ADB

Environmental Monitoring Report

Project Number: 46079-002
July 2016

PRC: Guangdong Chaonan Water Resources Development and Protection Demonstration Project -Environmental Monitoring Report (January to June 2016)

Prepared by Project Management Office of Guangdong Chaonan District and HJI Group Corporation.

Asian Development Bank

Environmental Monitoring Report

Project No.: 3114-PRC
3rd Semiannual Report
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WEIGHTS AND MEASURES

cm	centimeter
dB(A)	A-weighted sound pressure level in decibels
ha	hectare
kg	kilogram
km	kilometer
kWh	kilowatt hours
m	meter
mm	millimeter
m/s	meters per second
m^2	square meter
m^3	cubic meters
mg/l	milligrams per liter
mg/m^3	milligrams per cubic meter
mg/Nm^3	milligrams per standard cubic meter
Nm^3	standard cubic meter
^0C	degrees Celsius

NOTE

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I. INTRODUCTION

A. Report Purpose and Rationale

1. This Environmental Monitoring Report (EMR) was prepared by the Consultants from HJI Group USA, together with the project management office (PMO) of Chaonan, Guangdong Province, People's Republic of China (the PRC) to ADB for the Guangdong Chaonan Water Resources Development & Protection Demonstration Project (the Project). It is the third EMR, covering the period from January to June 2016, and is based on i) the compliance environmental monitoring report, provided by Chaonan District Environmental Monitoring Station (EMS); and ii) The contractors and construction supervision companies' (CSCs) internal environmental inspection reports, and iii) the Consultants and the PMO' s construction site inspection.

2. The purpose of this EMR is to document the environmental management activities and compliance with the approved environmental management plan (EMP) of this project. This report presents project implementation progress, institutional setup for EMP implementation and supervision; the external environmental monitoring results; project readiness assessment; training; public consultation and the grievance redress mechanism (GRM); as well as the assessment of environmental impact mitigation measures implemented within and nearby the construction sites by the contractors during the construction.

B. Project Objective and Components

3. Chaonan District Government has signed a $100 million Loan Agreement with ADB on 30 May 2014. The date of loan effectiveness is 12 August 2014, and the loan closing date will be 31 March 2020. The summary of the project information is shown in **Table 1**.

Table 1: Project Basic Information

Loan No.	3114-PRC
Project Name	Guangdong Chaonan Water Resources Development and Protection Demonstration Project
Borrower	People's Republic of China (PRC)
Executing Agency	Chaonan District Government (CDG),through the PMO
Loan Agreement Signing Date	30 May 2014
Loan Effective Date	12 August 2014
Estimated Project Completion Date	30 September 2019
Loan Closing Date	31 March 2020
Last ADB Mission Review Date	17-20 August, 2015
Project Implementing Agencies	1. Chaonan Water Supply Company (CWSC) 2. Chaonan Water Affairs Bureau (CWAB)

	3. Chaonan Forestry Bureau (CFoB) 4. Chaonan Education Bureau (CEB) 5. Chaonan Environmental Protection Bureau (CEPB) 6. Chaonan Urban Management Bureau (CUMB)
Project Investment and Financing Plans	The total estimated investment is $230.75 million of which ADB loans $100 million the rest is the counterpart fund.

4. The project aims at providing better and equitable water supply services to urban and rural residents in Chaonan District. The project includes components of water resources protection improvement, water supply infrastructure improvements and institutional and staff capacity strengthening.

5. The project includes the following three components:

(i) **Improved water resources protection (Output 1)**. This output comprises (i) public awareness and learning on environment and sanitation, (ii) water conservation reforestation of about 1,682 hectares (ha) in the catchments of Jinxi, Longxi, and Qiufeng reservoirs, (iii) a study on pollution prevention and control measures in the catchments of Jinxi, Longxi, and Qiufeng reservoirs, and (iv) solid waste collection and treatment in Chengpo and Qiufeng villages.

(ii) **Improved water supply infrastructure (Output 2)**. This output comprises (i) expansion of the capacity of the Qiufeng WSP from 70,000 m^3/day to 142,000 m^3/day, and construction of a sludge treatment facility and water intake facility; (ii) rehabilitation of the Jinxi WSP by constructing a pump station and a sludge treatment facility; (iii) construction of the Longxi WSP with a capacity of 100,000 m^3/day, including a sludge treatment facility and a pump station; (iv) installation and upgrade of water delivery and distribution pipelines in the district for a total length of about 1,000 kilometers; (v) establishment of a water quality monitoring center; (vi) installation of about 37,770 household water meters; and (vii) provision of O&M equipment, including water leakage detection equipment.

(iii) **Strengthened institutional and staff capacity (Output 3).** This output comprises (i) provision of consulting services and training, including study tours for project implementation; (ii) support for the establishment of a water supply control center with a remote monitoring and control system, a data transmission and dispatching center, and communication network; (iii) support for the establishment of a water resources management and three-prevention (flood, drought, and typhoon) management center; (iv) preparation of a water resources protection and development action plan to address issues concerning water safety, water allocation optimization, and water reuse and conservation; and (v) establishment of a project monitoring and evaluation system.

C. Project Implementation Progress

6. **Improved water resources protection (Output 1)**. There are two civil work contracts and one goods procurement contract in total. Currently, the bidding document for C2 was being prepared, and none under construction during the reporting period.

7. **Improved water supply infrastructure (Project output 2).** There are 11 civil work contracts and 6 goods contracts in total. During the reporting period, the only ongoing construction was the C4, Civil Works of Longxi Water Supply Plant. The bidding for the C3 contract of Civil works, Installation, and Commissioning of Water Transmission Pipelines from Shikeng to Yangfenchen was completed on 8 April 2016. And the contract was scheduled to be signed on 4th July 2016. See table 2 below in detail.

