厂污染物排放标准》（GB18918-2002）一级B标准要求。

（二）废气：外排废气应满足《城镇污水处理厂污染物排放标准》（GB18918-2002）二级标准要求。

（三）噪声：项目厂界噪声必须满足《工业企业厂界环境噪声排放标准》（GB12348-2008）中2类标准要求。

（四）固废：污泥稳定化应满足《城镇污水处理厂污染物排放标准》（GB18918-2002）中“污泥稳定化控制指标”要求。

六、环保监管要求

请省环监局加强项目日常运行中的环境监察，请宜春市环保

局监督企业认真落实上述要求，并加强对该项目的日常监督管理，督促企业正常运行环保治理设施，严禁偷排、直排，发现问题必须及时依法处理，并向我厅报告。

二〇一一年九月八日

主题词：环保　公共设施　竣工验收　意见

抄送：省发改委，宜春市环保局，靖安县人民政府及县环保局，厅有关处室，省环境监察局，省环境监测中心站。

江西省环境保护厅办公室　　2011年9月9日印发

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Annex IV Official Reply to the Environmental Acceptance of the Environmental Assessment of Jingan Sewage Treatment Plant (Step II of Phase I)

宜春市环境保护局

宜环评验字〔2015〕113号

关于靖安县污水处理厂一期（第二步）工程项目竣工环境保护验收意见的函

江西洪城水业环保有限公司靖安分公司：

你公司提交的《关于靖安县污水处理厂一期（第二步）工程项目验收申请报告》收悉。根据《建设项目环境保护条例》和环保部《建设项目竣工环境保护验收管理办法》，我局组织靖安县环保局、宜春市环境监察支队等单位于对该项目竣工环境保护情况进行了检查验收，并将检查验收与监测结果在宜春环境保护网上予以了公示，公示以来无单位和群众提出反对意见。经研究，我局验收意见如下：

一、项目基本情况

靖安县污水处理厂位于靖安县城以南北潦河南支下游的县园艺厂处。设计规模为1万吨/天，其中一期（第一步）项目（5000t/d）于2008年12月开工建设，2009年12月建成并投入试生产，通过了省环保厅竣工环保验收。靖安县污水处理厂一期（第二步）项目（5000t/d）于2014年7月开工建设，2014年12月建成，经过试生产运行正常。一期工程第一步、第二步

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均采用卡鲁赛尔氧化沟工艺。

靖安县污水处理厂一期（第二步）工程项目总投资 788 万元，环保投资 788 万元，占总投资的 100%。已建工程包括氧化沟、二沉池、配水排泥井；利用改造一期（第一步）工程消毒池。其他粗格栅池、集水池、细格栅池、沉砂池、污泥浓缩池、污泥脱水池等设施均依托一期（第一步）工程。

2008 年 8 月，靖安县城投公司委托江西省环科院对靖安县污水处理厂一期 1 万吨/日工程编制了环境影响报告表，同年 9 月原江西省环保局以赣环督字【2008】418 号对该报告表予以批复；2011 年 9 月，经靖安县城投公司申请，江西省环保厅对靖安县污水处理厂一期(第一步)5000 吨/日工程进行了验收(赣环评函【2011】111 号)；2014 年 12 月，靖安县污水处理厂一期（第二步）5000 吨/日工程建成后，江西洪城水业环保有限公司向环保部门提出了试生产申请，宜春市环保局以宜环评函字【2014】146 号文同意其试生产。

二、验收监测结果

以下调查监测情况来源于宜春市环境监测站提供的《建设项目竣工环境保护验收监测报告》(2015)第 y063 号。

（一）废气

项目废气主要来自于污水处理厂的恶臭气体。恶臭的主要排放点为格栅、产电池、CN 滤池、污泥贮存池、污泥浓缩池及泥仓等，排放方式为无组织排放，对氧化沟恶臭污染采取了设置卫生防护距离措施，增加恶臭污染源与厂界之间的距离与空间；厂区内和厂区外实行立体绿化，减轻恶臭污染。

监测结果表明，项目无组织排放废气氨、硫化氢监测结果均达

到《恶臭污染物排放标准》(GB14554-93)表 1 中二级标准，达标排放。

（二）废水

项目废水采用集水池+隔油池+预曝池 1+一沉池+氧化池+二沉池+调节预曝池 2+A/O 池+混凝沉淀池+ D 型滤池工艺处理。

公司外排尾水中 pH 值、化学需氧量（COD_{Cr}）、五日生化需氧量（BOD_5）、悬浮物（SS）、阴离子表面活性剂、石油类、动植物油、总氮、氨氮、总磷、色度、粪大肠菌群、总镉、总砷、总汞、总铬、总铅、六价铬达到《城镇污水处理厂污染物排放标准》(GB 18918－2002）一级 B 标准要求，即达标排放。进水水质均符合设计指标要求，污水处理效率除 SS 外，CODcr、总磷、BOD_5、总氮、NH_3-N 均达到设计指标。

