

**Updated Project Information Document (PID)****Report No: AB180**

<b>Project Name</b>	CHINA - TAI BASIN URBAN ENVIRONMENT PROJECT
<b>Region</b>	East Asia and Pacific Region
<b>Sector</b>	Sewerage; Flood protection
<b>Theme</b>	Water resource management (P); Pollution management and environmental health (P); Environmental policies and institutions (P); Other urban development (S)
<b>Project</b>	P057933
<b>Borrower(s)</b>	PRC
<b>Implementing Agency(ies)</b>	TAI BASIN PROJECT MANAGEMENT OFFICE Tai Basin Urban Environment Provincial Project Management Office, Jiangsu Economy and Finance Division, Jiangsu Finance Bureau Address: 63 Beijing Road, Nanjing 210024, Jiangsu Province Contact Person: Mr. Xu Weiming Tel: (86-25) 3633111 Fax: (86-25) 363 3110 Email: jswj@jscz.gov.cn
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**1. Country and Sector Background**

The Lake Tai Basin forms an integral part of the Yangtze River Delta economic region, which is China's most important industrial base and one of the most heavily populated areas of China. In 2000, over half of the Basin's residents lived in cities and peri-urban towns and urbanization continues to increase. Driven by high levels of foreign direct investment, total GDP in the Basin has been growing at over 10% per year on average and presently stands at RMB 1 trillion – approximately 11% of the national total. In 1999, Suzhou (RMB 136 billion) and Wuxi (RMB 114 billion) together accounted for almost three quarters of the GDP the area of the Tai Basin within Jiangsu Province.

The Tai Basin is also one of China's most important water resources. Lake Tai and its dense network of rivers and canals provide water supply for the majority of the Basin's 36.3 million residents including those who live in the large and growing urban economies of Wuxi and Suzhou in Jiangsu Province and well over half of the domestic water supply for Shanghai Municipality.

Despite the region's dependence on the water resources of the Basin for water supply, the provision of environmental infrastructure and services, including the collection and treatment of wastewater, has failed to keep pace with the rapidly growing economy of the region. Increasing flows of untreated domestic, industrial and agricultural wastewater into the Basin's rivers and lakes have put the region's water resources under severe environmental pressure. These consequences of continued rapid growth and urbanization have become increasingly apparent.

Government reports indicate that the water quality in over 85 percent of the main water bodies in the Basin is Class IV or worse (unsuitable for domestic supply) and deteriorating. The canals

within Suzhou and Wuxi cities are reportedly worse than Class V, the lowest classification according to Chinese water quality standards. Water quality in the upper Huangpo River, fed by Lake Tai, the main source of drinking water for the Shanghai metropolis, has become increasingly polluted over the last five years and is now only marginally acceptable as a drinking water source. Urban environmental conditions as poor as these have significant negative impact on the health of citizens and the livability and economic prospects of urban areas.

Recognition of the need for urgent action to protect the health and economic well-being of communities relying on this increasingly polluted lake and river network led the State Council to establish the Lake Tai Basin Water Resource Protection Leading Group in 1996 and a pollution control program with the goal of resolving the region's water pollution problems by 2010.

The first stage of the program conducted under the Ninth Five-Year Plan (1996 – 2000). The National Ninth Five-Year Plan and Long-Term Program on Water Pollution Prevention and Control to the Year 2010 for the Taihu Lake Basin was issued by the State Council on January 6, 1998 and focused almost entirely on industrial and domestic pollution point source control. It listed 54 domestic wastewater treatment plants planned to be built in the Tai Basin prior to the year 2000. Industrial Pollution Control Action Plans were also developed and some progress was made to bring key polluting enterprises (particularly in core city areas) into compliance with environmental regulations.

However, the success of the Ninth Five-Year plan was limited for several reasons. First, vast numbers of enterprises, particularly in the heavily industrializing districts and counties surrounding the core cities within the Basin, were generally not brought into compliance with the targets during the plan period. In addition, progress was slow on the collection and treatment of domestic sewage; only 29 of the proposed 54 domestic treatment plants were completed or partially finished by the end of 2000. The Government attributed the lack of implementation success to the scarcity of local government funds for investment in the wastewater sector, and to poor enforcement of environmental regulations at enterprises.

