Environmental Monitoring Report

Project Number: 45507-003
June 2016

PRC: Yunnan Chuxiong Urban Environment Improvement Project – Environmental Monitoring Report (July 2015-June 2016)

Prepared by Yunnan New Century Environmental Science and Research Institute for Chuxiong Prefecture Project Management Office, Chuxiong Prefecture Government, and the Asian Development Bank.

Asian Development Bank

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Abbreviations

ADB	Asian Development Bank
CPEMS	Chuxiong Prefecture Environmental Monitoring Station
CPG	Chuxiong Prefecture Government
CPPMO	Chuxiong Prefecture Project Management Office
CPPLG	Chuxiong Prefecture Project Leading Group
CSC	Construction Supervision Company
EMP	Environmental Monitoring Plan
EMU	Environmental Management Unit
EMR	Environmental Monitoring Report
EIA	Environmental Impact Assessment
EMS	Environmental Monitoring Station
EPB	Environmental Protection Bureau
FSR	Feasibility Study Report
GRM	Grievance Redress Mechanism
IA	Implementation Agency
LIEC	Loan Implementation Environmental Consultant
LPMO	Local Project Management Office
PIU	Project Implementation Unit
PPTA	Project Preparatory Technical Assistance
PPCU	Project Public Complaints Unit
YPG	Yunnan Provincial Government

I. Introduction

A.Report Purpose and Rationale

1. In order to address the poor infrastructure conditions that constraining the economic development, business environment and regional economy integration in Chuxiong Prefecture, Chuxiong Prefecture Government of Yunnan Province proposed Yunnan Chuxiong Urban Environment Improvement Project, and the PPTA Final Report which provided comprehensive assessment of the project feasibility and project impacts was completed in August 2013. ADB approved a loan of USD 150 million on March 21st, 2014. The total cost of the project is estimated at USD 406 million, including domestic counterpart funding. The project is the first ADB financed project to support the development of small and medium cities in Yunnan Province.
2. Our company is engaged by CPPMO in May 2016 to conduct external monitoring on EMP implementation of the project. As the project procurement was not started until end of 2015 and only a few civil work contracts has started construction, the monitoring work was also postponed, i.e. baseline monitoring was conducted in December 2015, project impact monitoring durding construction was conducted in Februrary, March, May and June of 2016, thereby the external monitoring was postponed accordingly. Based on the actual project progress, this monitoring report covers the reporting period until June 30, 2016, the next monitoring will be conducted according to the original schedule.
3. During May 12th ~14th of May, the environmental monitoring team conducted fielding visit to Chuxiong City and Wuding County and monitoring on the components under construction according to the requirements of EMP, and collected relevant documents including EIAs, EMP, internal monitoring reports and environmental supervision report. This environmental monitoring report was prepared in accordance with EMP requirements on external monitoring and the TOR.

4. The purpose of the monitoring is to identify any environmental issues during implementation by reviewing all environmental reports and field survey, and provide corrective measures, and prepare a concise annual EMP verification report.
5. The main tasks of the 1st environmental monitoring include: (1) conducting independent verification of the project's environmental management performance, including identification of any environment-related implementation issues and environment management plan (EMP) compliance issues; (2) reviewing environmental impact monitoring results of the local environmental monitoring stations, and EMP monitoring and progress reports prepared by local PMOs and CPPMO, comparing predicted with actual environmental impacts, assessing the effectiveness of the mitigation measures, and suggesting enhancement measures, as required; (3)providing advice to CPPMO, local PMOs and PIUs on required corrective actions; and (4) submitting the 1st EMP implementation compliance verification report in Chinese and English.

B.Project Objectives and Components

6. Project components include the development of Integrated Municipal and Environmental Services in each of the three Project cities – Chuxiong, Wuding and Lufeng, as well as support for the strengthening of management capacity and financial sustainability.

Table 1.1 Project Information Sheet

No.	Subproject	Scope	PIU
	Chuxiong Road and Associated facilities	4 urban roads with a total length of 9033.48m, and associated facilities including water supply, sewage and storm water pipelines, intelligent traffic system and lighting.	Chuxiong Development & Investment Company
1	No. 17 Road	Urban trunk road, ROW 60m, road length 3014.299m	-
2	No. 11 Road	Urban trunk road, ROW 40m, road length 2958.165m, a bridge over Qing River (center stake No. K0+668.000)	-
3	No. 10 Road	Secondary road, ROW 36m, road length	-

No.	Subproject	Scope	PIU
		1448.957m, a bridge over Qinglong River (center stake No. K0+038.000)	
4	49 Road	Branch road, ROW 24m, road length 1612.055m	-
5	Urban environmental sanitation	8 garbage compressing vehicles, 10 garbage collection vehicles, 2,500 trash bins, 2,900 garbage containers, 1 construction waste recycling machine, 6 street sweeping vehicles, 2 high pressure street cleaning vehicles, 2 water spraying vehicles, 2 sewage collection vehicles, and 10 portable toilets	-
	Chuxiong Longchuan River Rehabilitation	9.377km river rehabilitation, and a flood early warning system	Chuxiong Development & Investment Company
	Lufeng Urban Infrastructure and Environment Improvement	6 urban roads with a total length of 7506.179m, and associated facilities including water supply, sewage and storm water pipelines, intelligent traffic system and lighting; and 6.082km river rehabilitation	Lufeng Urban Construction Investment and Development Company
1	No.1 Road	Urban trunk road, ROW 36m, road length 1548.987m	-
2	No. 2 Road	Secondary road, ROW 24m, road length 1392.907m	-
3	No. 3 Road,	Urban trunk road, ROW 32m, road length 1000.55m	-
4	Zhuluoji Avenue Extension	Urban trunk road, ROW 40m, road length 1000.933m	-
5	Shiji Avenue Extension	Urban trunk road, ROW 36m, road length 1000.933m	-
6	Jinshan South Road Extension	Urban trunk road, ROW 36m, road length 1561.869m	-
7	Urban sanitation	Old Town: 4 garbage compactor trucks, 10 garbage collection vehicles, 1 construction waste recycling machine, 12 street sweeping/dust collection vehicles, 1 high pressure street cleaning vehicles, 2 water spraying vehicle, and 2 sewage collection vehicles Project Area: 252 trash bins.	-
	Wuding Urban Infrastructure and Environment Improvement		Wuding Urban Construction Investment and Development Company

No.	Subproject	Scope	PIU
1	Beicheng Avenue	Urban trunk road, ROW 40m, road length 1558.524m	-
2	Chengbei Road	Urban trunk road, ROW 32m, road length 1267.955m	-
3	Mudan Road	Urban trunk road, ROW 30m, road length 1320.39m	-
4	Caiyuan Road	Secondary road, ROW 24m, road length 606.631m	-
5	Wuzheng Road	Branch road, ROW 20m, road length 924.142m	-
6	Wuxu Road	Branch road, ROW 20m, road length 849.658m	-
7	Wuchan Road	Branch road, ROW 20m, road length 1346.52m	-
8	Binhe Road	Branch road, ROW 20m, road length 1187.625m	-
9	Access Road	Branch road, ROW 15m, road length 343m	-
10	Urban sanitation and sustainable improvements	3 garbage compactor trucks, 4 mini garbage collection & transport vehicles, 1 street sweeping/dust collection vehicle, 1 movable toilet, and 198 garbage containers	-
	Capacity development and institutional strengthening	The project will (i) strengthen the capacity and institutions for the project's management; (ii) provide expert support and advice on storm water management, municipal solid waste planning and management, and the management of urban transport; and (iii) support public awareness activities on subjects including road safety and solid waste recycling, training, seminars, workshops, and study tours on operation and maintenance of project facilities, public financial management and environmental awareness raising activities.	-

C.Project Implementation Progress

7. The project implementation progress as of June 30, 2016, is summarized in the table below:

Table 1.2 Project Implementation Progress

No.	Component	Progress	EMP Implementation Phase
Chuxiong Road and Associated facilities			

No.	Component	Progress	EMP Implementation Phase
1	No. 17 Road	The tendering was started in June 2015 and completed in October 2015, the contract was awarded to China Railway ShangShai Engineering Construction Bureau Co., Ltd. The contractor was mobilized on November 30th, 2015, the construction of Section 1 is ongoing (total length is 1486.384m from starting point K1+440 to ending point K2+926.384). So far, the completed works include 69740.46m^3 of topsoil removal, 310889 m^3 of subgrade filling, 38000 m^3 of water pumping, 140000 m^3 of slurry drainage and 90000 m^3 of slurry excavation.	Construction Period
2	No. 11 Road	Not started	Pre-construction
3	No. 10 Road	Not started	Pre-construction
4	No.49 Road	Not started	Pre-construction
5	Urban Environmental sanitation	Not started	Pre-construction
	Chuxiong Longchuan River Rehabiliation	Preliminary design was approved on January 5th, 2016; Construction not started	Pre-construction
Lufeng Urban Infrastructure and Environment Improvement			
1	No.1 Road	Not started	Pre-construction
2	No. 2 Road	Not started	Pre-construction
3	No. 3 Road,	Not started	Pre-construction
4	Zhuluoji Avenue Extension	Not started	Pre-construction
5	Shiji Avenue Extension	Not started	Pre-construction
6	Jinshan South Road Extension	Not started	Pre-construction
7	Urban sanitation	Not started	Pre-construction
Wuding Urban Infrastructure and Environment Improvement			

No.	Component	Progress	EMP Implementation Phase
1	Beicheng Avenue	The bid was advertised on July 17th, 2015; and the contract was awarded to Beijing Urban Construction Road & Bridge Construction Group Co., Ltd. On December 8th, 2015. Construction was started on December 8th, 2015, for K0+620----K1+440, laying of sewage and storm water pipepines, backfilling, manhole main structure and cover plates fabrication were completed; and topsoil removal, earth excavation and roadbed soil replacement for this section were completed; pile foundation construction and test for Wulong River's centeral bridge were completed, and reinforced banding for abutment is ongoing. So far, 146 manholes of different specs were completed, 1709.16m of storm water and 1441.17m of sewage pipelines were laid.	Construction Period
2	Chengbei Road	Not started	Pre-construction
3	Mudan Road	Not started	Pre-construction
4	Caiyuan Road	Not started	Pre-construction
5	Wuzheng Road	The bid was advertised on June 9th, 2015; the contract was awarded to Yunnan Zhenghao Construction Engineering Co., Ltd. Who was mobilized on October 20th, 2015. The works completed so far includes installation of DN500 sewage pipeline\DN600 stormwater pipeline and pouring of drain wells and storm water wells (BK0+27.203~BK0+380,BK0+630~BK0+892.276); subgrade backfilling and roadbed gravel backfilling (BK0+27.203~BK0+380,BK0+630~BK0+892.276)	Construction Period
6	Wuxu Road	Not started	Pre-construction
7	Wuchan Road	Not started	Pre-construction
8	Binhe Road	Not started	Pre-construction
9	Access Road	Not started	Pre-construction
10	Urban sanitation and sustainable improvements	Not started	Pre-construction

II.INSTITUTIONAL SETUP AND RESPONSIBILITIES FOR EMP IMPLEMENTATION

A.Institutional Responsibilities for EMP Implementation

8. On June 1st, 2016, Chuxiong Prefecture Government established a Project Leading Group (PLG), after that, the PLG was adjusted and replenished on July 19th, 2011 and February 21st, 2012, respectively. The project involves Chuxiong City, Wuding County and Lufeng County which established local PLGs during during 2010~2011, and respective PMOs in early 2014.
9. In accordance with EMP requirements, the compliance status of EMP implementation responsibilities is summarized in the table below.

Table 2.1 Status of EMP Implementation Responsibilities

Name of Organizations	Roles Responsibilities	Compliance
CPPMO	Responsible for all day-to-day management for project preparation and implementation	Being complied with
	Designate one environment specialist as EMP coordinator	completed
	Communicate andcoordinate with ADB for project management and implementation	Being complied with
	Monitors and reports on project implementation progress and prepares compliance monitoring to ADB	Being complied with
	Submit bidding documents, bid evaluation reports and other necessary documents to ADB for approval where necessary	Being complied with
	Procure and engage project management consulting service, including loan implementation environmental consultant (LIEC) to assist in supervision, tracking and reporting on EMP implementation of all subprojects	completed
	Procurement of external environment monitor (EEM)	completed
	Compiling environmental monitoring reports prepared by the LPMOs for submission to ADB	1st semi-annual report completed, the 2nd is under preparation
LPMOs	Communicate and coordinate with CPPMO for project management and implementation	Being complied with

Name of Organizations	Roles Responsibilities	Compliance
	Establish environment management unit (EMU) within LPMOs	completed
	Work with PIUs, ensuring EMP requirements are fully incorporated into bidding documents	Being complied with
	Establishment of a Grievance Redress Mechanism (GRM) with a dedicated Project Complaints Coordinating Unit (PCCU)	completed
	Supervise and monitor EMP implementation and prepare semi-annual reports to CPPMO (with support of LIEC)	1st quarterly report was completed, the 2nd quarter report is under review
	Participation in capacity building and training programs	Being complied with
PIUs	Appoint one Environmental Specialist as EMP Coordinator	completed
	Issue tenders for contractors & equipment with assistance of tendering agency	Being complied with
	Administer and monitor performance of contractors and suppliers	Being complied with
	Carry out construction supervision and quality control	Being complied with
	Contracting with local environment monitoring stations (EMS) to conduct environment impact monitoring work	Being complied with
	Procure and manage contract with construction supervision Companies (CSC) required for subproject implementation in accordance with PRC and ADB procedures and regulations	Being complied with
	Participate in capacity building and training programs	Being complied with
	Facility commissioning	NA
Facility Operators	In conjunction with PIUs, conduct commissioning of the constructed facilities	NA
	O&M of completed facilities, including environmental management, monitoring and reporting responsibilities.	NA

B.Specific EMP Implementation Responsibilities

10. In accordance with EMP requirements, the status of specific EMP implementation responsibilities is summarized in the table below.

Table 2.2 Status of Specific EMP Implementation Responsibilities

Name of Organization	Responsibilities	Status
EMUs	coordinating the implementation of the EMP and developing implementation details	Being complied with
	supervising the implementation of mitigation measures during project construction and operation	Being complied with
	ensuring that environmental management, monitoring, and mitigation measures are incorporated into bidding documents, construction contracts and operation management plans	Being complied with
	ubmitting semi-annual EMP monitoring and progress reports to the CPPMO	1st quarter report completed, 2nd quarter report is under review
	coordinating the local grievance redress mechanism (GRM)	No complaints
	responding to any unforeseen adverse impact beyond those mentioned in the domestic EIAs, the project EIA and the EMP	Not complied, no emergency response plan
LIEC	Assist in updating the EMP and environmental monitoring program, as needed, following the detailed design of project components	Being complied with
	Guide the implementation of the mitigation measures specified in the EMP	Being complied with
	On behalf of the LPMOs and CPPMO, prepare the semi-annual EMP monitoring and progress reports in English	Being complied with
	Provide training to the CPPMO, LPMOs, PIUs, CSCs, in requirements of PRC's environmental laws, regulations and policies, ADB SPS 2009, EMP implementation, and GRM, etc. in accordance with the training plan	Being complied with
	Identify any environment-related implementation issues, and propose necessary corrective actions	Being complied with
	Undertake site visits as required.	Being complied with

Name of Organization	Responsibilities	Status
Construction Contractors	Responsible for implementing relevant mitigation measures provided in the EMP as part of the contract agreement for all construction activities under the supervision of the Construction Supervision Companies (CSCs) and PIUs.	Being complied with
	Responsible for conducting internal environmental monitoring	Being complied with
	Contract local environmental monitoring stations (EMS) or other suitably qualified agencies to provide monitoring services to assess potential environmental impacts that may result from construction activities.	Being complied with
Construction Supervision Companies	responsible for supervising construction progress and quality, and EMP implementation at construction sites	Being complied with
	Each construction supervision company in every construction site has at least one environmental engineer, supervise contractors environmental management plan implementation performance	Being complied with
	Each CSC shall have at least one environmental engineer at each construction site to: (i) supervise the contractor's EMP implementation performance; and (ii) prepare the contractor's environmental management performance section in monthly project progress reports for submission to the PIUs and LPMOs.	Being complied with
Environmental Monitoring Stations	The IAs will appoint the EMS of each project city/county to conduct periodic environmental impact monitoring during construction and operation in accordance with the environmental impact monitoring plan	Being complied with

11. LPMOs' EMUs haven't developed any emergency response plans. City/county EMUs should develop emergency response plans as early as possible, and conduct drill regularly.

C. EMP IMPLEMENTATION AGENCIES AND PERSONNEL

12. According the EMP requirements, the EMP implementation agencies and personnel have been arranged as follows:

Table 2.3 Project Implementation Agencies and Personnel

Name	IAs	Organization/Institute	Position	Contact No.
Lu Xiangliang	CPPMO		Director	

Name	IAs	Organization/Institute	Position	Contact No.
Gan Yong	CPPMO		Deputy Director	
Jin Zhengdong	CPPMO		Deputy Director	
Li Yongjun	CPPMO		Deputy Director	
Sun Zhu'an	CPPMO		EMP coordinator	18987820940
Lu Qian	Chuxiong City PMO		Director	
Li Guangli	Chuxiong City PMO		EMU leader	13187658005
Chen Lei	Chuxiong IA	Chuxiong Development and Investment Company	EMP coordinator	13312608823
Li Wenqiang	Chuxiong Construction Contractor	China Railway Shanghai Engineering Bureau Co., Ltd.	Internal monitoring staff	18687190451
Yuan Shuangfeng	Chuxiong Construction Contractor	China Railway Shanghai Engineering Bureau Co., Ltd	Internal monitoring staff	13677004462
Zeng Wei	Chuxiong Subproject Supervision Agency	Kunming Construction Consulting and Supervision Co., Ltd.	Environmental Supervision Engineer	13987810998
Tan Zhengxiang	Chuxiong Subproject Supervision Agency	Kunming Construction Consulting and Supervision Co., Ltd.	Environmental supervisor	15974821970
Sun Qian	Chuxiong Subproject Supervision Agency	Kunming Construction Consulting and Supervision Co., Ltd.	Environmental supervisor	13769282909
Li Chunping	Lufeng PMO		Director	
Liao Yuhong	Lufeng PMO		EMU leader	
Chen Junyu	Lufeng IA	Lufeng Urban Construction Investment Company	EMP coordinator	18008785393
Wang Jianrong	Lufeng Construction Contractor	Guangdong Dayu Water Conservancy Engineering Co., Ltd.	Internal Monitor	13638782012
Shi Yunchun	Lufeng Subproject Supervision Agency	Yunnan Urban Construction Consulting Co., Ltd.	Internal Monitor	15808877698
Bi Xuewu	Wuding PMO		Director	
Yang Qingyou	Wuding PMO	EMU	Leader	18987803677
Zhang Lei	Wuding IA	Wuding Urban Construction and Investment Company	EMP coordinator	15125781064
Yu Liang	Wuding Construction Contractor	Beijing Xinchang Road & Bridge Construction Co., Ltd.	Safety and Environmental Protection Staff	15032576693
Li Jian	Wuding Construction Contractor	Yunnan Zhenghao Construction Engineering Co., Ltd.	Safety and Environmental Protection Staff	14787780177

Name	IAs	Organization/Institute	Position	Contact No.
Cao Zhongqiang	Wuding Construction Contractor	Beijing Urban Construction Road & Bridge Group Co., Ltd.	Safety and Environmental Protection Staff	15288546627
Su Guigang	Wuding Subproject Supervision Agency	Kunming Construction Consulting and Supervision Company	Supervision Engineer	13698774593
Shi Guofei	EMS	Chuxiong Prefecture Environmental Monitoring Station	Project officer	13320567775
Liu Yunwei	EMS	Chuxiong Prefecture Environmental Monitoring Station	Technical director Senior Engineer	13708783205
Hardy Wong	Loan Implementation Environmental Specialist	CUCD	International Environmental Specialist Director	4164528310
Ma Xing	Loan Implementation Environmental Specialist	CUCD	National Environmetal Specialist Senior Engineer	13987651084
Dong Zhifen	External Evironmental Monitoring Agency	Yunnan New Century Environmental Science and Research Institute	Engineer	13987656328
Shang Shihai	External Evironmental Monitoring Agency	Yunnan New Century Environmental Science and Research Institute	Engineer	15887102012
Hong Chunhui	External Evironmental Monitoring Agency	Yunnan New Century Environmental Science and Research Institute	Engineer	15398371944

Note: the contract period for the loan implementation environmental specialist is from January 2015 to April 2019, for external environmental monitoring institute is from May 2016 to April 2019.