（三）噪声

项目主要噪声源为污水泵、鼓风机、污泥泵、提升泵站、脱水机、空压机等机械设备产生。通过选用低噪声设备，采取吸声、减震措施，厂区绿化及围墙隔音等综合治理措施，降低噪声对周边环境的影响。

监测结果表明，项目厂界东、南、西、北的昼间和夜间噪声均达到《工业企业厂界噪声排放标准》(GB12348-2008）中 2 类标准要求。

（四）固体废物

项目产生的固体污泥；产生的污泥经脱水处理后用于绿化或送垃圾填埋场填埋处置。生活垃圾集中收集，交当地环卫部门送垃圾填埋场填埋。

（五）环境风险防范

公司制定了《环境风险应急预案》，在日常生产过程中严格按

规范要求操作运行生产和环保设施，确保生产和环保设施正常稳定运行。

（六）防护距离情况

根据宜春市环境监测站现场检查，该项目卫生防护距离（200米）范围内无居民区等环境敏感点。

三、验收批复意见

该项目基本符合竣工环境保护验收条件，公示期间无单位和群众提出异议，同意该项目通过竣工环境保护验收。

四、对项目今后运行管理的要求

1、加强生产装置的日常运行维护、管理和台账记录，严格执行各项环境管理制度，确保各项污染物长期稳定达标排放。

2、加强对监测仪器及在线监控设施的维护管理，确保其正常运行，对监测数据严重失真的溶解氧监测仪应及时送生产厂家修理。

五、日常环境监管要求

请靖安县环保局负责该项目的日常管理及以上措施落实情况的监督管理，督促企业正常运行环保治理设施，严禁偷排、直排，发现问题必须及时依法处理，并向我局报告。请宜春市环境监察支队负责该项目日常运行中的环境监察。