Table 2: Contract Information for Project Output 1

Contract No.	Contract Name	Contract Value (CNY)	Contractor	Progres of contract
C3	Civil works, Installation, and Commissioning of Water Transmission Pipelines from Shikeng to Yangfenchen	66,286,152	The joint venture of Guangdong Yaonan Construction Engineering Co., Ltd and Guangdong No.2 Hydropower Engineering Co. Ltd	The contract will be signed on 4th July 2016
C4	Civil works, installation, and commissioning of the Longxi water supply plant is under construction.	56,087,334.59	The joint venture of Guangdong No.2 Construction Engineering Co., Ltd and Guangzhou Tap Water Professional Construction and Installation Co. Ltd,	Construction is underway

8. **Progress of the C4 construction:** By the end of June 2016, The concrete bottom, cushion, tank wall and roof of the clean water reservoir, sedimentation tank, V shape filtration tank, and the main administrative building, with a total investment of CNY 12,868,700 has been completed, which accounts for about 30% of the total C4 budget.

9. The contract for G3, Supply and Installation of Equipment in Longxi Water Supply Plant and Pipeline Leakage Detecting equip,ment, was signed in April 2016. According to the plan, the equipment under the contract will be delivered to the site of Jinxi Water Supply Plant in September 2016.

II. INSTITUTIONAL SETUP AND RESPONSIBILITIES FOR EMP IMPLEMENTATION AND SUPERVISION

A. Institutional responsibilities for environmental management

10. **Executive Agency.** CDG is the executing agency (EA) for the project. The EA is responsible for communication with ADB, loan on-lending and repayment, as well as supervision and guidance of the PMO and IAs during project implementation. The PMO is a standing agency for daily management of the Project under CDG's guidance.

11. **Environmental Management Offices.** The PMO environmental management officer will be responsible for implementation of the EMP. The officer takes charge of: (i) overall coordination of the EMP; (ii) supervision the implementation of mitigation measures during project construction and operation; (iii) supervising contractors and construction supervision companies (CSCs)' internal monitoring, and coordinating the external and compliance monitoring; (iv) ensuring that environmental management, monitoring, and mitigation measures are incorporated into bidding documents, construction contracts and operation management manuals; (v) reporting the EMP performance to the EA and ADB; (vi) coordinating the grievance redress mechanism (GRM, together with the PMO social officer); and (vii) responding to any unforeseen adverse impact beyond those mentioned in the domestic environmental impact assessment (EIA), the project IEE and EMP. The PMO environment officer is technically supported by the loan environmental implementation consultant (LIEC) and supervised by the district EPB.

12. **Loan implementation environment consultants (LIEC).** The LIECs of HJI Group, USA has been hired under the loan implementation consultancy services in late June 2016. The LIECs advise the PMO, contractors and the CSCs on all aspects of environmental management and monitoring for the project. The LIECs (i) assist the PMO to update the EMP and environmental monitoring program; (ii) verify the implementation of the mitigation measures specified in the EMP; (iii) review internal and compliance monitoring reports and prepare semi-annual environment performance/monitoring report; (iv) provide training to PMO, IAs, CSCs, contractors on environmental laws, regulations and policies, ADB SPS, EMP implementation, GRM, etc.; (v) identify any environment-related implementation issues, propose necessary corrective actions, and reflect these in a corrective action plan; and (vi) undertake site visits as required.

13. **Construction contractors.** Construction contractors are responsible for implementing relevant mitigation measures and internal monitoring during construction with the help of CSCs and under the supervision of the district EPBs. Each contractor must appoint an environment, health and safety officer (EHSO) to supervise the implementation of the on-site environment, health and safety management plan (EHSMP)

14. **Construction supervision companies.** CSCs were contracted to conduct stand-by internal environmental supervision on contractor's mitigation measures implementation. The CSCs are responsible for supervising construction progress and quality, and EMP implementation on construction sites. Each CSC must at least one environmental engineer on each construction site to: (i) supervise contractor's EMP and EHSMP implementation performance; (ii) conduct internal environmental inspection and monitoring; (iii) fill out monthly environmental performance forms to be submitted to the IA and PMO.

15. **Environmental monitoring station.** The PMO has engaged Chaonan District

Environmental Monitoring Station (EMS) to conduct the periodic environmental monitoring work. The contract was signed in January 2014. The third monitoring has been conducted in March 2016 and the monitoring report has been submitted to the PMO and the consultants in July 2016, and the report has been revised and updated per consultant review comments. The results are reflected in this EMR.

III. COMPLIANCE WITH ENVIRONMENT RELATED PROJECT COVENANTS

16. Compliance with covenants defined in the Loan Agreement and Project Agreement that directly or indirectly refer to environment, health and safety, and the implementation of the EMP, is rated **satisfactory.** The project complies with most covenants, with some not yet due. A list of loan covenants and compliance status is shown in **table 3**.

Table 3: Compliance with environment related project covenants

Covenants	Reference to Loan Documents	Status of Compliance
LOAN AGREEMENT		
The Borrower shall, through GPG, cause CDG not to award any Works contract which involves environmental impacts until: (a) CDG has granted the final approval of the IEE; and (b) CDG has incorporated the relevant provisions from the EMP into the Works contract.	SCHEDULE 4, Procurement of Goods, Works and Consulting Services, General 7	In compliance.
PROJECT AGREEMENT		
a) CDG shall ensure that the preparation, design, construction, implementation and operation 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; and (c) all measures and requirements set forth in the IEE, the EMP, and any corrective or preventative actions (i) set forth in a Safeguards Monitoring Report; or (ii) which are subsequently agreed between ADB and CDG.	Schedule, Execution of Project; Environmental 9-12	In compliance.
b) CDG shall ensure that all planting activities under the Project, including water conservation reforestation, rehabilitation of construction sites and post construction landscaping around Jinxi, Longxi, and Qiufeng reservoirs shall only use plant species which are native to the Danan mountain ranges of the Chaonan District and are sourced from local stock within the Chaonan District or neighboring counties. In the event that non-native seedlings are required for rapid stabilization of exposed soils and sites, CDG shall ensure that only sterile seedlings are used to prevent weed spread.		To be complied with (the related construction has not been started)
c) To avoid pollution of the reservoir waters, CDG shall ensure that no pesticides and no top dressing fertilizers shall be used for any activities under the Project, including water conservation reforestation, rehabilitation of construction sites and post construction landscaping around Jinxi, Longxi, and Qiufeng reservoirs.		To be complied with (construction has not been started)
d) CDG shall ensure that emergency preparedness and response mechanisms for drinking water source protection and supply safety shall be developed for the Project in accordance with all applicable laws and regulations of the Borrower and the SPS.		The mechanism has been established

IV. ASSESSMENT OF PROJECT READINESS

17. The project's readiness in terms of environmental management was assessed during PPTA based on the indicators listed in **Table 4** and derived from the project IEE. Project readiness is rated **satisfactory**. Environmental commitments are being carried out and environmental management system is in place for civil work contracts that have been awarded. Environment supervision is in place.

