

**INTEGRATED SAFEGUARDS DATASHEET  
APPRAISAL STAGE**

**I. Basic Information**

Date prepared/updated: 06/26/2006

Report No.: AC2342

**1. Basic Project Data**

Country: China	Project ID: P077752	
Project Name: SECOND SHANDONG ENVIRONMENT PROJECT		
Task Team Leader: Shenhua Wang		
Estimated Appraisal Date: April 17, 2006	Estimated Board Date: October 26, 2006	
Managing Unit: EASUR	Lending Instrument: Specific Investment Loan	
Sector: Sewerage (76%);Water supply (13%);Solid waste management (11%)		
Theme: Pollution management and environmental health (P)		
IBRD Amount (US\$m.):	147.20	
IDA Amount (US\$m.):	0.00	
GEF Amount (US\$m.):	0.00	
PCF Amount (US\$m.):	0.00	
Other financing amounts by source:		
<u>BORROWER</u>		134.30
		134.30
Environmental Category: A - Full Assessment		
Simplified Processing	Simple <input checked="" type="checkbox"/>	Repeater <input type="checkbox"/>
Is this project processed under OP 8.50 (Emergency Recovery)	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>

**2. Project Objectives**

The development objective of the project is to promote the sustainable improvement of the environmental conditions in participating municipalities/counties of Shandong Province through: upgrading and development of facilities for wastewater collection and treatment, solid waste management, and water supply; and enhancement of financial performance and efficiency of key urban environmental services.

**3. Project Description**

The project covers 9 municipalities or counties of Shandong Province in the areas of waste water treatment, water supply, solid waste and institutional capacity building.

Though extensive screening and alternatives analysis, the project has the following four components: (1) wastewater collection network and treatment in Gaomi, Huantai, Qixia, Weifang, Weihai, Yantai and Zaozhuang, associated river improvements in Qixia, Weifang and Zaozhuang, and development of septic tanks management system supported by a GEF grant in Yantai; (2) solid waste management in Heze and Rizhao, with commitment from Heze to participate in CF transactions; (3) water supply in Gaomi and Huantai; and (4) institutional development and capacity building component.

#### **4. Project Location and salient physical characteristics relevant to the safeguard analysis**

Shandong Province is part of the North China Plain in North-Eastern China. The Province borders the Bohai Sea and the Yellow Sea and is crossed by the Yellow River. The Taishan-Yimeng mountainous terrains lay in the centre of the Province. The mountains are surrounded by the fluvial plains of the Yellow River to the west, of the Huai to the southwest, and of the Jaolai river system between the mainland and Jiaodong peninsula. The centre of the peninsula is hilly.

Many rivers in Shandong Province are 'non-permanent', with flows available only during the summer months. A great number of reservoirs have been built for water storage and flood protection. Rivers in urban areas are generally of poor quality, less than Class III standards. With poor water resources, the province relies more and more on water diverted from the Yellow River. Water scarcity gets even worse when many water sources are polluted and cannot be used for urban water supply or industrial needs.

Shandong province covers an area of over 157 000 km<sup>2</sup> with a total population of 91 million in 2003, which ranks it as the second most populated provinces in China. It consists of 17 municipalities and 139 counties (including county-level municipalities and districts under city administration). The average annual population growth rate from 1990 to 2000 was 0.64%, meaning an annual increase of 5.4 million people. There is also a growing transfer of rural population to urban areas, which makes the development of urban infrastructure an important challenge for the municipalities and the Province. The rapid demographic, urban and economic growth has led to environmental deterioration, with key environmental issues being air and water pollution, and a worsening situation of water scarcity.

Lack of proper sanitation and waste management facilities and services turn many rivers into open sewers or garbage fields, especially during low or no flows. These poor sanitary conditions particularly affect the health and living conditions of the poor in urban areas.

To combat further environmental deterioration, the province and municipalities have mapped out environmental policies and programs, which are aimed at substantially reducing the main pollution problems. These efforts should, on one hand permit economic growth, while on the other hand, improve municipal utility infrastructures and services to reduce industrial and urban pollution and provide ecological protection. Particular mention is made in these plans to regional watershed protection as well as environmental management. Improving and developing water supply management, wastewater management and solid waste management is necessary to improve environmental and sanitary conditions, especially for the poor, as well as to support urban growth and economic development. Developing these services also requires strengthening institutional capacity and taking measures to ensure financial sustainability of these public services. To make up for the investment shortage and matching the necessary funds to the population growth represent huge challenges for municipalities of Shandong Province.

The project will be located in following six cities and three counties. All participating municipalities have retained local consultants to prepare engineering feasibility studies, environmental assessment and resettlement plans. The work is overseen by an international consultant GroupeHuit-SCE of France.

Gaomi is the capital of the county, one of twelve counties within Weifang municipality. Gaomi covers an area of 24.7 km<sup>2</sup>, with a population of 261,000 inhabitants, which is expected to grow to 500,000 in 2020. The component is located in the town but its water supply will also provide water services to seven surrounding small townships. The town industries include textile, food processing and machineries. The total GDP of the county is 8.8 billion RMB, shared between first, second and tertiary sectors (18%, 50%, 32%). The surface water from Wangwu and Xiashan reservoirs will provide 85% of the water source, gradually increasing to 100%, as the remaining 15% from Jiaohe wellfield will be gradually phased out due to increased ground water pollution. Treated effluent from Gaomi WWTP is discharged to the Xiao Kang River, which currently receives the untreated raw sewage and has a poor water quality of Class V.