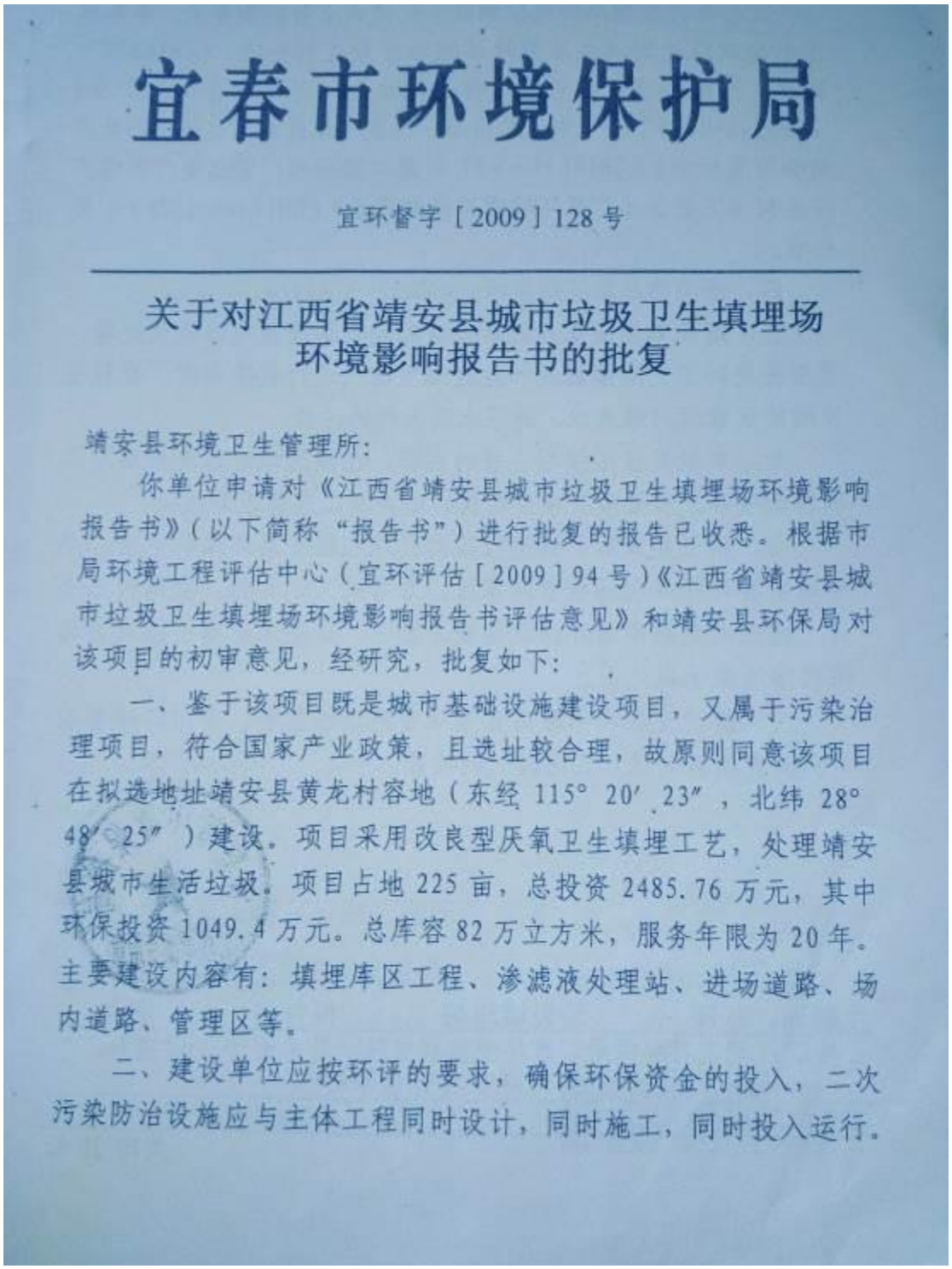
宜春市环境保护局

2015年10月28日

抄送：靖安县环保局，局相关科室，局直属有关单位。

宜春市环境保护局秘书科　　2015年10月28日印发

Annex V: Official Reply to the Environmental Assessment of Jingan Urban Garbage Sanitary Landfill



宜春市环境保护局

宜环督字［2009］128号

关于对江西省靖安县城市垃圾卫生填埋场环境影响报告书的批复

靖安县环境卫生管理所：

你单位申请对《江西省靖安县城市垃圾卫生填埋场环境影响报告书》（以下简称“报告书”）进行批复的报告已收悉。根据市局环境工程评估中心（宜环评估［2009］94号）《江西省靖安县城市垃圾卫生填埋场环境影响报告书评估意见》和靖安县环保局对该项目的初审意见，经研究，批复如下：

一、鉴于该项目既是城市基础设施建设项目，又属于污染治理项目，符合国家产业政策，且选址较合理，故原则同意该项目在拟选地址靖安县黄龙村容地（东经115° 20′ 23″，北纬28° 48′ 25″）建设。项目采用改良型厌氧卫生填埋工艺，处理靖安县城市生活垃圾。项目占地225亩，总投资2485.76万元，其中环保投资1049.4万元。总库容82万立方米，服务年限为20年。主要建设内容有：填埋库区工程、渗滤液处理站、进场道路、场内道路、管理区等。

二、建设单位应按环评的要求，确保环保资金的投入，二次污染防治设施应与主体工程同时设计，同时施工，同时投入运行。

宜春市环境保护局

宜环督字［2009］128号

关于对江西省靖安县城市垃圾卫生填埋场环境影响报告书的批复

靖安县环境卫生管理所：

你单位申请对《江西省靖安县城市垃圾卫生填埋场环境影响报告书》（以下简称“报告书”）进行批复的报告已收悉。根据市局环境工程评估中心（宜环评估［2009］94号）《江西省靖安县城市垃圾卫生填埋场环境影响报告书评估意见》和靖安县环保局对该项目的初审意见，经研究，批复如下：