Table 4: Project Readiness Assessment Indicators

Indicators	Criteria	Assessment
Designate Environment Officer	Designate a well-trained environment officer in the PMO.	Yes
Update EMP	Update mitigation measures defined in this EMP based on final detailed design, submit to district EPB for approval.	*No change for final design according to the DI*
External and compliance environmental monitoring	Prior to construction, engage Chaonan District EMS for compliance monitoring. Prepare a detailed work plan, based on the environmental monitoring program (Table A.5).	Yes
Technical assistance	Include environment provisions in the TOR for selecting the LIEC.	Yes
Bidding and contract documents	Include environment requirements in the bidding documents for selection of DI, contractors and loan implementation TA consultants; Include environmental mitigation and monitoring clauses defined in the EMP in the contracts with DI, contractors and LIECs	Yes
EMP training	LIEC, and/or invited environment specialists and/or officials from provincial and municipal EPB, provide training on construction environmental management and implementation and supervision of environmental mitigation measures to contractors and CSCs.	The environmental training has been conducted in July 2016, which will be included in next EMR
EMP and supervision manual	Prepare environmental operation and supervision plans/manuals for all construction activities. These plans will need to fulfill the requirements of this EMP.	Yes
Internal environmental monitoring and supervision plan	Prepare an internal environmental monitoring plan to meet the requirements defined in the EIA, the IEE and the EMP. These plans will need to fulfill the requirements of this EMP.	Yes
Establish GRM	Establish a Project Public Complaints Unit (PPCU) in PMO.	Yes.

18. These have been submitted to the PMO, and are considered adequate. Contractors and the CSCs assigned specific personnel for their daily environmental management and supervision on site during construction. A detailed assessment of the project's compliance with the EMP for the pre-construction and construction phases is presented in **Table 5 and Table 6,** respectively.

Table 5: EMP Mitigation Measures (pre-construction phase), Compliance Assessment

Potential Impacts and Issues	Mitigation Measures defined in the EMP	Implementation status and compliance with EMP
Process and equipment of WSPs	a) Design low-carbon water supply system including (i) high efficiency pumping with variable speed drivers, (ii) water leak detection, repairing and management (equipment and mechanism); (iii) water supply system automation for energy saving (SCADA), (iv) accurate metering and monitoring b) Design water quality monitoring lab in the WSC to monitor about 42 of 106 parameters listed in the national Drinking Water Quality Standard of GB5749-2006. c) Design a water quality monitoring vehicle with portable instruments for monitoring of the water supply network and rural water supply facilities. d) All WSP sites and pipeline routes in the detailed designs shall be carefully selected to avoid or minimize potential adverse impacts on the environment and surrounding communities.	Yes, a) and b) are in compliance with the EMP; and the bidding documents for b) the water quality monitoring lab, and c) the monitoring vehicle, are being prepared, and the equipment/instruments will be delivered to the site before the end of 2016 according to the plan.
Design of reforestation component	a) Select native trees for the reforestation with good water conservation function; b) Prohibit planting of foreign species; c) Focus on degraded hillsides around Qiufeng, Longxi and Jinxi reservoirs;	Yes, will be in compliance. The bidding document including the items of a), b) and c) is being prepared.

Table 6: EMP Mitigation Measures (construction phase), Compliance Assessment

Media	Issues	Mitigation Measures defined in the EMP	Implementation status and compliance with EMP
Soil and geology	Soil erosion	• Stabilize compacted pipe trenches, and other erosion-prone working areas. • Earthwork disturbance areas must be stabilized within 7 days after earthwork completion. • Minimize active open excavation areas during water supply pipeline trenching activities (Maximum trench length will be 300 m in accordance with the domestic EIA report); use appropriate compaction techniques for pipe trench construction. • Provide temporary 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 drainages. • Strip and stockpile topsoil, and cover or seed temporary soil stockpiles. • Limit construction and material handling during periods of rains and high winds. • Properly re-vegetate disturbed surfaces, such as	In compliance with the EMP for the only ongoing construction (C4)

Media	Issues	Mitigation Measures defined in the EMP	Implementation status and compliance with EMP
		compacted pipeline trenches and the WSPs after completion of constructions. • Appropriately locate construction camps and storage areas to minimize land area required and impact on soil erosion. • Implement soil erosion inspection and monitoring program. Internal inspection will be conducted by contractors and CSCs. Compliance inspection by a licensed institute (Table A.5).Monitoring results will be submitted to PMO and IAs, district EPB and WRB. These will serve as basis for project implementation progress reports and acceptance of construction.	
	Soil Contamination	• Properly store petroleum products, hazardous materials and wastes on impermeable surfaces in secured and covered areas. • Remove construction wastes from the site to approved waste disposal sites. • Establish emergency preparedness and response plan (Spill Management Plan). • Provide spill cleanup measures and equipment at each construction site. Require contractors to conduct training in emergency spill response procedures.	In compliance with the EMP for the only ongoing construction (C4)
	Spoil disposal site management and rehabilitation	• Prior to operation, construct intercepting ditches and drains, retaining walls (on upstream area of the site) and sedimentation basins (on downstream area of the site) to mitigate soil erosion. • Top soil (with some grass)on the spoil site will be stripped, moved and stored temporarily on nearby open areas, for site rehabilitation. Temporary sand bag retaining walls will be used to control top soil loss. • Existing small pits and depressions in the site will be filled with spoil first. • Avoid clearance of trees and bushes as much as possible. Where these have to be removed: (a) re-plant the individuals on-site within a week, and/or, (ii) conduct on-site compensatory planting of an equivalent or larger area of the affected trees and vegetation (as per PRC Forestry Law). • Conduct site restoration (compacting, re-vegetation) within a week after disposal of every 50,000 m^3 spoil (or every 4 ha). Replace the original top soil and vegetation, or, plant native trees and grass in case the original trees or bushes have been damaged. • Only use coastal plant species native to Chaonan District for all planting activities. • On windy or rainy days, cover loose and bare	In compliance with the EMP for the only ongoing construction (C4).