Heze municipality located in the southeastern part of the province has a current population of 380,000 over an area of 37.6 km<sup>2</sup>. The population is expected to grow to 720,000 by 2020. The GDP is 5.8 billion RMB share between the first, second and tertiary sectors (21%, 41%, 35%). Despite being an important chemical and food-processing base, Heze has one of the lowest GDP levels among the medium towns of Shandong.

Huantai, the capital of the county, one of eight counties within Zibo municipality, is located near to the Bohai Sea coast. It has a current population of 180,000, with a projected increase to 400,000 by 2020. Huantai covers an area of 11.6 km<sup>2</sup>. The component also affects four neighboring townships (Guihe, Tianzhuang, Tangshan and Guoli). Local industries include leather processing, medical chemistry, paper mill, food, building materials, and machineries. The total GDP of the town is 10 billion RMB shared between the first, second and tertiary sectors (8%, 61%, 31%), which indicates a large proportion of the industry in the economy. Huantai is closely linked to the development of the Zibo town, one of the richest and biggest areas of Shandong. Forecast indicates that by 2025, Huantai will become the northern urban district of Zibo city. Water from the Yellow River transferred through Xicheng reservoir will be the main water supply for local industries, leaving that groundwater source exclusively for residential use. Treated effluent from Huantai would be discharged to the Dong Zulong River, which has a quality standard of Class V.

Rizhao municipality located at the Shandong peninsula is the second largest port of the province on Yellow Sea. The city has a population of 430,000, growing to 820,000 by 2020 over an area of 40 km<sup>2</sup>. The economy is mainly supported by the harbor and other heavy industries. The total GDP is 11.5 billion RMB, shared between the first, secondary and tertiary sectors (21%, 51%, 28%), which indicate the importance of the agricultural sector and the weakness of the services sector.

Weihai municipality located at the Shandong peninsula is a port on Bohai Sea with 590,000 inhabitants on an area of 62 km<sup>2</sup> expected to grow to 1.25 million in 2020. The city industries include electronics, chemicals, plastics, food, construction materials, textile, and machine manufacturing. The total GDP is 22.5 billion RMB shared between the first, second and tertiary sectors (7%, 54%, 39%), which indicates a good balance between the industrial and the service sectors. The recipient of Weihai effluent is the Yellow Sea through sea outfall, with required environmental quality of Class II.

Yantai municipality located at the Shandong peninsula is a port on Bohai Sea with 1.1 million inhabitants on an area of 135 km<sup>2</sup>. The city industries include textile, energy generation, chemicals and light equipment manufacturing. The total GDP is 50.3 billion RMB, shared between the first, second and tertiary sectors (5%, 58%, 37%) indicating a large part of the industrial and very small part of agricultural sectors. The recipient is the Yellow Sea through sea outfall with required environmental quality of Class I.

Qixia is the capital of the county, one of eleven within Yantai municipality. It has 99,000 inhabitants. The total GDP of Qixia is 6.7 billion RMB shared between the first, second and tertiary sectors (24%, 43%, 33%), which indicates a large part of farming industry in the economy. The component is not located in Qixia city, but in Economic Development Zone, 20 km northwest from the town. The Zone has currently a population of 35,000 planned to reach 63,000 in 2020. Industries in the Zone's current area of 18 km<sup>2</sup> include cement production, machine tools, electrical components, clothes making, fruits storage and processing. The recipient is the Baiyang River, which feeds drinking water reservoir for Yantai, required environmental quality Level 1B.

Weifang municipality located near to the Bohai Sea coast has a population of 970,000 on an area of 118 km<sup>2</sup> expected to grow to 1.8 million in 2020. The city industries include chemicals, textiles, papermaking, food processing and machine manufacturing. The total GDP is 28.2 billion RMB, shared between the first, second and tertiary sectors (5%, 60%, 35%), which indicates the importance of the industrial production and the quite weak agricultural part in the economy. The recipient of Weifang effluent is the Bailang River, with planned quality within and downstream of the city of Category V; about 50 km downstream of Weifang before discharging into Bohai Sea the environmental regulation requires the Category III.

Zaozhuang municipality located in southern mainland has a population of 390,000 on an area of 42.3 km<sup>2</sup> expected to grow to 480,000 in 2020. The city industries include coal mining and processing, power generation, chemicals, food processing and light equipment manufacturing. The total GDP is 3.57 billion RMB shared between the first, second and tertiary sectors (7%, 54%, 39%). Per capita the GDP is 7,275 RMB, which is about half of the average of the Province. The recipients of the city effluent are the Yi Chengsha and the Xisha Rivers, with planned quality within and downstream of the city of Category IV.

