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The World Bank

Report No: 23567-CHA

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PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED ADAPTABLE PROGRAM LOAN

IN THE AMOUNT OF US$200 MILLION

TO THE

PEOPLE'S REPUBLIC OF CHINA

FOR THE

SHANGHAI URBAN ENVIRONMENT PROJECT
IN SUPPORT OF THE FIRST PHASE OF THE
SHANGHAI URBAN ENVIRONMENT PROGRAM

May 20, 2003

Urban Development Sector Unit
China Country Unit
East Asia and Pacific Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective May 1, 2003)

Currency Unit = Yuan (Y)
Y 1.00 = US$0.12
US$1.00 = Y 8.3

FISCAL YEAR
January 1 -- December 31

ABBREVIATIONS AND ACRONYMS

APL	Adaptable Program Loan	SFB	Shanghai Finance Bureau
CEIC	Shanghai Chengtou Environment Industry Development Company Limited	SHUEP	Shanghai Urban Environment Project
		SM	Shanghai Municipality
DFV	District Financing Vehicle	SMG	Shanghai Municipal Government
EA	Environmental Assessment	SMSC	Shanghai Municipal Sewerage Company
FWPC	Fengjing Water Purification Company Limited	SMWC	Shanghai Municipal Waterworks Company Limited
GDP	Gross Domestic Product	SOE	Statement of Expenditure
HDG	Hongkou District Government	SPC	Shanghai Development Planning Commission
ICB	International Competitive Bidding		
JOOC	Jinshan Ocean Outfall Engineering General Company Limited	SSP1	Shanghai Sewerage Project
		SSP2	Second Shanghai Sewerage Project
MOF	Ministry of Finance	SSPCC	Shanghai Sewerage Project Construction Company
NCB	National Competitive Bidding		
NSDC	Nanpai Sewage Disposal Company Limited	SWA	Shanghai Water Authority
PO	Project Office	SWAOD	Shanghai Water Assets Operation and Development Company
RAP	Resettlement Action Plan		
SCAESAB	Shanghai City Appearance & Environmental Sanitation Administration Bureau	SWEC	Shanghai Water & Environment Construction Company Limited
		TFYP	Tenth Five-Year Plan
SCC	Shanghai Construction & Management Commission	UDIC	Shanghai Urban Development and Investment Company
		WTO	World Trade Organization
SDRC	State Development & Reform Commission	WWTP	Wastewater Treatment Plant
SEPB	Shanghai Environmental Protection Bureau		

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Sector Director:	Keshav Varma, EASUR
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CHINA
SHANGHAI URBAN ENVIRONMENT PROJECT

CONTENTS

CHINA
Shanghai Urban Environment Project

Project Appraisal Document

East Asia and Pacific Region
EASUR

Date: May 20, 2003
Sector Manager/Director: Keshav Varma
Country Manager/Director: Yukon Huang
Project ID: P070191
Lending Instrument: Adaptable Program Loan (APL)

Team Leader: Geoffrey Read
Sector(s): Sewerage (73%), Solid waste management (20%), Sub-national government administration (7%)
Theme(s): Other urban development (P), Pollution management and environmental health (P), Access to urban services for the poor (P), Environmental policies and institutions (P)

Program Financing Data

APL	Indicative Financing Plan				Estimated Implementation Period (Bank FY)		Borrower
	IBRD US$ m	%	Others US$ m	Total US$ m	Commitment Date	Closing Date	
APL 1 Loan/ Credit	200.00	39.0	312.20	512.20	07/01/2003	03/31/2009	People's Republic of China
APL 2 Loan/ Credit	300.00	50.0	300.00	600.00	07/01/2005	09/30/2010	People's Republic of China
APL 3 Loan/ Credit	200.00	50.0	200.00	400.00	07/01/2007	09/30/2011	People's Republic of China
Total	700.00		812.20	1512.20			

[X] Loan **[ ] Credit** **[ ] Grant** **[ ] Guarantee** **[ ] Other:**

For Loans/Credits/Others:
Amount (US$m): 200
Borrower Rationale for Choice of Loan Terms Available on File: ☒ **Yes**
Proposed Terms (IBRD): Variable-Spread Loan (VSL)
Grace period (years): 5 **Years to maturity:** 20
Commitment fee: 0.75% **Front end fee (FEF) on Bank loan:** 1.00%

Financing Plan (US$m): Source	Local	Foreign	Total
BORROWER	0.00	0.00	0.00
IBRD	82.50	117.50	200.00
LOCAL GOVTS. (PROV., DISTRICT, CITY) OF BORROWING COUNTRY	293.80	18.40	312.20
Total:	376.30	135.90	512.20

