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Chongqing Small Town Integrated Water Environmental Improvement Project

Environmental Management Plan

By

**Chongqing World Bank Funded Integrated Urban and Rural Development Project Management Office
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1 General Introduction of the Project

1.1 Project Background

Located in the southwest part of China and at the center of Changjiang River upstream economic zone, Chongqing is surrounded by two rivers, Changjiang River and Jianling River, and is always called “Capital of Bridges” because of diversified bridges existing within its territory, or “City of Hills” because of its hilly topographic features. Geographically, East Chongqing and Southeast Chongqing border Hubei and Hunan provinces in the south, and West Chongqing and North Chongqing are adjacent to Sichuan Province, Northeast Chongqing is connected with Shaanxi and Hubei Provinces. Chongqing is 470 km long from east to west and 450 km wide from south to north, covering a total area of 82.4 thousand km² and with a total population of 24.95 million. Administratively, it consists of 19 directly administered districts, 15 counties, and 4 autonomous counties.

Small town development is not only the inevitable choice of urbanization process of China, but also the strategic approach to tackle the “three rural issues”, i.e. agricultural, rural and farmers’ issues, or the fundamental issues with regard to Chinese modernization. Compared with developed eastern areas, township enterprises and the closely related small town development in Chongqing started at a later stage. In order for sustainable development, Chinese central government attaches high attention to bridging the rural-urban, regional, and wealth gaps and is now making great efforts to address the related issues, Chongqing is facing the same challenges in its development process. In its on-going West China Development Campaign and the 11th and 12th Five Year Plans, Chinese government consistently gives highest priority to urban-rural integration. In such a context, Chongqing was selected in 2007 by the central government as one of the two pilot cities (Chengdu is the other pilot city) for exploration of innovative and practical approach towards integrated urban-rural development.

In its development strategy of “1 Circle and 2 Wings”, Chongqing established a four-tier urban-rural integration platform system, including one major city central zone (with projected population of 9.3 million in 2020) as the first-tier, 4 regional sub-center cities (with projected population of 500 thousand to 1 million in 2020) as the second-tier, 25 counties (with projected population of 200 thousand to 500 thousand in 2020) as the third-tier, and about 300 small towns in rural area as the fourth-tier. Along with the increasingly fast and greater flow of rural population into urban area, absorption/bearing capacity (to provide jobs and housing for a great amount of residents with transformed status from agricultural to non-agricultural population) of the major city and sub-center cities is relatively limited, hence, Chongqing government needs to rely on the 25 counties (third-tier) to absorb the rural-to-urban migrant population, so as to relieve the great pressure on the first and second tier cities. In accordance with the urban-rural integrated development strategy and urbanization development policies stipulated in its 12th Five Year Plan, Chongqing government has promulgated a series of reform schemes and incentive policies to promote development of the 25 third-tier counties, including relaxing restrictions on census registration and increasing infrastructure investments (highway and high speed rail) and thus employment opportunities in those counties, with the hope that the 25 counties

accommodate one third of its total urban population in the future.

The county towns in Chongqing are usually located in a narrow land plot between rivers/hills, mostly confined by hilly geomorphological conditions and prone to risks of flood, mudflow, water and soil erosion and water pollution. Though great progress has been made over the past years on flood protection and disaster reduction in the established areas of these county towns, further upgrading of bearing capacity, including flood protection and disaster reducing capacity, is needed in these counties to cope with urbanization development and to protect the ever growing urban population along with rural-to-urban immigration, together with the resulted expansion of residential areas and the newly added industrial zones, so that safe, sustainable development of these counties and their full play in promoting urbanization process of Chongqing as a whole can be guaranteed.

The small towns in Chongqing are scattered in the rural areas, functioning to drive and lead rural development as the head of the rural area and tail of the urban area. They are seeing rapid development and, along with it, rising environmental problems, mainly including lagging behind development of environmental facilities, destruction of human and natural landscapes and etc. Due to one-sided emphasis on economic growth and inadequate attention to environmental protection, a majority of small towns are lacking a complete sewage collection system or being served with a sewage collection system with apparent defects, and arbitrary quarrying and river-straightening are also degrading environmental bearing capacity of the small towns.

As is stated in the “Outline of 12th Five Year Plan (2011-2015) for National Economic and Social Development in Chongqing”, Chongqing shall “accelerate development of small towns with focus placed on central towns of the cities/counties, complete functions of the small towns while properly increasing their size and population”. The 12th Five Year Plan of Chongqing Municipality for Ecological Construction and Environmental Protection” states that “Based on local and development features of the specific small towns, differentiated guidance shall be given to small towns to expedite their preparation and revision of environmental protection plans, so as to enhance environmental protection and ecological construction in the process of small town development. Comprehensive pollution control of secondary rivers should be promoted and integrated measures, including sewage interception and pollution control, river channel dredging and improvement, and ecological recovery and etc., should be taken to achieve the purpose of meeting water quality standards and recovering ecological functions of a river, based on local condition along the specific river section, as well as functions and pollution status of the river”.

Totally 29 secondary rivers in Chongqing are planned to be improved during the 12th Five Year Period. More specifically, 5 rivers (Liangtan, Huaxi, Yipin, Bibei, Dongliang rivers) with the problem of water quality exceeding the standard and 9 black and odorous rivers (Kuxi, Tiaodeng, Daxi, Funiu, Panxi, Qingshuixi, Chaoyangxi, Xiaojia and Tiaodun rivers), all of which are in the central area of the city, are planned to be improved by 2012; and 15 rivers (Zhuxi, Taohua, Pengxi, Laixi, Xiaoanxi, Longxi, Longhe, Wuqiao, Daning, Binan, Linjiang, Jijiang, Daxi (Wulong), Xiaozi, Qiongjiang rivers) in the districts/counties are planned to be improved by 2015. The Project proposed involves Laixi, Longhe, Fujiang and Wujiang rivers.

According to its 12th Five Year Plan, Chongqing adopts overall planning of sewage collection and treatment facilities in urban and rural areas, and is completing sewage collection and treatment facilities in urban areas to ensure 90% of sewage treatment in urban areas. It is also increasing support to construction of suitable sewage collection and treatment facilities in small towns to achieve 75% of sewage collection and treatment there, and promoting sewage collection and treatment in rural areas to achieve 25% of rural sewage treatment.

The World Bank has supported several projects in Chongqing through providing funds for infrastructure development (roads, water supply, flood control, wastewater collection and treatment), vocational education, health care in the small towns and rural areas, all of which have contributed to comprehensive and coordinated reform for overall urban-rural development.

Over the past 6 months, Chongqing municipal DRC, Finance Bureau and PMO had done a lot of preparatory work for preliminary screening of the activities proposed for this Project.

1.2 Brief Description of the Project

The Project consists of 4 components of two categories, flood protection and sewage collection.

The project management entity is Chongqing Municipal Management Office for World Bank Loan Funded Urban-Rural Integrated Development and Reform Project (or Chongqing PMO). There are 4 project implementing entities, namely, Tongnan County Longquan Water Conservancy Construction and Development Co. Ltd., Rongchang County Hongyu Water Resources Development Co. Ltd., Pengshui County Hongyu Water Affairs Investment and Construction Co. Ltd., and Shizhu Tujia Autonomous County Urban Construction and Comprehensive Development Co., and the following table (Table 1-1) gives details of the 4 project components.

1.3 Project Development Objective

The Project aims to support upgrading flood control standard, reducing discharge of water pollutants, improving surface water environmental quality in the selected small towns and thus promoting development of small towns in Chongqing Municipality.

1.4 Objectives of Environmental Management Plan (EMP)

The objectives of environmental management are to achieve the expected environmental goals by means of planning, organization, coordination, control, and supervision, ultimately realizing mitigation of adverse impacts and improvement of positive impacts. The environmental protection awareness of all the staff would be improved by carrying out the environmental management to promote enterprises' active prevention and treatment of pollution and avoid possible environmental pollution due to poor management.

1.5 Content of EMP

The effective environmental management plan is developed by adequately understanding the characteristics of the Project during its implementation based on identification of weak links in the environmental management. The environmental management plan applies to the whole process of the project establishment, including establishment of management organization, and pre-construction period, construction period and operation period of the Project. The environmental management plan mainly comprises the environmental management system, the environmental management organization, the environmental management training, the environmental management regulation, the environmental monitoring and water & soil control monitoring program, and the environmental protection cost estimate.

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Table 1-1 Composition of Project Components

Flood Control Works						
Component Name	Location of Construction Site	Main Work Contents				Non-engineering Measures
		Flood control Revetment	Dredging	Ancillary Works	Road at Embankment Crest	
Tongnan flood control	Dafuba District, Tongnan County	The river channel subject to treatment under the Project is 7.89km long. The total length of the embankment works is 6.84 km, including a 1.8 km long section, a 3.24 km long section, and a 1.8 km long intermediate revetment, and 4 drainage box culverts will be installed	None	1.52 km of river side banquet		Construction of flood control and disaster mitigation system, improvement and deployment of monitoring system and warning system, and application of flood risk map
Rongchang flood control	Changzhou Street and Wanling Ancient Town, Rongchang County	The river channel subject to treatment is 10.3 km long, 13892.17 m of embankment, including 6213.686 m long upstream section and 7678.484 m long downstream section. The upstream section of the branch gully is provided with a 1.85 km long drainage ditch, four water logging drainage pipe culverts, and three box culverts, while the downstream section is provided with a 1.20 km long drainage ditch, and a box culvert; a flood-diversion sluice at the left barrage of Yushabao power station to be added, in addition to the enhancement of the overflow dam at Wanning old town.	None	① 5 m wide steps to the river with spacing of about 200~300 m; ② Three landscape bridges	Total length: 13.9 km; width: 4 m	Improvement and deployment of monitoring system and warning system, provision of flood control and emergency tools and equipment, and closure and relocation of local livestock farms

Pengshui flood control	Riverside Section of Wujiang River in Shangtang Cluster and Xujiaba Cluster of Dianshui New Town	The total length of the embankment works is 4.687 km long, including a 0.556 km long section involving Yunxin Company, a 3.068 km long section involving Chongqing-Huaihua Railway Bridge, a 0.709 km long section involving Xujiaba Ruins, and a 0.344 km long section involving Xujiaba Village. The embankment passes through six branch gullies and provided with six embankment-crossing box culverts.	None	None	Road on crest of embankment with a total length of 4.762 km and a width of 8 m	Hydrological monitoring data storage and server construction, and preparation of flood risk map
Shizhu flood control	Urban area along Longhe River in Shizhu County	The river channel subject to treatment is 4171.37m long, in addition to 4836.76m long new embankment. The embankment is provide with nine drainage box culverts at gullies and one pipe culvert. In addition, the retaining tam is subject to be reconstructed (e.g. level 5,4,1,8 is subject to be retrived, while lelel 4 retaining dam will be relocated to 140m upstream of Sizhu Bridge, and the level 2,3,6,7 will be dismantled.)	3394.64m long river channel to be dredged, with a depth of 0.1-0.5m and total dreding amount of 49,000 tons.	38 sets of ladles down to the river, 2 green landscape sections with total area of 57,500 m ² and a newly water diverion with a total length of 190.16 m to be constructed.	Road on crest of embankment with a total length of 1.904 km and a width of 15.5 m (including 8 m wide sidewalk)	Application of flood risk map, construction of emergency flood control system, construction and improvement of monitoring system

Sewage collection and treatment Works

Component	Location of Construction Site	Main Work Contents				Scope of Service
		Sewage treatment Plant	Sewage Pipeline Network	Pump Station	Rainwater Pipeline Network	
Rongchang Sewage Collection	Changzhou Street and Wanling Ancient Town, Rongchang County	None	Sewage pipeline works: 19 km	One new sewage lifting pump station about 300 m upstream of Erlangtan Bridge	None	Changzhou Street and Wanling Ancient Town, Rongchang County

Shizhu Sewage Collection	Urban area along Longhe River in Shizhu County	None	Sewage pipeline works: 11.7 km	One reconstruction sewage lifting pump station at the head of Longjing Bridge; one new sewage lifting pump station at Zhongba Bridge	Rainwater pipeline works: 4.4 km	Shizhu County seat
Pengshui Sewage Collection and Treatment	Xujiaba, Dianshui New Town, Pengshui	The project doesn't include construction of sewage treatment plant (A planned sewage treatment plant has a long-term design capacity of 49,000 m ³ /d and expected near-term design capacity of 24,500 m ³ /d.)	The trunk sewer is divided into two sections: the section from the end of the trunk sewer of Dianshui New Town to the start section of the works is about 1.97 km long, and the section from the start section of the works to the planned sewage collection and treatment plant is about 4.69 km long.	None	None	Expectedly, Dianshui New Town and old county town, Pengshui

Note: As the drainage planning for Pengshui County has not been completed, the size and location of the Pengshui Sewage collection and treatment are uncertain. A separate environmental management framework will be designed Pengshui Sewage collection and treatment Component to guide the preparation and approval of environmental protection documents in the next stage.

2 Policies and Legislation Framework

2.1 Laws and Regulations

- (1) *Environmental Protection Law of the People's Republic of China*, December 26, 1989
- (2) *Environmental Impact Assessment Law of the People's Republic of China*, October 28, 2002
- (3) Law of the People's Republic of China on Atmospheric Pollution Prevention and Control (April 29, 2000);
- (4) Law of the People's Republic of China on Prevention and Control of Ambient Noise Pollution (October 29, 1996);
- (5) Law of the People's Republic of China on Water Pollution Prevention and Control (February 28, 2008);
- (6) Law of the People's Republic of China on Prevention and Control of Environmental Pollution Caused by Solid Waste (December 29, 2004)
- (7) Law of the People's Republic of China on Soil and Water Conservation (December 25, 2010);
- (8) Law of the People's Republic of China on Protection of Cultural Relics (Amendment adopted and implemented from December 29, 2007);
- (9) Land Management Law of the People's Republic of China (January 1998);
- (10) Law of the People's Republic of China on Urban and Rural Planning (October 2007);
- (11) Law of the People's Republic of China on Water Pollution Prevention and Control (February 28, 2008);
- (12) Law of the People's Republic of China on Prevention and Control of Environmental Pollution Caused by Solid Waste (promulgated by Decree No.31 of the President of the People's Republic of China on December 29, 2004);
- (13) Regulations on Environmental Protection of Construction Projects (State Council Decree No.253, issued on November 29, 1998);
- (14) Decisions by the State Council on Implementing Scientific Development Perspective and Strengthening Environmental Protection (Document Guo Fa [2005] No.39, December 3, 2005);
- (15) Interim Procedures for Public Consultation and Information Disclosure of Environmental Impact Assessment (Document Huan Fa [2006] No. 28 issued by the State Environmental Protection Administration, effective as of March 18, 2006);
- (16) Guiding Catalogue for Industrial Restructuring (2011) (amended in 2013);

- (17) Regulations of the People's Republic of China on Natural Reserves (State Council Decree No.167, promulgated on October 9, 1994);
- (18) Guidance on Environmental Protection of Centralized Drinking Water Sources (for Trial Implementation) (Document HuanBan No.(2012)50);
- (19) Regulations of the People's Republic of China on River Channel Management (June 1988);
- (20) Regulations of the People's Republic of China on Landscape and Scenic Spots;
- (21) Notice on Strengthening Management on Environmental Impact Assessment to Prevent Environmental Risks (Document Huan Fa [2005] No. 152, December 16, 2005);
- (22) Water Pollution Prevention and Control Plan for the Three Gorges Reservoir Area and the Upper Stream (Revised Version) (Document No. HuanFa (2008) 16);
- (23) Regulations on Protection of Wetlands (Decree No.32 issued by the State Forestry Administration);
- (24) Regulations of the People's Republic of China on Natural Reserves (State Council Decree No. 167, October 9, 1994);
- (25) Enforcement Regulations on Protection of Terrestrial Wildlife (March 1992);
- (26) Enforcement Regulations on Protection of Aquatic Wildlife (September 1993).

2.2 Local Regulations

- (1) Regulations of Chongqing Municipality on Environmental Protection (Amended by the Standing Committee of the People's Congress of Chongqing Municipality in 2010);
- (2) Procedures of Chongqing Municipality on Noise Pollution Prevention and Control (Decree of Chongqing Government No.(2013)270);
- (3) Regulations of Chongqing Municipality on Water Pollution Prevention and Control for Changjiang Three Gorges Reservoir Area and the Catchment (effective as of October 1, 2011);
- (4) Management Regulations of Chongqing Municipality on Water Conservancy Projects (amended in 2006);
- (5) Regulations of Chongqing Municipality on River Channel Management (amended for the second time by the 18th meeting of the Standing Committee of the 3rd People's Congress of Chongqing Municipality on July 23, 2010);
- (6) Provisions of Chongqing Municipality on Ambient Air Quality Function Zoning (Chongqing Municipal Government Document No.(2008) 135);
- (7) Ecological Function Zoning of Chongqing Municipality (Revised Version) (Chongqing Municipal Government Document No.(2008) 133);

(8) Notification of Chongqing Municipality on Defining Key Control Zone for Water and Soil Erosion (Chongqing Municipal Government Document No.(1999) 8);

(9) Notification of Chongqing Municipal Government on Approval and forwarding of the Adjustment Plan of Surface Water Environment Function Classification (Chongqing Municipal Government Document No.(2012) 4);

(10) Notification of Chongqing Municipal Government on Printing and Distributing the Implementation Plan for the Five Actions for Environmental Protection of Chongqing (2013-2017) (Chongqing Municipal Government Document YuFuFa No.(2013) 43);

(11) Notification of Chongqing Environmental Protection Bureau on Printing and Distributing the Adjustment Plan for Zoning Provisions for Applicable Ambient Noise Standards of Urban Area (Chongqing Environmental Protection Bureau Document YuHuanFa No. (2007) 39);

(12) Notification of Chongqing Environmental Protection Bureau on Relevant Issues regarding the Adjustment Plan for Zoning Provisions for Applicable Ambient Noise Standards of Urban Area (Chongqing Environmental Protection Bureau Document YuHuanFa No. (2007) 78).

2.3 Technical Guidance

(1) Technical Guidance for Environmental Impact Assessment-General Principles (HJ2.1-2011);

(2) Technical Guidance for Environmental Impact Assessment-Ambient Air (HJ2.2-2008);

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

(4) Technical Guidance for Environmental Impact Assessment-Acoustic Environment (HJ2.4-2009);

(5) Technical Guidance for Environmental Risk Assessment of Construction Projects (HJ/T169-2004);

(6) Technical Guidance for Environmental Impact Assessment-Ecological Impact (HJ19-2011).

2.4 Safeguard Policies of the World Bank

(1) World Bank OP/BP 4.01 (Environmental Assessment)(Jan.1999)and its annexes

(2) World Bank OP/BP 4.12 (Involuntary Resettlement) (June 1990)

(3) World Bank OP 4.11 (Physical Cultural Resources)

(4) World Bank OP4.04 (Natural Habitat)

(5) World Bank OP 4.36 (Safety of Dams)

(6) World Bank BP17.50 (Information Disclosure)

(7) International Finance Corporation (IFC) Environment, Health and Safety Guidelines (EHS Guidelines), including guiding standards for atmospheric emission, ambient air quality, wastewater, water environment and noise.

2.5 Assessment Standards

2.5.1 Environmental Quality Standards

Since the 4 project components are all located in areas for mixed purposes of rural, industrial and commercial uses, belonging to Class-2 ambient air function zone, thus Class-2 standards in the Ambient Air Quality Standard (GB3095-2012) are applied for the assessment. Table 2-1 includes details of the Class-2 standards and EHS standards for comparison.

2.5.1.1 Ambient Air

Table 2-1 Quality Standards for Ambient Air (Unit: ug/Nm³)

Items	Time Period	Class-2 Standards as per Ambient Air Quality Standards (GB3095-2012)	EHS Standards	Scope of Application
TSP	Annual average	200	—	All project components
	24-hour Average	300	—	
	1-hour Average	—	—	
PM ₁₀	Annual average	70	70	
	24-hour Average	150	150	
	1-hour Average	—	—	
PM _{2.5}	Annual average	35	35	
	24-hour Average	75	75	
	1-hour Average	—	—	
SO ₂	Annual average	60	—	
	24-hour Average	150	125	
	1-hour Average	500	—	
	10min	—	500	
NO ₂	Annual average	40	40	
	24-hour Average	80	—	
	1-hour Average	200	200	
NO _x	Annual average	50	—	
	24-hour Average	100	—	
	1-hour Average	250	—	

From the above table, it can be seen that EHS standard for 24-hour average SO₂ concentration is stricter than that in the national standards, so the EHS standard is applied

for SO₂ while for other pollutant items national standards are applied.

2.5.1.2 Surface Water

Tongnan flood control construction involves Fujiang River and Class-3 standards in Surface Water Environment Quality Standards (GB3838-2002) are applied for its surface water assessment, and the same standards are applied for surface water assessment for Pengshui flood control construction involving Wujiang River, Rongchang flood control construction involving Laixi River and Shizhu flood control construction involving Longhe River. Table 2-2 that follows gives details of the standards applied.

Table 2-2 Standards for Surface Water Assessment

No.	Items	Unit	Value of Standards	Surface Water Environment Quality Standards Applied	Scope of Application
1	COD _{Cr}	mg/L	≤20	Class-3 Standards as per GB3838—2002	All Flood Control Construction Activities
2	BOD ₅	mg/L	≤4		
3	NH ₃ —N	mg/L	≤1.0		
4	pH	—	6-9		
5	Oil	mg/L	≤0.05		

2.5.1.3 Acoustic Environment

Of the Acoustic Environment Quality Standard (GB3096-2008), the Class-2 standards are enforced for noise assessment at construction site boundary, the Class-1 standards are adopted for sensitive receptor such as school, and the Class-4a standards for traffic noise assessment. The following Table 2-3 shows the noise values as per the quality standard and EHS guiding values for noise levels.

Table 2-3 Standards for Ambient Noise Assessment (Unit:[dB(A)])

Acoustic Environment	Classification	Acoustic Environment Quality Standards (GB3096-2008)		EHS Guiding Values for Noise Levels	
		Daytime	Nighttime	Daytime	Nighttime
Construction Site Boundary (Mixed uses of industries and residences)	Class-2	60	50	70	70
Sensitive Sites (schools)	Class-1	55	45	55*	45
Main Trunk Roads	Class-4a	70	55	—	—

Note: *—Residences, offices, education facilities.

As shown in the table, domestic noise level standards for residences, offices, cultural and educational facilities are the same as those in EHS guidelines enforced by World Bank; domestic noise level standards for industrial and commercial facilities are stricter than those in EHS enforced by World Bank; but there is no provision in EHS guidelines as to zones mixed with commercial and residential uses. Therefore, appropriate domestic standards would be enforced for noise assessment of the Project.

2.5.2 Standards for Pollutant Discharge

2.5.2.1 Waste Gas Emission

For waste gas emission during construction period, the concentration limits for fugitive emission monitoring in the Integrated Emission Standard of Air Pollutants (GB16297-1996) are applied in China. See Table 2-5 for details.

Table 2-5 Concentration Limits for Emission of Waste Gas Pollutants

Items	Unit	Concentration limits for fugitive emission monitoring in the Integrated Emission Standard of Air Pollutants (GB16297-1996)	Scope of Application
TSP	mg/Nm ³	1.0	All project components
SO ₂	mg/Nm ³	0.4	
NO _x (NO ₂ Equivalent)	mg/Nm ³	1.0	

2.5.2.2 Waste Water Discharge

For sewage interception and discharge into wastewater treatment plant, Class-3 Standards in Table 4 of the Integrated Sewage Discharge Standard (GB8978-1996) are applied; for discharge from wastewater treatment plant into surface water environment, Class-1 B standards in the Discharge Standards of Pollutants from Municipal Wastewater Treatment Plant (GB18918-2002) are applied. The limit values stipulated in the Standards are shown in Table 2-6.

Table 2-6 Limit Values for Discharge of Wastewater Pollutants

No.	Items	Unit	Standards for Sewage Discharge into Municipal Wastewater Treatment Plant		Standards for Discharge into Surface Water from Municipal Wastewater Treatment Plant	
			Standard Values	Reference Standard	Standard Values	Reference Standard
1	pH	—	6~9	Class-3 standards in Table 4 of the Integrated Sewage Discharge Standard (GB8978-1996)	6~9	Class-1 B standards in the Discharge Standards of Pollutants from Municipal Wastewater Treatment Plant (GB18918-2002)
2	COD _{Cr}	mg/L	≤500		60	
3	BOD ₅	mg/L	≤300		20	
4	NH ₃ -N	mg/L	—		8 (15)	
5	Oils	mg/L	≤20		3	
6	Animal and Vegetable Oils	mg/L	≤100		3	

2.5.2.3 Noise Emission Standard

The national standard, the Emission Standard of Ambient Noise at Construction Site Boundary (GB12523-2011) would be enforced for noise during construction period; for standard limit values, refer to Table 2-7.

Table 2-7 Emission Standards for Ambient Noise at Construction Site Boundary

Time Interval	Daytime [dB(A)]	Night Time [dB(A)]	Scope of Application
Standard value	75	55	All project components

During operation period, Class-2 standards of the Standard Limit Values of Noise at Industrial Enterprise Site Boundary (GB12348-2008) will be enforced for noise at boundary of the wastewater treatment plant/pumping station, and Class-4 standards will be applied to noise of main trunk roads. Table 2-8 shows the standard values.

Table 2-8 Standard Limit Values of Noise at Industrial Enterprise Site Boundary

Time Period Acoustic Functioning Zones	Daytime [dB(A)]	Night Time [dB(A)]	Reference Standard	Scope of Application
2	60	50	Standard Limit Values of Noise at Industrial Enterprise Site Boundary (GB12348-2008)	WWTP, Pumping Station
4	70	55		Main Trunk Roads

2.5.2.4 Solid Waste Standard

For sludge dredging under Shizhou project component, the national standard Standard Values for Control of Pollutants in Agricultural Sludge (GB4284-84) is applied.

Table 2-9 Standard for Solid Waste

Item	Reference Standard	Scope of Application
Sludge Dredging	Standard Values for Control of Pollutants in Agricultural Sludge (GB4284-84)	Shizhu project component

3 Environmental Management System

The environmental management system of Chongqing Small Town Water Environment Improvement Project under World Bank Loan is divided into external management and internal management, and management is performed during pre-construction period, construction period, and operation period.

(1) External management: The management is implemented by the environmental protection administrative departments at all levels and the World Bank. On the basis of the World Bank's requirements and relevant laws and regulations of China, corresponding

standards and requirements that should be met for the environmental protection of the construction project are identified, and the supervision and inspection at all stages as well as acceptance of the completed environmental protection works are undertaken.

(2) Internal management: The project implementer is responsible for its organization and implementation and for the optimization, organization and implementation of environmental protection measures for the Project, ensuring that the management reaches the environmental protection requirements by the World Bank and the national and local environmental protection departments. The internal environmental management system for the Project is performed at different levels by implementer, the Supervision Engineer, contractor, and monitoring unit.

3.1 Environmental Management System during Pre-construction Period of the Project

The environmental management during pre-construction period of the Project is mainly organized and implemented by Chongqing Municipal Management Office for the World Bank's Capital Utilization, coordinated by each component organization, EIA organization and design institute, and supervised by Chongqing Environmental Protection Bureau, the Environmental Protection Bureaus of cities and counties where components are implemented, and the World Bank.

