ADB

Environmental Monitoring Report

Project Number: 46079-002
February 2017

PRC: Guangdong Chaonan Water Resources Development and Protection Demonstration Project – Environmental Monitoring Report No.4 (July to December 2016)

Prepared by Project Management Office of Guangdong Chaonan District and HJI Group Corporation for the Asian Development Bank.

Asian Development Bank

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Project No.: 3114-PRC

4th Semiannual Report (July – December 2016)

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CURRENCY EQUIVALENTS
(as of January 2017)

Currency Unit	–	Chinese Yuan (CNY) US Dollar ($)

CNY1.00	=	$0.15
$1.00	=	CNY6.90

ABBREVIATIONS

ADB	Asian Development Bank
CDG	Chaonan District Government
CSC	Construction Supervision Company
EA	Executing Agency
EHS	Environment, Health and Safety
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMR	Environmental Monitoring Report
EMS	Environment Monitoring Station
EMU	Environmental Management Unit
EPB	Environmental Protection Bureau
GRM	Grievance Redress Mechanism
IEE	Initial Environmental Examination
LIEC	Loan Implementation Environmental Consultant
MEP	Ministry of Environmental Protection
NOx	Nitrogen Oxides
PMO	Project Management Office
PPCU	Project Public Complaints Unit
PRC	People's Republic of China
SPS	Safeguards Policy Statement
WSP	Water supply plant

WEIGHTS AND MEASURES

dB(A)	A-weighted sound pressure level in decibels
ha	hectare
km	kilometer
m	meter
m^2	square meter
m^3	cubic meters
mg/l	milligrams per liter
mg/m^3	milligrams per 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 Corporation, USA, together with the project management office (PMO) of Chaonan District, Guangdong Province, People's Republic of China (the PRC) to Asian Development Bank (ADB) for the Guangdong Chaonan Water Resources Development & Protection Demonstration Project (the Project). It is the fourth EMR, covering the period from July to December 2016. The report is based on (i) the compliance environmental monitoring report, provided by Chaonan District Environmental Monitoring Station (EMS); (ii) The contractors and construction supervision companies' (CSCs) internal environmental inspection reports; and (iii) the Consultants and the PMO's construction sites inspections.

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 arrangements for EMP implementation and supervision; the external environmental monitoring results; project readiness assessment; training; public consultation and the grievance redress mechanism (GRM).

B. Project Objective and Components

3. Chaonan District Government has borrowed $100 million for the Project from the ADB and the Loan Agreement was signed on 30 May 2014. The date of the loan effectiveness is 12 August 2014 and the loan closing date is 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	27-31 October 2016

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 and the rest is the counterpart fund.

4. The project aims at providing better and equitable water supply services to about 1.33 million urban and rural residents in Chaonan District by integrating urban–rural water supply systems and reducing water losses, providing better health and quality of life in Chaonan District. The project includes three components: water resources protection improvement, water supply infrastructure improvements and institutional and staff capacity strengthening and they are summarized below.

5. **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.

6. **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.

7. **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

8. The project has 26 contract packages financed by ADB loan, including 13 civil works contract packages, 9 goods contract packages and four consulting service contract packages. By the end of December 2016, six (6) contract packages have been procured and awarded,

and started construction (civil works contract packages and equipment contract packages) or engaged (consulting service contract). There are two other contract packages under bid evaluation and contract award. Additionally, 9 contract packages have been submitted to ADB for review. The summary of contract classification and award is shown in **Table 2**.

Table 2: Contract Package Classification and Awarding

Contract Package Category	Contract Package Subdivision	Quantity	Total Based on Category	Total
Works	Improved water resources protection	2	13	26
	Improved water supply infrastructure	11		
Goods	Improved water resources protection	1	9	
	Improved water supply infrastructure	6		
	Strengthened institutional and staff capacity	2		
Consulting	Improved water supply infrastructure	2	4	
	Strengthened institutional and staff capacity	2		

9. As of the end of December 2016, four contract packages, including Longxi WTP civil works and equipment procurement package, main pipelines and equipment installation packages of Shikeng to Yangfenchen section, Wugou reservoir to Longxi WTP section and Shikeng to Jingdu section, have made substantial progress. They are described below.