Borrower: PEOPLE'S REPUBLIC OF CHINA
Responsible agency: SHANGHAI MUNICIPAL GOVERNMENT
principally through the Development Planning Commission, the Municipal Finance Bureau, and the Municipal Construction and Management Commission of Shanghai.
Address: Shanghai Municipal People's Government, 200 Renmin Da Dao, Shanghai 200003
Contact Person: Mr. Han Zheng, Mayor
Tel: 86 21 6355 9829 Fax: 86 21 6311 9462 Email:
Other Agency(ies):
Shanghai Municipal Finance Bureau
Address: 60, Jiu Jiang Road, Shanghai, China, 200002
Contact Person: Ms. Liu Hong Wei, Director
Tel: 86 21 6321 9610 Fax: 86 21 6321 3896 Email: smftbwb@public1.sta.net.cn
Shanghai Development & Planning Commission; Shanghai Municipal Construction Commission; Shanghai Water Authority (SWA); Shanghai Municipal Sewerage Company (SMSC).
Address: Shanghai Municipal People's Government, 200 Renmin Da Dao, Shanghai 200003
Contact Person: Mr. Jiang Yin Shi, Vice Director, Development Planning Commission of Shanghai; Mr. Xiong Jian Ping, Vice Chairman and Administrator, Shanghai Municipal Construction Commission; Mr. Ma De Rong, General Manager, Shanghai Municipal Sewerage Company (SMSC).
Tel: 86 21 5652 8200 Fax: 86 21 5652 9502 Email: xgf@public3.sta.net.cn

Estimated Disbursements (Bank FY/US$m):

FY	2004	2005	2006	2007	2008	2009		
Annual	20.00	31.00	43.70	56.60	30.90	17.80		
Cumulative	20.00	51.00	94.70	151.30	182.20	200.00		

Project implementation period: July 2003 to September 2008
Expected effectiveness date: 01/01/2004 **Expected closing date:** 03/31/2009

A. Program Purpose and Project Development Objective

1. Program purpose and program phasing:

The Shanghai Municipal Government (SMG) has adopted an ambitious and forward-looking Five-Year Development Plan (2001-2005) in which it seeks to enhance the economic, financial, trade and manufacturing stature of Shanghai, with the objective of Shanghai becoming a sustainable, global and competitive Municipality and an international economic, trade and shipping center at the heart of the Yangtze River Delta economic region. China's entry into the World Trade Organization (WTO) provides an added stimulus, reinforcing Shanghai's development strategy of market-oriented reforms.

As part of this overall development strategy, the Shanghai authorities have explicitly recognized the need not only to halt environmental deterioration, but also to improve urban environmental conditions to foster sustainable growth and improve living conditions for its citizens. The Urban Environmental Management Plan defines SMG's strategy: physical and service-level targets are contained in the Tenth Five-Year Plan. Nearly all key policy decisions have already been taken to underpin implementation of the Urban Environment Management Plan, including: applying the principle that the polluter pays; redefining the role of state from that of a service provider of urban environmental services toward that of regulator with an increasing role for private sector initiatives; increasing financial self-reliance of urban environmental services for operations and capital investment; and limiting the amount of capital investment in urban environmental services to be financed from the municipal government in the form of contributed equity.

The longer-term social and environment protection goals include:

- redressing the imbalance in access to urban environmental services in the poorer and less well-served areas across the Municipality.

- using surface and groundwater resources, which should be balanced with their sustainable supply across the Shanghai Municipality;

- collecting, treating and disposing of all wastewater and runoff and sludge generated from municipal wastewater treatment in ways that protect public health and atmospheric, terrestrial and aquatic environments and conserve diminishing land resources;

- collecting, transferring, treating and disposing of solid waste from households and the growing volume from food services in ways that protect public health and atmospheric, terrestrial and aquatic environments;

- optimizing the environmental benefits in terms of air quality from the expected increase in availability of natural gas; and

- finding alternative/improved approaches for upgrading urban environmental services in currently underserved areas to: (a) support Shanghai's cultural heritage protection objectives; and (b) maintain community life without resorting to massive clearing/permanent relocation.

There are currently no regular capital- or revenue-sharing arrangements between the nine districts (and one county) and Shanghai City for the formers' environmental infrastructure needs. These districts are growing rapidly and their environmental degradation is now a major problem requiring solutions they cannot afford to finance entirely from their own resources. Under its Tenth Five-Year Plan, SMG is pursuing a program to promote the development of one satellite city (Songjiang) and nine central towns. There are currently 11 satellite cities, 22 central towns and over 40 other towns in Shanghai

Municipality. SMG proposes to formulate integrated institutional and financing arrangements that would better serve the needs of its suburban districts, including meeting part of the district urban environmental infrastructure requirements and services through a district financing vehicle. A successful model could be replicated in the rest of China.

In order to meet its environmental objectives, SMG and the districts/county face large-scale and continuing investment commitments. Some estimates indicate that to meet the Tenth Five-Year Plan targets, they would need to finance a minimum of Y40 billion ($4.85 billion equivalent) in the water and wastewater subsectors alone. SMG has therefore established a core program of activities and investments that it considers to be the top priority, and requested World Bank support over the next eight years through an Adaptable Program Loan (APL). The major organizing concept for including activities in the core program is that they are based on a metropolitan-wide vision of the needs and require metropolitan-wide measures to be achieved. This core program is described in SMG's letter of development policy and amounts in investment terms to a program of about $2.6 billion equivalent.

Shanghai's strategy is deserving of Bank assistance. No other large city in China (or in the developing world) has adopted a strategy that so explicitly links environmental progress with long-term economic growth. Furthermore, no other city in China is as likely to be able to successfully spearhead new approaches to public-private partnerships in environmental services, and new approaches to tapping capital market finance, which are needed to implement such a strategy. Shanghai has long been a model for and leader of reforms in China and the reforms embedded in its very ambitious urban environmental strategy are likely to have major demonstration effects on urban areas throughout the country and the region.

