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Traffic Integration Demonstration Project of Wuhan City Circle Supported by World Bank Loan- Urban Transport Infrastructure Subproject in Anlu, Xiaogan

Environmental Management Plan

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Contents

Table:

Figures:

1 Preface

The Environmental Management Plan (EMP) is prepared according to Environmental Influence Report for Traffic Integration Demonstration Project of Wuhan City Circle Supported by World Bank Loan-Urban Transport Infrastructure Subproject in Anlu Xiaogan prepared by Hubei Gimbol Environment Technology Co., Ltd. and related environment management system on the Project of Anlu Yunan Asset Management Co., Ltd. In the project evaluation stage, EMP will undergo review and consent of World Bank Loan Project Leading Group in Anlu and be comprehensively implemented in project implementation stage.

Environmental Management Plan aims to put forward measures and methods for eliminating and reducing or mitigating unfavorable environmental impact to reduce negative environmental impact to acceptable level.

To ensure practicable and effective implementation of Environmental Management Plan, expense budget of environmental protection measures are listed in engineering budget in project preparation stage and all environmental mitigation measures will be included in technical specification documents, bidding document and construction contract of engineering procurement. Environmental management training for Project Manager, Implementer, Construction Supervision Organization and Construction Organization is carried out and training expense as well as consultation expense for implementation of EMP will be included to overall project investment estimation. At the same time, Project Employer will employ qualified and experienced EMP External Monitoring Consultant (EMC) to carry out independent external monitoring work and monitor whether the Construction Organization performs environmental protection measures as specified in tendering document and monitor validity and rationality of all environmental protection measures in project preparation stage and put forward optimization suggestions to further enhance environmental management of construction period and application period for the Employer.

1.1 EMP objective

EMP is formulated to work out a set of technically feasible, financial sustainable and operable environment countermeasures with regard to inevitable environment impact in the Project to clarify environment mitigation, environment management,

organization construction measures and arrangement of Project Contractor, Supervisor, Operator and Environment Management Department in project construction and operation period to eliminate or compensate negative impact of the Project on society and environment as much as possible and reduce it to acceptable level. Specific objective includes:

(1) Clarify environmental management obligation of the Contractor and Operator

Environmental Protection Department, Environmental Evaluation Organization and Design Organization will conduct detailed on-site verification and confirmation for environmental protection objective, put forward effective environmental mitigation measures and include them to engineering design as contractual liability of Project Construction Contractor and Operator.

(2) Operation guideline of environmental management

Environmental monitoring plan proposed by EMP in the construction period and operation period can ensure effective implementation of environmental mitigation measures and will be provided for Construction Supervision Organization, Environmental Supervision Organization and other related organizations in construction period and operation period as environmental protection text to clarify responsibility and function of related functional department and management organization and put forward communication channel and mode among all departments.

(3) Expenditure of environmental protection management action

Expenditure of environmental management, environmental monitoring, supervision and capacity construction mentioned in EMP is estimated and expenditure source is described to ensure that all environmental management action can be put into effect.

1.2 EMP design

To describe contents in environmental management, environmental supervision, environmental monitoring in details, formulated EMP is a guiding document for environmental management in project implementation and the action plan mainly includes the following 6 parts:

(1) Environmental impact and mitigation measure: main environmental impact of the Project during construction period and operation period, engineering measures and management measures adopted to prevent or mitigate adverse environmental impact

brought by the Project.

(2) Environmental management system: set up environmental management organization to clarify contents and duties of environmental supervision management and ensure environmental supervision action adopted for synchronous implementation of environmental protection measures and engineering construction.

(3) Environmental monitoring plan: to eliminate environmental pollution in construction period and operation period, ensure safe engineering operation and improvement of environment conditions in the project area, external monitoring is adopted to carry out environmental monitoring action.

(4) Environmental management training plan: skill and expertise training for managers, environment supervisors, full-time or part-time environmental managers and other personnel in project implementation to guarantee implementation of EMP.

(5) Expense and organization arrangement: certain financial support shall be guaranteed and corresponding organization shall implement it to guarantee implementation of EMP.

(6) Public participation plan and complaint channel setup: formulate continuous public participation plan and set up public complaint channel.

2 Environmental Policies and Regulations Documents

2.1 Related laws and regulations

(1) *Environmental Protection Law of the People's Republic of China*, issued on November 26, 1989, revised on April 24, 2014 in the eighth session of the 12th National People's Congress Standing Committee, implemented as from January 1, 2015;

(2) *Law of the People's Republic of China on Environment Impact Assessment*, implemented as from September 1, 2003;

(3) *Law of the People's Republic of China on the Prevention and Control of Atmospheric Pollution*, implemented as from September 1, 2000;

(4) *Water Pollution Prevention Law of the People's Republic of China,* revised on February 28, 2008, implemented as from June 1, 2008;

(5) *Noise Pollution Prevention Law of the People's Republic of China,* implemented as from March 1, 1997;

(6) *Solid Pollution Prevention Law of the People's Republic of China* (Revised in 2003);

(7) *Decisions of the National People's Congress Standing Committee on Revision of Twelve Laws including Law of the People's Republic of China on Protection of Cultural Relics* (No.5 Order of the President of the PRC, adopted and announced on June 29, 2013 at the third session of the 12th National People' Congress Standing Committee, implemented as from the date of announcement);

(8) *Land Administration Law of the People's Republic of China,* implemented as from revision on August 28, 2004;

(9) *Soil and Water Conservation Law of the People's Republic of China,* revised on December 25, 2010, implemented as from March 1, 2011;

(10) *Urban and Rural Planning Law of the People's Republic of China,* implemented as from January 1, 2008;

(11) *Regulations on the Administration of Construction Project Environmental Protection*, promulgated by Decree No. 253 of the State Council of the People's Republic of China, implemented as of November 29, 1998;

(12) *Regulations on the Expropriation of Buildings on the State-owned Land and Relevant Compensation*, No. 590 Decree [2011] issued by the State Council of the People's Republic of China, implemented as of January 21, 2011;

(13) *Decisions of the State Council of the People's Republic of China on Implementing Scientific Viewpoint of Development and Strengthening Environmental Protection*, Document GF [2005] No. 39 issued by the State Council of the People's Republic of China;

(14) *Catalogue for the Classified Administration of Environmental Impact Assessments for Construction Projects*, No. 2 Decree of the Ministry of Environmental Protection of the People's Republic of China, implemented as of October 1, 2008;

(15) *Notice on Strengthening the Supervision and Administration of Environmental Impact Assessments for Urban Construction Projects*, Document Huan Ban [2008] No. 70 issued by the General Office of the Ministry of Environmental Protection of the People's Republic of China on September 18, 2008;

(16) *Notice on Issuance of Ground Traffic Noise Pollution Prevention Policies*, Document HF [2010] No. 7 issued by the Ministry of Environmental Protection of the People's Republic of China on January 11, 2010;

(17) *Instructions on Strengthening Environmental Noise Pollution Prevention and Improving Urban and Rural Acoustic Environment Quality*, Document HF [2010] No. 144 issued by the Ministry of Environmental Protection of the People's Republic of China;

(18) *Notice on Strengthening Administration of Environmental Impact Assessment and Environmental Risks Prevention*, Document HF [2012] No. 77 issued by the Ministry of Environmental Protection of the People's Republic of China;

(19) *Provisional Measure of Public Participating in Environmental Impact Assessment*, Document HF [2006] No. 28 issued by the original State Environmental Protection Administration;

(20) *Measures for the Administration of Environmental Protection of Transport Construction Projects*, No.5 Decree of the Ministry of Transport of the People's Republic of China in 2003;

(21) *Notice on Implementation of Environmental Supervision for Traffic Projects*, Document JHF [2004] No. 314 issued by the Ministry of Transport of the People's Republic of China;

(22) *Notice on Forbidding Spot Mixing Concrete in Urban Area within Limited Period*, Document SGF[2003] No. 341 issued by the Ministry of Commerce, the Ministry of Public Security, the Ministry of Construction and the Ministry of Transport;

(23) *Guiding Catalogue of Industrial Structure Regulation in 2011*, No. 9 Decree of the National Development and Reform Commission of the People's Republic of China;

(24) *Decisions of the National Development and Reform Commission of the People's Republic of China on Revision of Relevant Articles in Guiding Catalogue of Industrial Structure Regulation in 2011,* No. 21 Decree of the National Development and Reform Commission of the People's Republic of China in 2013;

(25) *Regulations on Administration of Urban House Removal*, No. 305 Decree of the State Council of the People's Republic of China, implemented as of November 1, 2001;

2.2 Technical specifications and standards

(1) *Guideline for Environment Impact Assessment Technique – General Program,* HJ/T2.1-2011;

(2) *Guideline for Environment Impact Assessment Technique – Atmospheric Environment,* HJ/T2.2-2008;

(3) *Guideline for Environment Impact Assessment Technique – Surface Water Environment,* HJ/T2.3-93;

(4) *Guideline for Environment Impact Assessment Technique – Acoustic Environment,* HJ/T2.4-2009;

(5) *Guideline for Environment Impact Assessment Technique – Ecological Impact,* HJ19-2011;

(6) *Guideline for Environment Impact Assessment Technique – Underground Water Environment,* HJ 610-2011;

(7) *Guideline for Environment Impact Assessment Technique –Environmental Risk,* HJ/T169-2004;

(8) *Specifications for Environmental Impact Assessment on Road Construction Project*, (JTG B03-2006);

(9) *Design Specifications of Highway Environmental Protection* (JTG B04-2010);

(10) *Temporary Methods of Public Consultation for EIA* HF 2006 [No. 28], former State Environmental Protection Administration;

(11) *Specification for Comprehensive Control of Water and Soil Conservation* (GB/T16453.1-16453.6-1996), Ministry of Water Resources;

(12) *Environmental Quality Standards for Surface Water*, (GB3838-2002);

(13) *Quality Standard for Ground Water*, (GB/T14848-93);

(14) *Ambient Air Quality Standards*, (GB3095-2012);

(15) *Environmental Quality Standard for Noise*, (GB3096-2008);

(16) *Integrated Wastewater Discharge Standard*, (GB8978-1996);

(17) *Standards for Irrigation Water Quality*, (GB5048-2005);

(18) *Integrated Emission Standard of Air Pollutants*, (GB16297-1996);

(19) *Emission Standard of Environment Noise for Boundary of Construction Site*, (GB12523-2011).

2.3Safety guarantee policies of the World Bank

Policy conditions involved in the Project are as follows according to project construction nature, engineering layout and on-site survey:

(1) OP4.01 environmental evaluation (applicable): proposed Anlu traffic construction project shall conduct environmental evaluation according to requirements of the World Bank and requirements of the country for the construction project to ensure that these projects are normal in environment and has sustainability to contribute to decision making.

(2) OP4.12 BP 4.12 involuntary resettlement (applicable): the proposed project involves house demolition and resettlement of inhabitant. As required by the World Bank, the Project Organization has entrusted Hohai University to prepare Social Impact Evaluation Report and Resettlement Plan.

(3) BP17.50 information distribution (applicable): all projects granted by the World Bank shall carry out public consultation to make the consultation between the borrower and group affected by the Project and non-government organization obtain effect and related materials shall be provided promptly before public participation.

Environment document in English shall be publicized in the country and published on the information website Infoshop of the World Bank.

(4) OP 4.04 natural habitat and OP 4.10 minority policy (NA): the Project does not trigger the two policies through on-site survey.

(5) OP4.11 material culture resources (applicable): the Project affects two graves, and the private grave owners are common residents, so they are not historical relics and material culture resources without cultural and archaeological significance. Specific resettlement measures are shown in Resettlement Plan.

2.4 Related technical documents

(1) Traffic Integration Demonstration Project of Wuhan City Circle Supported by World Bank Loan – Letter of Authorization for Environmental Impact Assessment of Urban Transport Infrastructure Subproject in Anlu Xiaogan (Anlu Yunan Asset Management Co., Ltd.);

(2) *Feasibility Study Report of Urban Transport Infrastructure Subproject in Anlu Xiaogan* (Wuhan Municipal Engineering Design & Research Institute Co., Ltd. in December 2014);

(3) *Traffic Integration Demonstration Project of Wuhan City Circle Supported by World Bank Loan - Environmental Impact Report on Urban Transport Infrastructure Subproject in Anlu Xiaogan* (Hubei Anlu Supervision and Management Station of Water and Soil Conservation, in February 2015);

(4) *Traffic Integration Demonstration Project of Wuhan City Circle Supported by World Bank Loan - Inhabitant Resettlement Plan of Urban Transport Infrastructure Subproject in Anlu Xiaogan (first draft)* (Wuhan University Engineering Research Center of Immigrant, dated in December 2014)

2.5 Applicable standards

The evaluation standard of the Project is determined according to initial investigation of environment conditions in the place where the proposed project is located and main passing areas, and engineering construction scale, characteristics and main environment function division requirements within the scope of evaluation, *Environmental Quality Standard for Noise,* (GB3096-2008), *Technical Specifications to Determinate the Suitable Areas for Environmental Noise of Urban Area*

(GB/T15190-2014) and Anlu Environmental Protection Bureau's *A Letter on Implementation Standard of Environment Influence of Traffic Integration Demonstration Project of Wuhan City Circle Supported by World Bank Loan – Urban Transport Infrastructure Subproject in Anlu Xiaogan by Municipal Environmental Protection Bureau*.

2.5.1 Environmental quality standard

Ambient air quality standard in the place where the Project is located is subject to the secondary standard in GB3095-2012 *Ambient Air Quality Standards.* See Table 2.5-1 for details.

Table 2.5-1 Extract of Ambient Air Quality Standards

Standard name	Category	Standard limit	
		Parameter name	Concentration limit
GB3095-2012 *Ambient Air Quality Standards*	Secondary standard	Sulfur dioxide (SO_2)	Annual average 60μg /m^3
			Average in twenty-four hours 150μg/m^3
			Average in one hour 500μg/m^3
		Nitrogen dioxide (NO_2)	Annual average 40μg /m^3
			Average in twenty-four hours 80μg/m^3
			Average in one hour 200μg/m^3
		Particulate matter (PM_{10})	Annual average 70μg /m^3
			Average in twenty-four hours 150μg/m^3
		Carbon monoxide	Average in

		(CO)	twenty-four hours 4mg/m^3
			Average in one hour 10mg/m^3

The main surface water in the project area is Fuhe River, and also includes Mao River, Qili River. The upstream of Fuhe through Jiefangshan Mountain of Anlu is subject to category II water area standard of *Environmental Quality Standards for Surface Water*, (GB3838-2002), and the downstream through Jiefangshan Mountain is subject to category III water area standard of *Environmental Quality Standards for Surface Water*, (GB3838-2002). The water quality of Mao River, Qili River, etc. refers to category III water area standard of *Environmental Quality Standards for Surface Water*, (GB3838-2002). See Table 2.5-2 for details.

Table 2.5-2 List of Environmental Quality Standards for Surface Water Unit: mg/L (pH dimensionless)

Water name	Executive standard	pH	Dissolved oxygen	SS	Permanganate index	BOD	NH_3-N	Total phosphorus	Petroleum
Upstream of Fuhe through Jiefangshan Mountain	GB3838-2002 category II	6-9	≥6	/	≤4	≤3	≤0.5	≤0.1	≤0.05
Downstream of Fuhe through Jiefangshan Mountain, Mao River,	GB3838-2002 category III	6-9	≥5	/	≤6	≤4	≤1.0	≤0.2	≤0.05

Qili River									

The related areas affected by noise of the Project is subject to corresponding noise standard in *Environmental Quality Standard for Noise* (GB3096-2008), and the purpose of the standard is to control noise pollution and guarantee acoustic environment quality of residents' normal life, work and study which conform to relevant requirements *General EHS Guidelines*. See Table 2.5-3 for details of *Environmental Quality Standard for Noise* (GB3096-2008).

Table 2.5-3 Environmental Quality Standard for Noise

Area category	Daytime	Nighttime	Application scope
Category 4a	70 dB(A)	55 dB(A)	Certain scope at both sides of urban arterial traffic
Category 3	65 dB(A)	55 dB(A)	Industrial concentration area in the evaluation scope
Category 2	60 dB(A)	50 dB(A)	Areas with combined commerce and technician, or commerce, residence and industry which require residential quietness
Category 1	55 dB(A)	45 dB(A)	Areas with concentrated residence, medical health, cultural education, administrative office, etc. which require quietness
Category 0	50 dB(A)	40 dB(A)	Areas in particular need of quietness such as convalescence area

2.5.2 Polluant emission standard

The emission of air pollutant such as dust during construction period of the Project is subject to secondary standard in Table 2 of *Integrated Emission Standard of Air Pollutants* (GB16297-1996). See Table 2.5-4 for details.

Table 2.5-4 *Integrated Emission Standard of Air Pollutants* (GB16297-1996)

Polluant	Maximum permissible	Limit point of fugitive

	emission standard (mg/m^3)	emission monitoring concentration (mg/m^3)
Particulate matter	120	The highest concentration point 1.0 outside the perimeter
Asphalt fume	40 (smelting, dip-coating)	Production equipment shall be free from evident emission
	75 (building mix)	/

Exhaust gas during operation of the Project mainly comes from canteen cooking fume, automobile exhaust generated by public transit hub and passenger transportation center among which the automobile exhaust emission is subject to fugitive emission concentration limit in Table 2 of GB16297-1996 *Integrated Emission Standard of Air Pollutants* and the canteen cooking fume is subject to "small-scale" standard limit of GB18483-2001 *Emission Standard of Cooking Fume (trial implementation)*. See Table 2.5-5 for exhaust gas emission standard during use period of the Project.

Table 2.5-5 Exhaust Gas Emission Standard During Use Period of the Project

Source of exhaust gas	Standard source	Polluant	Standard value
Automobile exhaust	Table 2 in GB16297-1996	NO_2	Fugitive monitoring point 0.12mg/m^3
		Non-methane hydrocarbon	Fugitive monitoring point 4.0mg/m^3
Canteen cooking fume	GB18483-2001	Cooking fume	2.0mg/m3
			Treatment efficiency: small-scale≥60%; medium-scale≥75%; large-scale≥85%

During construction of the Project, waste water to be discharged into urban sewage treatment plant (sewage treatment plant in Nanchengyanglin village) is subject to three-grade standard of *Integrated Wastewater Discharge Standard* (GB8978-1996); waste water to be discharged to water is subject to primary standard of *Integrated*

Wastewater Discharge Standard (GB8978-1996). During operation of the Project, waste water (domestic sewage, canteen waste water, car washing wastewater for public transit hub and passenger transportation center) is treated in urban sewage treatment plant, and the discharge is subject to three-grade standard of *Integrated Wastewater Discharge Standard* (GB8978-1996). See Table 1-5-6 for discharge emission standard of water pollutant of the Project.

Table 1-5-6 *Integrated Wastewater Discharge Standard* (GB8978-1996) Unit: mg/L

No.	Polluant	Three-grade (discharged to urban sewage treatment plant)	Primary (discharged to surface water)
1	COD	≤500	≤100
2	BOD_5	≤300	≤20
3	SS	≤400	≤70
4	Petroleum	≤100	≤5
5	Ammonia nitrogen	≤45*	≤15

***NH_3-N refers to grade B standard of CJ343-2010 *Wastewater Quality Standards for Discharge to Municipal Sewer*.**

The noise during construction period of the Project is subject to *Emission Standard of Environment Noise for Boundary of Construction Site* (GB12523-2011). See Table 1-5-7 for details.

Table 1-5-7 *Emission Standard of Environment Noise for Boundary of Construction Site* (GB12523-2011)

Period	Daytime	Nighttime
Boundary of Construction Site	70	55

3 Project Overview

3.1Project overview

The Project includes five subprojects according to the feasibility report: improvement project of integrated traffic corridor and road network, supporting facility project of public transport system, road safety project, slow traffic system improvement and institution building and technical assistance. The related construction contents are as follows:

The integrated traffic corridor project includes 4.49km expanded road, 20.36km reconstructed road and 4.29km new road and the specific construction contents are shown in Table 3.1.-1;

Table 3.1-1 – Overview of Improvement Project of Integrated Traffic Corridor and Road Network

No.	Road name	Starting point	Ending point	Design speed (km/h)	Road grade	Length (km)	Width of red line (m)	Engineering content
1	Taibai Road	Yinxing Avenue	Jiangxia Avenue	50	Urban arterial road	4.49	60	Reconstruction within the red line without land expropriation, and the reconstruction content: reconstruction engineering being traffic safety facilities on the construction road
2	Biyun Road	Binhe Avenue	New G316	40	Urban sub-arterial road	6.13	24~52	Reconstruction within the red line without land expropriation, and the reconstruction contents: laying of asphalt according to different road sections and

								pavements, addition of guardrail, perfection of drainage, greening, road traffic safety facilities, etc.
3	Jiefang Avenue	Binhe Avenue	Jinqiu Avenue	50	Urban arterial road	3.34	43~53	Reconstruction within the red line without land expropriation, and the reconstruction contents: laying of asphalt on part of road sections and pavements, addition of guardrail, perfection of drainage, greening, road traffic safety facilities, etc.
4	Jinqiu Avenue	Yinxing Avenue	Biyun Road	40	Urban sub-arterial road	4.46	60	Reconstruction within the red line without land expropriation, and the reconstruction contents: laying of asphalt on traffic lane, perfection of public transportation and slow-traffic system and other supporting facilities.
5	Yinxing Avenue	Fucheng Avenue	New G316	50	Urban arterial road	4.49	40	Reconstruction within the red line without land expropriati

								on, and the reconstruction contents: expansion on the current section width according to 40m red line to reconstruct highway into secondary road
6	Zhanqian Road	Anlu-Beijing line (Extended line of Jiefang Avenue)	Connecting line of the Third Bridge (Hengyi Road)	40	Urban sub-arterial road	2.10	40	Newly-built road connecting to intercity railway Anluxi Railway Station with a total length of 2.10 km and width of red line being 40m
7	Fucheng Avenue	Yinxing Avenue	Jiefang Avenue	40	Urban sub-arterial road	2.19	40	Newly-built road with a total length of 2.19 km and width of red line being 40m

The supporting facility project of public transport system includes 3 public transport hubs, 1 small public transport hub, 2 public transport hubs+ highway passenger terminals, e-card system for public transport, intelligent public transport system and purchase of a batch of buses and the specific construction contents are shown in Table 3.1-2;

Table 3.1-2 Basic Information of Supporting Facility Project of Public Transport System

Name	Total covering area (m^2)	Construction contents
Public transport transfer hub at passenger terminal	7,490	Reconstruction and expansion within the red line without the need of added land, 40 parking stalls for bus; parking lot for non-motor vehicles including 200 parking stalls; set up a 2-level supporting house for bus and a one-level bus repair shop; provide 10 motor vehicles and 21 non-motor vehicles to support construction.
Small public transport hub for arrival and dispatch at railway station	2,030	Reconstruction and expansion within the red line without the need of added land, set up 6 parking stalls for bus, platforms, a 1-level bus dispatch house and a 2-line waiting area.
Public transport transfer hub at short-distance bus	10,600	Reconstruction and expansion within the red line without the need of added land, set up 50 (9m) + 22 (6m) parking stalls for bus; transform the 2-level ticket office into

station		supporting house for bus (including bus dispatch center) and provide 5 motor vehicles and 10 non-motor vehicles to support construction; set up a 1-level bus repair shop; set up an underground public parking lot including 100 parking stalls.
Public transport transfer hub at long-distance bus station	7,280	Reconstruction and expansion within the red line without the need of added land, set up 30 (9m) + 20 (6m) parking stalls for bus; set up 2 1-level bus repair shops; transform the 2-level ticket office into supporting house for bus and provide 20 motor vehicles and 10 non-motor vehicles to support construction.
Qiliqiao Highway Passenger Terminal+ public transport transfer hub	16,410	The expropriated land area for reconstruction being 16410 m^2, highway passenger terminal: covering area of 9,130m^2, 64 parking stalls for bus, a new 3-level passenger terminal with total area of 6,480m^2, including supporting house for bus of 750m^2; Public transport transfer hub: cover an area of 7,280m^2, set up 54 (9m) + 22 (6m) parking stalls for bus, set up 2 2-level bus repair shops with area of 180m^2 and construct a new 3-level passenger terminal containing supporting house for bus.
Highway passenger terminal at high-speed rail station+ public transport transfer hub	5,000	The expropriated land area for reconstruction being 5000 m^2, and design in accordance with grade 3 station of highway passenger terminal and public transport transfer hub.