At the project level, the Bank's role is to ensure that lessons learned and experience gained through Shandong Environmental Project (SDEP) and other similar or related projects are reflected in the planning, design and management of the proposed investments. Attention has been and will continue to be focused on assessing options, alternative technologies, selecting least cost solutions in developing municipal utility infrastructures. The Bank will also place emphasis on the financial sustainability of these municipal utility services by strengthening institutional capacity and operational efficiency with proper arrangements of tariff policies and measures, with special consideration for improving the conditions of the urban poor. All of these goals are consistent with the objectives of the China Country Assistance Strategy related to environmental protection and infrastructure and urban development.

## 5. Environmental and Social Safeguards Specialists

Ms Chongwu Sun (EASEN)

Mr Chaogang Wang (EASSD)

6. Safeguard Policies Triggered	Yes	No
Environmental Assessment (OP/BP 4.01)	X	
Natural Habitats (OP/BP 4.04)		X
Forests (OP/BP 4.36)		X
Pest Management (OP 4.09)		X
Cultural Property (OPN 11.03)		X
Indigenous Peoples (OP/BP 4.10)		X
Involuntary Resettlement (OP/BP 4.12)	X	
Safety of Dams (OP/BP 4.37)	X	
Projects on International Waterways (OP/BP 7.50)		X
Projects in Disputed Areas (OP/BP 7.60)		X

## II. Key Safeguard Policy Issues and Their Management

### A. Summary of Key Safeguard Issues

1. Describe any safeguard issues and impacts associated with the proposed project. Identify and describe any potential large scale, significant and/or irreversible impacts:

The proposed project covers the following areas:

- Improvements and expansion of water supply systems to meet current and future demands;
- Collection of wastewater and municipal solid waste to improve quality of urban life;
- Treatment of wastewater to improve water quality in rivers and sea;
- Improvement of flood control;
- Enhancement of river landscape in urban areas; and
- Municipal solid waste processing and disposal facilities.

Environment Assessment:

The proposed project is classified as Category A under OP 4.01. Local consulting firms (Shandong Academy of Environmental Sciences and China's Ocean University) have

prepared environmental Assessment (EA), with the assistance of an international environmental consulting firm GroupeHuit-SCE of France. The EA concludes that the Project will bring significant positive impacts to the natural and socioeconomic environments of participating cities. The EA has not identified serious adverse or irreversible environmental impacts that cannot be effectively mitigated to acceptable levels.

More specifically, the project will collect a large volume of wastewater currently being discharged untreated to local rivers flowing through urbanized areas, reduce pollution loadings and improve water quality in local rivers (from worse than Class V to designated Class V) and eventually seawater, and establishing much needed solid waste processing facilities and sanitary landfill sites. The proposed project will also be beneficial to public health and quality of life through improved water supply service and improved solid waste collection systems. Expansion of sanitation facilities and services will improve the sanitation conditions of about 700,000 people. Over 400,000 people will be covered by improved flood protection measures. An additional over 300,000 people will have access to potable water.

The WWTPs planned in Huantai, Yantai and Qixia would remove annual pollution load of more than 13,000 t of BOD, 17,000 t of suspended solids, 2,300 t of NH<sub>3</sub>-N and 300 t of total phosphorus.

Furthermore, the proposed SDEP II project will result in the collection of an additional 220,000 m<sup>3</sup>/day of wastewater in Gaomi, Weihai, Weifang and Zaozhuang. Collected wastewater will be treated in WWTPs built with other financing sources. It can be estimated that, when this wastewater is properly treated, the project will result in an annual pollution abatement of about 14,000 t of BOD, 19,000 t of suspended solids, 2,500 t of NH<sub>3</sub>-N and 79 t of total phosphorus.

Shandong Academy of Environmental Sciences and China's Ocean University carried out the Environmental Impact Assessment (EIA) of the proposed Second Shandong Environment Project according to China's national requirements as well as Bank policies and procedures. The international consultants provided guidance during EIA preparation and prepared the project-wide consolidated EA report based on the component EIA reports. The TORs and draft EAs were discussed in detail during project preparation with the Bank. EIAs have been completed for components in each project city, inter alia, baseline environmental conditions (water resources quantity and quality, air quality) and socio-economic conditions. They also describe alternatives considered in feasibility studies for each component. The draft English-version consolidated EA report was submitted to the Bank in mid February 2006 and reviewed by the Bank before and during appraisal.

Major potential adverse impacts will mostly occur during the project construction phase. Construction of the water distribution and sewer collection networks, water and wastewater treatment plants, river landscape improvements, sediment removal (during dry-out seasons) and construction solid waste collection and disposal facilities will

involve landfill occupation, airborne dust, noise, soil erosion and odor incidents. The result of the sediment sampling and analysis program indicate that the sediment is not hazardous and can be disposed of at a local sanitary landfill.

#### Resettlement:

Among 10 subprojects, 7 of them would involve new land acquisition and 2 of them would involve building demolition for affected households, enterprise and small shops. According to the survey, the construction of 7 subprojects will acquire a total of 155 ha of land areas, including 88 ha of rural land areas and 67 ha of state owned land. Among the acquired rural lands, 24 ha or 28% are cultivated land. The acquisition of farmland would affect 315 households and 1,203 persons from 32 villages, 19 townships and 7 counties or districts, averaging 0.02 ha per person. In addition, during project construction, a total of 208 ha of land areas would be occupied temporarily, which include 113 ha from rural collectives with 56% as farmland and 95 ha of state owned land. Most of affected state owned lands are roads and rivers. Along with land acquisition, a total of 142,188 square meters of buildings will be demolished, with 92% as residential structures. It will cause relocation of 754 households with 606 households in urban areas and 148 households in rural areas, and affect 11 enterprises and 42 shops, involving with 210 employees.