Media	Issues	Mitigation Measures defined in the EMP	Implementation status and compliance with EMP
		spoil. • Trucks carrying the spoil will be covered to avoid spillage or dust generation. Give special attention to dust suppression near sensitive receptors e.g. schools, hospitals, villages and residential areas along spoil hauling roads. • Prohibit spoil transport vehicles working along urban and village roads between 22:00 and 07:00, as per PRC and Guangdong Provincial regulations. • Identify, demarcate and protect small animals, reptiles, and birds[a] living on the spoil site. • Disposal of any hazardous solid waste is strictly prohibited. • Conduct project completion audit to confirm the site is restored in accordance with the Approved EIA and PRC laws and regulations. Hold contractors liable in case of non-compliance.	
Reservoir water quality	Water quality and hydrology	• Earthworks near the reservoirs will be accompanied by measures to minimize sediment runoff into the reservoirs, including sediment traps. • The discharge of construction wastewater to the reservoirs will be prohibited. • Fuel storage, maintenance shop and vehicle cleaning areas will be stationed at least 500 m away from the reservoirs. • A water monitoring program has been developed and will be implemented to assess construction impacts (see Table A.5).	In compliance with the EMP for the only ongoing construction (C4)
Ambient Air	Dust and emission generated by construction activities	• Spray water on construction sites and earth/material handling routes where fugitive dust is being generated. • Locate asphalt mixers at least 500 m downwind from the nearest villages, residential areas and other sensitive receptors. • Pay particular attention to dust suppression near sensitive receptors. • Store petroleum or other harmful materials in appropriate places and covering to minimize fugitive dust and emission. • Cover materials during truck transport, in particular, the fine material, to avoid spillage or dust generation. • Ensure emissions from vehicle and construction machinery comply with PRC standards GB18352-2005, GB17691-2005, GB11340-2005, GB2847-2005, and GB18285-2005.	In compliance with the EMP for the only ongoing construction (C4)
Noise	Noise generated from	• Ensure noise levels from equipment and machinery conform to PRC standard of GB12523-90. Properly maintain construction	In compliance with the EMP for the only ongoing

Media	Issues	Mitigation Measures defined in the EMP	Implementation status and compliance with EMP
	construction activities	vehicles and machineries to minimize noise. • Apply noise reduction devices or methods where piling equipment is operating within 300 m of villages, 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 operation of machinery generating high levels of noise (e.g. piling) and movement of heavy vehicles along urban and village roads between 22:00 and 07:00 h in accordance with municipal regulations. • Take special caution at construction sites close to sensitive sites. When construction activities are unavoidable during school seasons, the use of heavy equipment will be restricted to weekends and non-class hours. • For construction sites near sensitive receptors, place temporary hoardings or noise barriers around noise sources. • Monitor noise at sensitive receptors (see Table A.5). If noise standards are exceeded, equipment and construction conditions shall be checked, and mitigation measures shall be implemented to rectify the situation. • Distribute ear protection plugs to residents prior to start of construction activity. • Conduct monthly interviews with residents adjacent to construction sites to identify community complaints about noise and seek suggestions to adjust work hours of noise-generating machinery.	construction (C4)
Vibration	Vibration generated by piling	• In consultation with local residents and/or other property/landowners, identify structures which may be most vulnerable to vibration impacts. • Cleary demarcate such structures to avoid hazards to human safety. • Coordinate with residents on the timing of heavy machinery work close to these structures. • Prohibit piling and compaction operations at night.	In compliance with the EMP for the only ongoing construction (C4)
Solid Waste	Solid waste generated by construction activities and from workers' camps	• Provide appropriate waste collection and storage containers at locations away from the reservoirs or sensitive receivers. • Reach agreement with municipal waste collection services for regular collection of domestic waste prior to construction. • Hold contractors responsible for proper removal and disposal of any significant residual materials, wastes and contaminated soils that remain on the ground timely during and after construction. • Any planned paving or vegetating shall be done	In compliance with the EMP for the only ongoing construction (C4)

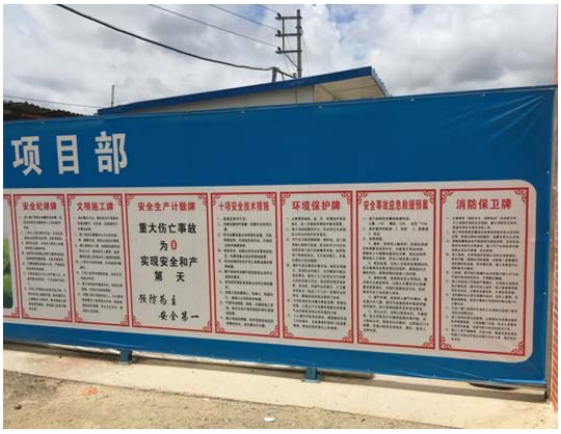
Media	Issues	Mitigation Measures defined in the EMP	Implementation status and compliance with EMP
		as soon as the materials are removed to protect and stabilize the soil. • Burning of waste is strictly prohibited. • Provide sufficient garbage bins at strategic locations and ensure that they are protected from birds and vermin, and emptied regularly (using the municipal solid waste collection systems).	
Flora and Fauna	Protection of vegetation	• Protect existing vegetation nearby construction sites. • Properly backfill, compact and re-vegetate pipeline trenches after construction. • Protect existing trees and grassland during WSP and pipeline construction. Where vegetation must be disturbed, re-vegetate 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 compensatory planting of an equivalent or larger area of affected trees and vegetation. • Identify, demarcate and protect sites where small animals, reptiles, and birds of common species live such as vegetated roadside areas, trees, and reservoir beaches. • Only use native plant species of local provenance for replanting in the WSPs and along the roads if the pipeline construction damaged existing vegetation.	In compliance with the EMP for the only ongoing construction (C4)
	Fauna	• Identify, demarcate and protect sites where small animals, reptiles, and birds of common species live such as vegetated roadside areas, trees, inner areas of bridges and river beaches. • In the event that any animals are found in pipeline trenches, contact EPB and ensure that the animal is released nearby, and unharmed.	In compliance with the EMP for the only ongoing construction (C4)
Socio-economy	Physical Cultural Resources	• Establish chance-find procedures for physical cultural resources. If an artifact is unearthed during construction, work will be stopped immediately. The BCR, IAs and PMO will be promptly notified. Construction will only resume after permission of the appropriate authority.	Not involve this issue for C4 construction
Health and safety	Community health and safety	• Traffic management. A traffic control and operation plan will be prepared, to be approved by the Traffic Management Bureau before construction. The plan will 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	In compliance with the EMP for the only ongoing construction (C4)