10. **Longxi WSP Packages C4 and G3.** For package C4, civil works, installation, and commissioning of the Longxi WSP, a**s** of the end of December 2016, 13 buildings of the main engineering in Longxi WSP has been completed, 90% of the construction of the administrative building, water quality inspection center, decoration of dosing room has been completed. It is expected to complete the civil work construction by the end of March 2017.

11. For package G3, Supply, installation, and commissioning of equipment of the Longxi WSP and water plant maintenance equipment and pipeline leak- detecting equipment, the supply, installation and commissioning of equipment have begun the goods supply on 22 September 2016. As of the end of December 2016, the contract has provided some of the major instruments and automatic control equipment, electrical equipment and some machinery equipment.

12. **Pipeline C3 package:** Civil works, installation, and commissioning of water transmission pipelines from Shikeng to Jingdu. This package includes three sections: Shikeng to Yangfengchen section (SY), Wugou Reservior to Longxi WTP section (WL), and Shikeng to Jingdu section (SJ), respectively. The SY section includes three road subsections: national road 324 GD subsection, Chen-Xian Road subsection (CX), and Chen-Sha Road subsection (CS). The pipeline installation length is 49.5 km, including 35.77 km from Shikeng to Yangfenchen, 2.69 km (double pipes) from the Wugou Reservoir to Longxi WTP, and 8.03km from Shikeng to Jingdu.

13. **Wugou reservoir to Longxi WTP (WL) section.** Construction started on 23 July 2016. By the end of December 2016, the completed engineering works includes: excavation of 2.1 km, pipeline laying of 4.2km (double pipes), pipeline pressure test and detection, backfill, valve installation, valve shaft casting work for K0 + 572 ~ K2 + 681 section; and intake pipe

installation for K0 + 000 ~ K0 +050 section, pipe installation for K0 + 305 ~ K0 +450 section. Engineering work for GD section started on 10 August 2016, and as of the end of December 2016, the completed engineering works includes: trench excavation, pipeline laying, backfilling work for GD0 + 000 ~ GD2 + 000 section.

14. **Package G2:** Water transmission pipelines from Shikeng to Yangfenchen, Wugou reservoir to the Longxi water supply plant and Shi-Jing section, and water meters used for households. The total length of the pipeline is 49.68 km. The contract package was supplied on 31 July 2016 and 6,923 m pipes had been supplied by the end of 2016,, accounting for 13.9% of the total contract pipelines.

15. **ADB annual review mission.** ADB fielded an annual review mission to Chaonan from 27-31 October 2016 and ADB environmental officer was with the mission. The ADB mission visited the construction sites, reviewed CSC's records, discussed with the PMO, IAs and LIEC. In general the ADB mission was satisfied with the EMP implementation.

II. INSTITUTIONAL ARRANGEMENTS FOR EMP IMPLEMENTATION

16. **Executive Agency.** CDG is the executing agency (EA) for the project. A project leading group was established and is responsible for providing policy guidance and direction during project implementation. 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 responsible for daily management of the project implementation on behalf of the EA and under the guidance of the EA.

17. **Environmental Management Offices.** The PMO has designated an environmental management officer who is responsible for the implementation of the EMP. The environmental management officer's specific responsibilities include (i) overall coordination of the EMP implementation; (ii) supervising the implementation of mitigation measures during project construction and operation; (iii) supervising contractors and construction supervision companies (CSCs) on 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 PMO; (vi) coordinating the grievance redress mechanism (GRM), together with the PMO social officer; and (vii) responding to any unforeseen adverse environmental impact beyond those mentioned in the domestic environmental impact assessment (EIA), the project Initial Environmental Examination (IEE) and EMP. The PMO environment officer is supported by the loan implementation environmental consultant (LIEC) and supervised by the district EPB.