Road safety project includes equipment and system construction of command center, self-adaptive traffic signal control system, video monitoring system for traffic, electronic police system and traffic safety publicity and education;

Slow traffic system improvement project is to improve the slow traffic facilities of existing branches and public roads in old downtown. The construction contents mainly include reconstruction of special roads for slow traffic in old downtown, improvement of slow traffic sign and marking system, construction of non-motor vehicle parking facility and improvement of railway passage for slow traffic.

Institution building and technical assistance include institution operation, research on traffic strategy of Anlu, research on Anlu annual optimization and reorganization of bus routes, research on traffic characteristics of non-motor vehicles in Anlu, research on public bike system in Anlu and consultation service, investigation and training of World Bank project and technical management.

See relevant contents of *Environment Impact Assessment Report* in Chapter II for specific construction contents and scale.

3.2 Construction organization

(1) Waste slag yard

Waste slag of 933,800m^3 was produced from road surface excavation of integrated traffic corridor and road network improvement works based on water conservation, stacked temporarily after excavation (within boundary line of roads), and may be used for

backfilling of subgrade broken stone hardcore after treatment, with permanent waste slag output being 249,600m³.

(2) Construction, production and living areas

Construction technology used in the project is simple, commercial concrete purchased will be used as bituminous concrete necessary for the works in urban center, and construction site such as separate mixing station will not be arranged in the works.

For line and depot in the town in the works, constructors may rent houses owned by citizens instead of setting up living camp separately; for line without such houses to rent nearby, the constructors may set up color bond temporary living house around the line.

Material storage and mechanical temporary storage during construction may be directly arranged within the boundary line of land acquisition, with area available to meet arrangement requirements of the construction site.

(3) Construction road

Semi-closed construction is adopted in the project, which basically has no influence on urban traffic, and existing urban road may be used for construction, without the necessity to build construction road.

4. Environmental Impact of the Project

4.1 Goal of environmental protection

4.4.1 Protection goal of ecological environment

Investigation results show that there are no natural protection area, landscape and famous scenery, forest park, cultural relic protection unit, basic farmland preservation area and other ecological sensitive goal within the area of evaluation scope of the Project.

4.1.2 Protection goals of acoustic environment and ambient air

Protection goals of acoustic environment and ambient air of roads of the Project are shown in Table 4.1-1 to Table 4.1-7; projection goals of acoustic environment and ambient air of stations are shown in Table 4.1-8.

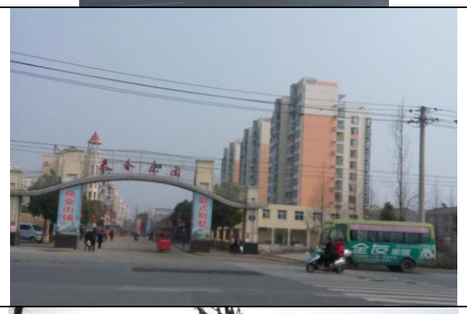
4.1.3 Protection goal for water environment

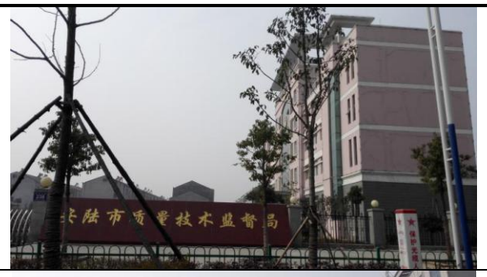
Rain sewage is discharged into Fuhe River; quality objective for upper reaches of Jiefang Mountain in Anlu section of Fuhe River is based on class-II water area standard *Environmental Quality Standard for Surface Water* (GB3838-2002), and quality objective for lower reaches is based on class-III water area standard *Environmental Quality Standard for Surface Water* (GB3838-2002).

Bridges for the project mainly cross Huguo River, Mao River River, Chashan River and Qili River, of which the quality objective is based on class-III water area standard *Environmental Quality Standard for Surface Water* (GB3838-2002).

Fuhe River is the water source for Anlu City and there is an intake for drinking water source within the drainage basin in Anlu City. The bridge section (Fuhe River Dam Bridge) in Jiefang Avenue is located at about 850m of lower reaches of this intake, not within the secondary protection area in drinking water sources.

Table 4.1-1 Distribution of Atmospheric and Acoustic Environment Protection Goal on Both Sides along Taibai Road

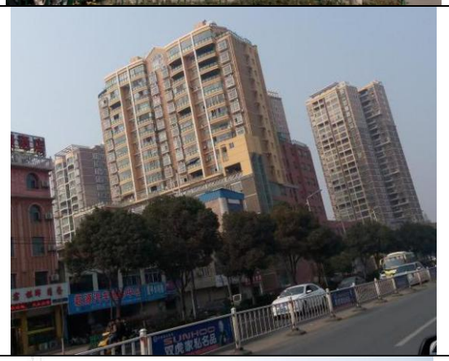
No.	Name	Position opposite to road	Distance to road (m)		First-row buildings in planning road	Classification of sensitive point	Realistic picture	Environment protection goal	
			Distance to center line	Distance to red line				Atmospheric environment	Acoustic environment
1	Taihe Village	East side	30	0	F24, opposite to road	Residence		Class 2	Class 2/4a
2	Taihe Paradise	East side	45	15	F11, broadside facing road	Residence		Class 2	Class 2/4a
3	Yuantong Community	West side	110	80	F2/4, broadside facing road	Residence		Class 2	Class 2
4	Jintai Community	East side	60	30	F2/3, broadside facing road	Residence		Class 2	Class 2/4a

No.	Name	Position opposite to road	Distance to road (m)		First-row buildings in planning road	Classification of sensitive point	Realistic picture	Environment protection goal	
			Distance to center line	Distance to red line				Atmospheric environment	Acoustic environment
5	Anlu Quality and Technology Supervision Bureau	West side	35	5	F4, broadside facing road	Institution		Class 2	Class 2/4a
6	Fucheng Subdistrict Office	West side	35	5	F6, broadside facing road	Institution		Class 2	Class 2/4a
7	North Area of Linyu Huadu Building	East side	32	2	F16, broadside facing road, under construction	Residence		Class 2	Class 2/4a
8	Xiaotai Community	West side	30	0	F3/4, broadside facing road	Residence		Class 2	Class 2/4a

No.	Name	Position opposite to road	Distance to road (m)		First-row buildings in planning road	Classification of sensitive point	Realistic picture	Environment protection goal	
			Distance to center line	Distance to red line				Atmospheric environment	Acoustic environment
9	Fengda International City	East side 和 West side	31	1	F24, directly facing road	Residence		Class 2	Class 2/4a
10	Demian Dormitory Building	East side	31	1	F5, broadside facing road	Residence		Class 2	Class 2/4a
11	Anlu Secondary Vocational School	East side	65	35	F6, directly facing road	School		Class 2	Class 2/4a
12	Delin Garden	West side	33	3	5/7 层，broadside facing road	Residence		Class 2	Class 2/4a

No.	Name	Position opposite to road	Distance to road (m)		First-row buildings in planning road	Classification of sensitive point	Realistic picture	Environment protection goal	
			Distance to center line	Distance to red line				Atmospheric environment	Acoustic environment
13	Jinbang Famous City	West side	32	2	F18, directly facing road	Residence		Class 2	Class 2/4a
14	Chengdong Community	East side and west side	31	1	F2/5, directly facing road	Residence		Class 2	Class 2/4a
15	Pu’ai Hospital	East side	58	28	F8, directly facing road	医院		Class 2	Class 2/4a

No.	Name	Position opposite to road	Distance to road (m)		First-row buildings in planning road	Classification of sensitive point	Realistic picture	Environment protection goal	
			Distance to center line	Distance to red line				Atmospheric environment	Acoustic environment
16	China Post	West side	35	5	F6, directly facing road	Institution		Class 2	Class 2/4a
17	Jingang Garden	West side	33	3	F7, directly facing road	Residence		Class 2	Class 2/4a
18	Lu’s Orthopedic Clinic	West side	35	5	F1, directly facing road	Hospital		Class 2	Class 2/4a

No.	Name	Position opposite to road	Distance to road (m)		First-row buildings in planning road	Classification of sensitive point	Realistic picture	Environment protection goal	
			Distance to center line	Distance to red line				Atmospheric environment	Acoustic environment
19	Anlu Economic Development Zone	East side	33	3	F5/6, directly facing road	Residence		Class 2	Class 2/4a
20	An'er Homeland	East side	33	3	F33/5, directly facing road	Residence		Class 2	Class 2/4a
21	Anlu Second Middle School		32	2	F6, directly facing road	School		Class 2	Class 2/4a

No.	Name	Position opposite to road	Distance to road (m)		First-row buildings in planning road	Classification of sensitive point	Realistic picture	Environment protection goal	
			Distance to center line	Distance to red line				Atmospheric environment	Acoustic environment
22	Power Supply Community	West side	30	0	F6/5, directly or broadside facing road	Residence		Class 2	Class 2/4a
23	Chuyue Community	East side	32	2	F6, broadside facing road	Residence		Class 2	Class 2/4a
24	Jijiawan	East side	33	3	F3/5, directly or broadside facing road	Residence		Class 2	Class 2/4a

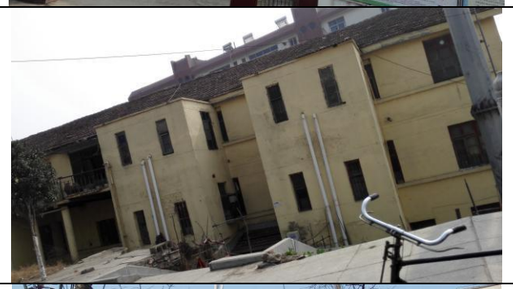
No.	Name	Position opposite to road	Distance to road (m)		First-row buildings in planning road	Classification of sensitive point	Realistic picture	Environment protection goal	
			Distance to center line	Distance to red line				Atmospheric environment	Acoustic environment
25	Haocheng Jiayuan Building	East side	32	2	F6, directly facing road	Residence		Class 2	Class 2/4a
26	Fenghuang City	West side	33	3	F16, F1-5 as shops, residence broadside facing road, under construction	Residence		Class 2	Class 2/4a
27	Anlu First Middle School	East side	36	6	F2-6, directly facing road	School		Class 2	Class 2/4a

No.	Name	Position opposite to road	Distance to road (m)		First-row buildings in planning road	Classification of sensitive point	Realistic picture	Environment protection goal	
			Distance to center line	Distance to red line				Atmospheric environment	Acoustic environment
28	Fenghuang Village	Southeast side	36	6	F2/3, directly facing road	Residence		Class 2	Class 2/4a
29	Hubei Aluminum Manufacturer Dormitory Building	East side	55	25	F6, broadside facing road	Residence		Class 2	Class 2/4a
30	Sili Community	East side	35	5	F7/8 in the first row (F1-3 as shops), F17 in the second row, directly facing road	Residence		Class 2	Class 2/4a

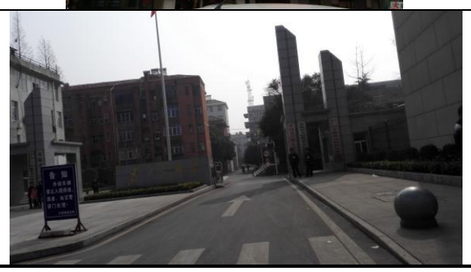
No.	Name	Position opposite to road	Distance to road (m)		First-row buildings in planning road	Classification of sensitive point	Realistic picture	Environment protection goal	
			Distance to center line	Distance to red line				Atmospheric environment	Acoustic environment
31	Sili Village	West side	33	3	F2/4, directly facing road	Residence		Class 2	Class 2/4a
32	Nancheng Police Station of Public Security Bureau	East side	38	8	F3, directly facing road	Institution		Class 2	Class 2/4a
33	Zhongyi Community	East side	35	5	F6, directly facing road	Residence		Class 2	Class 2/4a

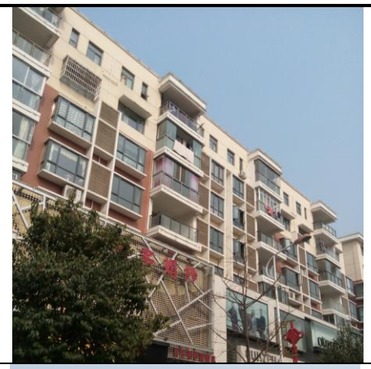
No.	Name	Position opposite to road	Distance to road (m)		First-row buildings in planning road	Classification of sensitive point	Realistic picture	Environment protection goal	
			Distance to center line	Distance to red line				Atmospheric environment	Acoustic environment
34	Caomiao Village	East side	60	30	F2/4, directly facing road	Residence		Class 2	Class 2/4a

Table 4.1-2 Distribution of Atmospheric and Acoustic Environment Protection Goal on Both Sides along Biyun Road

No.	Name	Position opposite to road	Distance to road (m)		First-row buildings in planning road	Classification of sensitive point	Realistic picture	Environment protection goal	
			Distance to center line	Distance to red line					
1	Health Supervision Institute	Southwest	66	58	F3/4, broadside facing road	Institution		Class 2	Class 2
2	Original Waterworks Dormitory	South side	16	8	F2/3, directly or broadside facing road	Residence		Class 2	Class 2/4a
3	Jiahe Community	North side	29	21	F6, directly facing road	Residence		Class 2	Class 2/4a
4	Fuhe Community	South side	16	4	F5/6, directly or broadside facing road	Residence		Class 2	Class 2/4a

No.	Name	Position opposite to road	Distance to road (m)		First-row buildings in planning road	Classification of sensitive point	Realistic picture	Environment protection goal	
			Distance to center line	Distance to red line					
5	Zijin Garden	North side	13	1	F6, directly facing road	Residence		Class 2	Class 2/4a
6	Nanda Community	South side	14	2	F5/6, directly facing road	Residence		Class 2	Class 2/4a
7	Yushi Community	North side	13	1	F6, directly facing road	Residence		Class 2	Class 2/4a

No.	Name	Position opposite to road	Distance to road (m)		First-row buildings in planning road	Classification of sensitive point	Realistic picture	Environment protection goal	
			Distance to center line	Distance to red line					
8	Cultural Center	North side	12	0	F6, directly facing road	办公		Class 2	Class 2/4a
9	Fuhe Community	North side	14	2	F5, directly facing road	Residence		Class 2	Class 2/4a
10	Anlu Government	South side	52	40	F3, directly facing road	Institution		Class 2	Class 2

No.	Name	Position opposite to road	Distance to road (m)		First-row buildings in planning road	Classification of sensitive point	Realistic picture	Environment protection goal	
			Distance to center line	Distance to red line					
11	Yangguang Century City	North side	13	1	F7, directly facing road	Residence		Class 2	Class 2/4a
12	Shiyou Community	North side	13	1	F5, directly or broadside facing road			Class 2	Class 2/4a
13	Zhongshan Community	South side	12	0	F6, directly facing road				Class 2/4a

No.	Name	Position opposite to road	Distance to road (m)		First-row buildings in planning road	Classification of sensitive point	Realistic picture	Environment protection goal	
			Distance to center line	Distance to red line					
14	Apartment Building in Railway Station	South side	12	0	F5, directly facing road	Residence		Class 2	Class 2/4a
15	Fucheng Branch of Land and Resources Bureau	North side	31	6	F6, directly facing road	Institution		Class 2	Class 2/4a
16	Fudong Community	Both sides	31	6	F3-7, directly facing road	Residence		Class 2	Class 2/4a
17	Anlu National Tax Bureau	North side	27	1	F10, directly facing road	Institution		Class 2	Class 2/4a

No.	Name	Position opposite to road	Distance to road (m)		First-row buildings in planning road	Classification of sensitive point	Realistic picture	Environment protection goal	
			Distance to center line	Distance to red line					
18	Civil Affairs Bureau	North side	27	1	F6, directly facing road	Institution		Class 2	Class 2/4a
19	Hongshi Community	South side	35	15	F4-7, directly facing road	Residence		Class 2	Class 2/4a
20	Fuli Community	North side	35	15	F4-7, directly facing road	Residence		Class 2	Class 2/4a
21	Chuyue Community	Both sides	35	15	F2-7, directly or broadside facing road	Residence		Class 2	Class 2/4a

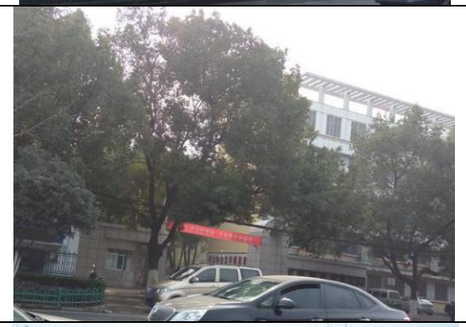
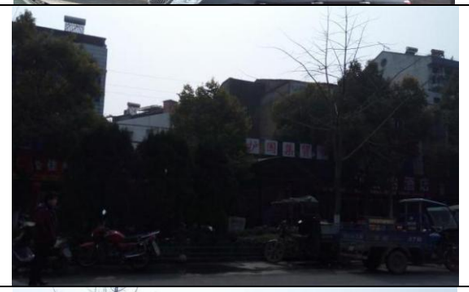
No.	Name	Position opposite to road	Distance to road (m)		First-row buildings in planning road	Classification of sensitive point	Realistic picture	Environment protection goal	
			Distance to center line	Distance to red line					
22	Shili Community Garden	North side	60	40	F7, directly facing road	Residence		Class 2	Class 2
23	Land and Resources Bureau	South side	37	17	F5, directly facing road	Institution		Class 2	Class 2/4a
24	Shili Community	Both sides	35	15	F3-6, directly or broadside facing road	Residence		Class 2	Class 2/4a
25	Shili Primary School	South side	160	140	F2-3, broadside facing road	School	/	Class 2	Class 2
26	Vehicle Administration	North side	32	12	F3, directly facing road	Institution		Class 2	Class 2/4a
27	Shili Middle School	South side	80	60	F3, broadside facing road	School	/	Class 2	Class 2

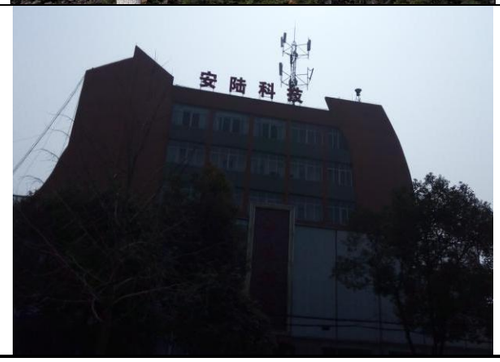
No.	Name	Position opposite to road	Distance to road (m)		First-row buildings in planning road	Classification of sensitive point	Realistic picture	Environment protection goal	
			Distance to center line	Distance to red line					
28	Dapeng Village	South side	35	15	F3`6, directly or broadside facing road	Residence		Class 2	Class 2/4a

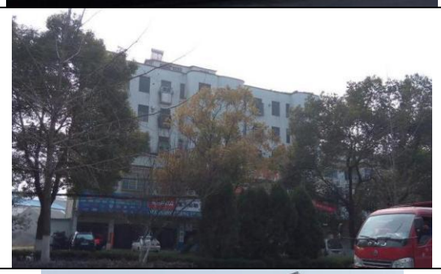
Table 4.1-3 Distribution of Atmospheric and Acoustic Environment Protection Goal on Both Sides along Jiefang Avenue

No.	Name	Position opposite to road	Distance to road (m)		First-row buildings in planning road	Classification of sensitive point	Realistic picture	Environment protection goal	
			Distance to center line	Distance to red line					
1	Hexi Village	North side	24	2	F2/3, broadside facing road	Residence		Class 2	Class 2/4a
2	Guilin Jiayuan Building	North side	38	13	F5/6, directly facing road	Residence		Class 2	Class 2/4a
3	Wuqi Dormitory	South side	31	6	F6, directly facing road	Residence		Class 2	Class 2/4a

No.	Name	Position opposite to road	Distance to road (m)		First-row buildings in planning road	Classification of sensitive point	Realistic picture	Environment protection goal	
			Distance to center line	Distance to red line					
	Anlu Bureau of Radio and Television	South side	28	3	F5, directly facing road	Institution		Class 2	Class 2/4a
	Anlu Development and Reform Bureau	South side	28	3	F5, directly facing road	Institution		Class 2	Class 2/4a
4	Huguo Village	South side and north side	27	2	F2/3, broadside facing road	Residence		Class 2	Class 2/4a

No.	Name	Position opposite to road	Distance to road (m)		First-row buildings in planning road	Classification of sensitive point	Realistic picture	Environment protection goal	
			Distance to center line	Distance to red line					
5	Dean Garden	South side	30	5	F5/6, broadside facing road	Residence		Class 2	Class 2/4a
6	Junior Middle School in Anlu Jiefang Avenue	South side	33	8	F4/5, directly or broadside facing road	School		Class 2	Class 2/4a
7	Huguo Village	North side	32	7	F3, directly or broadside facing road	Residence		Class 2	Class 2/4a
8	People's Procuratorate	South side	65	40	F6, directly or broadside facing road	Institution		Class 2	Class 2

No.	Name	Position opposite to road	Distance to road (m)		First-row buildings in planning road	Classification of sensitive point	Realistic picture	Environment protection goal	
			Distance to center line	Distance to red line					
9	Shuanglongqiao Community	South side	30	5	F4/7, directly facing road	Residence		Class 2	Class 2/4a
10	Traffic Police Battalion	North side	30	5	F2/5, directly facing road	Institution		Class 2	Class 2/4a
	Anlu Public Security Bureau	North side	35	10	F2/4, directly facing road	Institution		Class 2	Class 2/4a
11	Science and Technology Department	South side	33	8	F5, directly facing road	Institution		Class 2	Class 2/4a

No.	Name	Position opposite to road	Distance to road (m)		First-row buildings in planning road	Classification of sensitive point	Realistic picture	Environment protection goal	
			Distance to center line	Distance to red line					
12	Beicheng Health Center	South side	32	7	F5/6, directly facing road	Hospital		Class 2	Class 2/4a
13	Jiefang Community	North side and south side	30	5	F3/5, directly facing road	Residence		Class 2	Class 2/4a
14	Fengda International City	North side and south side	26	0	F24, directly facing road	Residence		Class 2	Class 2/4a

No.	Name	Position opposite to road	Distance to road (m)		First-row buildings in planning road	Classification of sensitive point	Realistic picture	Environment protection goal	
			Distance to center line	Distance to red line					
15	Hegang Village	South side and north side	29	3	F2/3, directly or broadside facing road	Residence		Class 2	Class 2/4a
16	Anlu Court	South side	35	10	F6, directly facing road	办公		Class 2	Class 2/4a
17	Linyu Huadu Building	South side	31	5	F12/15, directly facing road	Residence		Class 2	Class 2/4a

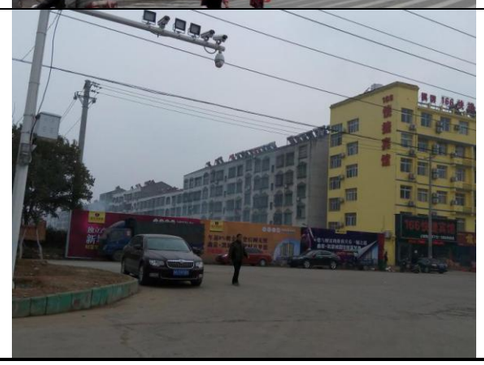
No.	Name	Position opposite to road	Distance to road (m)		First-row buildings in planning road	Classification of sensitive point	Realistic picture	Environment protection goal	
			Distance to center line	Distance to red line					
18	Gaojiawan	North side	28	2	F2/3, directly or broadside facing road	Residence		Class 2	Class 2/4a

Table 4.1.4 Distribution of Atmospheric and Acoustic Environment Protection Goal on Both Sides along Jinqui Avenue

No.	Name	Position opposite to road	Distance to road (m)		First-row buildings in planning road	Classification of sensitive point	Realistic picture	Environment protection goal	
			Distance to center line	Distance to red line					
1	Fashion-International Garden	East side	32	2	F12, directly facing road, under construction	Residence		Class 2	Class 2/4a
2	Zhongye Huafu Building	East side	32.5	2.5	F7, broadside facing road	Residence		Class 2	Class 2/4a

No.	Name	Position opposite to road	Distance to road (m)		First-row buildings in planning road	Classification of sensitive point	Realistic picture	Environment protection goal	
			Distance to center line	Distance to red line					
3	Gaojiawan	West side	35	5	F2/3, directly or broadside facing road	Residence		Class 2	Class 2/4a
4	Linyu Huadu Building	East side and west side	32.5	2.5	F6, 12 and 15 in first row in the west side, F11 and 16 in the first row in east side, broadside facing road	Residence		Class 2	Class 2/4a
5	Fenghai Tiancheng Building	West side	48	18	F27, broadside facing road	Residence		Class 2	Class 2/4a