3.2 Environmental Management System during Construction Period

Refer to Figure 12-1 for details of the environmental management system during construction period of the Project, and refer to Table 3-1 for responsibilities of all organizations in the management system.

Table 3-1 Organizations in the Environmental Management System during Construction Period and Their Responsibilities

Nature of Organizations		Names	Responsibilities
External environmental management	Supervision organizations	Chongqing Environmental Protection Bureau	For operational guidance and supervision & administration of environmental protection bureaus at county level
		Environmental Protection Bureaus at County Level	For supervision & administration of matters related to of the Project and matters related to the examination & approval, acceptance and environmental protection of components
		World Bank	For bi-annual supervision and inspection of implementation of the environmental management plan during construction period
Internal environmental management	Management organizations	Chongqing Municipal Management Office for the World Bank's Capital Utilization	For coordination and management of the Project, including the environmental management and environmental supervision of all components, and for supervision and inspection of implementation of the environmental management plan, ensuring that the environmental protection measures proposed for the Project are included in the bidding documents and the civil engineering contract.
		Component	As the project implementer, responsible for supervision and

	Implementer	management of the environmental protection management work during construction period from construction commencement till completion acceptance, bearing the responsibility for environmental protection management of the Project. Responsible for coordination and management of all components, including the daily environmental management of the Project, and for supervision and inspection of implementation of the environmental management plan during construction period
Environmental management implementers	Contractor	As the implementer, responsible for implementation of the environmental protection measures during construction period
Consulting services	Environmental Supervision Organization	For review of the environmental protection plan submitted by the civil construction contractor and related costs; for review of civil engineering contract and supervision the Owner's preparation of environmental protection requirements in the contract, including related costs and penalty causes; for report of the environmental management during construction period to relevant departments and recommendation of solutions and suggestions for existing problems; for curbing the actions causing damage to the environment and going against the environmental protection regulations and for punishment according to the contract.
	Environmental monitoring agency	Commissioned by owners of the components to undertaking the professional environmental monitoring task
	EIA Organization	Commissioned by the implementer to providing consulting service for issues arising out of environmental management

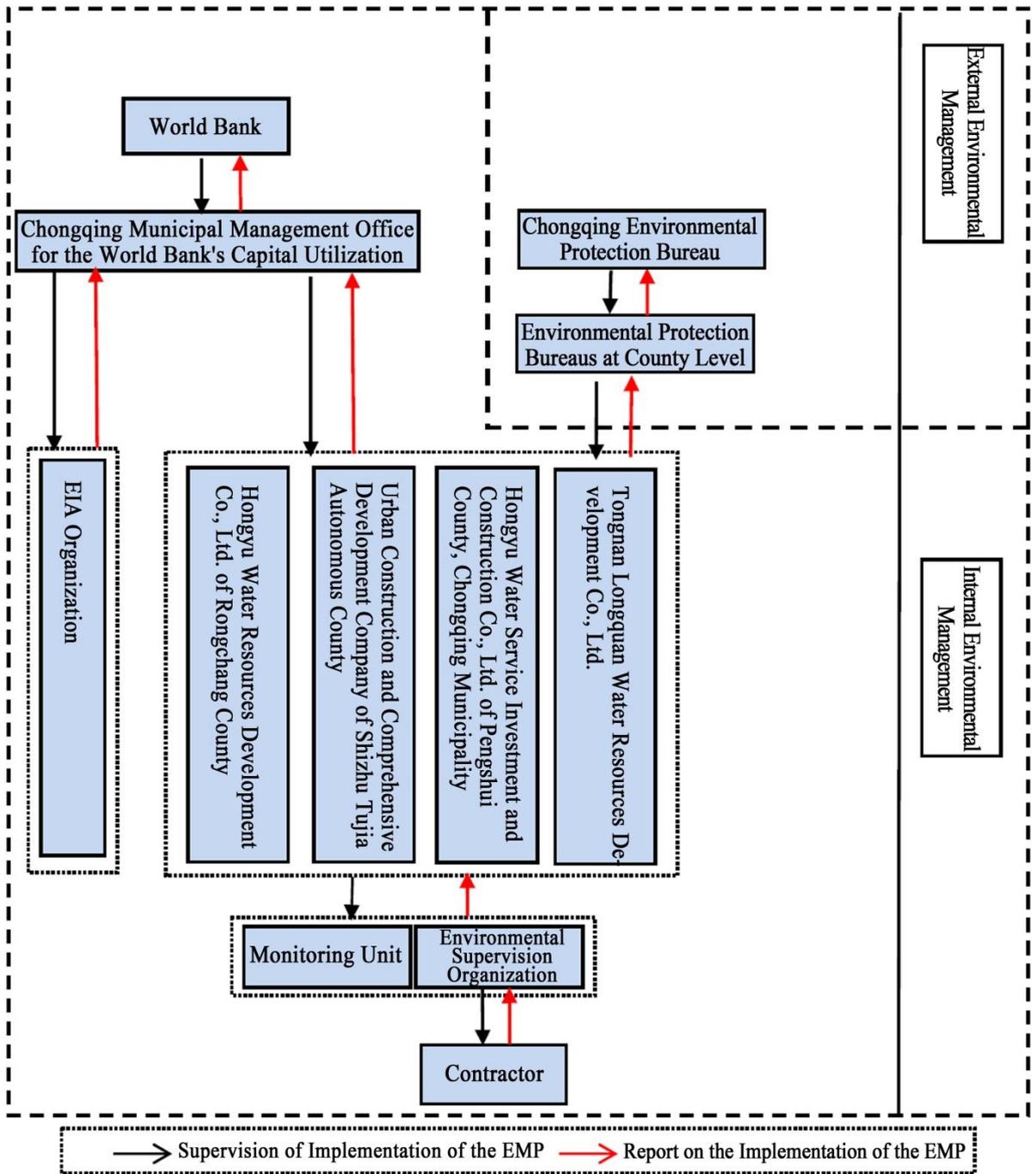


Figure 3-1 Diagram of Environmental Management System during Construction Period

3.3 Environmental Management System during Operation Period

Refer to Figure 3-2 for details of the environmental management system during operation period of the Project, and refer to Table 3-2 for responsibilities of all organizations in the management system.

Table 3-2 Organizations in the Environmental Management System during Operation Period and Their Responsibilities

Nature of Organizations		Names	Responsibilities
External environmental management	Supervision organizations	Chongqing Environmental Protection Bureau	For operational guidance and supervision & administration of environmental protection bureaus at county level
		Environmental Protection Bureaus at County Level	For supervision and management of matters related to environmental protection during operation period of the Project
		World Bank	For periodical supervision and inspection of implementation of the environmental management plan during operation period
Internal environmental management	Management organizations	Chongqing Municipal Management Office for the World Bank's Capital Utilization	For supervision and management of environmental protection during operation period of the Project
		Owners of the components	For supervision of the environmental protection management during operation period of the Project, bearing the responsibility for environmental protection management of the Project
	Environmental management implementers	Rongchang Urban Utilities and Landscaping Bureau, and Government of Longkong Town	For implementation of environmental protection during operation period (pump station)
		Shizhu Urban Utilities Bureau	
Consulting services	Environmental monitoring agency	Commissioned by the project implementer, responsible for all the environmental monitoring during operation period of the Project and for preparation of environmental monitoring report	

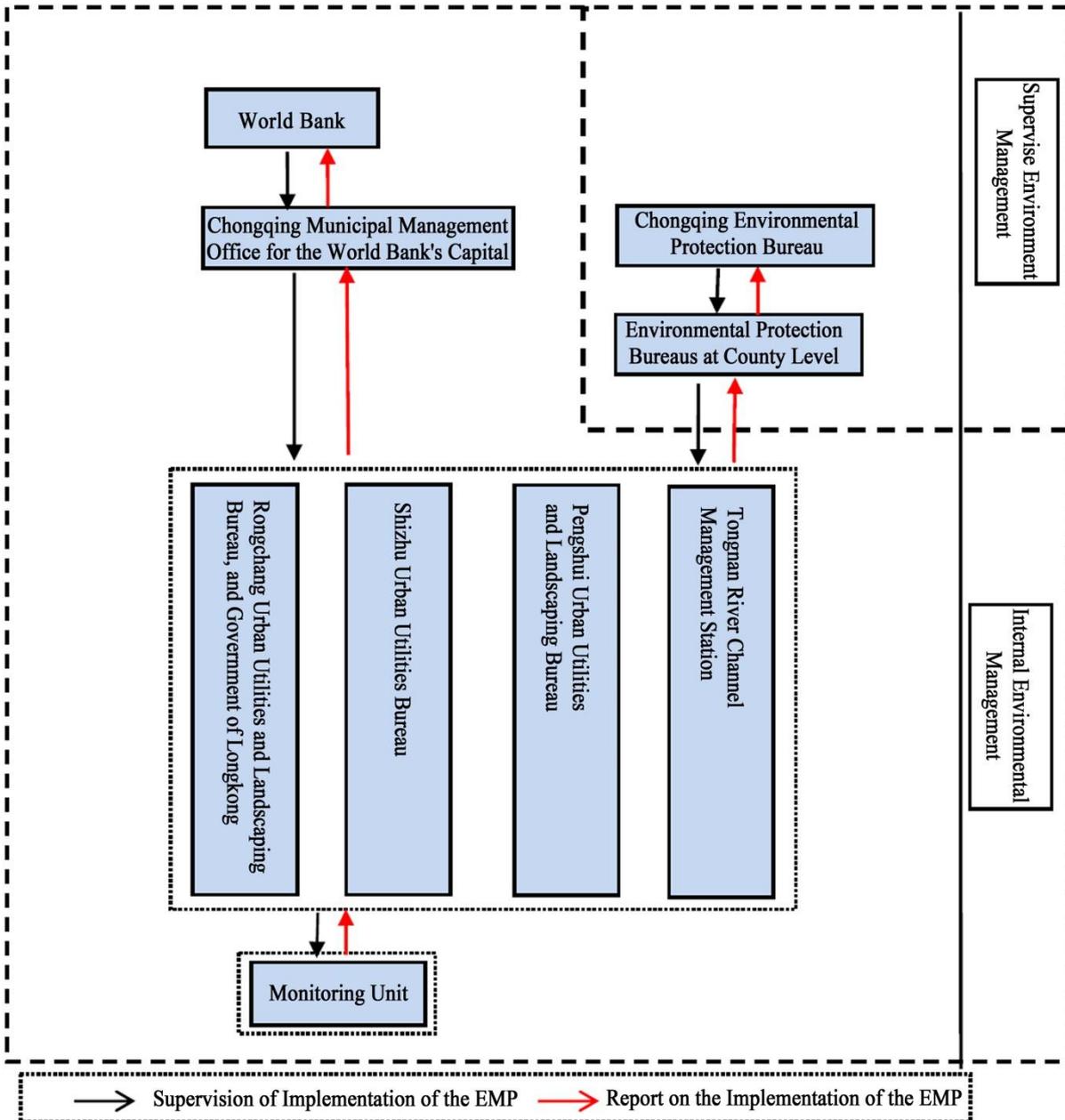


Figure 3-2 Diagram of Environmental Management System during Operation Period

4 Environmental Management Organizations

4.1 Environmental Supervision Organizations

The World Bank, Chongqing Environmental Protection Bureau and Environmental Protection Bureau of various counties jointly form the external environmental management organizations of the Project.

The environmental protection departments at all levels are the environmental administrative authorities. They should conduct environmental supervision and management for the whole process of the Project, involving approval of EIA report for the Project, final acceptance of environmental protection works during construction period, and environmental supervision & management during operation period and other phases. The World Bank supervises and inspects the environmental management of the Project during the whole process.

4.2 Environmental Management Organizations

4.2.1 Environmental Management Organizations during Pre-construction Period

Organization and personnel: During pre-construction period of the Project, Chongqing Municipal Management Office for the World Bank's Capital Utilization is the main organization of environmental management. In the pre-construction period, Chongqing Municipal Management Office for the World Bank's Capital Utilization should designate an environmental protection officer to be responsible for environmental protection and coordination in the stage.

Competency requirements: The environmental protection officer should graduate from environmental protection major or environmental management major and related majors, have been trained in environmental management, and have similar experience in environmental management of the Project.

Responsibilities: entrust EIA organization to prepare EIA statement; conduct EIA during construction period and operation period of the Project; propose various environmental protection measures; put the measures proposed by EIA into design document through design institute; and include the investment of environmental protection works in project budget.

4.2.2 Environmental Management Organization during Construction Period

During construction period, environmental management is mainly performed by project office, the Supervision Engineer and the Contractor. They should be supervised and inspected by the World Bank, Chongqing Environmental Protection Bureau and the Environmental Protection Bureaus of counties where components are located. The Contractor should implement various environmental protection measures during construction period, with the cooperation of and services provided by EIA organization and monitoring unit. The Supervision Engineer should conduct overall supervision and inspection for the implementation and effect of the Contractor's environmental protection measures.

(1) Chongqing Municipal Management Office for the World Bank's Capital Utilization and the owners of components

② Chongqing Municipal Management Office for the World Bank's Capital Utilization

Organization personnel: During the construction period of the Project, Chongqing Municipal Management Office for the World Bank's Capital Utilization should designate an officer to be fully responsible for environmental management and supervision of the period.

Competency requirements: The environmental protection officer should graduate from environmental protection major or environmental management major and related majors, have been trained in environmental management, and have similar experience in environmental management of the Project.

Responsibilities:

① Be responsible for reporting to the World Bank; implement the World Bank's suggestions about EMP of the Project.

② Be responsible for reporting to governmental administrative authorities; coordinate with other related departments to solve environmental problems.

③ Supervise the implementation of environmental protection measures required by EIA.

④ Organize and implement the environmental management training plan of the Project.

⑤ Submit report (statement) to environmental management department annually.

⑥ Assist the consultation organizations including EIA organization to carry out relevant work.

⑦ Cooperate in environmental inspection (including the inspection by the World Bank).

⑧ Ensure that the environmental protection measures proposed for the Project are included in the Bidding Documents and civil engineering contract.

② Owners of the components

Organization personnel: Each implementer should designate a full-time environmental protection officer to be responsible for environmental management and supervision during the construction period of the components.

Competency requirements: The environmental protection officer should graduate from environmental protection major or environmental management major and related majors, have been trained in environmental management, and have similar experience in environmental management of the Project.

Responsibilities:

- ① Be responsible for reporting to Chongqing Municipal Management Office for the World Bank's Capital Utilization; implement the World Bank's suggestions about EMP of each component.
- ② Prepare and implement environmental management rules and regulations for each component; conduct daily environmental management for those components.
- ③ Be responsible for reporting to governmental administrative authorities; coordinate with other related departments to solve environmental problems.
- ④ Ensure the implementation of environmental protection measures required by EIA for each component.
- ⑤ Ensure that the environmental protection measures proposed in EMP are included in project construction contract.
- ⑥ Invite, supervise and coordinate with environmental supervisor (qualification, responsibility and management).
- ⑦ Assist the consultation organizations including EIA organization to carry out relevant work.
- ⑧ Be responsible for recording and sorting out the complaints made during construction and operation period of the Project; reporting to Chongqing Municipal Management Office for the World Bank's Capital Utilization; explaining the disposal results to the public and solving the public petition issues.
- ⑨ Review environmental supervision and monitoring reports.
- ⑩ Cooperate in environmental inspection (including the inspection by the World Bank).
- ⑪ Other work, like document management, coordination between departments, publicity, reporting, etc.

(2) Environmental supervision

Environmental supervision engineer: For each component of the Project, environmental supervision engineer should be employed to supervise the environment for components.

Competency requirements: The environmental supervision engineer should have been trained in environmental protection, should receive the environmental management training for the Project, and be qualified in environmental management.

Responsibilities:

- ① Fill in environment checklist.

② Be responsible for completing environmental supervision- & inspection-related environmental reports; implement the mitigation measures for environmental impacts during construction period.

③ Supervise and inspect the domestic sewage collection and treatment, production wastewater treatment and water & soil loss prevention measures, exhaust gas, dust & noise control measures, and production & domestic wastes and sanitation, etc., in the construction area.

④ Propose solution for environmental protection-related problems encountered by the Contractor during construction.

⑤ Make sure that the Contractor will prepare and submit monthly report on environment.

⑥ Check the monthly report on environment; propose official or unofficial disposal suggestions with respect to various problems arising in work. Communicate and coordinate with the Contractor through the Engineer of the Project, if necessary.

⑦ Observe the impact of construction on the population around the construction area; make sure whether the Contractor should take additional protective measures. If the Contractor fails in taking proper measures, fine penalties should be imposed.

The Scope of the service also includes:

- supervision on the environmental works and environmental compliance;
- Review the environmental works in the preliminary design;
- Keep the journal of supervision and record of the site inspection;
- submit the daily report, conclusion report and environmental accident reports;
- hold environmental meetings (initial meeting, regular meeting, and topic meeting);
- keep the files on the daily supervision;
- supervise the progress of the implementation of the environmental works and the signature the investment on the environmental works;
- invite environmental experts to inspect the sites.

(3) The Contractor

Personnel: For each contract, two full-time or part-time persons should be allocated to conduct environmental protection during construction period.

Competency requirements: The technicians, who were trained in environmental protection and have certain environmental management capacity, are preferred. Additionally, they should receive the environmental management training of the Project.

Responsibilities:

- ① Develop environmental protection plan.
- ② Inspect environmental protection facility's construction progress, quality and operation; handle the problems arising during implementation.
- ③ Communicate and consult with the population in the project area during construction; set up bulletin board to inform the public of the detailed construction and time. Also, provide the contact person and contact information, so that the public can supervise the construction.
- ④ Check the utilization of annually environmental protection funds.
- ⑤ Report the execution of environmental protection clauses included in the contract.

(4) Monitoring unit

The project office entrusts qualified environmental monitoring unit to monitor the important parameters in construction area and affected area, and to prepare monitoring report.

(5) EIA organization

Commissioned by the implementer, the EIA organization provides consulting service for issues arising out of environmental management

4.2.3 Environmental Management Organizations during Operation Period

During operation period, environmental management is to be implemented by administrative authorities of municipal works and river channel in various counties. At the same time, the management organization, during operation period, entrusts the environmental monitoring unit to monitor the environmental management & monitoring plans for the period proposed in EMP.

(1) Management organizations

Rongchang Urban Utilities and Landscaping Bureau, Government of Longkong Town, Shizhu Urban Utilities Bureau, Pengshui Urban Utilities and Landscaping Bureau and Tongnan River Channel Management Station.

Personnel: During operation period, the above organizations should designate an environmental protection officer to be responsible for environmental management of the components in various counties during operation period. They should be guided and supervised by Chongqing Environmental Protection Bureau, the Environmental Protection Bureaus of counties where components are located, and Chongqing Municipal Management Office for the World Bank's Capital Utilization.

Competency requirements: The environmental protection officer should have been trained in environmental management and have similar experience in environmental

management of the Project.

Responsibilities:

① Be responsible for the whole environmental management of the components during operation period.

② Improve the environmental protection awareness and technical level of the administrators at all levels and workers.

③ Formulate environmental management rules and regulations for the operation period of the thermal power plant component.

④ Formulate the operation instructions of pollution prevention facilities; inspect and maintain the facilities regularly.

⑤ Cooperate with the governmental administrative authority in charge of environmental protection and the group company to conduct environmental management, supervision and inspection.

(2) Monitoring unit

The implementer entrusts qualified environmental monitoring unit to accomplish the monitoring of exhaust gas, wastewater, noise and others during operation period, proposed in EMP, and to prepare environmental monitoring report.

5 Education Plan for Public Awareness Raising of Environmental Protection

The project areas are in 4 counties of Chongqing Municipality, all involving new development zones of the project towns, and environmental protection awareness of people living in the project areas is still kept at a low level. To address this issue, environmental protection education, information dissemination and training need to be conducted to raise public awareness of environmental protection at the preparation stage of each project component.

Responsible organizations for the education and training: Implementation organization of each of the project components.

Supervision organizations for the education and training: Chongqing Municipal Project Management Office.

Timing of the education and training: Preparation stage of project components (before construction commencement).

Trainees of the education and training: The general public living along the project construction line and directly and indirectly affected by the Project.

Environmental protection specialists for the education and training: Specialists from the environmental protection expert pool of Chongqing and environmental specialists from the World Bank will be invited to assist in the education and training.

Material to be used for the education and training: Environmental protection laws and regulations of China and relevant policies of the World Bank.

Forms for the education and training: Training workshops combined with on-site and classroom intensive lectures.

Information dissemination: From the county government to the town/township/street communities, then to communities/village leaders, and then to the general public; distribution of printed publicity material shall also be conducted.

Education and training archiving: Public education plan and the progress report should be archived to fully reflect implementation status and results of the education and training plan.

6 Environmental Management Training

6.1 Training Purpose

Environmental management training aims to improve the environmental protection awareness of all participants; make all persons actively and effectively perform the EMP, be familiar with EMP' contents and procedures; ensure the implementation of the environmental protection measures in EMP.

6.2 Trainees

Trainees of environmental management training: representatives of project office, representatives of the owners, environmental supervisors, contractor representatives of the components, representatives of management organizations during operation period.

6.3 Training Contents

① Understanding and application of environmental policy of the World Bank, domestic environmental protection law & regulation and environmental standard.

② Environmental impact assessments and environmental management plan of the Project.□ □

③ Environmental management regulations of the Project, especially that for construction period.

④ Pollution control technology during operation period of the Project.

⑤ Preparation of environmental management report, environmental supervision report, environmental monitoring report and the Contractor's monthly report.

6.4 Training Plan

In order to ensure smooth and effect implementation of the Project, relevant personnel

must be trained in environmental protection knowledge and skills. In addition to explaining the importance and implementation significance of the proposed project to all staff, specific training with different focuses should also be given to the personnel at various positions.

See Table 6-1 for details of the training plan.

Table 6-1 Training Plan for Environmental Protection Technicians

Phase of the Project	Training Organization	Personnel	Training Contents	Method	Number of People	Time (day)	Expense (RMB 10,000)
Construction period	Chongqing Municipal Management Office for the World Bank's Capital Utilization	The Contractor representative, environmental protection officer on construction site, relevant personnel from historical and cultural sites under government protection	EMP of the Project and management plan for physical cultural resources	Domestic training	2 persons for each component	2	6
	Chongqing Municipal Management Office for the World Bank's Capital Utilization	Environmental protection officer of the owners at all levels	The World Bank's environmental policy and environmental protection regulations, as well as the EMP of the Project	Domestic training	1 person for each project office	2	6
	Chongqing Municipal Management Office for the World Bank's Capital Utilization	Environmental supervisor	Environmental protection regulations, construction planning, environmental monitoring guidelines & specifications, and EMP of the Project	Domestic training	All supervisors	3	7
Operation period	Chongqing Municipal Management Office for the World Bank's Capital Utilization	Management organization at each operation period	Related monitoring & pollution control technology during operation period, EMP of the Project, and the preparation of implementation report on EMP.	Domestic training	1 person for each organization; 1 person for each branch company	1	3
		Total			/	/	22

7 Environmental Management Regulations

Environmental management regulations cover design stage, construction period and operation period.

Implementatin of the four project components should observe environmental management regulations set for the construction, operation stages (as shown in Tables 7-1, 7-2 and 7-3).

Besides, Tongnan project component should also follow regulations defined in Table 7-4; Pengshui project component should also observe regulatiosn defined in Table 7-5; Rongchang project component should also observe regulations in Tables 7-6 and 7-7; and Shizhu project component should also abide by regulations in Tables 7-8 and 7-9.

7.1 Environmental Management Regulations for Construction Period and Operation Period

See Tables 7-1, 7-2 and 7-3 for details of the environmental management regulations for construction and operation periods of the Project.