III.Compliance with Project Covenants Relating to Environmental Management

13. To date, all covenants in the Loan Agreement and Project Agreement have been executed as stipulated, while some are still to be enacted. A list of covenants and compliance status related to the environmental aspect is shown in the following table.

Table 3.1 Project Terms and environment-related compliance table

Item	Environment Related Specific Covenants	Status of Compliance
1	CPG shall ensure, and cause the Project Implementing Agencies to ensure, that the preparation, design, construction, implementation, operation and decommissioning of the Project and all Project facilities comply with: a) all applicable laws and regulations of the Borrower relating to environment, health and safety; b) the Environmental Safeguards; c) all measures and requirements set forth in the EIA, and the EMP, and any corrective or preventive actions (i) set forth in a Safeguards Monitoring Report, or (ii) subsequently agreed between ADB and CPG. CPG shall cause the Project Implementing Agencies to incorporate such respective mitigation and monitoring measures into the design and bidding documents and construction contracts.	Being complied with
2	CPG shall ensure, and cause the Project Implementing Agencies to ensure that: a) no artificial structures will be constructed to impound water restricting free flow of flood waters in the project rivers, and b) no river sediment dredging is carried out unless a sediment management plan is developed, defining a minimum sediment treatment, transport, disposal and reuse and shared with ADB, and disclosed to affected people by environmental safeguards. CPG shall cause the Project Implementing Agencies to ensure that spoil and dredged material generated in the course of implementation of the Project is tested and disposed of in accordance with national and local laws and regulations, and that such disposal creates no significant risk of secondary pollution.	Being complied with
3	CPG shall cause Chuxiong Prefecture Water Resource Bureau to review and adjust the operating procedures of the Qingshanzui Reservoir to	

	ensure that the Longchuan River receives a minimum flow at all times in accordance with the reservoir operating rule on minimum flow provision as defined in reservoir EIA approved by the Ministry of Environmental Protection in 2005	
4	CPG shall cause the Project Implementing Agencies to implement the necessary noise mitigation measures along the Project roads in accordance with the requirements specified in the EMP and applicable national environmental protection regulations.	Being complied with
5	CPG shall make available, and cause the Project Implementing Agencies to make available, necessary budgetary and human resources to fully implement the EMP, (the RPs and the REMDP).	Being complied with
6	CPG shall ensure, and cause the Project Implementing Agencies to ensure that all bidding documents and contracts for Works contain provisions that require contractors to: a) comply with the measures relevant to the contractor set forth in the EIA and the EMP (to the extent they concern impacts on the respective affected people under the Environmental Safeguards, and any corrective or preventative actions set forth in (i) a Safeguards Monitoring Report or (ii) subsequently agreed between ADB and CPG; b) monitor relevant environmental impacts caused by the construction and installation activities and report to the supervising project management office of the Project Implementing Agencies; c) make available a budget for all such environmental measures; d) provide the Project Implementing Agencies with a written notice of any unanticipated environmental risks or impacts that arise during construction, implementation or operation of the project that were not considered in the EIA and the EMP; e) adequately record the condition of roads, agricultural land, physical cultural resources and other infrastructure prior to starting to transport materials and construction; and f) reinstate pathways, other local infrastructure, and agricultural land to at least their pre-project condition as soon as possible and no later than the completion of construction.	Being complied with
7	CPG shall do, or cause the Project Implementing Agencies to do, the following: a) submit Safeguards Monitoring Reports to ADB in respect of implementation of and compliance with Environmental Safeguards and the EMP, annually during construction and the implementation of the Project and the EMP until the issuance of ADB's Project completion report unless a longer period is agreed in the EMP; and disclose relevant information from such reports to respective affected	Being complied with

	people under Environmental Safeguards promptly upon submission; b) If any unanticipated environmental risks and impacts arise during construction, implementation or operation of the Project that were not considered in the EIA and the EMP, promptly inform ADB of the occurrence of such risks or impacts, with detailed description of the event and proposed corrective action plan; c) No later than the date of award of Works Contract, i. Update the EMP, if necessary in order to fully take into account the final detailed design, and submit to ADB for its concurrence; ii. Engage a qualified and experienced external environmental expert, acceptable to ADB, to verify information produced through the environmental monitoring process, and to facilitate the carrying out of any verification activities; and iii. Contract licensed environmental monitoring agencies who conduct periodic environmental impact monitoring in accordance with the approved monitoring plan; d) Report any actual or potential breach of compliance with the measures and requirements set forth in the EMP promptly after becoming aware of the breach.	
8	Safeguard Grievance Redress Mechanism - CPG shall ensure that separate safeguards grievance redress mechanisms acceptable to ADB are established in accordance with the provisions of the EIA and EMP at its project management office, within the timeframes specified in the relevant EIA and EMP to consider safeguards complaints.	Being complied with
9	Applicability of ADB Safeguard Policies – CPG shall ensure that the provisions of the EIA and EMP as well as any requirements under the Safeguards Policy Statement also apply to the portion of the Project to be financed by the Project Implementing Agencies and commercial banks.	Being complied with
10	Public Awareness – CPG shall cause the Project Implementing Agencies to undertake public awareness campaigns on the Project and its benefits, including but not limited to information related to the EMP, to be conducted through information disclosure, education and consultation, in both local dialect and Madarin.	Being complied with

IV.Environmental Mitigation Measures Implemented during This Reporting Period

14. According to EMP requirements, potential environmental impacts, mitigation measures and its implementation status at design, pre-construction, construction and operation stages are summarized in Appendix B. All in all, environmental mitigation measures have been effectively taken.

V.Environmental Monitoring Summary

A.Monitoring Plan and Responsibilities

15. Environmental monitoring plans are shown in Table 5.1, 5.2 and 5.3. The plans include monitoring scope, media, indictors and frequency.

Table 5.1 Environmental Monitoring Plan – Existing Environmental Conditions

Subject	Parameter	Locations	Frequency
Surface Water	pH, DO,SS, NH_3-N, oil, COD_{Cr}, total coliforms, anionic surfactants, COD_{Mn}, BOD_5, TN, TP,	At each project bridge, 50m upstream, and 100m downstream, with GPS Coordinate identifier for sampling locations	Monitoring of Existing Environmental Conditions: Once per day for 3 consecutive days prior to commencement of site construction activities;
	pH, DO, SS, NH_3-N, oil, COD_{Cr}, total coliforms, anionic surfactants, COD_{Mn}, BOD_5, TN, TP, As, Cd	50m upstream, and 100m downstream of construction activities on project river.	
Air	TSP, SO_2, NO_x, PM_{10}	At all construction sites of Chuxiong Roads, Chuxiong River & Wuding & Lufeng (one point upwind, three points downwind)	Monitoring of Existing Environmental Conditions: Impact Monitoring: Four times per day for 3 consecutive days; Once prior to commencement of construction activities.
Noise	LAeq	At the boundary of all construction sites in 4 directions (north, south, east & west) of Chuxiong Roads, Chuxiong River & Wuding and Lufeng, and sensitive receivers nearby (see Chapter IV-sensitive receptors within project area of influence)	Impact Monitoring: Twice per day (once in day time and once at night time) for 2 consecutive days, Once prior to commencement of construction activities.

Table 5.2 Environmental Monitoring Program - Roads Components

Subject	Parameter	Location	Frequency

Construction			
Surface water	pH, DO, SS, NH_3-N, oil, total coliforms, anionic surfactants, TN, TP, BOD5, COD_{Mn}, COD_{Cr}	At each project bridge, 50m upstream, and 100m downstream, sampling points selected using GPS	Impact Monitoring: Once per day, for 3 consecutive days, 4 times per year during construction activities (quarterly)
Air	Inspection of dust mitigation measures (water spraying, cover transport vehicles, etc.); and maintenance of vehicles and construction equipment	Visual inspection at all construction sites.	Internal Monitoring: weekly
			External Monitoring: At least twice per year
	PM, SO_2, NO_x	At all construction sites (one point upwind, three points downwind)	Impact Monitoring: Four times (one hour each time) per day for 3 consecutive days, take hourly value; 4 times per year during construction activities.
	TSP, SO_2, NO_2, PM_{10}	sensitive receptors nearby (see Chapter IV-sensitive receivers within project area of influence)	For sensitive receptors, continuous monitoring of 24 hours for consecutive 3 days, 4 times per year during construction period (quarterly)
Noise	LAeq (social living environment)	Sensitive receptors nearby (see Chapter IV-sensitive receptors within project area of influence)	Impact Monitoring: Twice per day (once in day time and once at night time) for 2 consecutive days, 4 times per year during construction activities.
	LAeq (boundary of construction site)	Fours directions of the construction site	
Solid Waste	Garbage from work-camps and construction waste at construction sites	Visual inspection at all construction sites and work-camps	Internal Monitoring: weekly
			External Monitoring: Twice per year
Soil erosion,	Soil erosion intensity, re-vegetation	Visual inspection at borrow pit and spoil	Internal Monitoring: Random check after rainstorm (rainfall＞

Subject	Parameter	Location	Frequency
vegetation		sites	50mm)
			External Monitoring: twice per year, and once after completion of construction
	Slope stability, topsoil stockpile and rehabilitation of construction sites	Visual inspection of all subgrade slopes and retaining walls, bridges, culverts	Internal Monitoring: At least four times per year
			External Monitoring: Twice per year, and once after completion of construction
	Compensatory plantings and re-vegetation of borrow pits, spoil disposal sites and construction sites	Visual inspection at all disposal sites, borrow pits and temporary occupied lands	Internal Monitoring: At least four times per year
			External Monitoring: Twice per year, and once after completion of construction
Occupational health and safety	Work camp hygiene and safety, availability of clean water and emergency response plans	Inspection at all construction sites and work-camps	Internal Monitoring: Monthly
			External Monitoring: Twice per year

Table 5.3 Environmental Monitoring Plan - River Rehabilitation and Flood Prevention Impact Monitoring and Internal Monitoring

Subject	Parameter	Location	Frequency
Construction Phase			
Construction wastewater	pH, SS, oil	At discharge points of all construction sites	Impact Monitoring: One sampling each day each time, twice per year
Work-camp domestic wastewater	pH, SS, NH3-N, COD_{Cr}, oil, total coliform	At domestic wastewater discharge points of all work-camps	Impact Monitoring: One sampling each day each time, twice per year
Surface water	pH, DO, SS, NH3-N, COD_{Cr}, oil, anionic surfactants, TN, TP, BOD_5, COD_{Mn}, COD_{Cr}, As, Cd	50m upstream, and 100m downstream of construction activities on project river.	Internal Monitoring: one sampling each day, 3 consecutive days, 6 times per year.
			Impact Monitoring: once per day for two consecutive days, twice per year
Air	Inspection of dust mitigation	At all construction sites	Internal Monitoring: At least six times per year

Subject	Parameter	Location	Frequency
	measures (water spraying, cover transport vehicles, etc.); and maintenance for vehicles and construction equipment		External Monitoring: Twice per year
	TSP, PM_{10}, SO_2, NO_2	Sensitive receptors nearby the construction sites	Quality Monitoring: 24 hours continuous sampling for 3 consecutive days, take daily average value; twice per year during construction period
	PM, SO_2,NOx	Beyond construction site boundary (one point upwind, three points downwind);	Impact Monitoring: Four times per day (one hour sampling each time) for three consecutive days, take hourly value; twice per year during construction period
Noise	LAeq (social living environment)	Sensitive receptors (see Chapter IV)	Impact Monitoring: Twice per day (once in day time and once at night time) for 2 consecutive days, twice per year
	LAeq (boundary of construction site)	At boundary of all construction sites in Chuxiong, Wuding & Lufeng in all four directions (north, south, east & west).	
Soil erosion	Inspection of topsoil stockpile and construction site rehabilitation (e.g. compensatory plantings)	At all construction sites	Internal Monitoring: At least four times per year
			External Monitoring: Twice per year
Occupational health and safety	Inspection of hygiene status, availability of clean water and emergency response plans	At all construction sites and work-camps	Internal Monitoring: Monthly
			External Monitoring: Twice per year

16. All environmental monitoring of the project has been entrusted to Chuxiong Prefecture Environmental Monitoring Station which, under the assistance from LIEC, developed detailed monitoring plan in accordance with EMP monitoring requirements. So far, Chuxiong Prefecture Environmental Monitoring Station has completed the baseline surveys of Wuding Subproject, Chuxiong Road Component and Chuxing Longchuan River Component during November 10~12, 2015, December 2~4, 2015, February 17~22, 2016, respectively; and 1st and 2nd

quarter impact monitoring of Wuding Subproject from March 8~16th 2016 and May 24~June 6 of 2016, respectively; and impact monitoring of Chuxiong Road Component from February 23~26 and June 21~23 of 2016, respectively.

17. During this reporting period, Kunming Construction Consulting and Supervision Company (CSC) was engaged for internal environmental monitoring. The CSC conducted supervision on the performances of contractors for CCX4, CWD1 and CWD4-1. According to EMP monitoring requirements, the CSC will conduct weekly inspection on dust reduction measures (water spraying and covering of transport vehicles, etc.), maintenance for vehicles and construction equipment, waste management at work-camps and construction sites; monthly inspection on work camp sanitation and safety, clean water availability and emergency response plan; quarterly inspection on slope stablility, topsoil stacking and restoration of construction sites, compensatory planting and vegetation restoration for borrowing pits, spill disposal site and construction sites; random inspection on soil erosion after rain storm and vegetation restoration. Ever since the contractor has started in relevant project activities, CSC has conducted weekly and monthly inspections, with completed monthly reports submitted to County/city PMOs.

B.Environmental Quality Objectives, Sampling and Analytical Methods

18. Chuxiong Prefecture Environmental Monitoring Station is responsible for environmental sampling and monitoring of the Project, the sampling points are detailed in Table 5.4 and a layout map is provided in the Map attached.

Table 5.4 Sampling Points for Air, Noise and Water Quality Monitoring of Chuxiong Subproject

NO.	Type	Name	Longitude (°′″)	Latitude (°′″)	Note
1	Air	Chuxiong Special School	101°34′51″	24°59′09″	South
2		Garden Company	101°35′41″	24°59′02″	North
3		Plant Seedling Field	101°36′16″	25°00′11″	East
4		Xuyang Sanzu	101°34′54″	25°00′04″	West
5	Noise	Chuxiong Vocational District	101°34′24″	24°59′19″	sensitive receiver

NO.	Type	Name	Longitude (°′″)	Latitude (°′″)	Note
6		Yangji Village	101°34′57″	24°59′24″	sensitive receiver
7		Fuming Village	101°35′42″	24°59′10″	sensitive receiver
8		Longtanwa	101°36′12″	24°59′52″	sensitive receiver
9		Heningba	101°35′25″	25°00′00″	sensitive receiver
10		Xuyang Erzu	101°35′01″	25°00′12″	sensitive receiver
11		Xuyang Sanzu	101°34′57″	25°00′05″	sensitive receiver
12		Hehua Village	101°34′49″	25°00′10″	sensitive receiver
13	Water	50m upper-stream the intersection of Qinglong River and 11 Road	101°35′12 ″	24°59′23 ″	project bridge upper-stream 50m
14		down-stream the intersection of Qinglong River and 11 Road	101°35′09 ″	24°59′29 ″	project bridge down-stream 100m
15		50m upper-stream the intersection of Qinglong River and 10 Road	101°35′57 ″	24°59′26 ″	project bridge upper-stream 50m
16		100m down-stream the intersection of Qinglong River and 10 Road	101°35′52 ″	24°59′28 ″	project bridge down-stream 100m

19. Chuxiong Prefecture Environmental Monitoring Station is responsible for environmental sampling and monitoring of all environmental medias of Wuding Subproject, the sampling points are detailed in Table 5.4 and a layout map is provided in the Map attached.

Table 5.5 Sampling Points for Air, Noise and Water Quality Monitoring of Wuding Subproject

NO.	Type	Name	Longitude (°′″)	Latitude (°′″)	Note
1	Air	Office Building of Wuding Chinese People's Political	102°24′18″	25°32′32″	West

NO.	Type	Name	Longitude (°′″)	Latitude (°′″)	Note
		Consultative Conference			
2		Beijie Community	102°24′41″	25°32′11″	South
3		Jiucheng Community	102°24′4″	25°32′38″	East
4		Xihe Village Committee	102°24′29″	25°32′53″	North
5	Noise	Xiajiu Cheng	102°24′55″	25°32′34″	sensitive receiver
6		Baiyi Village	102°25′06″	25°32′43″	sensitive receiver
7		Yongji Village	102°24′08″	25°33′05″	sensitive receiver
8		Luowu home Hotel	102°25′30″	25°32′28″	sensitive receiver
9		Xihe Village Committee	102°24′30″	25°32′52″	sensitive receiver
10		Shangjiu Cheng	102°24′49″	25°32′21″	sensitive receiver
11		Yuanhe District	102°24′47″	25°32′15″	sensitive receiver
12		Wuding Chinese Medicine Hospital	102°24′38″	25°32′07″	sensitive receiver
13		Beiqu Yizu Replacement Housing	102°24′38″	25°32′12″	sensitive receiver
15	Water	50 米 50m upper-stream of River rehabilitation start point	102°24′2″	25°33′12″	River rehabilitation upper-stream 50m
16		100m down-stream of River rehabilitation end point	102°25′10″	25°32′38″	River rehabilitation down-stream 100m
17		50m upper-stream of project bridge (No1 medium bridge)	102°24′18″	25°32′56″	project bridge upper-stream 50m
18		100m down-stream of project bridge (No1 medium bridge)	102°24′19″	25°32′51″	project bridge down-stream 100m
19		50m upper-stream of project bridge (No2 medium bridge)	102°24′18″	25°32′44″	project bridge upper-stream 50m
20		100m down-stream of project bridge (No2 medium bridge)	102°24′20″	25°32′33″	project bridge down-stream 100m
21		50m upper-stream of project bridge (No3 medium bridge)	102°24′21″	25°32′29″	project bridge upper-stream 50m
22		100m down-stream of project bridge (No3 medium bridge)	102°24′20″	25°32′29″	project bridge down-stream 100m
23		50m upper-stream of	102°24′31″	25°32′18″	project bridge

NO.	Type	Name	Longitude (°′″)	Latitude (°′″)	Note
		project bridge (No4 medium bridge)			upper-stream 50m
24		100m down-stream of project bridge (No4 medium bridge)	102°24′32″	25°32′13″	project bridge down-stream 100m
25		50m upper-stream of project bridge (No5 medium bridge)	102°24′43″	25°32′15″	project bridge upper-stream 50m
26		100m down-stream of project bridge (No5 medium bridge)	102°24′48″	25°32′18″	project bridge down-stream 100m
27		50m upper-stream of project bridge (Caiyuanhe medium bridge)	102°24′56″	25°32′38″	project bridge upper-stream 50m
28		100m down-stream of project bridge (Caiyuanhe medium bridge)	102°24′59″	25°32′43″	project bridge down-stream 100m

20. Monitoring method adopts the standard methods for pollutants monitoring in the PRC. Standard limits refer to the national environmental quality standard and pollutant discharge standard.