Following the Ninth Five-Year Plan, which concluded in 2000, the Government has continued to identify improvement of water quality in the lake and river system of the Tai Basin as a national priority and municipalities are aiming to collect and treat 50 percent of wastewater in smaller cities and 70 percent in larger cities by 2010. However, the Government's strategy was modified somewhat in the Tenth Five-Year Action Plan for Lake Tai Pollution Control (2001-2005). Whilst this plan continues to emphasize collection and treatment of point source pollution, it also seeks to enhance the results of pollution control activities by increasing circulation in the Basin's rivers and lakes through water transfers from the Yangtze River. In summary, this plan, under which the current project is proposed, places priority on: a) improving wastewater management, particularly collection and treatment of domestic sewage; b) improving water quality by reducing Total Phosphorus (TP) discharges into heavily polluted water bodies such as Meiliang and Wuli Lakes in Wuxi Municipality and by transferring higher quality water from the Yangtze River to increase circulation and improve water quality in the lake and canal system; and c) strengthening local capacity for water environment monitoring and management. The Tai Basin Authority (TBA) is planning and constructing infrastructure to facilitate these transfers, including gates and

pumping systems. Pilot transfer activities have been undertaken by TBA during the last few years to determine the viability of the key transfer schemes, such as that through the WangYu River.

In response to the Ninth and Tenth Five-Year Plans, in Zhejiang Province, wastewater capture and treatment capacity has been substantially increased and additional facilities and networks are under construction and planned (e.g., in Jiaxin City, which lies on a major tributary of Shanghai's Huangpu River). Jiangsu and Zhejiang Provinces have also introduced bans on the production and sale of phosphorous-based detergents in the Basin, which were estimated to contribute up to 15% of TP in the lakes and rivers. Shanghai Municipality and its districts continue to make substantial investments in wastewater networks and facilities, many with Bank support, and Shanghai has shown leadership in radically restructuring the institutional framework to improve planning, financing and delivery of urban environmental services.

Whilst considerable strategy work for environmental improvement in the Basin lying within Jiangsu Province has already been completed by TBA and provincial agencies, less progress has been achieved in translating these strategies into well coordinated, operational plans for the main implementers within the Basin's municipal and district governments.

In Wuxi and Suzhou, for example, selected key polluting industrial enterprises are being more closely monitored using automatic equipment, though this remains a relatively small proportion of total existing industries. For some industrial sectors (e.g., dyeing), discharge standards are being tightened to reduce the overall pollution contribution of large enterprises in that sector. However, many important pollution sources such as non-point source pollution from agriculture, animal husbandry facilities and the vast numbers of small-scale industries, have yet to be effectively addressed by the national or local environmental regulatory authorities.

In the domestic wastewater sector in China, responsibility for urban water and wastewater services is generally divided between municipal governments with jurisdiction over core city areas, and district governments, responsible for towns. Many district governments in the Tai Basin area have recently been upgraded from county level governments to expand their role in providing urban public infrastructure and utility services in urbanizing towns and industrial development zones. Responding to national priority plans and provincial strategies, locally funded programs are underway at the municipal level, albeit slowly, and with limited coordination, to rehabilitate and expand wastewater systems in the core city areas of Changzhou, Wuxi and Suzhou. The rapidly developing districts surrounding these cities are also now scrambling to collect and treat increasing wastewater flows, particularly in areas where industries continue to concentrate.

The key limitation of the municipalities' and districts' response to the national planning initiatives in the Tai Basin has been the fragmented approach to local planning and management of environmental infrastructure in the Basin. A lack of effective inter-jurisdictional coordination in service planning and delivery as well as relatively weak regulatory oversight and environmental monitoring/enforcement capacity has limited the effectiveness of implementation. For example, in the wastewater sector, district governments in the Basin are actively developing independent wastewater facilities under new wastewater agencies, rather than consolidating new service areas under existing, more experienced municipal wastewater companies. Sewer networks, where they

exist, are often inadequate to fully capture wastewater flows even for the relatively small district treatment plants in place. In the area of water transfers, planning has been hampered by a lack of local consensus on the location of gates and other infrastructure.

The Government recognizes the need to build the capacity of agencies responsible for the wastewater management by strengthening the planning, management and financing capabilities of these agencies to improve the efficiency and sustainability of the substantial investment required. In particular, government policies aim to strengthen the market orientation of wastewater service by promoting establishment of autonomous and financially viable wastewater enterprises and limited private sector participation, including through partnerships with private sector operators.