Media	Issues	Mitigation Measures defined in the EMP	Implementation status and compliance with EMP
		traffic as soon as the construction is completed. • Underground facilities survey and protection. Construction activities are planned to minimize disturbances to utility services. Three-dimensional detection of underground facilities will be conducted before construction where appropriate. • Information disclosure. Residents and businesses will be informed at least 2 weeks in advance, through media of the construction activities, given the dates and duration of expected disruption. • Public signs will be placed at construction sites, warning people of potential dangers such as moving vehicles, hazardous materials, excavations, and raising awareness on safety issues. All sites will be secured, through fencing if appropriate.	
	Occupational. health and safety	• An environmental, health and safety officer (EHSO) will be appointed by each contractor to implement and supervise the environmental, health, and safety management plan. • Each contractor will prepare an environmental, health and safety management plan (EHSMP)for construction works, based on this EMP. The EHSMP will include the following: • provide clean and sufficient supply of fresh water, for construction sites, camps, offices, workshops; • provide adequate number of latrines and other sanitary arrangements at construction sites and work camps, and ensure they are maintained in a hygienic state; • install and regularly empty garbage receptacles at construction sites and camps; • provide personal protection equipment, e.g. safety boots, helmets, gloves, protective clothing, goggles, ear protection, in accordance with relevant health and safety regulations for workers. • Prepare emergency response plan to address accidents and emergencies, including environmental and public health emergencies associated with hazardous material spills and similar events. Submitto EPB for review and appraisal. Emergency phone link with hospitals in the district will be established. A fully equipped first-aid base in each construction camp will be organized; • Maintain a record management system, to document occupational accidents, diseases, and incidents. Records will be reviewed during compliance monitoring and audits. • Ensure occupational health and safety matters are accorded a high priority to all persons accessing	In compliance with the EMP for the only ongoing construction (C4)

Media	Issues	Mitigation Measures defined in the EMP	Implementation status and compliance with EMP
		construction sites. Posters will be displayed prominently in relevant areas of the site. • Train all construction workers in basic sanitation, general health and safety matters, and 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.	

Source: Adapted from project IEE.

19. For the C4 construction, the contractor's assigned environmental management staff is Mr. Lv Jinqiu. The contractor provided the labor protection appliance to its workers, and installed the environmental protection policy board sign as shown in picture 1; the construction wastes are removed from the site to approved spoil disposal site; the petroleum products (gasoline and diesel) are stored in secure, covered area; and the construction wastewater settlement basin is installed on the site as shown in picture 2.



Pic.1 Environmental Protection Publicity Board (Taken in July 2016)

Pic.2 On-site Settling Tank of Construction Wastewater (Taken in July 2016)

V. SUMMARY OF ENVIRONMENTAL MONITORING

A. Monitoring plan and responsibilities

20. The project monitoring program focuses on the environment within the project's area of influence (during the report period, only ongoing construction was the C4, civil construction of Longxi Water Supply Plant). The contract for the Loan Implementation consulting service was signed in late June 2016, during the consultants' inception period in July 2016, the monthly monitoring form was distributed to the Contractor and CSC (**Appendix 1**). The Contractor and CSC will conduct daily internal environmental inspections in the construction site, the inspection result will be documented in monthly internal environment inspection reports, submitted to the PMO and the LIEC once a month, the inspection result will be included in the next EMR.

21. The Chaonan District EMS was contracted by the PMO to conduct environment compliance monitoring at construction site and environmentally sensitive spots, in accordance with the environment monitoring program show in **Table 7**, which is derived from the original monitoring plan defined in the Project IEE.