No.	Name	Position opposite to road	Distance to road (m)		First-row buildings in planning road	Classification of sensitive point	Realistic picture	Environment protection goal	
			Distance to center line	Distance to red line					
6	Shui'an Xingcheng Building	East side	38	8	F10/15/23, broadside facing road	Residence		Class 2	Class 2/4a
7	Jiuqiu Garden	East side	33	3	F7/11, broadside facing road	Residence		Class 2	Class 2/4a
8	Shangri-La City Garden	East side	31	1	F18/6, broadside facing road	Residence		Class 2	Class 2/4a
9	Chengdong Community	East side 和 West side	30	0	F2/3, broadside facing road	Residence		Class 2	Class 2/4a

No.	Name	Position opposite to road	Distance to road (m)		First-row buildings in planning road	Classification of sensitive point	Realistic picture	Environment protection goal	
			Distance to center line	Distance to red line					
10	New Zhoujiawan	West side	30	0	F5/7, broadside facing road	Residence		Class 2	Class 2/4a
11	Kaixuan City	East side	31	1	F16, broadside facing road	Residence		Class 2	Class 2/4a
12	Fuli Community	West side	30	0	F6, broadside facing road	Residence		Class 2	Class 2/4a
13	Chuyue Community	East side	30	0	F3/6, broadside facing road	Residence		Class 2	Class 2/4a

No.	Name	Position opposite to road	Distance to road (m)		First-row buildings in planning road	Classification of sensitive point	Realistic picture	Environment protection goal	
			Distance to center line	Distance to red line					
14	Fudong Community	East side and west side	30	0	F3/5, broadside facing road	Residence		Class 2	Class 2/4a

Table 4.1-5 Distribution of Atmospheric and Acoustic Environment Protection Goal on Both Sides along Yinxing Avenue

No.	Name	Position opposite to road	Distance to road (m)		First-row buildings in planning road	Classification of sensitive point	Realistic picture	Environment protection goal	
			Distance to center line	Distance to red line					
1	Anlu Supervision Center	North side	Survey-forbidden area	Survey- forbidden area	F2/3, directly facing road	Residence		Class 2	Class 2/4a
2	People's Armed Police	North side	Survey-forbidden area	Survey- forbidden area	F5, directly facing road	Residence		Class 2	Class 2/4a

No.	Name	Position opposite to road	Distance to road (m)		First-row buildings in planning road	Classification of sensitive point	Realistic picture	Environment protection goal	
			Distance to center line	Distance to red line					
3	Zhaohe Community	South side	150	130	F2/3, directly or broadside facing road	Residence		Class 2	Class 2
4	Shimiao Village	South side/north side	22	2	F2, directly or broadside facing road	Residence		Class 2	Class 2/4a
5	Shimiao Community	North side	100	80	F6, directly facing road	Residence		Class 2	Class 2
6	Anlu People Hospital	North side	23	3	F5, directly facing road	Hospital		Class 2	Class 2/4a

No.	Name	Position opposite to road	Distance to road (m)		First-row buildings in planning road	Classification of sensitive point	Realistic picture	Environment protection goal	
			Distance to center line	Distance to red line					
7	Qiliqiao Middle School	North side	60	40	F5, directly facing road	School		Class 2	Class 2
8	Taihe Villa	South side	50	30	F2/4, back facing road	Residence		Class 2	Class 2/4a
9	Xugang Community	North side	55	35	F3/7, slantwise facing road	Residence		Class 2	Class 2
10	Shitang Community	North side	22	2	F3, directly facing road	Residence		Class 2	Class 2

Table 4.1-6 Distribution of Atmospheric and Acoustic Environment Protection Goal on Both Sides along Fucheng Avenue

No.	Name	Position opposite to road	Distance to road (m)		First-row buildings in planning road	Classification of sensitive point	Realistic picture	Environment protection goal	
			Distance to center line	Distance to red line					
1	Zhaohe Village	East side	22	2	F2/3, directly facing or broadside facing road	Residence		Class 2	Class 2/4a
2	Lvjiafan	Northeast side	25	5	F3, broadside facing road	Residence			
3	Huguo Village	Southwest side	20	0	F3, directly facing road	Residence			

Table 4.1-7 Distribution of Atmospheric and Acoustic Environment Protection Goal on Both Sides along Zhanqian Road

No.	Name	Position opposite to road	Distance to road (m)		First-row buildings in planning road	Classification of sensitive point	Realistic picture	Environment protection goal	
			Distance to center line	Distance to red line					

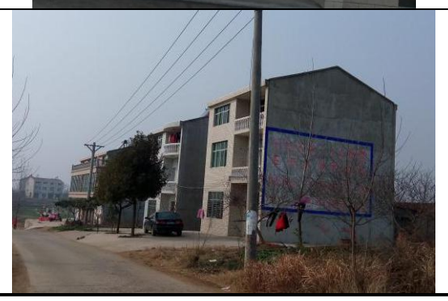
No.	Name	Position opposite to road	Distance to road (m)		First-row buildings in planning road	Classification of sensitive point	Realistic picture	Environment protection goal	
			Distance to center line	Distance to red line					
1	Lilong Village	East and west side	20	0	F2/3, broadside facing road	Residence		Class 2	Class 2/4a
2	Jinquan Village	East and west side	20	0	F3, broadside facing road	Residence			

Table 4.1-8 Table of Ambient Air and Acoustic Environment Protection Goals for Supporting Infrastructure Project of Public Traffic System

Depot name	Name of sensitive point	Direction	Distance (m)	Purpose and scale	Control objective
Public transfer hub in passenger transportation station	Aluminum Manufacturer Dormitory	North	Close to	Dormitory, residence	GB3096-2008 Class 2 GB3095-2012 Grade 2
	Sili Village	West	60	Residence	
Small railway station to public transport hub	Building 6, No. 21 Wenchang Road	South	85	Residence	
	Shengli Community, Baiyun Community	West	25	Residence	
	Residential area in Wenchang Road	North	30	Residence	
Public transfer hub in short distance station	Residential buildings in Fudong Community	East, South, West, North	Close to	Residence	
Public transfer hub in long distance station	Residential buildings in Fudong Community	East, West, North	Close to	Residence	
Qiliqiao Road Passenger transportation center + Public transfer hub	Taihe Villa	East	90	Residence	
	Taihe Paradise	East	110	Residence	
	Jinyuan Community (part of Yuantong Community)	South	140	Residence	
	Qiliqiao Middle School	Northwest	95	Residence	
	Shimiao Community	Northwest	180	Residence	
Highway station Passenger transportation center + Public transfer hub	Jinquan Village	Surrounding	——	Residence	
	——	——	——	Army camp	

4.2 Identification of environmental impact of engineering construction

In the overall consideration of project nature, project feature, implementation periods (early period, construction period and operation period) and environmental characteristics of the area, matrix identification method is adopted to identify environmental impact factors produced during construction period and operation period of the proposed project. During construction period and operation period of the Project, adverse impact to atmospheric environment, acoustic environment around the project, ecological environment along roads and water environment at crossing place of

bridges and different levels of positive and negative influences on social environment and public life will be mainly caused.

Identification results of integration traffic corridor, road network perfection engineering and supporting facilities engineering for public transport system are shown in Table 4.2-1 and Table 4.2-2.

Table 4.2-1 List of Identification Matrix for Environmental Impact Factors of Integrated Traffic Corridor and Road Network Perfection Engineering

Engineering activity / Environmental element		Early stage		Construction stage						Operation stage		
		Land occupation	Demolition and resettlement	Earth borrowing	Sub-grade	Road surface	Bridge and culvert	Material transportation	Construction	Driving of vehicle	Landscaping	Side ditch drainage
Natural environment	Water loss and soil erosion			-1S	-1S	-2S	-2S					
	Terrestrial vegetation	-1L		-2S	-2L	-2S	-2S					
	Atmospheric environment			-2S	-2S			-1S	-1S	-2L		
	Acoustic environment							-1S	-1S	-1L		
	Water environment			-2S	-2S	-2S	-2S				+2L	
	Land utilization	-1L	-2L	-1S								
Social environment	Industry									+2L		
	Agriculture	-1L		-1S								
	Traffic							-2S	-2S	+2L		
	Tourism									+2L		
	Social economy	-2S	-2S							+2L		
	Public health		-2S					-2S	-2S			
	Life quality of resident		-1S							+1L		

Note: "+"——positive impact; "－"——adverse impact; "L"——long-term impact; "S"——short-term impact; "1"——obvious impact; "2"——slight impact; blank means no impact.

Table 4.2-2 List of Identification Matrix for Environmental Impact Factors of Supporting Facilities Engineering for Public Transport System

Engineering activity / Environmental elements		Early stage		Construction stage			Operation stage	
		Land occupation	Demolition and resettlement	Foundation construction	Structural construction	Equipment installation	Vehicle access	Landscaping
Natural environment	Water loss and soil erosion			-2S	-2S			
	Terrestrial vegetation	-1L		-2S	-2S			
	Atmospheric environment			-1S	-1S	-2S	-1L	
	Acoustic environment			-1S	-1S	-2S	-1L	
	Water environment			-2S	-2S			+2L
	Land utilization	-1L	-2L	-2S				
Social	Industry							
	Agriculture							
	Traffic					-2S	+1L	

envi	Tourism						+1L	
ron	Social economy	-2S	-2S				+1L	
	Public health		-2S	-2S	-2S			+2L
men t	Life quality of resident		-1S				+1L	+2L

Notes: "+"——positive impact; " — "——adverse impact; "L"——long-term impact; "S"——short-term impact; "1"——obvious impact; "2"——slight impact; blank means no impact.

Evaluation factors are decided according to engineering contents of the project, environmental impact identification, features of all environmental factors of the place where the project is located and existing environmental problems; evaluation scope is decided according to *Technical Guide of Environmental Impact Evaluation* and *Evaluation Specification for Environmental Impact of Road Construction*. Please refer to Table 4.2-3 for details.

Table 4.2-3 List of Evaluation Factors and Evaluation Scope

Type			Evaluation factor	Evaluation scope
Evaluation of current situation of environment quality		Current situation of ambient air quality	NO_2, CO, PM_{10} and SO_2	Both sides of road center line and bus station Area of surroundings within the scope of 200m
		Current situation of quality of surface water environment	PH value, BOD_5、SS, TP, NH_3-N, petroleum, DO and permanganate index	Take proposed engineering area as the boundary and enlarge evaluation scope of the water body accepting wastes when necessary.
		Current situation of quality of local acoustic environment	Equivalent A sound-level	Both sides of road center line and bus station Area of surroundings within the scope of 200m
		Ecological environment	Animals and plants, water loss and soil erosion	Both sides of proposed engineering and area of surroundings within the scope of 300m
Forecast and evaluation of environmental impact	Construction stage	Evaluation of impact on surface water	SS, COD, petroleum, BOD_5 and NH_3-N	Water section of Fuhe River from Jiefang Mountain Section to Yuxiuge Section
		Evaluation of impact on atmospheric environment	Flying dust and asphalt fume	Scope of 200m from each side of road center line; possibly involved areas of engineering construction for public transport hub and passenger transport center.
		Evaluation of impact on acoustic environment	Equivalent A sound-level	Scope of 200m from each side of road center line; possibly involved areas of engineering construction for public transport hub and passenger transport center.
		Environmental impact evaluation of solid waste	Waste slag, construction waste and domestic waste	Both sides of proposed engineering and area of surroundings within the scope of 300m

Type			Evaluation factor	Evaluation scope
		Ecological environment	Animals and plants, water loss and soil erosion	Scope of 100m from each side of road center line; possibly involved areas of engineering construction for public transport hub and passenger transport center.
	Operation stage	Evaluation of impact on surface water	SS, COD, petroleum, BOD_5 and NH_3-N	Water section of Fuhe River from Jiefang Mountain Section to Yuxiuge Section
		Evaluation of impact on atmospheric environment	CO, NO_2, non-methane hydrocarbon and lampblack, etc.	Both sides of road center line and bus station Area of surroundings within the scope of 200m
		Evaluation of impact on acoustic environment	Equivalent A sound-level	Both sides of road center line and bus station Area of surroundings within the scope of 200m
		Environmental impact evaluation of solid waste	Animals and plants, water loss and soil erosion	Scope of 100m from each side of road center line; possibly involved areas of engineering construction for public transport hub and passenger transport center.

4.3 Influence on ecological environment

4.3.1 Construction stage

(1) Influences on animals

After field investigation, the category and quantity of wild animal resources within evaluation scope of the Project are not abundant for intensification of urban construction activities. It is found that there are no places for breeding and inhabitation of wild rare animals and other special sensitive spots and no distribution of local endemic species, therefore the engineering construction has little influence on terrestrial animals.

With construction of the Project, large number of constructors are put in and the distribution of small beasts with grinding tooth will expand and the density in area with frequent human economic activities will increase. The contact frequency with humans and living materials will be increased and thouse mouses as propagating source of natural epidemic disease may have threats on the health of local residents.

After the Project enters operation period, direct influence of construction period on wild animals will be eliminated graduallyand the influce on terrestrail animals is mainly noise pollution

caused by vehicle operating, which has little influence on survival of animals and quantity of population within evaluation scope.

(2) Influences on plant resources

Landscape design philosophy of the Project is to create a “concise ecological pergola” and create beautiful and comfortable road traffic environment by combining planting design with large green quantity and environment around the site.

Green space system plays an important role in integrity and stability of urban ecological process. It can improve and strengthen anti-jamming capacity of ecological system and make structure of urban landscape more reasonable, stable, make energy flow more smooth and make environment more quiet and elegant, thus reaching efficient and harmonious state. A certain restoration measure of plants is taken in the Project to reduce the influence on ecological structure and function within evaluation scope of engineering.

In dots, lines and faces consisting urban green space system and as framework of “line” and urban green space system, banding afforestation of road is critically significant. It can combine the urban green space as an entirety and make rationality of layout and effectiveness of afforestation directly influence rationality of urban green space system. Therefore, the Project shall strictly follow relevant requirements of planning in implementation process and make the most of road space in afforestation and make road space of engineering become a real green gallery under the premise of satisfying leading function of traffic.

Acording to design requirements, part of highway section in the Project shall have a road cross-section regulation and the main and subsidiary roads shall be separated among which the position of part of treelawn will be trasferred or be changed into subsidiary road and the project construction will have a certain influence on treelawn.

Acording to design requirements, road engineering will reduce external migration of nursery stock caused by road construction by taking maximum preservation of existing trees as the principle. At the same time, take preservation of existing conditions of border trees as the principal thing and for highway section with partial deficiency or damage, plant trees by referring to tree species and specifications along the line. Vegetaion along the line after reconstruction is similar to the current condition and it can highlight effects of landscape. The construction activities are mainly in existing scope of road and it will not have great influence on animals and plants resources along the line.

①Vehetation recovery principle

The road engineering reduces external migration of nursery stock caused by road construction by taking maximum preservation of existing trees as the principle. For the road engineering needs to meet traffic function and make the existing afforested arbor be migrated outside or chopped down, it is necessary to decide together with Party A and relevant administrative departments of garden through mutual negotiation. Based on principle of ecological environmental protection, every construction organization is required to choose trees and shrubs with fine growth conditions for existing trees that influence road construction and implement transplantation for reuse so as to effectively reduce investment cost in afforestation and realize rapid reafforestation of newly-built roads.

②Tree species selection

For species of plants along the road, give priority to species of plant that grows in local place and have orbamental value. Plant trees in propert place and attention shall be paid to aspect changes of plants. Take unification of landcape of existing trees and principle of economy into consideration and confirm that main species for afforestation of this road are mainly the following varieties.

Main tree species: camphor, goldenrain tree and platanus orientails;

Backbone tree species: magnolia grandflora, gingko, clump osmanthus fragrans, moor besom, crape myrtle, red maple, prunus lannesiana, red authumnal leaves and so on;

Main shrubs and ground cover: fatsia japonica, aucuba japonica variegata, photinia serrulata, French viburrnum odoratissimum, ligustrum japonicum, gardenia with large leaves, golden-edged Chinese littleaf box, nandina domestica, floribunda Roses, ophiopogon japonicus, iris techtorum, Maynilad and so on.

(3) Influences on land resources along the line

The road is constructed according to the method of “main line + subsidiary road” and the engineering is basically arranged along the existing road and part of highway section is being expanded and newly constructed. The Project can basically maintain original land use pattern along the line of engineering without intensifying tension degree of land resources in area along the line; at the same time, after forestation measures were taken in the engineering, green land area along the line can be added, which is helpful to beautify environment along the line and improve overall image of the city.

4.3.2 Operation stage

After the Project is completed and comes into operation, impact on animal and plant resources due to construction will fade away. Ecological environment of assessment district will not change too much before and after construction of the Project. Natural animal and plant resources are rare. Impact on animals and plants due to construction will fade away or disappear after operation of the Project. In the area where the Project goes through, birds are basically frequent species in urban communities. Their activity scope is limited and operation of the Project will not influence their distribution and will not result to decrease or disappearance of bird species and quantity.

Urban landscape is made up of several ecological systems with interaction relationship between human and environment as core. Urban landscape has a weak ecological structure and its self adjusting capacity is low. So, it relies on input and output of ecological flow such as material flow and energy flow to maintain its stability. Access gallery is the only way which must be passed by energy flow, material flow, information flow and population flow of urban ecosystem. Smooth of access gallery can guarantee complete and smooth of urban functions. With recovery of landscape conditions destroyed during construction period, gallery function effects will increase, material circulation will be accelerated, landscape heterogeneity will increase and function such as landscape flow will recover in a certain degree.

Both sides of road appear typical urban ecology landscape. Functional structures such as residence zone, transportation junction, enterprise and public institution are distributed along the line. Dense population along line and impeded surrounding gallery restrict migration of population flow, material flow, energy and information among each structure, which influences stability of landscape ecological system along the line. Green construction of urban transport infrastructure subproject in Anlu Xiaogan emphasizes landscape design and local cultural features and it will not influence landscape basically after completion. Existing green plants grow well along the line of the Project. Construction method shall be selected reasonably in next design and construction process and effective measures shall be taken to reserve existing street trees. Transplant and protection for existing plants shall be implemented for recycle later. In general, construction of the Project has little influence on surrounding landscapes. Recovery and transplant of existing plants on the road after construction can reduce interference of project construction on landscapes.

After operation of the Project, as artificial gallery, basic functions of city such as residence zone, commercial zone, transportation junction and enterprise and public institution along the line will be combined as a more integrated structural system. Road construction improves accessibility of function section landscapes along the line, makes input and output of ecological flow smooth, ensures efficient functioning of city, improves stability of urban ecology landscape system and ensures healthy development of the city. At the same time, the Project is constructed along the existing road, which reduces division of function section along the line and will not increase crumbliness of line landscapes.

4.4 Influence on water environment

4.4.1 Construction stage

Influence on surrounding water environment during construction period of the Project mainly includes influence of construction wastewater and domestic sewage.

(1) Construction wastewater

Construction site of the Project has no maintenance site and machines shall be uniformly repaired at professional maintenance station. Construction wastewater mainly includes wastewater from machinery and vehicle cleaning, wastewater from road maintenance and drainage water from construction site washing.

Exit and entrance to construction site on generally roads shall be constructed with satisfactory vehicle washing and clean-keeping facilities. Vehicles going in and out of the construction site must be cleaned by washing and clean-keeping facilities before being driven away from the construction site. Vehicles carrying with mud and muck are not allowed to be driven on the road. According to actual investigation and analogy analysis, machinery and vehicles on roads to be washed each day is calculated by 100 sets per time; average water consumption for washing each vehicle is calculated by 60L per time; washing water is calculated by 80% of the drainage quantity; daily drainage quantity of wastewater for washing machinery and vehicles is about 6t. Generally, such wastewater contains SS 1000-5000mg/L of pollutant concentration, including 25mg/L of petroleum pollutant

Considering that present stage is for feasibility study and that office-use houses and renting in living area remain undetermined, renting housing estate situated within the area and already established with sewage pipe network shall be taken into consideration when selecting office-use houses and living area in later period.

(2) Domestic wastewater

During project construction period, constructors will produce a certain quantity of domestic wastewater. According to similar engineering data, about 400 constructs will be there during construction peak period, and calculating water consumption as 120L/person per day and calculating emission factor of domestic wastewater as 0.85, maximum production of domestic wastewater is 41m^3/d, while concentration of specific pollutants in wastewater is: COD350mg/L, ammonia nitrogen 50mg/L. In combination with social environment characteristics along the line of the Project, both office-use houses and houses in living area will adopt temporary renting of surrounding existing houses and domestic wastewater so produced will be discharged through municipal pipes.

Considering that present stage is for feasibility study and that office-use houses and renting in living area remain undetermined, renting housing estate situated within the area and already established with sewage pipe network shall be taken into consideration when selecting office-use houses and living area in later period.

(3) Analysis of impact on rivers

Three wading bridges are involved in the Project (Mao River Bridge crossing Mao River on Taibai Road, Bridge crossing Chaishanhe on Jiefang Road and reconstruction project on Jinqiu Road crossing Mao River Bridge). To minimize the impact of bridge construction on water quality of Mao River and Qili River (construction of Mao River Bridge crossing Mao River on Taibai road is pavement reconstruction, having no influence on Mao River). Try best to carry out pile foundation construction in dry season and to adopt circulating cast-in-situ bored pile for construction technology which makes cycle use of mud to reduce mud discharge and reduce mud to enter into water body by combination with construction technology of cofferdam. According to analysis of analogical data, cofferdam construction will be adopted and increase of SS shall not exceed 50mg/l for areas out of the scope of 50m within lower course of construction area, having no pollution on water quality of water areas out of scope within 100m of lower course. Sediment cleared through excavation of pile foundation shall be delivered to earth spoil site nearby promptly for stacking in order to prevent second time pollution on water environment caused by its arbitrary in-pouring into water body.

Another main source of water quality pollution is oil running, leaking or dripping of machines which cause the increase of oils in the water; therefore, equipment shall be well maintained to eradicate pollution caused by industrial oils。

Meanwhile, in combination with water conservation scheme of the Work, reasonable measures can be adopted for adjacent places of rivers to minimize impact on surrounding rivers caused by project construction:

a. Stacking site for construction materials including pitch, oil fuel and chemicals shall be established away from rivers and water bodies.

b. During the construction process, in order to reduce the impact of engineering construction on nearby traffic and residents, PVC project enclosure with the height of not less than 2.4m shall be set up around the areas which need to be rebuilt and extended.

c. At road segments adjacent to rivers, it is adoptable to use waterproof cloth to cover exposed roadbed surface for rainy season in order to prevent rainfall runoff creating washout on road surface as well as to minimize the impact on rivers.

Water quality pollution caused by bridge construction is temporary and main reverse impact on water source is temporarily caused by partial elevation of suspended solids in water body. Such impact will no longer exist as the work is completed.

4.4.2 Operation period

(1) Analysis of impact of station yard on water environment

Wastewater produced by station yard involved in the Project mainly includes: office and domestic wastewater produced by staff, domestic wastewater produced by travelers, etc. Through treatment in oil separtors, catering wastewater of the Project enters into septic-tank along with other domestic wastewater for disposal and discharged to sewage pipe and discharged into Fuhe through treatment from sewage treatment plant after reaching the standard.

According to abovementioned analysis, in 6 station yards to be constructed for the Project (construction scheme and construction scale for some station yards remain undetermined), visitors flow rate in terms of maximum passenger flow scale is about 2200 persons/d (railway station small size arriving-dispatching public transport hub), maximum water consumption quantity at single station yard is about 31 m^3/d, and water drainage coefficient is taken as 0.85 and domestic wastewater quantity is about 26.4 m^3/d.

According to investigation, in six station yards to be constructed in the Project, except that high speed railway station and highway passenger transportation center + public transportation transfer junction are unconnected to sewage pipe network, the rest five station yards have been connected to sewage pipe network and domestic wastewater can be collectively treated in Anlu sewage treatment plant. According to construction plan of the Project, construction of high speed railway station and highway passenger transportation center + public transportation transfer junction will be commenced in 2019 and completed in 2020. At that time, provided this place has been connected to sewage pipe network, sewage from high speed railway station and highway

passenger transportation center + public transportation transfer junction will be collectively treated in sewage treatment plant; otherwise the construction organization shall construct sewage treatment facility by itself and discharge domestic wastewater after its conformity with level 1 standard in *Integrated Wastewater Discharge Standard* (GB8978-1996). In conclusion, wastewater produced from station yard of the Project will not cause great impact on water environment.