Table 5.6 Monitoring Methods for Air, Noise and Water Monitoring

Media	Monitoring Parameter	Method (Standard No.)	Detection Limit	Standard Limit
Air	TSP,PM	Gravimetric (GB/T15432-1995)	0.001 mg/m^3	0.30 mg/m^3
	PM_{10}	Traffic Sampling Gravimetric method from Air and Exhaust Air Monitoring and Analysis Method (4th Edition) issued by Ministry of Environmental Protection in 2003	0.001 mg/m^3	0.15 mg/m^3
	SO_2	Formaldehyde absorbing-pararosaniline spectrophotometry (HJ 482-2009)	0.007-0.667 mg/m^3	0.15 mg/m^3
	NOx	N-(1-naphthyl)ethylene diamine dihydrochloride spectrophotometric method (HJ479-2009)	0.024-2.0 mg/m^3	0.08 mg/m^3

Noise	Equivalent Continuous A Sound (Leq)	Acoustimeter Method (GB12524-90)	(30-130)dB(A)	70dB (day); 55dB (night)
Surface water	pH	Glass electrode method (GB6920-86)	(0-14) pH	6-9
	COD_{Mn}	Permanganate index (GB11914-89)	(0.5-4.5) mg/L	10 mg/L
	Petroleum	Infrared spectra photograph (HJ 637-2012)	0.01 mg/L	0.5 mg/L
	SS	Gravimetric method (GB11901-89)	4 mg/L	-
	Fecal coliforms	Manifold zymotechnics and filter membrane (HJ/T 347-2007)	-	20000/L
	DO	Iodometry (GB7489-87)	(0.2-20) mg/L	3 mg/L
	COD_{cr}	Permanganate index (GB11914-89)	10 mg/L	30 mg/L
	NH_3-N	Nessler's reagent spectrophotometric method (HJ535-2009)	0.05 mg/L	1.5 mg/L
	anionic surfactants	Methylene blue spectrophotometric method(GB7494-87)	0.05 mg/L	0.3 mg/L
	BOD_5	Dilution and inoculation test (HJ505-2009)	(2-6000) mg/L	6 mg/L
	TN	Alkaline potassium persulfate digestion ultraviolet spectrophotometry (HJ 636-2012)	0.05 mg/L	1.5 mg/L
	TP	Ammonium molybdate spectrophotometric method(GB11893-89)	(0.01-0.06) mg/L	0.3 mg/L
	As	Diethyl dithio carbamic acid-Ag Spectrophotometry (GB7485-87)	(0.07-0.50) mg/L	0.1 mg/L
	Cd	Atomic absorption spectrophotography (GB7467-87)	(0.05-1) mg/L	0.005 mg/L

C.Monitoring Results

C1.Chuxiong Road Component

C.1.1.Air quality

21. December 2~4, 2015, Chuxiong Prefecture Enviromental Monitoring Station conducted air baseline monitoring on the construction site of Chuxiong Road

Component, the monitoring results at the 4 monitoring points are provided in Table 5.7.

Table 5.7 Air Monitoring Results of Chuxiong Project Site

(Pre-construction)

Site boundary	Mean Value	SO2 (Mg/Nm3)	NO2 (Mg/Nm3)	TSP (Mg/Nm3)	PM10 (Mg/Nm3)
Chuxiong Special Education School	Hourly	0.009 ~ 0.032	0.015L ~ 0.082	0.022 ~ 0.689	0.010L ~ 0.289
Garden Company	Hourly	0.014~ 0.045	0.015L ~ 0.071	0.067 ~ 0.545	0.022 ~ 0.227
Plant Seedling Field	Hourly	0.012~ 0.046	0.015L ~ 0.069	0.044 ~ 0.311	0.044 ~ 0.267
Xuyang Village Group No.3	Hourly	0.012 ~ 0.035	0.015L ~ 0.078	0.022 ~ 0.318	0.022 to 0.200
"Ambient Air Quality Standard" Class II standard value		0.50	0.20	-	-
Status of compliance		All complied with	All complied with	-	-

Monitoring conclusions are outlined below:

- The SO_2 and NO_2 concentrations at pre-construction stage in the four monitoring points during the four time bucket can all meet Class II standard of the Ambient Air Quality Standard (GB3095-2012), in other words, the ambient air quality around the construction site before construction can meet Class II standard of the Ambient Air Quality Standard (GB3095-2012).

22. Februrary 23~25, 2015, Chuxiong Prefecture Enviromental Monitoring Station conducted the 1st quarterly monitoring on ambient air impact during construction at Chuxiong City project site, considering air quality impact on the nearby environment from CCX4 construction, on monitoring pont (Heiniba, 300m northeast downwind of CCX4 construction site) was arranaged in addition to baseline monitoring points; the monitoring results are shown in Table 5.8 and 5.9.

Table 5.8 Exhaust Gas Fugitive Emission Monitoring at the Boundary of Chuxiong Subproject Construction Site

(2016 Q1)

Site boundary	Mean Value	SO2 (Mg/Nm3)	PM (Mg/Nm3)	NOx (Mg/Nm3)
Chuxiong Special	Hourly	0.007L ~ 0.025	0.087 to 0.200	0.015L ~ 0.056

Education School				
Garden Company	Hourly	0.007L ~ 0.027	0.109 ~ 0.239	0.015L ~ 0.050
Plant Seedling Field	Hourly	0.007L ~ 0.024	0.067 ~ 0.174	0.015L ~ 0.045
Xuyang Village Group No.3	Hourly	0.007L ~ 0.029	0.087 ~ 0.455	0.015L ~ 0.041
"Air Pollutant Emission Standards" fugitive emissions monitoring concentration limits		0.40	1.0	0.12
Status of Compliance		All complied	All complied	All complied

Table 5.9 Ambient Air Quality Monitoring at the Sensitive Receptors of Chuxiong Subproject (2016 Q1)

Sensitive receptor	Mean Value	SO2 (Mg/Nm3)	NO2 (Mg/Nm3)	TSP (Mg/Nm3)	PM10 (Mg/Nm3)
Heiniba	24 hours average	0.005~ 0.006	0.007~0.011	0.158~0.168	**0.143~0.155**
"Ambient Air Quality Standard" Class II standard value		0.15	0.08	0.30	0.15
Status of Compliance		Complied	Complied	Complied	Exceeded the standard

Monitoring conclusions are outlined below:

- The concentrations at the 4 monitoring points (Chuxiong Special Education School, Garden Company, Plant Seedling Field and Xuyang Village Group No.3) can meet the fugitive emission concentration limit requirements specified in Table 2 of the Integrated Emission Standard of Air Pollutants (GB16297-1996).
- The ambient air quality at the sensitive receptor (Heiniba) is subject to Class II standard of the Ambient Air Quality Standard (GB3095-2012), the monitoring results are: slightly exceeded Class II standard on February 23 and 25 of 2016; met Class II standard on February 24, the pollutant exceeded the standard is PM_{10}.

23. June 21~23, 2016, Chuxiong Prefecture Enviromental Monitoring Station conducted the 2nd quarterly ambient air quality impact monitoring during construction; compared to 1st quarterly monitoring, there is one additional monitoring point (Hehua Village-sensitive receptor, residential community

nearby at the north of the CCX4 construction site). The monitoring results are shown in Table 5.10 and 5.11.

Table 5.10 Exaust Gas Fugitive Emission Monitoring Results

(2016 Q2)

Site boundary	Mean Value	SO2 (Mg/Nm3)	PM (Mg/Nm3)	NOx (Mg/Nm3)
Chuxiong Special Education School	Hourly	0.009~0.014	0.010L ~ 0.095	0.011 ~ 0.042
Garden Company	Hourly	0.010 ~ 0.018	0.023 ~ 0.070	0.011 ~ 0.026
Plant Seedling Field	Hourly	0.009 ~ 0.014	0.023 ~ 0.093	0.017 ~ 0.034
Xuyang Village Group No.3	Hourly	0.009 ~ 0.017	0.023 ~ 0.114	0.011 ~ 0.026
"Air Pollutant Emission Standards" fugitive emissions monitoring concentration limits		0.40	1.0	0.12
Status of Compliance		All complied	All complied	All complied

Table 5.11 Ambient Air Quality Monitoring at the Sensitive Receptors of Chuxiong Subproject

(2016 Q2)

Sensitive receptor	Mean Value	SO2 (Mg/Nm^3)	NO2 (Mg/Nm^3)	TSP (Mg/Nm^3)	PM10 (Mg/Nm^3)
Hehua Village	24 hours average	0.006 ~ 0.011	0.004 ~0.008	0.023 ~ 0.088	0.012 ~ 0.032
Heniba	24 hours average	0.006 ~ 0.011	0.004 ~ 0.006	0.012 ~ 0.018	0.010L ~ 0.014
"Ambient Air Quality Standard" Class II standard value		0.15	0.08	0.30	0.15
Status of Compliance		Complied	Complied	Complied	Complied

Monitoring conclusions are outlined below:

- The concentrations at the 4 monitoring points (Chuxiong Special Education School, Garden Company, Plant Seedling Field and Xuyang Village Group No.3) can meet the fugitive emission concentration limit requirements specified in Table 2 of the Integrated Emission Standard of Air Pollutants (GB16297-1996).

- The ambient air quality at the sensitive receptors (Heiniba and Hehua Village) can meet Class II standard of the Ambient Air Quality Standard (GB3095-2012)

24. Summary

According to the monthly progress reports from February to June of 2016 submitted by CCX4 contractor, the construction activity conducted in February was sandpit backfilling, the construction was then stopped to wait for utility tunnel construction (another domestic funded project overlapping with this project). It can be concluded form the fact that the monitoring results of June are basically the reflection of baseline values of ambient air quality without any impact from the project construction, while February monitoring results show that the PM_{10} concentrations at the sensitive receptor (Heiniba, 300m) at the downwind of the construction site exceeded the standard. As there are no other construction sites apart from CCX4, it's likely that the impacts were from the construction of this project. Therefore dust reduction measures should be strengthened at the construction site.

C.1.2.Acoustic Environmental Quality

25. During December 2~4, 2015, Chuxiong Prefecture Enviromental Monitoring Station conducted baseline monitoring of noise at Chuxiong project site, including 8 sensitive receptors (i.e. Chuxiong Vocational Education Park, Yangji Village Group, Fumin Village, Longtanao, Heiniba, Xuyang Village Group 2 &3 and Hehua Village. The monitoring results are shown in table 5.12.

Table 5.12 Noise Monitoring at Sensitive Receptors of Chuxiong Subproject (Pre-construction)

Monitoring Points	Monitoring Results dB (A)	
	Daytime	Nighttime
Chuxiong Vocational Education Park	55.0 ~ 59.9	37.2 ~ 46.2
Yangji Village Group	41.3 ~ 45.1	33.9 ~ 35.8
Fumin Village	46.0 ~ 49.8	36.3 ~ 39.3
Longtanao	37.0 ~ 46.0	34.8 ~ 35.2
Heiniba	49.0 ~ 52.6	43.7 ~ 45.1
Xuyang Village Group 2	47.8 ~ 53.1	37.6 ~ 37.9

Monitoring Points	Monitoring Results dB (A)	
	Daytime	Nighttime
Xuyang Village Group 3	45.0 ~ 46.9	36.2 ~ 37.7
Hehua Village	45.1 ~ 48.1	38.0 ~ 39.3
"Acoustic Environment Quality Standard" Class II Area Standard Value	60	50
Status of Compliance	All complied	All complied

Monitoring conclusions are outlined below:

- Evaluated by Class II Area Standard of Acoustic Environment Quality Standard (GB3099-2008), the acoustic environment during daytime and nighttime at the 8 sensitive receptors before construction all met Class II standard.

26. February 23th to 25th of 2016, Chuxiong Prefecture Enviromental Monitoring Station conducted the 1st quarterly noise monitoring during construction at Chuxiong project site, including acoustic environmental monitoring at the sensitive receptors of CCX4 (Hehua Village and Xuyang Village Group 2), and noise monitoring at the site boundary (Chuxiong Special Education School, Garden Company, Plant Seedling Field and Xuyang Village Group 3). Monitoring results are shown in Table 5.13 and 5.14.

Table 5.13 Acoustic Environmental Monitoring at Boundary of Chuxiong Subproject Site

(2016 Q1)

Site boundary	Monitoring Results dB (A)		
	Daytime	Nighttime	Night Max
Chuxiong Special Education School	53.4~58.4	45.4~48.9	67.5~69.3
Garden Company	44.2~46.3	41.3~42.4	60.4~61.1
Plant Seedling Field	57.1~58.0	45.4~48.3	64.0~69.0
Xuyang Village Group 3	39.7~43.1	34.8~36.9	57.8~60.5
Noise Limit for Construction Site (GB12523-2011)	70	55	70
Status of Compliance	All complied	All complied	All complied

Table 5.14 Acoustic Environmental Monitoring at the Sensitive Receptors of Chuxiong Subproject Site

(2016 Q1)

Sensitive Receptors	Monitoring Results dB (A)	
	Daytime	Nighttime
Hehua Village	45.5~48.8	34.3~37.7
Xuyang Village Group 2	43.5~45.6	37.1~39.5
"Acoustic Environment Quality Standard" Class II Area Standard Value	60	50
Status of compliance	All complied	All complied

Monitoring results are summarized as follows:

- The acoustic environmental quality at the sensitive receptors of Hehua Village and Xuyang Village Group 2 during daytime and nighttime met Class II Area Standard of the Acoustic Environment Quality Standard (GB3096-2008).
- The noise levels at the 4 monitoring points close to site boundary were in line with the required emission limit of the Noise Limit for Construction Site (GB12523-2011).

27. June 21to 23, 2016, Chuxiong Prefecture Enviromental Monitoring Station conducted the 2nd quarterly noise monitoring during construction at Chuxiong project site, including acoustic environmental monitoring at the sensitive receptors of CCX4 (Hehua Village, Xuyang Village Group 2 and Group 3), and noise monitoring at the site boundary (Chuxiong Special Education School, Garden Company, Plant Seedling Field and Xuyang Village Group 3). Monitoring results are shown in Table 5.15 and 5.16.

Table 5.15 Acoustic Environmental Monitoring at Boundary of Chuxiong Subproject Site

(2016 Q2)

Site boundary	Monitoring Results dB (A)		
	Daytime	Nighttime	Night Max
Chuxiong Special Education School	52.0~55.0	46.0~47.0	60.0~61.0
Garden Company	49.0~54.0	46.0~47.0	**64.0~73.0**
Plant Seedling Field	47.0~56.0	38.0~42.0	52.0~56.0
Xuyang Village Group 3	47.0	39.0~45.0	60.0~62.0
Noise Limit for Construction	70	55	70

Site (GB12523-2011)			
Status of Compliance	All complied	All complied	All complied except for the Garden Company

Table 5.16 Acoustic Environmental Monitoring at the Sensitive Receptors of Chuxiong Subproject Site

(2016 Q2)

Sensitive Receptors	Monitoring Results dB (A)	
	Daytime	Nighttime
Hehua Village	49.0	44.0~45.0
Xuyang Village Group 2	46.0~47.0	41.0~42.0
Xuyang Village Group 3	44.0~46.0	42.0
"Acoustic Environment Quality Standard" Class II Area Standard Value	60	50
Status of compliance	All complied	All complied

Monitoring results are summarized as follows:

- The acoustic environmental quality at the sensitive receptors of Hehua Village and Xuyang Village Group 2 & 3 during daytime and nighttime met Class II Area Standard of the Acoustic Environment Quality Standard (GB3096-2008).
- The noise levels at the 4 monitoring points close to site boundary were in line with the required emission limit of the Noise Limit for Construction Site (GB12523-2011), the noise levels at the Garden Company slighted exceeded the limit.

28. Summary: As the Garden Company is relatively far from the site boundary, the night Max. exceeded the limit possible due to traffic noise from nearby. Acoording to the monitoring results, project construction had little impact on the acoustic environment nearby, which demonstrates effective noice reduction and prevention measures from the contrator.

C.1.3.Surface Water Quality

29. December 2 to 4, 2015, Chuxiong Prefecture Environmental Monitoring Station conducted baseline monitoring of the water environment of Chuxiong Subproject. Surface water quality monitoring was carried out at 50m upstream and 100m

downstream of the intersection between the two roads (No. 10 and No.11) and Qinglong River. The monitoring results are shown in Table 5.17.

Monitoring results are summarized as follows:

- The water quality before construction at the four monitoring points coundn't meet Class IV standard requirements of the Surface Water Environmental Quality Standard (GB3838-2002). At the crosssection of 50m upstream of No.11 Road's bridge over Qinglong River, the pollutants with exceeded concentrations are DO, NH3-N, BOD5, TN and Total coliform; pollutants with exceeded concentrations are all NH3-N, TN, TP and Total coliform for Crosssections of 100m downstream of No.11 Road's bridge over Qinglong River, 50m upstream of No.10 Road's bridge over Qinglong River and 100m downstream of No.10 Road's bridge over Qinglong River. It can be concluded that the Qinglong River is mainly under non-point source pollution.

As of now, no bridge construction was undertaken, therefore surface water environmental quality monitoring for construction period was not conducted.

