ADB

Environmental Monitoring Report

Project Number: 46079-002
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PRC: Guangdong Chaonan Water Resources Development and Protection Demonstration Project – Environmental Monitoring Report (July-December 2015)

Prepared by Project Management Office of Guangdong Chaonan Water Resources Development & Protection Demonstration Project and Chaonan District Environmental Monitoring Station

Asian Development Bank

Guangdong Chaonan Water Resources Development & Protection Demonstration Project
Loan Number：3114-PRC

Environmental Monitoring Report

Second-phased

Environmental Monitoring Period：1 July 2015–31 December

Report Submitted to

Resident Mission in the People's Republic of China

Report Prepared by

Project Management Office of Guangdong Chaonan Water Resources Development & Protection Demonstration Project

and

Chaonan District Environmental Monitoring Station

Shantou Municipality, China
January 1, 2016

Guangdong Chaonan Water Resources Development & Protection Demonstration Project

（Project Number：3114-PRC）
Environmental Monitoring Report

Environmental Monitoring Unit： Chaonan District Environmental Protection Monitoring Station

Project Management Agency： Project Management Office of Guangdong Chaonan Water Resources Development & Protection Demonstration Project

Environmental Monitoring Period： 1 July 2015–31 December

I. Project Background

Chaonan District is a county-level administrative division of Shantou Municipality, Guangdong Province, the People's Republic of China (PRC). Chaonan District faces the great challenge of ensuring water security for its social and economic development due to lack of adequate water treatment and supply facilities, water pollution, and weak institutional capacity. The total annual average water resources in Chaonan District are about 580 million m3, of which annual surface water runoffs are about 548 million m3, and ground water resources are about 32 million m3. The average per capita water resources are about 450 m3, which is about 20% of the national average of 2,200 m3 or 26% of the provincial average of 1,700 m3. The ground water in Chaonan District could not be used for drinking water purpose due to its higher fluorine content, as well as the surface water pollution as a result of its rapid economic and social development activities of Chaonan in recent years. In addition, the gap between water demand and supply has been widening due to inadequate water supply capacity and increasingly growing comprehensive water consumption. Moreover, a number of small rural water supply plants (WSPs) are operating in a small sacle with lower technical standards and poor management skills, resulting in unsafe and non-secured water supply.

To help protect water resources and improve water security in Chaonan District, Guangdong Province, the government of PRC applied to the Asian Development Bank (ADB) during the country programming mission held in Manila in November 2011, to t for the

Guangdong Chaonan Water Resources Development and Protection Demonstration Project (the Project implemented by the governments of Guangdong Province and Chaonan District.

The proposed Project will provide improved water supply to about 1.23 million populations of Chaonan District, inclusive of urban and rural residents by integrating urban–rural water supply systems and reducing water losses. The Project will provide assistance to Guangdong Provincial Government (GPG) and Chaonan District Government (CDG) to improve its water supply services equitably; protect its water resources; improve the overall living conditions; improve the environment; increase public awareness on environment and sanitation; and strengthen institutional and capacity building on water resources management and water quality monitoring. The implementation of the Project will greatly promote effective water resources protection and efficient utilization in the the region and will be an important model demonstration to facilitate the transformation and upgrading of Guangdong's urbanization, and to "build a wealthy Guangdong".

The Government of the PRC has requested a loan of $100 million from ADB's ordinary capital resources to finance 42.89% of the project cost under ADB's London interbank offered rate (LIBOR)-based lending facility. The loan will have a 25-year term including a grace period of 5 years, an interest rate determined in accordance with ADB's LIBOR-based lending facility, a commitment charge of 0.15% per annum, and such other terms and conditions set forth in the draft loan and project agreements. The loan will cover civil works, equipment, and Institutional strengthening and capacity development. In addition to the $100 million loan requested from ADB, all the rest funds will be borne by the Guangdong Provincial Government and Shantou Municipal Government respectively.