(2) Analysis of impact of road surface runoff

Road involved in the Project does not produce wastewater and such wastewater is mainly rainwater, of which pollutant content in initial rainwater is large. According to relevant document, during initial stage of rainfall, it takes 30 minutes for rainform to form surface runoff and content of SS and oily materials in rainwater is large and after half an hour, its concentration decreases rapidly with extension of rainfall duration. BOD_5 is generated in rainwater and rate of descent is slower than the former with extension of rainfall duration while its pH value remains relatively stable. Apparently, after 40 minutes of the rainfall, road surface is washed to clean basically. According to relevant actual measurement result and documents in respect of rainwater on road in Hubei district, initial rainwater pollutant SS on road surface is about 221mg/l and COD is about 107mg/l, BOD is about 20mg/l and petroleum is about 7 mg/l. Road surface runoff constitutes a small part in surface runoff volume in the whole district, and is distributed along the whole line. As road rainwater is transmitted through open water drainage channel or rainwater pipe network, in-water pollutant concentration will be reduced as suspended solids and sediment are attenuated, sedimented or degraded. The impact on receiving water of rainwater is small.

When malfunction and accidents happen due to bad vehicle maintenance situation, it is possible to have gasoline leakage and engine oil contamination on road surface. At rainfall, rainwater flowing into nearby water area through road will cause petroleum and COD contamination and such accidents shall be prevented by traffic management measures.

4.5 Impact on acoustic environment

4.5.1 Construction period

There are many construction machines to be put into use for construction of proposed project as well as many transport vehicles and the construction activity will have certain influence on acoustic environment of areas along the line of the Project.

(1) Source of noise

Main noise sources during road construction stage come from construction noise of construction machines and radiation noise of transport vehicles. These noises are temporary, however, construction period of the Project is long and there are many construction machineries while construction machineries are generally featured by high noise and irregularity. In combination with features of the Project, construction process is divided mainly into foundation construction, road construction and construction of transport, landscape and illumination works.

①Foundation construction: mainly including foundation treatment, foundation roadbed leveling, earthwork excavation and filling (including pipelines) and pavement compaction and other construction processes. Such construction comes with a large number of material delivery vehicles arriving and leaving the construction site. Construction machinery of this stage mainly includes loaders, vibrating loaders, and earthmovers, land levelers, drilling machines, pile drivers and other construction machineries.

②Pavement construction: mainly including pitch paving on pavement or bridge floor. Construction machinery mainly includes large-scale pitch pavers.

③Construction of transport, landscape and illumination works: mainly to improve signs and marked lines on roads and to carry out road greening, road illumination construction; whereas it is unlikely to use large-scale construction machines during this stage and most of them are separately distributed, and some work is dominated by manual work, thus creating less noise impact.

Noise during construction period mainly comes from construction machines which produce most of the equipment noise along with vehicles for construction transportation, and the former mainly constitutes excavators, earthmovers, road rollers, agitators and loaders, etc.

(2) Impact analysis

Emission Standard of Environment Noise for Boundary of Construction Site shall apply to noise during construction period (GB12523-2011).

Through analogical reasoning, when single machine operates, noise of all single machine such as earthmover, excavator and loader at 60m from sound source can be in conformity to standard as sound level no higher than 70dB(A) at boundary of construction site during day time. To achieve a sound level no higher than 55dB(A) as required for night time, construction equipment shall be 200m or more from sound source. Construction noise of crusher has the most sever impact, requiring a distance of 80m from sound source during day time and such distance should be greater than 300m from sound source to meet the requirement of 70dB(A) during day time and 55dB（A） during night time.

During actual construction process, diversified machines work together frequently and with mutual superposition of radiation from various noise sources, noise level would be higher with larger radiation scope. When 10 construction equipment operate within the site simultaneously, noise value at boundary of the site will increase by 10dB compared to such value when single construction equipment operates (A). On the one hand, mobility of construction machinery may cause distance from noise source close to boundary of construction site at some time frame; on the other hand, due to variation of mechanical equipment combination during each stage of building construction, the extent of impact by noise radiation can be different. The abovementioned situations ultimately result in the difficulty to meet requirements on limiting value *Emission Standard of Environment Noise for Boundary of Construction Site*.

Seen from field investigation, a number of sensitive spot spread intensively at both sides of the Project including residents, hospitals and schools. Daytime and nighttime construction will disturb normal life and rest for abovementioned dwelling sites, especially noise during nighttime will cause even greater interference which requires corresponding protective and management measures. As completion of the work, impact by construction noise will no longer exist and adverse impact on environment by construction noise is temporary and short-term.

During transport process of construction materials and construction spoils of the Project, noise of transport vehicles will impact noise-sensitive points along the sides of transport roads. Construction materials to be transported mainly constitute commercial concrete, steels, timbers, etc.

As indicated by analogical test, sound level at places 7.5m, 10m and 30m from loading

vehicles is 82～88dB(A), 79～85dB(A) and 72～78dB(A) respectively. When transport vehicles passing by, living areas within 50m of places along the line will be effected in a larger extent.

4.5.2 Operation period

Prediction results show that predicted values of part sensitive points will be superior to the existing values during late period of road operation period. Reasons may contain the following aspects:

①Though road traffic flow increases during operation period of the Project, influenced by change of trip mode in the area, proportion of small vehicle increases gradually and that of large and middle vehicles decreases. Impact of traffic noise on sensitive points will be stable gradually in late period. Therefore, some predicted values may be superior to existing values during late period of project operation.

②Some sensitive points are located on both sides of intersected road, they are influenced by roads of the Project as well as traffic noise of the crossroad. Roads of the Project have small contribution to overall noise value of sensitive points and noise value on sensitive points can remain the present status.

③According to on-site investigation, some sensitive points within assessment scope are influenced by noise of real estate project under construction significantly. They are near existing roads, where traffic flow is huge and vehicles are mainly heavy trucks and slag cars. Noise in the area due to construction vehicles is continuous. Monitored existing noise can not reflect acoustic environment condition before construction of the Project objectively and monitored existing noise value is bigger than actual value.

Predicted values of some sensitive points in nighttime do not exceed present status but values in daytime exceed present status. This is due to:

Municipal road traffic flow concentrates mainly in daytime during operation period. Traffic flow day-night ratio is about 8:1, namely flow in daytime (6:00-22:00) accounts for 89% of flow of whole day and flow in nighttime (22:00 to 6:00 of next day) accounts for 11% of flow of whole day. Traffic flow concentrates mainly in daytime, which leads to that noise contribution value in nighttime is much smaller than that in daytime during operation period. Traffic flow day-night ratio is about 4:1 according to monitoring of present status. So, traffic flow in nighttime may be lower than present status during operation period and predicted value of noise in nighttime is superior to the existing values slightly.

4.6 Ambient air impact

4.6.1 Construction period

Important construction material-concrete required by proposed project is outsourcing commercial concrete and there is no concrete mixing station set in the construction area.

Air pollution sources during construction period include earth-rock excavation and backfilling, demolition of existing buildings, loading and unloading of sands and soil and flying dust generated during transportation; asphalt fume generated from road surface pavement and exhaust gas discharged by construction machinery and transport vehicles powered by fuel.

(1) Flying dust generated from earth-rock excavation and demolition of exiting buildings

In earlier stage of construction, site demolition and earth-rock excavation shall be conducted according to design requirements. These processes will damage the original earth surface and turn it into bare land. In the case of sunny day, surface water is evaporated, soil turns into dry and soft particles and then the earth surface becomes loose. When the wind is large, flying dust will be generated. A part of dust flies in the air and the other part of dust falls on nearby ground and building surface with wind. Influence of flying dust can continue 30min, thus it is the main factor to cause urban ambient air pollution.

Loose particles generated from earth-rock excavation and storage yard of sands and stones are pollution sources of flying dust; in the process of materials loading, unloading and transportation, secondary flying dust will proceed to affect ambient air quality of both sides of roads and roads. According to above factors analysis of ambient air quality, secondary flying dust generated in the process of transportation is related to degree of cleanliness of road surface and driving speed. Under the same degree of cleanliness of roads, higher driving speed will cause larger quantity of flying dust; under the same driving speed, more dirt retention on roads surface will cause larger quantity of flying dust.

If no any protective measures are taken, concentration of TSP at down wind of construction site is rapidly decreased when the distance is increase, and then the concentration is basically in stable value at the distance about 40m. When its scope of

influence is evaluated according to Class-II standards of Ambient Air Quality Standard (GB3095-2012) (daily average concentration of TSP is 0.3mg/m3), the result is that it can meet the standard only at these places outside 50m.

Watering of construction site plays a very obvious role in restraining the generation of TSP at construction site. At place with distance about 35m to down wind, daily average concentration of TSP has been decreased below standard value. It shows that, suitable watering of construction site can ensure its degree of wetness and is beneficial to restrain the generation of flying dust at construction site, so as to effectively relieve the influence on surrounding environment.

(2) Secondary flying dust generated in the process of loading, unloading and transportation of construction materials

Processes of loading, unloading and transportation of construction materials almost are basic parts during the period of construction. Most of raw and auxiliary materials and outsourcing soils are transported from the nearest place, thus improper protection in the process of transportation will generate flying dust, so as to affect ambient air quality of both sides of roads and roads. Flying dust generated from vehicles travel can be divided into wind-force flying dust and power-drive flying dust according to reasons of dusting. In which, wind-force flying dust is mainly generated from floating dust on exposed road surface under the conditions of dry weather and strong wind; power-drive flying dust is mainly generated by external force in the process of loading and unloading.

In order to decrease the influence of flying dust of construction site and vehicle transportation on surrounding environment, Development Organization, Design Organization and Construction Organization shall earnestly do well at protection of air pollution during construction period according to relevant provisions and requirements.

(3) Exhaust gas generated from asphalt pavement

The project adopts commercial asphalt and asphalt fume during construction mainly comes from asphalt pavement maintenance. During pavement, asphalt shall be compacted by road roller and placed for 10min for natural cooling firstly. When temperature of asphalt mixture is cooled below 82℃, asphalt fume will be obviously decreased. When the asphalt is basically solidified, asphalt fume will be gone.

(4) Tail gas of construction vehicle

Exhaust gas discharged by construction machinery and transportation vehicles powered by fuel oil will increase total emission of atmospheric pollutant of local ambient air. As relevant management departments have enhanced the management degree of motor vehicles exhaust gas and Construction Organization have strengthened maintenance management of construction machinery and equipment in recent years, exhaust gas discharged by construction machinery and vehicles will not pollute surrounding environment.

4.6.2 Operation period

The assessment predicts impact of vehicle exhaust on ambient air during operation period of the Project (year 2030) through ADMS model recommended by *Guideline for Environmental Impact Assessment-Atmospheric Environment* (HT2.2-2008). It predicts impact of road pollutant on the area and environmental protection target under typical hour, daily and long-term meteorological conditions.

Prediction results show that high concentration exhaust gas of the Project is mainly near road axis. Concentration contribution value on sensitive points is lower than the corresponding standard value. As traffic flow change is not huge before and after reconstruction of the Project, exhaust gas concentration in the area will remain the present status after reconstruction.

To sum up, increment of maximum concentration of CO and NO_2 in the area is small during operation period of the Project and it also has small impact on ambient air quality along the line. With improvement of environmental protection laws and regulations and development of automobile industry, motor vehicle exhaust pollutant discharge will decrease.

4.7 Solid waste impact

4.7.1 Construction period

The solid waste during construction period of the Project mainly includes discarded earthwork and domestic refuse of constructors.

(1) Abandoned earthwork

Earthwork of the Project constitutes temporary earthwork and permanent earthwork.

For the Project, during excavation and backfilling of water drainage works, there exists earthwork to be temporarily stacked, and earthwork of some rod line mobilization works requires being temporarily stacked. The Project is designed with temporary earth

stacking site along the road and establish such sites for all the areas where pipe network requires to be reconstructed and areas to be remolded as well as areas of rod line mobilization, and earthwork shall be stacked nearby at one side of pipelines. As the work belongs to road and station yard works, excavation of earthwork exists along the whole line, construction organization shall, during actual construction process, optimize scheme of earth stacking site setting and enforce management on reduction of impact of temporary earth stacking during construction period on surroundings:

①During the construction process, in order to reduce the impact of engineering construction on nearby traffic and residents, PVC project enclosure with the height of not less than 2.4m shall be set up around the areas which need to be rebuilt and extended. Keep construction area within these enclosures clean, and assign specific persons to take charge of clean-keeping at the construction site to make sure watering and cleaning is promptly carried out to reduce dust-raise. Stacking earth and stacking materials shall not occupy areas surrounding the red line.

②Make reasonable planning for earth stacking site according to quantity of temporary earth stacking to reduce the number of temporary earth stacking site. Try best to locate earth stacking site in the center of the enclosure where there will be less vehicles and machines pass through during construction period to reduce disturbance on earth stacking site caused by construction machines.

③Waterproof cloth shall be adopted to create temporary cover on the mould surface according to the duration of such mould.

According to Report of Water and Soil Conservation Scheme and according to earthwork balance of the works, total excavation quantity of the work is 933,800 m^3, and 684,200m^3 backfilling and 186,400 out-borrowed earthwork and 436,100 m^3 to be abandoned, of which 249,600 m^3 to be abandoned permanently, mainly including road excavation surplus within land occupation area and boring mud of bridge pier foundation which can be delivered to temporary earth stacking site and then be utilized for backfilling of other surrounding projects in lack of earth; 186,500 m^3 to be abandoned temporarily, mainly including topsoil stripping earthwork which can be used for earthing and backfilling of green belt in later period.

(2) Construction waste

All housing demolitions of the Project are demolitions within land used for the work; total area of buildings to be removed is 18214.33 square meters, producing 820 thousand

m^3 construction wastes. Construction wastes of the Project will undergo uniform organization and distribution by Urban Management Department for regional balance, while unavailable parts will be delivered to site designated by Urban Management Department for digestion and absorption.

(3) Household waste of constructors

Maximum quantity of household wastes during construction period is approximately 0.4t/d when calculating household wastes of constructors as 1.0kg/person•d and taking the number of constructors during the peak as 400. Household wastes of constructors will be delivered to Environmental Sanitation Department for disposal after being collected and won't have evident influence on surrounding environment.

4.7.2 Operation period

Solid wastes during road operation period are mainly carriers of transport vehicles, stowage scattered from traffic accident vehicles and passengers' litters etc. Environmental sanitation department shall strengthen management and clean.

Passenger stations of the Project are not equipped with vehicle maintenance and washing functions. Solid wastes generated in public transportation and passenger stations are mainly domestic garbage from staffs and passengers. In terms of there domestic garbage, environmental sanitation department shall arrange special environmental sanitation personnel to clean the road regularly, collect and handle garbage on the road.

Final emission load of the Project is zero. It has no huge influence on outside environment.

4.8 Accident risk impact

The Project is an important constituent part of Anlu traffic framework road network and it takes dual functions: regional transportation and local service. As main passage of the area, potential environmental risks of the Project are environmental influence and control due to accident risks. The chapter will analyze dangerous goods transportation environmental risks on the road.

The Project is located in Anlu City, Xiaogan. Parts of the sections are located in suburb. Both sides of the road are mainly offices and residences. There is also crossing bridge.

In consideration of environmental sensitivity of the section as well as environmental risk influence of dangerous goods transportation, according to Regulations on the Control Over Safety of Dangerous Chemicals, “transport vehicle shall try to drive in the suburb in order to avoid risk accidents happening in urban center or communities with dense population”, the assessment thinks that urban section road of the Project shall forbid dangerous chemicals transportation and obvious warning marks shall be posted in both ends of the bridge to prevent environmental risk accidents due to traffic accidents.

4.9 Social impact

Movement of construction vehicles and occupation of existing roads during construction period will have a short-term adverse effect on travel and normal life of surrounding residents. Meanwhile, a number of transport vehicles for materials may lead to traffic jam in certain road sections. Construction vehicles will raise dusts which will degrade life quality of neighboring residents and construction noises will also play a negative role in rest and relaxation of residents. Sewage, household refuse and production rubbish from construction camps and site will also affect the water quality of rivers. Level of civilization of construction personnel may have impact on normal life of local residents. Residents who live nearby the construction site will be firstly exposed to those effects.

Coming in and out of construction vehicles, transportation of construction materials and other construction activities will cause obstruction to occupation of existing road and bring adverse effects on going out of residents along the line. According to field investigation, there are residents, schools, official organizations at both sides of construction road. The road construction will have a certain influence on going out of surrounding residents. If there are function changes of land used in demolishing and requisition of engineering, there will be a certain influence on life of residents, traffic, social economy and infrastructure. Placing of material on construction site of the Project and excavation on construction site will make the city in a mess and influence urban landscape. Excavation and other activities in process of engineering construction may bring inconvenience to residents around. Most of construction contents of road in the Project are located in downtown of Anlu and there are many shops along the line of road. Therefore, during construction period, if closed management is conducted, it may have influences on business of shops along the line of road.

Construction of the Project is municipal construction with public welfare, which will

bring positive interests for the society and economy. Construction of the Project provides convenient traffic condition and complete public facilities for residents and organizations along the line. It can also improve regional investment environment, improve city image and it has significant meaning for driving continuous, healthy and quick development of surrounding economy.

4.10 Accumulated influence

The construction period of the Project lasts sixty months, so the time span is relatively long. The construction is conducted in different points and different sections, but no concurrent construction in many construction sites is arranged, so there is relatively small influence on each other in different subprojects of the Project. There is no accumulated influence of construction period in the Project. What tends to generate accumulated influence of construction period is mainly recent large-scale infrastructure engineering in Anlu. According the the investigation, the relatively large-scale infrastructure engineering to be started in recent years is “Five Roads and One Bridge” Engineering, and the engineering has been included in the construction plan, but the specific construction plan is still not available.

If the “Five Roads and One Bridge” Engineering and the Project is concurrently constructed in both time and space, the accumulated influence may be imposed on the area which is affected by the construction site, such as accumulated influence of construction noise, raised dust, abandoned slag, traffic organization, etc. So the Construction Management Department shall promptly coordinate the construction arrangement of the Project and “Five Roads and One Bridge” Engineering, prepare prevention measures in advance, reasonably arrange the construction time and construction period in different construction sections to avoid relatively great accumulated influence.

5 Mitigation Measures of Environment Influence

In terms of potential project impacts, measures shall be taken to intensify positive effects and reduce adverse effects. Mitigation measures specified in the section are mainly aimed at adverse impacts generated during project design and implementation. Contractors shall specify detailed and specific environmental protection measure implementation plan on construction site aimed at each sub-project and each construction site. This requirement is also included in the Contractor's bidding document.

The Contractor shall ensure total implementation of required mitigation measures during project construction period. External monitoring company (EMC) for environment management plan employed by the Employer will monitor aggregate performance of environmental protection and contractors' responsibilities and obligations. The company will also report problems to project management office so as to take necessary measures.

5.1 Environmental mitigation measures during design phase

In terms of design organization, if site selection is feasible, site selection and construction scheme design for stations shall avoid sensitive points nearby.

5.2 Environmental mitigation measures during construction phase

Construction activity will influence environment along the line differently especially sensitive points. Contractors are responsible for environmental protection and reducing impacts on environment during project construction period. Environmental impact mitigation measures during construction period will be listed into tender document and shall be implemented during construction process as important provision of project contracting agreement, so as to supervise and urge constructors to take practical and effective environmental protection measures to protect environment in construction site or nearby during construction process as well as protect safety of local residents and constructors.

5.2.1 Water environment impact mitigation measures

In order to reduce impact on water environment during construction period, contractors shall take the following specific measures:

Measures adopted during construction period are mainly as follows:

(1) Strengthen construction management and supervision, and regularly check the construction machinery to avoid leakage of oil to flow into municipal pipe network;

(2) Temporary covering canvas shall be prepared for construction materials such as asphalt, oil and chemicals; necessary measures shall be adopted to prevent earth and scattered construction materials from blocking existing municipal pipe network;

(3) Build simple drainage facility before construction of roadbed slope, and dig trapezoidal drainage ditch outside slope angle of embankment;

(4) Build interception and drainage ditch around stock ground of construction site, and set desilting basin and silt fence at the exit to drain rainwater, mud with silt to municipal sewage pipe network after precipitation through desilting basin;

(5) Build oil separator and precipitation facilities for construction sewage; build mud purification pond to precipitate mud drained into the purification pond, and the supernatant will be used to water the construction pavement and to rinse the machinery and trucks, etc. and the rest will be drained to municipal pipe network through silt fence.

(6) The stacking sites of construction materials such as asphalt, oil and chemicals shall be far away from rivers;

(7) During the construction process, in order to reduce the impact of engineering construction on nearby traffic and residents, PVC project enclosure with the height of not less than 2.4m shall be set up around the areas which need to be rebuilt and extended. (8) The exposed roadbed surface of road section close to rivers shall be covered with waterproof cloth in rainy days to avoid erosion to road surface caused by rainfall runoff and to reduce influence on the rivers.

5.2.2 Atmospheric environmental pollution prevention measures

(1) Hardness fence with height of no less than 2.4m shall be set in construction site and the site shall be kept clean. Specially-assigned person shall be in charge of cleaning work on construction site. He shall water and clean the site to reduce dust. One person shall be arranged in each construction section to water the site and reduce rise of dust regularly. Watering frequency shall be determined by weather situation. Watering shall be conducted in rush hours such as morning (7:30-8:30), noon (12:00-13:00) and night (17:30-19:00) according to general principle. Watering shall be conducted every 2 hours in fine days of summer with wind speed exceeding grade 3.

(2) Watering and spraying shall be conducted before removal of existing buildings to control the dust. In terms of removal of buildings, vertical transport equipment or chute

shall be set. Removed objects shall not be thrown from high altitude or pushed over in large scale. Barbaric construction operation is forbidden.

(3) Special spray vehicle shall be used for watering to control the dust during removal of existing buildings. Building removal operation shall be stopped in case of gale weather exceeding grade 4.

(4) Vehicles carrying building materials and building rubbish shall conform to related regulations. Construction muck clear and transportation qualification management shall be implemented strictly. Vehicles carrying construction muck must transport according to the route and time specified by city management department. Clean-keeping measures shall be implemented in construction site and digestion yard strictly. Hardening measures shall be taken and washing facility shall be equipped in entrances and exits of digestion yard and construction site where construction muck is to be discharged. Vehicles in and out of construction site and digestion yard shall keep clean. There shall be no mud on the running vehicles. Vehicles carrying construction muck must be equipped with waterproof cloth or sealed transport vehicle shall be used to reduce scattering of muck. Otherwise, the vehicle shall not be used for construction muck transport.

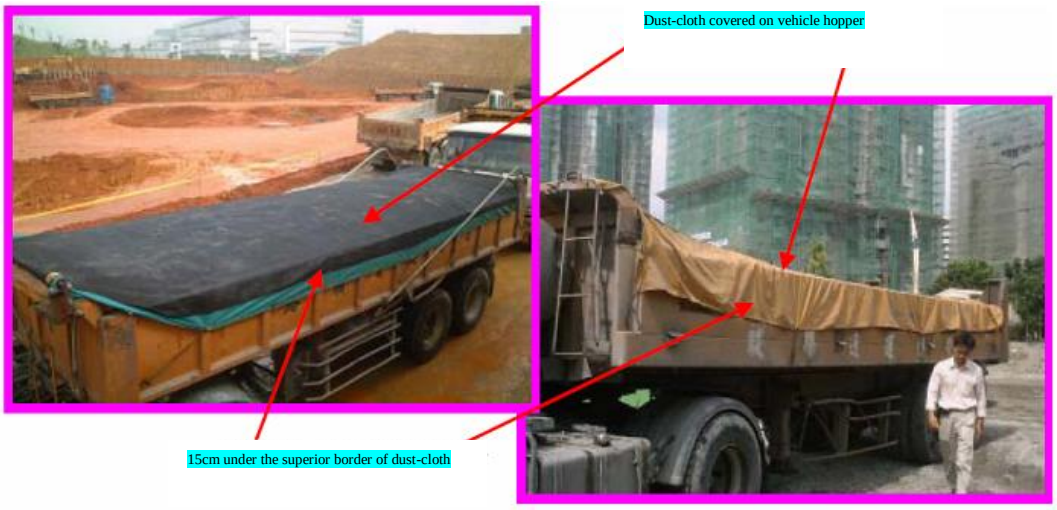


Fig.5.2-1 Sketch Map of Dust-cloth on Vehicle Hopper

(5) Professional environmental protection management personnel shall be assigned during each construction phase. Their responsibilities are guiding and managing discarded earth of project, construction rubbish, disposition, clean, transportation and pile of building materials, site recovery and hardening. They shall also clean dirt and discarded material on

construction site roads and dirt on vehicle wheels to prevent secondary flowing dust pollution.