Table 5.17 Surface Water Environmental Monitoring for Chuxiong Subproject

(Pre-construction)

Monitoring Points		pH (Dimensionless)	DO (Mg/L)	SS (Mg/L)	COD (Mg/L)	Oil (Mg/L)	Anionic Surfactant (Mg / L)	NH3-N (Mg / L)	CODMn (Mg/L)	BOD5 (Mg / L)	TN (Mg/L)	TP (Mg/L)	Total coliform (A/L)
50m upstream the intersection between No.11 Road and Qinglong River	Monitoring value	7.30 ~ 7.38	**1.1~2.1**	4~5	21	0.013 ~ 0.025	0.09 ~0.11	**3.14 ~ 3.91**	5.1 ~ 5.4	**7~8**	**4.75 ~ 5.67**	0.13 ~ 0.22	**≥24000**
	Status of compliance	Complied	**Exceeded**	-	Complied	Complied	Complied	**Exceeded**	Complied	**Exceeded**	**Exceeded**	Complied	**Exceeded**
100m downstream the intersection between No.11 Road and Qinglong River	Monitoring value	7.41 ~ 7.51	3.1 ~ 4.3	4~8	26 ~ 28	0.013 ~ 0.015	0.12 ~ 0.23	**2.83 ~ 6.02**	5.2 ~ 6.0	5-6	**5.26 ~ 7.37**	**0.23 ~ 0.40**	**≥24000**
	Status of compliance	Complied	Complied	-	Complied	Complied	Complied	**Exceeded**	Complied	Complied	**Exceeded**	**Exceeded**	**Exceeded**
50m upstream the intersection between No.10 Road and Qinglong River	Monitoring value	7.64 ~ 7.70	3.6~5.7	7~9	22 ~ 25	0.010L ~ 0.028	0.22 ~ 0.28	**6.23 ~ 8.13**	6.0 ~6.3	4~5	**8.49 ~ 8.96**	**0.54 ~ 0.58**	**≥24000**
	Status of compliance	Complied	Complied	-	Complied	Complied	Complied	**Exceeded**	Complied	Complied	**Exceeded**	**Exceeded**	**Exceeded**
100m downstream the intersection between No.10 Road and Qinglong River	Monitoring value	7.32 ~ 7.64	3.7 ~ 5.7	8~9	21~ 24	0.017 ~ 0.023	0.20 ~ 0.28	**6.79 ~ 8.47**	6.0 ~ 6.4	4-5	**8.64 ~ 9.13**	**0.56 ~ 0.62**	**≥24000**
	Status of compliance	Complied	Complied	-	Complied	Complied	Complied	**Exceeded**	Complied	Complied	**Exceeded**	**Exceeded**	**Exceeded**
Class IV standard of "Surface Water Environmental Quality Standard"		**6-9**	**≥3**	**-**	**≤30**	**≤0.5**	**≤0.3**	**≤1.5**	**≤10**	**≤6**	**≤1.5**	**≤0.3**	**≤20000**

C2.Wuding Subproject

C.2.1.Air Quality

30. November 10 to 12, 2015, Chuxiong Prefecture Environmental Monitoring Station conduted ambient air baseline monitoring for Wuding Subproject, including 4 monitoring points (i.e. County PCC office building, Beijie Community, Jiucheng Community and Xihe Village Committee) at the east, west, south and north of the construction site boundary. The monitoring results are shown in Table 5.18.

Table 5.18 Site Boundary Air Monitoring Results of Wuding Project Site (Pre-construction)

Site boundary	Mean Value	SO2 (Mg/Nm3)	NO2 (Mg/Nm3)	TSP (Mg/Nm3)	PM10 (Mg/Nm3)
County PCC office building	Hourly	0.008~0.017	0.008~0.035	0.091~0.822	0.045~0.545
Beijie Community	Hourly	0.008~0.016	0.005~0.030	0.044~0.182	0.022~0.159
Xihe Village Committee	Hourly	0.009~0.017	0.005~0.022	0.067~0.364	0.022~0.116
Jiucheng Community	Hourly	0.018~0.037	0.007~0.031	0.044~0.422	0.044~0.311
"Ambient Air Quality Standard" Class II standard value		0.50	0.20	-	-
Status of compliance		All complied with	All complied with	-	-

Monitoring results showed that:

- The ambient air quality nearby the construction site at pre-construction stage met Class II standard of the Ambient Air Quality Standard (GB3095-2012).

31. March 8 to 13, 2016, Chuxiong Prefecture Enviromental Monitoring Station conducted the 1st quarterly monitoring on ambient air impact during construction at Wuding project site, including fugitive emissions at the site boundary (County PCC office building, Beijie Community, Jiucheng Community and Xihe Village Committee) and ambient air quality monitoring at 8 sensitive receptors (Xihe Village, Shangjiucheng, Xiajiucheng, County Chinese Medicine Hospital, Siyuan

Experimental School, Ronghe Residential Community, Baiyi Village, Luowujiayuan Grand Hotel). The monitoring results are shown in Table 5.19 and 5.20.

Table 5.19 Exhaust Gas Fugitive Emission Monitoring at the Boundary of Wuding Subproject Construction Site

(2016 Q1)

Site boundary	Mean Value	SO2 (Mg/Nm3)	PM (Mg/Nm3)	NOx (Mg/Nm3)
Beijie Community	Hourly	0.010~0.019	0.028~0.524	0.015L~0.116
Jiucheng Community	Hourly	0.011~0.021	0.010L~0.522	0.015L~0.112
County PCC office building	Hourly	0.011~0.022	0.058~0.639	**0.016~0.220**
Xihe Village Committee	Hourly	0.011~0.028	0.010L~0.477	0.015L~0.092
"Air Pollutant Emission Standards" fugitive emissions monitoring concentration limits		0.40	1.0	0.12
Status of Compliance		All complied	All complied	All complied except for County PCC

Table 5.20 Ambient Air Quality Monitoring at the Sensitive Receptors of Wuding Subproject

(2016 Q1)

Sensitive	Mean Value	SO2 (Mg / Nm3)	NO2 (Mg / Nm3)	TSP (Mg / Nm3)	PM10 (Mg / Nm3)
Xihe Village	24 hours average	0.009~0.010	0.004~0.013	0.076~0.098	0.076~0.097
Shangjiucheng	24 hours average	0.009~0.016	0.018~0.037	0.155~0.194	0.065~0.083
Xiajiucheng	24 hours average	0.010~0.015	0.018~0.032	0.099~0.149	0.088~0.099
County Chinese Medicine Hospital	24 hours average	0.010~0.016	0.015~0.032	0.122~0.185	**0.109~0.174**
Siyuan Experimental School	24 hours average	0.010~0.017	0.008~0.012	0.074~0.139	0.068~0.123
Ronghe Residential	24 hours average	0.014~0.024	0.011~0.016	0.106~0.152	0.102~0.141

Sensitive	Mean Value	SO2 (Mg / Nm3)	NO2 (Mg / Nm3)	TSP (Mg / Nm3)	PM10 (Mg / Nm3)
Community					
Baiyi Village	24 hours average	0.014~0.020	0.023~0.029	0.131~0.192	**0.072~0.158**
Luowujiayuan Grand Hotel	24 hours average	0.013~0.017	0.029~0.032	0.180~0.213	0.067~0.078
"Ambient Air Quality Standard" Class II standard value		0.15	0.15	0.08	0.30
Status of Compliance		Complied	Complied	Complied	Complied except for County Chinese Medicine Hospital and Baiyi Village

Monitoring results showed that:

- The concentrations at the 4 monitoring points can meet the fugitive emission concentration limit requirements specified in Table 2 of the Integrated Emission Standard of Air Pollutants (GB16297-1996).
- The ambient air quality at the monitoring points of Xihe Village, Shangjiucheng, Xiajiucheng, Siyuan Experimental School, Ronghe Residential Community, Luowujiayuan Grand Hotel met Class II standard of the Ambient Air Quality Standard (GB3095-2012); while that slighted exceeded Class II standard at County Chinese Medicine Hospital and Baiyi Village, the exceeded pollutant is PM10.

32. June 21~23, 2016, Chuxiong Prefecture Enviromental Monitoring Station conducted the 2nd quarterly ambient air quality impact monitoring during construction; the monitoring results are shown in Table 5.21and 5.22.

Table 5.21 Exaust Gas Fugitive Emission Monitoring Results for Wuding Subproject

(2016 Q2)

Site boundary	Mean Value	SO2 (Mg / Nm3)	PM (Mg / Nm3)	NOx (Mg / Nm3)
Beijie Community	Hourly	0.008~0.018	0.010L~0.093	0.014~0.033
Jiucheng	Hourly	0.009~0.016	0.023~0.160	0.016~0.033

Site boundary	Mean Value	SO2 (Mg / Nm3)	PM (Mg / Nm3)	NOx (Mg / Nm3)
Community				
County PCC office building	Hourly	0.010~0.016	0.010L~0.214	0.016~0.078
Xihe Village Committee	Hourly	0.011~0.018	0.010L~0.091	0.015~0.036
"Air Pollutant Emission Standards" fugitive emissions monitoring concentration limits		0.40	1.0	0.12
Status of Compliance		All complied	All complied	All complied

Table 5.22 Ambient Air Quality Monitoring at the Sensitive Receptors of Wuding Subproject

(2016 Q2)

Sensitive Receptors	Mean Value	SO2 (Mg / Nm3)	NO2 (Mg / Nm3)	TSP (Mg / Nm3)	PM10 (Mg / Nm3)
Xihe Village	24 hours average	0.008~0.010	0.022~0.028	0.036~0.055	0.021~0.039
Xiajiucheng,	24 hours average	0.009~0.012	0.017~0.029	0.037~0.062	0.030~0.046
Luowujiayuan Grand Hotel	24 hours average	0.010~0.012	0.016~0.022	0.083~0.124	0.032~0.045
County Chinese Medicine Hospital	24 hours average	0.009~0.011	0.014~0.018	0.047~0.061	0.027~0.051
Siyuan Experimental School	24 hours average	0.008~0.017	0.017~0.021	0.058~0.077	0.033~0.055
Ronghe Residential Community	24 hours average	0.009~0.028	0.018~0.028	0.092~0.154	0.058~0.097
Baiyi Village	24 hours average	0.007~0.023	0.020~0.022	0.078~0.138	0.051~0.099
Shangjiucheng	24 hours average	0.008~0.013	0.016~0.018	0.079~0.126	0.047~0.069
"Ambient Air Quality Standard" Class II standard value		0.15	0.08	0.30	0.15
Status of Compliance		All complied	All complied	All complied	All complied

Monitoring results are summarized as follows:

- The concentrations at the 4 monitoring points can meet Class II standard of the Ambient Air Quality Standard (GB3095-2012).

- The concentrations at all of the 8 monitoring points (Xihe Village, Shangjiucheng, Xiajiucheng, County Chinese Medicine Hospital, Siyuan Experimental School, Ronghe Residential Community, Baiyi Village, Luowujiayuan Grand Hotel) met Class II standard of the Ambient Air Quality Standard (GB3095-2012).

33. Summary:

All concentrations at the monitoring points at pre-construction stage and during 2nd quarterly monitoring can meet relevant standards; 2016 Q1 monitoring results showed that fugitive emissions of NOx in front of the CPP office building exceeded the standard, and PM10 at the County Chinese Medicine Hospital and Baiyi Village exceeded the standard.

- The county PCC is adjacent to an urban trunk road, the exceeding NOx concentration was mostly possibly due to automobile exhaust. CWD4-1 and CWD1 are far (over 500m) from that point and at the downwind, the impact from the construction site was low.
- Baiyi Village is far (over 800m) from the above two construction sites, the exceeding PM_{10} concentration has little relation to the project construction.
- According to March and May monthly progress reports from CWD1 contractor, the main works undertaken in March include sewage and storm water pipeline installations between Wulong River and the meteorological station, and subgrade replacement filling between Wulong River and the Chinese Medicine Hospital; main works in May mainly include sewage and storm water pipeline installations and partial subgrade replacement filling at K0+620~K1+440 section. The County Chinese Medicine Hospital is located at the east of CWD1 site, less than 10m away; the PM_{10} concentration exceeded the standard in March, and met the standard in May. Considering the construction status of CWD1, part of the reason could be inadequate dust reduction measures during construction activities, therefore, the CWD1 contractor shall strengthen dust reduction measures during construction period.

C.2.2.C.1.2.Acoustic Environmental Quality

34. During November 10~11, 2015, Chuxiong Prefecture Enviromental Monitoring Station conducted baseline monitoring of noise at Wuding project site, including 9 sensitive receptors (Baiyi Village, Shangjiucheng, Xiajiucheng, Luowujiayuan Grand Hotel, County Chinese Medicine Hospital, Xihe Village, Beiji Group 1 Resettlement Housing, Yuanhe Residential Community and Yongji Village), the monitoring results are shown in Table 5.23.

Table 5.23 Noise Monitoring at Sensitive Receptors of Wuding Subproject (Pre-construction)

Monitoring sites	Monitoring Results dB (A)	
	Daytime	Nighttime
Xiajiucheng	51.5~54.0	42.5~43.7
Baiyi Village	47.7~53.0	46.7~48.6
Yongji Village	55.8~55.9	**46.6~51.9**
Luowujiayuan Grand Hotel	**60.8~61.5**	**54.7~58.2**
Xihe Village Committee	51.0~53.5	43.8~46.5
Shangjiucheng	52.1~52.1	43.3~43.6
Yuanhe Residential Community	44.2~46.3	43.1~43.2
Chinese Medicine Hospital	49.0~50.1	43.0~44.7
Beiji Group 1 Resettlement Housing	46.7~56.0	40.1~40.6
"Acoustic Environment Quality Standard" Class II Area Standard Value	60	**50**
Status of Compliance	All complied except for Luowujiayuan Grand Hotel with slighting exceeding noise level	All complied except for Luowujiayuan Grand Hotel and Yongji Village

Monitoring conclusions are outlined below:

- Evaluated by Class II Area Standard of Acoustic Environment Quality Standard (GB3099-2008), the acoustic environment during daytime and nighttime at the 7 sensitive receptors before construction all met Class II standard, noice levels at Luowujiayuan Grand Hotel during daytime and nighttime all exceeded the standard, that at Yongji Village met the standard during daytime but slightly exceeded the standard during nighttime.

35. March 8~10 of 2016, Chuxiong Prefecture Enviromental Monitoring Station conducted the 1st quarterly noise monitoring during construction at Wuding project site, which covered site boundary locations (County CPP, Beijing Community, Jiucheng Community and Xihe Village Committee) and 8 sensitive receptors (Xihe Village, Shangjiucheng, Xiajiucheng, Luowujiayuan Grand Hotel, County Chinese Medicine Hospital, Siyuan Experimental School, Ronghe Village and Baiyi Village), the monitoring results are shown in Table 5.24 and 5.25.

Table 5.24 Acoustic Environmental Monitoring at Boundary of Wudingg Subproject Site

(2016 Q1)

Site boundary	Monitoring Results dB (A)		
	Daytime	Nighttime	Night Max
Jiucheng Community	49.4~54.0	46.8~47.0	66.2~66.7
Beijie Community	47.4~50.2	38.4~39.3	67.6~69.6
County PCC	61.2~64.3	**57.7~59.9**	68.3~69.4
Xihe Village Committee	54.3~55.1	49.8~51.0	68.9~69.2
Noise Limit for Construction Site (GB12523-2011)	70	55	70
Status of Compliance	All complied	All complied except County PCC	All Complied

Table 5.25 Acoustic Environmental Monitoring at the Sensitive Receptors of Wuding Subproject Site

(2016 Q1)

Sensitive receptors	Monitoring Results dB (A)	
	Daytime	Nighttime
Xihe Village	45.3 ~ 46.7	**45.4 ~ 51.7**
Baiyi Village	49.3 ~ 52.8	45.1 ~ 49.7
Shangjiucheng	49.3 ~ 52.2	**42.8 ~ 53.6**
Xiajiucheng	46.1 ~ 46.4	40.0 ~ 43.8
Siyuan Experimental School	51.2 ~ 52.8	43.1 ~ 47.2
Ronghe Community	**66.4 ~ 66.6**	**57.7 ~ 60.7**
County Chinese Medicine Hospital	54.3 ~ 54.5	45.0 ~ 50.3
Luowujiayuan Grand Hotel	54.1 ~ 54.8	**54.5 ~ 59.7**

Sensitive receptors	Monitoring Results dB (A)	
	Daytime	Nighttime
"Acoustic Environment Quality Standard" Class II Area Standard Value	60	**50**
Status of compliance	All Complied except for Ronghe Community	All complied except for Xihe Village, Shangjiucheng, Ronghe Community and Luowujiayuan Grand Hotel

Monitoring results are summarized as follows:

- The acoustic environmental quality at 6 monitoring points (Xihe Village, Shangjiucheng, Xiajiucheng, County Chinese Medicine Hospital, Siyuan Experimental School and Baiyi Village) during daytime and nighttime met Class II Area Standard of the Acoustic Environment Quality Standard (GB3096-2008); noise levels at Ronghe Community during daytime and nighttime all exceeded the standard, noise level at the County Chinese Medicine Hospital met the standard during daytime but slightly exceeded the standard during nighttime.
- Among the site boundary monitoring points, the noise levels at Jiucheng Community, Beijing Community and Xihe Village Committee met the emission standard, while that at the County PCC during nighttime slightly exceeded the standard.

36. 2016 May 24 to 25, Chuxiong Prefecture Environmental Monitoring Station conducted the 2nd quarterly noise monitoring during construction period, the monitoring points are consistent with Q1 2016. The monitoring results are shown in Table 5.26 and 5.27.

Table 5.26 Acoustic Environmental Monitoring at Boundary of Wuding Subproject Site

(Q2 2016)

Site boundary	Monitoring Results dB (A)		
	Daytime	Nighttime	Night Max
Jiucheng Community	53.0~56.0	46.0~47.0	59.0~62.0
Beijie Community	44.0~48.0	42.0~45.0	57.0~59.0
County PCC	64.0~67.0	**62.0~62.0**	**77.0**

Site boundary	Monitoring Results dB (A)		
	Daytime	Nighttime	Night Max
Xihe Village	57.0~66.0	45.0~46.0	65.0~68.0
Noise Limit for Construction Site (GB12523-2011)	70	55	70
Status of compliance	All Complied	All complied except PCC	All complied except PCC

Table 5.27 Acoustic Environmental Monitoring at the Sensitive Receptors of Wuding Subproject Site

(Q2 2016)

Sensitive receptors	Monitoring Results dB (A)	
	Daytime	at night
Xihe Vilalge	43.0 ~ 47.0	43.0 to 45.0
Baiyi Village	49.0 ~ 49.0	47.0 ~ 49.0
Shangjiucheng	46.0 ~ 48.0	42.0 ~ 43.0
Xiajiucheng	45.0 ~ 46.0	44.0 ~ 48.0
Siyuan Experimental School	43.0 ~ 43.0	46.0 ~ 46.0
Ronghe Community	**62.0 ~ 63.0**	**56.0 ~ 61.0**
County Chinese Medicine Hospital	46.0 ~ 46.0	**48.0 ~ 51.0**
Luowujiayuan Grand Hotel	52.0 ~ 57.0	46.0 ~ 49.0
"Acoustic Environment Quality Standard" Class II Area Standard Value	60	50
Status of compliance	All complied except Ronghe Community	All complied except Ronghe Community and County Chinese Medicine Hospital

Monitoring results are summarized as follows:

- The noise levels at 6 monitoring points (Baiyi Village, Xiajiucheng, Siyuan Experimental School, County Chinese Medicine Hospital, Xihe Village and Shangjiucheng) during both daytime and nighttime met the Class II Area Standard of the Acoustic Environment Quality Standard; the noise levels at Ronghe Community during daytime and nighttime exceeded the standard; that at the County Chinese Medicine Hospital can meet the standard during the day but slightly exceeded during nighttime.

- At the site boundary, the noise emissions at Jiucheng Community, Beijie Community and Xihe Village Committee can meet the standard; however that at the County PCC during nighttime exceeded the standard.

37. Summary

According to the monitoring results, the noise levels before construction at Luowujiayuan Grand Hotel and Yongji Village exceeded the standard; according to 1st quarterly monitoring, the locations with exceeding noise levels include Xihe Village, Shangjiucheng, Ronghe Community, Luowujiayuan Grand Hotel and PCC (site boundary); according to 2nd quarterly monitoring, the locations with exceeding noise levels include Ronghe Community, County Chinese Medicine Hospital and County PCC.