Table 7: Environmental Monitoring Program

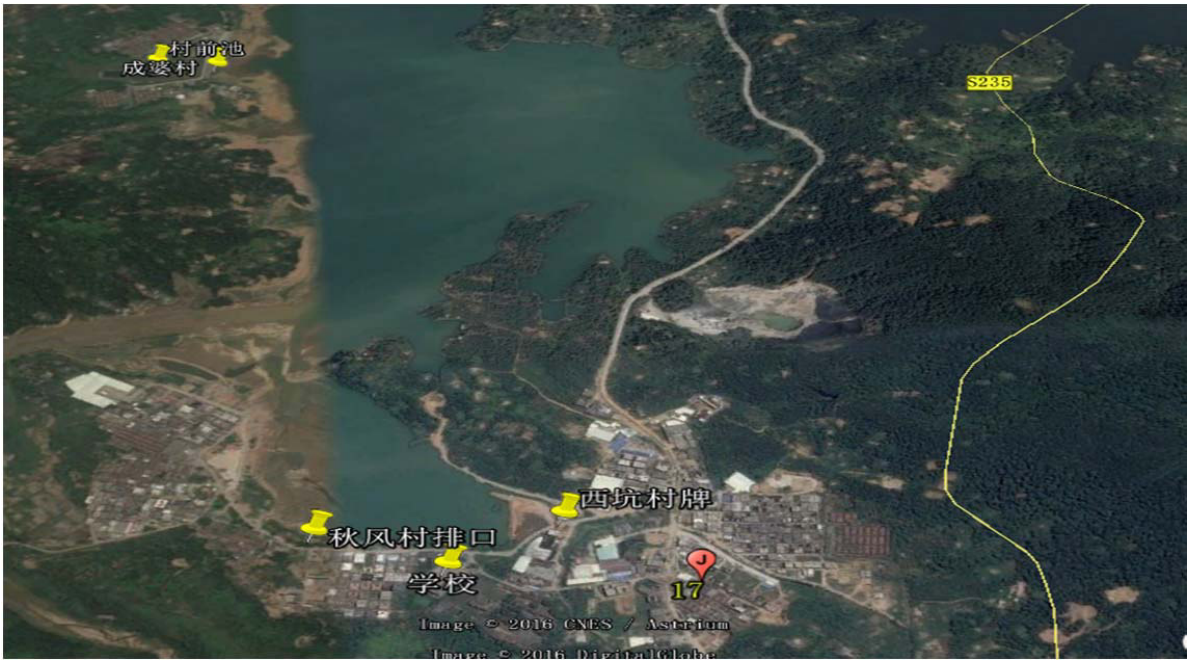
Subject	Parameter	Location	Frequency
Reservoir water quality	pH, SS, NH3-N, CODcr, BOD_5, TP, oil, total coliforms	Center of Qiufeng, Jinxi and Longxi reservoirs, and, the water intake points of the three WSPs	Once a month
Water quality of wastewater drainage creeks	pH, SS, NH3-N, CODcr, BOD_5, TP, oil, total coliforms	At discharge points of the wastewater drainage creeks of Liangying, Nanshan and Shenxi	External monitoring: once per day for 3 consecutive days, twice per year
Air	Inspect dust mitigation measures (IEE Table A.3) and maintenance of vehicles and construction equipment	Visual inspection at all construction sites	Internal Monitoring: at least once a month External Monitoring: at least twice per year
	TSP, NOx	All construction sites (at least one point 100 m upwind, two points 100 m downwind), the spoil disposal site, and sensitive receivers nearby (see Section IV of IEE -sensitive receivers within project area of influence)	External Monitoring: twice per day for 3 consecutive days, twice per year
Noise	LAeq	Boundaries of all WSPs, and sensitive receivers near the pipeline construction sites	External monitoring: twice per day (once in day time and once at night time) for 2 consecutive days, once per month.
Solid Waste	Garbage from work-camps and construction waste at construction sites	Visual inspection at all construction sites and work-camps	Internal Monitoring: Monthly. External Monitoring: Twice per year
Soil erosion, vegetation	Quantity of soil erosion and ecologic restoration	Visual inspection at borrow pit and spoil sites	Internal Monitoring: Radom check after rainstorm (rainfall> 50mm)

Subject	Parameter	Location	Frequency
			External Monitoring: twice per year, and once after completion of construction
	Compensatory plantings and re-vegetation of spoil disposal sites and construction sites	Visual inspection at all disposal sites 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	Monthly Internal Monitoring; External Monitoring: Twice per yea

Source: Adapted from project IEE

B. Monitoring Results for Qiufeng Reservoir

22. **Surface Water.** The monitoring was conducted on 2nd March 2016. The monitoring locations were Chenpo village (23°10'42.00"N, 116°20'52.00"E) and Qiufeng Village (23°9'56.28"N, 116°21'2.59"E), the yellow pin sign as shown in Picture 3.



Pic. 3. The monitoring locations of the Qiufeng Reservoir

23. The monitoring locations and the corresponding sample numbers are shown in **Table 8**

Table 8: Monitoring locations and sample number

Sampling location	Sample No.

Domestic waste water drainage inlet of Qiufeng Village	S16030216
Domestic waste water drainage inlet of Qiufeng Village in reservoir (left 20m)	S16030217
Domestic waste water drainage inlet of Qiufeng Village in reservoir (right 20m)	S16030218
Domestic waste water penetration point of Chengpo Village (left)	S16030219
Domestic waste water penetration point of Chengpo Village (right)	S16030220

24. The Monitoring parameters, method, standard, instrument and detection limit is shown in **Table 9** below:

Table 9: Monitoring Methods, Instrument and Detection Limit

Parameter	Examination Method and Standard No.	Instrument	Detection Limit
PH	Glass electrode method GB/T 6920-1986	420A+type acidometer	--
Suspended solids	Gravimetric method (Membrane filter method) GB/T 11901-1989	Electro-thermal constant-temperature dry box CP224S electronic balance	10 mg/L
CODcr	Fast catalysis-digestion-sealed method, 《water and wastewater monitoring analysis method》（4th version）MEP（2002）	WMX, Microwave digester	5 mg/L
BOD5	Dilution and inoculation method HJ 505-2009	SPX-150B-Z, Biochemical incubator	0.5 mg/L
Ammonia nitrogen	Nessler's reagent spectrophotometry HJ 535-2009	UV-1201 ultraviolet and visible spectrophotometer	0.025 mg/L
Total phosphorus	Ammonium molybdate spectrophotometric method GB/T 11893-1989	UV-1201 ultraviolet and visible spectrophotometer	0.01 mg/L
Petroleum	Infrared spectrophotometry HJ 637-2012	IR-200A type three wave infrared metering instrument	0.05 mg/L
Total coliform	Membrane filter method 《water and wastewater monitoring analysis method》（4th version）	PCS/L	

25. Parameters of pH, CODcr, BOD_5, NH_3-N, SS, DO, TP and coliform were monitored and the monitoring results are shown in **Table 10**. The monitoring result shows that except the TP in the domestic wastewater drainage inlet of Qiufeng village, the other water quality parameters meet the Grade II standard of GB3838-2002.