(6) Reasonably arrange the construction and transportation, and try to avoid the rush hour to ease the traffic pressure for transportation of large-scale members and large quantity of materials and spoil. Meanwhile, The Construction Organization shall coordinate with the Traffic Administrative Department to adopt responsive measures and ease traffic on the construction site with a view to avoid traffic jam and control vehicle exhaust emission to the maximum.

(7) Special persons shall be assigned to the construction area to realize scientific management and civilized construction. During foundation construction, measures to enhance the construction progress shall be adopted as far as possible, and earthwork shall be promptly transported to the designated place to shorten the hazard circle of stacking earthwork.

(8) The gravel, building materials, etc. can't be loaded fully during transportation, and meanwhile the corresponding covering and sealing measures (for instance with tarpaulin) shall be adopted. The accidentally dropped sand and building materials on the ground shall be cleared.

(9) Adequately watering the operating plane and temporary mound to keep a certain extent of humidity to reduce dust emission; if the construction site is close to all vulnerable spots, the watering quantity and frequency shall be raised and measures to reduce dust emission and influence on the surrounding vulnerable spots shall be adopted; the construction roads shall be tamped and hardened, and the in and out vehicles shall pass though the water pool to reduce dust emission.

(10) The garbage truck for construction shall be covered with tarpaulin or transport the garbage with enclosed truck, and the open truck is strictly forbidden to transport the construction garbage. The illegal behaviors of superelevation, overload and dropping along the road are forbidden.

(11) Adopt commercial concrete for construction concrete and spot mixed concrete is forbidden to avoid dust pollution during mixing of concrete.

5.2.3 Acoustic environment protection measures

According to Article 27, 28, 29 and 30 of Law of the People's Republic of China on Environmental Noise Pollution Prevention, the Project shall conform to emission standard of environmental noise on the construction site specified by the state during construction period; report the project name, construction site and duration, possible environmental noise value and the adopted noise pollution prevention measures to the administrative department in charge of environment protection of the construction site five days before commencement of the engineering. The following countermeasures and suggestions are put forth for influence of noise environment during construction period:

(1) During construction, receive the supervision and inspection of the Urban Management Department and take effective measures for vibration and noise reduction without disturbing the residents;

(2) The sensitive spots of residential area, hospital, school, etc are densely and evenly distributed at the both side of the Project. The day and night construction will disturb normal life, rest of the above residents, and the influence of night noise is even worse, so all the night construction shall be forbidden; if there is really a need for night construction due to the construction technology, it is necessary to go through formalities for review and approval of Night Construction Permit according to the relevant provisions and publicize the complaint hotline for night construction noise; the use of high-noise mechanical equipment at night is restricted within 7:00-12:00 and 14:00-22:00, and if there is a need for continuous construction for special reason, the approval of the environment protection department must be obtained in advance;

(3) Try to use low-noise machinery, and all the construction machinery shall be receive noise measurement under normal operation in advance and the nonconforming machinery shall be prohibited from mobilization. The machinery shall be regularly maintained during construction to avoid noise enhancement due to poor performance of the equipment; the high-noise machinery such electric generator, air compressor shall be located at the remote place which is far from the sensitive spots such as residential area, and shall be regularly maintained strictly in conformity with operation procedure, and build 2.4m high fence near the residential area;

(4) Use the commercial concrete, and there is no concrete mixer in the construction site;

(5) Organize the construction trucks. The transportation trucks shall pass the construction site through the side far away from the sensitive spots, and shall slow down and avoid honking when passing through;

(6) Stop construction during special days such as on the dates of senior high school entrance examination and national college entrance examination, etc.

It is expected that after the adoption of the above measures, the environmental influence of construction noise will be reduced and the noise doesn't much affect the surrounding environment when the night construction is avoided. But when there is a need for night construction for special reasons and the requirement of Emission Standard of Environment Noise for Boundary of Construction Site (GB12523-2011) is hard to meet, the Development Organization and the Construction Organization shall strengthen the operation and management of construction period and take the advice of surrounding residents to heart to obtain their understanding and support.

5.2.4 Ecological protection measures

(1) Flowers, plants and trees in the middle part of the road and by the sides of the road shall be transplanted without the need of replanting after being totally removed, and it is suitable to fill up the vacant field through transplanting by design. During the construction, pay attention to protect vegetation of trees and green space in neighboring area.

The road engineering shall be based on the principle of preserving existing trees to avoid migration of seedlings caused by road construction. Give priority to locally grown species with ornamental value for plants along the sides of the road, match species with the site and stress seasonal change of the plants. Determine main species for greening of the road by taking landscape uniformity of the existing species and the principle of economy into account. Tamp the spoil surface, temporarily obstruct with bagged soil around it and meanwhile cover the spoil with cloth. Set drainage ditch around the temporary spoil spots, and the rainwater shall be precipitated in the desilting basin after flowing through the drainage ditch, and then be discharged into the municipal pipe network. To the satisfaction of requirements of the engineering construction, try to save

the occupied land and reasonably arrange the construction progress. Clear the construction site instantly after the completion of the Project, withdraw from the occupied site and restore the original road and greening.

5.2.5 Water and soil conservation measures

The water and soil conservation measures of the Project include three parts, i.e. engineering measures, vegetation measures and temporary measures. Before commencement of the engineering, the Development Organization shall organize the investigation of soil environment of the construction site, and then formulate scientific protection or restoration measures to avoid soil erosion and degeneration during construction and to reduce damage and pollution to soil environment caused by construction activities.

Temporary measures include temporary obstruction, cover and temporary drainage ditch and desilting basin.

Vegetation measures include revegetation and landscaping.

Engineering measures include topsoil stripping, drainage facility, etc.

5.2.6 Mitigation measures of social environment influence

Occupation of the existing road by construction activities such as in and out of construction trucks, transportation of the construction materials will cause traffic jam and bring adverse effect on resident trip along the road. According to the site investigation, there are residents, school, research institute, etc. along the both sides of construction roads. Road construction will bring adverse effect on the trip of surrounding residents. The Development Organization shall reasonably arrange the construction period, and try to reduce the quantity of traveling trucks during rush hours to reduce the adverse influence of the construction on resident trip. The specific measures are as follows:

(1) The Construction Organization shall foster good relations with the public and the surrounding residents around construction site to create a harmonious construction environment. Before commencement of construction, post the necessary notice to describe the engineering condition and the possible disturbance to obtain understanding and support of the public.

(2) To reduce the influence of adverse effect of engineering construction on urban resident life and traffic to the minimum, the vehicle routes during construction shall be uniformly shunted and arranged to avoid traffic jam; meanwhile, the routes of construction machinery and construction transport vehicles shall be uniformly arranged, either, and relevant restriction provisions shall be issued to ensure smooth and normal running of the urban traffic with advance notice by means of broadcast, television and newspaper. People shall be arranged on duty in the construction section to disperse traffic and ensure pedestrian safety.

(3) Set clear signs at the entrance and exit section of the Project to remind detour.

(4) Try to shorten the construction period on the premise of ensuring the construction quality, and stop construction during special periods such as in the periods of senior high school entrance examination and national college entrance examination.

(5) Measures to mitigate influence on the traffic

During road construction, the traffic capacity of the intersection will be reduced under the influence of the construction, so it is suggested that citizens shall detour through the regional road network to avoid passing through the affected intersections and reduce the delayed time.

5.3 Environmental mitigation measures in operation stage

5.3.1 Water environment impact mitigation measures

(1) Water body pollution and safety accident caused by oil leakage of vehicles and cargo dropping shall be avoided to protect surrounding water body such as river. The loaded bulk cargos such as coal, lime, cement and so on which tend to lead dust emission shall be covered to avoid adverse impact on water quality by runoff rainwater caused by falling materials.

(2) Regularly check and clear the rainwater drainage system to ensure that the system is flowing in good condition, and maintain and protect the drainage facilities along the road.

(3) Establish an emergency response group for transportation of dangerous goods to handle all the potential major pollution accident; the vehicles to transport dangerous goods shall be specially managed with special sign.

(4) The domestic sewage of all stations shall be drained into municipal sewage pipeline after pretreatment, and then be discharged with standard level after centralized treatment by sewage treatment plant; if the sewage pipeline is not connected when highway passenger transportation center at the high-speed railway station + public transportation transfer hub are established, the Development Organization shall build a sewage treatment facility by itself to discharge the domestic sewage after the primary standard of *Integrated Wastewater Discharge Standard* (GB8978-1996) is reached.

5.3.2 Atmospheric environmental pollution prevention measures

In specific respect to road system, it is recommended in the report that the following measures should be taken for the purpose to further reduce the impact of exhaust gas produced during operation of the Project on surrounding environment.

(1) No thoroughfare for motor vehicles with over-proof emission of off-gas pollutant

(2) Enforcement on detection and maintenance of motor vehicles

(3) Keep roads clean and carry out watering promptly in order to reduce dust particles on road surface

(4) Utilize plant cover to purify the air

(5) Enforce environmental management and establish organization of environmental management for Road Management Department; entrust Environmental Protection Department to carry out regular ambient air monitoring at monitoring points specified in the Evaluation.

In specific respect to station yard, it is recommended in the report that the following measures should be taken to further reduce the impact of exhaust gas produced during the operation of the Project on surrounding environment.

(1) For catering setting, catering project setting shall be in conformity with relevant requirements by HJ554-2010 Specification For Environmental Protection of Catering Trade and emission of cooking fume shall be in conformity with GB18483-2001 Emission Standard of Cooking Fume (trial implementation); in addition, prior to establishment of catering project, catering organization shall handle environmental impact assessment submitting and approval procedures separately.

(2) Enforcement on interior ventilation of the station yard.

(3) Reasonable planning of overall layout of station yard and scientific management on vehicles entering and leaving the site.

5.3.3 Acoustic environment impact mitigation measures

Traffic noise preventive measures mainly include route adjustment, greenbelt planting, relocation, sound barrier, enclosing wall, sound proof window, change of function of the first row of houses along the road, etc. The Project has predicted that the traffic noise during the operation period in all road sections and the noise of sensitive spots along the road exceed the standard in a certain extent after road construction. To maximally reduce the engineering acoustic impact and improve the acoustic environment quality in the region, the following measures aimed at the road and the surrounding sensitive spots are taken based on different operation periods and present actual circumstance.

(1) Intrinsic control measures of the work

Strengthen management on road operation. Carry out landscaping along the road planned to be constructed, and in respect of tree species, aiphyllium with large crown and leaf area shall be selected, and plant short shrubs of proper amount at places surrounding arbors, in order to reduce traffic noise effectively.

(2) Strengthening the reasonable planning and building layout along the roads

Most of the regions along roads of the Project have been planned to be class 2 residential lands, administrative lands, school lands, hospital lands, commercial facility lands, retail commerce lands, green lands of parks, green lands for environmental protection, etc. Therefore, class 2 residential lands, administrative lands, lands of institutions of higher learning, primary school lands, hospital lands, etc. are the acoustic environmental sensitive areas of the Project.

According to the forecast, the roads will exert severe impacts on the surrounding acoustic environment in the operation period. In the later phase, the Planning Department should adopt an optimal design, avoid infrared rays and adjust the building layout to alleviate the influences of traffic noise on the surrounding environment.

(3) Noise prevention scheme for sensitive spots

Based on the comprehensive consideration of such factors as features, road characteristics, noise reduction effect needed and the application conditions of different noise reduction measures of all the sensitive spots along the roads of the Project and in the principles of technical feasibility, economy and rationality, and fair, low noise pavement will be adopted. Because the Work is located in the central urban area, medium-and large vehicles moving on the roads account for a low percentage which tends to decrease with time going by. Therefore, low noise pavement can be adopted to further reduce the impacts of traffic noise on the surroundings.

5.3.4 Solid waste environment impact mitigation measures

The Development Organization and the Management Organization shall adopt the following solid waste environment impact mitigation measures:

(1) Road engineering

Solid waste of the road engineering during operation period mainly comes from waste caused by pedestrians along the road which shall be included in urban waste processing system. Set up waste container along both sides of the road, and carry out separate collection and concentrated disposal.

(2) Station yard

Set up a concentrated dump in the station yard for domestic garbage produced in the station yard, and the Sanitation Department in the district where the Project is located shall regularly and centrally clear and transport the garbage.

5.3.5 Risk accident preventive measures

The Project is an important part of the road network in Anlu, and undertakes dual functions of rush through of local transportation and local service. As the local main passage, both sides of the road are mainly used in office and residence.

In consideration of environmental sensitivity of the road section and the environment impact degree of dangerous goods transportation, it is assessed that the road section shall forbid transportation of dangerous chemicals according to the provision of "Transport vehicles shall run through the suburb where there is scarce people to avoid occurrence of risk accident in urban center or densely populated community" specified in *Regulations on the Control over Safety of Dangerous Chemicals*. If in

special circumstance, there is really a need to run through the road transported with dangerous chemicals, it is required to take the following measures:

①Report to the local departments such as the Public Security Department, the Environment Protection Department, and propose a Risk Prevention Plan for Transportation of Dangerous Goods.

②The Public Security Department shall designate the running time and road section to be passed, and if necessary the Public Security Department can implement traffic control.

③ The transport vehicle must strictly conform to the relevant provisions in *Transportation Code of Dangerous Goods* (TT3130).

6 Environment Management System

6.1 Environment management organizations and responsibilities

The effective implementation of Environmental Management Plan needs common participation of relevant parties, including competent administrative departments for environment protection (EPB) at all levels; the Initiator of the Project, i.e. Project Management Office (hereinafter referred to as “Project Employer” or “Project Office”); the Contractor, i.e. the Construction Organization (CET); the Supervision Organization for construction engaged by the Employer (CSC) and the External Monitoring Consultant of Environmental Management Plan entrusted by the Employer (EMC).

To realize the objectives of Environmental Management Plan, the Employer will entrust the Supervision Organization to assign a special person to be responsible for environment supervision during construction period of the Project; in addition, the Employer will engage the qualified and experienced External Monitoring Consultant of Environmental Management Plan (EMC) to independently carry out external monitoring of the implementation of Environmental Management Plan and to be responsible for regular and targeted construction site check and necessary environment monitoring through competitive procurement supported by its own fund and capacity building sub-item fund of lending institution of World Bank. See Appendix A for work outline of the External Monitoring Consultant of Environmental Management Plan. See Fig. 6.1-1 and Fig. 6.1-2 for organization establishment, organization structure and working mechanism for implementation of Environmental Management Plan during construction and operation of the Project.

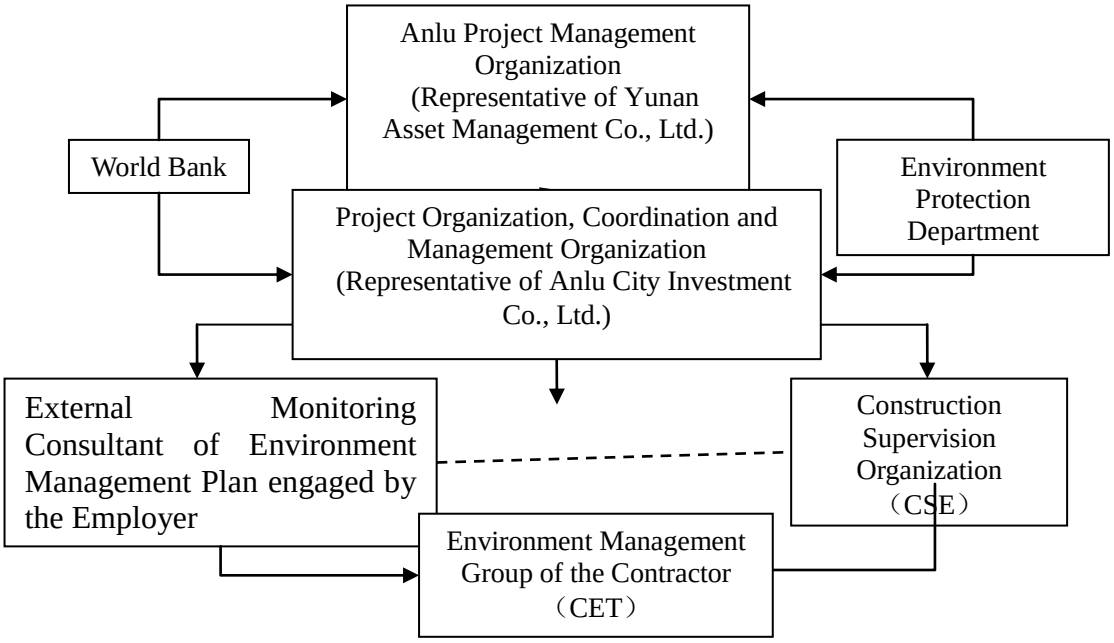


Fig. 6.1-1 Organizational Chart of Environmental Management Plan During Construction

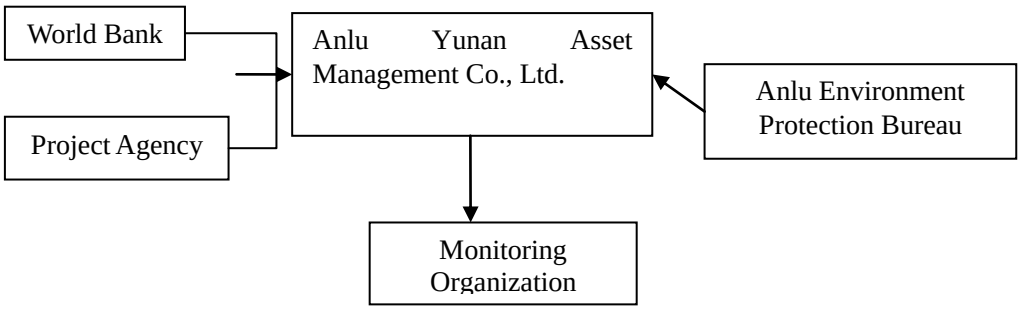


Fig. 6.1-2 Organizational Chart of Environmental Management Plan During Operation

See the following Table 6.1-1 for main environmental responsibilities and personnel arrangement of main relevant parties in various phases of the Project.

Table 6.1-1 Environment Management Organization Arrangement and Responsibilities of the Project

Phase	Relevant parties of the Project	Environmental responsibilities
Preparation phase of the Project	Hubei Environmental Protection Bureau (HBEPB)	Examine and approve the environment impact assessment report.
	Anlu Environmental Protection Bureau (ALEPB)	Issue Standard Letter for Implementation of Environment Impact Assessment of the Project; assist the Project Office in carrying out environment impact assessment during preparation of the Project; assist the Project Office in carrying out environment impact assessment during preparation of the Project.
	Anlu Leading Group of World Bank Loan Project	Direct, supervise and coordinate the work, and general organization.

Phase	Relevant parties of the Project	Environmental responsibilities
	Anlu Construction and Development Investment Co., Ltd., Anlu Yunan Asset Management Co., Ltd.	Be responsible for organizing the implementation of Environmental Management Plan (EMP), and the inclusion of environment mitigation measures into technical specification, project table and construction contract by the Design Organization during preparation of bidding document.
Construction period	Project Management Office (PMO)	1. Direct, supervise and coordinate various work during construction period; 2. Regularly submit the progress report (semiannual report, annual report) for implementation of EMP to the World Bank.
	Contractor (CET)	1. Be responsible for implementation of EMP and other environment protection measures; 2. Be responsible for organizing environment protection training participated by constructors.
	Construction Supervising Engineer (CSE)	1. Ensure the implementation of environment protection measures by daily supervision; 2. Pay attention to the record of implementation of environment protection measures and the problems in supervision monthly.
	External Monitoring Consultant of Environmental Management Plan (EMC)	1. Train the relevant organizations such as the Construction Organization, the Employer according to requirements of working outline; 2. Carry out regular check, monitor the emission of such pollutant as water, air and sound by sampling if necessary, and verify the authenticity of the environment protection log of the Construction Supervision Organization, and the validity of environment mitigation measures proposed in environment assessment report.
	Hubei Environmental Protection Bureau (HBEPB)	Check the environment management during construction period.
Operation Period	Project Management Office, Employer Organization	The same as those in construction period.
	Anlu Construction and Development Investment Co., Ltd., Anlu Yunan Asset Management Co., Ltd.	1. Be responsible for implementation of environment protection measures and environment management plan; 2. Be responsible for normal operation of environment protection facilities.
	Hubei Environmental Protection Bureau (HBEPB)	1. Organize the acceptance of “Three Simultaneities” of environment protection facilities; 2. Check environment management during operation.
	Qualified monitoring organization	Monitoring during operation and accident monitoring.
	Anlu Urban and Rural Planning Bureau	Control the construction of developing sensitive objectives along both sides of the newly- built road.

6.1.1 Environmental protection bureau (EPB)

As supervision department, environmental protection departments (bureaus) at all levels shall make environmental regulations and policies for project construction and operation activities, and shall be responsible for enforcing laws, regulations, standards,

guidelines, and related environmental policy of all the organization within their jurisdictional limits.

Chinese Ministry of Environmental Protection is the highest organ of environmental protection and will guide Hubei Environmental Protection Department in enforcing related regulations; Hubei Environmental Protection Department will review and approve environmental impact assessment report and guide Anlu Environmental Protection Administration in overall environment management of the project; Anlu Environmental Protection Administration shall be directly responsible for supervising and enforcing environmental regulations and standards.

As provincial environmental supervision and administration organization, roles and duties of Hubei Environmental Protection Department are as follows:

(1) Supervise the performance of environment management plan;

(2) Enforce applicable laws, regulations and standards;

(3) Coordinate matters with regard to environment protection among related departments;

(4) Inspect and supervise the construction, completion and operation of environmental facilities;

(5) Guide Anlu Environmental Protection Administration in environmental management.

(6) Roles and duties of Anlu Environmental Protection Administration are as follows:

①Supervise environment management plan performed by construction organization and enforce applicable regulations and standards;

②Coordinate matters with regard to environment protection among related departments;

③Inspect and supervise the construction, completion and operation of environmental facilities within its purview.

6.1.2 The Employer (PMO)

Anlu Municipal Government established leading group of projects supported by World Bank Loan to take charge of overall project decision and comprehensive coordination. Projects Coordination Office under the leading group is set at Anlu Development and Reform Commission, which takes charge of specific coordination of

relevant departments of Anlu and is responsible for communication and coordination among the World Bank and relevant departments of Hubei Province during periods of project preparation and implementation.

Anlu Administration Office for projects supported by World Bank Loan established by Anlu Construction Committee shall take the ultimate responsibility of environmental performance of the Project during construction period and operation period. The organization is a daily management organization set under the leading group of Anlu Municipal Government and responsible for management of all kinds of work during project preparation and implementation. Project Office will take charge of relevant work of World Bank's security policy during periods of preparation and implementation of Anlu urban traffic projects, including but not limited to the following 5 aspects:

(1) Organize Environment Evaluation Organization, with qualification and experiences, to formulate environment evaluation report for the Project in the period of project preparation, including supporting and supervising Environment Evaluation Organization on completion of *Evaluation Report of Environmental Impact* and *Environmental Management Plan* of the Project, so as to ensure that they can meet requirements of relevant national laws, regulations, standards, technical guides and security policy of the World Bank, as well as obtain approval of local competent administrative department for environmental protection and security policy department of the World Bank.

(2) Ensure interaction among environmental impact assessment and consultation organization, project feasibility organization and design & consultation organization, so as to overall consider mitigation measures and other environmental aspects and integrate procedures and requirements into project design, as well as include cost for environmental protection measures into total project investment.

(3) Final supervisors of Environmental mitigation measures and other environmental protection measures during construction period of the Project will integrate environmental requirements into construction contract, organize training for the Contractor, Construction Supervision and local Project Office and conduct other environmental management procedures, as well as conduct regular inspection of construction site.

(4) Carry out and supervise environment monitoring procedures, review supervision log of Construction Supervision Engineer (CSE) and external monitoring report of External Monitoring Consultant (EMC) of Environmental Management Plan, inspect Contractor's

environmental performance, promptly take necessary rectification & reform actions to deal with problems found in external monitoring report and suggestions, including any emergency situations and sudden events caused during construction period.

(5) Provide public consultant for the public, persons affected by the Project, relevant organizations and other stakeholders during project preparation and implementation period, so as to ensure that they can completely understand project process, existing potential environmental problems and mitigation measures, as well as listen to and reply problems and suggestions with respect to environmental protection concerned by them.