II. Project's Main outputs

The Project will include three outputs/components: (i) improved water resources protection; (ii) improved water supply infrastructure; and (iii) strengthened institutional and staff capacity. Details are as below：

Summary of Outputs and Components

Output/ Component	Description
A. Improved water resources protection	A.1 Public awareness on environment and sanitation A.1.1 Training of school teachers and students A.1.2 Development of education and training materials

Output/ Component	Description
	A.1.3 Establishment of an exhibition hall A.1.4 Field trips and social survey A.1.5 Propaganda at schools A.1.6 Public participation A.2 Water conservation reforestation in catchments of Jinxi, Longxi, and Qiufeng reservoirs A.3 Study on pollution prevention and control measures in the catchment of Jinxi, Longxi, and Qiufeng reservoirs A.3.1 Pollution source survey and control technology A.3.2 Nonpoint source pollution prevention A.3.3 Wastewater collection and treatment technology A.4. Solid waste collection and treatment in Qiufeng and Chengpo villages
B. Inclusive Water Supply Infrastructure	B.1 Expansion of Qiufeng water supply plant (WSP) by 72,000 m^3/day B.2 Rehabilitation of Jinxi WSP B.3 Construction of Longxi WSP (capacity of 100,000 m^3/day) B.4 Installation of water delivery and distribution pipelines with a total length of about 1,000 km B.5 Establishment of Water quality monitoring center B.6 Installation of water meters B.7 Provision of operation and maintenance equipment
C. Strengthened institutional and staff capacity	C.1 Provision of project implementation consulting services, training and study tours C.2 Support for the establishment of a water supply control center C.3 Support for establishment of a water resources management and three-prevention (flood, drought and typhoon) regulating system/center C.4 Development of a water resources protection and development action plan C.5 Establishment of a project monitoring and evaluation system

III. Project Implementation Progress

This Project mainly includes: 15 civil works packages, C1-C15; 9 equipment procurement packages, G1- G9; 12 packages of consulting services and survey and training, T1-T12. By the completion of this report, regards of civil works packages, all bidding and procurement of packages have not been started except construction of Longxi WSP, and construction contract of C10 was signed on June 2013.

To coordinate with road construction in Chaonan district, avoid repeated investment and safe financial funds, in July 2013, Chaonan district start first-phase of water supply pipelines construction underneath roads（Package C10）, which mainly includes laying water supply main pipes of DN100—DN800 along G324 line from Xinqing to Yangfengchen, S237 and 337 line from Heping Chaoyang to Huilai, Chaonan section of G324 changed line, with budgetary investment of RMB 64,678,000. So far, about 30,000,000 CNY of construction amount has been completed, which accounts for 46% of the planned investment. Among the construction, main pipes for G324 line from Xinqing to Yangfengchen, and S237 and 337 line from Heping Chaoyang to Huilai is basically completed and pressure acceptance test without water for different sections is conducted. However, because the Chaonan section of G324 changed line is still in the stage of subgrade treatment, and drainage channel along both sides of roads are not constructed, the corresponding water supply pipelines can't be started on time, which directly affects the project progress, and it is predicted that the construction task cannot be completed in July 2015 according to the previous plan.

Longxi WSP Civil Works. The designed capacity of Longxi WSP is 100,000 m3/d, with total approved budgetary construction investment of RMB 121 million, whose main construction content include: clean water treatment facilities, sludge treatment facilities, water delivery pumping station, water quality testing center, water dispatching center and other production and management supporting facilities. Currently, public tendering for project civil works, supervision unit, and equipment installation has been completed, and the construction unit has been in place for construction, with field leveling, foundation pilling and excavation being carried out.

IV. Set up and Function of Implementation and Supervision Institution for Environmental Management Plan

Project Leading Group. The CDG has established a leading group headed by the director of the CDG, which includes the director or deputy director of the district Development

and Reform Commission (DRC), the Urban Management Bureau (UMB), EB, EPB, FB, and WRB. The project leading group is responsible for directing the project and providing policy guidance during project implementation.

Project Executing Agency.CDG is the executing agency (EA) for the project, and under the Project Leading Group, Chaonan Project Management Office is established. The EA is responsible for communication with ADB, loan onlending and repayment, as well as supervision and guidance of the PMO and IAs during project implementation.