Consistent with these objectives for overall environmental sector reform, some municipalities in the Basin are reforming organizational structures to consolidate the water resources (including transfers and other hydraulic control measures), water supply and wastewater sectors under a single Water Affairs Bureau. These reforms generally transfer ownership of wastewater networks and facilities to an asset management company and promote outsourcing of O&M for these systems to experienced operators. While these are positive developments, which bring the promise of better coordination of the water and wastewater sectors in the future, they generally do not yet extend to district governments. Moreover, without reform of funding arrangements, wastewater companies, particularly at the district level, will be unable to operate in the market oriented and financially sustainable manner sought by government policies.

Indeed, achieving financial viability and sustainability has been a considerable challenge for the small district wastewater systems in the Tai Basin. First, because the lack of economies of scale and the relatively high proportion of industrial wastewater, results in relatively high unit investment and operating costs. Second, district governments do not have sufficient authority to establish tariff levels or levy separate wastewater fees reflecting their higher cost base. Third, district wastewater companies lack any legal claim over wastewater fees levied by municipal governments on consumers in the districts and there is presently no agreed mechanism in place to return municipal wastewater fee revenues to district wastewater companies to meet debt service obligations and operating expenses.

## **2. Objectives**

The Government's objective for the proposed Tai Basin Urban Environment Project is to enhance the quality of life of the rapidly increasing urban population and to enhance economic competitiveness to sustain economic growth in Wuxi and Suzhou, key municipalities in the Tai Basin and the Yangtze River Delta economic region, by alleviating degradation of water resources and improving the quality of the urban environment.

To meet this objective, the project is designed to increase the capture and treatment of wastewater in core cities and the rapidly industrializing suburban districts through physical investments and institutional and financial reforms that will enhance the viability and sustainability of wastewater systems, particularly in these rapidly developing districts. The project will support rehabilitation and water quality improvement in several urban and district canal and river systems through physical investments and improved water management. In addition, the project will support lakeshore rehabilitation around Wuli Lake as a new development and amenity area for

Wuxi City. Finally, the project will seek to strengthen water resource protection in the Tai Basin through improved and integrated planning, water quality monitoring and environmental management. The project design therefore reflects the core elements of the Bank's Urban Strategy – livability, good governance, competitiveness and bankability.

### **3. Rationale for Bank's Involvement**

The value of Bank assistance in terms of effective investment outcomes is already known to the client, who successfully implemented the wastewater investments under the Southern Jiangsu Environmental Protection Project. To build on this satisfactory experience, Bank involvement during project preparation has highlighted practical opportunities to modernize management arrangements for district wastewater utilities and improve the cost effectiveness and financial sustainability of wastewater systems and to help strengthen institutional arrangements for sector coordination. The project, therefore, seeks to address a priority in the Government's strategy for wastewater sector management by helping to shape viable approaches for smaller district/township wastewater systems that generally have relatively higher unit costs and more difficulty in mobilizing experienced operating staff to ensure efficient and economical operation and maintenance of networks and treatments facilities.

In particular, more cost effective and viable configurations, requiring fewer separate wastewater treatment plants and institutions, have been developed for district wastewater systems. In addition, the proposed expansion of sewer networks, both for existing as well as for proposed new treatment facilities under the project, will minimize the risk of under-utilization of these assets in the project area, a growing problem for many existing wastewater systems in China. Use of turnkey contracts including detailed design, construction, equipment supply/installation, commissioning and initial operation for wastewater treatment plants in Suzhou should ensure these plants operate at peak performance and lowest operating cost when handed over to responsible wastewater companies, thereby reducing wastewater fee/tariff increases needed. Outsourcing of implementation management and O&M functions to experienced operators should enable the new wastewater companies being established to avoid lengthy and costly implementation delays due to inexperienced procurement management, etc., and to set clear performance accountabilities for the efficient and reliable operation and maintenance of wastewater systems. Dialogue through project preparation has also encouraged municipalities to initiate reform of funding arrangements noted above to make the ongoing municipal institutional reforms affecting the wastewater sector fully effective.