6.1.3 The Contractor (CET)

During construction period, project contractor is one of key links of environmental control, pollution control and impact mitigation. The Contractor will take a series of measures as guarantee and be aware of responsibilities and obligations for environmental protection. Obligations of the Contractor and its professional personnel for environmental management, including but not limited to:

(1) Requirements of mitigation measures listed in Environmental Management Plan shall be included in bidding documents of civil engineering and adopted as appendix of construction contract; in addition, the Contractor must strictly carry out measures specified in the report of *Environmental Management Plan*;

(2) The Contractor shall actively fulfill its environmental responsibilities and daily or weekly provide its environmental performance log. These records will be submitted to Construction Supervision and reviewed by Project Office and Construction Supervision for self-inspection and rectification & reform activities.

(3) Abide by requirements of relevant environmental laws;

(4) Complete work within the scope of contract and other bidding conditions;

(5) Each contract shall appoint one profession person to take charge of implementation of environmental measures and work together with External Monitoring Consultant (EMC) of Environmental Management Plan, so as to carry out mitigation measures, on-site inspection and corrective measures indicated by any employer and/or its EMC;

(6) When indication of stopping construction activity causing adverse influence is received from the Employer or External Monitoring Organization of Environmental Management Plan (EMC) entrusted by the Employer, other construction method shall be

adopted to minimize environmental impact, if necessary;

(7) The Contractor shall make full public participation with communities at construction site, set showy sign boards at all roads to indicate main construction activities at special site and construction period; at the same time, provide the public with contract name, contact person and her/his phone number on those sign boards, so as to ensure that the public can express their concern and complains on construction activities;

(8) Before commencement of works, all contractors shall participate in compulsory environmental training. The training mainly includes the following 8 aspects:

1. National and local laws, regulations and standards;

2. Environmental Management Plan;

3. Environmental mitigation measures;

4. Provisions for protection of material cultural heritage (including treatment procedures for historical relic found during construction period);

5. Emergency measures;

6. Environmental monitoring method and requirements specified in contract, as well as report procedures;

7. Long-term public consultant and response;

8. Environmental obligations of the Contractor.

6.1.4 Construction Supervision Engineer (CSE)

Construction Supervision Engineer (CSE) shall be responsible for construction activities and supervision of the Contractors' performance on their environmental duties during construction, so as to ensure that they can abide by relevant environmental laws, regulations, technical guides, standards, specifications and contract requirements. Responsibilities of CSE include:

(1) Review construction organization design to ensure that engineering design and *Environmental Management Plan* of the Project can be met, as well as consider environmental protection and impact mitigation. Construction activities can be started only after being reviewed and approved by CSE;

(2) Provide necessary assistance for the Employer and EMC employed by the Employer in the process of environmental management and supervision;

(3) Regularly conduct on-site inspection for environmental management work of the Contractor; if CSE thinks that environmental management personnel of the Contractor fail

to fulfill responsibilities or fail to abide by contract requirements, he can instruct the Contractor to change their environmental management personnel;

(4) Ask the Contractor to take rectification measures within specified period; if there is nonperformance and serious public complaints, CSE shall command the Contractor to make corrections, changes or stop the work, as well as report to relevant organizations and the Employer;

(5) Supervise activities of the Contractors and ensure that they can fully satisfy requirements of Environmental Management Plan and mitigation measures specified in contracts;

(6) Instruct the Contractor to take actions to mitigate impact and avoid nonperformance according to requirements in approved *Environmental Management Plan*;

(7) In case that the Contractor violates any environmental problem, the Contractor can be paid only after solution of environmental problem at current month and approval of CSE;

(8) In case that the Contractor finds cultural relic in the process of construction, CSE shall instruct him to protect the site and inform relevant organizations the Employer;

(9) Persist in making complaint and investigation as per procedures.

6.2 Laws for on-site environmental supervision and contract requirements

The Contractor shall formulate detailed environmental protection implementation plan specifying all sites in bidding documents. Clauses with respect to environmental protection in this plan and construction contract must conform to requirements of relevant national environmental protection laws and regulations.

Construction organization plan of the Contractor must be submitted to CSE for approval; CSE shall inspect that whether it contains adequate environmental protection and pollution control measures. The Contractor shall submit project progress report, updated engineering plan and relevant documents to CSE, so as to ensure that inspection work of CSE can proceed smoothly. On-site log shall be recorded according to requirements of CSE and submitted to CSE for inspection at any time.

In documents for review, if there is any content nonconforming to requirements for environmental protection and pollution prevention and control in contracts and laws, CSE will give clear rectification opinions to the Contractor and the Contractor must make a

rectification promptly; otherwise CSE will not issue Construction Permit.

Through regular on-site inspection and supervision of construction activities, CSE can inspect and confirm possible potential environmental problems and put forward prompt mitigation (prevention) measures to the Contractor. Inspection area includes construction area and places outside of construction area directly or indirectly affected by project construction.

Routine and regular on-site inspection (such as, weekly inspection or monthly inspection) shall be organized by CSE and participated by CET and PMO. CSE shall record environmental changes and environmental performance of the Contractor into work log in the process of project construction; nonperformance in environmental impact evaluation and report of *Environmental Impact Plan* and suggestions of project contract can also be included. The work log shall be provided to the Contractor for implementation of *Environmental Impact Plan* and looking up by External Monitoring Consultant and any other personnel.

The following information will be involved when CSE guides inspections:

(1) The Contractor's environmental performance, environmental protection implementation plan and implementation of waste reduction, dangerous waste management and other required mitigation measures;

(2) Specific requirements in Chapter V of the *Environmental Management Plan*;

(3) Requirements conforming to Environmental Management Plan, relevant laws, regulations, technical standards and specifications of the People's Republic of China specified in contracts;

(4) Protection of sensitive area and management mechanism of restricted area;

(5) The Contractor's construction method and conditions of construction site;

(6) Single project construction plan including relevant measures and suggestions for controlling pollution;

(7) Engineering progress and construction processes;

(8) Adequacy and effectiveness of pollution control measures (treatment facilities) of the Contractor for minimizing environmental impact;

(9) Positions and management of waste, material storage area, soil pit and construction road, as well as pollution control measures;

(10) Problems found in previous on-site inspection and results;

All information related to construction contract updated by the Contractor for CSE

shall be provided to CSE for implementing on-site inspection. Inspection results and relevant suggestions for optimizing environmental protection measures shall be promptly submitted to the Contractor for modification. If there is default, disconnection or something exceeding environmental quality standard, the Contractor shall take rectification measures according to requirements in documents. The Contractor shall implement those measures according to procedures and periods specified by CSE, as well as report any remedial measures to be taken next.

Organize a meeting after each weekly (or monthly) inspection. In this period, the Contractor shall report implementation progress of rectification measures decided in previous inspection. During current inspection period, determined investigation and required improvement measures shall be discussed. Meeting minutes shall be distributed to all participants. The Contractor is required to implement necessary measures within the prescribed period of time.

6.3 Punishment system

According to contracts, If CSE finds actions violating against environmental laws during on-site supervision period, the Contractor shall complete the rectification within specified period (for example, 2 weeks). If the Contractor can complete the rectification within specified period, it will be freed from punishment. If the Contractor fails to successfully make necessary rectification within specified period, payment shall be paid to third party for taking the place of the Contract to complete rectification measures.

6.4 Environmental complaint

In the process of construction, if environmental complaint is received, CSE will start complaint investigation procedures. CSE will conduct the following procedures according to received complaint:

(1) Input complaint contents and receiving date of complaint into complaint database and inform the Contractor;

(2) Investigate the complaint to confirm its effectiveness, as well as appraise that whether the problem comes from engineering activities;

(3) If the complaint is valid and indeed caused by engineering activities, mitigation measures shall be worked out and the Contractor shall be informed;

(4) If the complain is delivered by Ministry of Environmental Protection, temporary report related to complaint investigation shall be submitted to Ministry of Environmental

Protection; in addition, next action shall be taken within the period specified by Ministry of Environmental Protection;

(5) Make further inspection to verify the situation and take measures to avoid reoccurrence of complaint;

(6) Take actions for complainant during and after reporting investigation result according to cause of complaint (if the complaint comes form Ministry of Environmental Protection, the result shall be reported within the period specified by Ministry of Environmental Protection);

(7) Record complaints, investigation, subsequent action and results of monthly environmental management plan report.

During the period of complaint investigation, the Contractor shall work in coordination with CSE and provide all necessary information to help to complete the investigation. If mitigation measures are determined in the process of investigation, the Contractor shall promptly carry out mitigation measures. CSE shall ensure that the Contract carries out these measures.

6.5 External Monitoring Consultant (EMC) of Environmental Management Plan

External Monitoring Consultant (EMC) of Environmental Management Plan supervises that whether the Contract fully conforms to requirements of *Environmental Management Plan* on behalf of the Employer, directly report to the Employer and is responsible to the Employer. The Employer will, through competitive procurement procedures, employ qualified consultant organization through competitive procurement procedures, to carry out external monitoring work of Environmental Management Plan. Employed EMC shall have 5 years of experience at least in aspects of similar projects, similar consultant services, know well in relevant environmental laws, regulations, technical standards, specifications and guides. Employed consultant shall be familiar with his work by reviewing relevant reports, including Environmental Management Plan; monitoring personnel shall have relevant certificate issued by Ministry of Environmental Protection (MEP), be familiar with urban roads, public transport hub, environmental problems in the process of facility construction, protection demand and have experiences, so as to conduct environmental monitoring of urban traffic project. External Monitoring Consultant (EMC) of Environmental Management Plan shall have the following main

responsibilities:

(1) Confirm that whether construction organization design requiring review entrusted by the Employer conforms to requirements of approved *Environmental Management Plan*, especially requirements with respect to on-site environmental management and mitigation of impact;

(2) Monitor and inspect on-site environmental management system of the Contractor and environmental performance, experience and ability to handling on-site environmental problems of CSE; if necessary, EMC is entitled to suggest the Employer to change professional environmental management personnel of the Contractor and CSE;

(3) Conduct daily inspection for performances of the Contractor and CSE on implementation of *Environmental Management Plan*;

(4) Review effectiveness of relevant environmental protection measures in *Environmental Management Plan*, inspect and confirm effectiveness of measures for mitigating impact, as well as provide consultant report to the Employer at regular intervals;

(5) In case that environmental emergency is caused, EMC shall participate in coordination and treatment;

(6) Supervise environmental protection actions of the Contractor; if there are any actions violating against contracts or requirements of *Environmental Management Plan*, EMC shall command to temporarily stop the work, as well as put forward rectification measures or give punishment suggestions;

(7) Submit biannual and annual consultant reports to the Employer;

(8) Participate into environmental inspection of World Bank Project Group or other relevant departments upon requirement of the Employer;

(9) If environmental pollution accident is caused within contract period, investigation shall be made and independent investigation report shall be provided to the Employer upon its requirements.

(10) Assist the Employer and CSE in investigation and evaluation of environmental complaint upon requirement of the Employer.

6.6 Information management of environmental management plan

6.6.1 Information exchange

Environmental management requires necessary information exchange between different departments and posts among the Project Office, the Contractor and the

Construction Supervision Organization and related information shall be notified to the outside (related parties and the public, etc.)

Internal information exchange can be conducted in various forms such as meeting, internal bulletin, etc. and one formal meeting a year is required. In addition, all exchange information shall be recorded and filed. External information exchange shall be conducted once half a year or a year and information exchange with cooperation organization shall form minutes and be filed.

6.6.2 Recording mechanism

The organization shall set up a perfect recording system and keep records of the following aspects for the sake of effective operation of environmental management system:

(1) Requirements of laws and regulations;

(2) Administrative licensing;

(3) Environmental factor, related environmental impact document and EMP report;

(4) Training record;

(5) Inspection, verification and maintenance activity records;

(6) Monitoring data;

(7) Validity of corrective and preventive measures;

(8) Information of related party: complaint and treatment process as well as result recording. In addition, various records above shall be controlled necessarily, including record identification, collection, catalogue, filing, storage, management, maintenance, query, retention period, disposal and other links.

6.6.3 Reporting mechanism

The Contractor, External Supervision Organization, Environmental Supervision Engineer and Project Office shall record project progress, EMP execution, environmental monitoring result, etc. and report to related departments during project implementation. Monitoring record of operation condition of garbage dump and sewage treatment plant involved in the Project shall be understood and collected regularly and related requirements are included in the monitoring plan. It mainly includes the following six parts:

(1) Environmental Supervision Engineer of the Project shall keep records of EMP execution monthly in details and promptly weekly and monthly reports to Project Employer and Project Office. Execution of environmental protection measures, progress of environmental monitoring and monitoring data shall be included in weekly and monthly

reports.

(2) The Contractor and the Operator shall keep records of project progress and EMP execution quarterly in details and promptly report quarterly report to Project Office. At the same time, the quarterly report shall be copied to State Ministry of Environmental Protection.

(3) After completing entrusted monitoring task, the Monitoring Organization shall promptly submit the monitoring report to the Contractor (the Operator) and Environmental Supervision Engineer;

(4) The Contractor and the Operator shall promptly submit environmental monitoring report of the Project to Anlu Ministry of Environmental Protection and Project Office which shall promptly submit monthly, quarterly and annual reports for progress and effect of project EMP execution to Anlu Ministry of Environmental Protection and related organizations. If necessary, they shall be submitted to the World Bank.

(5) In case of special violation against rules with regard to environmental protection, the Environmental Supervision Engineer and Project Office shall notify local administrative department in charge of environmental protection. If necessary, it shall be reported level by level.

(6) EMP execution report of the Project shall be submitted to the World Bank every half a year and EMP execution report can include the following main contents:

1. Project progress;

2. Execution of project environmental protection measures, progress of environmental monitoring and main monitoring results;

3. Implementation of training plan;

4. Existence of public complaint. If yes, main contents, solution and public satisfaction of complaint shall be recorded;

5. EMP execution plan in the second half year.

7 External Supervision of Environmental Management Plan

7.1 Supervision purpose

According to the purpose of the Project, the Employer should entrust an External Monitoring Consultant (EMC) of environmental management plan. The EMC will go to construction site to collect every index of environmental sensitive spot (including water, air,

and sound and so on) regularly. These indexes will be passed to the Employer and its environmental supervision company to be used as the reference frame of the judgment of observing environmental legislation. Appropriate design monitoring plan and monitoring frequency is necessary for they can demonstrate the aggregate performance of the Project engineering and the short period effect caused by construction activity. More specifically, as an necessary and important part of EMP, environmental supervision plan includes the following aspects:

(1) Affirm the predicted adverse effect of EIA;

(2) Affirm the practical scope of influence;

(3) Evaluate the effect of mitigation measures constructed at site;

(4) Identify and adjust the addition retard measures adopted for sudden impact. These measures may be necessary during the period of project construction and operation.

7.2 Environmental monitoring agency

The environmental monitoring during the period of construction and operation is undertaken by qualified environmental monitoring agency entrusted by project contractor. Every undertaking organization is national environmental quality certification testing unit with full equipment, strong technology strength and can accomplish its undertaken environmental monitoring task nicely.

Take sensitive focus of obvious pollution as monitoring spot and trace the pollution condition during the period of construction and operation according to the predicted result of environmental influence. Choose the noise of great environmental influence, are environment and surface water environment as monitoring content. Monitoring factor is ensured by engineering pollution characteristics factor. Adopt monitoring analysis method of relative project in Environmental monitoring technical specification issued by the National Environmental Protection Agency as monitoring analysis method. Carry out national standard affirmed by each subproject environment impact assessment as evaluation criterion.

7.3 Detailed environmental monitoring requirement

7.3.1 Construction environmental monitoring content and requirement

(1) Construction environmental monitoring content

①The impacts of construction field and transport vehicles raise dust to sensitive spot such as surrounding resident area;

②The influence of construction noise on sensitive spot such as surrounding resident area;

(2) Monitoring plan

The construction monitoring plan is shown in Table 7.3-1. The monitoring of environmental noise is mainly centered on road pavement base construction and the monitoring of air quality is mainly centered on earth-rock phase. The monitoring of solid waste runs through the whole construction phase. As for the selection of monitoring spot, mainly air and noise spot sensitive spot that along the line according to practical condition such as transport route during construction period. The monitoring spot of solid waste can be established at areas such as topsoil pile place, temporary mound field and so on.

Table 7.3-1 Environmental monitoring plan table of construction period

Monitoring program	Monitoring spot	Monitoring frequency		Monitoring duration	Enforcement body	Monitoring agency
TSP	Transport vehicles turnover construction field	Monitor once at every sensitive spot construction period		Succession for 12 hours every time	The Employer entrusts qualified monitoring unit	Anlu environmental protection agency
L_{Aeq}	Sensitive spot along the line of the Project	Once a season	1 day	Once at the day and once at the night		
COD、BOD_5、SS	Waste water spot of vehicles washing	Monitoring twice during construction period	/	2 days a time		
Solid waste	Around the surface topsoil pile place and temporary mound field					

(3) Monitoring requirement

The Development Organization must clear-cut the environmental monitoring content and requirement during construction period in the construction contract and it should be organized and implemented by the Construction Organization during construction. The environmental monitoring should be finished by entrusting qualified unit. All monitoring reports should be documented and be regarded as part of environmental protection inspection data of construction project completion.

7.3.2 Environmental monitoring ability content and requirements during the construction period

(1) Environmental monitoring content during operation

The monitoring of operation period is mainly to monitor the influence of transport noise and vehicle exhaust besides road.

(2) Monitoring plan

The environmental monitoring plan is shown in Table 7.3-2

Table 7.3-2 Environmental Monitoring Plan

Monitoring elements	Phase	Monitoring point	Test parameter	Monitoring frequency	Executing agency	Monitoring agency
Environmental noise	Operation	Sensitive spot around road	Equivalent A sound level	Preliminary operation period should subject to monitoring scheme prepared by environmental protection inspection unit. And it should subject to the opinion of examination and approval department when passes environmental protection inspection	Entrust qualified monitoring unit	Hubei Province environmental protection department
Air quality	Operation	Sensitive spot around road	NO_2、CO			

(3) Monitoring requirement

The first operation year of the Project after completion, road management department must entrust environmental monitoring to qualified organization to perform environmental monitoring and all monitoring must be documented for future reference.

In addition, contractor and supervising engineer must conduct monitoring plan everyday or conduct as basic requirement. Adopt portable monitoring equipment to monitor the noise level of environmental sensitive spot. Monitor the noise level of environmental sensitive spot around monitoring road and construction site during heavy construction such as excavation, piling, material transport and night construction.

Make visual check to discover the water quality to accept water body influenced by construction activity such as turbidity, smell, color, dead fish and so on. Especially check the water quality condition of the water around Fuhe construction site.

The result will be brought into formal written report and will be delivered to be checked by EMC and PMO once a month. Once accident influence occurs, construction unit should report to EMC and PMO immediately.

7.4Monitoring equipment and record

The equipment and test method adopted by construction unit and monitoring unit during monitoring project should accord with relevant provision and relevant environmental quality standards. The monitoring equipment should make periodic calibration and the device correction should be conducted before field measurement. All calibration record will be delivered to EMC. EMC will save all field record, report, examination, statutory instruments, permit or relevant environmental problems of license.

If needed, any change of monitoring device and monitoring method should be made prior approval by EMC. Make data recording at possible place for easy acquisition during the period of site monitoring and inquiry. Table 7.4-1 specifies the records that should be documented in every EMC office.

Table 7.4-1 Typical environmental record saved in construction phase

Category	Records
Totality	1) Environmental train record (For example, participate record of environmental consciousness training council); 2) Environmental permission/ license; 3) Site log and site inspection record; 4) Environmental log book, work complaint book and limitation exceeding notice of environmental quality; 5) Construction procedure and progress plan; 6) Plant maintenance/ maintenance record; 7) The relationship between interested target and others relevant with environmental problems; 8) Meeting minutes.
Noise control	1) Update electromechanical equipment list of current site; 2) If environment sensitive points are influenced, periodic inspection shall be conducted and details of inspection results shall be provided.
Water pollution control	1) Construction site drainage plan; 2) Record quantity of abandoned swelling mud and/or reuse, repair and treatment drilling mud. 3) Record maintenance and clear of sediment and petroleum/grease; 4) Record toilet sewage treatment (not connected to existing sewage artery); 5) Record for final discharge quality of sewage and concentration of pollution.
Solid waste management	1) Back up valid documentation related to waste transport vehicle and waste collector in environmental management plan; 2) Record quantity of reuse and renewable waste; 3) Record quantity of inert waste which changes into active substance on site (if any); 4) Waste disposal record
Atmosphere	1) Construction site drainage plan; 2) Construction material transport alignment and plan; 3) Mitigation measure related to air effect such as watering; 4) Air quality monitoring results.
Ecological	Record location of sensitive ecological resources and related protection plan.

Category	Records
resources	
Dangerous goods storage	1) Dangerous Goods Storage Figure; 2) Dangerous goods list and consumption record
Environment emergency response	Emergency accident report.

8. Environment Training Plan

8.1 Training requirement

Major object of environment capacity building is Environment Manager and Environment Supervisor and their training is one of the technical supports of the Project. In order to ensure success and effectiveness of environment management plan, Employer of the Project, development organization, operation organization, contractors, Project Supervisor, local CPMO and personnel of related party shall receive training on environment management plan and other knowledge and skills. Different trainings shall be conducted for different posts.

8.2 Training content and budget

(1) Environmental management personnel and Environmental Supervising Engineer

Training is organized by CPMO and shall be conducted by environmental management special personnel and Environmental Supervising Engineer of CPMO one year before implementation of the Project. Specific implementation is in the charge of environmental technical experts.

(2) Contractors and constructors

Construction Contractors of CPMO organize personnel. Environment management experts or trained enterprise environment management

personnel carry out training on project location. They can implement it concretely.

(3) Operation organization

Personnel shall be organized by CPMO or Employer to carry out training at project location before operation of the Project. Environment management experts or trained enterprise environment management personnel can implement the training concretely.

See Table 8.2-1 for details of training content, personnel, time schedule and budget.

Table 8.2-1 Organization Reinforcement Project List

Type	Features	Personnel	Training content	Number of people	Time	Date (year)	Cost (ten thousand yuan)
Abroad	Environmental management	Project Coordination Office, management personnel of	Advanced environmental management experience and optimum practice	6	10 days	Year 2015	16

Type	Features	Personnel	Training content	Number of people	Time	Date (year)	Cost (ten thousand yuan)
	nt	related department	during construction period				
		Project Management Office, Employer Organization, special personnel of operation organization	Environmental management technical method during construction period	20	14 days	Year 2015	40
Domestic	Environmental protection	Environmental protection personnel of construction organization	Environmental basic theory and monitoring method, monitoring report, on-the-job training Once a year: Environmental management report, environment monitoring and report, emergency plan	10-20 person	4 days/time	Year 2015-2016	8.5
	Supervisor	Environmental Protection Supervising Engineer, environmental management	Environmental protection laws and regulations, construction planning, environment	5-10 person	days/time	Year 2015-2016	5.5

Type	Features	Personnel	Training content	Number of people	Time	Date (year)	Cost (ten thousand yuan)
		personnel of development organization	monitoring specification and planning, ambient air monitoring and control technology, noise monitoring and control technology				
Total							**70**

9. Environmental Management Cost Estimation and Capital Source

Environmental management cost estimation includes environment facility cost, monitoring cost, training cost and external monitoring consulting service cost of environmental management plan. All costs are included in total investment estimation of the Project.

9.1 Environment investment estimation

Total investment of project is planned to be 1,101,365,500 yuan. Environmental protection investment includes environmental protection facility, equipment and environment monitoring cost during construction period. Environmental protection countermeasures shall be drafted according to the report. It is estimated that preliminary estimates of one-time engineering environmental protection investment is 45,890,000 yuan. Environmental protection investment accounts for 4.2% of total investment of the project. See Table 9.1-1 for environmental protection investment.