Project Implementing Agencies. The project implementing agencies include Chaonan Water Supply Company, Chaonan district bureaus of water affairs, education, forestry, environmental protection, urban management. IAs will be responsible for（1）project management during implementation；（2）coordination between different government departments；（3）monitoring schedule and project execution quality control；（4）communication and coordination between EA and other agencies. PMO and EA will be responsible for the implementation of EMP, including review, monitoring, reporting and drafting up emergency response action and mitigation measures.

Project management office environment officer. The PMO environment officer will be responsible for implementation of the EMP. The officer will take charge of: (i) overall coordination of the EMP; (ii) supervising 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 this EMP. The PMO environment officer will be technically supported by the loan environmental implementation consultant (LIEC) and supervised by the municipal and district EPBs.

At the stage of detailed engineering design, the PMO will pass the EMP to the design institute to have mitigation measures incorporated into the detailed design. The EMP will be updated at the end of the detailed design phase and finally incorporated in bidding document and construction contracts. To ensure that the contractors comply with the EMP's provisions, the PMO environment officer, with the support of the LIEC, will prepare and provide the following clauses, to be incorporated into the bidding procedures: (i) a list of environmental

management requirements to be budgeted by the bidders in their tender documents; (ii) environmental clauses for contractual terms and conditions; and (iii) major items in the domestic EIA, IEE, and EMP.

Loan implementation environmental consultant.A LIEC will be hired under SubcomponentIII-1 (Table A.1). The LIEC will advise the PMO and IAs, contractors and CSCs on all aspects of environmental management and monitoring for the project. The LIEC will (i) assist the PMO and IAs in updating the EMP, including the environmental monitoring program; (ii) verify implementation of the EMP mitigation measures; (iii) review internal and compliance monitoring reports and the semi-annual external environment performance/monitoring reports; (iv) provide training to the PMO,IAs, CSCs, and contractors on the PRC's environmental laws, regulations and policies, ADB SPS, EMP implementation, and GRM; (v) identify any environment-related implementation issues, propose necessary corrective actions, and reflect these in a corrective action program; (vi) help the PMO and IAs prepare semi-annual environmental monitoring and progress reports to ADB; and (vii) undertake regular site visits.

Construction contractors. Construction contractors will be responsible for implementing relevant mitigation measures and internal monitoring during construction with the help of CSCs and under the supervision of the district EPB.

Construction supervision companies. The CSCs will oversee construction progress and quality and EMP implementation. Each CSC shall have at least one environmental engineer on their respective construction site to: (i) supervise the contractor's EMP implementation performance; (ii) conduct internal environmental inspection and monitoring; and (iii) prepare the contractor's environmental management performance section in monthly project progress reports submitted to the PMO.

Chaonan District environmental monitoring station. The Chaonan District environmental monitoring station (EMS) will ensure compliance with PRC environmental standards and regulations through implementation of the project environmental monitoring program and regular and random environmental compliance monitoring during construction and operation. The EMS will conduct the compliance monitoring on behalf of the Chaonan EPB.

V. Implementation of Environmental Mitigation Measures

During Project Preparation Technical Assistance（PPTA）, consultants prepared a Environmental Management Plan (EMP), in which there are project environmental impacts and mitigation measures（see Attachment 1）. The mitigation measures aim to: (i) mitigate

environmental impacts; (ii) achieve compliance with PRC environmental laws, regulations and standards and ADB's SPS; and (iii) protect environmental resources and ecosystems, and maximize social-economic and environmental benefits. The EMP will be attached to the bidding document of civil works contract, requiring the contractors to be strictly in line with the EMP.

Contractor for first-phase of water supply pipelines construction underneath roads (Package C10) has completed the following：

- Spraying water on construction sites and transportation roads everyday to control fugitive dust;
- Strictly manage materials to prevent any construction material from flowing into surface and groundwater system;
- Earth excavation is within construction area during construction, without any random excavation, and the soil and earthwork excavated are appropriately disposed.

The contractor of Longxi WSP complete the following:

- Spraying water on the construction sites and transportation roads everyday to control fugitive dust;
- Set up safety marking signs;
- Build sedimentation tank, waste water in the construction sites can be reused through treatment and discharged;
- Clean vehicles in and out.