Water quality modeling during project preparation has helped to target project investments in wastewater systems in the area of some of the most heavily polluted rivers. Expanding testing, during project preparation, of wastewater treatment plant sludge for hazardous material is a significant enhancement of environmental safeguards in light of the proportion of industrial wastewater being treated. At the same time, the proposed catchment study of the WangYu River, which is of strategic importance for water transfers from the Yangtze River to improve water quality in Tai Lake and in the lake and canals systems in both Wuxi and Suzhou and to the wider Basin will broaden and deepen the project's longer-term impact beyond the physical investments. Together with other sector development assistance proposed under the project, it will enhance the information base for effective environmental monitoring and provide a basis to strengthen coordination in strategy and action planning for improved water quality management in the Basin.

#### 4. Description

##### A. Wuxi Municipality

**Wuli Lake Sub-project** (\$37.4 million): The component deals with the most-heavily polluted perimeter lake – Wuli Lake, and includes: a) pollution control facilities (10 sluice gates, 1 shiplock); b) lake-bank restoration (19.4 km); and c) pilot research in ecological restoration.

**Wastewater Treatment Plants and Networks** (\$70.9 million): The component will include: a) the first phase of the Chengbei-Huishan WWTP in Huishan District with a capacity of 50,000 m<sup>3</sup>/day of primary and 25,000 m<sup>3</sup>/day of secondary treatment as well as 58 km of sewers serving Changan and Youqiao industrial area; b) expansion of Dongting WWTP in Xishan District (from 20,000 to 50,000 m<sup>3</sup>/day capacity) and 40 km of sewers; c) a new WWTP (25,000 m<sup>3</sup>/day capacity) and 130 km of sewers including 3 lifting stations to develop the full skeleton of the sewer network and user connections serving Anzhen, Houqiao and Yangjian townships and the proposed Wuxi East Industrial Park, all within Xishan District.

**Wuxi City Sewer Network Rehabilitation** (\$21.9 million): support to expedite the ongoing rehabilitation program to increase the conveyance of wastewater flows to be treated in the additional WWTPs under construction or planned by Wuxi city with own financing.

##### B. Suzhou Municipality

**Urban Area Canal Network Rehabilitation** (\$24.4 million): The component would include: control gates on Xujiang and Shangtang Rivers to enhance flood protection and prevent the intrusion of polluted water from the Grand Canal into Suzhou's urban canal system and to prevent the loss of clean water diverted through Xitanghe from the WangYu River. This scheme is also part of the overall flood protection plan for Suzhou city area. The component includes one sluice gate/shiplock on the Xujiang River and on sluice gate/shiplock on the Shangtang River with bank heightening works. The component would also finance sediment dredging for 65 km to restore transit and absorptive flood capacities of canals in the urban area of Suzhou.

**Wastewater Treatment Plants and Networks** (\$43.4 million): The component will include: a) a second phase of the Fuxin WWTP (100,000 m<sup>3</sup>/day capacity) serving the south and west areas of Suzhou city; b) a second phase of the Loujiang WWTP (80,000 m<sup>3</sup>/day capacity) serving the north and east areas of Suzhou city; and c) the first phase of a WWTP (25,000 m<sup>3</sup>/day capacity) and 72 km of associated sewers serving Wuzhong Economic Development Zone in Wuzhong District.

**C. Implementation Management and Sector Development Assistance** (\$3.8 million) This component will provide: a) technical assistance for wastewater masterplans for Wuxi and Suzhou Municipalities; b) capacity building for wastewater utilities management and financing; c) technical assistance for engineering design and construction supervision; d) locally-financed technical assistance to conduct a catchment management planning exercise for the WangYu River;

and e) locally-financed technical assistance for external monitoring and evaluation of implementation of RAPs and EMP.

Wuxi - Wuli Lake Rehabilitation

Wuxi - Wastewater Treatment Plants/networks

Wuxi - City Sewer Network Rehabilitation

Suzhou - Central Urban Area Canal Network Rehabilitation

Suzhou - Polluted Water Control Schemes (on Xujiang and Shangtang Rivers)

Suzhou - Wastewater Treatment Plants/networks

T/A and Capacity Building

Other

## **5. Financing**

### **Source (Total ( US\$m))**

BORROWER (116.95)

IBRD (91.41)

**Total Project Cost:** 208.36

## **6. Implementation**

The Tai Basin Urban Environment Project Office (TBUEPO), which has been established within the Jiangsu Provincial Finance Bureau, has taken the lead in coordinating the work of the international consultant team for review of project proposals and will be responsible for overall coordination of project implementation. TBUEPO will exercise this coordination function proactively to avoid the difficulties experienced by Jiangsu Provincial Environment Bureau during implementation of the recently completed Southern Jiangsu Environment Protection Project. A timetable for recruiting experienced staff in procurement and project financial management, environmental; and resettlement aspects, in particular, has been agreed. TBUEPO will report to the Project Leading Group (PLG) which consists of heads of relevant provincial commissions and bureaus.