Table 9.1-1 Investment Estimation of Environmental Protection Measures

No.	Environmental protection measures			Unit	Quantity	Total amount (ten thousand yuan)	Remark
Part I Monitoring of environment						/	/
1	Monitoring of environment during construction period			Item	1	10	Construction period is 60 months
2	Monitoring of environment at completion acceptance			Item	1	10	/
Part II Environmental protection measures						/	/
1	Ecological conservation measures	Ecological restoration and soil and water conservation		Item	1	1870	Data source: Water and Soil Conservation Scheme
2	Prevention and control of water pollution	Set temporary septic tank at construction camp and treat production wastewater in de-oiling and sedimentation basin. Temporary waste slag point, drainage ditch of treatment field, pipes and shielding devices.		/	/	30	Decrease the impact to surrounding water environment
3	Prevention and control of atmospheric environmental pollution	Surroundings of environmental sensitive point, construction camp, construction road, watering for decreasing dust		Item	1	10	Sensitive point is not affected by dust pollution (rent watering cart)
4	Prevention and control of noise pollution	Set temporary sound insulating board and other noise reduction facilities during construction period;		Item	1	50	Include it into water protection investment.
		Noise treatment during operation period	Low-noise pavement	m^2		1650	Set low-noise pavement along the whole line
5	Solid waste collection	Treatment of construction waste during construction period		Item	1	20	/
6	Health protection cost of construction personnel			Item	1	10	Disease prevention and safety protection
7	Reserved environmental protection funds			Item	1	100	
Part III Environmental management							

1	Training for environmental management personnel	Item	1	70	/
Part IV Independent cost					
I	Environmental protection expense	Item	1	192	
II	Design expense of environmental engineering	Item	1	240	
III	Environmental supervision expense	Item	1	15	
IV	Supervision expense of engineering quality	Item	1	12	
	Basic reserved funds			300	
	Total investment of environmental protection			4589	/

9.2 Annual operation expenses of environmental protection facilities

Operation expenses of environmental protection facilities in the first 3 years of operation period shall be included into the loan of the World Bank and operation expenses of environmental protection facilities in later period shall be included into expenses of the Operator. Operation expenses of environmental protection facilities of the report are considered as per 3 years, with total amount of 900 thousand yuan. Please refer to Table 9.2-1 for details.

Table 9.2-1 Annual Operation Expenses of Environmental Protection Facilities

No.	Item	Expense (ten thousand yuan)	Remark
1	Environmental monitoring expense during operation period	8	
2	Energy consumption of equipment	2	
3	Repair, maintenance and updating of environmental protection facilities	15	Sewage treatment facility and solid waste collection system, etc.

4	Wages and labor cost of facility maintenance personnel	5	
Sub-total		30	
Total of operation period		90	3 years

10 Information Disclosure, Public Participation and Channels of Disputes Complaint

The public participation work mainly adopts social investigation method. Investigate opinions and suggestions of social organizations and the public for the planned construction of urban traffic Project in Anlu through information bulletin, consultation of public opinion, interview, questionnaire and other methods.

According to on-site preliminary investigation result, and combining with characteristics of the Project, the target object of public participation of the EIA is divided into two categories: namely the public who suffer direct effect and other ordinary public who live in the area of the Project. After the preliminary investigation, organizations and communities which suffer direct effects of the Project include:

①Representatives of Public Institutions: Government Office of Anlu, Anlu Health Inspection Bureau, Municipal Government of Anlu, Anlu Civil Affairs Bureau, Anlu Supervision Center, Anlu Science and Technology Bureau, Anlu Public Security Bureau, Secondary Vocational and Technical School in Anlu, Anlu Pu'ai Hospital, economic development zone in Anlu, No. 2 Middle School in Anlu, Roads and Traffic Authority in Anlu, Anlu Internal Revenue Commission, No. 1 Middle School in Anlu and other organization representatives.

②Resident representatives: administration committee of the development zone in Anlu, Fucheng Office, Nancheng Office, Yandian Town, Tangdi Town, principal of environmental protection in branch of Hexi New District and Jiahe Community, Fudong Community, Shili Primary School, Shili Middle School, Zhoujiaxin Village, Kaixuan City, Shangri-La City Garden, Jinqiu Imperial Garden, Shui'an Xingcheng Building, Xugang Community, Shitang Community, Shimiao Community, Zhaohe Village, Lvjiafan, Huguo Village, Lilong Village, Jinquan Village, Yuanlin Garden, De'an Garden, Shuanglongqiao Homeland, Fengda International City, Linyu Fortant, Taihe Villa, Luojia Village, Taihe Paradise, Jinjia Yard, Delin Garden, Jinbang Well-known City, Jingang Garden, An'er Homeland, Haocheng Garden, Sili Community, Zhongyi Community and other resident representatives.

10.1 Sustainable plan of public participation

(1) Within three years after the construction period and operation, conduct a random survey of return visit to each environmental sensitive object in every quarter, and hold an on-site fact-finding meeting in the centralized district with environmental sensitive objects every year.

(2) According to results of quarterly survey and annual survey, satisfaction degree of the public can be evaluated and relevant opinions can be analyzed. Environmental mitigation measures can be improved when it is necessary.

10.2 Channels of making complaints for disputes

(1) Establishment and composition of Complaint Institutions

A kind of complaints mechanism will be established to better safeguard legal rights of affected people. Provide a convenient, transparent, fair and effective complaints channel for affected people. As a result, Leading Group of accepting environmental effects' complaints of the Project is established. Group leader is occupied by relevant personnel of Anlu Environmental Protection Bureau, and the group consists with members from the Project's office, Anlu Environmental Monitoring Station, EIA Organization, Construction Supervision Organization, Employer' organizations and so on. Office of accepting complaints is subordinated to Leading Group of accepting environmental effects' complaints, and it is located in Anlu Environmental Protection Bureau. Meanwhile, receiving points of complaints are set in Employer's organizations and construction monitoring offices. Daily complaints are collected and handled by Office of accepting complaints, and processed opinions shall be put forward after negotiations with relevant accountability organizations.

(2) Complaints procedures

Leading Group and Office of receiving complaints will be open to the public and receive complaints within one week after the commencement of the Project, and special line and mail box of complaints will be opened at the same time. Detailed complaints procedures

are as follows:

If the affected person thinks that his/her right is violated in any aspect involved in environmental protection, he/she can go to Office of receiving complaints set by Employer' organizations and make complaints in written or oral form. The Employer shall negotiate with the complainant to solve the problem within one week on basis of complaint conditions, make detailed record to the complaint and processing conditions and report to Leading Group of receiving complaints on a regular basis.

If the complaint cannot be solved through negotiation, the complainant can continuously make complaint in written or oral form to Office of receiving complaints in Environmental Protection Bureau, members of Office of receiving complaints shall make detailed record and conduct settlement; handling suggestion shall be proposed within two weeks after the negotiation between Office of receiving complaints and relevant accountability organizations.

If the complainant is not satisfied with suggestions of Office of receiving complaints, the complainant can make complaint to Anlu Environmental Protection Bureau in written form within one month after receiving handling suggestion, Environmental Protection Bureau shall give handling suggestions within three weeks. If the complainant is still not satisfied with suggestions given by Environmental Protection Bureau, the complainant can submit the case to local People's court in accordance with Civil Procedural Law of the People's Republic of China after the acceptance of handling suggestions, the complaint will be heard and judged by the court.

Annex: Technical Specification Environmental Clauses of Civil Engineering Bid Documents

The annex will be put as significant composition of Domestic Competitive Bidding Document of Civil Engineering Procurement "technical specification". Contractor shall strictly perform environmental responsibility, and put mitigation measures in approved EIA documents into

practice, which shall be made as one of gists to apply for payment of employers. Mitigation measures mentioned in the annex are suitable for Wuhan Urban circle traffic integration demonstrative project which obtains loan from World Bank – construction activities of Xiaogan Anlu urban transportation infrastructure subproject, including but not limited to urban roads, public transit hubs, public transportation lanes, bus stations, side pavements and so on.

Attached List 1 General Environmental Protection Measures Schedule of Project

Category of sub-project	Composition of main projects	Contents of main projects	General environmental protection measures in design period/preparation period of the Project	General environmental protection measures in construction period	General environmental protection measures in operating period	Construction Organization
Project of integrated traffic corridor and road network improvement	Expansion road of 4.49km, reconstructed road of 21.73km and new road of 4.29km are included.	Reconstructed road: ① Taibai Road (Yinxing Avenue-Jiangxia Avenue), through the central city area, with overall length of 7.8km and red line width of 60m, reconstruction works including construction road traffic safety facilities; ②Biyun Road (Binhe Avenue-New G316), through old city in east-west direction, overall length of 6.13km; Binhe Avenue-Jinqiu Avenue maintains existing section width (24~52m), Jinqiu Avenue-New G316 has red line width of 40m, reconstruction works including asphalt addition on part of pavement, adding guardrail, drainage improvement, greening and road traffic safety facilities, etc.; ③ Jiefang Avenue (Binhe Avenue-Jinqiu Avenue), connecting east area to west area of Fuhe River, with overall length of 3.34km and existing road width of	**Construction preparation:** --All kinds of preparation work shall be made fully before construction and detailed investigation and understanding have been made for contents involved in the Project such as: road, power supply communication and so on and all kinds of emergency preparation work has been made to ensure normal condition of social	**General environmental protection measures in construction period:** --Enact detailed construction management plan and confirm protected object. --In project construction period, reasonable construction scheme shall be enacted and take semi-range construction scheme, set warning sign in construction section and arrange traffic management personnel to ease the traffic so as to reduce influence of road construction on traffic capacity along the line. At the same time, the construction shall avoid influence of all-range road construction on traffic capacity; in construction where all-range construction shall be implemented, temporary road shall be built in advance before the construction is started. --It is necessary to set bulletin board at the entrance to construction site to specify contractor of engineering, construction supervising organization, construction period, hot-line number of local Environmental Protection Agency Administration of China and name of contact person to acquire the masses' understanding and consideration of temporary interference brought by	**Protective measures of ambient air:** --Execute strict emission standard for new vehicles with new license plate; --Reinforce detection and maintenance in vehicle using and motor vehicles whose tail gas pollutant emission exceeds standards are not allowed to go through; --Reinforce traffic management and ensure smooth	Construction preparation: contractor Environmental protection measures during construction period: contractor Environmental protection measures during operating period: development organizatio

Category of sub-project	Composition of main projects	Contents of main projects	General environmental protection measures in design period/preparation period of the Project	General environmental protection measures in construction period	General environmental protection measures in operating period	Construction Organization
		43~53m, reconstruction works including asphalt addition on part of pavement, adding guardrail, drainage improvement, greening and road traffic safety facilities, etc.; ④Jinqiu Avenue (Yinxing Avenue-Biyun Road), located in the east of urban area, with overall length of 4.46km and red line width of 60m, existing motorized vehicle road formed, reconstruction works mainly including asphalt addition on driveway, public transport improvement, slow-traffic system and other supporting facilities. Expansion road: Yinxing Avenue (Fucheng Avenue-New G316), located at outer ring of Hexi District, with overall length of 4.49km and red line width of 40m, existing two-way 2 driveways and 12m wide secondary road; according to future traffic demand, extension will be performed as per 40m of red line based on existing section width and road will be reconstructed to sub-arterial road. New road: ①Zhanqian Road (Sanqiao connecting line-Anjing line), located at the west of urban area, connecting Anlu West Station in interurban railway from Wuhan to Shiyan via Xiangyang, with overall length of 2.10km and red line width of 40m; ② Fucheng Avenue (Yinxing	life.	project construction and to make it convenient for the influenced masses to contact with relevant departments when they find there are rule-violating operations of Construction Organizations at the same time. --Prepare and enact traffic ease scheme and arrange specially-assigned person to ease the traffic when it is close to peak time of busy road construction. --Try to reduce the influences of construction on public service, commerce, residents and so on and if the influence can not be avoided, promptly inform the residents and commercial tenants. And try to shorten the time of being influenced and promptly recover influenced public and commercial business. --Establish valid stating mechanism and the contractor and employer shall be received by specially-assigned person. **Mitigation measures of social influences:** To reduce adverse influences of construction process on social life, the Construction Organization shall: --Promptly inform the public of construction plan, description of environmental impacts, construction road information, information of temporary public transport line, blasting, dismantling of announcement and other information; --Limit construction behavior at night; when it is necessary to construct at night, ensure the work at night is arranged reasonably and meticulously and inform the masses in influenced communities ahead of time so as to take necessary precaution measures. --When public facilities (such as water pipe, electric power, phone and public transport line) can not be in regular work because of construction, it is allowed to inform people by means of announcement on	road traffic; --Greatly popularize using of electricity, petroleum, liquefied gas and other clean fuels; --Avoid building up sensitive spots at two sides of the road; --Reinforce maintenance of green belts at two sides of the road. **Protective measures of ecological environment:** Reinforce management and maintenance of afforestation tree and improve rate of survival.	n and management organization

Category of sub-project	Composition of main projects	Contents of main projects	General environmental protection measures in design period/preparation period of the Project	General environmental protection measures in construction period	General environmental protection measures in operating period	Construction Organization
		Avenue-Jiefang Avenue), located at the west of Handan railway in northern urban area, with overall length of 2.19km and red line width of 40m. New road construction includes road works, water supply and sewerage works, traffic safety works, greening works and lighting works, not including ancillary works such as service area and toll station.		construction site, bus station and influenced area at least five days before. **Precaution measures of construction safety:** Responsibilities of construction include protecting construction site and everyone around and avoiding influence of construction on human body and property. The Construction Organization has responsibilities to follow national and regional safety regulations and take any necessary measures to avoid occurrence of accidents including: --Meticulously and clearly set signs to mark pedestrian safety on construction transportation road and at passageway to construction site; --During school time, arrange personnel to disperse personnel and ease the traffic around schools; --Set enough traffic warning signs (including painting, frame, landmark and so on), road sign and protecting handrail and ensure pedestrian safety in construction stage; --Dangerous regions (switching room, compressor room and so on), facilities, materials, safety precautions, emergency exits and others shall be hung with correct signboards; --Before construction, conduct safety training on construction workers; --Construction Organization shall provide enough sanitation and cleaning facilities (toilets and washing region) for workers. The sanitation and cleaning facilities shall provide enough cold and hot water, soap, dryer and so on. --Ensure integrity of all buildings in within construction site; temporary buildings shall be safe and reliable in structure and they can defense attacks of bad weather		

Category of sub-project	Composition of main projects	Contents of main projects	General environmental protection measures in design period/preparation period of the Project	General environmental protection measures in construction period	General environmental protection measures in operating period	Construction Organization
				in local region and have proper light and can isolate part of dust and noise; --Ensure construction site, warehouse, and device for manufacturing pitch and workshops are set in proper places and ensure they are not within 500 meters of housing estate and place to manufacture pitch shall be 1000 meters outside housing estate; at the same time, the layout scheme shall be approved by responsible engineer of the Project; --Ensure construction site, warehouse, place to store diesel and pitch as well as facility to manufacture pitch are not set within 500 meters of river and avoid pollutants flow into the river at the time of operation especially avoid leakage through land or surface water. Recycle lubricants and excavate ditch around the site and set setting pond or oil trap at the exit; --Every construction site shall possess bulletin board of safety information; set warning sign in warehouse to store chemicals; --All workers are required to know all kinds of material safety information and explain risks of use of all kinds of materials to construction personnel on their families especially on families with pregnancy or planning to have pregnancy and encourage workers to share relevant information; --Place warning board on all galvanical electric actuator and electric wire; inspect all electric wire, cable, manual electric tool and inspect whether there is damaged or exposed electric wire and confirm allowable maximum working voltage of manual electric tool according to suggestions of manufacturer; conduct double insulation/grounding treatment on all electrical equipment used in damp (or may be damp) environment;		

Category of sub-project	Composition of main projects	Contents of main projects	General environmental protection measures in design period/preparation period of the Project	General environmental protection measures in construction period	General environmental protection measures in operating period	Construction Organization
				--At the time of designing machine, ensure projection part of machine will not cause damage to human body under normal operation conditions; Provide proper eye protectors (such as welding goggle and/or mask) for all workers participating in or assisting in welding; --Install protective barrier (shall possess one pole in the middle and surrounding baffle) at the edge of fragile and dangerous area, and at the same time, construction personnel adopts falling-prevention device (including safety belt and distance restriction lanyard); --Construction Organization confirms and provides proper personal protection equipment (goggle, glove, respirator, dust cover, helmet and so on) to fully protect workers, other workers and occasional visitors and it is not allowed to cause unnecessary inconvenience to users; --The Construction Organization shall establish procedures and system to report and record occupational accidents and diseases and dangerous conditions and accidents; --Carry out health education for construction personnel such as implementing information communication strategy, enhancing face-to-face consultation work, soling systematic problem influencing individual behavior, encouraging people to take protective measures and avoiding infecting diseases to others by using condom; besides, encourage using anophelifuge, clothes, mosquito net and other obstructing methods to avoid being bitten by mosquitoes and transmitting diseases. -- The Construction Organization shall ensure it is able to provide first aids conforming to requirements. On		

Category of sub-project	Composition of main projects	Contents of main projects	General environmental protection measures in design period/preparation period of the Project	General environmental protection measures in construction period	General environmental protection measures in operating period	Construction Organization
				construction site, proper first-aid tools shall be equipped; in remote places, there shall be a written treatment procedure of critical situations until it can transfer patients to proper medical institutions; --If the workers' hands and arms are vibrated for using manual tools and electric tools or the whole body of workers is vibrated for standing or sitting on vibrated surface, control them by equipment selection, installation of anti-vibration pad or anti-vibration device and restriction of exposure duration; --Conduct occupational health and safety training for all new construction personnel and introduce basic working rules, personnel protection rules on construction site and how to prevent causing injuries to other workers to them; --Ensure materials containing asbestoses and other toxic materials are processed by workers who have received professional training; --Suspend construction when there is heavy rain or other critical situations; --Electrical equipment and mechanical equipment shall bear influence of earthquake in a certain level. **Safety precaution measures for dismantling of existing buildings:** During the period of dismantling the existing buildings, the Construction Organization shall take full measures to protect workers and the public from being injured by falling macadam and residue. These measures include: --Set apart a specified rubbish falling area or discharge chute to make rubbish safely fall down; --Control saw cutting, excavation, grinding, sanding, cutting and other processes and take reasonable anchoring measures to guide dropping out of barren		

Category of sub-project	Composition of main projects	Contents of main projects	General environmental protection measures in design period/preparation period of the Project	General environmental protection measures in construction period	General environmental protection measures in operating period	Construction Organization
				rocks; --Keep clean in transportation process and avoid vehicles cause dropping out of waste materials and thus polluting road and atmosphere for excessive loading; --At the edge of scaffold in lifting work, use temporary protective measures of dropping out such as handrail and toe board to prevent waste materials from dropping out; --When blasting work is conducted in habitation of people and near other buildings, all people in area influenced by blasting shall be dispersed and try to reduce influences of flying stones and splashing objects by using blasting cushion or other deflection methods; --Provide safety mirrors, edge shield, mask, helmet, safety shoes and other protective equipment for all workers. **Environment implementation regulations of spoil and waste slag site:** **(1) Site selection requirements of spoil and waste slag site:** --Site selection of spoil and waste slag site shall be wasteland, abandoned farmland, other inferior lands and land in col topography or low-lying area and it is not allowed to choose: basic farmland or other farmlands, paddy field and farmland of industrial crop; house site; forest land; land within 200 meters of river basin; scenic spot, water conservation district, forest park and other lands within sensitive area; low-lying land or paddy field; land with fine vegetation cover; collapsed and dangerous area of landslip; area prone to have debris flow; land for special purpose. **(2) Environment implementation regulations of spoil and waste slag site:**		

Category of sub-project	Composition of main projects	Contents of main projects	General environmental protection measures in design period/preparation period of the Project	General environmental protection measures in construction period	General environmental protection measures in operating period	Construction Organization
				--If abandoned soil is generated, first of all, it is necessary to consider its use in situ or transported for use in the rest section of the Project or used in vegetation recovery in borrow area, which can avoid single establishment of soil-abandoning site and eliminate the influence of borrow area on environment fundamentally. --When it can not be used, first of all, it is necessary to investigate whether there is specified processing and holding position of construction mucks in local place. If any, transact muck transportation procedures as required and transport it to specified processing and holding position. --The slag field shall be compacted layer by layer, which can effectively suppress generation of dust. --Take method of dust suppression by means of watering to reduce dust pollution brought by bareness of earth surface. --To prevent water and soil loss, it is required to set intercepting ditch and drainage ditch in slag field to avoid sediment lost in construction period and operation period from being directly discharged into surface water together with running water in drainage ditch and thus influencing water quality. --Before waste slag enters the area, it is required to excavate surface soil and use it in reclamation of land and the surface soil shall be temporarily placed in relatively flat area within the area and earthwork in bags shall be used to block temporarily. Temporary discharge ditch shall be set around and sand setting measures shall be taken and dust screen shall be used to cover and used in ecological restoration in slag field after the construction is over.		

Category of sub-project	Composition of main projects	Contents of main projects	General environmental protection measures in design period/preparation period of the Project	General environmental protection measures in construction period	General environmental protection measures in operating period	Construction Organization
				--Follow principles of conciseness and easy maintenance, adopt combined greening form of trees, shrub and grass, form plant community landscape, recover natural ecology in spoil (slag) site and reduce water and soil losses. --It is forbidden to arbitrarily pile up and abandon spoil. **Environment implementation regulations of stone-fetching site and borrow area:** According to site selection requirements of stone-fetching site and borrow area and influences on environment, stone-fetching site and borrow area shall follow the following requirements: --Dressed stone shall be exploited nearby and spoil of the Project shall be made full use of, try to make use of local existing legal quarry and borrow pit to alleviate exploitation of dressed stone and the influence of borrow earth on the ecological environment. --At the time of exploitation of dressed stone, rainwater harvesting side ditch shall be built to avoid water and soil losses, landslide, debris flow and other geological disasters. --In process of construction, avoid deep excavation of earthwork and try to balance excavation of earth and filling of earth. If the earth needs to be borrowed from other places, coordinate spoil of other construction projects in project area and avoid single establishment of borrow area, which can fundamentally eliminate the influence of borrow area on the environment. --The project shall get stone and fetch soil by means of concentrated method of getting stone and fetching soil so as to reduce quantity of quarry and borrow area. --In process of getting stone and fetching soil, pay attention to watering to suppress the dust and to reduce		

Category of sub-project	Composition of main projects	Contents of main projects	General environmental protection measures in design period/preparation period of the Project	General environmental protection measures in construction period	General environmental protection measures in operating period	Construction Organization
				the dust pollution caused by earth excavation. -- To prevent water and soil loss, it is required to set intercepting ditch and drainage ditch in slag field to avoid sediment lost in construction period and operation period from being directly discharged into surface water together with running water in drainage ditch and thus influencing water quality. -- Before waste slag enters the area, it is required to excavate surface soil and use it in reclamation of land and the surface soil shall be temporarily placed in relatively flat area within the area and earthwork in bags shall be used to block temporarily. Temporary discharge ditch shall be set around and sand setting measures shall be taken and dust screen shall be used to cover and used in ecological restoration in slag field after the construction is over. --Follow principles of conciseness and easy maintenance, adopt combined greening form of trees, shrub and grass, form plant community landscape, recover natural ecology in spoil (slag) site and reduce water and soil losses. --Strictly control time of construction work and if there are housing estate and other sensitive targets within scope of noise effects, it is not allowed to get stones from 12：00 to 14:00 in the day and from 22:00 to 6：00 at night. **Environment implementation regulations of construction road:** **(1) Site selection requirements of construction road:** --Construction road shall be village-level road, wasteland, abandoned farmland, other inferior lands and land and it is not allowed to choose: basic farmland or		

Category of sub-project	Composition of main projects	Contents of main projects	General environmental protection measures in design period/preparation period of the Project	General environmental protection measures in construction period	General environmental protection measures in operating period	Construction Organization
				other farmlands, paddy field and farmland of industrial crop; house site; forest land; land within 200 meters of river basin; scenic spot, water conservation district, forest park and other lands within sensitive area; low-lying land or paddy field; land with fine vegetation cover; collapsed and dangerous area of landslip; area prone to have debris flow; land for special purpose. **(2) Environment implementation regulations of construction road** --Try to make use of existing town-level and village-level roads as the construction road and transform town-level and village-level roads at the same time. --If it is necessary to build construction road, try to reduce high filling and deep excavation and do well in conservation of water and soil at the same time so as to reduce water and soil loss and ecological damage; at the time of building construction road, conduct hardening treatment on construction road. If going through road of overload vehicles, recycled load-bearing tile (construction members) can be used in treatment; for common road, it is allowed to pave recycled tiles for preventing water penetration. --Before building construction road, it is required to peel off the surface soil and the surface soil shall be temporarily placed in relatively flat area within the area and earthwork in bags shall be used to block temporarily. Temporary discharge ditch shall be set around and sand setting measures shall be taken and dust screen shall be used to cover and used in ecological restoration in slag field after the construction is over. --Try to combine construction road and road to construction camp so as to reduce quantity of		