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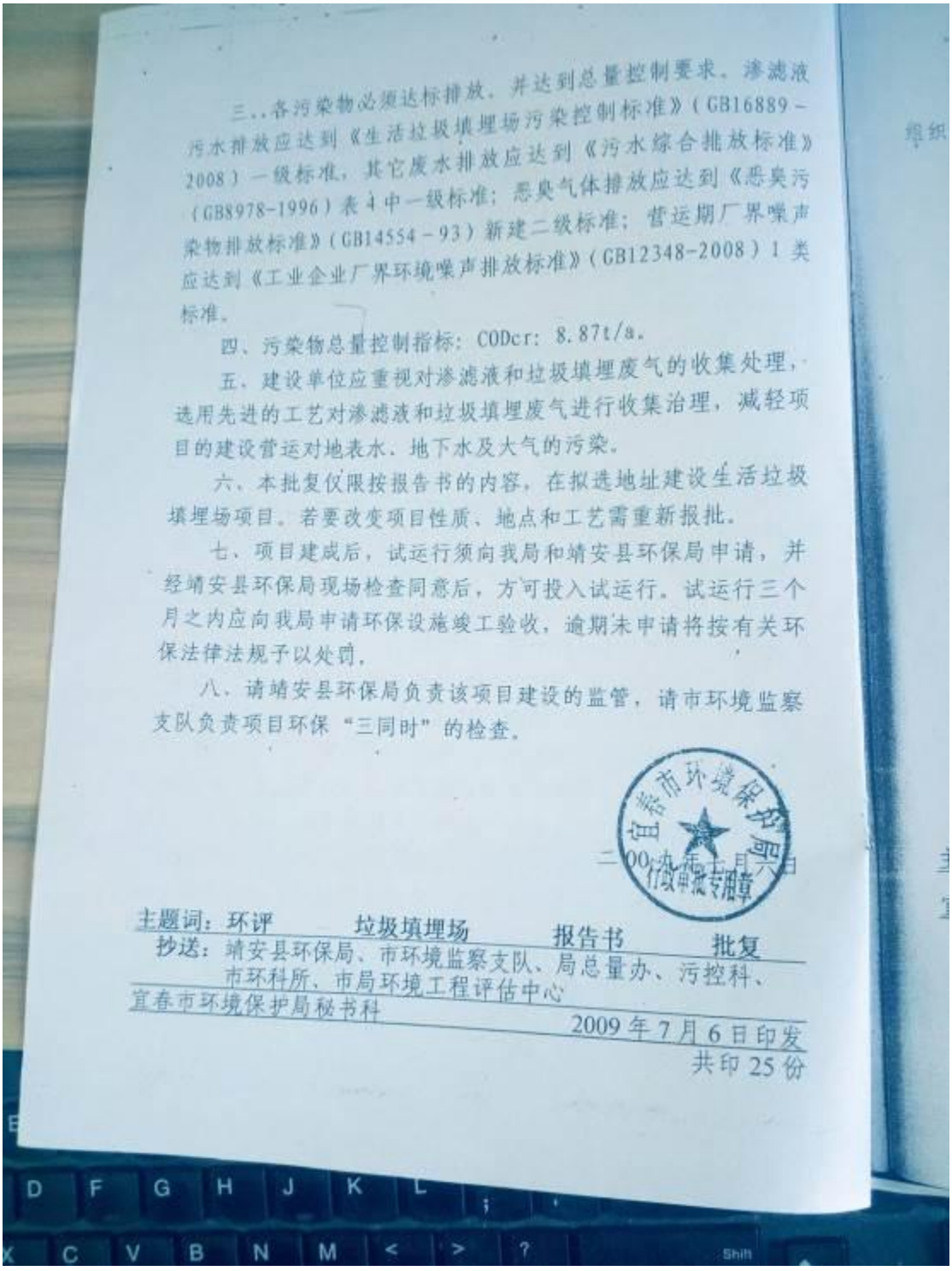


三、各污染物必须达标排放，并达到总量控制要求。渗滤液污水排放应达到《生活垃圾填埋场污染控制标准》（GB16889－2008）一级标准，其它废水排放应达到《污水综合排放标准》（GB8978-1996）表4中一级标准；恶臭气体排放应达到《恶臭污染物排放标准》（GB14554－93）新建二级标准；营运期厂界噪声应达到《工业企业厂界环境噪声排放标准》（GB12348-2008）1类标准。

四、污染物总量控制指标：CODcr：8.87t/a。

五、建设单位应重视对渗滤液和垃圾填埋废气的收集处理，选用先进的工艺对渗滤液和垃圾填埋废气进行收集治理，减轻项目的建设营运对地表水、地下水及大气的污染。

六、本批复仅限按报告书的内容，在拟选地址建设生活垃圾填埋场项目。若要改变项目性质、地点和工艺需重新报批。

七、项目建成后，试运行须向我局和靖安县环保局申请，并经靖安县环保局现场检查同意后，方可投入试运行。试运行三个月之内应向我局申请环保设施竣工验收，逾期未申请将按有关环保法律法规予以处罚。

八、请靖安县环保局负责该项目建设的监管，请市环境监察支队负责项目环保“三同时”的检查。

宜春市环境保护局 行政审批专用章

二00九年七月六日

主题词：环评　垃圾填埋场　报告书　批复

抄送：靖安县环保局、市环境监察支队、局总量办、污控科、市环科所、市局环境工程评估中心

宜春市环境保护局秘书科　2009年7月6日印发

共印25份

Annex VI Relevant Documents for Public Consultation Symposium

(1) Time: 9:30 am, May 9, 2016

(2) Location: Meeting Room, 2/F Jingan County Government building

(3) Content: Public consultation and information disclosure symposium on the environmental assessment of World-Bank-financed Jingan County water environment management project

(4) Presented by: Director Li of Provincial Project Office, Director Tu of Jingan County Project Office, Director Tu of Jingan County Sewage Treatment Plant, Engineer Ling of County Water Plant, Director Huang of County Finance Bureau, Engineer Cao of County Water Authority, Director Wang of County City Administration Bureau, Deputy Governor of Shuangxi Town, Heak of Station Lai of Jingan County Environmental Protection Bureau, Engineer Xiao of the design institute, Zhao Kai and Xiao Yang of the environmental assessment work division and others.