Table 7-1 Summary Sheet of Environmental Management Regulations for Construction & Operation Periods of Flood Control Works

Phase of the Project	Item	Environmental Factors	Mitigation Measures	Implementer	Supervision organization	Monitoring Unit	Monitored Item	
Design stage	Flood control works	Scale and route selection	<p>Comprehensively analyze and compare scale and route selection scheme for flood control works from multiple aspects, such as environmental protection, social needs, technology & economy and project, geological exploration and local planning.</p> <p>Select the optimum scale and route selection scheme and submit to the governmental administrative authority of the county and the Owner of the Project for approval.</p>	Design institute EIA organization Social impact assessment unit	The World Bank, local environmental protection bureau, and water conservancy bureau	/	/	
		Natural environment	Acoustic environment	Select optimum construction machinery, control construction time period, etc.	Design institute EIA organization	The World Bank, implementer, and local environmental protection bureau		
			Atmospheric environment	Optimize construction technology; reasonably select construction site.	Design institute and EIA organization	The World Bank, implementer, and local environmental protection bureau		
			Water environment	Reasonably select water-related construction technology; reasonably determine construction period (low-water period, storage period of upstream dam); confirm rationally dredging technology & method and time period (low-water period).	Design institute and EIA organization	The World Bank, implementer, local environmental protection bureau, and water conservancy bureau		
		Ecological environment	Avoid ecologically sensitive area for route selection whenever possible.	Design institute, EIA organization, and social impact assessment unit	The World Bank, implementer, local environmental protection bureau, and forestry bureau			

Phase of the Project	Item	Environmental Factors	Mitigation Measures	Implementer	Supervision organization	Monitoring Unit	Monitored Item	
		Water and soil conservation	Select optimum construction time period; reasonably select waste disposal area and material yard; etc.	Design institute and EIA organization	The World Bank and local environmental protection bureau			
		Social environment	Cultural resources	Investigate the presence of cultural relics and historic sites in the project area during design; avoid and protect physical cultural resources for the route selection whenever possible.	Design institute and cultural sites authorities	The World Bank and local cultural sites authorities		
			Relocation due to land requisition	Minimize relocation during route selection; select the route with little land requisitioned and with slight impact.	Design institute and social impact assessment unit	The World Bank and implementer		

Phase of the Project	Item	Environmental Factors	Mitigation Measures	Implementer	Supervision organization	Monitoring Unit	Monitored Item
		Residents' living, transportation and commerce	Select reasonable route; avoid dense community.	Design institute	The World Bank and implementer		
Construction period	Flood control works Natural environment	Acoustic environment	<p>Temporary construction sites should be located at 50m outside of the sensitive areas. Proper layout should be ensured to avoid too high noise level in the local area. Construction machines should be located at the side away from the sensitive site and at the side close to the sensitive site, management buildings can be placed, so as to minimize noise level. Under the premise that construction demands are met, advanced equipment with low noise, vibration and energy consumption should be selected whenever possible; maintenance and service of mechanical equipment should be strengthened to keep the noise at the lowest level.</p> <p>Reasonable arrangement of construction method and time: Construction time at night is under strict control, avoiding adverse effect of night work on environment to</p>	Implementer	Local environmental protection bureau	Qualified organization entrusted by the implementer in the form of a contract	

Phase of the Project	Item	Environmental Factors	Mitigation Measures	Implementer	Supervision organization	Monitoring Unit	Monitored Item
			<p>the largest extent. Construction activity that would cause environmental noise pollution is prohibited during the period from 22:00 p.m. to 6:00 a.m. of the next day. If night work is unavoidable due to requirement of production process or other special requirements, the Contractor should report for approval in accordance with relevant laws and regulations within 4 days before night work. For unavoidable night work, competent municipal authorities of public utilities and urban-rural construction should issue a certificate respectively. The Contractor should post notice on site within one day before night work, informing nearby residents of relevant matters.</p> <p>Noise reduction measures should be carefully taken by the Contractor, with approved certificates for night work hung on a conspicuous location on site. Meanwhile, notice with construction cause and time should be posted on access route of residential agglomeration for publicity and explanation, trying to obtain understanding of the public and accepting supervision of the public and environmental protection law enforcement officer;</p> <p>Implementation of measures for noise reduction at the construction site: The Contractor should develop construction noise reduction scheme before construction. For construction activity to be carried out in the residential agglomerations along the route of the Project, the Contractor should post a notice at the construction site during construction to show project name, construction content, construction period, owner's contact information, contractor's name, person in charge of the site and contact information, potential</p>				

Phase of the Project	Item	Environmental Factors	Mitigation Measures	Implementer	Supervision organization	Monitoring Unit	Monitored Item
			<p>noise pollution and control measures to be taken.</p> <p>Reasonable layout of working equipment: Management of powered mechanical equipment in construction area should be strengthened, and devices to be used at a fixed place such as construction machinery should be installed at a place far away from the protected object to reduce impact of construction noise on environment.</p> <p>It is prohibited to carry out night work that would cause noise pollution in the residential agglomerations along the route of the Project within 15 days before and during college entrance examination and senior high school entrance examination.</p> <p>Environmental publicity and education for the constructors shall be strengthened to make them carefully implement all noise reduction measures and construct in a civilized manner. Under the premise that construction quality is guaranteed, construction progress should be accelerated and construction period should be minimized.</p> <p>The Contractor shall handle well the relationship with the residents near the construction site, especially those who live very close to the regulation section, so as to avoid disputes caused by noise pollution and impact on social stability.</p>				
		<p>Atmospheric environment</p>	<p>Fence and enclosure would be provided around the work area during construction to reduce diffusivity of dust nuisance. Firm and beautiful fences with height no less than 1.8m should be provided around the construction site in series.</p> <p>Perform hardening of ground. Road in the construction camp, access road and construction material stockpile</p>	<p>Implementer</p>	<p>Local environmental protection bureau</p>	<p>Qualified organization entrusted by the implementer in the form of a contract</p>	

Phase of the Project	Item	Environmental Factors	Mitigation Measures	Implementer	Supervision organization	Monitoring Unit	Monitored Item
			<p>area must be hardened, with road surface kept clean. Facilities for car washing and drainage must be provided at access of the construction camp. Any car pulled out of the construction camp must be washed out, without flying, scattering, leaking particles and carrying soil.</p> <p>Construction should be carried out in a civilized manner, with necessary measures for dust nuisance prevention taken. For dust production point where cement is mixed, unloaded and poured, simple dustproof facilities should be provided, such as shelter workshop, dust board and water sprayer. Number of times of onsite mixing should be minimized and such work should be kept far away from the object under environmental protection. The construction site should be arranged reasonably, and all aggregates should be stacked and stored in a unified manner and covered with protective cloth. Powdery materials such as cement should be transported in bag or tanker. Transportation in bulk is prohibited. Besides, special warehouse should be set, with reliable measures for dust nuisance prevention provided.</p> <p>Water should be sprayed in the construction area to prevent dust. The Contractor should develop regulations on dust prevention by spraying water, and involved areas include working surface, road section, temporary dumping site and main road for transportation under construction as well as bare land not under construction. Frequency of water spraying should be determined by the Engineer based on site conditions and may be increased properly in case of</p>				

Phase of the Project	Item	Environmental Factors	Mitigation Measures	Implementer	Supervision organization	Monitoring Unit	Monitored Item
			<p>high wind or dry weather.</p> <p>Management of transport vehicle: Cement, aggregate and other similar materials would easily generate dust nuisance. For transportation of materials that would easily scatter and leak, they must be loaded based on normative procedures. Closed transporter should be intact, neat and clean. Overloading is strictly prohibited. The Contractor must select the construction machinery and transportation facility conforming to relevant national sanitary standards and use high-grade fuel, so that the exhaust gas emitted meets relevant national standards. The construction machinery and transportation facility should be maintained and serviced frequently to prevent accidental leakage of gasoline and diesel.</p> <p>Mess hall is built in the living area of constructors. Fuel coal is prohibited. All the constructors would use clean energy sources such as natural gas, liquefied gas and electricity.</p> <p>The Owner should incorporate the special fund for dust nuisance control during construction into the cost estimate of the Project, and the Contractor should ensure that such special fund is used as designated.</p>				
		Water environment	<p>Wastewater generated from mixing of concrete should be recycled after coagulation sedimentation.</p> <p>Management of construction machinery should be strengthened. Such situations as escaping, running-out, dripping and leaking should be avoided as much as possible; treatment facilities including permanent car washing station, oil trap and grit chamber and so on should be provided, so that oily wastewater can be</p>	Implementer	Local environmental protection bureau	Qualified organization entrusted by the implementer in the form of a contract	

Phase of the Project	Item	Environmental Factors	Mitigation Measures	Implementer	Supervision organization	Monitoring Unit	Monitored Item
			<p>reused after treatment in the oil trap and grit chamber; Domestic wastewater may be used for pit toilet on the construction site, or may be treated with sanitary facilities of local farmers nearby. Feces are used for local agricultural production. Temporary pit toilet should be removed after construction, covered with quicklime and treated like sanitary landfill. Based on site conditions, vegetations can be planted after landfill. Materials at the construction site must be protected against rain and seepage with sufficient canvases and asphalt felts, preventing such materials from mixing with rainwater and flowing into water body. If construction activity is carried out near a water body, earth and rock shall not be piled up at the side closer to the water body. If such case is unavoidable, temporary retaining wall shall be constructed to prevent earth and rock from falling into Laixi river and causing impact on the water body and aquatic flora and fauna. Small amount of suspended sediment generated from the construction activity in cofferdam can be treated by sedimentation, so as to prevent suspended materials from entering other water bodies beyond the cofferdam to the largest extent. Construction camp should not be set near the environmental sensitive site, ensuring good cleanness & hygiene conditions on the construction camp and the sanitary safety of drinking water.</p>				

Phase of the Project	Item	Environmental Factors	Mitigation Measures	Implementer	Supervision organization	Monitoring Unit	Monitored Item
		Solid waste	<p>A small amount of disposed construction wastes generated during the demolishing of original buildings within the scope of embankment foundation should be transported to the disposal area for construction wastes designated by municipal departments. Mixture of materials stripped from the embankment and foundation earth and stones would be generated during the excavation of embankment foundation. The materials stripped from embankment foundation should be used for placement of levee slope after humus soils are removed. The foundation earthwork should be used as fill for the embankment and its land area.</p> <p>Rainproof garbage bins or cans should be provided at the construction camp to collect domestic garbage and transported to designated place to be disposed.</p> <p>The dredging sludge from Shizhu component should be transported to Yaodianzi Waste Treatment Plant operated by Limin Waste Disposal Co., Ltd. of Shizhu County for sanitary landfill.</p>	Project implementer	Local environmental protection bureau		
		Ecological Environment	<p>Construction should be conducted within the acquired land area as much as possible, temporary land use and destruction to the farm land in the surrounding area should be minimized to the lowest level.</p>	Contractor	Project implementer, local environmental protection bureau		

Phase of the Project	Item	Environmental Factors	Mitigation Measures	Implementer	Supervision organization	Monitoring Unit	Monitored Item
		Water and Soil Conservation	During construction period, proper coverage and fencing should be adopted at the temporary earth stockyard to avoid soil and water erosion.	Contractor	Project implementer, local environmental protection bureau, water resources bureau		
		Social Environment					
		Cultural Resources	During construction period, good relationship should be maintained with local residents and strict management should be exercised on construction staff, so as to avoid behaviors in conflict with customs of local residents. Construction in Lukong town of Rongchang County and in areas close to Xujiaba ruin site of Pengshui County and Dafu Temple of Tongnan County should observe regulations stated in the annex "Physical Cultural Resources Management Plan".	Contractor	Project implementer, local cultural bureau		
		Land Acquisition	For permanent land occupation, feedback mechanism to hear from the impacted people is formulated for construction period.				

Phase of the Project	Item	Environmental Factors	Mitigation Measures	Implementer	Supervision organization	Monitoring Unit	Monitored Item
		Life of Local Residents	<p>During construction period, warning sign boards should be established at the construction sites to describe main contents, duration of construction, apology to the public for inconveniences caused due to the construction, and contacts of responsible people and grievance hotline and etc.</p> <p>Considering great amount of electricity consumption during construction period, the contractor should contact relevant department in advance to define power line connection plan. Connection of temporary power line should be well prepared. In areas without adequate power and water supply capacity, improvement of power and water supply system should be done ahead of time of construction, so as to avoid abrupt cut-off of water or power supply impacting on local residents and enterprises.</p> <p>For construction in areas close to Yutongwenwu School of Tongnan County and No.1 Vocational School, Chenlin Hope School and Liren Hospital of Shizhu County, temporary bridges should be provided at places to allow for entrance and exit uses by students. Fine mesh fencing net should be established outside the scaffolds to ensure safety of pedestrians.</p> <p>Height and lighting direction of floodlights should be carefully set to avoid impacting on rest of residents during nighttime.</p> <p>Storage sites for pipes and tube stock should be properly located, being far away from schools as much as possible and piled up in order, with specially assigned staff to ensure safety.</p>	Contractor	Project implementer, local environmental protection bureau		

Phase of the Project	Item	Environmental Factors	Mitigation Measures	Implementer	Supervision organization	Monitoring Unit	Monitored Item
		Traffic Safety	<p>To minimize impacts of project construction on local residents and local traffic, unified traffic diversion plan should be formulated for construction period to avoid traffic congestion; if necessary, cooperation with local public traffic management department should be exercised to ensure smooth traffic and proper function of urban traffic system. Prior notification to the public via TV, radio and newspaper should be issued.</p> <p>Enforcement of safety rules by the drivers should be strengthened.</p> <p>All drivers of construction vehicles should have driving licenses and qualified skillfulness, and working time limit and shift schedule should be set for the drivers to avoid driving while being tired.</p> <p>Risky roads should be avoided and time periods with higher potential of accidents for the construction vehicles should also be avoided to reduce possibility of accidents.</p> <p>Regular maintenance of construction vehicles should be maintained and use of verified devices and spare parts by the vehicle manufacturer should be ensured, so that risk of serious accident due to device or spare part failure or ineffectiveness can be avoided.</p> <p>Parallel use of a road by pedestrians and construction vehicles should be avoided. If such parallel use can not be avoided, special line should be set to separate pedestrians from the construction vehicles, or specially assigned staff should take responsibility to guide traffic on the road;</p> <p>Cooperation with local communities and responsible departments should be exercised to improve road signs,</p>	Contractor	Project implementer, local public traffic management department, the World Bank		

Phase of the Project	Item	Environmental Factors	Mitigation Measures	Implementer	Supervision organization	Monitoring Unit	Monitored Item
			<p>upgrade visibility and safety level of the road, especially for the roads close to schools or with children presence. Education on traffic rules and pedestrian safety can be conducted together with local communities (e.g. education campaign in schools);</p> <p>Contact with emergency reaction department should be conducted to ensure proper rescue and first aid in case of emergency of accident;</p> <p>Maximal use and procurement of locally available material should be ensured to reduce transport distance. Facilities (such as dormitories of construction workers) should be located close to the construction site, and bus should be used to transport workers to reduce incremental traffic volume.</p> <p>Traffic control measures should be used to ensure traffic safety, together with road signs and signalmen to warn pedestrians and staff of danger.</p>				

Table 7-2 Environmental Management Regulations during Construction and Operation Periods of Wastewater Treatment Works

Phase of Works	Works	Environmental Factors	Mitigation Measures	Implementer	Supervision Organization	Monitoring Unit	Monitoring Item
Design stage	Wastewater treatment	Selection of scheme	Based on selection of pipeline route and difficulty in land acquisition, laying of wastewater pipe network and construction.	Design institute	World Bank; project implementer		
		Selection of pipe network route	Pipe network route should be considered comprehensively based on several factors, such as relocation	Design institute	World Bank; project implementer		

				scale, investment, construction difficulty and cost of land acquisition.				
		Natural environment	Acoustic environment	Pipe network route should reasonably avoid the surrounding residents, hospitals and schools, etc. in consideration of the impact of noise on them during construction.	Design institute; EIA organization	World Bank; project implementer		
			Solid waste	Backfilling of excavated earth should be considered during the design of pipe network route.	Design institute	World Bank; project implementer		
		Ecological environment		Pipe network should be arranged along the embankment and road if possible to reduce damages to farmlands, forestlands and grasslands.	Design institute	World Bank; project implementer		
		Social environment	Culture resources	During the design, investigation should be carried out on whether there are cultural relics along the pipe network route.	Design institute Cultural relics department	World Bank; local cultural relics department		
			Land acquisition	During the selection of route, land acquisition and relocation should be reduced as much as possible to reduce the impact on the lives of people.	Design institute; social impact assessment organization	World Bank; project implementer		
			Lives of residents, traffic and commerce	Inverted siphons or pipe jacking should be adopted during crossing construction. Full preparations should be made and detailed investigation on roads and various underground pipelines involved along the route should be carried out.	Design institute	World Bank; project implementer		
Construction period	Pipe network	Natural environment	Acoustic environment	Noise from the construction equipment should be lowered; the machinery and equipment should be maintained regularly to keep them in good condition and reduce noise pollution caused due to unsatisfactory operation of the equipment; regular inspection and maintenance of powered	The Contractor	The project implementer and local environmental protection bureau		

			<p>machines and equipment should be strengthened.</p> <p>Temporary construction sites should be located at 50m outside of the sensitive areas. Proper layout should be ensured to avoid too high noise level in the local area. Construction machines should be located at the side away from the sensitive site and at the side close to the sensitive site, management buildings can be placed, so as to minimize noise level.</p> <p>The speed of vehicles should be restricted after driving on the road near the sound sensitive area and blaring of horns should be reduced or forbidden.</p> <p>Construction with equipment which causes loud noises should be avoided as much as possible; the operation time should be restricted, i.e. construction at night (22:00 – 6:00 of next day) should be forbidden so as to ensure a relatively good environment for surrounding residents to rest at night; especially when passing by sensitive points along the pipes in urban area, civilized construction should be carried out, and the operation time of machinery with loud noise should be strictly controlled so as to reduce the impact of construction noise on them.</p>				
		Atmospheric environment	<p>For construction materials which tend to cause flying dust during construction, special sheds should be provided and dustproof cloth should be used to cover the raw materials.</p> <p>In case of earth works with high</p>	The Contractor	The project implementer and local environmental protection bureau		

			<p>risk of causing dust due to dry state, water should be sprayed to control the dust and time of dust-causing operation should be shortened as much as possible. In case of wind of Beaufort scale 4 or above, earth works should be suspended and dustproof net should be used to cover the place where operation is suspended.</p> <p>Materials and garbage should be transported in sealed state and throwing in the air and rough handling should not be allowed; no spilling of materials should be ensured so as to avoid spilling along the road and reduce dust caused for the second time during transportation; after entering the sensitive areas, the vehicle should drive at a low speed so as to reduce impact on the surrounding environment.</p> <p>No construction camps should be set up and construction should rely on surrounding residential houses.</p>				
		Water environment	<p>When temporary toilet is built, excrement should be covered with earth in time. After construction is finished, the excrement may be given to local fellow-villagers nearby to be used as fertilizers, and the toilet should be backfilled after treated with lime.</p> <p>The treatment of domestic wastewater generated by construction personnel should be included in the drainage systems of the villages where the construction personnel are.</p>				
		Solid waste	<p>The disposed earth and stone during construction mainly come from</p>	The Contractor	The project implementer and local environmental		

			<p>those generated during laying of pipes and all of them should be backfilled.</p> <p>Waste materials generated during pipe construction as well as waste welding joints generated during pipe welding should be collected in a centralized way and sold and disposed in a unified manner in waste purchasing station.</p> <p>Domestic garbage collecting bin should be provided in the construction area and temporary living area; the domestic garbage should be disposed by environment sanitary authority in a unified manner after collected in a centralized way.</p> <p>The excrement from temporary toilet for construction personnel should be covered with earth in time. After construction is finished, the excrement may be given to local fellow-villagers nearby to be used as fertilizers, and the toilet should be backfilled after treated with lime.</p>		protection bureau		
		Ecological environment	<p>Construction should be carried out within the land acquisition scope if possible and damages caused to temporary lands and farmlands and forestlands around the operation area should be reduced to the minimum.</p>	The Contractor	The project implementer and local environmental protection bureau		
		Water and soil conservation	<p>During construction, temporary dump area should be enclosed and earth and stone should be covered to avoid water and soil loss.</p>	The Contractor	The project implementer, local environmental protection bureau and water conservancy bureau		
		Social environment	Culture resources	<p>During the construction, good relationship should be maintained with</p>	The Contractor	The project implementer and local government	

			<p>the local residents and local cultural practices should be followed, and construction personnel should be managed strictly to avoid behaviors which conflict with local cultural practices.</p> <p>Construction in Lukong town of Rongchang County and in areas close to Xujiaba ruin site of Pengshui County and Dafu Temple of Tongnan County should observe regulations stated in the annex "Physical Cultural Resources Management Plan".</p>				
		Land acquisition and relocation	<p>The acquired land for pipe network is for temporary use; feedback mechanism is provided during the construction to collect comments from the affected masses.</p>	Project implementer	World Bank Local government		
		Lives of residents	<p>Notice board should be provided on the construction site to indicate the main contents of the Project and the inconveniences brought about by construction during the construction period to seek understanding of the public. Besides, there should be the name of a contact, complaint hotline, etc. indicated on the notice board.</p> <p>Since there is a high demand in electricity consumption during construction, the Contractor should contact with relevant departments in advance to finalize a pipeline connection scheme and make good preparations for temporary pipeline connection; for sections with inadequate capacity locally, water and electricity pipelines should be transformed in</p>	The Contractor	The project implementer and local environmental protection bureau		

				<p>advance to prevent the impact of temporary failures of water and electricity supplies on normal water and electricity supplies for residents, industrial and mining enterprises and government departments along the line.</p> <p>For construction in areas close to Yutongwenwu School of Tongnan County and No.1 Vocational School, Chenlin Hope School and Liren Hospital of Shizhu County, temporary bridges should be provided at places to allow for entrance and exit uses by students. Fine mesh fencing net should be established outside the scaffolds to ensure safety of pedestrians</p> <p>The floodlight for construction should be hung at such a height and in such a direction that would not affect the rest of residents at night.</p> <p>The selection of site for pipes should be designed reasonably at a place far from schools and the pipes should be stacked in order and guarded by special personnel.</p>			
			Traffic safety	<p>To minimize the impact of project construction on the lives of urban residents and the urban traffic, the driving routes of vehicles on urban roads should be planned in a unified manner to subdivide traffic flow during construction to prevent traffic jams; if necessary, cooperation with public safeguard and traffic administration departments is needed to ensure smooth and normal urban traffic flow, and advance notice should be released</p>	The Contractor	The project implementer, local traffic safety department and World Bank	

				<p>via broadcasts, televisions and newspapers.</p> <p>Safety rules should be emphasized for drivers;</p> <p>The driving skills of drivers should be enhanced and drivers must have driving licenses.</p> <p>Driving time should be restricted and schedule of driving shifts for drivers should be prepared to avoid overwhelming tiredness.</p> <p>Dangerous roads and driving at a dangerous time of a day should be avoided so as to reduce the possibility of accidents.</p> <p>Vehicles should be maintained regularly and parts approved by manufacturers should be used to avoid serious accidents caused by equipment failure or premature failure of parts.</p> <p>Parallel use of a road by pedestrians and construction vehicles should be avoided. If such parallel use can not be avoided, special line should be set to separate pedestrians from the construction vehicles, or specially assigned staff should take responsibility to guide traffic on the road.</p> <p>Cooperation with local communities and competent authorities should be carried out to improve road signs and enhance the visibility so as to improve the general degree of safety of roads, especially around schools and other areas frequented by children. Traffic education and pedestrian safety education should be provided together</p>				
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				<p>with local communities (for example, carrying out publicity activities at schools).</p> <p>Coordination with emergency handling personnel should be implemented to ensure that proper first aids are provided in case of accidents.</p> <p>Materials purchased locally should be used if possible to shorten the haul distance. Relevant facilities (such as dormitories for workers) should be constructed near the project site and workers should be transported with large buses to avoid increase of traffic flow;</p> <p>Safe traffic control measures should be taken and road signs and signals should be used to warn pedestrians and vehicles coming and going about the risks of dangers.</p>				
Operation period	Pipe network works	Natural environment	Acoustic environment	The pump station should be arranged far from residential settlement and equipment maintenance should be strengthened.	Project implementer	Local environmental protection bureau		
		Cumulative impact of risk		<p>Design of embankment works and the strength of wastewater pipe network should be strengthened.</p> <p>Inspection and maintenance should be strengthened.</p>	Project implementer	The project implementer and local environmental protection bureau		

Table 7-3 List of Regulations for Management on Water and Soil Conservation

Phase of Works	Works	Mitigation Measures	Implementer	Supervision Organization	Monitoring Unit	Monitoring Item
Construction period	Wastewater collection and treatment works and flood control works	<p>Construction process should be optimized and construction should be organized reasonably according to the design of main works so as to reduce the impact of project construction on water and soil loss to the minimum.</p> <p>Prior to project construction, the Contractor should strengthen the publicity of water and soil conservation and improve the awareness of the construction personnel in water and soil conservation.</p> <p>Signs for land acquisition boundary should be set up around the construction area; earth-stone works should be strictly controlled within the land acquisition scope to avoid enlarging the disturbed area.</p> <p>The construction period should be selected reasonably; loose ground should be exposed as less as possible; construction of civil works should avoid to be carried out in rainy season; while carrying out earth-stone works and construction in rainy season, temporary protective measures should be implemented.</p> <p>During the construction, excavation, backfilling, rolling and slope protection measures should be implemented at the same time. For transportation of earth and stone vehicles with cover should be selected to avoid dropping and loss of disposed materials.</p> <p>In terms of the protective works for slope excavation and backfilling, drainage system for slope surface and toe should be adopted in</p>	The Contractor	The project implementer, local environmental protection bureau and water conservancy bureau	Qualified organization entrusted by the project implementer in the form of a contract	Monitoring of main factors affecting water and soil loss; monitoring of change in ecological environment with water and soil conservation measures in project area; dynamic monitoring of water and soil loss in project area; monitoring of control effects of water and soil conservation measures;

Phase of Works	Works	Mitigation Measures	Implementer	Supervision Organization	Monitoring Unit	Monitoring Item
		<p>time after the slope stability reach the design standard. The principle of protecting a section after this section is constructed or used is followed.</p> <p>During construction, earth and stone for each construction zone should be allocated well. Backfilling should be carried out immediately after excavation is completed if possible. If backfilling cannot be carried out in time, protection measures for temporary stacking and storage should be implemented.</p> <p>The disposed wastes and temporarily stacked earth and stone generated during the construction should be cleared and transported in time and stacked at the dump area designated by the Owner.</p> <p>Management of implemented measures for control of water and soil loss should be strengthened by establishing effective management system to achieve effects in water and soil conservation as soon as possible.</p>				

7.2 Environmental Management Plan for Sensitive Sites

For environmental management plans for sensitive sites of the Project, see Table 7-4 for Tongnan flood control works, Table 7-5 for Pengshui flood control works, Table 7-6 for Rongchang flood control works, Table 7-7 for Shizhu flood control works, Table 7-8 for Rongchang sewage collection works and Table 7-9 for Shizhu sewage collection works.