Regards of acoustic environment, the contractor reasonably arranged construction time, reinforced maintenance of construction machines and select construction equipment with lowest noise as possible as it can. The contractor also arranged appropriate construction location for construction equipments which produce noise. While night construction is necessary, the contractor shall apply for permission from the environmental departments as required and notice the residents nearby with noise reduction measures taken during construction.

Regards of ambient air, the contractor strictly forbid waste and spoil scattered and stored at random, and designated staff to clean the construction access roads.

VI. Environmental Monitoring

According to the requirements of domestic environmental evaluation documents, IEE and EMP, to monitor the environmental pollution produced during construction period, verify the effectiveness of environmental impact mitigation measures, supervise and examine implementation of environmental impact mitigation measures of the contractor within construction period, address public complaint, provide monitoring data for environmental impact mitigation measures improvement, and investigate current environmental status during construction period, in terms of relevant arrangement, PMO has signed an entrustment contract with Chaonan Environmental Monitoring Station to entrust the station to carry out environmental compliance monitoring during project implementation in line with required test items, test frequencies in IEE and EMP and prepare corresponding satisfactory monitoring report to be submitted to ADB. In February 2015, Chaonan District Environmental Monitoring Station, responsible for the collection and evaluation of monitoring data in EMP, has carried out environmental monitoring continuously. Meanwhile, PMO has requested the Station to formulate monitoring plan (6 years in total, including 5 years of construction and 1 year of implementation) according to the monitoring requirements of EIA and EMP. Besides, two monitoring points—Qiufeng and Chengpo village are added as ADB mission required (MOU, 20 August 2015). Monitoring for the two villages had been conducted in November 2015 and related report was prepared and submitted to PMO.

Chaonan Environmental Monitoring Station monitored surface water of Chengpo and Qiufeng village on 30 November 2015 and prepared monitoring report. Detailed monitoring period, monitoring staff and location see Attachment 2.

The monitoring result indicates that all parameters are in line with Surface Water III Standard, except total phosphorus, which exceeds Environmental Quality III Standard for surface water.

VII. Conclusion and Plan

The contractor has basically implemented various environmental mitigation measures as required. The environmental monitoring result indicates that the construction activities have little overall impact on the surrounding environmental protecting subjects, which is acceptable. Except total phosphorus, which exceeds the standard, the surface water of Chengpo and Qiufeng village is in line with Surface Water III Standard.

Suggest that PMO and CSC reinforce management of the contractor, require and supervise it to carry out the following measures:

Continue to strictly execute EMP, reasonably arrange operational time and distribution;

Use construction machine with low noise, avoid production of noise which is controllable, and forbid loud car horns in and out the construction sites;

Add water spraying to control fugitive dust pollution;

Civilized construction, forbid wildly throwing of steel bars and other construction materials to mitigate impact on the surrounding environment.

Attachment 1：

Potential Impacts and Mitigation Measures for Project Construction

Item	Potential Impact	Mitigation Measure	Responsibility	
			Implement	Supervise
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 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.	Contractors, CSCs	PMO, IAs, EPB, LIEC
	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.		
	Spoil disposal site management and	• 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	Contractors, CSCs	PMO, IAs EPB, LIEC

Item	Potential Impact	Mitigation Measure	Responsibility	
			Implement	Supervise
	rehabilitation	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 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.[b] 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).	Contractors, CSCs	PMO, IAs, LIEC, WSC, EPB, WRB,
Ambient Air	Dust and emission generated by construction	• 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	Contractors, CSCs	PMO, IAs LIEC, EPB

Item	Potential Impact	Mitigation Measure	Responsibility	
			Implement	Supervise
	activities	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.		
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.	Contractors, CSCs	PMO, IAs, LIEC, EPB
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.	Contractors, CSCs	PMO, IAs, LIEC, EPB

Item	Potential Impact	Mitigation Measure	Responsibility	
			Implement	Supervise
		• Coordinate with residents on the timing of heavy machinery work close to these structures. • Prohibit piling and compaction operations at night.		
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 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).	Contractors, CSCs	PMO, IAs, LIEC, EPB
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.	Contractors, CSCs	PMO, IAs FB, EPB, LIEC,
	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.	Contractors, CSCs	PMO, FB, IAs, LIEC, EPB,