(5) Hosted by: Director Tu (Jingan County Project Office)

(6) Minutes

At the symposium, public consultation was conducted on the completed first draft of Environmental Assessment Report of Jingan Water Environment Management Project. Consensus was reached on mitigation measures for the project environmental impacts after a discussion.Relevant agenda was recorded as follows:

① The host introduced those who presented at the symposium and handed out questionnaires.

②EIA Institute briefed on the purpose of public consultation.

According to national environmental protect laws and regulations as well as the World Bank Policy (OP4.01), two rounds of public consultation and information disclosure were launched concerning the World-Bank-financed Jingan water environment management project during construction and operation. The first round, in the period between environmental question selection and the completion of the project's EIA outline, was mainly to provide the affected mass with project overview and possible environmental impacts. The second round, during the completion of the first draft of EIA report, was to exchange ideas on environmental questions that the mass had shown concern for in the first round and their mitigation measures so as to gain the public understanding of the project construction and mitigation measures adopted.

It was to publicize information of the project for the public in the project area or concerned about the project in order to inform them of main conditions, operation features and major environmental problems of the project, to help assessment staff spot problems and ensure that all the major environmental problems generated by the project are analyzed and evaluated in the EIA report, to confirm feasibility of environmental protection measures and implementation of optimization measures and plans.

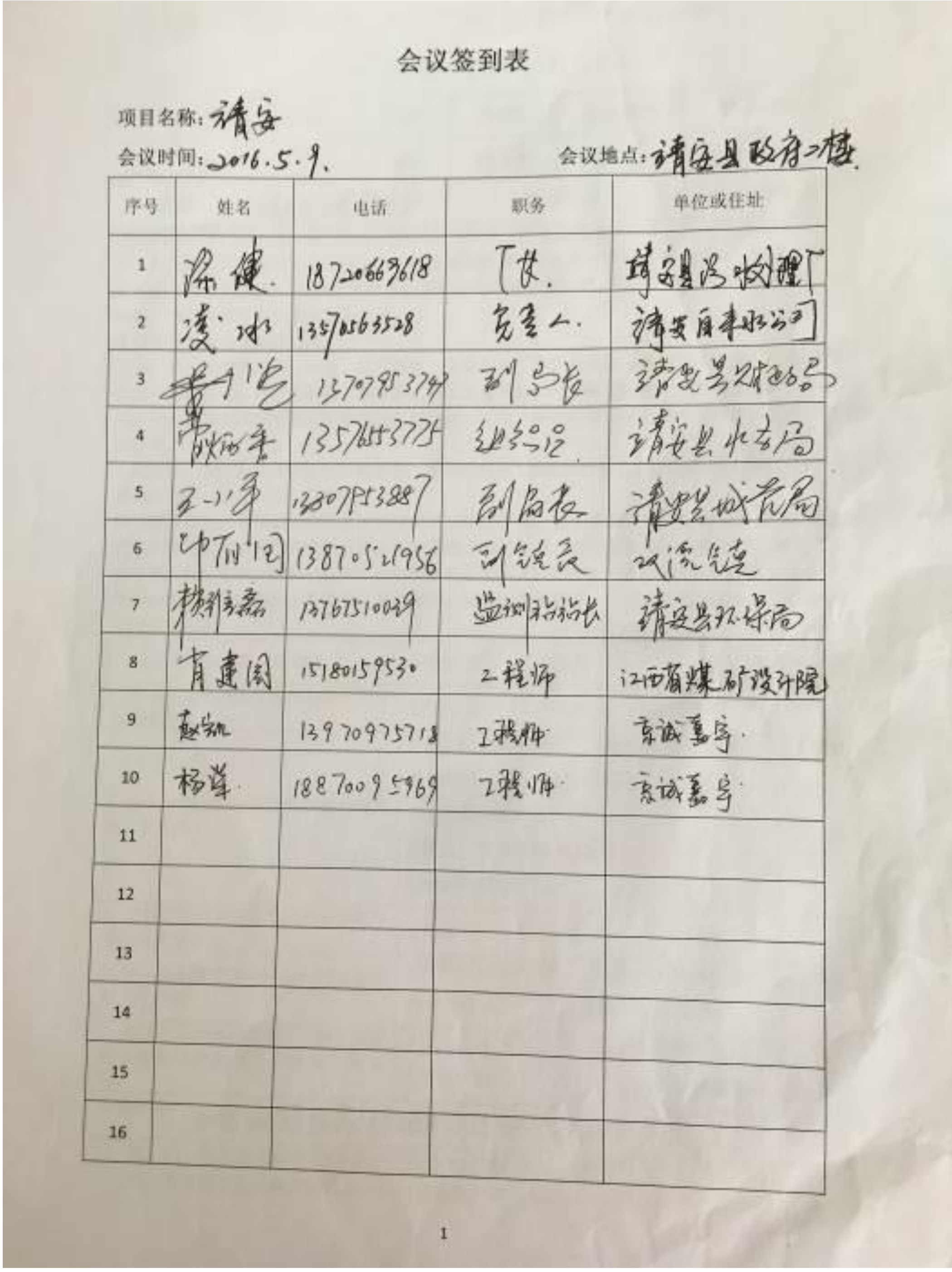
③ EIA Institute presented general conditions, environmental impacts, prevention and treatment measures of the project and the first draft conclusion of its environmental assessment.