#### Safety of Dams:

The safety status of their dams was reviewed in the context of OP/BP4.37, Safety of Dams. Four existing reservoirs would be involved in the project, either to provide raw water for water supply, or for flood regulation. Starting from 2003, the province conducted dam safety inspections and assessments on all large and major medium size dams, resulting in the project dams being classified as Class C dams, i.e. with quality defects, or unable to function under the design conditions. On the basis of that finding, the central Ministry of Water Resources and Shandong developed a remedial program to correct the identified deficiencies. The remedial works for one reservoir was complete in 2005; two would be completed by end of 2006; and the remedial works for Weifang Bailianghe Reservoir is planned to be completed in 2007. Until the remedial program is completed, the dam safety would be assured by keeping the water level and the pounding level lower than during normal operating condition in accordance with the Operating Plans for Flood Season for Dams Classified as Class C.

Assurances would be sought during negotiations that (a) Gaomi and Qixia Counties and Weifang Municipality will complete the remedial works for all four dams by December 31, 2007; (b) Shandong Province will establish an independent panel of dam safety experts, commencing no later than November 30, 2006, which will review the operation plans for all four dams prior to each flood season and recommend to the province to take all necessary actions if any to ensure the safe operation of the dams during the flood seasons; and (c) the panel will also report annually to the province and the Bank on progress in the remedial work and on the safety of the four dams.

2. Describe any potential indirect and/or long term impacts due to anticipated future activities in the project area:

Construction of water supply and wastewater networks, waterworks and water treatment plants and pumping stations, and river embankments, may require tree removal. The exact nature of this impact is difficult to quantify at present, but during construction phase, field inspectors in charge of supervising the EMP will ensure that any tree removal is kept at minimum. Records of tree removal would be kept and replanting will take place at a rate of not less than one tree planted for each one cut.

The proposed project will achieve a significant reduction of pollution loadings to local rivers, which will bring indirect positive impacts to downstream water bodies such as wetlands, lakes and seas.

3. Describe any project alternatives (if relevant) considered to help avoid or minimize adverse impacts.

Analyses of alternatives were conducted as part of the feasibility studies and EA's of wastewater collection and treatment, water supply and distribution and solid waste projects with the objective to avoid or otherwise minimize adverse environmental and social impacts and to minimize project benefits. Local feasibility study consultants worked with EA consultants and project owners to evaluate available options and optimal solutions were selected based on least adverse impacts on the environment and communities at the least costs. Details can be found in feasibility study reports and EIA reports.

For water and waste water components, the design institutes carried out comprehensive analyses, evaluating various alternatives for locations, technologies and numbers of wastewater treatment plants (WWTP) and water works, alignments for transmission mains, construction of pumping stations in comparison with gravity flows, selection of combined or sanitary sewer systems, and different layouts of wastewater and water supply networks. In each instance, the alternative with the lowest evaluated cost and least environmental and resettlement issues was selected. For example, four alternative locations were considered for Chengxi water plant in Gaomi and the final option was selected on the basis of cost effectiveness and the impact on areas with severe water pollution.

For solid waste component, a wide range of alternatives were considered in terms of location, treatment scheme, composing technologies and so on?the final choice was made by comparing the advantages and disadvantages of each alternative. In Heze, for example, the location of the treatment plant was chosen by taking into consideration distance from residential areas, the length of power line, the cost of land value and local urban Master Plan. In Zaozhuang, remediation of the existing dump was chosen as the preferred approach versus transporting waste to other landfills.

Table A Alternatives for the Wastewater Component

Alternatives	Choice Advantages/constraints
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Huantai



Choice between 1 or 3 WWTPs &#61485;1. Option A: 1 WWTP with 79 km sewer network

&#61485;2. Option B: 3 WWTPs with 65 km sewer network. 1 Lower cost  
20% longer sewer network

Treatment process 1. CASS (Cyclic Activated Sludge Technology)

2. Oxidation Ditch

3. A/O 3 Higher pollution abatement

Lower energy consumption

Less land occupation

Lower investment and operation costs

Easier operation

Yantai

Location and capacity of WWTP 1. New WWTP at Mouping

2. Extension Xinanhe WWTP 2 Less land occupation

Lower cost

Extension of Xinanhe WWTP 1. North of current site

2. East of current site 1 Lower impact on economic (farming) activities

Combined or separate sewer system 1. Combined

2. Separate 1 in old areas, 2 in new-built areas Minimizes discharge of polluted waters to rivers in new- built area, while minimizing resettlement in old areas

Minimizes civil works and costs in old area

Choice of interceptor ratio 1:1

Main intercepting pipes along Beiguan road 1. pipes at both sides of moat

2. the same, but pipe is laid only at one side in some places, and sewage from the two sides is conveyed to this pipe 2 Avoids clearance of 10,000 m<sup>2</sup> of buildings, 1785 m of walls, and one transformer