Item	Potential Impact	Mitigation Measure	Responsibility	
			Implement	Supervise
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.	Contractors CSCs	IAs, PMO, LIEC, BCR
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 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.	Contractors CSCs	IAs, PMO, LIEC, TMB
	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	Contractors, CSCs	PMO, IAs, LB, EPB, LIEC,

Item	Potential Impact	Mitigation Measure	Responsibility	
			Implement	Supervise
		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 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.		

Attachment 2：

Monitoring Report

（Chaonan）Environmental Monitoring SA Word（2015）No. 556

Project Name： Surface Water Monitoring

Entrusted Unit： Project Management Office of Guangdong Chaonan Water Resources Development & Protection Demonstration Project

Monitoring Category： Entrusted Monitoring

Report Date： November 30, 2015

Chaonan District Environmental Monitoring Station

I. Monitoring Objective

Surface Water Entrusted Monitoring

II. Monitoring Situation

Sampling Cross-sections	Sample Number
Domestic waste water drainage inlet of Qiufeng village	S15110316
Domestic waste water drainage inlet of Qiufeng village in reservoir (left 20m)	S15110317
Domestic waste water drainage inlet of Qiufeng village in reservoir (right 20m)	S15110318
Domestic waste water penetration point of Chengpo village (left)	S15110319
Domestic waste water penetration point of Chengpo village (right)	S15110320

Monitoring Items: PH, suspended solids, CODcr, BOD5, ammonia nitrogen, total phosphorus, petroleum, total coliform group.

Sampling Date: 3 November 2015 Analysis Date: 3 November 2015—8 November 2015

III. Monitoring Method, Used Instrument and Detection Limit

Analyzed Item	Analysis Method and Standard NO.	Used Instrument	Lowest Detection Limit
PH	Glass electrode method GB/T 6920-1986	420A+type acidometer	--
Suspended solids	gravimetric method (Membrane filter method) GB/T 11901-1989	Electrothermal constant-temperature dry box CP224S electronic balance	10mg/L

CODcr	Fast catalysis-digestion-sealed method《water and wastewater monitoring analysis method》（4th version）State Environmental Protection Administration（2002）	WMX Microwave digester	5 mg/L
BOD_5	Dilution and inoculation method HJ 505-2009	SPX-150B-Z Biochemical incubator	0.5mg/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	0.01mg/L
Petroleum	Infrared spectrophotometry HJ 637-2012	IR-200A type three wave infrared metering instrument	0.05mg/L
Total coliform group	Membrane filter method 《water and wastewater monitoring analysis method》（4th version）	PCS/L	

IV. Monitoring Result

Unit: Except PH and where noted, all are mg/L

Sample Number	Sampling Cross-sections	PH	Suspended solids	CODcr	BOD5	Ammonia nitrogen	Total phosphorus	Petroleum	Total coliform group
S15110316	Domestic waste water drainage inlet of Qiufeng village	7.09	18	7	ND	0.066	0.22	ND	5.8×103
S15110317	Domestic waste water drainage inlet of Qiufeng village in reservoir (left 20m)	7.12	19	12	1.1	ND	0.30	ND	3.3×103
S15110318	Domestic waste water drainage inlet of Qiufeng village in reservoir (right 20m)	7.18	17	11	1.3	0.115	0.22	ND	2.5×103

S15110319	Domestic waste water penetration point of Chengpo village (left)	6.79	18	6	ND	0.131	0.22	ND	2.3× 103
S15110320	Domestic waste water penetration point of Chengpo village (right)	6.82	20	ND	ND	0.112	0.30	ND	2.5× 103
《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	--

Note: Item of total coliform group is subcontracted by Shantou Municipal Environmental Monitoring Station.

Tested by：Monitoring Room　　Prepared by：Yao Hongsheng

Proofreader：吴晓华　　Verifier：

Issuer：陈贵雄　　Position：Station Director

Issuing Date：　　D / M /Y