Suzhou and Wuxi Municipalities have each established a Project Leading Group, a PMO, also under the respective Municipal Finance Bureau, and Project Implementation Agencies for preparation and implementation of individual components.

In Wuxi Municipality, the Wuli Lake Rehabilitation component will be implemented by the Wuxi Water Conservancy Bureau, which gained satisfactory experience implementing a component of the Tai Basin Flood Control Project, and has already implemented dredging works, relocation of fishponds and water transfer works in the lake. Rehabilitation of the sewer network in Wuxi City will be implemented by the Wuxi Drainage Company which gained satisfactory experience implementing wastewater investments under the Southern Jiangsu Environmental Protection Project.

The Huishan Water Treatment Company Limited (HWTC), established in March 2003, will be responsible for implementing the Huishan wastewater component. The Wuxi Drainage Company will provide implementation assistance, as needed, to ensure satisfactory implementation by this new wastewater company, which will also outsource operations and maintenance functions to an experienced operator. Similar arrangements are proposed for the expansion of the Dongting wastewater system, which is being merged with the new Anzhen wastewater system under the

Xishan Wastewater Treatment Company Limited (XWTC).

In Suzhou, the Suzhou Qingyuan Construction Company (SQCC) will be directly responsible for implementation of the canal rehabilitation component including the control gates on the Shangtang and Xujiang Rivers and the dredging program as well as for implementation of the expansion to the Fuxin and Loujiang wastewater treatment plants. The (corporatized) Drainage Facilities Management Division (DFMD) will be responsible for O&M of the wastewater treatment plants following construction. The Wuzhong Asset Management and Administration Company Limited (WAMC), set up under the Wuzhong Economic and Technical Development Zone Company (WETDZ), will be responsible for implementing and managing the proposed wastewater system in the Wuzhong industrial zone area. However, WETDZ has proposed to outsource implementation management, possibly to SQCC, as well as O&M of networks and facilities to an experienced operator, following construction.

Confirmation will be sought at negotiations on these arrangements and that the Drainage Facilities Management Division (DFMD) will be corporatized by January 2005, as a subsidiary under SWIDC to manage and oversee operation and maintenance of all wastewater systems in Suzhou's central urban districts.

Agreement will be also sought at negotiations on satisfactory arrangements for: implementation support for wastewater treatment companies and outsourcing of O&M functions on wastewater assets for which they are responsible; as well as on a timetable for consolidating wastewater in Xishan District under a single wastewater company.

## **7. Sustainability**

The project would contribute to the sustainability of continued strong economic growth by improving wastewater management and environmental conditions in areas of Wuxi and Suzhou that are experiencing rapid urban and industrial growth and by assisting ongoing efforts to stem continued deterioration of critical water resources in the Tai Basin. The project would strengthen the sustainability of wastewater services through improvements in the management and financing of responsible wastewater utility enterprises.

## **8. Lessons learned from past operations in the country/sector**

China has the largest portfolio in the Bank and its quality is amongst the best performing. A recent OED assessment China: Review of the Bank's assistance to the Urban Water Supply and Wastewater Sector, Report No. 24979 rated the outcome of Bank's assistance as having been moderately satisfactory, its sustainability as likely, but its institutional impact as modest.

The ICR for the Southern Jiangsu Environment Protection Project noted considerable difficulties with the sustainability of industrial pollution control and toxic and hazardous wastes components, which represented over 80 percent of investments under the project and were rated unsatisfactory. By contrast, the report rated the wastewater component as highly satisfactory having been well designed and implemented below appraised cost and fully meeting the water quality objectives as set out in each city's long-term water quality master plan. However, the project failed to achieve full cost recovery for wastewater investments at the time and to convert the wastewater companies into fully autonomous entities in accordance with the 1994 company law, thus

perpetuating their dependence on the municipal public utility bureaus and finance bureaus.