18. **Loan implementation environment consultant (LIEC).** The PMO signed the loan implementation consultancy services with HJI Group Corporation in late June 2016. LIECs are members of the consulting team from HJI Group. The LIECs advise the PMO, contractors and the CSCs on all aspects of EMP implementation and environmental monitoring for the project. The LIECs will (i) assist the PMO to update the EMP and environmental monitoring program as necessary; (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 to be submitted to ADB; (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 to check EMP implementation.

19. **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 EPB. Each contractor must appoint an environment, health and safety (EHS) officer to supervise the implementation of the on-site environment, health and safety management plan.

20. **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 have at least one environmental engineer on each construction site to: (i) supervise contractor's EMP and EHS management plan implementation performance; (ii) conduct internal environmental inspection and monitoring; (iii) complete monthly environmental performance forms to be submitted to the PMO.

21. **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 forth monitoring has been conducted in January 2017 and the monitoring report has been submitted to the PMO and the consultants. LIECs have reviewed the report and the results are incorporated in this EMR.

III. COMPLIANCE WITH ENVIRONMENT RELATED PROJECT COVENANTS

22. Compliance with covenants defined in the Loan Agreement and Project Agreement that directly or indirectly refer to environment, health and safety is assessed. The project complies with most covenants. A list of loan covenants and compliance status is shown in **Table 3**.

Table 3: Compliance with environment related project covenants

Agreement/Covenant	Section	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		
CDG shall ensure that (a) by 31 December 2015, up to 3 additional waste water collection and treatment plants, Chendian, Simapu and Longtian, each with a capacity of 30,000 cubic meters per day shall be constructed and shall become fully operational according to the Chaonan District Waste Water Treatment Plan (2013-2020) and the residents of their respective service areas shall be connected to the sanitation and sewage networks of these waste water collection and treatment plants; (b) by 31 December 2020, the three new waste water collection and treatment plants and the 2 existing waste water collection and treatment plants in Liangying and Xiashan towns shall be expanded to capacities as follows: Chendian, 50,000 cubic meters per day; Simapu, 50,000 cubic meters per day; Longtian, 70,000 cubic meters per day; Liangying, 60,000 cubic meters per day; and Xiashan, 70,000 cubic meters per day, respectively, and the residents of their respective service areas shall be connected to the sanitation and sewage networks of these waste water collection and treatment plants; and (c) by 31 December 2020, waste water management facilities in Qiufeng and Chengpo villages shall be in place and shall become fully functional.	Schedule, Execution of Project Para 7	The construction work for the expansion of Chendian, Simapu and Longtian wastewater treatment plants is still ongoing as of the end of 2016.
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; Para 9	In compliance.
CDG shall ensure that all planting activities under the Project, including water conservation reforestation, rehabilitation of	Schedule, Execution of	To be complied with (the related

Agreement/Covenant	Section	Status of Compliance
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.	Project; Para 10	construction has not started yet)
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.	Schedule, Execution of Project; Para 11	To be complied with (construction has not started yet)
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.	Schedule, Execution of Project; Para 12	In compliance. The mechanism has been established
Safeguards Monitoring and Reporting: CDG shall do the following: (a) Submit Safeguards Monitoring Reports to ADB (i) In respect of implementation of and compliance with the Environmental Safeguards and the EMP, semi-annually during construction and the implementation of the Project and the EMP, and thereafter annually during operation, until the issuance of ADB's Project completion report unless a longer period is agreed in the EMP; and (ii) In respect of implementation of and compliance with the Involuntary Resettlement Safeguards and of the RP, semi-annually during the implementation of the Project and the RP until the issuance of ADB's Project completion report unless a longer period is agreed in the RP and disclose relevant information from such reports to the respective affected people under the Environmental Safeguards and the Involuntary Resettlement Safeguards promptly upon submission; (b) If any unanticipated environmental and/or social risks and impacts arise during construction, implementation or operation of the Project that were not considered in the IEE, the EMP and the RP, promptly inform ADB of the occurrence of such risks or impacts, with detailed description of the event and proposed corrective action plan; and (c) Report any actual or potential breach of compliance with the measures and requirements set forth in the EMP or the RP promptly after becoming aware of the breach.	Schedule, Execution of Project; Para 18	In compliance. Semi-annual environmental monitoring reports have been prepared and submitted to ADB. There is no unanticipated environmental impact as of this report period.