- Before construction, acoustic environmental monitoring point was not set up at Ronghe Community, therefore the project impact on there could not be verified; while Shangjiucheng, Luowujiayuan Grand Hotel and County PCC are all far (over 300m) from CWD1 and CWD4-1, the project had little impact at those locations.
- Xihe Village-the sensitive receptor is close (170m) to CWD4-1, the County Chinese Medicine Hospital is only 10m away from CWD1, the noise levels both exceeded the standard during nighttime. As the EMP prohibits night construction, the exceeding noise levels were most likely due to traffic from roads nearby.

C.2.3.Surface Water Quality

38. During November 10th to 12th, 2015, Chuxiong Prefecture Environmental Monitoring Station conducted baseline monitoring of the water environment of Wuding Subproject. The monitoring covered 50m upstream and 100m downstream of the intersections between 5 roads (including Chengbei Road, Mudan Road, Wuxu Road, Beichang Avenue and Binhe Road) and Wulong River, and 50m upstream the starting point and 100m downstream the ending point of Wulong River Rehabilitation. The monitoring results are shown in Table 5.28.

The monitoring results indicate that the water quality at 14 monitoring points all exceed Class IV standard of the Surface Water Quality Standard (GB3838-2002). In which:

- At the crosssection 50m upstream Wulong River Rehabilitation, the pollutant with exceeding concentration was fecal coliform; at the crosssection 100m downstream Wudong River Rehabilitation, the pollutants with exceeding concentrations include NH3-N, TN and fecal coliform.
- At the crosssection 50m upstream No. 1 medium bridge, the the pollutant with exceeding concentration was fecal coliform; and at the crosssection 100m downstream No.1 medium bridge, the pollutants with exceeding concentrations include TN and fecal coliform.
- At the crosssection 50m upstream No. 2 medium bridge, the the pollutants with exceeding concentration were TN and fecal coliform; and at the crosssection 100m downstream No.2 medium bridge, the pollutants with exceeding concentrations include TN and fecal coliform.
- At the crosssection 50m upstream No. 3 medium bridge, the the pollutants with exceeding concentration were TN and fecal coliform; and at the crosssection 100m downstream No.3 medium bridge, the pollutants with exceeding concentrations include TN and fecal coliform.
- At the crosssection 50m upstream No. 4 medium bridge, the the pollutants with exceeding concentration were TN and fecal coliform; and at the crosssection 100m downstream No.4 medium bridge, the pollutants with exceeding concentrations include TN and fecal coliform.
- At the crosssection 50m upstream No. 5 medium bridge, the the pollutants with exceeding concentration were TN and fecal coliform; and at the crosssection 100m downstream No.5 medium bridge, the pollutants with exceeding concentrations include TN and fecal coliform.
- At the crosssection 50m upstream the medium bridge over Caiyuan River, the the pollutants with exceeding concentration were TN and fecal coliform; and

at the crosssection 100m downstream the medium bridge over Caiyuan River, the pollutants with exceeding concentrations include TN and fecal coliform.

It can be concluded that the surface water in the area has been extensively polluted by domestic wastewater and other non-point sources.

39. During March 8th to 10th, 2016, Chuxiong Prefecture Environmental Monitoring Station conducted the 1st quarterly surface water impact monitoring during construction at CWD1 construction site of Wuding, the monitored crosssections include 50m upstream and 100m downstream of Beicheng Road's (CWD1) No. 4 medium bridge over Wulong River, the monitoring results are shown in Table 5.29.

Monitoring results showed that:

- At 50m upstream the bridge, the water quality exceeded Class IV standard with exceeding pollutants of TN and fecal coliform; at 100m downstream the bridge, the water quality exceeded Class IV standard with exceeding pollutants of TN, NH3-N and fecal coliform.

40. May 24 to 26, 2016, Chuxiong Prefecture Environmental Monitoring Station conducted the 2nd quarterly surface water monitoring at CWD1 construction site, the monitoring points were same as the 1st quarter. The monitoring results are shown in Table 5.30.

Monitoring results showed that:

- At 50m upstream the bridge, the water quality exceeded Class IV standard with exceeding pollutants of TN and fecal coliform; at 100m downstream the bridge, the water quality exceeded Class IV standard with exceeding pollutants of TN, NH3-N and fecal coliform.

41. According to the monitoring results, the concentrations of TN, fecal coliform, NH3-N and BOD5 all exceeded the standards to different extents at pre-construction, 1st quarter and 2nd quarter. The reasons are analyzed as follows:

- Compared to the monitoring results at pre-construction and 1st quarter, water quality at 50m upstream and 100m downstream the No.4 medium bridge before bridge construction all exceeded Class IV standard with exceeding

pollutants being TN and fecal coliform; at the 1st quarter, the exceeding pollutants were the same at 50m upstream No.4 medium bridge of Wulong River, and concentrations had little change; and the monitoring results at 100m downstream also showed exceeding concentrations of NH3-N and fecal coliform, TN exceeded the standard with increased concentration compared to pre-construction and upstream concentrations, which indicates that bridge construction had certain impact on surface water quality. Therefore, construction wastewater collection and treatment should be strengthened to comply; proper measures should be taken in response to disturbance to construction site and avoid soil erosion.

- By comparison of the monitoring results at pre-construction, 1st quarter and 2nd quarter, the water quality at 2nd quarter was better than 1st quarter, still concentrations were higher than pre-construction; by comparing upstream and downstream concentrations, NH3-N and TN concentrations still shown big increase, indicating the impacts from construction wastewater and soil erosion, surface water pollutin prevention measures should be strengthened.
- In a word, treatment of domestic wastewater from construction site should be strengthened to make comply; and proper measures should be taken in response to disturbance to construction site and avoid soil erosion.

Table 5.28 Surface Water Monitoring Results of Wuding Subproject

(Pre-construction)

Detection point		pH (Dimensionless)	DO (Mg/L)	SS (Mg / L)	COD (Mg / L)	Oil (Mg/L)	LAS (Mg/L)	NH_3-N (Mg/L)	COD_{Mn} (Mg/L)	BOD_5 (Mg/L)	TN (Mg/L)	TP (Mg/L)	Fecal Coliform (A/L)	As (Mg/L)	Cd (Mg/L)
50m upstream of CWDR1	Monitoring value	7.94~7.98	7.7~8.1	8~10	6-8	0.012~0.020	0.05L	0.13~0.24	0.9~1.1	2L	1.22~ 1.42	0.06~0.07	**≥24000**	-	-
	Compliance	complied	complied	-	complied	complied	complied	complied	complied	complied	complied	complied	**Exceeded**	-	-
50m upstream of CDW3's No.1 Medium Bridge over Wulong River	Monitoring value	7.98~8.02	7.8~8.2	6~9	7~10	0.013~0.039	0.05L	0.21~ 0.28	1.2~ 1.4	2L~3	1.44~1.49	0.03~0.08	**≥24000**	-	-
	Compliance	complied	complied	-	complied	complied	complied	complied	complied	complied	complied	complied	**Exceeded**	-	-

Detection point		**pH (Dimensionless)**	**DO (Mg/L)**	**SS (Mg / L)**	**COD (Mg / L)**	**Oil (Mg/L)**	**LAS (Mg/L)**	**NH_3-N (Mg/L)**	**COD_{Mn} (Mg/L)**	**BOD_5 (Mg/L)**	**TN (Mg/L)**	**TP (Mg/L)**	**Fecal Coliform (A/L)**	**As (Mg/L)**	**Cd (Mg/L)**
100m downstream of CWD3's No.1 Medium Bridge over Wulong River	Monitoring value	8.00~8.12	7.9~8.2	6~9	5~7	0.027~0.044	0.05L	0.23~0.36	1.0~1.4	2L~3	**1.49~1.72**	0.05~0.11	**≥24000**	-	-
	Compliance	complied	complied	-	complied	complied	complied	complied	complied	complied	**Exceeded**	complied	**Exceeded**	-	-
50m upstream of CWD4-2's No.2 Medium Bridge over Wulong River	Monitoring value	8.03~8.06	7.8~8.2	7~10	4~7	0.011~0.020	0.05L	0.23~0.28	1.2~1.4	2L	**1.81~1.93**	0.05~0.08	**≥24000**	-	-
	Compliance	complied	complied	-	complied	complied	complied	complied	complied	complied	**Exceeded**	complied	**Exceeded**	-	-

Detection point		pH (Dimensionless)	DO (Mg/L)	SS (Mg / L)	COD (Mg / L)	Oil (Mg/L)	LAS (Mg/L)	NH_3-N (Mg/L)	COD_{Mn} (Mg/L)	BOD_5 (Mg/L)	TN (Mg/L)	TP (Mg/L)	Fecal Coliform (A/L)	As (Mg/L)	Cd (Mg/L)
100m downstream of CWD4-2's No.2 Medium Bridge over Wulong River	Monitoring value	8.02~8.05	7.7~8.0	8~11	9~10	0.018~0.024	0.05L~0.07	0.58~0.98	1.6~1.8	3	**2.04~2.25**	0.09~0.12	**≥24000**	-	-
	Compliance	complied	complied	-	complied	complied	complied	complied	complied	complied	**Exceeded**	complied	**Exceeded**	-	-
50m upstream of CWD2's No.3 Medium Bridge over Wulong River	Monitoring value	8.04~8.06	7.8~8.0	5~8	11~14	0.020~0.029	0.05L~0.07	0.60~0.70	1.4~1.9	2L~3	**1.87~2.36**	0.07~0.14	**≥24000**	-	-
	Compliance	complied	complied	-	complied	complied	complied	complied	complied	complied	**Exceeded**	complied	**Exceeded**	-	-

Detection point		**pH (Dimensionless)**	**DO (Mg/L)**	**SS (Mg / L)**	**COD (Mg / L)**	**Oil (Mg/L)**	**LAS (Mg/L)**	**NH_3-N (Mg/L)**	**COD_{Mn} (Mg/L)**	**BOD_5 (Mg/L)**	**TN (Mg/L)**	**TP (Mg/L)**	**Fecal Coliform (A/L)**	**As (Mg/L)**	**Cd (Mg/L)**
100m downstream of CWD2's No.3 Medium Bridge over Wulong River	Monitoring value	8.03~8.09	7.7~8.0	4~6	8~11	0.019~0.025	0.05L~0.10	0.62~0.64	1.4~1.7	2~3	**2.31~2.47**	0.06 ~0.12	**≥24000**	-	-
	Compliance	complied	complied	-	complied	complied	complied	complied	complied	complied	**Exceeded**	complied	**Exceeded**	-	-
50m upstream of CWD1's No.4 Medium Bridge over Wulong River	Monitoring value	8.00~8.06	7.5~7.9	7~9	4~9	0.014~0.026	0.05L~0.06	0.67~0.77	1.3~1.6	2L~2	**1.53~2.14**	0.08~0.12	**≥24000**	-	-
	Compliance	complied	complied	-	complied	complied	complied	complied	complied	complied	**Exceeded**	complied	**Exceeded**	-	-

Detection point		pH (Dimensionless)	DO (Mg/L)	SS (Mg / L)	COD (Mg / L)	Oil (Mg/L)	LAS (Mg/L)	NH_3-N (Mg/L)	COD_{Mn} (Mg/L)	BOD_5 (Mg/L)	TN (Mg/L)	TP (Mg/L)	Fecal Coliform (A/L)	As (Mg/L)	Cd (Mg/L)
100m downstream of CWD1's No.4 Medium Bridge over Wulong River	Monitoring value	8.01~8.06	7.4 ~7.7	5~6	9~12	0.024~0.042	0.05L~0.07	0.74~0.87	1.4~1.5	2L~2	**2.23~2.55**	0.07~0.09	**≥24000**	-	-
	Compliance	complied	complied	-	complied	complied	complied	complied	complied	complied	**Exceeded**	complied	**Exceeded**	-	-
50m upstream of CWD4-2's No.5 Medium Bridge over Wulong River	Monitoring value	8.02~8.08	7.4~7.9	6~8	5~7	0.020~0.031	0.05~0.08	0.78~0.86	1.4~1.4	2	**2.72~ 3.38**	0.07~0.14	**≥24000**	-	-
	Compliance	complied	complied	-	complied	complied	complied	complied	complied	complied	**Exceeded**	complied	**Exceeded**	-	-

Detection point		**pH (Dimensionless)**	**DO (Mg/L)**	**SS (Mg / L)**	**COD (Mg / L)**	**Oil (Mg/L)**	**LAS (Mg/L)**	**NH_3-N (Mg/L)**	**COD_{Mn} (Mg/L)**	**BOD_5 (Mg/L)**	**TN (Mg/L)**	**TP (Mg/L)**	**Fecal Coliform (A/L)**	**As (Mg/L)**	**Cd (Mg/L)**
100m downstream of CWD4-2's No.5 Medium Bridge over Wulong River	Monitoring value	7.98~8.01	6.9~7.0	10~14	8~13	0.040~0.044	0.12 ~0.18	**1.27~1.83**	1.8~2.0	3-4	**3.66~3.91**	0.15~0.35	**≥24000**	-	-
	Compliance	complied	complied	-	complied	complied	complied	**Exceeded**	complied	complied	**Exceeded**	complied	**Exceeded**	-	-
50m upstream of CWD4-2' Medium Bridge over Caiyuan River	Monitoring value	7.95 ~ 7.99	6.6 to 6.9	5-7	9 to 13	0.029 ~ 0.044	0.13 ~ 0.17	1.28 ~ 1.64	1.9 to 2.3	3	**3.40 ~ 4.00**	0.12 ~ 0.22	**≥24000**	-	-
	Compliance	complied	complied	-	complied	complied	complied	complied	complied	complied	**Exceeded**	complied	**Exceeded**	-	-

Detection point		pH (Dimensionless)	DO (Mg/L)	SS (Mg / L)	COD (Mg / L)	Oil (Mg/L)	LAS (Mg/L)	NH_3-N (Mg/L)	COD_{Mn} (Mg/L)	BOD_5 (Mg/L)	TN (Mg/L)	TP (Mg/L)	Fecal Coliform (A/L)	As (Mg/L)	Cd (Mg/L)
100m downstream of CWD4-2' Medium Bridge over Caiyuan River	Monitoring value	7.94 ~ 7.95	6.6 ~ 7.0	4-6	9-10	0.031 ~ 0.041	0.10 ~ 0.12	1.24 ~ 1.40	1.9 ~ 2.1	3	**3.27 ~ 4.45**	0.11 ~ 0.18	**≥24000**	-	-
	Compliance	complied	complied	-	complied	complied	complied	complied	complied	complied	**Exceeded**	complied	**Exceeded**	-	-
100m downstream of CWDR1	Monitoring value	7.91 ~ 7.96	6.4 ~ 6.7	11~ 13	9-12	0.035~0.044	0.13 ~ 0.25	**1.28 ~ 2.11**	2.0 ~ 2.7	3	**3.81 ~ 5.18**	0.14 ~ 0.30	**≥24000**	0.0007 ~ 0.0032	0.0001L
	Compliance	complied	complied	-	complied	complied	complied	**Exceeded**	complied	complied	**Exceeded**	complied	**Exceeded**	-	-
"Surface Water Environmental Quality", Class IV Standard		**6~9**	**≥3**	**-**	**≤30**	**≤0.5**	**≤0.3**	**≤1.5**	**≤10**	**≤6**	**≤1.5**	**≤0.3**	**≤20000**	**≤0.1**	**≤0.005**

Table 5.29 Surface Water Monitoring Results of Wuding Subproject

(Q1 2016)

Monitoring Point		pH (Dimensionless)	DO (Mg/L)	SS (Mg/L)	COD (Mg/L)	Oil (Mg/L)	LAS (Mg/L)	NH_3-N (Mg/L)	CODMn (Mg/L)	BOD_5 (Mg/L)	TN (Mg/L)	TP (Mg/L)	Fecal Coliform (A/L)
50m upstream CWD1's No.4 medium bridge over Wulong River	Monitoring value	7.84 ~ 7.98	4.0 ~ 7.1	4-6	12 ~ 15	0.010L ~ 0.020	0.07 ~ 0.13	0.97 ~ 1.32	2.5 ~ 3.3	2-5	**1.82 ~ 2.82**	0.06 ~ 0.27	**≥24000**
	Compliance	Complied	Complied	-	Complied	Complied	Complied	Complied	Complied	Complied	**Exceeded**	Complied	**Exceeded**
100m downstream CWD1's No.4 medium bridge over Wulong River	Monitoring value	7.94 ~ 7.97	5.4 ~6.8	35 ~135	18 ~20	0.010 ~0.030	0.17 ~ 0.27	**1.74 ~ 2.83**	3.3 ~3.4	**4-7**	**3.75 ~ 4.91**	0.20 ~ 0.45	**≥24000**
	Compliance	Complied	Complied	-	Complied	Complied	Complied	**Exceeded**	Complied	Complied	**Exceeded**	Complied	**Exceeded**
"Surface Water Environmental Quality", Class IV Standard		**6-9**	**≥3**	**-**	**≤30**	**≤0.5**	**≤0.3**	**≤1.5**	**≤10**	**≤6**	**≤1.5**	**≤0.3**	**≤20000**

Table 5.30 Surface Water Monitoring Results of Wuding Subproject

(Q2 2016)

Monitoring Point		pH (Dimensionless)	DO (Mg/L)	SS (Mg/L)	COD (Mg/L)	Oil (Mg/L)	LAS (Mg/L)	NH_3-N (Mg/L)	CODMn (Mg/L)	BOD_5 (Mg/L)	TN (Mg/L)	TP (Mg/L)	Fecal Coliform (A/L)
50m upstream CWD1's No.4 medium bridge over	Monitoring value	7.90 ~ 7.98	6.0~ 6.6	14 ~ 88	15~22	0.010L ~ 0.030	0.06 ~ 0.22	0.51 ~ 0.68	2.1 ~ 4.4	2	**2.36 ~ 2.56**	0.10~ 0.15	**≥24000**
	Compliance	Complied	Complied	-	Complied	Complied	Complied	Complied	Complied	Complied	**Exceeded**	Complied	**Exceeded**

Wulong River			e										
100m downstream CWD1's No.4 medium bridge over Wulong River	Monitoring value	7.90 ~ 7.94	5.6~ 6.4	17~ 94	18~26	0.010L ~ 0.040	0.12 ~ 0.26	**1.31 ~ 1.69**	2.3 ~ 4.4	3~4	**3.56 ~ 3.72**	0.15 ~ 0.29	**≥24000**
	Compliance	Complied	Complied	-	Complied	Complied	Complied	**Exceeded**	Complied	Complied	**Exceeded**	Complied	**Exceeded**
"Surface Water Environmental Quality", Class IV Standard		**6-9**	**≥3**	**-**	**≤30**	**≤0.5**	**≤0.3**	**≤1.5**	**≤10**	**≤6**	**≤1.5**	**≤0.3**	**≤20000**

C3.Conclusion

42. Chuxiong Road Component and Wuding Subproject started construction successively after November 2015. Chuxiong PrefectureEnvironmental Monitoring Station has conducted baseline monitoring of the two construction sites as well as two quarterly impact monitoring during construction in 2016.
43. Monitoring results at pre-construction show: the ambient air quality at the two construction sites met the Class II standard of the Ambient Air Quality Standrd (GB3095-2012); noise levels at construction sites basically met Class II standard. However, surface water quality at the monitoring points exceeded Class IV standard with major pollutants being NH_3-N, TN and fecal coliform.
44. According to the two quarterly monitoring results of 2016, the air quality at the sensitive receptors near the construction sites all exceeded the standards to different extents, therefore construction site management should be strengthened with dust reduction measures taken (such as covering temporary soil storage site and transportation vehicles and water spray) to reduce impacts on air quality; by comparing monitoring results at the upstream and downstream of CWD1's intersections with Wulong River during the same period, it can be concluded that project construction had certain impacts on Wulong River, therefore measures including intercepting and drainage channel, sedimentation basin and site greening should be takne to avoid soil erosion.
45. On the overall, the contractors have taken certain pollution prevention measures to mitigate construction impacts on air, noise and surface water. But environmental management on site should be further strengthened in strict accordance with EMP requirements to ensure implementation of environmental protection measures, and minimize project impacts on the nearby environment.