Table 10: Monitoring Result in Qiufeng Reservoir

Unit: Except pH and total coliform, all are mg/L

Sample No	Sampling location	PH	SS	CODcr	BOD_5	NH_3-N	TP	Petroleum	Total coliform
S16030216	Domestic waste water drainage inlet of Qiufeng village	7.12	10	10	0.6	0.035	0.14	ND	4.3×10^3
S16030217	Domestic waste water drainage inlet of Qiufeng village in reservoir (left 20m)	7.18	12	12	0.7	0.043	ND	ND	2.1×10^3
S16030218	Domestic waste water drainage inlet of Qiufeng village in reservoir (right 20m)	6.98	15	8	0.5	0.079	0.04	ND	2.2×10^3
S16030219	Domestic waste water penetration point of Chengpo village (left)	7.16	13	8	ND	0.065	0.04	ND	1.0×10^3
S16030220	Domestic waste water penetration point of Chengpo Village (right)	7.13	9	13	0.5	0.079	0.04	ND	1.0×10^3
Surface Water Environmental Quality Standard(GB 3838-2002)-Class II		6~9	--	20	4	1.0	0.2	0.05	--
Surface Water Environmental Quality Standard（GB 3838-2002)- Class II		**6~9**	**--**	**15**	**3**	**0.5**	**0.1**	**0.05**	**--**

C. Noise monitoring for Longxi WTP

26. Four (4) monitoring locations were selected for the noise monitoring around the boundary of Longxi WTP construction site. The east and west boundaries are farmland, south boundary is a factory, and north boundary is Chensha Road, no construction work was conducted at night. The monitoring was conducted on 8 March 2016 from 12:35 to 12:58. The monitoring method, instrument and detection limit are shown in **Table 11**. The monitoring result is shown in **Table 12**, which shows that all the monitoring data meet the environmental quality standard for noise (**GB 12523-2011**).

Table 11: Monitoring Methods, Instrument and Detection Limit

Item	Methods	Analysis instrument	Detection limit
Noise	Emission standard for industrial enterprises noise at boundary(GB 12348-2008)	Noise Analyzer AWA6228, Sound Calibrator AWA6221A	30dB(A)

Table 12: Noise Monitoring Data of Longxi Water Supply Plant (Leq[dB(A)])

No.	Monitoring points	Daytime	GB 12523-2011
1	East boundary	54.4	70
2	South boundary	56.8	70
3	West boundary	58.7	70
4	North boundary	62.7	70

VI. PUBLIC CONSULTATION, GRIEVANCE REDRESS MECHANISM

27. **Public consultation** for each subproject has been conducted during preparation of the domestic EIA and the IEE in accordance with the PRC Guideline on Public Consultation in EIA (2006) and ADB's SPS (2009). Information disclosure and public consultation included: i) two rounds of internet/newspaper disclosure; ii) numerous meetings with key stakeholders, including representatives of the affected public, local authorities and sector specific organizations; iii) informal visits to communities and households in the project areas; iv) two questionnaire surveys; and v) a wider stakeholder meeting attended by affected people and other concerned stakeholders.

28. A **grievance redress mechanism (GRM)** was established in compliance with ADB's SPS (2009) requirement to prevent and address community concerns and assist the project to maximize environmental and social benefits. The GRM was presented and discussed with potentially affected persons during public consultation.

1) The PMO has established a Project Public Complaint Unit (PPCU), coordinated by the environment management units (EMU);

2) The contact details for the entry points (e.g. phone numbers, addresses, e-mail addresses, etc.) are shown in **Table 13** and are publicly disseminated on information boards at construction sites and on the website of the local government. Clear redress procedures have been established, based on the GRM defined in the IEE;

3) The PPCU have established GRM tracking and documentation system.

Table 13: Contact information for the project public complaint Unit

Agency/Institution	Person in charge	Position	Telephone	Email
Construction Contractor	*Jinqiu Lv*	Site manager	13650986002	
	Mucai Zheng	Engineer	15913974313	591683788@qq.com
CSC	*Zejie Chen*	Representative of Construction Supervision	15919699858	
	Chenghou Jin	Supervision Engineer	17725767025	514938562@qq.com
CEPB	*Hongxu Huang*	Division Director	0754-87921635	stcnhbj@163.com
CWAB	*Xianze Wu*	Division Director	13822830928	cnqjgzx@163.com
CEB	*Xueli Weng*	Division Director	13542848099	cnqjcjyg@16.com
CFoB	*Jianbiao Zhang*	Division Director	13612337807	cnlyylg@163.com
CUMB	*Minfeng Xiao*	staff	0754-83791013	cncgj@sina.cn
CWSC	*Hongzhou Ma*	Division Director	0754-87750104	Mhzhou8231@126.com
Chaoyang PMO	*Junhao Lin*	Division Director	0754-87750106	5133200@qq.com
	Kai Chen	Staff		

VII. INSTITUTIONAL STRENGTHENING AND TRAINING

29. A capacity building and training program has been defined in the project EMP, which addresses immediate training needs, i.e. training needed for project personnel in order to ensure that contractors and CSCs are well versed in environmentally sound construction practices and are able to undertake all construction with the appropriate environmental safeguards.

30. The LIECs of HJI Group has been hired under the loan implementation consultancy service. The consulting service contract was signed on June 23rd 2016 and the LIECs will conduct training (by the EMR completion, the training has been conducted) to the staff, technicians and managers from the PMO, IAs, the contractors, the CSCs and other related units. The main contents of training includes (i) introduction of ADB's SPS and the World Bank's Environment, Health and Safety Guideline; (ii) Drinking water source protection; (iii) Impact to soil erosion and water conservation by global climate change; (iv) EMP management; (v) project GRM implementation; and (vi) best practices for EMP implementation during construction including responsibilities of contractors and CSCs.