IV. ASSESSMENT OF PROJECT READINESS

23. The project's readiness in terms of environmental management was assessed based on the indicators listed in **Table 4**, which are derived from the project IEE. 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.	The EMP is adequate and no update is required at this time
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.	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.	Yes, the environmental training has been conducted in July 2016
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.

24. 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 Implementation (pre-construction phase)

Potential Impacts and Issues	Mitigation Measures defined in the EMP	Compliance with EMP assessment
Process and equipment of WSP	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 WSP 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.	a) In compliance b) In compliance. the bidding documents for the water quality monitoring lab has been completed c) To be designed. d) In compliance.
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.	The bidding document includes items a), b) and c).

Table 6: EMP Mitigation Measures Implementation (construction phase)

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	In compliance with the EMP for ongoing construction contracts

Media	Issues	Mitigation Measures defined in the EMP	Implementation status and compliance with EMP
		temporary soil stockpiles. • Limit construction and material handling during periods of rains and high winds. • Properly re-vegetate disturbed surfaces, such as 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 ongoing construction contracts
	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	In compliance with the EMP for ongoing construction contracts

Media	Issues	Mitigation Measures defined in the EMP	Implementation status and compliance with EMP
		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 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 ongoing construction contracts
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,	In compliance with the EMP for ongoing construction contracts

Media	Issues	Mitigation Measures defined in the EMP	Implementation status and compliance with EMP
		GB2847-2005, and GB18285-2005.	
Noise	Noise generated from construction activities	• Ensure noise levels from equipment and machinery conform to PRC standard of GB12523-90. Properly maintain construction 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.	In compliance with the EMP for ongoing construction contracts
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 ongoing construction contracts
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	In compliance with the EMP for ongoing construction contracts

Media	Issues	Mitigation Measures defined in the EMP	Implementation status and compliance with EMP
		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 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 ongoing construction contracts
	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 ongoing construction contracts
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.	In compliance with the EMP for ongoing construction contracts
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	In compliance with the EMP

Media	Issues	Mitigation Measures defined in the EMP	Implementation status and compliance with EMP
		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 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.	for ongoing construction contracts
	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. Submit to 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;	In compliance with the EMP for ongoing construction contracts

Media	Issues	Mitigation Measures defined in the EMP	Implementation status and compliance with EMP
		• 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 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 and EMP.

V. SUMMARY OF ENVIRONMENTAL MONITORING

A. Monitoring plan and Responsibilities

25. The project environment monitoring program focuses on the environment impacts within the project's area of influence. The contract for the Loan Implementation consulting service was signed in late June 2016 and consultants were mobilized to Chaonan. The consultants visited the construction sites and provided training on EMP implementation to PMO staff, IA staff, contractors and CSCs. A monthly monitoring form was distributed to the contractors and CSCs during the training. The contractor and CSCs are required to conduct daily internal environmental inspections of each construction site. The inspection results are documented in monthly internal environment inspection reports and submitted to the PMO and the consultants.

26. 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 and EMP.

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.

Subject	Parameter	Location	Frequency
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) 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, Jinxi and Longxi Reservoirs

27. **Surface Water.** The surface water quality monitoring was conducted on 19 January 2017. The monitoring locations were at Chenpo village (23°10'42.00"N, 116°20'52.00"E), Qiufeng Village (23°9'56.28"N, 116°21'2.59"E), middle of Qiufeng Reservoir (23°10'0.65"N, 116°21'5.12"E), middle of Jinxi Reservoir (23°12'1.50"N, 116°17'41.2"E) and middle of Longxi Reservoir (23°8'23.93"N, 116°26'23.43"E) the yellow pin sign as shown in Photos 1, 2 and 3.