Key lessons learned from past projects, which will have been reflected in project design include the need for: (a) strong client ownership; b) improved coordination at the provincial level; (b) greater focus on utility reform to implement the Government's policies toward development of autonomous commercially oriented utilities, with tariffs adequate to ensure financial sustainability and ensure satisfactory operation and maintenance of assets created; and d) encouraging private sector participation, where there is political support for it.

The project design has also been shaped by recent experience that has highlighted a tendency for local investment plans that make inadequate provision for collection networks resulting in underutilization of the treatment plants that are often over-designed. Investments in networks have been increased to fully capture wastewater flows to support existing as well as proposed new wastewater treatment plants, which have been reviewed and scaled down to reflect more realistic wastewater flows. The turnkey contracts for wastewater treatment plants in Suzhou should ensure that plants operate at peak efficiency and lowest operating cost when handed over following commissioning and initial operation.

The institutional design of the project for asset management looks to outsourcing O&M activities to experienced operators rather than relying solely on strengthening in-house capacity, which has had mixed results elsewhere. Reforms in funding arrangements address major impediments to sustainability and expansion of wastewater service in districts.

#### **9. Environment Aspects (including any public consultation)**

**Issues** : Hohai University carried out the consolidated Environmental Assessment (EA) of the proposed Tai Basin Urban Environment Project in accordance with China's national and Bank policies and procedures, with support from an independent international consulting environmental specialist. The TORs and various draft versions were reviewed and discussed in detail during project preparation. The draft English version EA documents were submitted to the Bank in late September 2003 and reviewed by the Bank during the appraisal mission and revised accordingly. The final EA report, EA Summary and Environmental Management Plan (EMP) were submitted to the Bank in December 2003 and, following additional clarification and analysis, were found to be satisfactory. The Final EA documentation was sent to the Bank's Infoshop in Washington and in Beijing in January 2004. During the EA preparation, local people were consulted at least twice, and their opinions have been reflected in the project design and environmental mitigation measures as appropriate.

The project investments will have positive environmental impacts, in terms of improving the water quality in the Tai Basin. Domestic and industrial wastewaters will be collected and treated at six wastewater treatment plants (WWTPs) to remove pollutants. For year 2010, the expected reduction of pollutant discharges to surface waters from the six WWTPs are 122 tpd of CODCr, 62 tpd of BOD5/day, 6 tpd of NH3-N, 80 tpd of SS, and 0.6 tpd of TP. These reductions will improve the quality of the receiving surface waters in Suzhou and Wuxi and downstream areas. The canal network rehabilitation investments in Suzhou under this project – including dredging and construction of sluice gates and ship locks - will improve the water quality and reduce the risk

of flooding in this City. The Wuli Lake restoration investments under this project will improve the water quality and aquatic life in the Lake, and create a public greenbelt for tourism and recreation.

Minor adverse impacts during construction and operation of particular investments are expected, but will be mitigated. The adverse impacts will be mostly in the form of noise, odor (stink gas), particulate matter (PM) emissions, sediment and sludge discharges, and traffic congestion. Noise emissions from WWTP have been assessed at the boundary line of WWTPs, and found to be in excess of standards only in the case of the Fuxin WWTP (both day and night times), Huishan WWTP (only at night time), and Loujiang WWTPs (only at night time). However, adverse impacts on receptors – which are 200 m to 500 m away from these WWTPs – are not expected. Regarding transportation of sediments dredged from the Suzhou Canals to the disposal site, alternatives were evaluated considering such factors noise and traffic impacts. Mitigatory measures for noise emissions will include no construction at night, use of equipment with low noise, use of vehicles with noise control, and setting up of construction barriers. In addition, cargo ships will not be allowed at any time and pleasure boats will not be allowed at nights in the Shangtang and Xujiang networks in Suzhou, ship noise will be limited to 55 dBA, silencers will be installed on ships for noise suppression, siren duration and frequencies will be minimized, and use of sirens will not be permitted in residential areas.

Odor emissions from the sedimentation and SBR tanks of WWTPs will be minimized by proper operation through adjustment of the air flow rate of the blower to bring wastewater to aerobic state, and through timely sludge dewatering, handling of sludge cakes in dewatering rooms, use of sealed trucks for transporting the sludge to the disposal site, sprinkling temporary sludge storage areas with bleach, and planting trees around the aeration tanks and WWTP. To mitigate PM emissions, vehicles will be covered and their speed will be limited to 40 km/h, and their wheels will be cleaned of mud.