31. Planned training activities in the next reporting period (July to December 2016) are presented in **Table 14**:

Table 14: Capacity Building and Training Program (adapted from Project EMP)

Topic	Attendees	Contents
ADB's and PRC's environmental laws, regulations and policies	Contractors, CSCs, IAs, EPB, EMS, FB, PMO, OPs	● ADB's SPS (2009). ● Relevant PRC environmental laws, policies, standards, regulations for construction, surface water pollution, drinking water protection; ● Best environmental management practice for civil works – WSP, pipeline
Grievance Redress Mechanism	IAs, contractors, PPCU, OPs, EPB, EMS, community representatives from villages near WSPs and construction areas	● GRM structure, responsibilities, timeframe; ● Types of grievances, eligibility; ● Gender responsive GRM ● Recording and reporting procedures
EMP implementation	Contractors, CSCs, IAs, EPB, EMS, PMO, Ops	● Responsibilities under EMP and how to implement specific tasks; ● Environmental protection contents during construction and WSPs operation; ● Environmental forms and reporting (daily and monthly); ● EMP improvement and corrective actions.
Soil erosion protection	Contractors, CSCs, City/county IAs, EPB, EMS, FB, WRB, Ops	● Risks for soil erosion and other hazards; ● Mitigation measures.
Environmental	Contractors, CSCs, EPB,	● Monitoring and inspection methods, data

monitoring, inspection, and reporting	EMS	collection and processing, interpretation of data, reporting system QA/QC control during environmental monitoring

32. The contractor and CSC's monthly standard forms (**Appendix 1**) for recording environmental management and mitigation measures was prepared and distributed to the contractors (C4 and C3) and the CSCs by the LIECs, which are required to be submitted to the PMO, IAs and the consultants monthly with the signatures of site managers and environmental engineers of contractors and CSCs.

VIII. ISSUES, CORRECTIVE ACTIONS, RECOMMENDATIONS

33. The project implementation progress is smooth so far and the construction quality is general satisfactory. As the project management procedures become clearer for implement units, the project implementation will get more improvements.

34. **EMP implementation is generally satisfactory.** The Contractors and CSCs of C4 and C3 have assigned staff in charge of daily environment, health and safety inspections. Monthly internal monitoring reports (the standard form prepared by the LIECs was distributed to the contractors and CSCs in July 2016 after the consulting service start) are submitted to the PMO, which has established environment management unit (EMU). The GRM has been setup in both PMO and local EPB. So far, no complaints have been filed.

35. EMP related issues observed during the reporting period, and corrective actions implemented or planned, are described below:

36. **Bidding document preparation and contract for reforestation around the reservoirs**- The bidding document preparation shall use the standard bidding document template approved by the PRC MOF and ADB. Meanwhile, the technical bidding document shall include all major items for construction and environmental mitigation measures to avoid potential future variation. It is decided that when the consultant team start to work, they should have more detailed review in design drawings and bidding document to minimize the possible missing items, including reference to, and main components of, the EMP. Such as reviewing the bidding document of C2: Water conservation reforestation around the three major reservoirs. The purpose of reforestation is to water conservation, reduce soil erosion around the three reservoirs, and increase biological diversity. The subproject of reforestation around the reservoirs will be implemented in 2016 to 2017, which will involve some environmental sensitive issue, such as water pollution by using fertilizer and pesticide during reforestation activities. The major mitigation measures consultants will insist are as follows:

1) Native broad-leaved tree species, shrubs, and grasses will be used for reforestation.
2) Target sites are eroded and bare hill slopes facing the reservoir waterbodies.
3) Only base fertilization will be applied, without top-dressing fertilizer or pesticide spraying, to avoid contaminated runoff into streams and the reservoirs.
4) Planting will comprise a mixed mosaic of forests, shrubs, and grasses rather than mono-stands of a single or few species; and
5) No foreign species will be used for reforestation.

Appendix 1: Constructors and CSCs' monthly internal monitoring reports

承包商/监理公司内部环境监测月报 Contractor/CSC's Monthly Internal Environmental Inspection Report

合同编号 Contract No.		合同名称 Name of Contract		承包商 Contractor		承包商项目经理 Manager of Contractor	
开工日期 Date of Construction Start		监理公司 Construction Supervision Co.		监理公司环境工程师 Environmental Engineer of Supervision Co.		承包商环境管理人 Environmental Management Staff of Contractor	
施工内容 Construction Content							

环保措施/检查项目 Mitigation measure/ Inspection Item		1. 月份/年（Month/year）																													
		2. 每日监测 Daily Internal Monitoring																													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
施工小时 Hours of Construction	1																														
施工现场扬尘控制 Dust control on Site	2																														
运输道路防尘 Dust control on haul roads	3																														
车辆和机械尾气排放控制 Machineries and vehicles emission control	4																														
运输车辆和材料覆盖 covering haling vehicles & materials on site	5																														
燃料供给、机械和车辆停放区域环保措施 measures for machineries and vehicles refueling and parking areas..	6																														
机械和车辆噪声控制 Noise control for machineries and vehicles	7																														

土壤和水源保护措 Measures for soil and water source protection	8																														
燃料存储地-标签及警告标志 Fuel storage safety (labels & warning symbols)	9																														

3. 每周监测 (每周一次) Weekly Internal Monitoring (Once per week)

No. of Week		1	2	3	4	5
建筑材料和土方覆盖措施 Convering construction materials and earth	10					
建筑垃圾堆放和处理 Construction wastes piling and disposal	15					
有毒有害材料和废物（包括油料）的储存和处理措施。Storage and disposal of Hazardous materials including petroleum products.	16	。				
施工废水排放措施 Measures for construction wastewater discharge	17					
施工废水沉淀池 Settlement Basin	18					
工地生活污水排放和垃圾处置 Measures for	19					

wastewater and rubbish from workers camps						
现有植被保护 Existing vegetation protection	20					
再种植（绿化）Re-vegetation	21					
现有文物保护 Protection existing culture relics if any	22					
现有设施恢复 Rehabilitation of damaged public facilities	23				无	
4. 每月监测（每月一次）Monthly Internal Environmental Inspection (Once per month)						
取土坑恢复 Restoration of borrow pits	24					
弃土坑使用和恢复措施 Restoration of spoil disposal sites	25					
现场固废外运处置 Removal/ Disposal of wastes on site	26					
施工现场恢复 Restoration of construction sites	27	。				
职业安全措施保护 Occupational safety and health	28					

我，以我的知识，在此证明以上信息是真实和正确的。I hereby certified the above information is true and correct to the best of my knowledge.

承包商签字盖章/(职务）Signature/Stamp (Position) _____ 日期 Date_____

监理工程师签字盖章/(职务）Signature/Stamp (Position) _____ 日期 Date_____