Photo 1: Monitoring locations of the Qiufeng Reservoir

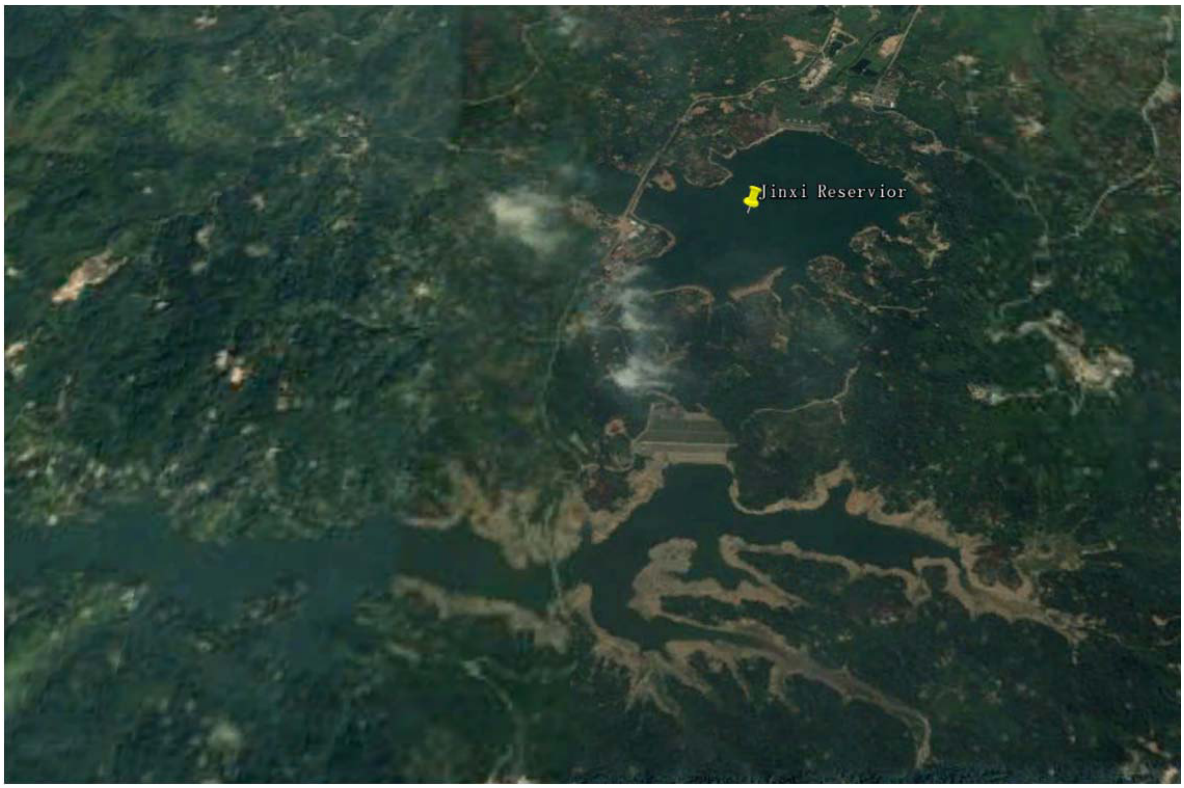


Photo 2: Monitoring locations of the Jinxi Reservoir

Photo 3: Monitoring locations of the Longxi Reservoir

Photo 6: Location of Longxi WSP

28. The monitoring locations and the corresponding sample IDs are shown in **Table 8** and the Monitoring parameters, methods, instrument and detection limits are shown in T**able 9**.