Table 7-4 Environmental Management Plan for Sensitive Sites of the Project (Tongnan Flood Control Works)

Works	Objective of Environmental Protection	Measures for Mitigating Environmental Pollution	Responsible Organization	Supervision Organization
Tongnan Flood Control Works	5 households of No. 1 Community of Xinsheng Village	The control of stationary and mobile noise sources should be strengthened during the construction period, and the operation time should be controlled. It shall not be allowed to carry out construction which may generate environmental noises during the period from 22:00 to 6:00 of the next day and from 12:00 to 14:00 in the day.	The Contractor and Supervision Engineer	Project implementer and Environmental Protection Bureau of Tongnan County
	Yutong Culture and Martial Art School of Tongnan County	<p>The Contractor should handle well the relationship with the residents of No. 1 Community of Xinsheng Village, especially with those living very close to the regulation section, so as to avoid disputes caused by noise pollution and impacts on social stability.</p> <p>Construction equipment which causes noises should be arranged at a place 50 m away to the eastern side of the school.</p> <p>Reduction of dust by water spraying: powdery materials should be transported in sealed state and the construction site should be arranged reasonably, with the mixing plant and aggregate yard being set up in the west of the site and at a place 50m away from the environmental sensitive sites. All the aggregates should be stacked and stored in a unified manner and covered with protective cloth.</p>		
	Water intake of stand-by drinking water source of Tongnan urban area	<p>Domestic wastewater should not be directly discharged until treated using existing facilities; and construction wastewater should be reused as spraying water for dust reduction of the construction site after treated in the grit chamber instead of being discharged.</p> <p>Monitoring of Class A protection area of stand-by drinking water source should be implemented during river-involved construction.</p>	The Contractor and Supervision Engineer	Project implementer, Tax Bureau and Environmental Protection Bureau of Tongnan County
	Fujiang River National Wetland Park	The construction should be carried out only within the occupied land of the Project; it shall not be allowed to destroy wetlands outside of the occupied land during construction; native species commonly seen at the local sites should be adopted for restoration.	The Contractor and Supervision Engineer	Project implementer and Forestry Bureau of Tongnan County

	<p>Xibutang spawning ground</p>	<p>For the construction of main embankment works, river-involved operation should not be involved; water bodies should not be disturbed; soil and water conservation measures should be strictly implemented; enclosing works should be done during construction; and dumping of waste soil into the river course shall not be allowed.</p> <p>The equipment with high noise should be reasonably arranged at a place as far away as possible from the river course side.</p> <p>Construction wastewater should be reused after treated and domestic wastewater should be treated using existing facilities instead of discharged into the Fujiang River.</p> <p>River-involved construction should avoid the breeding season of fishes (March-May) so as to alleviate the negative impact of construction on the spawning ground.</p>	<p>The Contractor and Supervision Engineer</p>	<p>Project implementer and Agricultural Committee of Tongnan County</p>
	<p>Huangjiaotang spawning ground</p>	<p>Prior to commencement of the construction, approval in writing by the Cultural Relics Protection Organization of the construction scheme should be obtained.</p> <p>The construction should only be carried out in the area within the delimited red line and any area outside of the red line shall not be excavated.</p> <p>It shall not be allowed to set up temporary construction sites in the sections near the Giant Buddha Temple; and temporarily stacked earth excavated during the construction should be covered with cloth as much as possible to avoid impacts of dust on the Giant Buddha Temple.</p> <p>For construction near the Giant Buddha Temple, Xujiaba Site, Lukong Ancient Town and Darong Bridge, specialists from the cultural relics protection organization shall be entrusted for on-site supervision and guidance. It is required to have the construction process being supervised by a qualified supervision engineer and have photos of the construction site taken and kept.</p> <p>If such circumstances as cracks or leaning of protected cultural relics in the Giant Buddha Temple are identified during construction, construction should be suspended immediately and the cultural relics protection organization should be informed in time. Construction may resume after it is ensured that no damages would be caused to the protected cultural relics in the Giant Buddha Temple by such construction.</p> <p>For construction near the Giant Buddha Temple, the construction equipment should be arranged as far away from the Giant Buddha Temple as possible, and construction operation which involves strong vibration should not be carried out near the Giant Buddha Temple. As a result, use of large machinery and equipment should be avoided in areas close to the temple and small equipment or construction by</p>	<p>The Contractor and Supervision Engineer</p>	<p>Project implementer, Tongnan Administration of Culture, Radio, Television, Press and Publication and Chongqing Bureau of Cultural Relics.</p>

		<p>manpower should be adopted as often as possible.</p> <p>If cultural relics are discovered during the construction, construction should be suspended in strict accordance with the <i>Cultural Relics Protection Law of the People's Republic of China</i> to inform the local cultural relics protection organization and obtain approval before construction resumes.</p> <p>See the attachment <i>Physical Cultural Resources Management Plan</i> for other specific measures.</p>		
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Table 7-5 Environmental Management Plan for Sensitive Sites of the Project (Pengshui Flood Control Works)

Works	Objective of Environmental Protection	Measures for Mitigating Environmental Pollution	Responsible Organization	Supervision Organization
Pengshui Flood Control Works	Construction period	<p>2 households of Linjiang Group 7</p> <p>The control of stationary and mobile noise sources should be strengthened during the construction period, and the operation time should be controlled. It shall not be allowed to carry out construction which may generate environmental noises during the period from 22:00 to 6:00 of the next day and from 12:00 to 14:00 in the day.</p>	The Contractor and Supervision Engineer	Project implementer and Environmental Protection Bureau of Pengshui County
		<p>3 households of Linjiang Group 8</p>		
		<p>2 households of Linjiang Group 9</p> <p>The Contractor should handle well the relationship with the residents of Linjiang Group 7, Group 8 and Group 9 as well as Zhangjiaba Group 5, especially with those living relatively close to the regulation section, so as to avoid disputes caused by noise pollution and impact on social stability.</p>		
		<p>2 households of Zhangjiaba Group 5</p> <p>The construction equipment which causes noise should be arranged at the side as far away from the residential dwellings as possible.</p> <p>Reduction of dust by water spraying: powdery materials shall be transported in sealed state and the construction site shall be arranged reasonably, with the mixing plant and aggregate yard being set up at a place far away from the environmental sensitive sites. All the aggregates should be stacked and stored in a unified manner and covered with protective cloth.</p>		
		<p>Xujiaba Site</p> <p>The construction boundary should be strictly delimited in accordance with the delimited protection zone of original Xujiaba Site; construction and land occupation outside the red line shall not be allowed.</p> <p>Prior to construction of the Project, the Owner needs to delimit the protection area of original Xujiaba Site with the cultural relics protection organization and provide warning signs.</p> <p>Engineering operations such as rolling compaction, excavation, backfilling and</p>	The Contractor and Supervision Engineer	Project implementer and Pengshui Administration of Culture, Radio, Television, Press and Publication

		<p>stacking of materials should be avoided in the delimited protection zone of the original historical site. The ground environment of the area where the historical site is located shall not be changed.</p> <p>If cultural relics are discovered during the construction, construction should be suspended in strict accordance with the <i>Cultural Relics Protection Law of the People's Republic of China</i> to inform the local cultural relics protection organization and obtain approval before construction resumes.</p> <p>See the attachment <i>Physical Cultural Resources Management Plan</i> for other specific measures.</p>		
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Table 7-6 Environmental Management Plan for Sensitive Sites of the Project (Rongchang Flood Control Works)

Works	Objective of Environmental Protection	Measures for Mitigating Environmental Pollution	Responsible Organization	Supervision Organization	
Rongchang Flood Control Works	Construction period	3 households of Darongzhai Community Group 7	The control of stationary and mobile noise sources should be strengthened during the construction. It shall not be allowed to carry out construction which may generate environmental noises during the period from 22:00 to 6:00 of the next day and from 12:00 to 14:00 in the day. The Contractor should handle well the relationship with residents of the 24 households of Darongzhai Community Group 5, 6, 7 and Yudingcun Group 8, Baochengsi Group 1, 2 and Shabaocun Group 1 within 50m from the project construction site, especially with those living relatively close to the regulation section, so as to avoid disputes caused by noise pollution and impact on social stability. The construction equipment which causes noise should be arranged at the side as far away from the residential dwellings as possible. Reduction of dust by water spraying: The powdery material should be transported sealed and the construction site should be arranged reasonably, i.e. the mixing plant and aggregate yard should be provided at the side far away from the environmental sensitive sites. All the aggregates should be stacked and stored in a unified manner and covered with protective cloth.	The Contractor and Supervision Engineer	Project implementer and Environmental Protection Bureau of Rongchang County
		11 households of Darongzhai Community Group 6			
		3 households of Darongzhai Community Group 5			
		1 household of Yudingcun Group 8			
		1 household of Baochengsi Group 2			
		1 household of Baochengsi Group 1			
		4 households of Shabaocun Group 1			
	Darong Bridge	The construction methods with small vibration impact on the environment, such as artificial construction, should be adopted during the construction. Meanwhile, construction should be carried out outside the control area (with the upstream and downstream being 2m from the bridgehead and 15m from the bridge body) of the protection area of the ancient bridge.	The Contractor and Supervision Engineer	Project implementer and Rongchang Administration of Culture, Radio, Television, Press and Publication	

		<p>Prior to construction, the Owner should submit the construction scheme to the Cultural relics protection organization of the Darong Bridge for comments and approval, and construction may begin after approved.</p> <p>During the construction near the Darong Bridge, specialists from cultural relics protection organization should be employed for on-site supervision and guidance.</p> <p>The whole construction process is required to be supervised by qualified Supervision Engineer and photos taken on the construction site are required to be kept.</p> <p>Fixed monitoring equipment should be installed at the right bank of Darong Bridge during construction. If such circumstances as cracks or leaning of protected cultural relics in the Giant Buddha Temple are identified, construction should be suspended immediately and the cultural relics protection organization should be informed in time. Construction may resume after it is ensured that no damages would be caused to the protected cultural relics in the Giant Buddha Temple by such construction</p>		
	<p>Wanling Ancient Town</p>	<p>The construction should only be carried out in the area within the delimited red line and any area outside of the red line shall not be excavated</p> <p>For construction near the Wanling Ancient Town, impact of strong vibration and noise on it should be avoided as far as possible. As a result, the use of large machinery and equipment should be limited as less as possible and small equipment or construction by manpower should be adopted as often as possible.</p> <p>The construction and protection measures should be strictly implemented according to the scheme approved by the cultural relics department; no construction site shall be established at this section.</p> <p>For temporarily stacked earth excavated during the construction, it should be covered with cloth as far as possible.</p> <p>During the construction near the Wanling Ancient Town, specialists from cultural relics protection organization should be employed for on-site supervision and guidance.</p> <p>The whole construction process is required to be supervised by qualified Supervision Engineer and photos taken on the construction site are required to be kept.</p> <p>If cultural relics are discovered during the construction, construction should be suspended in strict accordance with the <i>Cultural Relics Protection Law of the People's Republic of China</i> to inform the local cultural relics</p>	<p>The Contractor and Supervision Engineer</p>	<p>Project implementer and Rongchang Administration of Culture, Radio, Television, Press and Publication</p>

		protection organization and obtain approval before construction resumes. See the attachment <i>Physical Cultural Resources Management Plan</i> for other specific measures.		
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Table 7-7 Environmental Management Plan for Sensitive Sites of the Project (Shizhu Flood Control Works)

Works	Objective of Environmental Protection	Measures for Mitigating Environmental Pollution	Responsible Organization	Supervision Organization
Shizhu Flood Control Works	Construction period	23 households of Hongjing Community	The Contractor and Supervision Engineer	Project implementer and Environmental Protection Bureau of Shizhu County
		14 households of Shuangqing Community		
		5 households of Hongxingcun Village		
		Southwest Liren Hospital		
		<p>The control of stationary and mobile noise sources should be strengthened during the construction period, and the operation time should be controlled. It shall not be allowed to carry out construction which may generate environmental noises during the period from 22:00 to 6:00 of the next day and from 12:00 to 14:00 in the day.</p> <p>The Contractor should handle well the relationship with residents of the 42 households of Hongjing Community, Shuangqing Community and Hongxingcun Village within 50m from the project construction site, especially with those living relatively close to the regulation section, so as to avoid disputes caused by noise pollution and impact on social stability.</p> <p>The construction equipment which causes noise should be arranged at the side as far away from the residential dwellings as possible.</p> <p>Reduction of dust by water spraying: The powdery material should be transported sealed and the construction site should be arranged reasonably, i.e. the mixing plant and aggregate yard should be provided at the side far away from the environmental sensitive sites. All the aggregates should be stacked and stored in a unified manner and covered with protective cloth.</p>		

Table 7-8 Environmental Management Plan for Sensitive Sites of the Project (Rongchang Sewage Collection Works)

Works	Objective of Environmental Protection	Measures for Mitigating Environmental Pollution	Responsible Organization	Supervision Organization	
Rongchang Sewage collection Works	Construction period	Brook	The Cofferdam construction method should be adopted. Construction should avoid the rainy season (May to September).	The Contractor and Supervision Engineer	Project implementer and Water Affairs Bureau of Rongchang County
		Laixi River			
		G85 expressway	The included angle of the pipe with the expressway should not be smaller than 70°. The pipes should run under the expressway viaduct. The construction scheme should be approved by the highway administration department. The construction should be carried out strictly in the delimited scope according to the approved construction scheme; attention should be paid to the protection of the piers of viaduct during the construction; and any action posing harm to the piers of viaduct should be forbidden.	The Contractor and Supervision Engineer	Project implementer and relevant local departments
		Above county-level highway	Pipe jacking is adopted for crossing works and consent letter is received from relevant management department to avoid damages to the subgrade by the works. The pipelines should better be perpendicular to the highway and in case of oblique crossing, the included angle should not be smaller than 60°. Protective casings should be protected for the pipeline to pass through the highway and the strength of the casings should satisfy the highway-grade I loading requirements; the top surface of the protective casing should not be less than 1.5m away from the subbase of the highway. It is forbidden for the pipeline to cross the river by taking advantage of the highways and bridges. For the section of the pipeline parallel to the highway, the centerline of the pipeline should be kept at a safe distance of above 20m away from the side boundary of the land for highway.		
		General country road	Construction is carried out by way of half breadth excavation and at a time when there is a relatively small flow of people and vehicles on the road (9:00 am to 12:00am; 2:00pm to 5:00 pm during daytime). Temporary bridges are provided		

			during the construction period for passage of vehicles and pedestrians.		
	Operation period	Pipeline	The pipelines should be inspected 4 times every month with focus on those for crossing works.	Municipal Landscaping Administration Bureau of Rongchang County, the government of Lukong Town	Environmental Protection Bureau of Rongchang County
		Pump station	Submersible sewage pumps with low noise should be selected; Sound insulation pump houses should be provided for the pump; Measures for vibration reduction should be provided; The pump station should be inspected every day and problems discovered should be handled in time.		

Table 7-9 Environmental Management Plan for Sensitive Sites of the Project (Shizhu Sewage Collection Works)

Works		Objective of Environmental Protection	Measures for Mitigating Environmental Pollution	Responsible Organization	Supervision Organization
Shizhu Sewage collection and treatment Works	Construction period	Longhe River	For pipe networks to pass through the river, directional drilling is adopted. Excess earthwork is collected and backfilled in strict accordance with the environmental management regulations. It is not allowed to stack garbage or discharge any pollutants in the river course. The waste mud generated during the directional drilling through the river should be backfilled together with the dredging sludges of river course.	The Contractor and Supervision Engineer	Project implementer and Water Affairs Bureau of Shizhu County
		General country road	Construction is carried out by way of half breadth excavation and at a time when there is a relatively small flow of people and vehicles on the road (9:00 am to 12:00am; 2:00pm to 5:00 pm during daytime). Temporary bridges are provided during the construction period for passage of vehicles and pedestrians.	The Contractor and Supervision Engineer	Project implementer and relevant local departments
	Operation period	Pipeline	The pipelines should be inspected 4 times every month with focus on those for crossing works.	Shizhu Urban Utilities Bureau	Environmental Protection Bureau of Shizhu County
		Pump station	Submersible sewage pumps with low noise should be selected; Sound insulation pump houses should be provided for the pump; Measures for vibration reduction should be provided; The pump station should be inspected every day and problems discovered should be handled in time.		

8 Plan for Environmental, Water and Soil Conservation Monitoring

8.1 Monitoring Purpose

Environmental monitoring is an important part of the environmental management work. The preparation of necessary environmental monitoring plan and strict implementation of it according to the schedule may help effectively inspect the results of the environmental management work and facilitate timely and necessary adjustment and improvement. As a result, the normal operation of environment improvement facilities and the implementation of environmental protection measures are guaranteed making the environmental protection and management work go normally and effectively and thus well protecting the environment.

The purpose for water and soil conservation monitoring is to help the Owner implement the water and soil conservation scheme, strengthen the water and soil conservation design and construction management, optimize the water and soil loss control measures and coordinate the construction progress of the water and soil conservation works and main works; timely and accurately master the water and soil loss situation during the project construction and production period and the control efficiency so as to put forward improvement measures for water and soil loss and reduce water and soil loss caused by human factors; timely find major hazard risks of water and soil loss and give suggestions as to strategies for control of water and soil loss; provide basis for the water and soil conservation monitoring and management technologies as well as basic information of public supervision so as to promote the effective protection and timely restoration of the ecological environment of the project area.

8.2 Monitoring Plan

The impact of each component of the Project on the environment during construction is mainly reflected by the impact on the aquatic ecological system of river and water quality, the impact of noise and dust on environmental sensitive sites.

All the impact is relatively small in general and temporary during the construction period. With the approaching of construction deadline, such negative impact would disappear. Since the environmental impact of the four pipe network components is relatively small during the operation period, environmental protection monitoring plan is only needed to be prepared for the two heat & power cogeneration components. See Table 8-1 below for the specific monitoring points, items and frequencies. In addition, water and soil conservation monitoring plan needs to be determined for the thermal power plant component during the construction period. See Table 8-2 for the specific monitoring points, items and frequencies.

Table 8-1 Environmental Monitoring Plan and the Cost Estimation

Period	Works	Monitoring Object	Monitoring Point	Monitoring Item	Monitoring Frequency	Total Expense (RMB 10,000)	Monitoring Unit	Responsible Organization	Supervision Organization	Standards and Norms Executed
Monitoring after completion for acceptance	Sewage collection and treatment works	Noise	Boundary of Rongchang sewage lift pump station	Equivalent continuous sound level A	Monitoring once; monitoring continuously for 2d; once in the daytime and once at night every day.	0.2	Qualified organization entrusted by the Owner in the form of a contract	The Owner	Environmental Protection Bureau of Rongchang County	Class 2 standard in the <i>Emission Standard for Industrial Enterprises Noise at Boundary</i> (GB12348-2008)
			Boundary of Shizhu sewage lift pump station		Monitoring once; monitoring continuously for 2d; once in the daytime and once at night every day.	0.2	Qualified organization entrusted by the Owner in the form of a contract	The Owner	Environmental Protection Bureau of Shizhu County	
Construction period	Flood control and sewage collection and treatment works	Noise	Rongchang upstream 1#, 3# and 5# temporary construction sites; downstream 2#, 3# and 5# temporary construction sites	Equivalent continuous sound level A	Monitoring once during peak construction hours; monitoring continuously for 2d; once in the daytime and once at night every day.	0.6	Qualified organization entrusted by the Owner in the form of a contract	The Owner of each component	Environmental Protection Bureau of Rongchang County	Class 2 standard in <i>Environmental Quality Standard for Noise</i> (GB3096-2008)
			Shizhu 2# and 4# temporary construction sites; Southwest			0.3			Environmental Protection Bureau of Shizhu County	

			Liren Hospital								
			Pengshui 1# and 2# temporary construction sites; Xiatang Neighborhood Committee			0.3				Environmental Protection Bureau of Pengshui County	
			Tongnan 1# temporary construction site; Tongnan Culture and Martial Art School;			0.2				Environmental Protection Bureau of Tongnan County	
	Ambient air		Rongchang upstream 1#, 3# and 5# temporary construction sites; downstream 2#, 3# and 5# temporary construction sites	TSP	Monitoring once during peak construction hours and monitoring continuously for 3d	1.2	Qualified organization entrusted by the Owner in the form of a contract	The Owner of each component		Environmental Protection Bureau of Rongchang County	Class II standard in <i>Integrated Emission Standard of Air Pollutants</i> (GB16297-1996) (new pollution)
			Shizhu 2# and 4# temporary construction sites; Southwest Liren Hospital			0.6				Environmental Protection Bureau of Shizhu County	
			Pengshui 1# and 2# temporary construction sites; Xiatang Neighborhood Committee			0.6				Environmental Protection Bureau of Pengshui County	
			Tongnan 1# temporary			0.4				Environmental Protection	

			construction site; Tongnan Culture and Martial Art School;					Bureau of Tongnan County	
	Surface water	500m downstream of the dredging section of Shizhu County	SS	Monitoring 1d during the peak hours of dredging; monitoring once respectively in the morning and afternoon; analyzing mixed samples	0.2	Qualified organization entrusted by the Owner in the form of a contract	The Owner	Environmental Protection Bureau of Shizhu County	Class III standard in <i>Surface Water Environmental Quality Standards(GB3838-2002)</i>
		Water intake of Shangtang water plant of Pengshui County	SS	Monitoring once (about 30d) every day during the river-involved construction; monitoring once respectively in the morning and afternoon; analyzing mixed samples	3.0		The Owner	Environmental Protection Bureau of Pengshui County	
		Xibutang spawning ground	SS	Monitoring once for 2d during peak hours of river-involved construction; monitoring once every day respectively in the morning and afternoon; analyzing mixed samples	0.2		The Owner	Environmental Protection Bureau of Tongnan County	

		Cultural relics	Giant Buddha Temple	Observation of cultural relics	Tracking and observing when approaching the construction at the cultural relics section	/	Tongnan Cultural Relics Department Entrusted	The Owner of each component	Environmental Protection Bureau of Tongnan County	Timely prevent the actions which may damage the cultural relics and suspend the construction timely if cultural relics are found damaged.
			Darong Bridge and Lukong Ancient Town			/	Rongchang Cultural Relics Department Entrusted		Environmental Protection Bureau of Rongchang County	
			Xujiaba Site	Supervision of cultural relics	Supervising and managing on site during the construction at the cultural relics section	/	Pengshui Cultural Relics Department Entrusted		Environmental Protection Bureau of Pengshui County	
Operation period	Sewage collection and treatment works	Noise	Boundary of Rongchang sewage lift pump station	Equivalent continuous sound level A	Monitoring once every year; monitoring continuously for 2d; once in the daytime and once at night every day.	0.2	Qualified organization entrusted by the Owner in the form of a contract	The Owner	Environmental Protection Bureau of Rongchang County	Class 2 standard in the <i>Emission Standard for Industrial Enterprises Noise at Boundary</i> (GB12348-2008)
			Boundary of Shizhu sewage lift pump station		Monitoring once every year; monitoring continuously for 2d; once in the daytime and once at night every day.	0.4	Qualified organization entrusted by the Owner in the form of a contract		Organization	

Table 8-2 Water and Soil Conservation Monitoring Plan and the Cost Estimation

Item	Monitoring Area	Monitoring Point	Monitoring Content	Monitoring Method	Monitoring Frequency	Expense (RMB 10,000)	Monitoring Unit	Responsible Organization	Supervision Organization
	Temporary construction site	Provide one ground monitoring point in the site; select a representative area in the green area to establish one vegetation monitoring point to monitor the growth and survival rate of vegetation.	(1) Monitoring of the main causes of water and soil loss They include rainfall, slope gradient, height and volume of waste bank, type of vegetation and degree of coverage, quantity and quality of water and soil conservation facilities, etc. Investigate the causes of water and soil loss and monitor the soil erosion background value of the original landscape.	The method of combining surface observation, investigation monitoring and site inspection monitoring;	Prior to construction, conduct for once an overall investigation on the soil loss volume and vegetation coverage rate of the original landscape; monitor and record the implementation of the water and soil conservation measures being implemented at least once every 10 days; Monitor and record the blocking effects of engineering measures for water and soil conservation at least once every month; monitor and record at least once every three months the construction progress of main works, influence factors of water and soil loss and the growth of vegetation after implementation of plant measures for water and soil loss; timely monitor the situations in case of rainstorm and gale; and finish monitoring within one week after the water and soil loss disaster event occurs. For the investigated	36.77	Qualified organization entrusted by the Owner in the form of a contract	The Owner	Local environmental protection bureau
	Access road area	Arrange one ground monitoring point at the middle section of the access road; and one plant monitoring point in the vegetation restoration area.	(2) Monitoring of the change in ecological environment with water and soil conservation measures in the project area. It includes the change in terrain and landform of the project area; the occupied and disturbed surface area in project construction; quantity and area of cut and fill; spoil volume and stacking area; and degree of coverage of forest and grassland.						
	Sewage collection and treatment works	Arrange one ground monitoring point at the middle section of the sewage pipe network of each component, ending with two monitoring points in total (i.e. one for Rongchang and one for Shizhu.)	(3) Dynamic monitoring of water and soil loss of the project area; The dynamic monitoring of water and soil loss of the project area involves monitoring of the change in area, degree and total quantity of water and soil loss and the harm caused to the surrounding area and harm trend.						
	Dump area	Arrange one	① Dynamic monitoring of the						

	<p>monitoring point at each dump area provided.</p>	<p>extent of responsibility for control of water and soil loss</p> <p>During the construction, the extent of responsibilities for control changes with the continuous change of working face. Therefore, dynamic monitoring of the extent of responsibilities for control of water and soil loss is a primary task.</p> <p>② Monitoring of disturbed area; Record the disturbed area and situation of water and soil loss according to the working faces of excavation and backfilling, stacking area, construction road, construction camp, etc.</p> <p>③ Dynamic monitoring of soil loss (erosion modulus); It mainly refers to real-time monitoring of the volume of soil loss in different disturbed areas and temporary waste yards by stages, so as to analyse and calculate the change in the volume of water and soil loss, master its change rule and lay a foundation for control water and soil loss.</p> <p>④ Monitoring of the harm of water and soil loss; It mainly focuses on monitoring of the construction area by recording the degree of harm of water and soil loss caused to the surrounding area.</p> <p>(4) Monitoring of the effect of water and soil conservation measures; It refers to monitoring of the effects of various control measures, control over water and soil loss and improvement of ecological environment</p>		<p>and monitored items, investigation should be conducted once before, during the intermediate stage of and after the construction.</p>			
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		<p>including monitoring of the effects of engineering measures for water and soil conservation and vegetation measure.</p> <p>① Monitoring of the control effect of engineering measures It mainly includes implemented quantity and implementation quality; stability, completeness and operation of protective works; and the spoil blocking effect of the measures.</p> <p>② Monitoring of the control effect of plant measures It mainly includes the area, survival rate, conservation rate, growth and degree of coverage of planted forest and grassland; restoration of disturbed surface forest and grassland; and the spoil blocking and soil conservation effects of plant measures.</p> <p>③ Monitoring of the control effect of temporary measures It mainly refers to monitoring of the quantity and quality of temporary protection measures and the spoil blocking and soil conservation effects of temporary blocking measures.</p>					
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9 Social Action Plan

For preparation of the Social Action Plan included in this EIA, direct reference is made to the Social Assessment Report for Chongqing Small Town Integrated Water Environmental Improvement Project.

Based on full consultations with relevant departments and people in the project areas, Social Action Plan has been prepared to include concrete measures to ensure benefits of the Project to the people in the project areas and to minimize potential risks of the Project. The details of the Social Action Plan are shown in Table 9-1.