Category of sub-project	Composition of main projects	Contents of main projects	General environmental protection measures in design period/preparation period of the Project	General environmental protection measures in construction period	General environmental protection measures in operating period	Construction Organization
				construction road. --The construction road shall be regularly maintained and cleaned everyday and the section with dust shall be watered to suppress the dust. --Alleviate the influences of noises on the environment by controlling speed of vehicles, no horning, no transportation from 12：00 to 14:00 in the day and from 22:00 to 6：00 at night. --Before the construction is over, the newly-built construction road shall be conducted with ecological restoration and at least it shall be recovered to the state before construction. --Transformation, removal or protection treatment shall be conducted on occupied or damaged roads after the construction is over. Recover and afforest the road surface and pay a certain compensation expenses for local government so as to maintain legitimate interests of local governments and residents. **Protective measures of ambient air:** Set construction fence; conduct watering for dust fall; reinforce management in stacking site; control emission of exotic gas; enact proper line and scheme for transport of building materials. Truck for earth moving and transport cart of building materials shall be covered with tarpaulin and covered or other scattering-prevention measures shall be taken. It is not allowed for excessive loading to ensure no scattering in process of transportation; the road for transportation shall regularly cleaned and watered to reduce the re-entrainment of dust on the road and every construction road shall be equipped with one watering cart; (for road construction)		

Category of sub-project	Composition of main projects	Contents of main projects	General environmental protection measures in design period/preparation period of the Project	General environmental protection measures in construction period	General environmental protection measures in operating period	Construction Organization
				it is recommended to use sealed pitch mixing equipment equipped with smoke prevention and dust control device and site clearing in pitch mixing site shall be conducted after the construction is over. The wastes generated from this will be recycled, burnt or sent to site assigned by local environmental protection agency for processing by supplier of pitch and it is not allowed to use them as filling materials for site recovery and filled in local place. **Water environment protection measures:** --During construction period of the project, the Construction Organization shall strictly organize and control construction range and try to occupy less water area and ensure the project is within scope of red line, thus achieving civilized construction. At the same time, the Construction Organization shall organize and design wastewater discharge and it is not allowed to discharge and flow arbitrarily to pollute the environment. --Domestic wastewater: domestic wastewater of watch man for construction is processed in temporary and simple settling pond and then used in dust fall on construction site. --Construction wastewater: the construction wastewater shall be recycled after deoiling and sedimentation process and it is forbidden to discharge water into it; on construction site, cleaning part of front desk of blender, concrete pump and transport vehicle shall be equipped with settling pond and the wastewater is recycled or used in watering to reduce the dust after the second sediment; --Oil plants and chemical solvent as well as other articles stored on construction site shall be equipped with special warehouse and the ground shall be		

Category of sub-project	Composition of main projects	Contents of main projects	General environmental protection measures in design period/preparation period of the Project	General environmental protection measures in construction period	General environmental protection measures in operating period	Construction Organization
				conducted with anti0ssepage treatment. Concentrated processing shall be conducted for waste oil plants and chemical solvents and it is not allowed to discharge them arbitrarily. --Management measures: carry out water environment protection education on construction site and make construction personnel understand importance of protection of water environment. **Acoustic environment protection measures:** --Do well in organization of construction vehicles and management of construction site. Conduct civilized construction and complete noise supervision work during construction period at the same time. Control running speed of bulldozer, navy, road roller and other mechanical equipment and the vehicle speed of vehicles to transport materials shall be controlled when they enter construction site (the speed per hour shall not exceed 8 kilometers) and it is not allowed to whistle; reasonably arrange transportation of construction materials and vehicles shall slow down and are not allowed to whistle by the way of villages and towns as well as schools. --Reinforce noise monitoring. Monitoring and record of noises on construction site shall be conducted according to requirements of national standards and GB12523-2011 Emission Standard of Environment Noise for Boundary of Construction Site and the noise emission shall not exceed national standard. At the same time, adopt temporary acoustic barrier to reduce noise effects during construction period according to noise monitoring results. --According to requirements of Emission Standard of Environment Noise for Boundary of Construction Site, reasonably confirm boundary of construction site of the		

Category of sub-project	Composition of main projects	Contents of main projects	General environmental protection measures in design period/preparation period of the Project	General environmental protection measures in construction period	General environmental protection measures in operating period	Construction Organization
				project. The transportation trucks shall pass the construction site through the side far away from residential area, schools and other sensitive spots. Equipment with strong noise on construction site shall be set at one side far away from residential area. --The Construction Organization shall select and use construction machines and tools as well as transport vehicles conforming to relevant national standards and try to select and use construction machinery and technology with low noise and fixed mechanical equipment with large vibration shall be equipped with damping engine base. At the same time, reinforce maintenance and care of all kinds of construction equipment and keep fine operation so as to reduce intensity of noise source fundamentally. --If strong construction noise acts on human body for a long time, it will cause several kinds of diseases and even cause epicophosis caused by noise. To keep construction personnel healthy, the Construction Organization shall reasonably arrange workers to operate construction machinery radiating strong noises in turns so as to reduce the time of contacting strong noise or alternately arrange work with both strong and low noises. For construction personnel close to the source radiating strong noise, they shall not only wear protective earplug or helmets as well as other labor protective devices, their working time shall be shortened properly. --Reasonably arrange construction time and it is forbidden to construct from 22:00 to 06:00. For construction site where construction work shall be continuous, the Construction Organization shall contact with local environmental protection agency and issue		

Category of sub-project	Composition of main projects	Contents of main projects	General environmental protection measures in design period/preparation period of the Project	General environmental protection measures in construction period	General environmental protection measures in operating period	Construction Organization
				announcement at the same time to strive for support of the public to the greatest extent. --The Construction Organization is required to mark complaint hotline along construction line. For complaint problems, the Construction Organization shall promptly contact with local environmental protection agency so as to promptly handle all kinds of environmental disputes. **Disposal measures for solid waste:** -- The solid waste during construction period of the Project mainly includes discarded earthwork, construction waste and domestic refuse of constructors. To properly handle solid waste generated from the Project one step further, construction of the Project shall follow principle of "quantity reducing, recycling and being harmless". --It is forbidden to arbitrarily discharge any solid waste to irrigation canals and ditches. --Conduct recycling resources of solid waste well. For complete bricks and rebar as well as scrap iron in construction waste, reinforce recycling; after sorting out construction waste and smash usable waste residue and make them into mortar, which can b e used to construct the road; for excavated earthwork, deploy and use them so as to reduce quantity of spoil (slag) generated in construction of the Project to the greatest extent. --In concentrated urban and rural residential area along the line, the piling and transportation of solid waste shall be accomplished well and temporary piling place shall be covered with plastic film or petate. Intercepting ditch shall be set around to prevent water and soil loss and the site shall be far away from		

Category of sub-project	Composition of main projects	Contents of main projects	General environmental protection measures in design period/preparation period of the Project	General environmental protection measures in construction period	General environmental protection measures in operating period	Construction Organization
				irrigation canals and ditches. --In peak season of construction, domestic waste of construction personnel on construction site shall be intensively stored and promptly cleared and transported to municipal solid waste disposal plant in Anlu. The construction waste generated form demolishing shall be promptly cleared and transported to appointed landfill of construct waste for treatment. --In construction, try to reduce generation of solid waste. After the Project is over, it is required to eliminate solid waste generated from construction. For solid waste during construction is distributed along the road, if they are not piled properly or disposed promptly, they will directly destroy ecological environment along the road. Therefore, the influence of solid waste shall be reduced and prevented by prompt clear and disposal. **Ecological environment protection measures:** --Temporary construction site shall be cleared promptly after the construction is over. Promptly eliminate construction waste and recover ambient environment to its original appearance without causing pollution and destruction. For exposed land because of vegetation destruction caused by the construction, it shall be renovated and used immediately after the construction is over to shorten adverse effects on landscape in that region. --Strictly execute all kinds of precaution measures put forward in scheme of water and soil conservation to prevent muck generated from construction project flowing into rivers and influencing survival of aquatic organism. --Strictly conduct construction organization and construction management and it is forbidden to occupy		

Category of sub-project	Composition of main projects	Contents of main projects	General environmental protection measures in design period/preparation period of the Project	General environmental protection measures in construction period	General environmental protection measures in operating period	Construction Organization
				land as required and set fence in construction area before construction. --Make reasonable deployment work of excavated work and precaution measures shall be taken in piling place of spoil. Avoid excavating earthwork during the raining period to prevent water and soil loss, water pollution and block of drainage pipeline caused by rain wash. --Select native trees which can adapt to urban ecological environment, have less plant diseases and insect pests and have long age of trees and have strong resistance of smoke and damage caused by a windstorm to conduct road greening. --Transplant arbor in green belt to be dismantled. --In process of construction, if there is any key protection object, promptly report it to competent department for ex-situ conservation. --Orderly start construction in different zones and avoid messy landscape along the line. Besides, baffle can be set as fence to prevent landscape from being polluted. --Reinforce management of construction personnel during construction period and conduct vigorous propaganda of environmental protection policy for construction personnel. It is forbidden to damage and tread orchard and cultivated land around area of the Project. --It is forbidden to occupy land by exceeding plan to avoid vehicles and machinery equipment destroying plants outside construction area. --Improve animal protection awareness of construction personnel and try to reduce adverse effects of damage of ecological environment on animals. --To reduce disturbance of noises of project construction on wild animals, make a plan of construction method		

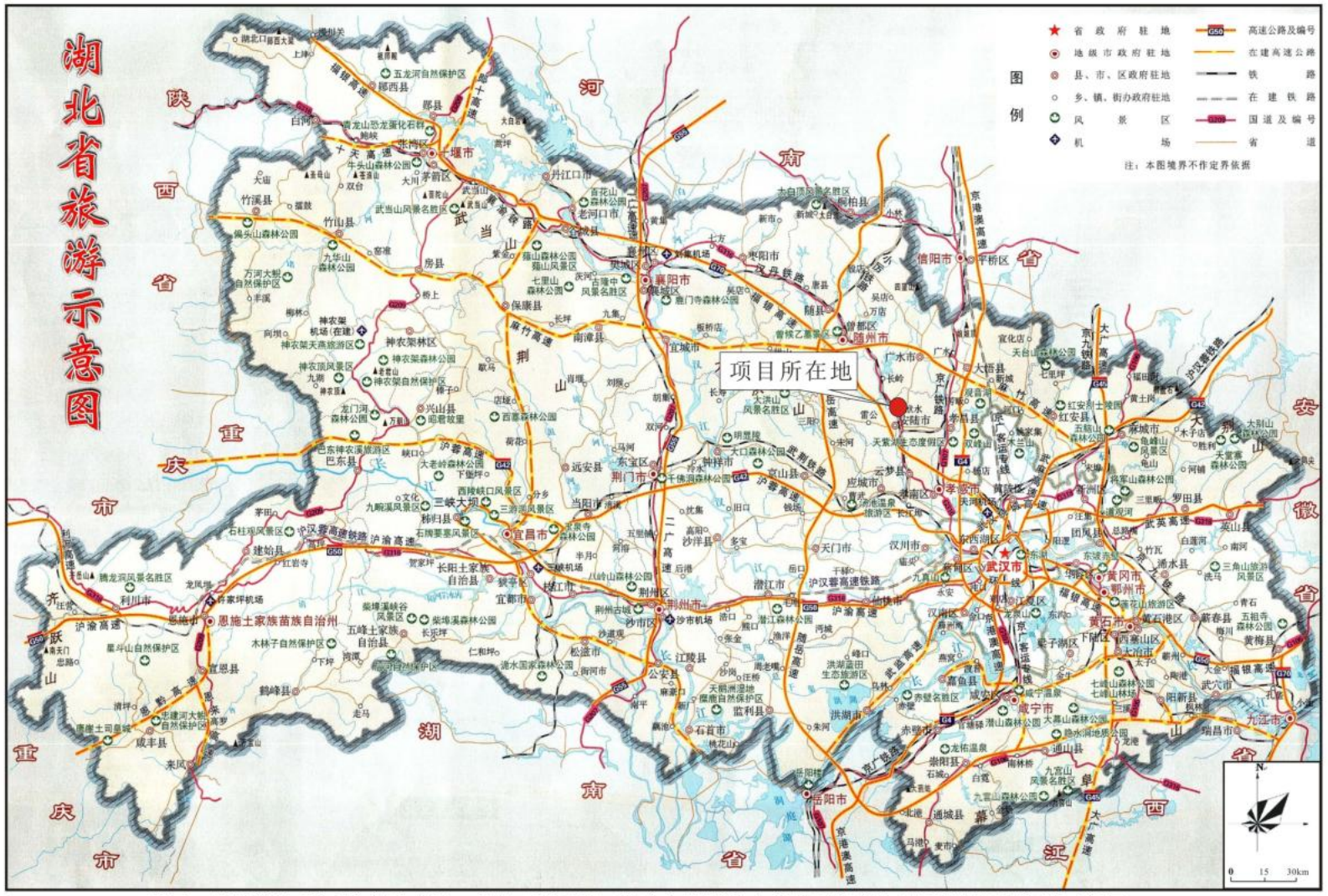
Category of sub-project	Composition of main projects	Contents of main projects	General environmental protection measures in design period/preparation period of the Project	General environmental protection measures in construction period	General environmental protection measures in operating period	Construction Organization
				and time and try to avoid influences of noises in the morning and night as well as at noon. --After the construction is over, land levelling, recovery work of vegetation and cultivated land shall be conducted as soon as possible on temporarily occupied land. **Mitigation measures of accumulated influences of construction project in the same period:** --Reinforce coordination between Construction Organization of the Project and conduct unified arrangement of walking line of construction machinery and construction transport vehicle to ensure smooth and normal operation of existing roads near the Project and to reduce the occurrence of traffic accidents to the greatest extent. --Accomplish construction management in sensitive section and set warning, speed limit and other signs in sensitive section and conduct traffic dispersion when necessary to ensure safety of surrounding residents' going out. --The Construction Organization of every project shall reinforce management of transport vehicles and transport vehicles of earthwork and building materials shall be covered with tarpaulin, and overcanopying and other anti-scattering measures shall be taken as required. The road traffic shall be regularly cleared and watered to reduce the re-entrainment of dust of road. --Reasonably arrange route of transport vehicles and try to make them far away from residence; reasonably arrange transport time of materials and it is required to slow down and it is forbidden to whistle when going through residence and schools to reduce noise pollution.		

Category of sub-project	Composition of main projects	Contents of main projects	General environmental protection measures in design period/preparation period of the Project	General environmental protection measures in construction period	General environmental protection measures in operating period	Construction Organization
Project of supporting facility of public transport system	Construction of 6 public transportation transfer junctions (including 3 public transportation transfer junctions, 1 small public transit hub at terminal and 2 transportation transfer junctions+highway passenger transportation centers) as well as 194 buses and an intelligent bus system (including bus dispatch, passenger information service and e-card system) are contained.	Public transportation hubs include railway-public/township highway passenger transportation transfer junctions, long-distance passenger transportation-public transportation transfer junctions, public transportation-public transportation transfer junctions and public transportation-township highway passenger transportation transfer junctions. Public transportation transfer junctions of passenger transportation stations refer to long-distance highway passenger transportation and urban public transportation transfer junctions. Small public transportation hubs at terminal of railways stations include common-speed railway transportation of passengers of Wuhan-Danjiangkou Railway and urban public transportation transfer junctions. Public transportation transfer junctions of long and short-distance bus stations include urban public transportation (including public transportation in urban and rural areas in suburbs) and internal transfer junctions of interurban public transportation. Highway passenger transportation centers of high speed rail stations and public transportation transfer junctions refer to Wuhan-Xiangyang-Shiyan	**Construction preparation (the same as above)**	**Land requisition and demolishing (the same as above)** **General environmental protection measures of construction, protective measures of ambient air, water environment protection measures, acoustic environment protection measures, disposal measures of solid waste, protection measures of ecological environment and mitigation measures of accumulated influences of construction project in the same period (the same as above).**	**Protective measures of ambient air:** --Execute strict emission standard for new vehicles with new license plate; --Reinforce detection and maintenance in vehicle using and motor vehicles whose tail gas pollutant emission exceeds standards are not allowed to go through; --Reinforce traffic management and ensure smooth road traffic; --Greatly popularize using of electricity, petroleum, liquefied gas and other clean fuels; --Reinforce maintenance of green belts at two sides of the road.	Land requisition and demolishing: Construction Organization Construction preparation: contractor Environmental protection measures during construction period: contractor Environmental protection measures during operation period: Construction Organization and administrati

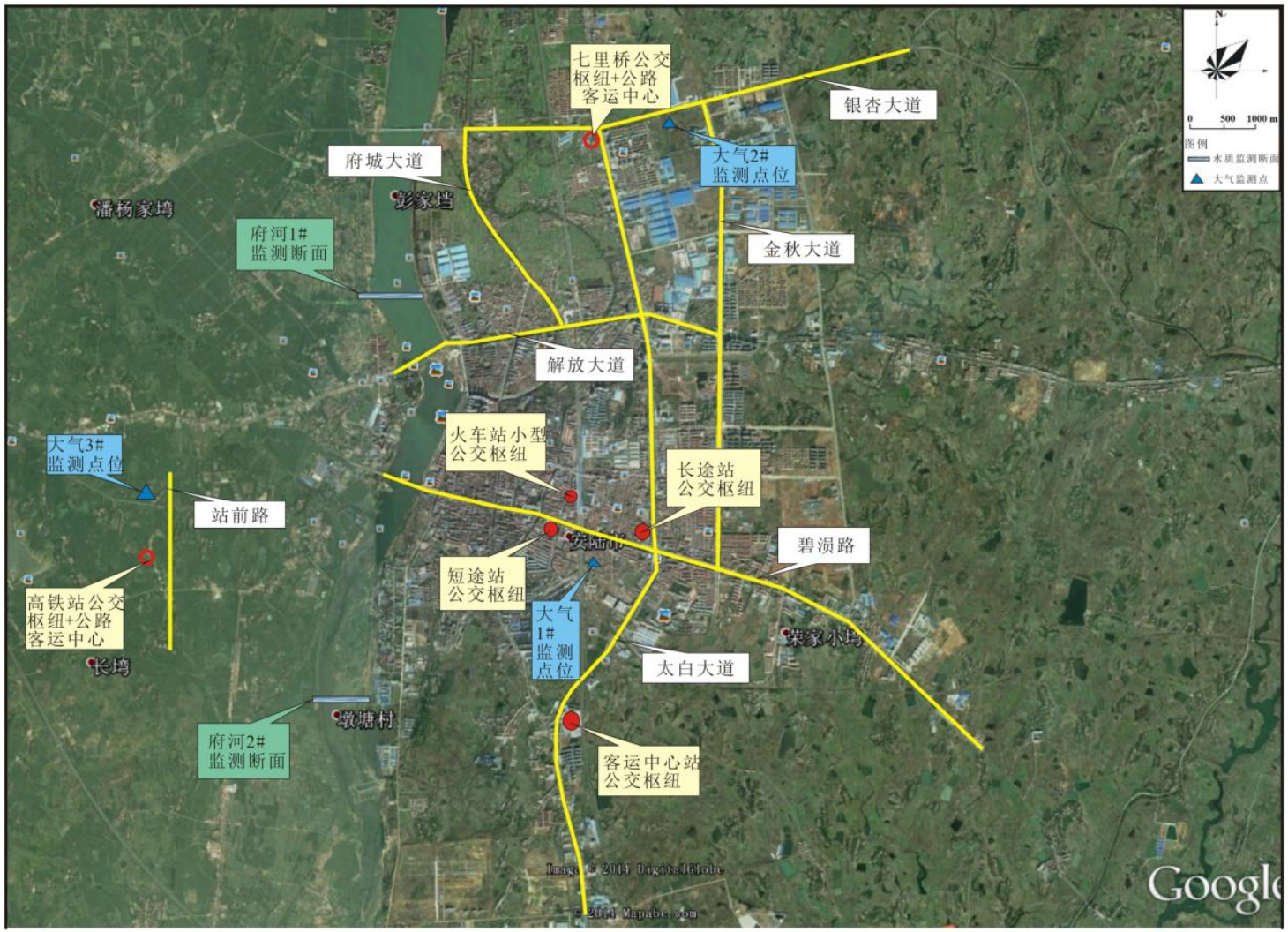
Category of sub-project	Composition of main projects	Contents of main projects	General environmental protection measures in design period/preparation period of the Project	General environmental protection measures in construction period	General environmental protection measures in operating period	Construction Organization
		Interurban Railway and urban public transportation and township highway passenger transportation transfer junctions. Qiliqiao Bridge Highway Passenger Transportation Center and public transportation transfer junctions are urban public transportation and township highway passenger transportation transfer junctions.			**Protective measures of ecological environment (the same as above).**	ve organization
Road safety project, slow traffic system improvement and institution building and technical assistance.	1. Road safety project Road safety project includes equipment and system construction of command center, self-adaptive traffic signal control system, video monitoring system for traffic, electronic police system and traffic safety publicity and education; 2. Slow traffic system Slow traffic system improvement project is mainly to improve slow traffic in the area enclosed by Wuhan-Danjiangkou Railway, Jiefang Avenue and Fuhe Avenue. The slow traffic facilities of existing branches and public roads in the enclosed area in old downtown will be improved. The construction contents mainly include reconstruction of special roads for slow traffic in old downtown, improvement of slow traffic sign and marking system, construction of non-motor vehicle parking facility and improvement of railway passage for slow traffic. The specific construction contents of slow traffic system improvement project are as follows:	**Construction preparation (the same as above)**	**General environmental protection measures of construction, protective measures of ambient air, water environment protection measures, acoustic environment protection measures, disposal measures of solid waste, protection measures of ecological environment and mitigation measures of accumulated influences of construction project in the same period (the same as above).**		Construction preparation: contractor Environmental protection measures during construction period: contractor

Category of sub-project	Composition of main projects	Contents of main projects	General environmental protection measures in design period/preparation period of the Project	General environmental protection measures in construction period	General environmental protection measures in operating period	Construction Organization
	Pave and repair sidewalks for Shuanglongqiao First Road and Third Road, Zhongshan Street, Upper and Lower Yushi Street, Wuyicun First Lane and improve pedestrian space; transform the nodal stairs in 5 streets and lanes including those in Fenghuang West District, near Shuanglong Bridge and Wenchang Road into gentle slopes for barrier-free access of non-motor vehicles. Break through the cul-de-sacs such as Lower Yushi Street and Wuyicun First Lane, construct a road connecting with Handan West Road for slow traffic, connect sidewalk with surrounding streets and lanes and enhance the connectivity of sidewalk. Set up 7 road humps at the gates of hospitals and schools including Anlu No. 2 Hospital, Experimental Middle School, Experimental Primary School, De'an Middle School, Zijinlu Primary School, Yong'an Shopping Mall and New Century Kindergarten to reduce the traveling speed of vehicles and guarantee the safety of students and patients; optimize the crossing facilities at 13 intersections including those between Fenghuang Road and Fuhe Avenue, De'an Road, Handan Road and Wenchang Road, between De'an Road and Handan Road, between Zijin Road and Fuhe Avenue, between De'an Road and Ruxue Road, between De'an Road and Zijin Road and between Wenchang Road and Handan Road to reduce the traveling speed of vehicles and guarantee the safety of disadvantaged groups; repair the special bridge for slow traffic in Wuyi Community to guarantee the safety of slow traffic. Set up traffic guardrail or isolating pole on sections like Handan Road, Ruxue Road, Longmen Road, Zijin Road (Fuhe Avenue – De'an Road, Biyun Road – Zijin Road) and Wenchang Road to separate motor vehicles and				

Category of sub-project	Composition of main projects	Contents of main projects	General environmental protection measures in design period/preparation period of the Project	General environmental protection measures in construction period	General environmental protection measures in operating period	Construction Organization
	non-motor vehicles and construct non-motor vehicle lane by isolation with marking for roads like De'an Road to guarantee continuous and safe traveling space of non-motor vehicles. Set up parking facilities for non-motor vehicles in sidewalk facility zones of De'an Road, Handan Road, Longmen Road, Wenchang Road, Ruxue Road, Fenghuang Road, Biyun Road, Zijin Road and Jiefang Avenue; set up 9 public parking lots for non-motor vehicles in Riverside Park, Jiefang Middle School, Taibai Square, Yong'an Shopping Mall and other places where there is a large population. Comprehensively improve slow traffic signs and markings from crossing and slow traffic sign and marking or direction system. 3. Institution building and technical assistance Institution building and technical assistance include institution operation, research on traffic strategy of Anlu, research on Anlu annual optimization and reorganization of bus routes, research on traffic characteristics of non-motor vehicles in Anlu, research on public bike system in Anlu and consultation service, investigation and training of World Bank project and technical management.				



附图1 世行贷款武汉城市圈交通一体化示范项目-孝感安陆城市交通基础设施子项项目地理位置示意图



附图2 世行贷款武汉城市圈交通一体化示范项目-孝感安陆城市交通基础设施子项项目周边环境及地表水、大气监测点位图