The planned project aims to cut pollutants discharged into Beiliao River water bodies by transforming urban pipeline network, transferring garbage and others. The project is related to not only sustainable economic and social development of Jingan County, but also people's drinking water safety. It adopts a mode of "water bodies purification by reducing pollution from the source, controlling in the middle and treating at the terminal" so that pollution of Beiliao River water environment is under control and prevention from the very source. The project is feasible in terms of the environment with measures mentioned in this assessment report such as mitigation measures, environmental management plans and public participation.

④ Representatives at the symposium all supported the project construction and acknowledged all the environmental protection measures proposed by EIA Institute.

④Representatives at the symposium all supported the project construction and The host concluded the symposium. That was the end of the symposium.

Figure 1 Photos of the Symposium at Jingan County



会议签到表

项目名称：靖安

会议时间：2016.5.9.　　会议地点：靖安县政府二楼

序号	姓名	电话	职务	单位或住址
1	孙健	18720663618	工长	靖安县污水处理厂
2	凌冰	13570563528	负责人	靖安自来水公司
3	[illegible]	13707953749	副局长	靖安县[illegible]
4	[illegible]	13576553775	[illegible]	靖安县水务局
5	王小平	13307953887	副局长	靖安县城管局
6	[illegible]	13870521956	副镇长	双溪镇
7	[illegible]	13767510029	监测站站长	靖安县环保局
8	肖建国	15180159530	工程师	江西省煤矿设计院
9	赵凯	13970975718	工程师	京诚嘉宇
10	杨洋	18870095969	工程师	京诚嘉宇
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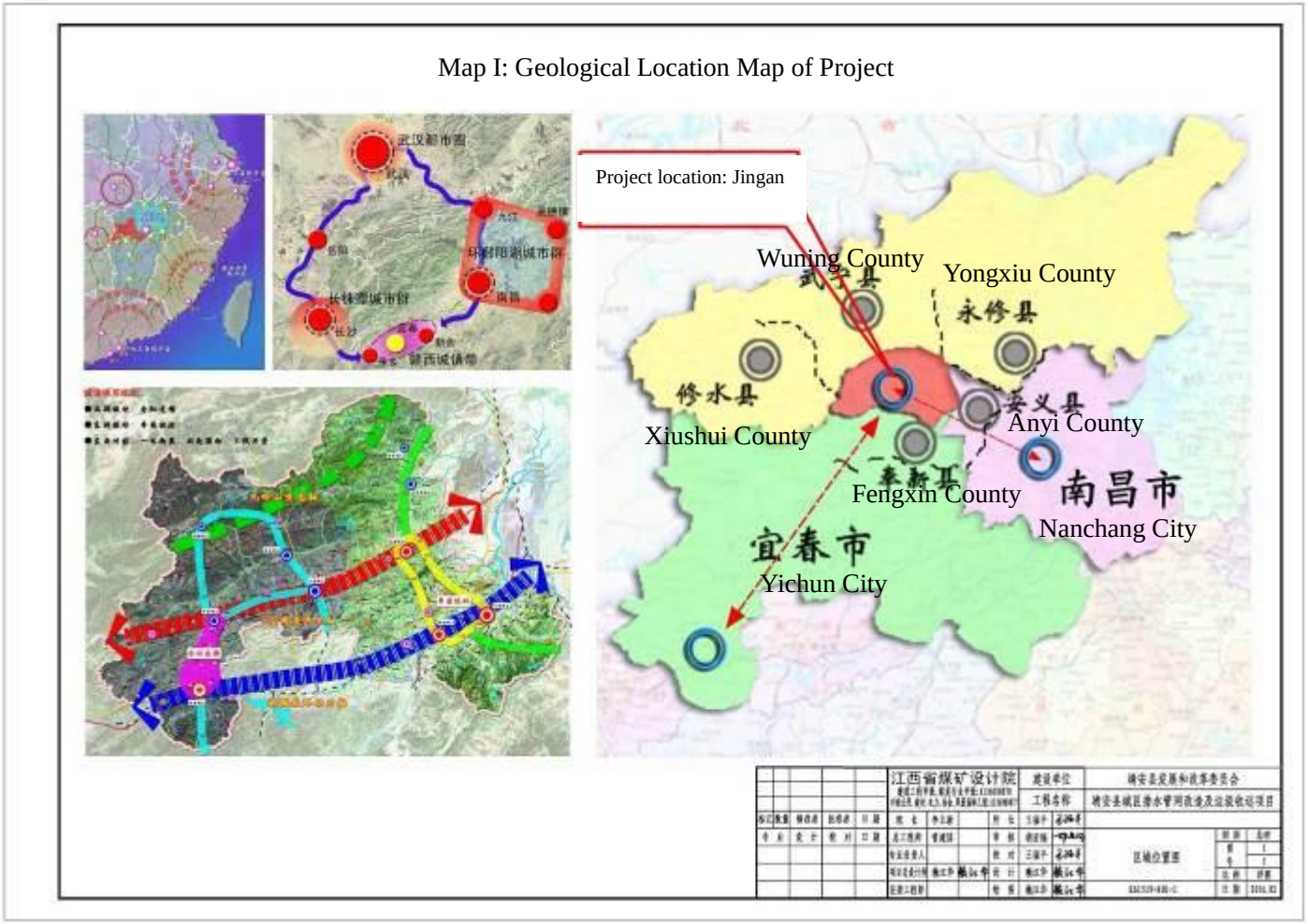
Figure 2 Attendance Sheet of the Symposium at Jingan County