Shanghai has already received support from the World Bank for: (a) focused urban wastewater investments (First and Second Shanghai Sewerage Projects--SSP1 and SSP2); and (b) urban water supply and solid waste management (Shanghai Environment Project--SEP). The Bank has had good experience in Shanghai. Implementation performance, including institutional performance, has steadily improved in successive projects and the Bank has found in the city authorities a partner who appreciates how environmental sector issues should be handled. With the exception of the wastewater investments and a small water supply subcomponent in Songjiang City financed under SEP, Bank financing has been limited to investments servicing the core urban area of Shanghai City. The success of the above-mentioned projects in terms of institutional, financial and physical performance improvements forms a solid base for Shanghai to proceed now in pursuing more innovative ways of providing services to its citizens, and to extending such services to its less affluent citizens living outside the city core.

In order to finance even this smaller core program, SMG would either have to partially defer or reduce funding presently allocated to some of its other programs, including its important social welfare programs, or seek alternative sources of funding more closely aligned to the financing of its proposed infrastructure investments. SMG has chosen to do the latter, and has asked for Bank support in policy, institutional reform and investment finance. It has also asked Bank help in gaining access to long-term sources of finance through, for example, issuance of infrastructure bonds, tapping the domestic capital market and involving the private sector, either alone or in partnership, in "build, operate and transfer" (BOT) schemes, or concessions.

The proposed Shanghai Urban Environment Project (SHUEP) adaptable program loan (APL) would aim to support SMG to: (a) implement the urban environment goal of its development strategy and thereby help to ensure that economic growth takes place in an environmentally and institutionally sustainable manner; (b) provide major long-term environmental benefits to its millions of citizens and to the ecology of Shanghai Municipality (SM); and (c) develop innovative policies, institutional reforms and financing

methods that are needed to support the environmental goals and that will serve as models for local government and environmental reform throughout China.

This smaller core program requires implementation of numerous and complementary measures, each with its own trajectory of policy formulation, institutional reform/capacity building, enabling steps and finally physical investments. The core program looks at first glance like a time slice, capturing a different combination and configuration of phases for each component. However, in conceptual terms, each phase of the overall core program is designed to give prominence to one aspect of the urban environmental strategy being pursued, which contributes to and enables the pursuit of the next phase of SMG's urban environment management strategy.

In ***Phase 1***, prominence is given to further developing the underpinnings and enabling conditions to pursue an integrated/regional approach to environmental issues. Investments included in this phase are those that are already known to be priority components of the integrated/regional approach (including the protection of upstream sources for water supply, expansion of shared landfills, complementary investments to increase efficiency of earlier investments). Further development of integrated/regional programs and related investments is expected to be continued during subsequent phases. Phase 1 will also test new approaches to upgrading urban environment services in a poorer, underserved area through a pilot program.

Phase 2 will support implementation of programs that address environmental issues of greater complexity and respond to the deepening of SMG's work on the environmental agenda (including solid-waste management program consolidation, bond finance and a district financing vehicle, and continue to expand the pilot approaches to upgrading urban environment services in poorer, underserved areas). Preparations for these Phase 2 activities are to be made during implementation of Phase 1.

Phase 3 is the stage at which the Shanghai authorities hope to begin realizing the fruits of their efforts to build up to a sustainable financial system for urban environment services. It is anticipated that further improvements to the operations, management and finances of at least some urban environment service utilities over the course of Phases 1 and 2 would enable them to move beyond the municipal budget to finance their capital investments on acceptable terms, either on the capital markets and/or obtaining finance from a sustainable district financing vehicle. Complementing this is the development and establishment during Phases 1 and 2 of the supply side, including enabling capital market/financing arrangements and institutions. Phase 3 also continues the deepening of the environmental agenda, moving on to begin pursuing some of the improvements in air quality potentially available from the increased supply of natural gas to the Shanghai metropolitan area.

2. Project development objective: (see Annex 1)

The three loans under the proposed APL are designed with the objective of improving environmental conditions by progressive development and implementation of integrated, metropolitan-wide measures.

The main development objective of APL1 is to put in place some of the underpinnings and enabling conditions for SMG to pursue this integrated, metropolitan-wide approach. Policies/programs will be formulated to enhance, among others, management of water resources, market-based approaches for solid waste services, development of new financing instruments, and the testing of alternative approaches for improving urban environment services in underserved areas. A second objective would be to install, in both the city center and some of the surrounding districts, facilities already known to be high priority to achieve metropolitan-wide environmental objectives (e.g., protection of upstream sources for water supply, expansion of shared landfills, and complementary investments to increase efficiency of existing

wastewater facilities).

The development objective of APL2 is to have the surrounding districts participate increasingly in the metropolitan-wide measures to improve wastewater and solid waste management, and to deepen the scope of the environmental agenda being addressed across the Municipality. Investments to be financed include those associated with the implementation in the districts and the core city of policies/programs developed in APL1 (including associated human resource development). The environment agenda will be deepened to include, among others, air quality, development of policies/programs for treatment of medical waste, strategy for dealing with agricultural waste, approaches for rehabilitation/upgrading of urban environment services in old urban areas and rehabilitation/redevelopment of old industrial areas in the core city.

The development objective of APL3 is to have a technically and operationally effective, financially sustainable urban environmental services system across the Municipality.