VI. Public Consultation and Grievance Redress

A.Public Consultation

46. According to the EMP requirements, status of the public consultation activities needed to be carried out under this project is summarized in Table 6.1.

Table 6.1 Status of Public Consultation

Project Phase	Agency	Approach	Time/Frequency	Implementation Status
Project Preparation	EIA institute	Questionnaire and interview	Field work during EIA phase	Implemented
	LIC, ADB	Site visit, public consultation	At each project city/county, 5 missions, 2 rounds of formal consultation during each mission	Implemented
	LIC, city/county PMOs	Grievance redress mechanism established in each county/city	-	Implemented
Construction	PIUs, city/county PMOs, LIC	questionnaires, public consultation by field work	At least once a year	Not yet, suggest to be implemented in Sept. 2016
		Expert Workshop	As needed	Not been
		Public workshops	At least once before mid-term review mission	To be implemented
Commissioning	PIUs, PMOs and Operators	Site survey	Multiple times depending on project completion environmental audit results	To be implemented
Operation	PIUs, PMOs and Operators	Public satisfaction survey	At least once after one year operation	To be implemented

47. Public consultation activities during project preparation have all been implemented. At least once a year questionnaire survey during construction period was not conducted yet, it is suggested this should carried out in November of 2016,

key participants should potential affected people along the ongoing or to be commenced construction site to facilitate effective implementation of the EMP; expert workshop and public workshop are to be conducted. Since the project has not entered commissioning or operation, required public consultation activities are not carried out yet.

B. Grievance Redress Mechanism

48. As part of the capacity building, CPPMO and local PMOs, under the assistance from LIC, have established GRM. The GRM provides specific methods and procedures to address complaints from individuals and affected groups or organizations in relation to construction impacts. The EMP alreay stipulated grievance redress procedures and format of record documents.

49. On March 24, 2016, Chuxiong City PMO established a pulic complaint unit (PCU) of the project with grievance redress mechanism established to handle complaints from the public in relation to project construction impacts. Mr. Chenlei is the team leader; Mr. Li Yongxiang and Ms. Li Guangli are team members. The contract information (Name, Address, Tel. and Email) of the PCU members are disclosed through bulleting boards and website (http://www.cxs.gov.cn/file_read.aspx?id=112029). Chuxiong City's Environmental grievance redress mechanism is shown in Figure 6.1, and bulleting board on GRM at Chuxiong's construction site is shown in Figure 6.2.

Figure 6.1 Chuxiogn GRM Disclosure on Website

Figure 6.2 Chuxiong No.17 Road (section one) Construction Site Bulleting Board of Environmental GRM

50. On April 20th, 2016, Wuding PMO established a pulic complaint unit (PCU) of the project with grievance redress mechanism established to handle complaints from the public in relation to project construction impacts. Mr. Tuo Guangyan is the team leader; Mr. Zhanglei, Mr. Cao Dengyu and Mr. Zhao Chunlin are team members. The contract information (Name, Address, Tel. and Email) of the PCU members are disclosed through bulleting boards and website (http://xxgk.yn.gov.cn/Z_M_004/Info_Detail.aspx?DocumentKeyID=2232F6E3C16441B89CC5FA94270FA25E). Wuding's Environmental grievance redress mechanism is shown in Figure 6.3, and bulleting board on GRM at Wuding's construction site is shown in Figure 6.4~6.5.

Figure 6.3 Wuding's Environmental GRM Disclosure on Website

Figure 6.4 Wuding Beichang Avenue Construction Site Environmental GRM Bulleting Board

Figure 6.5 Wuding Wuzheng Road Construction Site Environmental GRM Bulleting Board

51. Since environmental GRM establishment, no complaints have been received by Chuxiong and Wuding PCUs.

VII.Institutional Strengthening and Training

52. According to EMP requirements, the training programs to be conducted under the project are summarized in Table 7.1.

Table 7.1 Training Programme Implementation

Training program	Implementation	Training record (Y/N)
Procurement and contract management	implemented	Y
Storm water management pond O &M	implemented	Y
EMP implementation and other heath and safety requirements	implemented	Y
Urban and regional strategic planning	implemented	Y
Solid waste management	implemented	Y
Sustainable transportation planning	implemented	Y
Road safety	implemented	Y
Emergency preparedness and response planning	implemented	Y

53. The first EMP training workshop was held in Chuxiong city, on May 27th, 2015. The international and national environmental experts from the LIEC gave five lectures covering ADB Loan Project Environmental Management Manual, Safeguarding Policy, Environmental Impact Assessment, Environmental Management Plan (EMP), and Environmental Policy and law in China (see APPENDIX XI). Around 30 attendees participated in the training workshop, covering staff from CPPMO, LPMOs, PIUs, Water & Soil Conservation Bureaus, local EMS and one Wuding's CSC. Throughout one day's workshop, the participants got some ideas about the safeguard concepts, EIA, EMP, ADB Safeguard Policy 2009, and regulatory requirements for Environmental Management.

54. The second EMP in-depth 2-day training workshop was proposed by the international and national environmental experts when the first training workshop ended because the participants have not read the EMP document before they came to the training workshop, and no one had previous experiences in relating to environmental management. The 2-day in-depth training workshop was held on June, 15th -16th, 2015, after sites inspection and discussion with nominated

environmental staffs from CPPMO, LPMOs, and PIUs. The training topics included specific procedures in carrying out prescribed EMP activities and tasks, report preparation and reporting procedures (see APPENDIX X). The responsibility of contractor, CSCs and EMS in EMP was emphasized and explained step by step. Workshop also focused on sampling and laboratory analytical procedures, national standards, identified specific sampling locations for air, water and noise, as well as ensuring requirements for both EMP and EIA implementation are carried out concurrently. Throughout the in-depth training shop, EMP reports prepared for other similar ADB financed projects in China were used as samples to demonstrate the scope and structure of EMR reports. The workshop enhanced the capacity of EMP implementation at the different levels.

55. The 3rd EMP training workshop was held in Wuding County on November 11th, 2015, and in Chuxiong city on November 13th, 2015, corresponding to three construction activities commenced (CCX4 in Chuxiong city, CWD1&CWD4-1 in Wuding County). The aim of the site environmental management workshop is to give specific guidance on procedure in carrying out the EMP at the three construction sites. Staffs form LPMO, PIU, Two contractors and one CSC took part in the workshop in Wuding County, and staffs from LPMO, PIU, one contractor and one CSC attended the workshop in Chuxiong city. Key points on environmental management requirement in EIA and PA was highlighted and explained to all participants. The potential environmental impacts of the road construction and mitigated measures needed to implement was clearly clarified. Three responsibilities for road Contractors (Establish site environmental management plan, Implement mitigated measures, and summarize the progress of project monthly, and submit monthly progress report to PIU and LPMO.) were summarized and template of monthly progress report was prepared and handed over. Two responsibilities for CSCs (implement internal monitoring to supervise the mitigation measures undertaken by the contractors, and summarized and wrote monthly supervise report which will be embedded in the monthly progress report.) were outlined and template of monthly supervise report was prepared and

handed over (see APPENDIX X). The 3rd EMP training workshop with detailed materials has strengthened the environmental management capacity for the contractors, CSCs, and EMUs in CPPMO, LPMOs, and PIUs.

56. The 4th EMP training was conducted at CPPMO meeting room on May 19th, 2016, the training covered preparation of EMP monthly and quarterly reports, training participants included relevant personnel from LPMO, PIUs and CSCs. During the meeting, the issues in contractor's and supervision company's monthly reports and LPMOs' quarterly reports among other issues were discussed, technical guidance and reporting requirements were provided, the submission deadlines for 2016 montly reports and quarterly reports were further specified.

57. 4 EMP trainings have been conducted for the project; the details of the trainings are summarized in Table 7.2.

Table 7.2 Implementation of Trainings

No.	Date	Trainer	Content of Training	Participants
1	2015.5.27	LIEC	EMP, Safeguards Policy, EIA, and domestic environmental policies and laws	CPPMO,LPMOs,PIUs,Water Affairs Bureau,EMS, CSCs
2	2015.6.15~ 2015.6.16	LIEC	Procedures for EMP implementation, report preparation and reporting procedures	CPPMO,LPMOs,PIUs
3	2015.11.11~ 2015.11.13	LIEC	EMP implementation guidance to construction site	LPMO, PIUs, PIUs, CSCs
4	2016.5.19	LIEC	Preparation of EMP monthly reports and quarterly reports, and other issues	LPMO,PIUs,PIUs,CSCs

58. According to EMP implementation status, CPPMO, LPMOs, PIUs and CSCs have all assigned responsible environmental officers, and established feedback and adjustment mechanism, relevant systems and proceudres are specified in the EMP.

VIII.Key Environmental Issues and Next Step Action Plan

A.Key Environmental Issues Identified

59. The construction site of Chuxiong No.17 Road-Section 1 (CCX4) didn't have enclosure facility which could increase noise and duct impact on nearby sensitive receptors; see Appendix C-Site Photos C.18.
60. Wuding's CWD1 (Beicheng Avenue) construction site is close to the surrounding villages and the hospital, construction noise and duct could bring environmental impacts on the nearby residents, see Appendix C-Site Photos C.2.7~C2.8.

B. Action Plan of Environmental Monitoring and Assessment

61. Dust reduction measures need to be strengthened during construction through regular water spraying, regulated construction and transportation management to reduce air quality impact.
62. Corresponding noise pollution prevention measures have been taken during construction, this needs to be further strengthend, in particular, nighttime construction shall be prohibited, if unavoidable, one should inform the nearby residents in the form of announcement and obtain their consent.
63. The treatment of wastewater from bridge construction should be further enhanced to make comply with standard before discharge; ensure implementation of soil erosion prevention measures, control soil erosion.

IX.Conclusion

A. Overall Progress of Management Measures

64. According to the site survey and data collection, the management measures already carried out during the project implementation and the performance are summarized in Table 9.1.

Table 9.1 Project Management/Mitigation Measures Taken and Performance

No.	Item	Management/Mitigation Measures Taken	Performance
1	Soil Erosion	Proper drainage channels in place; Reduce slope coefficient during open cut excavation, accelerate construction pace; Vegetation protection for slopes; Stablizing slopes, embankment and other erosion-prone working areas	Reducd soil erosion
2	Solid Waste	Provided garbage cans properly at the living and construction areas, and arranged regular collection and disposal	Effective disposal of solid waste
3	Construction Site	Use enclosure and set up warning signs; Construction equipment and materials are kept in designated area with a keeper assigned.	Construction site safety ensured
4	Occupational Health and Safety	Provide toilet and other sanitation facilities, and regular cleaning and disinfection treatment for living areas; Ensure drinking water safety during construction; Provide personal protection equipment in accordance with relevant health and safety regulations for workers; Train all construction workers in basic sanitation, general health and safety matters	Workers' occupational health and safety ensured
5	Noise	Set up noise impact supervision and disclosure board, no nighttime construction; Regular maintainence for construction equipment and vehicles, ensure proper conditions; As close to school area, heavy equipment are only allowed during weekends and non-schooling sessions.	Reduced noise impacts on sensitive receptors

No.	Item	Management/Mitigation Measures Taken	Performance
6	Dust	Water spraying on construction site, increased frequency during sunny or windy days; Covering of material transportation vehicles, and use dedicated environmental trucks; CSC conducted visual inspection on dust during construction and prepare enviromental supervision monthly report.	Reduced dust pollution
7	Surface water	Slurry sedimentation tank during CWD1 bridge pile foundation construction; Septic tank in CWD4-1 temporary living area and provide regular clean-up; Unless permitted, surface water within site cannot be used for construction; Slurry and construction wastewater treated according to requirements, not allowed to discharge to surface water.	Reduced the impact on surface water

65. It can be concluded from the 1st environmental monitoring on the project, ongoing and to be constructed subprojects have implemented the environmental management measures and mitigation measures as required in the EMP and EIAs, potential negative environmental impacts during construction have been full attended to.

B. Issues and Recommended Measures

66. Based on framework provided in the updated EMP (09/01/2016), the table below summarized the verification of the project environmental management and effectiveness of the mitigation measures, identified issues during EMP impelementation and suggested enhancement and corrective measures.

Table 9.2 EMP Implementation Verification and Suggestions for Improvement

Item	Issues	Potential Impact	Suggestions for Improvement	Responsible Agency	
				Implementation unit	Oversight
EMP implementation responsibilities and institutional settings	Environmental monitoring reports by LPMOs were not submitted to ADB in a timely manner	ADB was not able to be timely informed of the project implementation progress and environmental impact status	Deliver as required by EMP	CPPMO	ADB
	Supervision and monitoring of EMP implementation, and quarterly reporting to CPPMO (with LIC support) were not conducted as required	CPPMO was not timly informed of the EMP implementation status	Deliver as required by EMP	LPMOs	CPPMO
	Not resonponding to the unforeseen adverse impact beyond those mentioned in the domestic EIAs, the Project EIA and the EMP.	No emergency reponse plan for unforeseeable impact	Develop corresponding emergency response plans for respective subprojects in regard to any unforeseeable adverse impact in accordance with EMP requirements	EMUs	CPPMO, LPMOs

Item	Issues	Potential Impact	Suggestions for Improvement	Responsible Agency	
				Implementation unit	Oversight
Environmental mitigation and compensation measures	CWD1, CWD4-1 has prepared the construction site environmental management plan, but did not meet the requirements of EMP, missing parts	Inadequate guidance for CWD1 and CWD4-1 site EMP, bringing risks of environmental impacts	Optimize CWD1 and CWD4-1 construction site EMP at the earliest	Construction contractors	LPMOs, PIUs, LIC, External Environmental Monitoring Institute
	Earthwork and spoil site management and restoration responsibilities were not performed for ongoing projects	Ongoing projects: earthwork still stacked on site due to untimely clean-up, part of those will be used for backfilling and greening	Dust pollution control responsibilities should be performed as required in the EIAs	Contractors, CSCs	LPMOs, PIUs, EPB, LIC, External Environmental Monitoring Institute
	Occupatinal health and safety protection responsibilities were not fully performed for ongoing contracts in Wuding	No record management system established, education on infectious diseases was not provided for workers	Occupatinal health and safety protection should be fully and adequately delivered as required by EMP	Contractors	CSCs, PMOs, Labor Bureau, EPB, LIC and External Environmental Monitoring Institute

Item	Issues	Potential Impact	Suggestions for Improvement	Responsible Agency	
				Implementation unit	Oversight
Environmental monitoring results analysis	Dust reduction measures were inadequate at some of the construction sites	According to 2016 Q1 monitoring results, PM10 concentrations at Heiniba (300m northeast of CCX4 construction site), Wuding County Chinese Medicine Hospital (CWD1) and County PCC (CWD1) exceeded the stanards	Duct pollution control should be strengthened at construction sites, and provide improvement suggestions based on actual performance	Construction contractors, PIUs, EMUs	LPMOs,CPPMO and External Environmental Monitoring Institute

Item	Issues	Potential Impact	Suggestions for Improvement	Responsible Agency	
				Implementation unit	Oversight
	Performance of mitigation measures taken by Wuding Subproject was not satisfactory Noise concentrations: Ronghe Community (day and night), County Chinese Medicine Hospital (night, slightly)	•Among site boundary monitoring points, the noise levels at Luowujiayuan Grand Hotel during both day and night exceeded the standard, that at Yongji Village and County PCC during nighttime exceeded the standard •2016Q1 environmental sensitive receptors : Ronghe Community day and night noise levels exceeded the standard, Xihe Village, Shangjiucheng and Luowujiayuan Grand Hotel exceeded the standard during nighttime •2016 Q1 sensitive receptors with exceeding Noise concentrations: Ronghe Community (day and night), County Chinese Medicine Hospital (night, slightly)	Should attach great importance to noise pollution control during construction activities, inspect control measures in accordance with EIAs and provide improvement measures and suggestions	Construction contractors, PIUs and EMUs	LPMOs, CPPMO and External Environmental Monitoring Institute

Item	Issues	Potential Impact	Suggestions for Improvement	Responsible Agency	
				Implementation unit	Oversight
	Strengthen water pollution prevention during construction	•Wuding subproject: exceeding concentrations occurred at 50m upstream Wulong River's No.4 medium bridge before and during construction, with minor deviation; exceeding concentrations occurred at 100m downstream Wulong River's No.4 medium bridge before and during construction, and increase concentrations during construction.	•Should attach great importance to water pollution prevention during construction, inspect control measures in accordance with EIAs and provide improvement measures and suggestions	Construction contractors, PIUs and EMUs	LPMOs, CPPMO and External Environmental Monitoring Institute

Item	Issues	Potential Impact	Suggestions for Improvement	Responsible Agency	
				Implementation unit	Oversight
Public consultation and grievance redress	Public consultation was not fully carried out as required by the EMP	Public participation during project preparation was conducted, but at least once a year questionnaire survey during construction period was not conducted yet.	Suggested this should be completed in Sept. 2016 for ongoing contracts	PIUs, LPMOs and LICs	LPMOs, CPPMO and External Environmental Monitoring Institute

Item	Issues	Potential Impact	Suggestions for Improvement	Responsible Agency	
				Implementation unit	Oversight
EMP update	Ambient air monitoring plan-site boundary monitoring points: TSP, SO2, NOX and PM10; sensitive receptor; monitoring frequency: 18 hours sampling, 3 consecutive days, four times a year.	Improper arrangement of monitoring points in their nature, thus cannot fully reflect impacts from construction activities on the nearby environment	Monitoring parameters for ambient air should be modified to "SO2, NO2, TSP and PM10"; monitoring frequency should be modified to " 24 hours concentrations, 20 hours sampling, 3 consecutive days, once per quarter, four time a year"; monitoring frequency for fugitive emissions should be modified to " hourly concentrations, four times monitoring per day, 1 hour sampling per each time, 3 consecutive days, once a quarter, four time per year".	Contractors, PIUs and EMUs	LPMOs, CPPMO and External Environmental Monitoring Institute

X.Appendix

A.Applicable Environmental Standards

A1.Air Quality Standards

The project is subject to the Class II standard in the Ambient Air Quality Standard (GB3095-2012), see details in Table A1.1.

Table A1.1 Ambient Air Quality Standards (Class II)

Pollution factor	Sampling	Standard value (mg/m^3)
SO_2	annual average	0.06
	daily average	0.15
	hourly	0.50
PM_{10}	annual average	0.07
	daily average	0.15
NO_2	annual average	0.04
	daily average	0.08
	hourly	0.20
TSP	annual average	0.20
	daily average	0.30

A2.Acoustic Environmental Quality Standards

The project is subject to the Acoustic Environmental Quality Standard (GB3096-2008), see details in Table A2.1.