Table 9-1 Social Action Plan

Activities	Objectives or Targets	Responsible Organization	Cost	Timing
Project Management				
1. Chongqing Municipal Project Management Office (Chongqing PMO) and county/district project implementing organizations assign specific staff to take responsibility for implementing activities stipulated in the Social Action Plan.	(1) Assign specific staff to take responsibility to accomplish objectives defined in the Social Action Plan, RAP and Ethnic Minority Development Plan (EMDP) (if necessary)	Chongqing PMO County/district project implementing organizations	Without extra cost to the project	Prior to project implementation
2. Consultant team for project implementation support needs to include at least one social specialist	(1) Number of man.months allocated to social specialist in the contract with the consultant team; (2) Times of field visits assigned to social specialist as per the contract with the consultant team.	Consultant team for project implementation support	Cost budgeted in project for the consultant team	When the consultant team is entrusted
1. Contractor should ensure: - To observe all relevant regulations on labour by national and provincial governments and all relevant supplementary requirements in the project commitment document; - To employ as many as possible local villagers in project affected areas to work as unskillful workers, and try to meet as much as possible employment requirements of families of the vulnerable groups.	(1) Contractor should observe all regulations and requirements in project commitment document; (2) Contractor should consider as much as possible poor families in employing local labours; (3) Construction at project sites should not cause adverse environmental impacts on surrounding villages.	(1) Contractor, human resources and social security department and project owner; (2) Project owner, humanresources and social security department, poverty alleviation office, and women's federation jointly ensure implementation of relevant activities and help	Cost assumed by contractor	Project implementation period

Activities	Objectives or Targets	Responsible Organization	Cost	Timing
		the contractor to employ local workers, if necessary		
Project Implementation				
<p>4. In process of land acquisition and resettlement:</p> <p>(1) Conduct in-depth socio-economic surveys prior to project implementation to understand details including amounts of land acquisition and resettlement, affected population and etc., and publicize the information, with full participation of affected villagers in the whole process;</p> <p>(2) Disclose and publicize policy on land acquisition and resettlement, explain to affected villagers if needed and respond to their questions;</p> <p>(3) Decide on issues regarding construction of resettlement arrangement houses, e.g. site selection, dates of construction commencement and completion, distribution scheme and etc.;</p> <p>(4) Fully consider needs of socio-economic development in the affected areas and of affected people, especially relevant requirements of ethnic minorities if the project is located in ethnic minority area. For instance, logo or signs with ethnic characteristics can be taken in construction design to cater to psychological features of ethnic people, such as color and pattern of guardrail, signs of key areas, landmark buildings, architectural design of resettlement arrangement residential buildings and etc.</p>	<p>(1) Times of meetings organized and numbers of participants;</p> <p>(2) Approaches used for policy publicity;</p> <p>(3) Performance in incorporating ethnic features in project design.</p>	<p>Project owner Land resources department Town/township and village heads Affected villagers</p>	Responsible by project owner	Prior to commencement of project construction
<p>5. Formulate practical assistance policies on poverty alleviation, employment, skillfulness training to address needs of people affected by land acquisition and resettlement, based on local conditions in the project area.</p>	<p>(1) Guarantee income sources for project affected groups;</p> <p>(2) Embody poverty alleviation purpose of the project</p>	<p>Project owner Human resources and social security bureau, agricultural committee, women's federation and etc.</p>	Responsible by project owner	Prior-to construction and during implementation
<p>6. Before project implementation, stationing of engineering facilities should be clearly defined, with ample consideration given to convenience of trips and safety of local residents. For instance, measures including establishment of separation</p>	<p>(1) Ensure convenience of trips and safety of local residents in the project area</p>	<p>Project owner Contractor</p>	Responsible by contractor and project owner	Prior-to construction and during implementation

Activities	Objectives or Targets	Responsible Organization	Cost	Timing
facilities, signs of warning and prior information disclosure of construction arrangement and etc.can be adopted.				
<p>7. Establish complete non-structural measures for flood control and protection:</p> <p>(1) Complete flood prediction systems in all project areas, mainly including 3 systems such as meteorological, hydrological and water conservancy systems; complete emergency response systems and establish emergency rescue systems that are under unified command and with features of reasonable structure, immediate reaction and efficient operation; establish completed flood control command system;</p> <p>(2) Conduct periodical flood early warning rehearsals, with flood control department taking the lead and cooperation of all relevant governmental departments, public institutions and the public, so as to help the residents to gain practical experience of flood control and protection;</p> <p>(3) Install some broadcasting facilities for flood message transfer, especially in areas with potential risk of flood accidents;</p> <p>(4) Constitute flood disaster insurance system to mitigate losses of affected people.</p>	<p>(1) "Soft Measures" for flood control in the project areas;</p> <p>(2) Times of flood control rehearsals every year and the number of participants.</p>	<p>Project owner Water resources department</p>	<p>Project owner Water resources department</p>	<p>During project implementation period</p>
Project Information Dissemination				
<p>8. Prior to construction, information bulletins should be posted at conspicuous places of all construction sites/camps, with details of dates of commencement and completion of construction, name and phone number of representative of contractor for easier contact by local residents; meanwhile, contractor and project owner organize meetings to notify villagers and heads of communities of basic information of the project (including date of commencement of construction) and safety precautions and etc., so that the villagers can prepare ahead of the time for planting and harvesting arrangement.</p>	<p>(1) Performance in use of bulletins;</p> <p>(2) Numbers of meetings held and of participating villages/communities;</p> <p>(3) Record of participants, including details such as gender, age and name of village/community in which the participant reside.</p>	<p>Social specialist for project implementation support, project owner represented by county/district leader to organize meetings, town/township branch of human resources and social security bureau, heads of village /community, contractor.</p>	<p>Cost incurred is mainly for travel allowances of meeting participants, but in small amount</p>	<p>Prior to construction commencement</p>
<p>9. Publicize information on unskilled employment opportunities ahead of time in public places most often visited by villagers/</p>	<p>(1) All local people know about employment opportunities the project</p>	<p>Contractor</p>	<p>Cost assumed by contractor</p>	

Activities	Objectives or Targets	Responsible Organization	Cost	Timing
residents or by means of media	bring about; (2) Contractor employs as many as possible local laborers for unskilled jobs available in the construction.			
10. Conduct awareness raising activities on waterway protection and environmentally friendly solid waste disposal in schools and communities in the project areas;	(1)Number of villages /communities covered by the activities; (2) Number of participating schools; (3)Number of participating students	Social specialist from the consultant team for project implementation support, project owner, local women, Education Bureau, Environmental Protection Bureau and Water Resources Bureau.	Costs incurred include mainly cost of publicity material (paper material and town/township broadcasting facilities) and travel allowances for staff	During project implementation
11. Strengthen knowledge publicity on flood protection in daily life to local residents through work by grass-roots cadres, community service staff, and make use of school resources to raise flood protection awareness of children and teenagers.	(1)Number of villages /communities covered by the activities; (2) Number of participating schools; (3)Numbers of participating villagers and students	Social specialist from the consultant team for project implementation support, project owner, Water Resources Bureau, Education Bureau and etc.	3 times of activities every year in each project area, costing about 10 thousand yuan each time	During Project implementation
Capacity Building for Project Implementation				
12. Establish supervision mechanism, including supervisors, guards, community environmental management teams, to ensure environmentally friendly disposal of solid waste and proper protection of waterways.		Environmental Protection Bureaus, Village Committees/Community Committees	Costs incurred are mainly for staff engaged and estimated at 1000 yuan/person	During Project implementation
13. Organize workshop engaging all project contractors /implementing organizations explaining contents and requirements in Social Action Plan and reasons for the activities to be conducted, and conduct relevant capacity building activities for implementation of the actions	(1) Record of the workshop attendance, including details of gender, age, title, job description of each attendee, and name of organization the attendee belonging to.	Social specialist from the consultant team for project implementation support	Without extra cost to the Project	Early stage of project implementation
Monitoring and Evaluation (M&E)				
14. Ensure effective monitoring and evaluation of social indicators	(1) Establishment of project performance monitoring system and monitoring framework;	(1) Responsible staff of Chongqing PMO and implementing organizations	- Costs of responsible staff of Chongqing PMO /Implementing	During Project implementation
15. Collect data on participation of project stakeholders in				

Activities	Objectives or Targets	Responsible Organization	Cost	Timing
<p>training, meetings and other social activities, and include details of gender, age, income and occupation; 16. Ensure reliability of data collected for baseline and ICR; 17 Social specialist from the consultant team for project implementation support and/or staff of project implementing organizations should conduct regular visits to project sites, so as to review implementation status of actions included in Social Action Plan.</p>	<p>(2) Gender data collected in surveys for baseline and ICR; (3) Field surveys and regular management.</p>	<p>to: a) assist communities in coordinating internal and external monitoring work; b) Project owner keep records of attendees to all meetings/trainings/notification meetings; c) Periodically gather and keep in archive duplicate copies of documents relating to activities mentioned above, for use in monitoring and evaluation.</p>	<p>organizations should be covered by routine management budget; - Costs for external M&E are included in the overall project monitoring cost. However, the suggestion is to set aside a proportion specially for monitoring of Social Action Plan and socio-economic indicators.</p>	

10 Cost Estimation for Environmental Protection

Total cost for environmental protection under the Project is 10.491 million yuan, the cost breakdowns for Rongchang, Tongnan, Pengshui and Shizhu project components are shown in Tables 10-1 through to 10-4.

Table 10-1 Cost Estimation for Environmental Protection Measures (Rongchang Project Component)

Period	Name of Works	Control Item	Control Measures	Investment (RMB 10,000)	
Construction period	Flood control and sewage collection and treatment works	Control of dust	Enclosure of not less than 1.8m in height should be provided around the construction site; for hardening of ground, cleaning of vehicles going in and out of the site, dust baffle should be provided; bulk material should be covered with tarpaulin, dedicated stacking area should be provided and water should be sprayed on the site to prevent dust.	11	
		Treatment of waste water	Temporary separation tanks and sedimentation tanks should be provided for each construction site; waste water should be recycled after treated and waste water from foundation pit should be recycled after sedimentated.	40	
		Control of noise	Submersible sewage pumps with low noise are preferred to be selected and sound insulation pump house and measures for vibration reduction should be provided.	13	
		Ecological protection and water and soil conservation	Expense for engineering measures for water and soil conservation, expense for plant measures, expense for temporary engineering measures, independent expense, basic reserve funds and compensation fee for water and soil conservation	320	
		Monitoring after completion for acceptance			0.2
		Monitoring during construction period			1.8
Operation period	Sewage collection and treatment works	Noise	Inspection, equipment maintenance and enclosure	0.2	
		Expense for environment monitoring during operation period	Noise monitoring during operation period	0.2	
Total investment				386.4	

Table 10-2 Cost Estimation for Environmental Protection Measures (Tongnan Project Component)

Period	Name of Works	Control Item	Control Measures	Investment (RMB 10,000)
Construction	Flood control and	Control of dust	Enclosure of not less than 1.8m in height should be provided around the construction site; for	8

period	sewage collection and treatment works		hardening of ground, cleaning of vehicles going in and out of the site, dust baffle should be provided; bulk material should be covered with tarpaulin, dedicated stacking area should be provided and water should be sprayed on the site to prevent dust.	
		Treatment of waste water	Temporary separation tanks and sedimentation tanks should be provided for each construction site; waste water should be recycled after treated and waste water from foundation pit should be recycled after sedimentated.	35
		Control of noise	Submersible sewage pumps with low noise are preferred to be selected and sound insulation pump house and measures for vibration reduction should be provided.	10
		Ecological protection and water and soil conservation	Expense for engineering measures for water and soil conservation, expense for plant measures, expense for temporary engineering measures, independent expense, basic reserve funds and compensation fee for water and soil conservation	200
		Monitoring during construction period		
Total investment			253.8	

Table 10-3 Cost Estimation for Environmental Protection Measures (Pengshui Project Component)

Period	Name of Works	Control Item	Control Measures	Investment (RMB 10,000)
Construction period	Flood control and sewage collection and treatment works	Control of dust	Enclosure of not less than 1.8m in height should be provided around the construction site; for hardening of ground, cleaning of vehicles going in and out of the site, dust baffle should be provided; bulk material should be covered with tarpaulin, dedicated stacking area should be provided and water should be sprayed on the site to prevent dust.	5
		Treatment of waste water	Temporary separation tanks and sedimentation tanks should be provided for each construction site; waste water should be recycled after treated and waste water from foundation pit should be recycled after sedimentated.	20
		Control of noise	Submersible sewage pumps with low noise are preferred to be selected and sound insulation pump house and measures for vibration reduction should be provided.	8
		Ecological protection and water and soil conservation	Expense for engineering measures for water and soil conservation, expense for plant measures, expense for temporary engineering measures, independent expense, basic reserve funds and compensation fee for water and soil conservation	150
		Monitoring during construction period		
Total investment			186.9	

Table 10-4 Cost Estimation for Environmental Protection Measures (Shizhu Project Component)

Period	Name of Works	Control Item	Control Measures	Investment (RMB 10,000)	
Construction period	Flood control and sewage collection and treatment works	Control of dust	Enclosure of not less than 1.8m in height should be provided around the construction site; for hardening of ground, cleaning of vehicles going in and out of the site, dust baffle should be provided; bulk material should be covered with tarpaulin, dedicated stacking area should be provided and water should be sprayed on the site to prevent dust.	6	
		Treatment of waste water	Temporary separation tanks and sedimentation tanks should be provided for each construction site; waste water should be recycled after treated and waste water from foundation pit should be recycled after sedimentated.	25	
		Control of noise	Submersible sewage pumps with low noise are preferred to be selected and sound insulation pump house and measures for vibration reduction should be provided.	9	
		Ecological protection and water and soil conservation	Expense for engineering measures for water and soil conservation, expense for plant measures, expense for temporary engineering measures, independent expense, basic reserve funds and compensation fee for water and soil conservation	180	
		Monitoring after completion for acceptance			0.2
		Monitoring during construction period			1.1
Operation period	Sewage collection and treatment works	Noise	Inspection, equipment maintenance and enclosure	0.3	
		Expense for environment monitoring during operation period	Noise monitoring during operation period	0.4	
Total investment				222	

11 Environmental Reporting System

During implementation of the Project, the Contractor and monitoring unit and the project office should record the project progress, implementation of management plan and monitoring result of environmental quality, and report to relevant departments in time. It mainly includes the following three aspects:

① The monitoring unit and the Contractor should keep a detailed record of the implementation of EMP and report to the project office in time.

② The project progress report prepared by the project office, such as monthly report, quarterly report and annual report, must include the implementation of EMP. For example, the implementation progress and effects of EMP.

③ The report on the implementation of the environmental management plan should be submitted to the Chongqing Municipal Management Office for the World Bank's Capital Utilization before March 10 every year. This report should consist of two parts, i.e. summary report on the implementation of the environmental management plan and professional monitoring report (atmospheric monitoring report, water monitoring report, noise monitoring report and water and soil conservation monitoring report). ②

④ The annual report on EMP implementation must be prepared and submitted to the World Bank by the Chongqing Municipal Management Office for the World Bank's Capital Utilization before March 31 of the following year.

EMP implementation report may include the following contents:

a Project progress, such as the construction progress of embankment and pipe network works;

b Implementation of EMP;②

c Implementation of training plan;②

d Whether there is public complaint or not. In case of a complaint, its main content, solution and public satisfaction index should be record.

e EMP implementation plan of the next year

12 Public Complaint Mechanism

In order to ensure that the problems found during the preparation and implementation of the Project are solved timely and effectively to guarantee the smooth proceeding of land acquisition and construction of the Project, transparent and effective complaint channel are provided for the environmental management of the Project for a long term apart from the existing complaint channel by submitting petition letters to each level of local government. Basic complaint channels are as follows:

Stage 1: If the residents are influenced in any aspect of the environmental management,

they may complain to the Project office of Guoxin Energy Corporation for Shanxi gas utilization project and the project office should make a decision for handling the complaint within 2 weeks.

Stage 2: If the residents are still not satisfied with the decision made by Project office of Guoxin Energy Corporation for Shanxi gas utilization project, they can, after receiving the decision, complain level by level to administrative organs with the right jurisdiction for arbitration according to *Administrative Procedure Law of the People's Republic of China*.

Stage 3: In case the residents are still not satisfied with the arbitration, they can, after receiving arbitration decision, file a lawsuit to civil court according to civil procedure law.

The residents may file a lawsuit regarding any aspect of the environmental management, including compensation standard, etc.

The above petition approaches would be notified to the residents through meeting or by other means, so as to make them fully understand the right of petition they have. Meanwhile, all kinds of media would be used to strengthen publicizing and reporting and comments and suggestions from every aspect for the environmental management work would be sorted out and presented in items of information to be investigated and handled by land acquisition management organization of each level.

The organization handling petitions of residents should not charge any fee and the expense related to petition should be paid as contingency allowance by the project office.

The petition feedback mechanism consists of standardized records, tracking and regular report systems.

Standardized record: The petition record mainly includes basic information of the petitioner, petition and replier, solution and effects achieved.

Tracking: Pay a return visit to the petitioner regarding whether the petition is handled or not and whether the petitioner is satisfied with the handling result.

Regular report: written report on the petition should be submitted regularly to the superior administration office and included in the plan of the next year to avoid occurrence of similar incidents.

Annex A: Environmental Management Framework for Pengshui Sewage Collection Component

1 Construction Activities Covered by This Environmental Management Framework

Flood protection and sewage collection component of Dianshui New District of Pengshui County includes construction of flood protection embankment, road on top of the embankment, wastewater treatment plant and the matching pipeline and etc. Since only construction activities for flood protection embankment and the road on top of the embankment have been defined for the time being, scale and location of the wastewater treatment plant and the matching pipeline are not yet decided due to lack of finished drainage plan of the county, this environmental management framework (hereinafter called as the Framework) is therefore prepared.

This Framework is for guidance to the project management institute and relevant departments for environmental management, so as to ensure environmental management under the Project fully consistent with relevant national and local policies, laws and regulations, as well as policies and procedures stipulated in OP/BP4.01 of the World Bank for environmental assessment of the relevant project component. This Framework defines the contents, steps and responsibilities for environmental management.

The specific project activity covered by this Framework is shown in Table 1 that follows.

Table 1 Project Activity Covered by this Framework

Project Activity	Description	Status
Wastewater Treatment Plant and the Matching Pipeline in Dianshui New District of Pengshui County	Construction of a Wastewater Treatment Plant and the Matching Pipeline	To be funded using World Bank Loan, still in process of planning and design, thus covered by this Framework

2 References Used in Preparing the Framework

2.1 Laws, Regulations on Environmental Protection and Sectoral Regulations

2.1.1 Law and Regulations

- (1) *Environmental Protection Law of the People's Republic of China*, December 26, 1989
- (2) *Environmental Impact Assessment Law of the People's Republic of China*, October 28, 2002
- (3) Law of the People's Republic of China on Atmospheric Pollution Prevention and Control (April 29, 2000);
- (4) Law of the People's Republic of China on Prevention and Control of Ambient Noise Pollution (October 29, 1996);
- (5) Law of the People's Republic of China on Water Pollution Prevention and Control (February 28, 2008);

- (6) Law of the People's Republic of China on Prevention and Control of Environmental Pollution Caused by Solid Waste (December 29, 2004)
- (7) Law of the People's Republic of China on Soil and Water Conservation (December 25, 2010);
- (8) Law of the People's Republic of China on Protection of Cultural Relics (Amendment adopted and implemented from December 29, 2007);
- (9) Land Management Law of the People's Republic of China (January 1998);
- (10) Law of the People's Republic of China on Urban and Rural Planning (October 2007);
- (11) Law of the People's Republic of China on Water Pollution Prevention and Control (February 28, 2008);
- (12) Law of the People's Republic of China on Prevention and Control of Environmental Pollution Caused by Solid Waste (promulgated by Decree No.31 of the President of the People's Republic of China on December 29, 2004);
- (13) Regulations on Environmental Protection of Construction Projects (State Council Decree No.253, issued on November 29, 1998);
- (14) Decisions by the State Council on Implementing Scientific Development Perspective and Strengthening Environmental Protection (Document Guo Fa [2005] No.39, December 3, 2005);
- (15) Interim Procedures for Public Consultation and Information Disclosure of Environmental Impact Assessment (Document Huan Fa [2006] No. 28 issued by the State Environmental Protection Administration, effective as of March 18, 2006);
- (16) Guiding Catalogue for Industrial Restructuring (2011) (amended in 2013);
- (17) Regulations of the People's Republic of China on Natural Reserves (State Council Decree No.167, promulgated on October 9, 1994);
- (18) Guidance on Environmental Protection of Centralized Drinking Water Sources (for Trial Implementation) (Document HuanBan No.(2012)50);
- (19) Regulations of the People's Republic of China on River Channel Management (June 1988);
- (20) Regulations of the People's Republic of China on Landscape and Scenic Spots;
- (21) Notice on Strengthening Management on Environmental Impact Assessment to Prevent Environmental Risks (Document Huan Fa [2005] No. 152, December 16, 2005);
- (22) Water Pollution Prevention and Control Plan for the Three Gorges Reservoir Area and the Upper Stream (Revised Version) (Document No. HuanFa (2008) 16);

(23) Regulations on Protection of Wetlands (Decree No.32 issued by the State Forestry Administration);

(24) Regulations of the People's Republic of China on Natural Reserves (State Council Decree No. 167, October 9, 1994);

(25) Enforcement Regulations on Protection of Terrestrial Wildlife (March 1992);

(26) Enforcement Regulations on Protection of Aquatic Wildlife (September 1993).

2.1.2 Local Regulations

(1) Regulations of Chongqing Municipality on Environmental Protection (Amended by the Standing Committee of the People's Congress of Chongqing Municipality in 2010);

(2) Procedures of Chongqing Municipality on Noise Pollution Prevention and Control (Decree of Chongqing Government No.(2013)270);

(3) Regulations of Chongqing Municipality on Water Pollution Prevention and Control for Changjiang Three Gorges Reservoir Area and the Catchment (effective as of October 1, 2011);

(4) Management Regulations of Chongqing Municipality on Water Conservancy Projects (amended in 2006);

(5) Regulations of Chongqing Municipality on River Channel Management (amended for the second time by the 18th meeting of the Standing Committee of the 3rd People's Congress of Chongqing Municipality on July 23, 2010);

(6) Provisions of Chongqing Municipality on Ambient Air Quality Function Zoning (Chongqing Municipal Government Document No.(2008) 135);

(7) Ecological Function Zoning of Chongqing Municipality (Revised Version) (Chongqing Municipal Government Document No.(2008) 133);

(8) Notification of Chongqing Municipality on Defining Key Control Zone for Water and Soil Erosion (Chongqing Municipal Government Document No.(1999) 8);

(9) Notification of Chongqing Municipal Government on Approval and forwarding of the Adjustment Plan of Surface Water Environment Function Classification (Chongqing Municipal Government Document No.(2012) 4);

(10) Notification of Chongqing Municipal Government on Printing and Distributing the Implementation Plan for the Five Actions for Environmental Protection of Chongqing (2013-2017) (Chongqing Municipal Government Document YuFuFa No.(2013) 43);

(11) Notification of Chongqing Environmental Protection Bureau on Printing and Distributing the Adjustment Plan for Zoning Provisions for Applicable Ambient Noise Standards of Urban Area (Chongqing Environmental Protection Bureau Document YuHuanFa No. (2007) 39);

(12) Notification of Chongqing Environmental Protection Bureau on Relevant Issues regarding

the Adjustment Plan for Zoning Provisions for Applicable Ambient Noise Standards of Urban Area (Chongqing Environmental Protection Bureau Document YuHuanFa No. (2007) 78).

2.2 Technical Guidance for Environmental Impact Assessment

- (1) Technical Guidance for Environmental Impact Assessment-General Principles (HJ2.1-2011);
- (2) Technical Guidance for Environmental Impact Assessment-Ambient Air (HJ2.2-2008);
- (3) Technical Guidance for Environmental Impact Assessment-Surface Water Environment (HJ/T2.3-93);
- (4) Technical Guidance for Environmental Impact Assessment-Acoustic Environment (HJ2.4-2009);
- (5) Technical Guidance for Environmental Risk Assessment of Construction Projects (HJ/T169-2004);
- (6) Technical Guidance for Environmental Impact Assessment-Ecological Impact (HJ19-2011);
- (7) Tentative Procedures for Public Consultation of Environmental Impact Assessment (Document No. HuanFa(2006)28 issued by the State Environmental Protection Administration on February 14, 2006);
- (8) Technical Specification for Water and Soil Conservation Plan of Development and Construction Projects (GB50433-2008).

2.3 Safeguard Policies of the World Bank and EHS Guidelines

(1) Safeguard Policies of the World Bank

The project component is one of the 4 project components under the Chongqing Small Town Integrated Water Environmental Improvement Project. Given the sensitivity, scope and magnitude of environmental impacts of the Project, Category-A EIA, or full environmental assessment, is applicable. The project component mainly involves activities such as construction of wastewater treatment plant and the matching pipelines and etc. Through relevance analysis, safeguard policies triggered by the Project are OP4.01 (Environmental Assessment), OP 4.11 (Physical Cultural Resources), OP 4.12 (Involuntary Resettlement) and OP 4.04 (Natural Habitats).

At project preparation stage, the EIA institute collected aquatic ecological information and data on Binjiang section of Wujiang River in Pengshui County, and the data show that, although being seriously degraded and without important natural habitats, Wujiang River may have some spawning sites of ordinary fish, just that the specific locations of such spawning sites are not yet identified at that moment. At public consultation stage, relevant experts and departments indicated that, as long as proper measures taken in construction of the embankment, the potential spawning sites wouldn't be seriously impacted, but suspended solid (SS) in the discharge from the planned wastewater treatment plant may

impact on the spawning sites. It was also noted that, the discharge outlet of the wastewater treatment plant should be located at least 500m downstream of the spawning sites. Therefore, high attention should be paid to this issue in the process of EIA preparation for the sewage collection and treatment construction activities under this component, and qualified institute should be engaged to conduct aquatic ecological investigations to the river section. Based on results of the investigation and requirements and procedures stipulated in OP4.04 of the World Bank, impacts on aquatic ecology should be assessed. Particularly, in deciding on location of the discharge outlet of the wastewater treatment plant, ample considerations should be given to recommendations by relevant experts and departments to avoid potential serious impacts on the spawning sites.

(2) EHS Guidelines of the World Bank Group

International Finance Corporation (IFC) Environment, Health and Safety Guidelines (EHS Guidelines), including guiding standards for atmospheric emission, ambient air quality, wastewater, water environment and noise, and EHS: Solid Waste Management.

3 Environment Management Procedures

The Environment Management Procedures cover five steps during project preparation and project construction, and two steps during project implementation. The requirements and responsibilities of each party at each step are as below:

A. Project Preparation and Construction Periods

- (1) Selection and classification of constructions
- (2) Preparation of environment documents
- (3) Public consultations (soliciting the public's opinions and disclosing information)
- (4) Appeal mechanism
- (5) Review and approval

B. Implementation Period

- (6) Supervision
- (7) Reporting
- (8)** Requirements for project progress for each construction work

3.1 Classification of Constructions

This project component consists of two construction activities, both are new construction activities:

- (1) Construction of Dianshui New District Wastewater Treatment Plant;
- (2) Sewage Collection Pipeline for Dianshui New District Wastewater Treatment Plant.

3.2 Preparation of and Requirements for Environment Documents

The borrower should provide environment documents listed in the following table and the approvals obtained from relevant government agencies.

Table 3. Environment documents.

Type of Construction	Requirements for environment documents *
Type 1. Construction of new facilities	<ul style="list-style-type: none"> ✓ Environment Impact Assessment (EIA) report and Environmental Management Plan; ✓ The EIA Report should be approved by the relevant local environment protection bureau.

The EIA Report

The borrower is responsible for the preparation of the EIA Report. The borrower should commit the environment impact assessment agencies that are approved by the relevant environment protection authorities and with relevant qualifications to assess the environment impacts and compile the EIA Report.

Environment Management Plan (EMP)

The borrower is responsible for the development of the EMP. The EMP should include the environment protection measures to be taken during project design, construction and implementation. These measures should try to eliminate or compensate the negative social and environmental impacts of the projects, or reduce such negative impacts to the minimum level or an acceptable level.

3.3 Public Consultations and Information Disclosure

The borrower should organize public consultations in accordance with the requirements of the government and the Bank. Its main responsibilities include: (1) to release environment documents; (2) to solicit opinions; and (3) to report major findings, conclusions, suggestions and feedbacks. The borrower or the environment impact assessment agency that it has committed should release the information in public places, disclose the environment documents and solicit the opinions of the residents nearby. The solicitation can be undertaken by means of survey questionnaires, workshops or hearings. The objectives of solicitations are to collect the opinions of residents who may be affected by project constructions and to identify the major environment issues that the affected residents deem important. All the important opinions raised during the solicitations will be included in the EIA report.

The environment management authority or the consultants it hires will be responsible for reviewing the records of the solicitations, determining whether or not feedbacks should be made to respond to the opinions and suggestions made by the public, and giving full attention to them when compiling the EIA report.

The requirements for public consultations for each construction are as follows:

Table 4. Requirements for public consultation

Type of construction	Relevant requirements
Construction 1: Construction of Dianshui New District Wastewater Treatment Plant	Organizing two rounds of public consultations: the 1 st round should take place prior to the completion of the EIA outline; the 2 nd round should take place after the completion of the EIA draft.
Construction 2: Sewage collection pipeline for Dianshui New District Wastewater Treatment Plant	Public consultations should be organized together with those for the above mentioned newly built wastewater treatment plant.

It is necessary to develop the information disclosure and public consultation procedures and methods in compliance with the relevant government's and the Bank's requirements. After the first round of public consultation and information disclosure, and before the environment selection and the preparation of the draft environment documents, the project information, major environmental impacts and mitigation measures should be made public in affected areas, and the opinions and suggestions of the public on the environmental impacts of the project should be solicited through public meetings, and feedbacks should be made. The second round of public consultation and information disclosure should be undertaken after the completion of the environment documents. The complete EIA report should be released in the affected areas. Comments and suggestions made by the public should be collected by organizing public meetings, and feedbacks should be made.

3.4 Grievance Appeal Mechanism

In order to continuously collect the public's opinions, disclose information and ensure the participation of communities during project implementation, the borrower should build an appeal mechanism.

The appeal mechanism should be included in the EIA report to ensure that all the complaints made by the affected groups or individuals are handled in a timely manner. During public consultations, the borrower should inform the affected groups or individuals of the appeal mechanism. The appealing mechanism should include: (1) recording and reporting system, including verbal and written complaints; (2) the person(s) handling complaints; and (3) the timeline and procedures for complaint handling. The complaining procedures include: the groups or individuals who are negatively affected by project constructions can file a complaint verbally or in writing to the borrower directly. Within a given time period upon the receipt of the complaint, the borrower should make a response to the complaint. The complainant who is not satisfied with the response can appeal to the local environment protection authority. In the case that the complainant still feels unsatisfied with the response by the local environment protection authority, he/she can bring the case to court.