SMG, with the support of the central government, has proposed that the above objective be achieved with support from an APL over about eight years in three phases commencing about July 1, 2003 and ending about September 30, 2011. The aggregate amount of loans under the APL is expected to be about $700 million, with tranches of $200, $300 and $200 million.

3. Key performance indicators: (see Annex 1)

The success of SMG's urban environment improvement program will be evaluated by the rate of progress made in meeting three types of goals--service coverage, environmental outcome targets, and tests of financial sustainability for the provision of urban environmental services. These are related to, but not synonymous with, the proposed triggers for proceeding with approval of subsequent APLs, which are discussed separately. Performance indicators for each APL phase will be focused more on outputs and outcomes, and relate to the rate of progress on putting in place the necessary preparations and enabling arrangements to prepare for the next steps in deepening the environmental agenda and obtaining the benefits of an integrated/regional urban environmental services strategy. Additional water quality and financial performance targets are described in Annex 1.

B. Strategic Context

1. Sector-related Country Assistance Strategy (CAS) goal supported by the project: (see Annex 1)
Document number: 25141-CHA **Date of latest CAS discussion:** 12/19/02

CAS Memorandum of January 22, 2003 and Country Program Matrix (FY03-05)

As China makes its historic social and economic transitions to a more urban society and a market-based economy, the project would directly support two of the three CAS themes. Firstly, to facilitate an environmentally sustainable development process. Enhancing environmental management and mitigating water, and air pollution are key sectoral directions of the Bank's CAS. The project supports this theme through: (a) the establishment of new mechanisms for environmental infrastructure finance; (b) the extension of urban wastewater collection, treatment and disposal facilities; (c) the expansion of the collection, transportation and safe disposal of solid and non-hazardous industrial waste in the core urban area; and (d) the development of water resource protection in the Upper Huangpu Catchment. It would improve the efficiency of infrastructure services by strengthening, where necessary, the service delivery institutions, enhancing capacity through focused interventions.

The second directly supported theme is to help improve the business environment, and facilitate the transition to a market economy, moving from the liberalization phase to the more challenging structural and institution-building phase. In particular, strengthen urban management and support China's planned financial sector reform. With China's accession to the WTO in 2001, and the private sector continuing to grow dynamically, support for innovation and change through more programmatic and pilot operations with strengthened links to private sector financing, would be major features of Bank operations. The proposed APL has been designed by Shanghai to specifically support these strategic directions, in tangible ways, through developing new financial mechanisms and instruments, strengthening metropolitan management, and advancing environmental service delivery approaches.

2. Main sector issues and Government strategy:

Shanghai Municipality is one of four provincial-level cities in China and is the country's largest contiguous urban center, with a permanent, registered population now approaching 14 million and an additional temporary population of about 3 million. The city is China's most important industrial base, and the major center of commerce, trade, finance and science. Shanghai accounts for about 1 percent of China's population, and about 5 percent of its gross domestic product (GDP).

Shanghai made substantial progress during the last decade of the 20th century in restructuring its economy and in upgrading its environmental infrastructure. However, in spite of the considerable recent investments in urban services, some 3 million of the urban residents live in very crowded conditions, with inadequate access to drinking water and sanitation. Less than two thirds of wastewater and stormwater in Shanghai City is hygienically intercepted and disposed of, and only some 11 percent of sewage flows are treated to secondary treatment standards and safely disposed; the existing sanitary landfill for municipal solid waste disposal has only about two years' capacity remaining; and the water quality in the Huangpu River, the main source of drinking water, has become increasingly polluted over the past five years, rendering it marginally acceptable as a source of drinking water. Air quality has also deteriorated during this period. The inequality of access to services is also of concern to SMG; this is exacerbated by an emerging disparity of incomes.

SMG recognizes the need to urgently address these issues, in line with responding to the consequence of rapid economic growth and urbanization of eastern China and the Yangtze Delta, and in order to achieve its objective of becoming a world-class international economic and trade center; SMG has specific objectives aiming to achieve the highest standards of urban environmental quality. Shanghai considers that good environmental performance will both enhance the quality of life of its citizens and help it to continue to attract high-quality foreign investment. Shanghai's development strategy follows that with increasing global concern for the environment, and with many multinational corporations worried about reputational risks, SMG would be able to turn good environmental performance into a competitive advantage in the future; the government intends to make greater strides in changing the role of government from a provider of services to more of an enabler and facilitator.

SMG has articulated five policy themes that it proposes to address during implementation of its development plan. The five themes are:

- developing innovative mechanisms for financing its environmental and other infrastructure investments, including adopting public/private partnership strategies;
- gaining experience in effectively engaging the nongovernment sector, both stand-alone and in partnership with the public sector;
- augmenting existing urban infrastructure in a cost-effective manner;
- enhancing environmental management and pollution control; and

- improving the effectiveness of the municipal management and service delivery institutions.