Table A2.1 Acoustic Environmental Quality Standard [dB (A)]

Category	Applicable area	Standard value	
1	Rural areas on both sides of the upper section of Longchuan River	55	45
2	Schools, hospitals, (nursing homes, elderly care center) and 50m perimeter of ROW	60	50

A3.Construction Noise Emission Standards

The noise emission during construction shall comply with Noise Limits at Construction Site Boundary (GB12523-2011), see details in Table A3.1.

Table A3.1 Noise Limits at Construction Site Boundary [dB (A)]

Time	Daytime	Nighttime
Construction Period	≤70	≤55
Night Max. shall not exceed 15dB		

A4.Surface Water Quality Standards

Water quality shall comply with Class IV standard of the Surface Water Environmental Quality Standard (GB3838-2002), see details in Table A4.1.

Table A4.1 Surface Water Environmental Quality Standard (mg / L)

Class	**pH**	**DO**	**Permanganate index**	**BOD_5**	**COD_{Cr}**	**TP**
IV	6-9	≥3	≤10	≤6	≤30	≤0.3
Class	**TN**	**NH_3-N**	**Oil**	**As**	**Cd**	
IV	≤1.5	≤1.5	≤0.5	0.1	0.005	
Class	**LAS (Mg/L)**		**Fecal coliform (a/L)**			
IV	≤0.3		≤20000			

A5.Wastewater Discharge Standards

Upon endorsement by local EPB, the project is subject to the Class II standard of the Integrated Wastewater Discharge Standard (GB8978-1996), see details in Table A5.1.

Table A5.1 Integrated Wastewater Discharge Standard (mg/L, pH dimensionless)

Class	**pH**	**COD_{Cr}**	**BOD_5**	**SS**	**NH_3-N**	**Oil**
Class II	6-9	150	30	150	25	10

A6.Air Pollutant Emission Standards

The air pollutants emission during construction shall comply with the fugitive emission concentration limits in Table 2 of the Integrated Air Pollutant Emission Standard (GB16297-1996); asphalt fume emission shall comply with Class II standard of the Integrated Air Pollutant Emission Standard (GB16297-1996), see details in Table A6.1.

Table A6.1 Integrated Emission Standard of Air Pollutants (mg/Nm3)

Pollutants	Maximum allowable emission concentration	Fugitive emission concentration limits
SO_2	-	0.40
NO_x	-	0.12
PM	-	1.0

B.Environmental Impacts from Subprojects during Construction and Implementation of Mitigation Measures

Item	Potential Impacts/issues	Mitigation Measures	Responsibility		Implementation of Mitigation Measures			
			Implementation unit	Oversight Unit	Chuxiong Infra.	Chuxiong River	Lufeng Infra. And River	Wuding Infra. And River
A. Design & Preconstruction Phases								
Detail Design Stage	Establishment of env. units at different levels of supervision	• Establish an EMU in each of the LPMOs, including at least one environment specialist • Appoint environmental coordinators for EMP coordination within CPPMO and PIUs	LPMOs, CPPMO, PIUs	EA, ADB	Implemented	Implemented	Implemented	Implemented
	Updated EMP	• Update mitigation measures defined in this EMP based on final detailed design, as needed, submit to ADB for disclosure.	LPMOs, EMU, TA consultant	EEM, EPBs, ADB	Implemented	Implemented	Implemented	Implemented

Item	Potential Impacts/issues	Mitigation Measures	Responsibility		Implementation of Mitigation Measures			
			Implementation unit	Oversight Unit	Chuxiong Infra.	Chuxiong River	Lufeng Infra. And River	Wuding Infra. And River
		• In case of major change of project location (or additional physical component) that may cause substantial environmental impacts or involve additional affected people, IAs and PMOs should form an EIA team to conduct additional environmental assessment and also public consultation. The revised EIA reports should be submitted to relevant EPB and ADB for approval and disclosure. To determine whether the change is minor or						

Item	Potential Impacts/issues	Mitigation Measures	Responsibility		Implementation of Mitigation Measures			
			Implementation unit	Oversight Unit	Chuxiong Infra.	Chuxiong River	Lufeng Infra. And River	Wuding Infra. And River
		major, City PMOs should consult with ADB.						
	Confirmation of land acquisition & resettlement	• Update LARP after detail design	DIs	BCA BLM	Implemented	Unplanned	Implemented	Implemented
Construction preparation	Environmental monitoring stations	• Prior to construction, engage EMS • Prepare a detailed environmental monitoring plan in accordance to monitoring plan defined in this EMP.	PIUs, EMSs	LPMOs, CPPMO, ADB	Implemented	Implemented	Not started	Implemented
Detailed design stage	Project Implementation Consultant Services (PIC)	• Engage loan implementation environmental consultant (LIEC)	CPPMO, City/county PIUs	ADB	Implemented	Implemented	Implemented	Implemented

Item	Potential Impacts/issues	Mitigation Measures	Responsibility		Implementation of Mitigation Measures			
			Implementation unit	Oversight Unit	Chuxiong Infra.	Chuxiong River	Lufeng Infra. And River	Wuding Infra. And River
	External environment monitor (EEM)	• Engage external environment monitor (EEM) to verify the project environmental performance and compliance with the EMP	EA, CPPMO	ADB	Implemented	Implemented	Implemented	Implemented
	Bidding and Contract Documents	• Prepare environment section in the terms of reference for bidders; • Prepare environmental contract clauses for contractors, namely the special conditions (e.g., reference to EMP and monitoring table).	LDIs, LPMOs, PIUs	Start-up Project Management Support, CPPMO,	Implemented	Not started	Not started	Implemented

Item	Potential Impacts/issues	Mitigation Measures	Responsibility		Implementation of Mitigation Measures			
			Implementation unit	Oversight Unit	Chuxiong Infra.	Chuxiong River	Lufeng Infra. And River	Wuding Infra. And River
	EMP training	• PIC, LIEC or invited environment specialists and/or officials from the provincial EPB and the Prefecture EPB provide training on construction environmental management and implementation and supervision of environmental mitigation measures to contractors and CSCs in accordance with training plan defined in this EMP.	PIC & LIEC	CPPMO, LPMOs, ADB	Implemented	Implemented	Implemented	Implemented
	Establish operational GRM	• Establish a Project Public Complaints Unit (PPCU) in each LPMO; provide training for PPCU members and GRM	LPMOs, PIUs	CPPMO, LIEC, ADB	Implemented	Implemented	Implemented	Implemented

Item	Potential Impacts/issues	Mitigation Measures	Responsibility		Implementation of Mitigation Measures			
			Implementation unit	Oversight Unit	Chuxiong Infra.	Chuxiong River	Lufeng Infra. And River	Wuding Infra. And River
		access points; • Disclose the PPCU's phone number, fax, address, and email to the public on City EPB's website and on information boards at each construction site.						
	Site Environmental Health Officer	• Assign a site environmental health offier for each contractor before contract award and construction commencement	LPMOs PIUs and Constractors	Local EPAs	Implemented	Not started, so did not carry out	Not started, so did not carry out	Implemented
	Land acquisition and resettlement	• Establish a resettlement office comprising local • government officials to manage the land acquisition and resettlement	PIUs, City/county LAROs[8],	EA, City/county LBs, BCAs	Office established	Office established	Office established	Office established

Item	Potential Impacts/issues	Mitigation Measures	Responsibility		Implementation of Mitigation Measures			
			Implementation unit	Oversight Unit	Chuxiong Infra.	Chuxiong River	Lufeng Infra. And River	Wuding Infra. And River
		process; • Conduct information dissemination and community consultation programs in accordance with the PRC Land Administration Law (1999) and ADB SPS (2009); • Ensure that all resettlement activities are reasonably completed before construction starts on any component.						
Contractor Obligation prior to construction	Environmental Conditions at construction site, as identified in the	• Each civil works contractor shall prepare a Construction site EMP (CS-EMP), based on	Civil works contractors	LPMOs, PIUs, LIEC, EEM	CCX4 has been prepared in accordance with the	Not started, so did not carry out	Not started, so did not carry out	CWD1, CWD4-1 has prepared the construction site

Item	Potential Impacts/issues	Mitigation Measures	Responsibility		Implementation of Mitigation Measures			
			Implementation unit	Oversight Unit	Chuxiong Infra.	Chuxiong River	Lufeng Infra. And River	Wuding Infra. And River
	EMP	this project EMP, to include the following plans: – Site drainage and soil erosion management; – Spill control and management; – Environmental, health & safety management plan; – Surface water protection; – Temporary traffic management; – Construction site access control; • These plans are further elaborated below in the Construction Phase.			requirements			environmental management plan, but did not meet the requirements of EMP, some parts were missing
B construction period								

Item	Potential Impacts/issues	Mitigation Measures	Responsibility		Implementation of Mitigation Measures			
			Implementation unit	Oversight Unit	Chuxiong Infra.	Chuxiong River	Lufeng Infra. And River	Wuding Infra. And River
Soils and geology	Soil erosion & contamination	Develop and implement a **Site Drainage and Soil Erosion Management Plan** that responds to the SEPP (Site Erosion Protection Plan) approved by local Water Resources Bureau, and the project EIA. Measures shall include the following: • During road and bridge constructions, maintain slope stability at cut faces by implementing erosion protection measures such as terraces and silt barriers;	Contractors, CSCs	PIUs, EPBs, WRBs, LIEC, EEM	Has been performed, see Appendix C Photo C1.1	Not started	Not started	Has been performed, see Appendix C Photo C2.1, C3.1

Item	Potential Impacts/issues	Mitigation Measures	Responsibility		Implementation of Mitigation Measures			
			Implementation unit	Oversight Unit	Chuxiong Infra.	Chuxiong River	Lufeng Infra. And River	Wuding Infra. And River
		• Stabilize all cut slopes, embankments, and other erosion-prone working areas while works are going on; • All earthwork disturbance areas must be stabilized within 30 days after earthworks have ceased at the sites; • Minimize active open excavation areas during trenching activities and use appropriate compaction techniques for pipe trenches construction; • Provide temporary						

Item	Potential Impacts/issues	Mitigation Measures	Responsibility		Implementation of Mitigation Measures			
			Implementation unit	Oversight Unit	Chuxiong Infra.	Chuxiong River	Lufeng Infra. And River	Wuding Infra. And River
		detention ponds or containment to control silt runoff; • Construct intercepting ditches and drains to prevent runoff entering construction sites, and divert runoff from sites to existing drainage; • Strip and stockpile topsoil, cover or seed temporary soil stockpiles; • Limit construction and material handling during periods of						

Item	Potential Impacts/issues	Mitigation Measures	Responsibility		Implementation of Mitigation Measures			
			Implementation unit	Oversight Unit	Chuxiong Infra.	Chuxiong River	Lufeng Infra. And River	Wuding Infra. And River
		rains and high winds; • Properly slope or re-vegetate disturbed surfaces, such as compacted pipeline trenches and cut banks; • Protect slopes on both sides of bridges and culverts; • Plant grass to protect slopes, especially on sandy soil and terraced slopes; • Appropriately set up temporary construction camps and storage areas to minimize the land area required and impact on soil erosion;						

Item	Potential Impacts/issues	Mitigation Measures	Responsibility		Implementation of Mitigation Measures			
			Implementation unit	Oversight Unit	Chuxiong Infra.	Chuxiong River	Lufeng Infra. And River	Wuding Infra. And River
		Implement the following measures to avoid soil contamination: • Properly store petroleum products, hazardous materials and wastes on impermeable surfaces in secured and covered areas, and use best management practices to avoid soil contamination; • Remove all construction wastes from the site to approved waste disposal sites;						

Item	Potential Impacts/issues	Mitigation Measures	Responsibility		Implementation of Mitigation Measures			
			Implementation unit	Oversight Unit	Chuxiong Infra.	Chuxiong River	Lufeng Infra. And River	Wuding Infra. And River
		• Establish emergency preparednessand response plan (Spill Management Plan); and Provide spill clean-up measures and equipment at each construction site and require contractors to conduct training in emergency spill response procedures.						
	Earthwork, spoil disposal site management & rehabilitation	• For Chuxiong, the surplus earth of 79,857m^3 shall be used for filling the planned landscaping area between Qinglong River bank and the	Contractors,CSCs	LPMOs, PIUs, EPBs, LIEC, EEM	Earthwork removal not conducted yet, temporarily stored on site, some will be used	Not started	Not started	Earthwork removal not conducted yet, temporarily stored on site, some will be used for backfilling,

Item	Potential Impacts/issues	Mitigation Measures	Responsibility		Implementation of Mitigation Measures			
			Implementation unit	Oversight Unit	Chuxiong Infra.	Chuxiong River	Lufeng Infra. And River	Wuding Infra. And River
		roads of No.15 and 16, where about 0.9million m^3 filling earth will be needed; • For Wuding, the surplus earth of 250,824m^3 shall be transported to the northwest part of the county town for filling the real estate construction site, where about 0.15million m3 of earth will be used; • For Lufeng, the surplus earth of 40,500m^3 shall be used for filling the landscaping area on the river banks,			for backfilling, some for greening			some for greening

Item	Potential Impacts/issues	Mitigation Measures	Responsibility		Implementation of Mitigation Measures			
			Implementation unit	Oversight Unit	Chuxiong Infra.	Chuxiong River	Lufeng Infra. And River	Wuding Infra. And River
		where about 0.5million m^3 filling soil will be used; • Topsoil of 45,591m^3 will be used for planting trees, bushes and grass in the landscaping areas in Chuxiong and Wuding, respectively. • Transport remaining constructionspoil to approved spoil disposal sites defined in Table V.4 of this EIA.						
Surface water quality, hydrology	Impact on river hydrology by bridge construction	• River bridge pier constructions (11 bridges - 2 in Chuxiong, 7 in Wuding, 2 for	Contractors CSCs	City/county PIUs, LIEC, EPBs, WRB	Bridge construction not started	Not started	Not started	CWD1 Bridge pile foundation completed in April 2016, implemented

Item	Potential Impacts/issues	Mitigation Measures	Responsibility		Implementation of Mitigation Measures			
			Implementation unit	Oversight Unit	Chuxiong Infra.	Chuxiong River	Lufeng Infra. And River	Wuding Infra. And River
		Lufeng) shall be conducted during the dry season; construction during the rainy season will be prohibited; • Foundation treatment and pier grouting come first in pier construction; and • Provide adequate opening for flood flow before the rainy season.						
	Impact on river hydrology by river rehabilitation works	• Cofferdam diversion will be set along the proposed rivers; and • River bank constructions shall be conducted during the dry season (from October to May), and			Don't involve river rehabilitation			River rehabilitation not started yet

Item	Potential Impacts/issues	Mitigation Measures	Responsibility		Implementation of Mitigation Measures			
			Implementation unit	Oversight Unit	Chuxiong Infra.	Chuxiong River	Lufeng Infra. And River	Wuding Infra. And River
		construction during the rainy season shall be prohibited.						
	Surface and groundwater pollution	● Contractors will be requested to implement the following measures to protect surface and groundwater resources (to be defined in their CS-EMPs): - During bridge and river bank constructions, pump slurry to shore and properly dispose cutting materials; - Install sediment traps along the rivers to minimize sediment runoff into the rivers during earthworks; - Works on the river bed, including sediment dredging, shall not be conducted without prior assessment of environmental impacts, and dredged material management			All Implemented, CCX4 doesn't involve river rehabilitation			River rehabilitation not started yet, CWD1 and CWD4-1 has implemented according to the requirements

Item	Potential Impacts/issues	Mitigation Measures	Responsibility		Implementation of Mitigation Measures			
			Implementation unit	Oversight Unit	Chuxiong Infra.	Chuxiong River	Lufeng Infra. And River	Wuding Infra. And River
		planning; - Develop contingency plans for control of oil and other dangerous substances (Spill Management Plan); - Collect wastewater from construction activities in sedimentation tanks, retention ponds, and filter tanks to remove silts and oil; - Equip all areas where construction equipment is being washed with water collection basins and sediment traps; - Station fuel storage, maintenance shop and vehicle cleaning areas at least 500m away from the nearest water body; - Locate storage facilities for fuels, oil, and other hazardous materials within secured areas on impermeable surfaces, and provided with bunds and cleanup						

Item	Potential Impacts/issues	Mitigation Measures	Responsibility		Implementation of Mitigation Measures			
			Implementation unit	Oversight Unit	Chuxiong Infra.	Chuxiong River	Lufeng Infra. And River	Wuding Infra. And River
		installations; - Ensure that fuel suppliers are properly licensed. They shall follow proper protocol for transferring fuel and the PRC standard of JT3145-88 (Transportation, Loading and Unloading of Dangerous or Harmful Goods); - Locate labor camps at least 500m from ecologically sensitive receivers, such as rivers, residential areas and natural ponds, etc.; - Install eco-toilets and septic treatment and disposal systems at construction camps along with proper maintenance protocols; - The discharge of construction wastewater to the rivers will be prohibited; - Conduct water						

Item	Potential Impacts/issues	Mitigation Measures	Responsibility		Implementation of Mitigation Measures			
			Implementation unit	Oversight Unit	Chuxiong Infra.	Chuxiong River	Lufeng Infra. And River	Wuding Infra. And River
		quality monitoring in the rivers and the natural ponds during construction in accordance with the EMP monitoring program to identify and confirm results of the impact assessment and effectiveness of adopted mitigation measures.						
Ambient Air	Dust generated by construction activities	● Spray water daily on construction sites and earth/material handling routes where fugitive dust is being generated; ● Pay particular attention to dust suppression near sensitive receptors such as schools, hospitals and residential areas; and • Cover materials during truck transportation, in particular, the fine material, to avoid	Contractors, CSCs	LPMOs, PIUs, LIEC, EEM	Has been implemented, see Appendix C Photo C1.2 ~ C1.3	Not started	Not started	Has been implemented, see Appendix C Photo C2.2 ~ C2.4, C3.2 ~ C3.4

Item	Potential Impacts/issues	Mitigation Measures	Responsibility		Implementation of Mitigation Measures			
			Implementation unit	Oversight Unit	Chuxiong Infra.	Chuxiong River	Lufeng Infra. And River	Wuding Infra. And River
		spillage or dust generation.						
	Air emission from asphalt pavement, and vehicles and machinery	● Locate asphalt plants and mixers as far away as possible (at least 500 m downwind) from the nearest residential areas, and other sensitive receptors; ● Store petroleum or other harmful materials in appropriate places and covering to minimize emission; ● Maintain vehicles and construction machinery regularly to a high standard of efficient running and fuel-burning to ensure emissions from vehicle and construction machineries are in compliance with the PRC standards of GB18352-2005, GB17691-2005, GB11340-2005, GB2847-2005, and GB18285 -2005; and	Contractors, CSCs	LPMOs, PIUs, LIEC, EEM	Pavement not started	Not started	Not started	Pavement not started

Item	Potential Impacts/issues	Mitigation Measures	Responsibility		Implementation of Mitigation Measures			
			Implementation unit	Oversight Unit	Chuxiong Infra.	Chuxiong River	Lufeng Infra. And River	Wuding Infra. And River
		• Initiate a regular inspection and certification system for vehicle and equipment emission.						
Noise	Noise generated from construction activities	● Ensure that noise levels from equipment and machinery conform to the PRC standard of GB12523-90, and properly maintain construction vehicles and machineries to minimize noise; ● Apply noise reduction devices or methods where piling equipment is operating within 300m of sensitive sites such as schools, hospitals and residential areas; ● Locate sites for rock crushing, concrete-mixing, and similar activities at least 1 km away from sensitive areas; ● To reduce noise at night, restrict the	Contractors, CSCs	LPMOs, PIUs, LIEC, EEM	Implemented except there was no record of visiting residents	Not started	Not started	Implemented except there was no record of visiting residents