3.5 Review and Approval

Domestic review and approval: The borrower is responsible for obtaining the approval for environment documents from the government. At the same time, the borrower should ensure that relevant policies, guidance and procedures of the Bank have been taken into full consideration during the preparation of the environment documents.

Review and approval by the Bank: The Bank will review the environment documents to ensure that the contents of such documents are in line with the requirements of the government and the Bank.

During project implementation: The borrower is responsible for the comprehensive and effective implementation of the EMP. It should also invite the external environment monitoring agencies to monitor the environmental impacts in line with the EMP and submit the EMP implementation progress report.

3.6 Supervision

During project implementation, the Bank, together with local environment protection authorities and the borrower, will supervise the project implementation to ensure the EMP has been implemented as required.

3.7 Reporting

During project implementation, the borrower should request project construction supervisors to report on the implementation of the EMP. Project construction supervisors should, in accordance with the monitoring plan in the EMP, carefully record the monitoring results and identify the corrective or preventive measures that are necessary to be taken during the monitoring. The progress reports submitted by the supervisors should include the implementation situation/progress of the EMP (e.g., the mitigation measures and supervision), the existence of major environment issues and the solutions. The borrower should submit semi-annual environmental management implementation reports to the Bank. Such reports should include: (1) the implementation situation of the EMP; (2) the environment issues emerged; and (3) the way in which the environment issues are handled and the results.

4 Identification of Environmental Impacts

4.1 Contents of Identification of Environmental Impacts

(1) Identification of Environmental Impacts of Wastewater Treatment Plant

Results of identified environmental impacts of construction of the wastewater treatment plant during the construction and operation periods are summarized in Table 5.

Table 5 Environmental Impacts of Construction of Wastewater Treatment Plant

Phase	Activities affecting the environment	Air	Surface water	Groundwater	Noise	Soil	Soil erosion	Vegetation	Animal	Landscape	Environment risks
Construction period	Land demolition and resettlement					✓	✓	✓	✓	✓	
	Earth works	✓		✓	✓	✓	✓	✓	✓	✓	
	Roadbed and surface	✓			✓	✓	✓	✓	✓	✓	
	Transportation of materials	✓			✓						
	Construction of draining system		✓				✓				
	Activities of construction workers and vehicles					✓					
Operation period	Operation of the wastewater treatment plant	✓	✓	✓	✓						✓

During the operation phase, the most important environmental issue is how to manage the sludge appropriately.

(2) Identification of Environmental Impacts of Sewage Collection Pipeline

The following table gives results of identified environmental impact of sewage collection pipeline during construction and operation periods.

Table 6 Environmental Impacts of Construction of Sewage Collection Pipeline

Phase	Activities affecting the environment	Air	Surface water	Ground water	Noise	Soil	Soil erosion	Vegetation	Animal	Landscape	Environment risks
Construction period	Temporary and permanent land occupation					✓	✓	✓	✓	✓	
	Earth works	✓		✓	✓	✓	✓	✓	✓	✓	
	Activities of construction workers and vehicles				✓					✓	
	Operation of the sewage system (wastewater)				✓						✓

4.2 Identification of Major Environmental Issues

(1) Identification of Environmentally Sensitive Areas

According to the confirmation by the Agricultural Committee of Panshui County, in the river sections within the construction areas, there are no national rare and endangered fish species, protected fish species listed by Chongqing municipal government and migratory fish species; there are no natural spawning grounds, feeding grounds, wintering grounds, migratory corridors of important aquatic organisms, or fish farms of certain scale. However, there may be spawning sites of ordinary fish in the river sections.

(2) Environmentally Sensitive Objects for Protection

After the construction contents and routes have been determined, detailed investigations will be conducted on the spot. As soon as an environmentally sensitive objects are identified, the EIA class will be rated in accordance with relevant requirements of the nation, and the specific mitigation measures shall be worked out.

4.3 Selection of EIA Tools

It is necessary to determine the EIA tools for each construction included in the framework as stipulated in Table 7.

Table 7 Selection of the EIA Tools

Item	Name of the construction	Nature	EIA tools	Remarks
1	Dianshui New District Wastewater Treatment Plant	Construction of new facility	EIA is necessary to deliver the EMP	Approval from the environment protection authority should be obtained
2	Sewage Collection Pipeling to Match with Dianshui New District Wastewater Treatment Plant	Construction of new facility	EIA is necessary to deliver the EMP	Approval from the environment protection authority should be obtained

4.4 Selection of Site and Route

4.4.1 Requirements of Site Selection of the Wastewater Treatment Plant

- (1) the site should be at the downstream of the headwater of the city, and a certain sanitation protective distance between it and the nearby residential areas should be kept.
- (2) the plant should be located in the direction from which the environmental impacts on nearby residential areas during summers are the lowest.
- (3) the engineering geologic conditions -- including soil, soil bearing capacity and the level of groundwater -- should be favorable for the design, construction, management and cost saving.
- (4) the occupation/use of farmland should be avoided or reduced to the minimum level so that the construction of the wastewater treatment plant can be started relatively easily.
- (5) when selecting the site for the wastewater treatment plant, the short- and long-term development of the city should be taken into account; the future expansion of the plant should be considered, taking into account the master planning for rural and urban development.
- (6) The site should not be in flood-prone low-lying areas. If the location may be flooded as it is close to a waterbody, flood control measures should be taken.
- (7) The transportation conditions and the supply of water and power should be favorable to shorten the construction period and make the daily management of the wastewater treatment plant more convenient.
- (8) The slope, geographic and drainage conditions should be favorable to meet the requirements of the vertical layout (or elevation arrangement) of the wastewater treatment facility and reduce the investment in the infrastructure and the cost of power.

4.4.2 Requirements of Route Selection for the Sewage Collection Pipeline

(1) The layout of the pipelines should reflect the geographic patterns, slope drainage should be employed, the route should be as short as possible, and circuitous routes and crossing with waterways, mountains and hills or other municipality utility systems should be avoided.

(2) It is necessary to make full use of the differences in elevation to avoid the construction of lift pump stations or reduce the number of such stations to the lowest possible level.

(3) Measures should be taken to avoid the impacts on the sensitive areas.

(4) When selecting the route, hydrogeology and engineering geology investigations should be conducted, and the routes associated with favorable hydrogeologic conditions should be selected. The burial depth of the pipelines should be as shallow as possible.

(5) The trunk sewers should be installed in the areas where the amount of wastewater is large and concentrated.

4.4.3 Requirement for Location of Discharge Outlet

In addition to relevant national regulations, the discharge outlet should be located at least 500m downstream of fish spawning sites.

5 Environment Management Procedures and Responsible Institutions

Table 8 Environmental Management Institutions and Their Responsibilities

Environment Management Institutions	Responsibilities
Chongqing PMO	<ul style="list-style-type: none"> ➤ <u>Project preparation:</u> (i) to determine the types of construction works and the requirements for environment documents, with the assistance of the consultants or consulting companies; (ii) to review the environment documents submitted by Hongyu Water Investment Construction Co. Ltd., Pengshui County (referred to as Hongyu Water hereinafter); (iii) to review Hongyu Water's capacity of effectively implementing the EMP; (iv) to ensure the contracts with provisions stipulating the enterprise's responsibilities of implementing the EMP; and (v) to request Hongyu Water to prepare and submit the environment due diligence report. ➤ <u>During the implementation of construction works:</u> (i) to supervise the implementation of the EMP by Hongyu Water, with the assistance of experts and local environment protection bureaus; and (2) to regularly update the implementation situation of the EMP to the Bank.
Hongyu Water	<ul style="list-style-type: none"> ➤ <u>During project preparation:</u> (1) to be responsible for the planning, design and implementation of each construction work, and the preparation of environment documents (e.g., the EIA report, EMP and environment due diligence report) as required, and ensuring the participation of the public (public consultations and

	<p>information disclosure).</p> <p>➤ <u>During the implementation of construction works:</u> (i) to carry out project activities and to assist project review and supervision, in line with the approved environment documents; (ii) to ensure the requirements of the EMP are included in the bidding documents and relevant contracts; (iii) to record monitoring results in line with the monitoring plan included in the EMP, and at the same time, to identify the corrective or preventive measures necessary during monitoring, as well as the results of similar activities that have been carried out during the previous reporting period; and (iv) to submit the progress report to the project management unit, in which the implementation situation of the EMP should be included.</p>
EIA agency or consultants or experts	<p>➤ To prepare the EIA report and the EMP, committed by Hongyu Water;</p> <p>➤ to assist Hongyu Water to implement the EMP.</p>
Local environment protection authorities	<p>➤ <u>During project preparation:</u> to review and approve the EIA report;</p> <p>➤ <u>During the implementation of construction works:</u> (i) to supervise the implementation of the EMP; (ii) to ensure that the enterprise complies with 'three simultaneity' system and relevant environment policies; and (iii) to carry out other daily operations, such as coordinating and handling pollution events and disputes.</p>
The Bank	<p>➤ To review the environment documents and to supervise the implementation of the EMP.</p>

6 Environmental Management Procedures

For the construction works that are included in the environmental management framework (EMF), a set of environment management procedures has been developed for the effective environment management of the general impacts emerged during construction. It stipulates the environment management measures, institutions, environment supervision procedures and requirements. As to the sensitive spots identified during the further environmental impact analysis by employing the selected EIA tools and the development of mitigation measures, the detailed impact analysis should be carried out and the specific measures should be developed.

The details of the EMF are described in the following table (Table 9).

Table 9 Environmental Management Procedures

Construction work	Environmental impact mitigation measures	Implementation unit	Supervisory unit	Monitoring unit
During design Period				
Implementing environment measures when producing the engineering drawings and preparing the bids	<ol style="list-style-type: none"> 1. Each civil work contractor is requested to allocate 1-2 on-site environmental engineers who are responsible for the implementation of environment measures throughout the construction period, and ensuring the civil work activities and the construction activities by sub-contractors (if there are any) meet all the requirements stipulated in this protocol and the necessary environment measures are taken during the construction period. 2. During construction, the contractor should communicate and negotiate with the mass living or working in project areas, set up bulletins at each entrance to the construction site to inform the public of the detailed construction activities and the duration of the construction works. Meanwhile, it should provide the name(s) of contact person(s) and contact methods, so that the general public can file complaints or provide suggestions. 3. The contractor should proactively coordinate with the environment-supervising unit committed by the owner of the construction to carry out all supervisory activities during the construction period. 4. After signing on the contract and before starting construction works, the contractor should include the 'on-spot' EMP in its construction plan. 5. The contractor should comply with the requirements for safe and civilized construction in project areas. 6. Before starting to construct, the civil work contractors and supervisors should complete relevant environmental protection and management training. 7. In the event that severe environmental impacts emerge due to the incompliance with the environmental protection measures specified in this protocol, the environmental supervisor or the civil work contractor must take corrective measures immediately and inform the relevant PMO within 24 hours. The CPMO should supervise and assist the civil work contractor to take corrective measures. The contractor should record the implementation status of the corrective measures and report to the supervisors and 	PMO	PMO, owner, relevant municipal (county) environment protection bureaus and traffic management bureau	

			CPMOs. 8. In each year, the contractor should retain a certain percentage of the contract amount as the deposit for environment management, which should be about 3% of the budget.			
During construction						
Environmental protection implementation protocol when making preparation on the construction site			1. The scopes of temporary and permanent land occupation/use (construction and production areas, camps, construction paths, material yards) should be determined, and relevant land use procedures should be completed.	Construction unit	PMO, owner, city (county) environment protection bureaus and traffic management bureaus.	The owner should contract the qualified agencies to do so.
			2. Survey of the existing pipelines on the construction site should be carried out to avoid causing damages to them.			
			3. Construction areas, camps, construction paths, borrow pits and waste pits should be kept far away from surface water.			
			4. The construction unit should negotiate with the City or County PMO to determine the appropriate public source of water, and use the running water provided by the city as the source of drinkable water. It is strictly prohibited to dig new wells.			
Construction field management	Controlling environmental impacts on construction areas where the major facility is constructed	Cleaning — up the surface	1. Attention should be paid to water spray and dust suppression.			
			2. Construction wastes should be removed in a timely manner; only vehicles with a closed container can be used to transport earth and wastes.			
		Constructing road bed	1. Crossing roadbed and pipeline should be under strict control; damage to the surrounding vegetation cover due to over-digging should be avoided as much as possible, and trees outside of the construction sites should not be cut down arbitrarily.			
			2. Construction wastes should be removed in a timely manner; only vehicles with a closed container can be used to transport earth and wastes.			
			3. Water should be sprayed on the construction site to reduce dust.			
		Ecological restoration	1. Before the completion of the construction work, the affected land should be restored to at least what it is before the construction work is started.			
			2. During the construction period, the tillable surface soil that has been peeled should be stored temporarily in a relatively flat area on the site, with bags of earth as barriers and draining and desilting measures in place,			

			covered by dust-proof nets; such soil should be used to restore the land used to build construction camps after the construction work is completed.			
		Construction noise	<ol style="list-style-type: none"> 1. The construction time should be controlled strictly. If the distance between the construction site and the residential area is less than 200m, the equipments/machinery that may generate loud noise should be stopped at night (22:00-06:00). If it is necessary to continue the construction at night, depending on the situation, the construction unit should contact with the local environment protection bureau in a timely manner, and apply for the permit for construction at night, and inform the public in order to get support from the public as much as possible. 2. With respect to the sensitive spot close to the construction site (within 50m), it is necessary to take measures (such as installing mobile or temporary acoustic barriers) to reduce noise. 3. The construction site should be kept away from schools as far as possible. It is necessary to negotiate with the school to determine the operation time of machinery and equipments that produce loud noise, and efforts should be made to avoid operating such machinery and equipments during the exam season. 			
		Others	<ol style="list-style-type: none"> 1. It is strictly prohibited to burn any kind of wastes on the construction site. 			
	Controlling environmental impacts in construction and production areas	Cleaning up the surface	<ol style="list-style-type: none"> 1. Attention should be paid to water spray and dust suppression. 2. Construction wastes should be removed in a timely manner and disposed appropriately. 			
<ol style="list-style-type: none"> 1. Ready-mix concrete should be the first choice. 2. Concrete should be mixed with water; during this process, the mixture should be placed in a closed container. 						
Uploading or unloading materials		<ol style="list-style-type: none"> 1. When transporting, storing, uploading or downloading earth, concrete and lime, wind-proofing and dust-reducing measures should be taken. 2. Material yard should be located in the flat and solid area on the site. 				

			<p>3. Barriers should be set up around the material yard where concrete, lime and stones are stored, and such materials should be covered by plastic sheets to avoid or reduce the pollution due to rain-wash.</p>			
		Vehicles for construction purpose	<p>1. At the entrance /exit to the construction site, washing facilities should be installed to clean up the vehicles before they leave the site. The road connecting the washing facility and the entrance/exit should be hardened by concrete, asphalt or crushed bricks; the vehicles should not carry dust away from the construction site.</p> <p>2. Only vehicles with a closed container can be used to transport earth and wastes.</p>			
		Casting yard	<p>1. The wastewater generated when mixing concrete should not be discharged arbitrarily, and instead should be collected at the sedimentation tanks, and then sprayed to reduce dust after being treated. The sedimentation tank should be buried after the construction work is completed and ecological restoration should be undertaken.</p>			
		Noise	<p>1. For the immovable machinery that produce a large amount of vibration (e.g., mixer), vibration mount(s) should be installed.</p> <p>2. Acoustical barriers should be installed to reduce the sound pollution by machinery/equipments that generate loud noise; or such machinery/equipments should be placed and operated indoors.</p> <p>3. The construction time should be controlled strictly. If the distance between the construction site and the residential area is less than 200m, the equipments/machinery that may generate loud noise should be stopped at night (22:00-06:00).</p>			
		Others	<p>1. Before the completion of the construction work, the affected land should be restored to at least what it is before the construction work is started.</p> <p>2. During the construction period, the tillable surface soil that has been peeled should be stored temporarily in a relatively flat area on the sit, surrounded by bags of earth as barriers with draining and desilting measures in place, and covered by dust-proof nets; such soil should be used for restoring the land used for building</p>			

			<p>construction camps after the construction work is completed.</p> <p>3. It is strictly prohibited to burn any kind of wastes on the construction site.</p>			
Management of construction facilities/equipments	Controlling oil pollution due to leakage	1. Advanced equipments and machinery should be selected as much as possible to effectively reduce the occurrence of water leakage and the number of equipments and machinery repairs, and as a result reduce the amount of greasy wastewater.				
		2. In the case that water leakage is unavoidable, solid oil-absorbing materials (e.g., cotton yam, wood chips and oil-absorbing sheets) should be used if possible. In this way, the grease can be absorbed and contained by solid, and the amount of greasy wastewater can be reduced.				
		3. The maintenance for machinery, equipments and vehicles should be carried out mainly at the maintenance yard on each road section to make it easier to collect greasy wastewater.				
		4. Horizontal flow sedimentation tanks should be installed in the maintenance yard to collect greasy wastewater; after some simple treatments such as acid-base neutralization, sedimentation, oil water separation, residual removal, etc., the water can be discharged. After the construction is completed, the sedimentation tanks should be buried and trees /bush/grass should be planted on top of them.				
		5. The floor in the maintenance yard should be hardened and seepage treatment should be applied to the floor to avoid the soil being polluted by leaking oil.				
		6. It is necessary to record equipment maintenance and repairs, and undertake regular maintenance according to the equipment operation status.				
	Controlling the noise produced by equipments	1. The construction unit should use the equipments, machinery and vehicles that are in line with relevant national standards and try to choose the equipments and machinery that generate low noise.				
		2. For the immovable machinery that produce a large amount of vibration (e.g., power-generating vehicles), vibration mounts should be installed, or such machinery should be placed and operated indoors.				
		3. The maintenance and repair of each type of construction equipments should be strengthened to ensure the sound operation and to reduce noise and vibration fundamentally.				
	Air emission control	1. The construction unit should use the equipments, machinery and vehicles that are in line with relevant national sanitation standards to ensure the air emission meets relevant national standards.				
Solid waste control	1. The sporadically generated poisonous wastes (gloves contaminated by oil) should be collected and treated by qualified units committed by the project.					
	2. The oil that leaks into soil should be removed by					

		<p>using scrapers, sealed, and then transported to the qualified treatment plant to dispose.</p> <p>3. In case it is impossible to maintain or repair the equipments, facility or vehicles at the maintenance yard at each road section, then containers or oil-absorbing solid should be used to absorb the generated greasy wastewater, which will then be collected, sealed and shipped away for treatment. The destination should be as close to the qualified treatment plant as possible.</p>			
Environment protection implementation protocol at construction camps	Flattening the site	<p>1. Construction wastes should be removed in a timely manner; only vehicles with a closed container can be used to transport earth and wastes.</p>			
		<p>2. Water should be sprayed on the construction sites to reduce dust.</p>			
	Controlling residential wastewater	<p>1. Oil [water] separation tanks should be installed in canteens, and be cleaned by the designated cleaning units, which should have the permit for disposing of wastes and the permit for operation issued by relevant authorities.</p>			
		<p>2. On construction camps, temporary toilets should be installed, affiliated with septic tanks. Seepage treatment should be applied to the tanks.</p>			
		<p>3. On the camps, draining ditches and sedimentation tanks should be installed; filtering nets should be installed in the pipelines connecting to the canteen, washing room and shower room. After flowing through sedimentation tanks, construction wastewater can be discharged into the municipal draining system or rivers. At the same time, efforts should be made to ensure that the draining ditches are clean and function well.</p>			
		<p>4. On construction camps, draining should be kept smooth; no one should pee or poo all over the camps.</p>			
		<p>5. It is strictly prohibited to dump or discharge any kind of residential wastewater into draining pipelines; it is also prohibited to dump any residential or construction wastes near the camps.</p>			
	Controlling residential air emission	<p>1. Clean resources such as natural gas and electrical power should be used for cooking on camps in line with relevant regulations issued by local environment protection authorities.</p>			
	Controlling solid wastes	<p>1. Wastes that can be recycled (e.g., used paper) should be collected and treated by designated recyclers.</p>			
		<p>2. Closed trash tanks should be placed on construction camps, such that residential trash are collected, removed and disposed of according to relevant requirements and in a timely manner.</p>			
<p>3. Slop buckets should be put in place outside of the canteens. The buckets should be cleaned and the slops</p>					

		should be removed in a timely manner.			
		4. Septic tanks should be cleaned by designated persons. After the construction is completed, such tanks should be buried.			
	Controlling ecological impacts	1. Within one month after the completion of the construction, all temporary buildings should be demolished and the land should be restored to what it is before the construction is started.			
		2. During the construction period, the tillable surface soil that has been peeled should be stored temporarily in a relatively flat area on the site, surrounded by bags of earth as barriers, with draining and desilting measures in place, covered by dust-proof nets; such soil should be used to restore the land used to build construction camps after the construction work is completed.			
	Other requirements	1. Clay bricks are prohibited to use when constructing temporary buildings on camps; such buildings should meet the safety and firefighting standards and other relevant national standards.			
		2. The camps and construction areas should be clearly separated. Relevant separation measures should be applied to ensure that the camps are clean, tidy and well organized.			
		3. It is prohibited to burn any kind of wastes on camps.			
Implementing environment protection protocol on material yards	Controlling environmental impacts in borrow pit	General requirements	1. Deep excavations should be avoided as much as possible. The volumes of the excavations and fills should be balanced as much as possible. If more earth is needed, purchasing commercial earth and earth abandoned by urban construction projects should be considered first. Establishing borrow pits should be avoided, to ultimately eliminate the environment impacts of the borrow pits.		
			2. Earth collection should be conducted in a centralized way to reduce the number of borrow pits.		
		Dust suppression	1. Attention should be paid to water spray and dust suppression, to reduce dust pollution as a result of excavations.		
		Controlling ecological impacts	1. During excavations, surface soil should be temporarily stored for land reclamation in a relatively flat area on the site, surrounded by bags of earth as barriers, with temporary drainage ditches and sedimentation measures in place, covered by dust-proof nets. After the construction is completed, surface soil should be used for ecological restoration at borrow pits.		
2. Vegetation cover should be restored					

			at the end of the construction.			
		Controlling landscape	1. Relevant environment protection measures should be carried out in line with the requirements in the EIA report.			
	Environmental impacts control at abandoned dreg pits	General Requirements	1. It is necessary to first consider reusing abandoned dreg (if there are any) on the site or shipping them to other construction sites for reutilization. Alternatively, they can be used for restoration at borrow pits. The establishment of a abandoned dreg pit should be avoided to fundamentally eliminate the environment impacts of borrow pits.			
2. In case abandoned dreg cannot be recycled, it is necessary to first understand if there are designated abandoned dreg treatment plant. If yes, the relevant procedures should be completed and the abandoned dreg should be shipped to the designated treatment plant.						
Dust control		3. Compaction in layers should be applied to the abandoned dreg pit to effectively reduce dust.				
		4. Water should be sprayed to reduce dust.				
Ecological impacts control		1. Before building abandoned dreg pits, surface soil should be peeled for land reclamation and temporarily stored in the relatively flat area on the site, surrounded by bags of earth as barriers, with temporary draining ditches and sedimentation tanks in place, covered by dust-proof nets. After the construction is completed, surface soil will be used for ecological restoration at abandoned dreg pits.				
	5. After the earth is collected, the land should be restored.					
Soil erosion prevention plan	The main construction area	1. Surface soil should not be stored at the places where surface runoffs converge, or roads close to the construction site or environmentally sensitive areas that are close to rivers; the area that may affect construction or the smooth traffic on the road. Instead, surface soil should be stored at the relatively low and idle area to reduce the volume of protective measures. For temporary storage, surface soil can be piled in the acquired land on the two sides of the roadbed. In order to avoid the soil sliding down, bags of earth should be used as barriers along soil piles. Such soil should be used for landscaping at the end of the construction.				
		2. A grouted rock draining ditch should be built				

		<p>along the wall of the plant (outside), with sedimentation tanks on the two ends. Before flattening the land, surface soil should be peeled. At the end of the construction, it should be covered by soil for landscaping purpose.</p> <p>3. For the earth stored temporarily, barriers should be built to prevent damage caused by rainfall splashing.</p> <p>4. Sedimentation tanks should be built at the outlet of the roadbed.</p>			
Construction and production area		<p>1. In the construction and production area, the protection focus should be put on soil erosion. As vehicles run back and forth frequently and for the needs of storing materials, the floor in the whole area should be hardened by concrete.</p>			
		<p>2. During wet seasons, barriers should be built up along the boundary of low-lying areas to prevent damage caused by rainfall splashing.</p>			
		<p>3. Surface soil and materials stored should be covered by dust-proof nets, barriers should be built to prevent damage caused by rainfall splashing.</p>			
		<p>4. The construction time should be arranged reasonably, and the length of temporary land use should be shortened. After the completion of the construction, vegetation restoration or reclamation should be carried out immediately.</p>			
Construction paths		<p>1. Engineering protection and draining system should be employed along newly built construction paths.</p>			
		<p>2. The construction time should be arranged reasonably, and the length of temporary land use should be shortened. After the completion of the construction, vegetation restoration or reclamation should be carried out immediately.</p>			
Construction camps		<p>1. Temporary afforestation should be applied to the outside of the sheds and the hardened areas. Grass and flower seeds and bushes should be planted to improve the landscape on the camps.</p>			
		<p>2. Brick draining ditches should be built to discharge the stagnant water.</p>			
		<p>3. At the end of the construction, sheds and hardened surface should be removed, the land should be flattened and the vegetation should be recovered.</p>			
Borrow pits		<p>1. Before start to operate at borrow pits, the necessary water interception and draining measures should be taken: draining ditches should be built around the pit, sedimentation tanks should be built at the outlet, after sedimentation, rainwater can be discharged to nearby natural gullies; at the platform on the slope and the outside of the slope, water interception ditches should be built, connecting to draining ditches.</p>			
		<p>2. Efforts should be made such that after excavating a small area, the land will be restored and trees and</p>			