Articulation of these themes demonstrates the ambitious and far-reaching nature of SMG's urban environment strategy and program objectives, and SMG's full understanding of the highly complex and interrelated nature of the measures needed to bring these objectives to reality. The themes and proposed measures in the SMG program represent a deepening of the environment sector development agenda, as they progress from the relatively straightforward issues in water supply and primary types of infrastructure for wastewater collection (where substantial progress has been achieved under previous Bank-supported projects) into more difficult and complex areas such as wastewater treatment, solid-waste management, and improved air quality. This sequence in itself reflects a progressive evolution in the role of the public sector in environmental services, complemented by a growing prospect for private sector involvement. And as the subsectoral features develop and public/private roles evolve, they also enable a progression from reliance on financial support from the municipal budget, toward the sector's own cash generation and, eventually, to tapping the financial/capital markets to fund capital investment needs. Overarching these themes is the broadening of their development vision in spatial terms beyond the city-center to also include the surrounding nine districts and one county. While administratively separate on some urban environment matters, the city center and the surrounding districts and county have significant mutual interests in pursuing an integrated, metropolitan-wide urban environment management approach.

During its Tenth Five-Year Plan, environmental protection investments would account for 3 percent of the municipal GDP, to be financed by enhanced user charges and a range of new and refined financing methods. Quantified targets have been set for water supply, wastewater collection and treatment, and municipal solid waste management. The environmental legal system would also be strengthened and the effectiveness of environmental decision-making processes improved.

The City is responding to local, regional and global issues in its development plans, and continued augmentation of its infrastructure is critical for its future competitiveness. SMG recognizes the need to adopt a more holistic approach to environmental management involving not simply the control of point sources of pollution but also measures to influence other urban activities that generate pollution of a dispersed nature. In this connection the Tenth Five-Year Plan recognizes the growing impact of motorization on urban environmental quality.

SMG also plans to further modernize its management, establishing an integrated legal framework for urban management with a rational division of responsibilities among local jurisdictions. This would be achieved through: (a) the establishment of a comprehensive urban hierarchy, consisting of major urban centers, satellite cities, suburban areas and towns/townships; (b) a comprehensive urban infrastructure system; and (c) the adoption of an environmentally sustainable approach in all investments.

3. Sector issues to be addressed by the project and strategic choices:

Both the central and Shanghai municipal governments have determined that a project prepared along the lines of an APL would best serve Shanghai's requirements for a programmatic and innovative approach to the provision of the next generation of urban infrastructure. For Shanghai, a programmatic loan would allow for a more integrated and flexible approach to development and metropolitan management than a solely project-focused strategy and would offer more scope for innovation through its inherent greater flexibility. A copy of SMG's Program Development Letter is included as an attachment to Annex 1.

The overall objective of the APL program would be to support SMG's efforts to improve the competitive advantage of Shanghai in the region and the world through improved urban environmental conditions, thus improving the quality of urban life within the municipality and the sustainability of its infrastructure. This long-term development program would comprise a blend of policy, institutional and investment initiatives. The program would support a stronger market orientation for municipal services pricing, and institutions delivering those services would be strengthened, as would the Shanghai Water Authority (SWA) and the Shanghai Environmental Protection Bureau (SEPB) in their regulatory functions of water resource management and monitoring water and air quality. It would also aim to have a broader impact on the reforms and development of other cities in China through testing of new concepts and innovative measures, in particular innovative financing of water/sanitation and solid waste services.

The operation builds on the main tenets of the Bank's urban strategy, ***liveability, good governance, bankability and competitiveness***, and extends the idea of sustainable development into the setting of a broad city region. In this respect, it is the first, and possibly the most ambitious, effort in the Bank to address the central issues of sustainable urban development on a large metropolitan scale. By focusing on the client concerns for environmental improvements, the project addresses two interlocking issues--environmental quality and competitiveness--both seen as central to quality of life and the generation of livelihood in the region. Sector reforms embedded in the project also have the effect of improving city financial practices and institutions, and demonstrating the imperatives of market pricing and cost recovery for environmental services. The project agencies are keenly aware that the Municipality must achieve a coherence of effort in its regulations, service delivery and financial practices if Shanghai is to stay competitive in global markets and responsive to its citizens.

Metropolitan environment management has always been a great challenge in developing countries and has been marked by deteriorating qualities of environment and liveability, institutional clutter and overlap and lack of a coordinated, comprehensive approach. This APL gives the opportunity to engage with these issues in a metropolis that is willing to reinvent its systems of governance and regionalize them to develop a more holistic and well-integrated approach and to show the political and administrative will to improve its liveability and responsiveness to its citizens. In that regard, this partnership would not only have great demonstration value for China, as well as for the region, but would also have the subsidiary effect of providing valuable inputs to the Bank's pool of learning and knowledge with regard to metropolitan development. It is important to note here that the developing world, and particularly Asia, needs a success story with regard to metropolitan development.

Sustainable long-term financing would be essential to meet the significant investment programs for the environment improvements SMG plans over the next decade. SMG recognized that the current funding methods using short-term funding for most long-term investment commitments is risky, inefficient and not sustainable. Hence, SMG has decided, with central government support, to develop a more responsive and innovative framework for infrastructure financing. This conceptual framework, "Financial Policy Objectives and Financial Innovations," discussing challenges and innovations, is provided in Annex 15.

Need for Access to Domestic Capital Markets

One of the most important legacies of the Shanghai Urban Environment Project APL would be the precedents it establishes for financing municipal-level environmental infrastructure. Shanghai is the acknowledged leader in China of local financial innovations. Its initiatives, if successful in providing stable access to long-term financing for environmental investments, will be widely imitated. The financing agenda therefore should address issues that are high on the priority list not only for Shanghai but also for other metropolitan regions and should reinforce the national program of financial sector reform, as applied to the municipal sector.