Item	Potential Impacts/issues	Mitigation Measures	Responsibility		Implementation of Mitigation Measures			
			Implementation unit	Oversight Unit	Chuxiong Infra.	Chuxiong River	Lufeng Infra. And River	Wuding Infra. And River
		operation of machinery generating high levels of noise, such as piling, and movement of heavy vehicles along urban and village roads between 20:00 and 06:00 the next day in accordance with PRC regulations; ● Take special caution at construction sites that are close to such sensitive sites as schools, hospitals and office buildings. When construction activities are unavoidable during the school seasons, the use of heavy equipment will be restricted to weekends and non-class hours. ● Place temporary hoardings or noise barriers around noise sources during construction, if necessary; ● Monitor noise at sensitive areas at regular intervals (refer						

Item	Potential Impacts/issues	Mitigation Measures	Responsibility		Implementation of Mitigation Measures			
			Implementation unit	Oversight Unit	Chuxiong Infra.	Chuxiong River	Lufeng Infra. And River	Wuding Infra. And River
		to the monitoring plan in the EMP). If noise standards are exceeded, equipment and construction conditions shall be checked, and mitigation measures shall be implemented to rectify the situation; and • Conduct monthly interviews with residents living adjacent to construction sites to identify community complaints about noise, and seek suggestions from community members to reduce noise annoyance. Community suggestions will be used to adjust work hours of						

Item	Potential Impacts/issues	Mitigation Measures	Responsibility		Implementation of Mitigation Measures			
			Implementation unit	Oversight Unit	Chuxiong Infra.	Chuxiong River	Lufeng Infra. And River	Wuding Infra. And River
		noise-generating machinery.						
	Noise impacts on the first section[1] of Longchuan River in Chuxiong City	● Erect temporary noise barriers around noise sources during construction to comply with Class I [2] (55 dB(A) day-time; 45 dB(A) night-time) of the PRC Ambient Noise Standard (GB 3096-2008); • Prohibit construction activities during the night;	Contractor, CSC, nearby villages	LPMO, PIU and EPB, LIEC, EEM	NA	Not started	NA	NA
Vibration	Vibration generated by piling	• Piling and compaction operations at night are prohibited.	Contractors, CSCs	LPMOs, PIUs, LIEC, EEM	Implemented	Not started	Not started	Implemented
Solid Waste	Solid waste generated by construction activities and from workers' camps	● Provide appropriate waste collection and storage containers at locations away from surface water or sensitive receivers; ● Reach agreement with municipal waste	Contractors, CSCs	PIUs, LIEC, EEM	It has been Implemented, See Appendix C Photo C1.4	Not started	Not started	It has been Implemented See Appendix C Photo C2.5, C3.5

[1] The section (4500m in length) has some ecological value (vegetation, fish, ducks); other downstream section lost ecological value (seasonal stream)
[2] For the first section of Longchuan River in Chuxiong City

Item	Potential Impacts/issues	Mitigation Measures	Responsibility		Implementation of Mitigation Measures			
			Implementation unit	Oversight Unit	Chuxiong Infra.	Chuxiong River	Lufeng Infra. And River	Wuding Infra. And River
		collection services for regular collection of waste prior to construction; ● Properly remove and dispose of any significant residual materials, wastes and contaminated soils that remain on the ground timely during and after construction to designated sites. Any planned paving or vegetating of the area shall be done as soon as the materials are removed to protect and stabilize the soil; ● Burning of waste is strictly prohibited. • Provide sufficient garbage bins at strategic locations and ensure that they are protected from birds and vermin, and emptied regularly (using the municipal						

Item	Potential Impacts/issues	Mitigation Measures	Responsibility		Implementation of Mitigation Measures			
			Implementation unit	Oversight Unit	Chuxiong Infra.	Chuxiong River	Lufeng Infra. And River	Wuding Infra. And River
		solid waste collection systems).						
Flora and Fauna	Protection of vegetation, and fauna	● Protect existing vegetation nearby construction sites; ● Properly backfill, compact and re-vegetate pipeline trenches after pipeline installation; ● Protect existing trees and grassland during road, bridge, river rehabilitation and pipeline constructions; where a tree has to be removed or an area of grassland disturbed, replant trees and re-vegetate the area immediately after construction; ● Remove trees or shrubs only as a last resort if they impinge directly on permanent works or approved necessary temporary works; ● In compliance with the PRC's forestry law, undertake	Contractor, CSCs	PIUs, LIEC, EEM	Implemented	Not started	Not started	Implemented

Item	Potential Impacts/issues	Mitigation Measures	Responsibility		Implementation of Mitigation Measures			
			Implementation unit	Oversight Unit	Chuxiong Infra.	Chuxiong River	Lufeng Infra. And River	Wuding Infra. And River
		compensatory planting of an equivalent or larger area of affected trees and vegetation; and ● Use native plant species of local provenance will for replanting; • Take special precautions during and after construction for the protection of small animals, reptiles, and birds of common species that live in the vegetated roadside and riverside areas, medians, inner areas of bridges, and green areas						
	Protection of flora and fauna (first section of Longchuan River)	• The river rehabilitation shall be limited to the existing river embankment repairs,	DI, Contractor, CSCs	LPMO, FB and EPB, LIEC, EEM	NA	Not started	NA	NA

Item	Potential Impacts/issues	Mitigation Measures	Responsibility		Implementation of Mitigation Measures			
			Implementation unit	Oversight Unit	Chuxiong Infra.	Chuxiong River	Lufeng Infra. And River	Wuding Infra. And River
		tree planting to stabilize the exiting riverbank, water channel sediment removal. The existing waterway channel, tree line and vegetation will be preserved;						
Socio-economic impacts	Impact on physical cultural resources	● Contractors shall establish chance-find procedures for physical cultural resources; • If a new site is unearthed, work shall be stopped immediately and local BCR and the LPMO promptly notified, and construction will resume only after thorough investigation	Contractors, CSCs	LPMO,, LIEC, City BCR[3], EEM	Has been established, no artifacts found	Not started	Not started	Has been established, no artifacts found

[3] Bureau of Cultural Relics

Item	Potential Impacts/issues	Mitigation Measures	Responsibility		Implementation of Mitigation Measures			
			Implementation unit	Oversight Unit	Chuxiong Infra.	Chuxiong River	Lufeng Infra. And River	Wuding Infra. And River
		and with the permission of the appropriate authority.						
	Community health and safety	● The civil work contractors shall implement the following measures to ensure community health and safety during construction: - Develop and implement **temporary traffic control and operation plan**, to be cleared by local traffic management administrations before construction. The plan shall include provisions for diverting or scheduling construction traffic to avoid morning and afternoon peak traffic hours, regulating traffic at road crossings, selecting transport routes to reduce disturbance to regular traffic, reinstating roads, and opening them to traffic			implemented			implemented

Item	Potential Impacts/issues	Mitigation Measures	Responsibility		Implementation of Mitigation Measures			
			Implementation unit	Oversight Unit	Chuxiong Infra.	Chuxiong River	Lufeng Infra. And River	Wuding Infra. And River
		as soon as the construction is completed; **- Conduct underground facilities survey and protection** to avoid disturbances to utility services, where needed. **- Disclose information** to residents and businesses in advance through media of the construction activities, given the dates and duration of expected disruption; • **- Ensure that construction sites are well protected** but placing **c**lear signs at construction sites in view of the public, warning people of potential dangers such as moving vehicles,						

Item	Potential Impacts/issues	Mitigation Measures	Responsibility		Implementation of Mitigation Measures			
			Implementation unit	Oversight Unit	Chuxiong Infra.	Chuxiong River	Lufeng Infra. And River	Wuding Infra. And River
		hazardous materials, excavations etc., and raising awareness on safety issues. All sites shall be secured, disabling access by members of the public through appropriate fencing whenever appropriate.						
	Occupational. health and safety	● Each civil works contractor shall develop and implement an **environmental, health and safety management plan (EHSMP)** which shall include the following provisions: - Provide a clean and sufficient supply of fresh water, for construction sites and for all camps, offices and workshops; - Provide an adequate number of latrines and	Contractors	CSCs, LPMOs, LBs, EPBs, LIEC, EEM	It has been Implemented See Appendix C Photo C1.5 ~ C1.7	Not started	Not started	Record management system not established, infectious disease education was not provided for workers, the rest were implemented; See Appendix

Item	Potential Impacts/issues	Mitigation Measures	Responsibility		Implementation of Mitigation Measures			
			Implementation unit	Oversight Unit	Chuxiong Infra.	Chuxiong River	Lufeng Infra. And River	Wuding Infra. And River
		other sanitary arrangements at construction sites and work camps, and ensure that they are cleaned and maintained in a hygienic state; - Garbage receptacles at construction site and camps will be setup, which will be periodically cleared to prevent outbreak of diseases; - Provide personal protection equipment, such as safety boots, helmets, gloves, protective clothing, goggles, and ear protection, in accordance with relevant health and safety regulations for workers; - An emergency response plan to take actions on accidents and emergencies will be prepared, including environmental and public health emergencies						C Photo C2.6, C3.6

Item	Potential Impacts/issues	Mitigation Measures	Responsibility		Implementation of Mitigation Measures			
			Implementation unit	Oversight Unit	Chuxiong Infra.	Chuxiong River	Lufeng Infra. And River	Wuding Infra. And River
		associated with hazardous material spills and similar events, and submitted to the local EPBs for review and appraisal. Emergency phone link with hospitals in the three project towns will be established. A fully equipped first-aid base in each construction camp will be organized; - A records management system that will store and maintain easily retrievable records protected against loss or damage will be established. It will include documenting and reporting occupational accidents, diseases, and incidents. The records will be reviewed during compliance monitoring and audits; - Ensure that occupational health and safety matters are						

Item	Potential Impacts/issues	Mitigation Measures	Responsibility		Implementation of Mitigation Measures			
			Implementation unit	Oversight Unit	Chuxiong Infra.	Chuxiong River	Lufeng Infra. And River	Wuding Infra. And River
		given a high degree of publicity to all persons regularly or occasionally on each construction site. Posters will be displayed prominently in relevant areas of the site; and • - Train all construction workers in basic sanitation, general health and safety matters, and on the specific hazards of their work. Implement SITs/HIV/AIDS and other communicable diseases awareness and prevention program to target the local community and construction workers.						

C.Site photos

C1. Chuxiong No.17 Road Section 1 (CCX4) Construction Site Photo

C1.1 Vegetation Cover for Temporary Spoil Site

C1.2 Dust Reduction by Watering

C1.3 Earthmoving Vehicle Covering

C1.4 Garbage Cans

C1.5 Safety Warning Signs

C1.6 Workers Training

C1.7 Wearing Helmets

C1 No .8 No Construction Enclosure

C2. Wuding Beicheng Avenue (CWD1) Construction Site

C2.1 Intercepting/Drainage Channel

C2.2 Dust Reduction by Watering

C2.3 Earthmoving Vehicle Covering

C2.4 Gravels Temporary Coverage

C2.5 Garbage Cans

C2.6Environmental Awareness and Safety Education and Training

C2.7 Construction Site Close to

C2.8 County Hospital outside

Residential Area	Enclosure

C3. Wuding Wuzheng Road (CWD4-1) Construction Site

C3.1 Slope Greening

C3.2 Dust Reduction

C3.3 Watering by Man

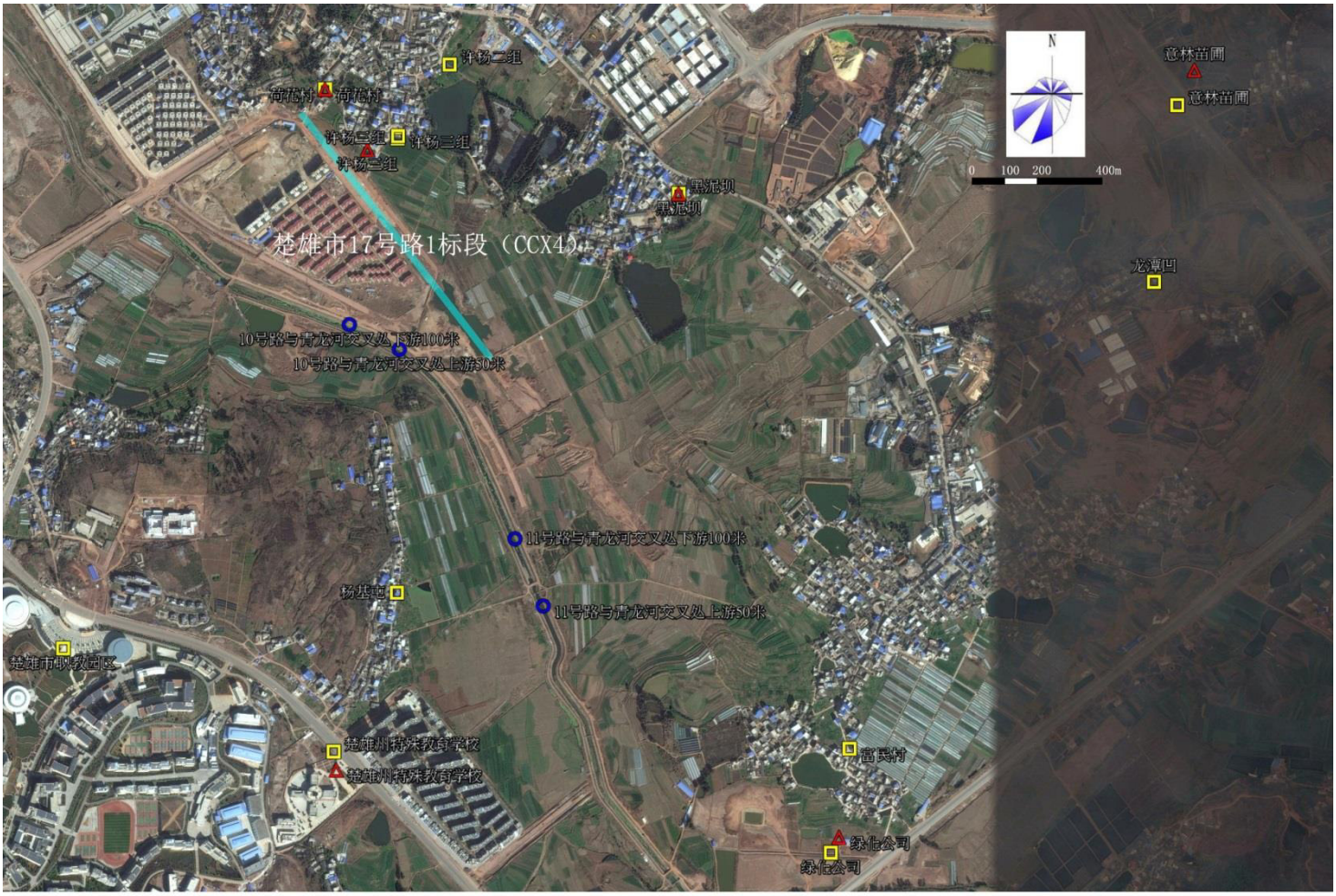
C3.4 Earthmoving Vehicle Covering

C3.5 Garbage Collection Barrel

C3.6 Safety Warning Sign

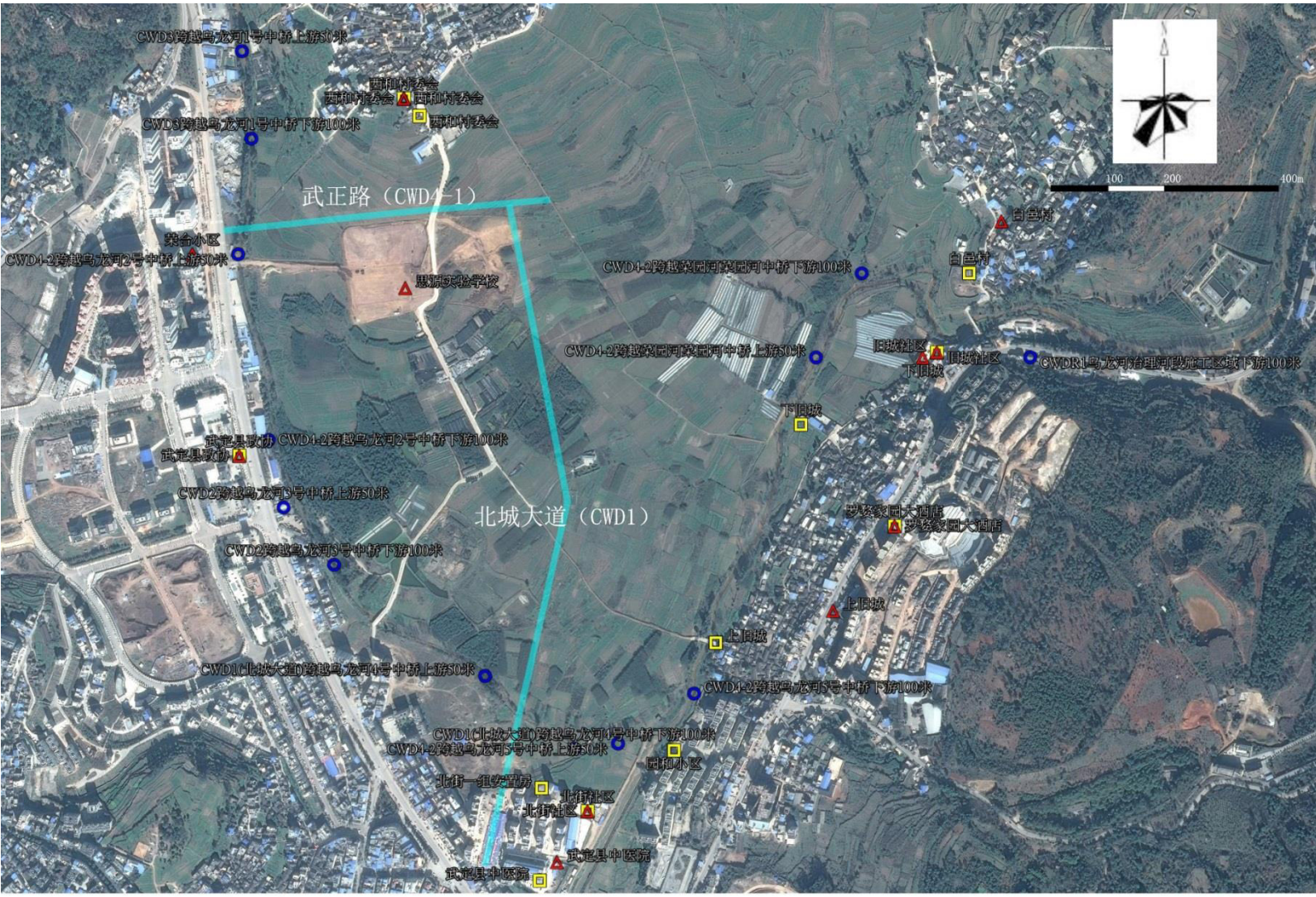
D. Maps

D1. Environmental Monitoring Points of Chuxiong Road Subproject



附图1 楚雄市城市道路及附属设施建设工程环境监测点位布置图

D2. Environmental Monitoring Points of Wuding Subproject



附图2 武定县城市道路与河道综合整治工程环境监测点位布置图