		<p>grass will be planted, to avoid the situation that a large area is excavated and exposed, causing serious soil erosion. Before afforestation, surface soil should be backfilled, and the land should be flattened.</p> <p>3. The slope where restoration of the vegetation cover takes a longer time should be covered in case of heavy rainfalls to avoid runoff scouring.</p> <p>4. After the construction is completed, afforestation or reclamation should be carried out immediately.</p>			
	Abandoned dreg pit	<p>1. In case of practicable difficulties, the abandoned dreg pits should be built. Such pits should stand in basins or low-lying areas.</p> <p>2. Before abandoning dregs, barriers should be built at the places lower than the pit, based on the land patterns; when building such barriers, the location where abandoned dregs will be placed and the land patterns should be fully considered, and such barriers should be safe, economic and reasonable.</p> <p>3. In the areas above the pit, intercepting dikes should be built to intercept runoffs. On the two ends, desiltering tanks should be built. If the slopes of the dikes are relatively steep, energy dissipators should be put in place.</p> <p>4. After the abandoned dreg have been compacted and flattened, draining ditches should be built.</p> <p>5. After the construction is completed, ecological restoration should be conducted at the abandoned dreg pit.</p>			
Ecological restoration		<p>1. During ecological restoration, the peeled surface soil that has been stored during the preparation of the construction site should be used as much as possible to reduce the use of new soil.</p> <p>2. Trees, bushes and grasses should be planted. That is, when planting trees, it is necessary to also plant bushes that grow fast so that the whole area is covered by plants and the invasion of alien species can be prevented.</p> <p>3. Alien species should not be introduced.</p>			
Preservation of cultural relics		<p>1. Provided immovable cultural relics (e.g., ancient relics and ancient tombs) have been discovered, the construction must be stopped immediately. Under the supervision of the construction supervisors, the site must be preserved well and no one can dispose of it arbitrarily, and the cultural relics preservation authority should be notified immediately.</p> <p>2. After the cultural relics preservation authority evaluates and cleans the relics, the construction unit should develop a construction plan specifically for the area where the relics are discovered, and resume the construction after the cultural relics preservation authority approves the plan.</p> <p>3. Movable cultural relics (including stuffs used in daily lives or production in ancient times) that are</p>			

	discovered should be submitted to the cultural relics preservation authority proactively, no one shall keep them.			
Construction transportation management	1. The construction time should be arranged reasonably, and the length of temporary land use should be shortened.			
	2. Only vehicles with a closed container can be used to transport earth and wastes.			
	3. If the distance between contiguous residential areas and the construction path is less than 50m, then transporting construction materials on the path at night should be prohibited.			
	4. The operation of construction vehicles should avoid traffic peak hours to prevent traffic jams and the occurrence of accidents.			
	5. Vehicles should run on the designated routes. Changing routes without approval and doing harm to farmland and forestland are prohibited.			
Traffic safety	1. Drivers should pay attention to safe driving; they should drive along the designated routes, and not change lanes or routes arbitrarily.			
	2. Drivers should improve their driving skills, and they all should have a driver license.			
	3. A limit to the continuous driving time should be set; drivers can rotate. Drivers should avoid driving on dangerous road sections or during dangerous times to reduce the occurrence of traffic accidents. Vehicles and pedestrians should respect the traffic lights or the traffic policemen's instructions.			
	4. The speed control system should be installed on vehicles to monitor drivers' performance.			
	5. Spare parts should be purchased timely for vehicle maintenance to avoid severe accidents as a result of premature engine failures.			
	6. Pedestrians and vehicles should be separated as much as possible. Pedestrians should use the crosswalk, bridges, tunnels to cross the roads and they should respect the right of way of others.			
	7. The visibility of traffic signs should be improved to fully promote safe traffic.			
	8. Safe traffic and pedestrian safety campaigns should be delivered near schools and residential areas.			
	9. The provision of appropriate first aid rescue during the incidents should be ensured by coordinating with persons handling emergent situations. Materials should be purchased locally as much as possible to reduce transportation distance. Large vans should be used on the construction site to reduce traffic load. Traffic safety restriction measures should be taken to warn vehicles and pedestrians of dangerous traffic conditions by means of signs and lights. Temporary bridges should be built up at sensitive sections, e.g., schools, hospitals, residential areas,			

	<p>senior nursery houses to ensure that pedestrians can cross roads safely.</p> <p>10. It is better to purchase local materials to reduce transportation distance and use shuttle buses to transport workers to reduce the use of vehicles from the outside as much as possible.</p> <p>11. Overloading should be avoided. Meanwhile, the load should be covered to prevent spilling. The transportation routes and times should be planned carefully to avoid affecting the traffic conditions in the central areas, key roads and residential areas. For the road sections where the requirements are very strict, transportation at night should be adopted taking into account the specific situations. The earth spilled should be cleaned and removed timely to reduce dust pollution.</p> <p>12. At the excavating sections, lights should be installed and turned on at night.</p>			
Dangerous wastes, and flammable and explosive products	<p>1. When fuel and diesel are shipped to the construction site, inspectors should check the package, if leakage takes place, they should be refused and returned.</p> <p>2. The designated warehouses for oil and chemicals should be built in the construction and production area, with warning signs. Anti-leaking treatment should be applied to the floor. Absorbing bags, sands and wood chips should be put in place.</p> <p>3. An emergency plan should be developed; before entering the site, workers should be provided with training.</p>			
Public participation	<p>1. Bulletins should be set up at each entrance to the construction site to inform the public of the name, contents, and duration of the construction work, and the names of contact person(s) and contact methods for filing complaints or providing suggestions.</p> <p>2. It is necessary to organize environment protection experts and technicians to answer the questions and concerns raised by the public.</p> <p>3. If it is necessary to continue the construction at night, the construction unit should complete relevant procedures, and inform the nearby residents by making an announcement. The announcement should include: the starting and ending time of the continuous construction, and the permit for construction at night issued by the environment protection authority.</p> <p>4. If the municipal utility service has to be interrupted due to the construction (including water, power, telephone and bus, etc.), it is necessary to post an announcement at the project site, affected neighborhoods and enterprises, illustrating the starting and ending time of the interruption.</p> <p>5. All the comments and concerns raised by the public should be recorded, archived and responded –</p>			

	<p>the responses and feedbacks should be recorded and archived as well and subject to the supervision by the supervisory agencies.</p>			
Controlling social and environmental impacts	<p>1. Each kind of allowances or compensations for land demolition and resettlement should be in line with national and Chongqing municipal standards, and distributed to relevant villages/groups/individuals, taking into account local conditions and the agreements signed with the affected households; democracy and citizens' basic rights should be fully respected, such that the compensations are distributed and used appropriately; farmland should be adjusted appropriately, labor force should be allocated adequately, and relevant policies should be implemented.</p>			
	<p>2. The operation of construction vehicles during peak hours should be avoided as much as possible to prevent traffic jams and the occurrence of accidents.</p>			
	<p>3. During the construction of the proposed road, in case existing local roads have been occupied or damaged, removal and protective measures should be carried out after the construction is completed, the roads should be restored, trees should be planted, and a certain amount of compensation fee should be paid to local governments to protect the lawful interests of local governments and residents.</p>			
Controlling impacts on landscape	<p>(1) In order to make the landscape of the construction match the surrounding landscape, the slopes of excavations and backfills should reach the natural ground, arch-shaped slopes can be used to improve the view. The surface of the slope should be rough to some extent, so that protective measures can be taken or grasses can be planted.</p>			
	<p>(2) As most construction paths are along the two sides of roads, it is suggested to strengthen the environment protection promotion to raise environment awareness of the management and workers; throwing residential and production wastes all over is strictly forbidden.</p>			
	<p>(3) At the abandoned dreg pit and material yard, operation can be conducted within designated areas only. Throwing wastes all over is strictly forbidden.</p>			
	<p>(4) After the construction is completed, grease and wastes in abandoned dreg pits, material yards, construction paths and camps should be removed timely; land should be flattened, the original landscape and vegetation cover should be restored, such that the construction and the surrounding environment are in harmony.</p>			
Safe construction	<p>1. Warning signs should be set up at the posts, equipments and places that are prone to occupational</p>			

	<p>hazards.</p> <p>2. Training on vocational safety and health, and body checks should be organized regularly for those who work in harmful and poisonous environment, teaching them how to adequately use protective equipments and supplies.</p> <p>3. The construction unit should provide workers with protective supplies, such as hamlets, security belts, working boots and uniforms.</p> <p>4. On the construction site, low-noise generating equipments should be used, automatic technologies and indoors operations should be promoted to reduce noise generated. During operation, workers should wear earplugs to protect their hearing.</p> <p>5. In the places where natural ventilation cannot be ensured, e.g., anti-corrosion and water-proofing operation in basements, the air ventilation system should be built. Workers who operate in the harmful and poisonous environment should wear gas masks or protective masks.</p> <p>6. In dusty working environment, measures should be taken to reduce dust, e.g., spraying water; workers should wear masks. When welding, workers should wear protective masks, glasses and gloves.</p> <p>7. During high temperature operations, cooling supplies should be provided on the site, and the operation and resting times should be appropriately managed.</p>			
Health and medical	<p>1. On the construction site, meals, drinking water and the places where workers rest should meet relevant sanitary standards.</p> <p>2. Ventilation and lighting equipments should be installed in dormitories, canteens, shower rooms and toilets. It is necessary to designate persons to be responsible for maintenance.</p> <p>3. In the dormitories on the construction site, operable windows can be installed. Each bunk bed could not have more than three layers. One big bed for all workers in the room is strictly forbidden.</p> <p>4. Canteens must have the valid sanitation permit granted by the relevant authority. All utensils should be clean and meet relevant standards. Cooks must have the valid health certificates.</p> <p>5. Canteens should be away from sources of pollutants, e.g., toilets, trash tanks, and poisonous or dangerous materials.</p> <p>6. In canteens, there should be separate operating rooms and storerooms. Rat guards should be applied under the door (no less than 0.2m).</p> <p>7. Toilets, sanitary equipments, draining and the places in wet and dark areas should be disinfected regularly.</p> <p>8. Closed containers should be installed in</p>			

	residential areas, fly control should be carried out on a regular basis, and removed timely.			
	9. There should be a clinic on the construction site, equipped with the health care kit, commonly used medicines and first aid equipments such as bandage, tourniquet, cervical collar and stretcher.			
	10. The occurrence of contagious diseases, food poisoning and acute occupational poisoning should be reported to local epidemic prevention department and the construction administrative authorities, and handled in line with local epidemic prevention department's requirements.			
During Operation phase				
Controlling environment risks	1. In the wastewater treatment plant, there should be an emergent tank with the necessary equipments such as reflux pumps.	The owner	PMO, owner, and environment protection bureau, urban and rural construction committee, and water resource bureau of the county (city)	
	2. The operating unit should install on-line monitoring equipments at inlets, outlets and the key water treatment buildings as required by the environment protection authorities and the wastewater treatment administrative units, and connect them to the networks of the environment protection authorities and the wastewater treatment administrative units.			
	3. The inspections of pipelines and inspection pits should be strengthened, in particular the inspection of the newly-built constructions along the pipelines, to avoid the sewers are damaged due to careless construction works.			
	4. The emergent plan for the wastewater treatment plant and the affiliated pipeline network should be compiled.			
Water pollution prevention and control	1. The maintenance and management of the pipelines should be strengthened to prevent the pipelines being jammed by sinking sands. 2. The design, construction and operation of the wastewater treatment plant and the intercept pipelines should be carried out at the same time. 3. Leakage at the intercept pipelines connections should be avoided to prevent environment problems such as groundwater pollution and weakened foundation. 4. The internal operation and management of the wastewater treatment plant should be strengthened: operation staff should go through special training programs and their performance should be evaluated, regular testing and analysis should be strengthened, a relatively advanced automatic control system should be established. 5. Water consumption should be reduced by reutilizing treated wastewater, reducing the volume of the discharged wastewater and improving the			

	utilization rate of water resources.			
Odor control	<ol style="list-style-type: none"> 1. Closed buildings equipped with deodorization system should be used. It is recommended to use biofilter tanks to deal with the odor. The treatment rate and the removal rate should be no less than 90%. After treatment, the air can be emitted through the exhaust chimney. 2. Three-dimensional afforestation can be applied in the plant (protective belt). At the same time, a green (tree) belt can be built along the boundary of the plant. Solid wastes should be cleaned and removed in a timely way. The sludge dewatering plant, water tanks, and fences can be positioned at the places that are far away from the front area of the plant, away from the boundary in the downwind area. Furthermore, the surrounding areas should be afforested intensively. 3. A certain sanitation protective distance should be kept. 			
Prevention and control of Noise	<ol style="list-style-type: none"> 1. Low-noise and high-quality equipment should be used as much as possible. 2. Noisy production areas should be located in the middle of the plant to reduce the impacts on the surrounding areas and the environmentally sensitive spots. 3. Mobile covers with sound absorbing materials can be used to cover the engines that produce a large amount of noise. In this way, the overall level of the noise created by such engines can be reduced by about 15dB(A). 4. For blowers, appropriate mufflers can be used; soft links can be employed; anti-vibration measures can be applied. Therefore, the noise can be reduced by 20dB(A). 5. In the plant, a tree belt should be built; at the boundary of the plant, a tree belt should be established to separate it from the outside. 			
Solid waste treatment and disposal measures	<ol style="list-style-type: none"> 1. Temporary leakage-proof tanks should be installed and placed under the sheds. Such tanks should be used to hold different types of solid wastes. The leaking wastewater should be collected and treated at the wastewater treatment system. 2. The solid wastes piled up should be transported to the treatment plant by designated vehicles with a closed container. Transportation management should be strengthened to reduce spilling – spilled wastes should be cleaned and removed in a timely manner. 3. The appropriate sludge treatment method should be selected, taking into account the real situation in Pengshui. 			
Groundwater pollution prevention measures	<ol style="list-style-type: none"> 1. The floor of the solid waste yard should be hardened by a layer of 10-15cm concrete above a layer of clay; epoxide resin should be applied to prevent water leakage. 			

	<p>2. The wastewater treatment tanks should be hardened by concrete, the walls should be brick wall hardened by concrete to prevent water leakage. Epoxide resin should be applied to the whole tank to prevent corrosion and leakage.</p> <p>3. The roads in production areas, the area where trash tanks are located, the floors of the maintenance yards and warehouses should be hardened by a layer of 10-15cm concrete on top of a layer of clay.</p>			
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Annex B: Physical Cultural Resources Management Plan

1 Situation of the Project-related Physical Cultural Resources

1.1 Wanling Ancient Town (also named as Lukong Ancient Town)

The Lukong ancient town has a long history and it is a cultural relic protection site at county level. Its well-preserved ancient streets and architectures cover an area of 3.2 hectares in total, of which most streets were built in Ming and Qing dynasty while the traditional architectures are mainly the Old House and the Gorgeous House of Zhao's family and the Former Residence of Liu Naifu. Based on principles of integral control, key protection and unified coordination, the entire ancient town and its surroundings are set to be a control zone in conservation plan. This zone is further classified into 4 levels for protection, i.e. core conservation, common conservation, construction control and regional coordination. Scope of this zone is shown in **Figure 11**. The Lukong ancient town located on the left bank of Lukong district of the project (LaiUpper L1+265.298~LaiUpper L1+325.231). Informed by interviewed administrations of cultural relic protection, the Huguang guild hall and Zhao clan's ancestral hall in Lukong town are located on the left bank of the project. They are protected on county level. With a completed embankment on the left bank of the town, there is no need for further construction in that area.

1.2 Darong Bridge

The left and right bank of Darong Bridge located respectively on left side (LaiUpper L1+265.298~LaiUpper L1+325.231) and right side of the project (LaiUpper R0+611.315~LaiUpper R0+622.984). It is a stone slab bridge, of which the deck consists of stone units weigh 10 tons each. The bridge is 116 meters in length and 1.75 meters in width, connecting the west and east bank of Lukong. Built in early Zhengde period of Ming dynasty, this 24-span bridge now has been a cultural relic protected at municipal level. According to the opinion of cultural relic administrations, its conservation zone stretches two meters from each end of the bridge and 15 meters from its upstream and downstream faces.

1.3 Grand Buddha Temple (Dafu Temple)

Grand Buddha temple is a national emphasis cultural relic unit. It is located on the south bank of Fujiang river at the northern foot of Dingming Mountain, 1.5km to the northwest of Tongnan county. Its area is from the second Fujiang bridge on the north to the old urban district of Tongnan county on the south. It is right next to the Dafu dam district, facing the new urban district on the other side of the river. The Cliffside Buddha coated with gold in Grand Buddha temple is 18.43 meters high, of which the height rank first in china and seventh among world's gold decorated Buddhas. Founded during Xiantong period (A.D. 860~873) of Tang dynasty, the temple's initial name was Dingming, while it can be also called as Nanchan Temple. In Ming dynasty, a seven-story pavilion was built to cover the Buddha, and it has been well preserved ever since. Works of successive celebrities were carved on aged stone walls in the temple, among which pictures named Feixia and Tiankai etc. was of great artistic value. All relics in the temple had been made part of the first batch of provincial-level key protected culture relics by the government of Sichuan Province in august 1956. And the Cliffside Buddha, classified as a relic of the period from Sui dynasty to Qing

dynasty, was approved in the list of the 6th batch of national key protected culture relics by the state council of China on May the 25th, 2006.

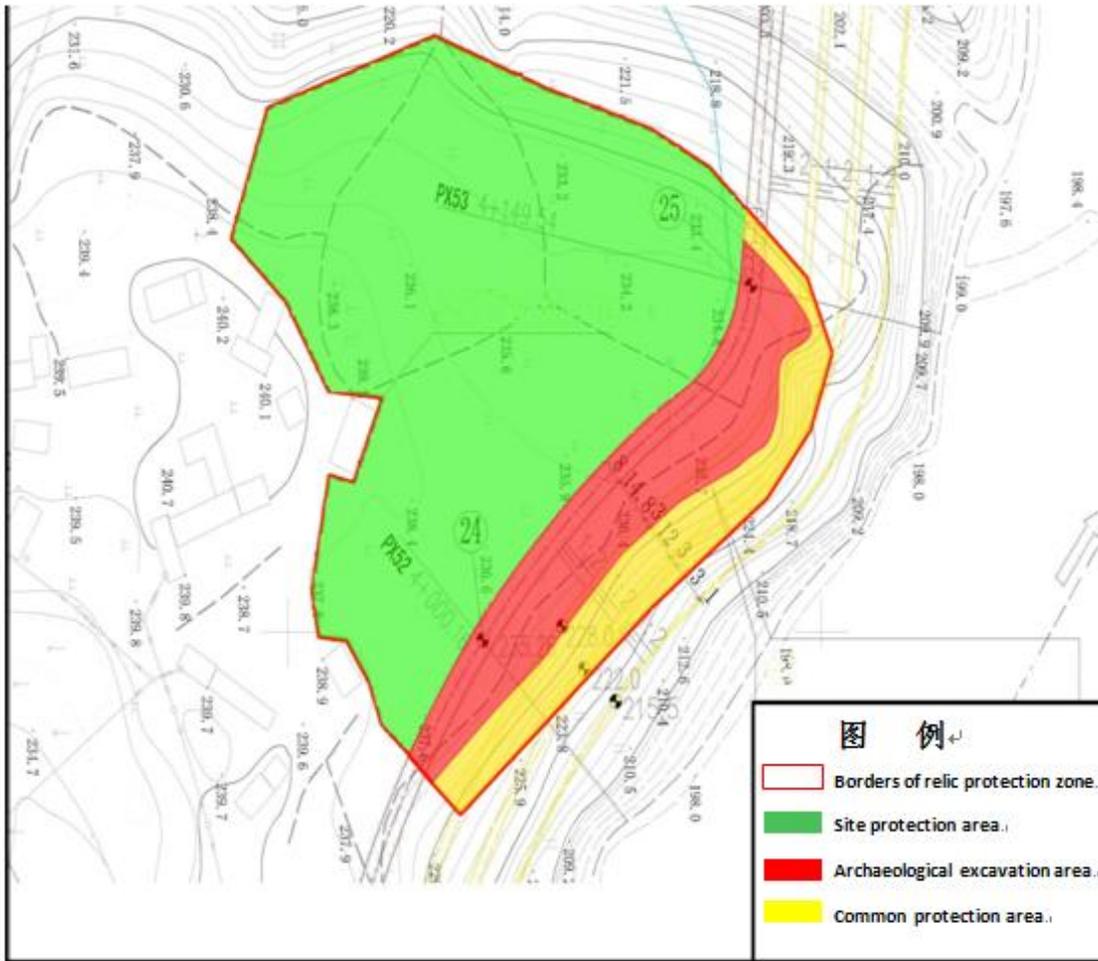
Grand Buddha temple was planned to be a multi-function comprehensive scenic integrated of tourism function, multi-cultural elements of Confucianism and Buddhism and experimental function. Based on such principles as no damage to the existing relics and non-renewable resources, no changes to the existing architectures or its layout, and moderate development of new cultural tourism project in line with the landform features, its scenic plan arranged each function area reasonably. It proposed a three-layer protection zone to consist of a core area, a range control area, and an environmental coordination area to protect the relics respectively. Scope of the protection area is shown in **Figure 13**.

This project lies to the northwest of Tongnan Grand Buddha temple with a shortest distance of 500m from the range control area of Grand Buddha Temple (Dafu Temple) protection zone.

1.4 Xujiaba Site

The relic site was one of the settlement ruins of clans existed in Shang and Zhou dynasty. Located at 29°22' 00.9" N, 108° 07' 16.0" E, the east-facing relic site covers an area of about 45000m² in territory of the 9th group of Linjiang village (former 3rd group of Tianchi village) with an altitude of 220m. It is on the 2nd terrace of the left bank of Wujiang River, closed to Wujiang River. Three small rills divide the site into 3 parts. It can be observed that there are 4 cultural layers on the precipice near river. The 1st contains roots and bulbs in its 30cm thick soft taupe soil. The 2nd is 40-50cm thick filled with high ratio sand. The 3rd layer with 50-67cm thick soft reddish brown soil contains sand inclusion, pottery shards decorated with thin corded pattern, rocks and plant ash. And the brown soil in 4th layer is hard and pure. Stone implements collected from the ruin are mainly hammered implements, pottery shards, sand inclusion, and flat bottomed vessels. This considerably valued ruin is preserved rather well except mild corrosion due to long time burial and years of exposure during its early centuries. Additionally, cultivation activities of local villagers before archaeological excavation also had impact on the ruin.

According to *Evaluation of Impact on Xujiaba Site and Culture Relics* and on the basis of *The Cultural Relics Protection Law of the People's Republic of China*, the related part of Xujiaba relic site is proposed to be preserved by site protection and archaeological excavation arrangement. It is planned to be divided as site protection area, archaeological excavation area and common protection area. Scope of each area is shown in figure 1.1. The common protection area has no relics involved, and archaeology activities in archaeological excavation area had been already completed. Construction of the project will only occupy the common zone and archaeological excavation area.



Sketch of Cultural Relic Protection Plan of Xujiaba Site

Legend

- Borders of relic protection zone
- Site protection area
- Archaeological excavation area
- Common protection area



Distant view of Xujiaba Site



Pottery specimens collected in Xujiaba Site



Stone implements collected in Xujiaba Site



Animal bones in K3 stratum of Xujiaba Site

2 Related laws, regulations and policies

2.1 Domestic Laws and Regulations

- (1) *Cultural Relics Protection Law of the People's Republic of China* (1991.6.29)
- (2) *Measures for the Administration of Culture Relics Preservation Projects* (2007.12.8)
- (3) *Principles for the Conservation of Heritage Sites in China* (2004)
- (4) *Regulations of the People's Republic of China on Nature Reserves* (1994.10.9)

2.2 World Bank policy

OP 4.11 Physical Cultural Resources

3 Conclusions of impact analysis

3.1 Wanling Ancient Town

Wanling ancient town lies on the left bank of the project (LaiUpper L1+265.298~LaiUpper L1+325.231). According to the interviewed administrations of cultural relic protection, the Huguang guild hall and Zhao clan's ancestral hall in Lukong town are located on the left bank of the project. As an embankment project is already completed on the left bank of Lukong town, there is no need for further construction. So construction of this project will not cause any disturbance to the relics in Lukong ancient town.

3.2 Darong Bridge

The left and right bank of Darong Bridge locate respectively on left side (LaiUpper L1+265.298~LaiUpper L1+325.231) and right side of the project (LaiUpper R0+611.315~LaiUpper R0+622.984). With a completed embankment project on left bank, there is no need for further construction. So the left bank of Darong Bridge will not suffer any impact. However, the right bank of Darong Bridge is in construction area, so mechanical excavation there may impact the bridge at some level and potentially cause damage to its stability or scene.

According to the opinion of cultural relic administrations, its conservation zone stretches 2 meters from each end of the bridge and 15 meters from its upstream and downstream faces. So construction of embankment on right bank should be carried out outside the conservation zone. At mean time, reasonable layout of construction near bridge should be put forward and the excavation near bridge is suggested to be carried out manually.

According to the construction arrangement, no construction will be carried out on left bank, construction on right bank will be kept off from the conservation zone, and manual excavation will be carried out on right bank of the bridge. As a result, the project will not have any impact on the bridge.

3.3 Grand Buddha Temple (Dafu Temple)

The project is on northwest to Tongnan Grand Buddha temple, a state emphasis cultural relic unit. From a route optimization based on researchable data, the final adopted route will avoid the scenic region. The ending point of the route is beside a road on the left bank of 1st group's territory of Shengli Village. It will not go through Shengli weir. And shortest straight-line distance from the route to Dafu Temple control area is 500m. During construction period of this project, its workyard is placed in canal scenic region far off the Grand Buddha temple. Without any important scenic around, it will have little impact on Grand Buddha temple. Transportation of earthwork and other materials will make use of Jingfo Avenue and other main transport arteries around.

EIA requires construction unit to deliver the construction plan to the cultural relic administration of Grand Buddha temple for approval before construction. If cracking or inclining were found during construction period, the construction should be suspended immediately, and construction unit should inform the cultural relic protection units in time. The project cannot be resumed until it is assured that continuous construction will not cause damage to relics in Grand Buddha temple.

There are several protected relic sites in Tongnan County, the 2nd section of the project is located near Dafu Temple (Grand Buddha Temple) state-level key cultural relic. Consequently, it is of great importance to handle well the suspected relics found during construction. The contractor should train the constructors and tell all things about safety technology of handling suspected relics in advance. Once suspected relics appeared, construction unit should suspend the construction, and preserve the site. Then inform cultural relic administrations of Tongnan county and Chongqing city. In brief, construction unit should execute timely site protection and situation report after a sudden appearance of relics. It is construction unit's duty to protect the relics from being damage, concealed or resold.

At present, no actual or suspected cultural relic has been found in both permanent and temporary occupied areas of Dafuba embankment.

3.4 Xujiaba Site

Affected by both natural and human factors, some collapse and erosion are shown on the river bank of Xujiaba Site. To protect the relic site from being eroded by Wujiang River, it is necessary to add slope protection to the whole bank of the relic site section. Based on landform and geological features and borders of the relic protection area, an earth embankment slope-attaching revetment design was proposed, which means a partial occupation of the protection zone is unavoidable. To reduce the occupation of the protection area the shore line could be reallocated outward once goals of flood control were fulfilled. According to **Figure 12**, the project occupies only part of the riverside of the relic site. Despite certain impact on deposition of the ruin caused by the project, the scope of influenced area is rather small, and the negative influence can be minimized by protection measures. On the other hand, once bank revetment project begins to be operated, the project will protect the bank and benefit the following protection works of the site. So the site will be protected well to the maximum extent. Additionally, operation of the road on top of the embankment will improve regional traffic conditions which will help stimulate the tourism in Xujiaba Site. It is also good for cultural communications of the site. Over all, operation of the project will help to protect, advertise and develop the value of Xujiaba Site

in long term.

4 Management Institutions

The competent authorities for cultural relic administration of Wanling Ancient Town and Darong Ancient Bridge are respectively Rongchang County Cultural Relic Bureau and Chongqing Cultural Relic Bureau, and they are daily managed by Rongchang County cultural relic bureau. The cultural relic administration of Grand Buddha temple and Xujiaba Site is Chongqing Cultural Relic Bureau. Additionally, relevant organizations are World Bank office in Chongqing, project contractor, environmental supervision institutions and environmental monitoring agencies.

5 Protection Measures for Avoiding or Mitigating Impacts

5.1 Handling Procedures for Physical Cultural Resources Discovered in Construction

The basis of the handling procedure is article 32 of the *Law of the People's Republic of China on protection of cultural relics*, which says: "Anybody who finds cultural relics during construction or agriculture production should protect the site and report the situation to local administrations of cultural relic immediately. Without special situation, the administration should rush to the scene in 24 hours, and give advice in 7 days. The administration could appeal to local government to ask for security assistance from police department. If the relics were found of great importance, it should be reported immediately to the state council administration of cultural relic. The relics are state-owned, any unit or individual should not snatch, unauthorized distribute or conceal them.