Infrastructure finance in China today is primarily arranged through: (a) short- and medium-term "policy lending" through the China Development Bank (CDB), funded through Policy Financial Bonds periodically issued by CDB (in some cases issued by a commercial bank, after competitive bidding for the "policy lending" and corresponding bond issue)--normally with a 5- or 10-year maturity--with an implicit government guarantee; (b) short-term (mostly 3-, sometimes 5-year) commercial bank lending; and (c) on- and off-budget revenues. China has very limited experience with municipal bonds, including a brief surge of municipal bond issuance in the early 1990s that led to a number of defaults or near-defaults by the original issuers. This experience led to imposition of tight regulatory controls on municipal bonds, which now require individual approval of the State Development & Reform Commission (SDRC). The interest rates for lending as well as bond issues are regulated by the People's Bank of China. Municipal governments are not allowed to borrow against general revenues, but it is possible for them to borrow for special projects through municipal investment companies, such as the Shanghai Urban Development and Investment Company (UDIC). These companies act on behalf of the municipality to mobilize funding for municipal infrastructure and other investments. Budgetary resources have played a declining role in infrastructure finance in recent years.

In order to be able to finance its environmental program, Shanghai authorities will have to tap the domestic capital markets utilizing new financial instruments. Shanghai officials estimate that over the next five years they will have to finance Y40 billion ($4.85 billion) in the broadly defined metropolitan water sector. Capital funding available from the municipal budget is estimated at only Y3.5 billion. Multilateral and international donor agencies will provide a small part of the gap, leaving the great bulk of financing to be raised from nonstate sources either in the form of debt or investor equity. At present, credits for municipal infrastructure investment financing are provided primarily by commercial banks' three-year loans. Since construction can take at least two years, project revenues will not be available to repay the loan and it is known that such loans will have to be rolled over. The continuous rolling over of short-term bank loans to finance long-term investment projects creates serious risks. It exposes both the municipality and the banks to vulnerabilities in case rollover is not feasible—due, for example, to an economic slowdown. It also breaks the efficiency links between financing strategy and tariffs, since economically efficient water and wastewater tariffs cannot be structured to repay short-term borrowing. Shanghai realizes that it needs to broaden its access to capital and tap the domestic bond market.

The Shanghai UDIC has previously issued bonds for manufacturing and transportation, but not for environmental purposes. Bond financing for environmental purposes would have several advantages. These include: lengthening tenure and better matching assets and liabilities, accessing long-term institutional savings (securing approval for insurance company purchase of a Shanghai UDIC environmental bond issue will be sought and would represent a major breakthrough in sustainable capital financing), lowering interest rates, while exerting pressure on commercial banks to lengthen their infrastructure finance lending periods in order to remain competitive. One of the APL project objectives is to launch a program of regular municipal enterprise bond issuance to help finance local environmental

investment.

The bond issuer will be the Shanghai Water Assets Operation and Development Company (SWAOD), a sectoral subsidiary of the Shanghai UDIC. The first bond issue is planned for about mid-2005 (see Annex 15). This will give the Program ample time to work with SWAOD in preparing an institutional business plan, a debt management policy, and a projection of future tariff increases necessary to service all of SWAOD's debt from service revenues. All of these elements of long-term finance planning are now absent. A series of SWAOD bond issues, backed by full disclosure of SWAOD finances and sources of debt-service revenue in Offering Statements, also should help establish a responsible municipal-level bond market in China. In the past, bonds have been issued with virtually no financial disclosure, creating the expectation of implied government guarantees. Establishment of a well-functioning municipal bond market is one element in deepening capital markets, improving disclosure standards in financial transactions, and moving toward project finance, all of which are primary financial sector reform goals shared by the Government and the World Bank.

The suburban districts of Shanghai face even greater obstacles than the core city in raising stable, long-term financing for environmental infrastructure investment. The second major objective of the financial component of the APL is to use Shanghai's strength to help districts secure long-term financing at reasonable costs for their key environmental investments. National policy, as well as Shanghai municipal policy, discourages subsidizing districts' investments from the municipal budget. Districts are intended to be self-financing levels of government as regards capital budgets. Under the APL, however, Shanghai Municipality and the districts recognize their environmental interdependence. They have agreed to establish a District Financing Vehicle (DFV), to operate on commercial terms, that will help the districts raise long-term financing from the market.

Several models for the DFV were considered during project preparation. One could operate as a metropolitan-scale Municipal Development Fund, passing on portions of the Bank's SHUEP loan as well as domestically raised funds, to the districts. A second model could involve a joint venture between the Shanghai UDIC and a nonstate partner, formed to invest in district environmental projects. Under a third model the DFV could establish lines of credit with participating commercial banks, so that projects approved by the DFV as technically feasible and cost efficient, and then given a credit enhancement such as municipal budget intercept authority, would automatically qualify for long-term commercial bank financing. Under Phase One of the APL, a Steering Committee, headed by the Shanghai UDIC, and including representatives of the Construction Commission, Planning Commission, Finance Bureau, and local banks, would define the institutional structure and modus operandi of the DFV. All parties have expressed a preference for a straightforward, low-risk design that could respond quickly to districts' financing needs, while relying on the nonstate sector for financing. The DFV would be formally established and begin operation in Phase Two.