Lower cost

Pipeline route 2 routes (see FSR) Less land occupation

Pipelines pass under Xiangzhuang Jigeng Road in the forest

Lower cost

Location of pumping station 1. south side of Yan-Wei highway crossing with Yuniao river

2. north side 1 Ease of construction

Choice of treatment process 1. A<sup>2</sup>/O

2. BIOLAK

3. Orbal oxidation channel 1 Better N and P removal

Land occupation 5.3 instead of 6.3 ha

Power consumption 0.3 instead of 0.35/0.46 kWh/m<sup>3</sup>

Better operation convenience (+experience in China)

Lower cost:

Resp. total investment (million RMB), annual operation cost (thousand RMB), unit handling cost (RMB/m<sup>3</sup>) and unit operating cost (RMB/m<sup>3</sup>)

1. 114; 22; 0.77; 15; 0.52

2. 112; 24; 0.82; 16; 0.53

3. 129; 26; 0.89; 18; 0.62

Choice of dephosphorization process - where to add the coagulant;

- choice of coagulant Polyaluminium salt added between biological basin and secondary sedimentation basin Efficiency

Convenience of use

Choice of sterilization process 1. chlorination with liquid chloride

2. chlorination with chlorine dioxide

3. sterilization with UV rays 3 Safer operation

Less land occupation

Ease of operation

Sludge management 1. anaerobic digestion;

2. aerobic treatment 2 Simplicity of operation

Lower investment cost

Design of underwater pipe sea outlet 1. discharge at 7 meter depth

2. discharge at 10 meter depth 1 Lower cost

Both alternatives satisfy seawater quality criteria

Options for water reuse 1. circulating cooling water in existing power plants in Mashan Industrial Park or Mouping Development Zone

2. greening irrigation Binhai road short term: 2

long term: 1 can be discussed 1: investments for delivery are expensive and current consumption possibilities are small

Qixia

Location of WWTP Site 1: close to industrial area

Site 2: farther from industrial area 1 Less damage to existing vegetation

Better convenience for water reuse

Better accessibility

Treatment processes 1. Oxidation ditch

2. ICEAS

3. A2/O 1 Higher land occupation

Higher power consumption

Ease of operation

Average investment

Wastewater network Two alternative routes (see FSR) 2 Higher impact on traffic

Lower cost

Zaozhuang

Combined/separate system 1. Combined

2. Separate 1 in old areas, 2 in new-built areas Minimizes discharge of polluted waters to rivers in new-built area, while minimizing resettlement in old areas

Minimizes civil works and costs in old area

Pipeline route 1. two interceptor mains along both banks

2. one interceptor main in the middle of the river 2 Ease of maintenance

West bank of Dongsha River

1. Along north outer ring road till WWTP in the south

2. north outer ring road-Hongkong St.-Zaozhuang St.-RenDa Wall-along west bank of Xisha river-WWTP 1 Shorter pipe

Ease of connection

Saving the need of lifting pump station  
 East bank of Dongsha River  
 1. north outer ring road-Xinhe Rd.-Dongshahe railway bridge-Renmin Rd.-invert siphon-west bank interceptor main  
 2. Qitao Rd.-Chang'an Rd.-Renmin Rd.- invert siphon-west bank interceptor main  
 1 Ease of connection

Saving the need of lifting pump station  
 East bank of Xisha River  
 1. Along east bank of Xisha River-Shiliquan Rd.-WWTP  
 2. Xichang Rd.- Shiliquan Rd.-WWTP 2 Limited resettlement

Shorter pipe  
 Ease of connection  
 West bank of Xisha River  
 Along west bank of Xisha River-Shiliquan Rd.-WWTP  
 Wenhua Rd.- Jingji San Lu-Shiliquan Rd.-WWTP 1 Ease of connection

Zaozhuang  
 Transverse river section pattern 1. complex section  
 2. rectangular section 1 More land acquisition and resettlement

Nicer scenery  
 Higher cost (188 instead of 169 million RMB, including resettlement)  
 Land appreciation by 100,000 RMB/mu (surplus revenue of 40 million RMB at least)  
 Rubber weirs or regulating locks 1. rubber weirs  
 2. regulating locks Lower cost (174 instead of 214 million RMB)

Nicer scenery  
 Weifang 1. interception culvert boxes 1:1 + artificial wetland  
 smaller interception culvert boxes 1:2 + stormwater balance tank 1 Interception  
 box culvert + artificial wetland

Rainwater adjusting storage scheme  
 Cost lower  
 Good pollutant removal  
 Lower power consumption  
 Large land occupation but out of city area  
 No water replenishment to the river

Table B Alternatives for the Solid Waste component

Alternatives	Choice	Advantages/constraints
Heze		
Location of treatment plant	1. Yuwayao: North of Heze, 8 km to the center 2. Gengwayao: North-West of Heze, 15 km to the center	1 Longer distance to residential area (m)
Drinking water protection area	close to site 2	
Larger storage volume		
Shorter necessary power line		
	1. is more in accordance with Urban Master Plan	
Lower land value		