Table 8: Monitoring locations and sample number

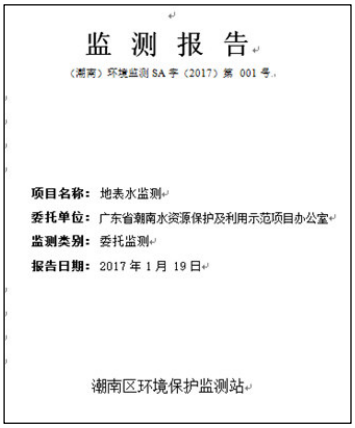
No.	Sampling location	Sample ID.
1	Domestic waste water drainage inlet of Qiufeng Village	S17011205
2	Domestic waste water drainage inlet of Qiufeng Village in reservoir (left 20m)	S17011206
3	Domestic waste water drainage inlet of Qiufeng Village in reservoir (right 20m)	S17011207
4	Domestic waste water penetration point of Chengpo Village (left)	S17011208
5	Domestic waste water penetration point of Chengpo Village (right)	S17011209
6	Jinxi Reservoir (middle reservoir)	S17011210
7	Longxi Reservoir (middle reservoir)	S17011211
8	Qiufeng Reservoir (middle reservoir)	S17011212

Table 9: Monitoring Methods, Instrument and Detection Limit

Parameter	Method and Standard	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
BOD_5	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 edition)	––	PCS/L

29. 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 results show that except the TP in the domestic wastewater drainage inlet of Qiufeng village, all other water quality parameters meet the Class II standards of PRC national standards as specified in GB3838-2002.



监 测 报 告

（潮南）环境监测 SA 字（2017）第 001 号

项目名称：地表水监测

委托单位：广东省潮南水资源保护及利用示范项目办公室

监测类别：委托监测

报告日期：2017 年 1 月 19 日

潮南区环境保护监测站

Table 10: Monitoring Result in Qiufeng, Jinxi and Longxi Reservoirs

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

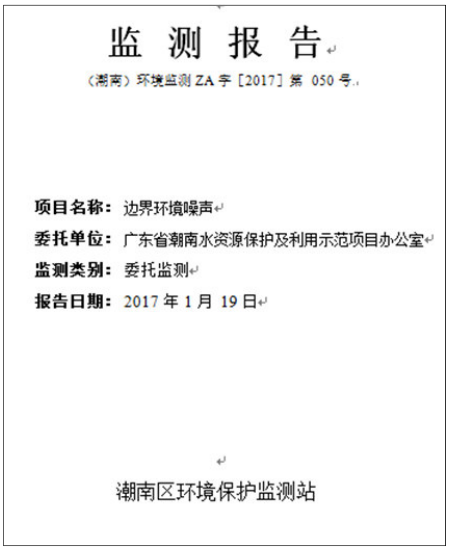
Sample No	Sampling location	pH	SS	CODcr	BOD_5	NH_3-N	TP	Petroleum	Total coliform
S17011205	Domestic waste water drainage inlet of Qiufeng village	6.29	ND	ND	ND	0.063	0.13	ND	3.5×10^3
S17011206	Domestic waste water drainage inlet of Qiufeng village in reservoir (left 20m)	6.58	ND	ND	ND	0.142	0.07	ND	1.9×10^3
S17011207	Domestic waste water drainage inlet of Qiufeng village in reservoir (right 20m)	7.02	ND	ND	ND	0.096	0.13	ND	2.0×10^3
S17011208	Domestic waste water penetration point of Chengpo village (left)	6.46	ND	ND	ND	0.134	0.13	ND	1.3×10^3
S17011209	Domestic waste water penetration point of Chengpo Village (right)	6.52	ND	ND	ND	0.068	ND	ND	1.4×10^3
S17011210	Jinxi Reservoir (middle)	7.16	ND	ND	ND	0.032	0.13	ND	4.5×10^3

S17011211	Longxi Reservoir (middle)	7.22	ND	ND	ND	0.043	0.15	ND	2.2×10^3
S17011212	Qiufeng Reservoir (middle)	7.24	16	ND	1.09	0.066	0.025	ND	1.5×10^3
Surface Water Environmental Quality Standard (GB 3838-2002)-Class III		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**	**--**

ND = Not detected

C. Noise Monitoring for Longxi WTP

30. 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 12 January 2017. The monitoring method, instrument and detection limit are shown in **Table 11**. The monitoring results are shown in **Table 12**, which shows that all the monitoring data meet the environmental quality standard for noise (GB 12523-2011). There was no noise measurements data in the report from Chaonan EMS.