4. Program description and performance triggers for subsequent loans:

Program Area. The program area comprises Shanghai Municipality (SM), with particular emphasis on (a) the core urban area; and (b) the Upper Huangpu Catchment, which is the principal source of water for the city. The urban area, of Shanghai, had a population of 9.6 million in November 2000, with a density of 14,500 persons per square kilometer (p/km2); the suburban areas had a population of some 6.8 million (1,200 p/km2) giving a total populatuion of 16.4 million (2,586 p/km2). The jurisdictional distinction between Shanghai City and suburban districts requires project design to address the issue of metropolitan-level environmental management and governance for the APL. While environmental infrastructure services (water, wastewater, solid waste) are provided in Shanghai City by SMG agencies, responsibilities for investment, tariff-setting, asset management and service delivery in the rapidly

urbanizing suburban parts of the metropolis lie with suburban District Governments and Chongming County (the single remaining county in Shanghai Municipality). The APL is explicitly designed to assist both the Shanghai Municipal Government in service delivery within Shanghai City and District Governments in the suburban and peri-urban areas.

APL1 – July 2003 to September 2008. Developing Underpinnings and Enabling Conditions to Pursue Integrated/Regional Approach to Urban Environment Issues

SMG, the district governments and their respective agencies and utilities have achieved the following, which provide a satisfactory basis for moving to the implementation of the first phase (APL1):

- SMG has provided a satisfactory Letter of Development Program;
- SMG has prepared an updated Wastewater Management Master Plan;
- SMG and the Districts have agreed on pursuit of investments already known to be high priority components of the integrated/regional approach for implementation during Phase 1.
- Two Districts have agreed to establish wastewater companies to collect, treat and dispose wastewater during Phase 1.
- SMG has approved and implemented the first phase of the planned solid waste user charges, commencing with charges levied for collection and transportation of food wastes produced by commercial enterprises;
- The Program Steering Group has approved terms of reference for proposed institutional development and technical assistance assignments to be funded under the project;
- SMG and two Districts are nearing completion of preparations for three high priority environmental investments in suburban districts as the first stage of the program for protecting water quality of the Upper Huangpu catchment, including analysis of technical, economic and resettlement options;
- Project Preparation teams have completed at least 40 percent of the detailed design for investments to be funded under Phase 1; and
- The Shanghai Municipal Sewerage Company is in compliance with its financial covenants under the nearly completed Second Shanghai Sewerage Project (Loan 3987-CHA).

During APL1, the project would help Shanghai Municipality (SM) to develop policies that would allow it to withdraw gradually from being a service provider in the environmental infrastructure services sectors to that of a facilitator of such services. In this respect, SMG would arrange for the following: (a) the formulation of a preliminary plan and prospectus for the issuance of long-term municipal infrastructure bonds to replace the traditional counterpart funding sources of tax and other receipts and short-term commercial bank loans; (b) the development of improved integrated institutional arrangements between SMG serving the urban core area and the nine suburban districts (and one rural county) within SM concerning the planning, design, financing and operation of environmental infrastructure, including arrangements for the feasibility of establishing a district financing vehicle to help finance the districts' needs, including using a portion of long-term infrastructure bonds proceeds as counterpart funds in future; (c) a demonstration program of environmental infrastructure services upgrading in an underserved area of the core urban area; (d) the development of an administrative framework and draft implementing regulations for service/management contracts and/or concessions with the objective of signing a social participation contract for a wastewater treatment and/or solid waste facility; (e) the initiation of a study, including water quality modeling, on agricultural pollution control options and strategies supported by a social assessment on policy impacts; and (f) the initiation of a study on the feasibility of improving air quality in Shanghai.

The APL1 project would have the following components: (a) facilities for the collection, treatment and disposal of municipal wastewater from the areas of Baoshan, Yangpu, Hongkou and Pudong located in the urban area of Shanghai; (b) environmentally secure municipal solid waste disposal facilities in the urban area; (c) urban planning and pilot urban infrastructure upgrading in the Hongkou District, adjacent to the central core area, which is facing strong pressure for redevelopment; (d) protection of water resources in the Upper Huangpu Catchment, through providing facilities in Jinshan and Fengxian Districts for treatment and disposal of wastewater and animal wastes; and (e) strengthening of institutions with responsibility for environmental management, including executive capacity building.

By the end of APL1, SMG will expect to have: (a) completed its time-bound action plan for the issuance of long-term infrastructure bond(s) as a source of financing part of its counterpart funding requirements; (b) completed the design for a district financing vehicle and submitted it to the central government for approval, and refined its institutional and financial arrangements with respect to its suburban districts; (c) demonstrated the feasibility of embarking on a viable urban environmental infrastructure services upgrading program; (d) prepared an administrative framework and draft implementing regulations for service management contracts and for concessions with the objective of signing a social participation contract for a wastewater treatment facility and/or a large solid waste management facility; (e) prepared draft revised regulations for agricultural pollution control; and (f) discussed with the Bank the findings of the policy and initial feasibility studies on measures to improve air quality in Shanghai and identified a possible investment program suitable for Bank financing, including pilot operations under APL2.

APL2. Deepening the Urban Environment Agenda and Implementing the Programs Prepared Under Phase 1

APL2 would be considered by the Bank when four of the six triggers shown below have been met, which is expected by December 31, 2004. In addition, triggers 1, 2, and 3 must be among the 4 triggers fulfilled. Activities proposed for implementation under APL2, which are related to any outstanding trigger, would not be excluded from funding under APL2, but would be taken up as and when the trigger condition is met.