- Treatment scheme
1. sanitary landfill
  2. high temperature composting
  3. incineration
  4. synthetic treatment
- 4 Minimizes environmental impact  
Higher cost
- Composting technologies
1. storehouse static aerobic composting
  2. silo intermission dynamic composting
  3. skip stacking machine turn-over aerobic composting
- Lower investment  
Ease of operation
- Treatment process for leachate and wastewater
1. membrane filtration and discharge into surface water
  2. A/O with discharge into municipal sewage system
- 2 Lower investment and operation costs
- Isolation of landfill bottom
1. curtain wall drilling (grouting)
  2. lining with on-site available materials and with artificial materials;
  3. both
- 2 2 greater safety than 1  
1 lower cost than 3

To minimize the resettlement impacts, serious efforts have been made through optimizing the project design and implementation arrangements. For instance, in order to reduce demolition impacts, the river regulation scope was reduced from 80 to 40 meters wide in Zaozhuang and from 50 to 10 meter wide in Weifang. Various measures were taken to minimize the resettlement impacts among different subprojects, which are reflected in the subproject RAPs.

4. Describe measures taken by the borrower to address safeguard policy issues. Provide an assessment of borrower capacity to plan and implement the measures described.  
Policy Framework

China has adopted multi-pronged policies to manage water issues in North China. They include preventing and reducing water pollution, implementing rational prices for water (including irrigation), recovering costs for wastewater sector, reducing consumption of water, promoting re-use of water, and building the South-North water transfer project. Reflecting these national policies, Shandong has been implementing its share in: (a) the Bohai Blue Sea Action Program, which is being implemented in three stages from 2000 through 2015 with the aim of reducing land-based pollution and restoring the damaged ecological system in the sea; and (b) the South-North project, which includes Huantai and Zaozhuang within its pollution reduction program, for construction of municipal sewage treatment works for the Shandong section of the South-North project.

Shandong provincial and municipal EPBs are in charge of drafting and issuing local laws and regulations; organizing environmental monitoring and control; supervising the treatment of pollution; dealing with the major pollution incidents; and carrying out education and training in environmental protection. Accordingly, within its duties, SEPBB reviewed and approved the individual EIAs.

## Environmental Management

Designated by the Shandong Provincial Government, Shandong Provincial Project Management Office (SPPMO) will be responsible for overall coordination of the project implementation including the EMP implementation. SPPMO has had previous experience in coordinating the implementation of Bank-financed projects, including SDEP and the Huai River Pollution Control Project. The project management offices (PMOs) of municipality/counties (including EPB staff) and PIUs will be responsible for the implementation of their respective components including their EMP implementation. The staff responsible for EMP at SPPMO and city PMOs/PIUs will be trained through the project TA package on environmental regulations and their application, mitigation measures, public consultations, environmental monitoring and producing progress reports. Environmental consultants contracted by the PIUs will also assist in environmental supervision during project construction and monitoring listed in the table below:

### Institutional Arrangement for Environmental Management

Level	Project Management	Construction Supervision	Environment Management
	Compliance Monitoring		
	During Construction		
	SDEP II level	SPPMO	
	Technical Assistance Consultants	Shandong Provincial EPB	
	Technical Assistance Consultants	(Shandong EPB)	
	Sub-project level	Implementing Agency Project Management Unit (PIU)	
		Construction Supervision Engineer (or Institute) engaged by the Agency	
		Construction Supervision Environmental Engineers (CSEE) and Environmental Field Site Inspectors (EFSI) (within the Construction Supervision Engineer team)	
		Local EPMD 1. Monitoring Programme as defined in EMP, carried out by the CSEE	
		2. Regulatory monitoring by local Environment Monitoring Station (EMS) under authority of the EPB	
	During Operation-		
	SDEP II level	-	Provincial EPB Shandong EPB
	Sub-project level	Management, Operation and Maintenance Agency -	
		Environmental Management Unit (EMU) + Environmental Monitoring Unit	
		1. Monitoring Programme as defined in EMP, carried out by Environmental Monitoring Unit	
		2. Regulatory monitoring by local Environment Monitoring Station (EMS) under authority of the EPB	

**Training Requirements.** To ensure effective implementation of the above measures and plans staff of implementation agencies will be trained in environmental impacts and how to ensure timely responses to accidents. The training program will covers issues such as

environmental laws and regulations, standards, project-related environmental science and environmental management. The training will be held prior to the commencement of construction and will be attended by at least one senior management staff and one environmental staff from each of the contractors and supervision companies.

**Monitoring.** The EMP lists environmental performance indicators such as air and water quality, noise levels, construction sites and camps, as well as details of monitoring programs, such as specific locations and time of sampling and the agencies responsible for reviewing monitoring programs and results.

**Supervision and reporting.** The Bank will supervise the project's environmental aspects twice a year. SPPMO will be responsible for reporting including semi-annual progress reports with a section/chapter on the EMP implementation. During project implementation and beginning in 2007, an annual report on the EMP will be furnished to the Bank by March 31 of each year, along with any revisions proposed to the EMP to achieve its objectives.

**Funding Arrangements and Schedule of Implementation.** The costs of mitigating the effects from construction will be included in the cost of facilities. Monitoring of air and water quality, noise, worker health, and site safety/hygiene will be conducted by local environmental monitoring units or consultants, and financed from counterpart funds.