Map I: Geological Location Map of Project



Map II: Jingan Land Utilization Planning Map

North district
Planned area: 3.9km2

East Industrial Park
Planned area: 1.4 km2

South district
Planned area: 3.5km2

Cemented Carbide Base
Planned area: 2.49 km2

Green Lighting Base
Planned area: 2.75 km2

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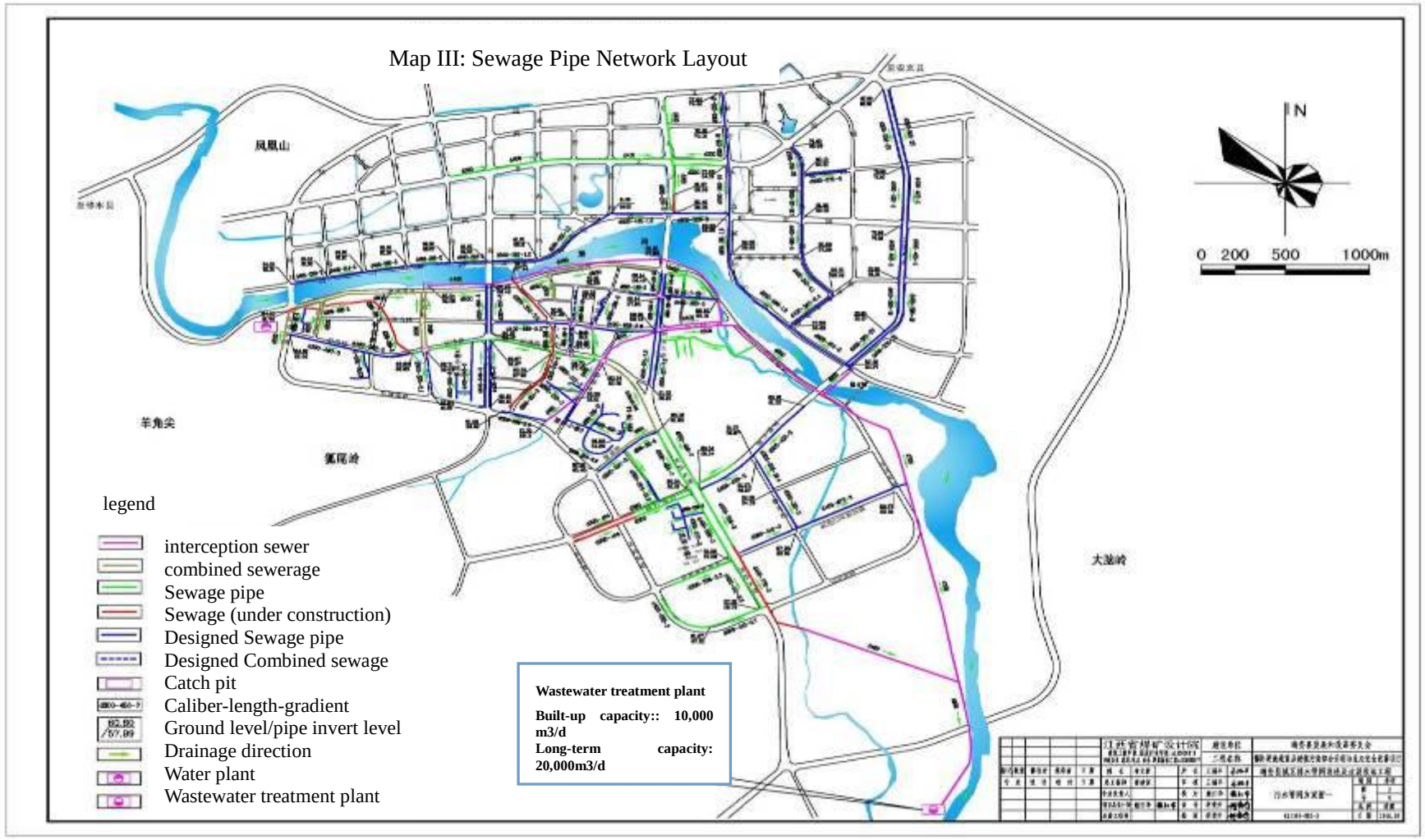
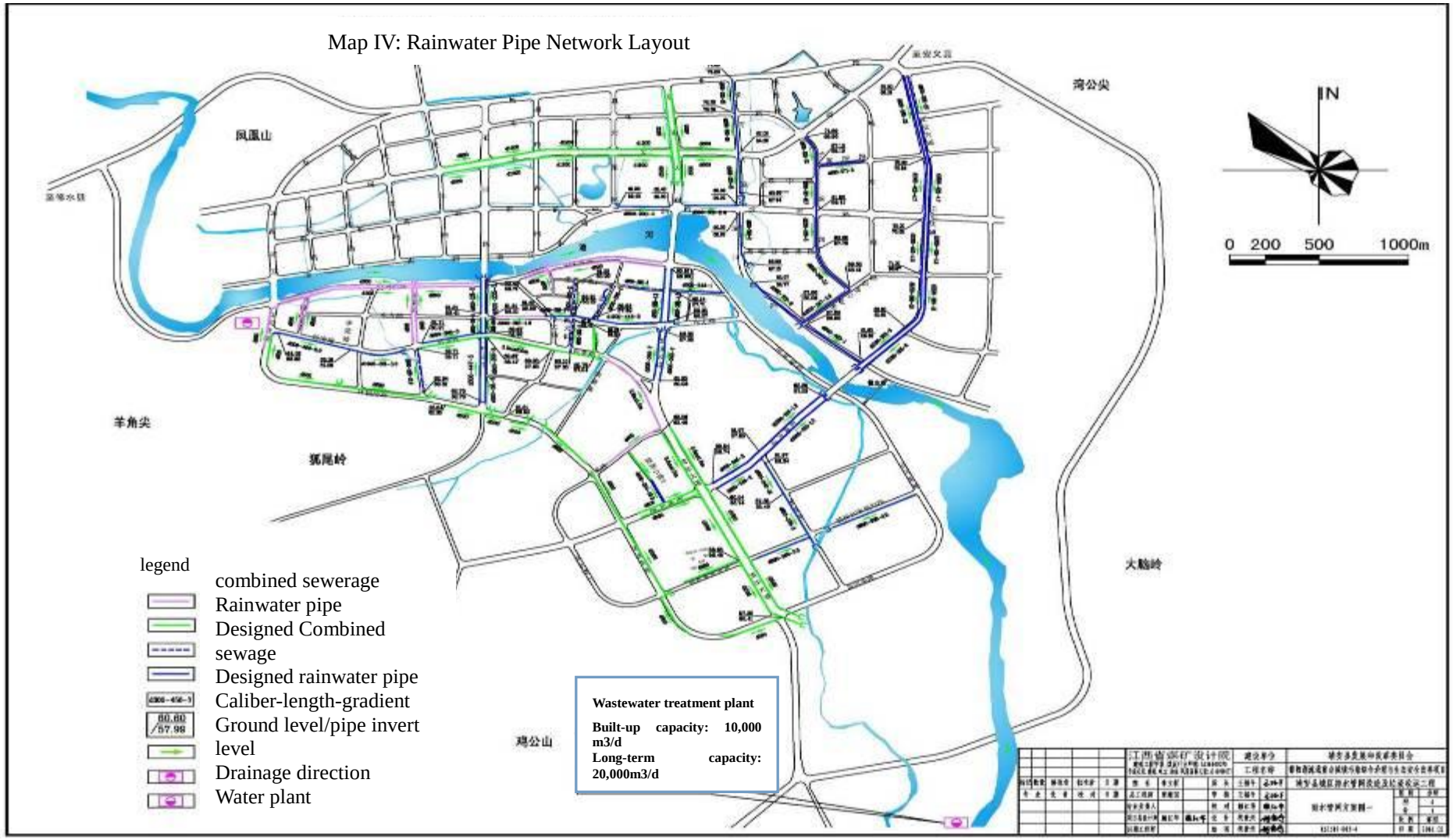
Map III: Sewage Pipe Network Layout



Map IV: Rainwater Pipe Network Layout



Map V: Location Map of Sensitive Spots