This plan raises management claims for accidentally found of relics during construction period as follow:

If a relic were found during construction, related activities should be suspended, the site should be controlled and prevent form any unauthorized disposal. The construction unit should report the situation to local cultural relic administration immediately.

When disposal advice received, construction unit should enact a construction plan within relic site section based on suggestion from cultural relic administration. Then, the construction can be resumed with the permission from cultural relic administration. Any unit or individual should not resume the construction or production in archaeological excavation area without authorization.

Any snatch, distribution or concealment is prohibited.

The relic handling flowchart is shown in Figure 1.5-1.

5.2 Protection Measures for Grand Buddha Temple

(1)Route selection should avoid Dafu Temple state-level key cultural relic unit and its core scenic area.

(2) Before construction, scheme should be delivered to cultural relic administration to consult and seek permission.

(3) During construction period, if cracking or inclining happened within Grand Buddha temple, construction should be suspended. The construction unit should report the situation to local cultural relic administration immediately. The construction could be resumed only when continuous construction is assured not to cause damage to the protected cultural relics in Grand Buddha temple.

(4) Construction equipment should be settled far off temple area when construction near Grand Buddha temple carried out. And works with strong vibration is advised to be avoid near the protection area

(5) If suspected relic were found during construction, construction should be suspended. The construction unit should report the situation to local cultural relic administration immediately. Construction could not be resumed until excavation is completed.

(6) Connect the embankments near Grand Buddha temple to form an integrity flood control system. Strengthen the monitoring of water level of Fujiang river.

5.3 Protection Measures for Darong Bridge

(1) Not to carry out construction on left bank. Construction near the ancient bridge will be operated out of the set protection area to avoid affecting the bridge.

(2) For less vibration impact, artificial excavation solution will be adopted. Excavation activities will be out of the conservation zone.

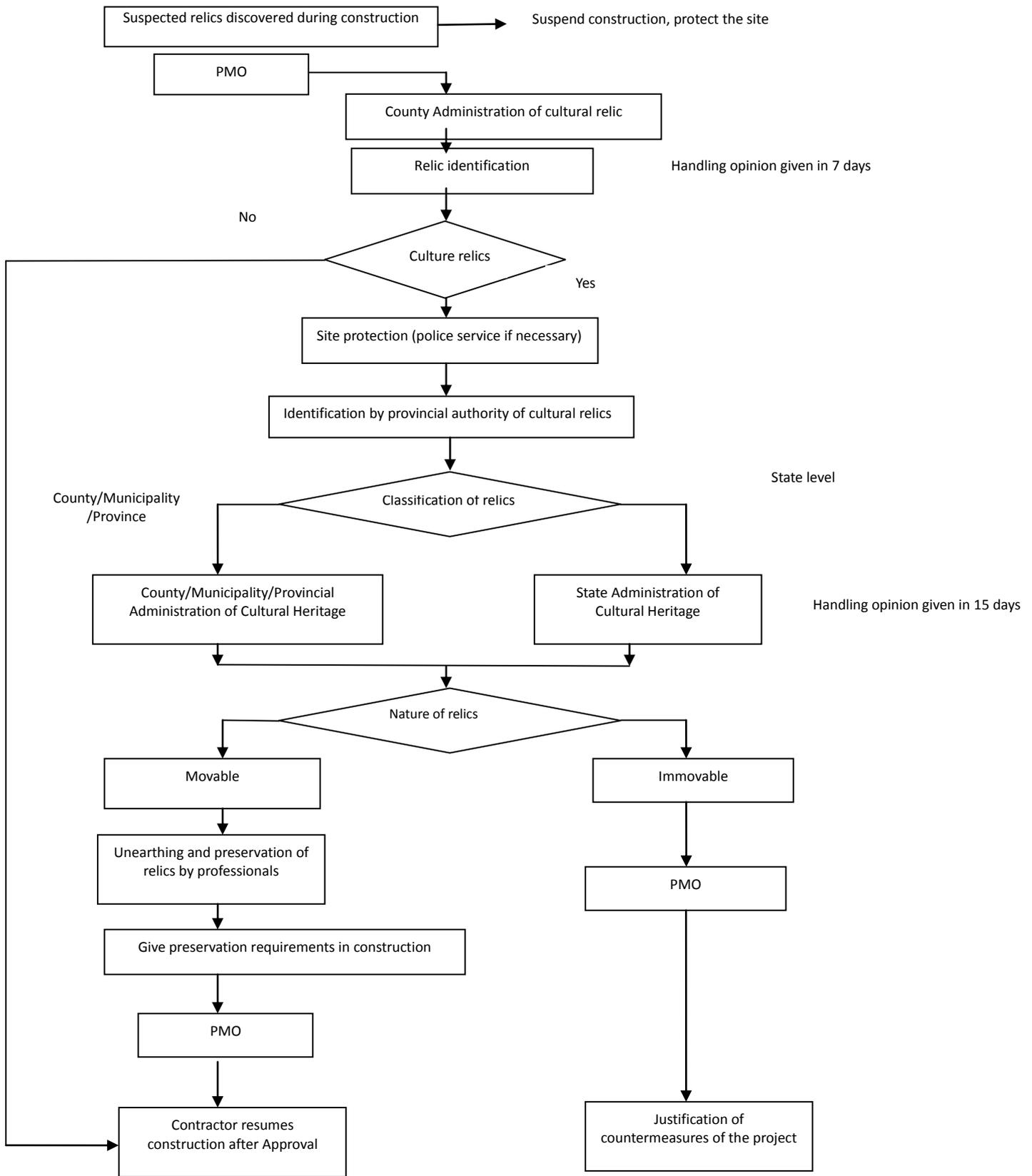


Figure 5-1. Handling Procedures for Relics Discovered in Construction

(3) Before construction, construction unit should hand over the construction plan to cultural relic protection administrations of Darong Bridge.

(4) Set a fixed monitor on right bank of Darong Bridge. If cracking or inclining were observed within the bridge, construction unit should suspended its work immediately, and inform cultural relic protection units. The construction could be resumed only when continuous construction is assured not to cause damage to the bridge.

(5) Connect the project with existing embankments, form an integrity flood control system, and strengthen the monitoring and forecast of water level of flood.

5.4 Protection Measures for Xujiaba Site

Set a protection area for the original site, the proprietor of the project should adjust the plan on land use appropriately to avoid occupying the protection area.

(1) Execute protection for the relic site in strict accordance with the set original site protection area. Before construction, the proprietor of the project together with cultural relic administration should determine the scope of original site protection area, and set up alarm marks.

(2) Proprietor should adjust the construction plan to avoid rolling, excavation, burial, material stacking works in the original site protection area, and not change the ground environment of the relic site.

(3) Because of municipal construction like underground pipeline construction, it is impossible to avoid conducting some excavation work within original site protection area. In this case, detailed plans and drawings of the excavation should be provided for administrative permission, followed by handing in of a separately compiled work plan. Then, construction could be conducted after archaeological excavation

(4) If relics were accidentally found during construction, the construction should be suspended immediately, and situation report to cultural relic administration should be delivered in time. Construction could not be resumed until relevant administrations authorized.

6 Training

(1) Participants

Environmental supervisors, delegates of project contractor

(2) Contents

① Laws, regulations and theory of relic protection

② Relevant technical specifications and basic skills

③ Physical cultural resources management plan

④ Environmental management stipulations of this project,

7 Monitoring Plan

Construction period: In accordance with the List of Identified Environmental Impact Factors, vibration of the machines during construction will impact on the relics to some extent. However, since there is not any large vibration source and the construction period is short, the impact shall be rather small. Therefore, monitor on vibration will not be done. During the construction period, a qualified supervising entity should be employed to provide a full-course supervision service.

Annex C: Regulations on Management of Pipe Stacking During the Construction Period

1. Pipe Stacking Area and Stacking Position

- (1) Prior to the construction, pipes shall be stacked in the warehouse where each project locates and quantity of pipes to be stacked shall be determined by the construction progress.
- (2) One temporary storage yard shall be considered at every 5 km along pipelines during their construction and occupied area is about 15m×15m. Layer of pipelines to be stacked shall be no more than 4 layers.

2. Requirements for Material Stacking at the Construction Site

2.1 General requirements

- (1) Stacking of construction materials shall be determined by consumption, use time, and supply and transportation. Materials with large consumption, long use time and convenient supply and transportation shall be approached by batches;
- (2) Safety requirements must be ensured for stacking of tools, structures and materials at the construction site;
- (3) Position shall be selected properly to facilitate transportation and handling, and reduce re-handling;
- (4) Terrain shall be high, solid and flat, backfill shall be compacted layer by layer, discharge measures shall be available and requirements for safety and fire prevention shall be met;
- (5) Stacking shall be made as per type and specification and obvious sign shall be provided, indicating name, specification and production place, etc;
- (6) Various materials and articles must be neatly stacked;
- (7) Material storage yard shall be far from surrounding residents and schools, and special person shall be designated for attending;
- (8) If materials are stacked around the residential area or the school, fence shall be constructed and special person shall be designated for attending.

2.2 Site Clearing

- (1) In the operation area, construction site shall be cleaned and residual material shall be disposed properly when construction work is completed, and the material can't be immediately removed shall be put neatly.
- (2) All construction wastes shall be taken away and original ecology shall be recovered when construction work is completed.

2.3 Material Stacking

- (1) Principles for stacking of pipes are to achieve stacking by type and specification under the conditions of stable stacking and ensuring safety. Materials of different types shall be stacked individually to avoid mixing and mutual corrosion;
- (2) It is forbidden to store articles that have corrosion to pipes around the pipe stack;
- (3) Materials of the same type shall be individually stacked according to their entering;
- (4) For exposed steel pipes and section steels, wood pad or boulder strip shall be inserted under the steel pipe and the stack shall have a slight inclination to facilitate discharge; moreover, straight placing of materials shall be kept to avoid deformation caused by bending;
- (5) Pipe stack height shall not exceed 1.2 m for manual operation and shall not exceed 1.5 m for mechanical operation, and stack width shall not exceed 2.5 m;
- (6) Certain channel shall be left between stacks. Check channel is normally 0.5 m, and access channel shall be subject to material size and transportation machinery and it is normally not less than 1.5 m;
- (7) Stack bottom elevation: if the warehouse has a sun exposure cement floor, 0.1 m can be elevated; if it has a mud floor, 0.2~0.5 m shall be elevated. If the warehouse is an open area, 0.3~0.5 m shall be elevated for the cement floor and 0.5~0.7 m shall be elevated for the mud floor.

Annex D: ECOP Checklist**1. Site Checklist Prior to Construction Commencement**

No.	Environmental problems	Results (marking "v")	Remarks
1	Whether the project touches security policies of the World Bank such as natural habitat, physical cultural resources and involuntary resettlement?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>	
2	Whether there are important vegetations or trees in project land occupancy scope?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>	
3	Whether project pipe network construction causes significant effects on travel of nearby residents?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>	
4	Whether there are publics (residents, schools, hospitals and office concentration area, etc) easily to be affected by the project?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>	
5	May cause living quality deterioration of nearby towns	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>	
6	Whether project construction requires interruption of municipal services (including water, electricity, telephone and bus route, etc)?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>	
7	Whether project construction requires Relocation?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>	
8	Whether rainy season may be affected by floods?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>	
9	Whether temporary land of the project occupies the land beyond the project area?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>	
10	Whether construction scope of the project involves municipal service pipelines such as water supply and power supply, etc	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>	
11	Whether there is surface water body within and nearby construction scope of the project?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>	
Others		Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>	

2. Environment Checklist for Construction Site

Environment Checklist of WB Financed Chongqing Small Towns Water Environment Management Project					
Component name		Site name			
Contract No. and name		Results (marking "V")		Remarks	
Check items		Yes	No	N/A	
I. General requirements	1.1 Whether effective measures for preventing air, water and soil, wastewater and noise pollution and improving environmental health are available in construction organization design of the project?				
	1.2 Whether construction site environmental protection, environmental health management and inspection systems are established?				
	1.3 Whether construction site environmental protection and environmental health management and inspection records are available?				
	1.4 Whether necessary protective equipments are provided for the worker and whether effective occupational disease prevention measures are taken?				
	1.5 Whether physical examination and training for personnel engaging in works with occupational hazards are periodically conducted (related physical examination evidence and training record shall be available)?				
	1.6 Whether dietetic hygiene and heatstroke prevention, cold resistance and warmth maintenance, and epidemic prevention works of the constructor are well done by combining seasonal characteristics?				
	1.7 Whether educational training and evaluation for constructors at the construction site include contents of environmental protection and environmental health related laws and regulations (related records and evidentiary materials shall be available)?				
	Others (please specify)				
II. Site layout and temporary facility construction	2.1 Whether construction area at the construction site has a clear division with office and living areas and whether corresponding isolation measures are taken?				
	2.2 Whether the construction area is clean and tidy?				
	2.3 Whether the construction site is marked with company name or has company sign and whether acceptable project information board is arranged?				
	2.4 Whether the public is notified in advance when construction interrupts travel of the residents?				
	2.5 Whether existing buildings and infrastructures are used as the temporary facility of the construction site?				
	2.6 Whether land occupation of temporary building newly constructed is reasonable and whether it meets safety and fire prevention requirements (related evidences shall be available)?				

Environment Checklist of WB Financed Chongqing Small Towns Water Environment Management Project					
Component name		Site name			
Contract No. and name		Results (marking "V")		Remarks	
Check items		Yes	No	N/A	
	2.7 Whether construction of temporary facilities uses clay brick?				
	2.8 Whether oils and articles stored in construction site are provided with dedicated warehouse and also warning sign?				
	2.9 Whether ground of the oil warehouse has a anti-seepage treatment and whether emergency accident treatment materials such as adsorption bag/sand/sawdust, etc are prepared in the warehouse?				
	2.10 Whether employee dormitory is built in the uncompleted building?				
	2.11 Whether temporarily constructed facilities are removed within one (1) month after completion of the construction project?				
	Others (please specify)				
III. Operating conditions and environmental safety	3.1 Whether the construction site is provided with closed color steel fence with height no less than 1.8 m?				
	3.2 Whether the construction site is provided with acceptable billboard to show information including environmental protection, civilized construction system and emergency disposal flow, etc?				
	3.3 Whether the project construction unit takes protection measures to ensure safety of underground pipelines adjacent to the construction project?				
	3.4 Whether schools and residential areas around the construction project are taken with safety protection measures and whether lighting indication device is provided at the night?				
	3.5 Whether dangerous sections of construction site are provided with obvious safety warning sign in conformity with national standards?				
	3.6 Whether fire-fighting equipments are properly maintained and whether the escape way is smooth?				
	Others (please specify)				
IV. Raised dust pollution control	4.1 Whether roads at construction site reasonably use existing or proposed roads at and around the site?				
	4.2 Whether hardening treatment will be made according to applications when constructing new construction roads and whether the road section generating dust is sprinkled for dust suppression?				
	4.3 Whether materials of the construction site are collectively stacked?				
	4.4 Whether site selection for stacking materials is reasonable?				
	4.5 Whether site material storage area is flat and solid?				

Environment Checklist of WB Financed Chongqing Small Twons Water Environment Management Project					
Component name		Site name			
Contract No. and name		Results (marking "V")			Remarks
Check items		Yes	No	N/A	
	4.6 Whether bulk materials easily flying and of fine particles at the construction site have a airtight storage and handling and whether handling operation is taken with sheltering measures?				
	4.7 Whether earth collectively stacked is taken with measures such as covering, solidifying or greening, etc?				
	4.8 Whether exposed areas in office area and living area at the construction site are sprinkled for dust suppression and whether they are greened and beautified by combining actual conditions?				
	4.9 Whether closed transport vehicles are used for transporting soils, mucks and construction wastes?				
	4.10 Whether facilities for vehicle cleaning is provided at entrance of the construction site and whether concrete, asphalt, straw mattress or rubble cushion courses are laid for the road between vehicle cleaning equipment and construction site outlet to avoid bring the mud out of the site?				
	4.11 Whether commercial concrete is used at the construction site?				
	4.12 Whether earth backfill, transport and construction possibly producing raised dust pollution are prohibited in case of the weather of stronger than moderate breeze?				
	Others (please specify)				
V. Harmful gas emission control	5. Whether various wastes are burned at the construction site?				
	5.2 Whether construction vehicles and machinery equipments, etc are kept in good operation status?				
	5.3 Whether construction materials select the acceptable materials tested by qualified testing organization (conformity certificate shall be available for the material)?				
	5.4 Whether asphalt, coal tar corrosion prevention and moisture proof treating agents are prohibited to be used for boards and other wood materials used by indoor decoration?				
	5.5 Whether kitchen in construction living area is installed with oily fume treatment facility?				
	Others (please specify)				
VI. Water pollution control	6.1 Whether wastewater of construction site is provided with sedimentation basin?				
	6.2 Whether wastewater is directly discharged into municipal wastewater pipe network or river?				
	6.3 Whether wastewater is reused or used for dust falling by sprinkling after being precipitated?				

Environment Checklist of WB Financed Chongqing Small Twons Water Environment Management Project					
Component name		Site name			
Contract No. and name		Results (marking "V")		Remarks	
Check items		Yes	No	N/A	
	6.4 Whether spoil disposal treatment is taken when sediment of sedimentation basin reaches 1/4 of its depth and whether the sediment is transported to the designated place?				
	6.5 Whether dining hall is provided with oil separator and whether a qualified transportation organization is entrusted for a time cleaning?				
	6.6 Whether a closed pail is provided outside the dining hall and whether it is timely cleaned?				
	6.7 Whether pit toilet at the construction site is cleaned by the nearby resident?				
	6.8 Discharge ditch shall be constructed at the construction site and whether wastewater is reused for dust suppression by sprinkling after being precipitated?				
	Others (please specify)				
VII. Noise pollution control	7.1 Whether requirements of construction time are strictly followed?				
	7.2 Whether surrounding residents are notified and whether related procedures are handled when constructing continuously at night?				
	7.3 Whether the construction site is taken with sound absorption and sound insulation measures such as sheltering, closing and greening, etc?				
	7.4 Whether equipments with low noise are used and whether equipment maintenance is well made?				
	7.5 Whether equipments producing noise are arranged at the side far from the residential area?				
	7.6 Whether equipments producing noise are taken with sealing and noise reduction measures?				
	7.7 Whether construction vehicles are taken with speed limit and no honking measures?				
	7.8 Whether equipments with large noise are arranged in closed equipment room?				
VIII. Waste control	8.1 Whether closed garbage station is arranged at the construction site, whether construction wastes and domestic wastes are stored by category and whether they are timely removed and handled according to provisions?				
	8.2 Whether transportation of construction wastes in building uses corresponding container, prohibiting throwing?				
	8.3 Whether wastes produced from cleaning of construction site are handled and recycled by category?				
	8.4 Whether construction waste transportation unit holds waste handling qualification proof and business certificate approved by related departments?				
	8.5 Whether all construction earths and stones are back filled?				

Environment Checklist of WB Financed Chongqing Small Towns Water Environment Management Project					
Component name		Site name			
Contract No. and name		Results (marking "V")			Remarks
Check items		Yes	No	N/A	
	8.6 Whether construction equipments have obvious greasy dirt scattering?				
	8.7 Closed garbage station is provided at the construction camp to collect domestic wastes of the staff and it is timely cleaned and handled according to provisions?				
	8.8 Pit toilet at the construction camp shall be timely cleaned and removed and the septic-tank shall be buried by covering soil after the construction completes.				
	8.9 Whether all solid waste produced during the construction are removed after the construction completes.				
	Others (please specify)				
IX. Soil erosion control	9.1 Whether discharge ditch is constructed to lead water flow formed in rainy season away, thereby avoiding washout of surface runoff to engineering?				
	9.2 Whether the temporary storage yard is fenced around, whether its surface is compacted by manual and whether sprinkling is made periodically for dust suppression?				
	9.3 Whether attention is paid to cleaning and storage of surface soil to ensure its utilization for vegetation recovery after the construction completes?				
	9.4 Whether there is arbitrary excavation or abandonment phenomenon during the construction?				
	Others (please specify)				
X. Protection of cultural relics	10.1 If cultural relics are discovered or suspected during the construction, it is necessary to stop construction immediately and keep the scene intact, and also report to the local administrative department for cultural relics at once; construction can be restored only after handling is made by the administrative department for cultural relics.				
	10.2 When constructing, whether the construction is strictly controlled within the red line?				
	Others (please specify)				
XI. Vegetation protection	11.1 Whether the behavior of arbitrarily cutting down trees outside the construction area exists?				
	11.2 Whether layout of the construction site is reasonable (judged from reducing damage degree of project implementation to vegetations)?				
	11.3 Whether effective measures are timely taken for damaged vegetations and exposed soil caused by construction to avoid soil erosion (measures of covering gravel or planting fast-growing grass, etc are taken)?				
	11.4 After the construction completes, whether the original vegetation area damaged is recovered or reasonably greened?				

Environment Checklist of WB Financed Chongqing Small Twons Water Environment Management Project					
Component name		Site name			
Contract No. and name		Results (marking "V")		Remarks	
Check items		Yes	No	N/A	
	11.5 Whether alien species are introduced at vegetation ecological restoration and greening?				
	Others (please specify)				
XII. Risk prevention	12.1 Whether accident prevention measures and emergency plan are formulated?				
	Others (please specify)				
XIII. Occupational health	13.1 Whether warning signs or warning marks are provided at operating post and equipment as well as location easily causing occupational hazards?				
	13.2 Whether the operator wears earplug for hearing protection when working in a high noise environment?				
	13.3 Whether the operator wears protective mask, goggles, gloves and personal protective articles when welding?				
	13.4 Whether the construction site is equipped with cooling articles and whether rest time is reasonably arranged when working in a high temperature environment?				
	Others (please specify)				
XIV. Health and epidemic prevention	14.1 Whether food, drinking water and rest area of employees at the construction meet hygienic standard (hygiene qualification shall be available)?				
	14.2 Whether dormitory, dining hall, bathroom and toilet are provided with ventilation and lighting facilities and whether they are maintained by the designated person?				
	14.3 Whether dormitory at the construction site meets requirements that open window shall be provided, bed in dormitory shall be no more than 2 layers and no wide bed is used?				
	14.4 Whether the dining hall has the effective hygienic license issued by related department and whether the cook has effective health certificate?				
	14.5 Whether setting of the dining hall meets requirements that it is far from pollution sources such as toilet, garbage station and poisonous and harmful place, etc?				
	14.6 Whether the dining hall is designed with independent production room and storeroom, and whether rat proof baffle no less than 0.2 m is provided below the door leaf?				
	14.7 Whether toilet, health facility, discharge ditch and dark and wet zone are periodically disinfected (related records shall be available)?				
	14.8 Whether the living area is provided with closed container, whether flies are destroyed periodically and whether the container is timely cleaned?				

Environment Checklist of WB Financed Chongqing Small Twons Water Environment Management Project					
Component name		Site name			
Contract No. and name		Results (marking "V")			Remarks
Check items		Yes	No	N/A	
	14.9 Whether time reporting to health and epidemic prevention department and construction competent department of the place when the constructor is suffered from communicable disease, food poisoning or acute occupational poisoning and whether handling is made according to related provisions of health and epidemic prevention department?				
	Others (please specify)				
XV. Traffic safety	15.1 Whether safety driving is emphasized to the driver and whether safety education training is periodically carried out?				
	15.2 Whether traveling time is restricted and whether drivers drive by turns; Whether driving at dangerous road and time is avoided?				
	15.3 Vehicles shall be periodically maintained. Whether components approved by the manufacturer shall be used? Parts shall be timely purchased for the maintenance of the vehicle.				
	15.4 Whether separation of pedestrian and vehicles is achieved?				
	15.5 Whether the local traffic management department is cooperated to ensure smooth and normal operation of the road?				
	15.6 Whether traffic safety and pedestrian safety educations are carried out at village, school and the location where crowds are gathered?				
	15.7 Whether local materials are purchased maximally?				
	15.8 Whether automobile driver takes up the post with certificate?				
Others (please specify)					
Construction stage at check: _____ Check date: _____ Check time: _____					
Weather condition:s _____					
Signature of site checker: _____ Signature of person in charge of environmental supervision: _____					

Environment Checklist of WB Financed Chongqing Small Twons Water Environment Management Project				
Component name			Site name	
Contract No. and name			Results (marking "V")	Remarks
Check items	Yes	No	N/A	
<p>Notes:</p> <p>(1) In the column of remarks, information such as problems observed, descriptions for nonconformities and suggestions for rectification and prevention activities can be filled in.</p> <p>(2) When measures are unacceptable or need to be improved at the site inspection, the environmental supervisor shall immediately issue the "Environmental Protection Rectification Notice" to the Contractor and mark the number of the Notice in the column of the remarks. Details of rectification activities of the Contractor shall be additionally recorded.</p> <p>(3) This table is Environment Checklist of WB Financed Shanxi Gas Utilization Project and it can be properly adjusted by combining local environmental conditions and constructions according to specific subprojects and specific environmental problems to take proper environmental protection measures.</p>				

3. Environmental Protection Rectification Notice

Environmental Protection Rectification Notice
No. _____
Contract No. and name _____
Subproject name: _____
Construction site name: _____
Current construction stage: _____
Problems existed in site inspection:
Inspector: _____ Date: _____
Contractor analyzes problem causes and formulates rectification scheme:
Person in charge of Contractor: _____ Date: _____
Opinions of the environmental supervisor:
Person in charge of environmental supervisor: _____ Date: _____
Opinions of the environmental protection competent department (as necessary):
Contact: _____ Date: _____

Environmental Protection Rectification Notice

Rectification deadline:

Please complete before _____ (month) ____ (date) ____ (year).

Person in charge of Contractor: _____ Date: _____

Person in charge of environmental supervisor: _____ Date: _____

Review opinions:

Contact: _____ Date: _____

Annex E: Code of Conduct

A major concern during a construction of a project is the potentially negative impacts of the workforce interactions with the local communities. For that reason, a Code of Conduct shall be established to outline the importance of appropriate behavior, drug and alcohol abuse, and compliance with relevant laws and regulations. Each employee shall be informed of The Code of Conduct and bound by it while in the employment of the Client or its Contractors. The Code of Conduct shall be available to local communities at the project information centers or other place easily accessible to the communities. The Code of Conduct shall address the following measures (but not limited to them):

- _ All workers and subcontractors shall abide by the laws and regulations of Vietnam.
- _ Illegal substances, weapons and firearms shall be prohibited.
- _ Pornographic material and gambling shall be prohibited.
- _ Fighting (physical or verbal) shall be prohibited.
- _ Workers shall not be allowed to hunt, fish or trade in wild animals.
- _ No consumption of bush meat shall be allowed in camp.
- _ No pets shall be allowed in camp.
- _ Creating nuisances and disturbances in or near communities shall be prohibited.
- _ Disrespecting local customs and traditions shall be prohibited.
- _ Smoking shall be prohibited in the workplace.
- _ Maintenance of appropriate standards of dress and personal hygiene shall be in effect.
- _ Maintenance of appropriate hygiene standards in accommodation quarters shall be set in place.
- _ Residing camp workforce visiting the local communities shall behave in a manner consistent with the Code of Conduct; and
- _ Failure to comply with the Code of Conduct, or the rules, regulations, and procedures implemented at the construction camp will result in disciplinary actions.