#### Resettlement Planning, Implementation Capacity and Monitoring

**Resettlement Planning:** 7 of 10 components involved resettlement impacts. Individual RAP's in Chinese were prepared for each of 7 components describing resettlement impacts. A summary RAP was prepared in both English and Chinese based on outline provided by the Bank. The RAP included comprehensive inventory survey, adequate compensation rates, realistic rehabilitation measures, and detailed cost estimate, which is in compliance with both Bank's policy and Chinese laws and regulations. The RAP contains a detailed budget that amounts to RMB243.16 million, which is integrated into the total project cost.

To facilitate the implementation of RAP, resettlement leading groups and resettlement offices have been set up in relevant counties and municipalities to be responsible for the resettlement implementation. The resettlement leading groups are led by deputy governors of relevant counties and cities and resettlement offices are staffed with experienced persons from key city agencies and affected townships. Trainings on Bank resettlement policy and resettlement practice will be provided to improve local capacity and facilitate resettlement implementation. The resettlement implementation among subprojects will be coordinated by Shandong Provincial PMO which has extensive

experience from implementing both Shandong Environment Project (Ln 4237-CHA) and the Huai River Basin Pollution Control Project (Ln 4597-CHA).

During the course of implementation, an experience independent external monitoring agency will be selected to carry out resettlement monitoring and evaluation for these 7 subprojects, which will be carried out once a year. The monitoring procedures, content, staffing, timeframe and reporting have been detailed in the RAPs. Independent monitoring will cover both physical progress of RAP implementation and monitor the restoration of income and livelihood among affected people. In terms of internal resettlement monitoring, it will be carried out by both provincial PMO and subproject resettlement offices with assistance from external monitoring agency.

**Borrower's Capacity:** The Shandong Provincial Project Management Office (SPPMO), which has guided the preparation and successful implementation of the Shandong Environment Project (Ln 4237-CHA) and the Huai River Basin Pollution Control Project (Ln 4597-CHA), has experienced staff with capacity to manage the preparation of the proposed project. The experience and knowledge accumulated will continue to support preparation of this project. At the municipal/county level, Leading Groups, Project Management Offices, and Project Implementation Units for the most part have been established already and resettlement officials are assigned in each of the municipal PMOs.

**Monitoring:** Internal and external monitoring has been designed as part of the project resettlement management. The project resettlement offices will carry out internal monitoring of the resettlement implementation. The monitoring procedures, content, staffing, responsibility, timeframe and reporting have been detailed in the RAPs. An external monitor has been selected for independent monitoring of the RAP implementation. Independent monitoring will cover physical progress of RAP implementation, including compensation payment, allocation of residential sites, farmland allocation, and restoration of infrastructure. The independent monitor will also review the public consultation process, operation of the resettlement project offices, grievance redress mechanisms and restoration of livelihood of the affected farmers. Independent monitoring will be conducted once a year during the project implementation period.

5. Identify the key stakeholders and describe the mechanisms for consultation and disclosure on safeguard policies, with an emphasis on potentially affected people. In preparation of RAPs, local governments, township and village officials, affected households and affected shops and shops were consulted in census and asset inventorying processes and on finalization of the project location and schemes, compensation rates, relocation arrangements and livelihood restoration measures. Consultation with affected persons will be continued throughout the resettlement implementation process. The RAP contains procedures for grievance redress for the affected people. A resettlement information booklet (RIB) including the key contents of the RAP will be developed and distributed to the affected persons once the final RAP is approved by the Bank. The draft RAPs have already been disclosed in the project areas, which is listed in the following:

During the EA preparation, at least two rounds of public consultations were conducted in each project city; Public announcements were made about the project and the EIA on local radio and television, as well as in newspapers and on the Internet. These notices informed the public of the locations where the EA and the RAP could be reviewed and commented on, as well as contact telephone numbers. Posters summarizing the EA and RAP were displayed in community centers and public meetings were held. The EIA was disseminated in the project cities from August 2005 to January, 2006. Public comments are reflected in the project design and environmental mitigation measures. The documents were sent to the Bank's Infoshop in Washington and in Beijing in February 2006. Details of public consultations and information on each component are available in the project files.

No.	Component	Time of disclosure	Media	Location of RAP
1	Yantai waste water Drainage Company	01/05/2006	Yantai Daily News Paper	Yantai
2	Qixia Waste water Drainage Company	01/22/2006	Yantai Daily News Paper	Qixia
3	Zaozhuang waste water Zaozhuang PMO	12/30/2005	Zaozhuang City weekend	
4	Gaomi water supply Supply company	01/24/2006	Wafang Daily News Paper	Gaomi Water
5	Huangai waste water and water supply Huantai PMO		01/24/2006	Huantai online Web
5	Huangai waste water and water supply Huantai PMO		01/24/2006	Huantai online Web
6	Wafang waste water	01/24/2006	Wangang DRC Web	Wangfang DRC
7	Heze solid waste	01/25/2006	Mudan Evening Daily News	Heze PMO

Information Disclosure. The table below summarizes the information disclosure activities that have been held in each SDEP II location.