监 测 报 告

（潮南）环境监测 ZA 字［2017］第 050 号

项目名称：边界环境噪声

委托单位：广东省潮南水资源保护及利用示范项目办公室

监测类别：委托监测

报告日期：2017 年 1 月 19 日

潮南区环境保护监测站

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	Standard (GB 12523-2011)
1	East boundary	56.3	70
2	South boundary	55.5	70
3	West boundary	55.8	70
4	North boundary	67.9	70

VI. PUBLIC CONSULTATION, GRIEVANCE REDRESS MECHANISM

31. **Public consultation.** Each subproject has conducted public consultations during preparation of the domestic EIA and the IEE in accordance with the PRC Guideline on Public Consultation for 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. There is no additional public consultation activity during this report period.

32. 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.

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

ii) 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; and

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

33. During the reporting period, LIEC visited construction sites, inspected reports from each CSC, and contacted local EPB. No complain was received from any of the entry point during the reporting period.

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

34. 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.

35. The LIECs of HJI Group has been hired under the loan implementation consultancy service. LIECs conducted training to the staff, technicians and managers from the PMO, IAs, the contractors, the CSCs and other related personnel in July 2017. 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; (vi) best practices for EMP implementation during construction including responsibilities of contractors and CSCs; and (vii) construction safety management. Detailed training topics covered during the training are listed in Table 14.

36. The contractor and CSC's monthly standard forms for recording environmental management and mitigation measures was prepared and distributed to the contractors and the CSCs during the training workshop. The contractors and CSCs are required to be submitted the completed form to the PMO.

Table 14: Capacity Building and Training in July 2016

Topic	Attendees	Contents
ADB's and PRC's environmental laws, regulations and policies	Contractors, CSCs, IAs, EMS, PMO	➢ 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	Contractors, CSCs, IAs, EMS, PMO	➢ GRM structure, responsibilities, timeframe; ➢ Types of grievances, eligibility; ➢ Gender responsive GRM ➢ Recording and reporting procedures
EMP implementation	Contractors, CSCs, IAs, EMS, PMO	➢ 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, IAs, EMS, PMO	➢ Risks for soil erosion and other hazards; ➢ Mitigation measures.
Environmental monitoring, inspection, and reporting	Contractors, CSCs, IAs, EMS, PMO	➢ Monitoring and inspection methods, data collection and processing, interpretation of data, reporting system QA/QC control during environmental monitoring
Construction site safety management	Contractors, CSCs, IAs, EMS, PMO	➢ Safety risk identification and assessment ➢ Specific safety risks at construction sites ➢ Safety awareness training ➢ Safety procedures at construction site ➢ Incident reporting procedures ➢ Safety inspection and reporting

VIII. CONCLUSIONS

37. The EMP implementation is generally satisfactory. The Contractors and CSCs for civil works contracts have assigned staff in charge of daily EHS inspections of each construction site. Monthly internal monitoring reports are submitted to the PMO using the standard form prepared by the LIECs and distributed to the contractors and CSCs in July 2016. The PMO, has established environment management unit (EMU) for the supervision of the EMP implementation. The GRM has been setup in both PMO and local EPB. So far, no complaint was received from any entry point.

38. Chaonan area had more than normal rainfall during the reporting period. Fugitive dust was not a serious issue at the construction sites. The Chaonan EMS did not measure TSP around the construction sites as required by the Environment Monitoring Plan. The PMO has discussed this issue with Chaonan EMS and they agreed to measure TSP in the next reporting period.

APPENDIX 1: PHOTOS OF CONSTRUCTION SITES


09/26/2016


09/26/2016


建设优质工程，创造优良信誉。
09/26/2016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