Sediments from Suzhou Canals have been tested for hazardous materials and found to be within standards prescribed by applicable Chinese regulations - most indicators were low or undetectable - and, in accordance with applicable Chinese regulations, will be disposed at a site at Sanjiaozhui that is zoned as green area in Suzhou's masterplan. Even so, further testing for hazardous materials is to be undertaken of sediments in the Xiaomiduqiao River section prior to dredging to determine if other disposal arrangements, for example at purpose built cells at the municipal landfill. Sludge from WWTPs will be tested for hazardous characteristics under applicable Chinese regulations/standards. Any sludge found to be hazardous will be disposed at a hazardous waste landfill. If the sludge is found to be non-hazardous, it will be disposed at a separate cell that is designed and operated in compliance with Chinese Government regulations, in a sanitary landfill. Prior to receiving the sludge, the hazardous and/or sanitary landfills will be certified as designed and operated in compliance with applicable government regulations. Transportation of the WWTP sludge will be conducted by leak proof trucks. Confirmation of these arrangements will be sought at negotiations.

Public consultations have revealed considerable support for this project. However, concerns were also expressed about the potential unpleasant odors from WWTPs, and greater noise and dust

levels as well as traffic. Some suggested shorter construction periods to reduce adverse impacts during the construction period. Regarding the ship lock at the Shangtang River, the sight of the Hangshang Temple was emphasized and the gate was re-sited. Agricultural use of the WWTP sludge was viewed not feasible by affected people for the Wuzhong and Dongting WWTPs. These concerns have been incorporated into the project design and in the EMP.

Two suggestions are made at the conclusion of the EA Report. The first one regarding implementation of the Wuli Lake ecological restoration sub-component as a pilot activity (instead of an activity for full-scale implementation) is reflected in the project design. The second relates to the implementation of industrial pollution prevention measures (in particular, water recycle and reuse at industrial facilities) as a means to reduce costs associated with wastewater treatment and sludge management. Agreement will be sought at negotiations that industries discharging into project-financed WWTPs will be included in the Jiangsu CP program and that periodic project progress reports will report in pollution prevention audits and implementation of recommended measures. Confirmation will also be sought at negotiations that periodic project progress reports will report on implementation of all activities required under the EMP.

#### **10. List of factual technical documents:**

- Yangtze Urban Water Resource Sector Strategy Study, Final Report, Part III: Water Quality Modeling Study of Taihu Lake, June 2002, DHI
- Lake Taihu Networks Water Quality Modelling, Support the Bank for Project Appraisal of, Lake Taihu Pollution Control Project (Tai Basin Project - Urban Environmental Report, Final Report, July 2003, DHI
- Lake Taihu Water Quality Improvement Project, Hydrodynamic & Eutrophication Modelling of Lake Taihu, Calibration and Scenario Study Report, May 2003, DHI
- Changzhou Drainage Management Department, Changzhou Wastewater System Expansion Feasibility Study, May 2002
- Suzhou Municipality, Preliminary Wastewater Institutional Strategy Analysis, MWH, March 2, 2003, MWH
- Wuxi Municipality, Preliminary Wastewater Institutional Strategy Analysis, MWH, March 2, 2003, MWH
- Jiangsu Provincial Finance Bureau, Proposed Lake Tai Water Quality Improvement Project (Tai Basin Project), Project Preparation Assistance, Preliminary Wastewater Projections, MWH
- Jiangsu Provincial Finance Bureau, Proposed Lake Tai Water Quality Improvement Project (Tai Basin Project), Project Preparation Assistance, Suzhou Sewerage Master Plan Review, April 29, 2003, MWH
- Long-term Planning on Water Environment Management in Taihu Basin, Taihu Basin Authority, MWR, PRC, December, 2001
- A Strategic Taihu Basin Water Quality Management Plan, World Bank, EASUR, 2000
- Tai Basin Urban Environment Project, Wuxi Components Feasibility Report (Draft), August 2003, MWH
- Tai Basin Urban Environment Project, Suzhou Components Feasibility Report (Draft),

August 2003, MWH

- Modelling of the Suzhou Creek River System within the Framework of MIKE11, A Report of Training at DHI

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**Note: This is information on an evolving project. Certain components may not be necessarily included in the final project.**