No.	Project Component	Information Disclosed	Media	Time of Disclosure
1	Gaomi Water Supply and wastewater management	Draft EIA report	Weifang Daily ; www.sdgmzls.cn	9/19/2005
2	Huantai Water Supply and wastewater management	Draft EIA report	Huantai Broadcast Station	9/9-16, 2005
3	Weihai Wastewater Management	Draft EIA report		
4	Yantai Wastewater management	Draft EIA report		
5	Qixia Wastewater management	Questionnaire release notice	Qixia Broadcast and TV Station	8/7-17, 2005
6	Weifang wastewater management	Project brief and draft EIA report	www.wfdpc.gov.cn	11/7/2005 1/6/2006



7	Zaozhuang Wastewater management		
8	Heze Solid waste management	Draft EIA report	Heze Daily
	12/21/2005		
9	Rizhao Solid waste management	Draft EIA report	www.rzjs.gov.cn
	11/11/2005		
	12/23/2005		

RAP Disclosure

No.	Component	Time of disclosure	Media	Location of RAP	Contact phone
1	Yantai waste water	01/05/2006	Yantai Daily News Paper	Yantai	Yantai
Drainage Company					
2	Qixia Waste water	01/22/2006	Yantai Daily News Paper	Qixia	Qixia
Drainage Company 0535-5215964					
3	Zaozhuang waste water	12/30/2005	Zaozhuang City weekend		
	Zaozhuang PMO	0632-3313195			
4	Gaomi water supply	01/24/2006	Wafang Daily News Paper	Gaomi Water	Gaomi Water
Supply Company 0536-2323435					
5	Huangai waste water and water supply		01/24/2006	Huantai online Web	
	Huantai PMO	0533-8189904			
5	Huangai waste water and water supply		01/24/2006	Huantai online Web	
	Huantai PMO	0533-8189904			
6	Wafang waste water	01/24/2006	Wangang DRC Web	Wangfang DRC	
	0536-8789827				
7	Heze solid waste	01/25/2006	Mudan Evening Daily News Paper	Heze	
	PMO 0530-5190555				

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***B. Disclosure Requirements Date***

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**Environmental Assessment/Audit/Management Plan/Other:**

Date of receipt by the Bank	01/26/2006
Date of "in-country" disclosure	01/26/2006
Date of submission to InfoShop	02/21/2006
For category A projects, date of distributing the Executive Summary of the EA to the Executive Directors	08/01/2006

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**Resettlement Action Plan/Framework/Policy Process:**

Date of receipt by the Bank	01/25/2006
Date of "in-country" disclosure	01/25/2006
Date of submission to InfoShop	02/21/2006

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**\* If the project triggers the Pest Management and/or Cultural Property, the respective issues are to be addressed and disclosed as part of the Environmental Assessment/Audit/or EMP.**

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**If in-country disclosure of any of the above documents is not expected, please explain why:**

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***C. Compliance Monitoring Indicators at the Corporate Level (to be filled in when the ISDS is finalized by the project decision meeting)***

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**OP/BP/GP 4.01 - Environment Assessment**

Does the project require a stand-alone EA (including EMP) report?	Yes
If yes, then did the Regional Environment Unit or Sector Manager (SM) review and approve the EA report?	Yes
Are the cost and the accountabilities for the EMP incorporated in the credit/loan?	Yes

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**OP/BP 4.12 - Involuntary Resettlement**

Has a resettlement plan/abbreviated plan/policy framework/process framework (as appropriate) been prepared?	Yes
If yes, then did the Regional unit responsible for safeguards or Sector Manager review the plan?	Yes

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**OP/BP 4.37 - Safety of Dams**

Have dam safety plans been prepared?	Yes
Have the TORs as well as composition for the independent Panel of Experts (POE) been reviewed and approved by the Bank?	Yes
Has an Emergency Preparedness Plan (EPP) been prepared and arrangements been made for public awareness and training?	N/A

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**The World Bank Policy on Disclosure of Information**

Have relevant safeguard policies documents been sent to the World Bank's Infoshop?	Yes
Have relevant documents been disclosed in-country in a public place in a form and language that are understandable and accessible to project-affected groups and local NGOs?	Yes

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**All Safeguard Policies**

Have satisfactory calendar, budget and clear institutional responsibilities been prepared for the implementation of measures related to safeguard policies?	Yes
Have costs related to safeguard policy measures been included in the project cost?	Yes
Does the Monitoring and Evaluation system of the project include the monitoring of safeguard impacts and measures related to safeguard policies?	Yes
Have satisfactory implementation arrangements been agreed with the borrower and the same been adequately reflected in the project legal documents?	Yes

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***D. Approvals***

<b><i>Signed and submitted by:</i></b>	<b><i>Name</i></b>	<b><i>Date</i></b>
Task Team Leader:	Ms Shenhua Wang	06/21/2006
Environmental Specialist:	Ms Chongwu Sun	06/21/2006
Social Development Specialist	Mr Chaogang Wang	06/21/2006
Additional Environmental and/or Social Development Specialist(s):		
<b><i>Approved by:</i></b>		
Regional Safeguards Coordinator:	Mr Glenn S. Morgan	
Comments:		
Sector Manager:	Mr Keshav Varma	
Comments:		