1. SMG has approved a Solid Waste Disposal Master Plan covering all urban and suburban districts and Chongming County of Shanghai. Such Master Plan would contain the service charge policy, including adoption of market-oriented charges on users, fees for treatment, disposal and discharge, waste volume reduction measures, and recovery and reuse approaches.

2. (a) SWAOD has: (i) prepared and adopted a five-year capital investment plan which includes a capital financing plan, a debt management plan and a revenue adjustment plan; and (ii) formulated the preliminary design of long-term bonds to finance environmental infrastructure; and (b) SMG has: (i) reviewed said preliminary design and submitted it to the central government for approval; and (ii) completed a time-bound action plan for Phase 2 in preparation for bond issuance.

3. SMG has prepared an administrative framework and draft implementing regulations for social participation (i.e., various forms of ownership) in wastewater treatment and/or solid waste management.

4. SMG has: (a) initiated a study, including water quality modeling, for the purpose of developing an Upper Huangpu Catchment Management Plan; and (b) provided an interim report of such study which includes draft revised regulations of agricultural wastewater pollution control in the Upper Huangpu Catchment area.

5. SMG has piloted in Hongkou District approaches for urban services upgrading for poorer and underserved areas, which incorporate the principle of maintaining community life and minimizing clearing and permanent relocation of the residents of such areas.

6. SMG has: (a) completed the design for a District Financing Vehicle for environmental services in its suburban districts, together with the institutional and financial arrangements necessary for the functioning of such Vehicle; and (b) in accordance with applicable national laws and regulations, submitted such design to the relevant agencies of the central government for approval.

During APL2, SMG will expect to have completed the following: (a) issues of long-term infrastructure bonds and/or gained long-term loans from domestic commercial banks dedicated to financing environmental infrastructure investments both in the core urban area and in the suburban districts; (b) application of enhanced integrated institutional arrangements between the municipal government and district governments' coordinated environmental management; (c) creation and commencement of operations of a district financing vehicle; (d) signing of a social participation contract for the design, construction and operation of a wastewater treatment facility and/or a large solid waste management facility; (e) corporatization of some of the operations of solid waste management; (f) scaling up of its program for addressing environmental infrastructure services needs in underserviced areas of the core urban area; (g) implementation of regulations on agricultural pollution control in SM and agreement with the Bank on the next steps to address the pollution problems; and (h) completion of a time-bound action plan for improving air quality in the core urban area and agreement with the Bank on a possible investment program suitable for Bank financing, and implemented pilot programs.

The APL2 project would have the following components: (a) urban wastewater management; (b) urban solid waste management; (c) urban environmental planning and pilot upgrading in underserved areas; (d) urban environment improvement, increasing more city open space; (e) Upper Huangpu Catchment environmental management through increased coverage for treatment and disposal of wastewater and animal wastes; (f) air pollution management pilot program; and (g) institutional and executive management strengthening and training.

By the end of APL2, SMG will expect to have: (a) issued long-term infrastructure bonds and/or obtained long-term loans from domestic commercial banks; (b) made, or approved at least two loans through the district financing vehicle; (c) entered into a social participation contract for the design, construction and operation of a wastewater treatment facility and/or a large solid waste management facility; (d) extended its program for urban environmental infrastructure services upgrading; (e) corporatized at least 25 percent of its solid waste management operations; (f) agreed with the Bank on the next steps for controlling agricultural pollution in the Upper Huangpu Catchment; and (g) completed the air pollution pilot program, and agreed with the Bank on follow-on policy and investments to be financed under APL3.

APL3. Consolidation: Beginning to Reap the Benefits of Past Efforts

APL3 would be considered by the Bank when four of the six triggers shown below have been met, which is expected by December 31, 2006. In addition, triggers 1, 2 and 3 must be among the 4 triggers fulfilled. Activities proposed for implementation under APL3, which are related to any outstanding trigger, would not be excluded from funding under APL3, but would be taken up as and when the trigger condition is met.

1. (a) SMG has adopted a sustainable financing plan for the environmental infrastructure investments planned under APL3; such financing plan would provide that: about 50 percent of the local costs would be financed from the proceeds of long-term infrastructure bonds, or long-term loans from local banks, or from the District Financing Vehicle; and (b) each public utility which is a beneficiary of such financing has taken steps to ensure that the rates of fees, tariffs or charges for services are adequate to cover the redemption and/or repayment of such financing.

2. About 500,000 people in underserved areas have benefited from improved environment services under the urban planning and upgrading component of APL1 and APL2.

3. (a) Solid waste services covering at least 25 percent of the total volume of solid wastes in the urban areas of Shanghai Municipality are managed by corporate entities; and (b) SMG has adopted an administrative framework and implementing regulations for the execution of service or management or concession contracts for solid waste services.

4. The institutional capacity and resources of the Shanghai Water Authority have been increased to enable it to carry out its responsibility for: (a) the planning and investment strategies for urban environmental services related to water, wastewater and drainage across the entire municipal area; and (b) the preparation and implementation of the Upper Huangpu Catchment Management Plan.

5. Environmentally acceptable and sustainable sludge management practices have been introduced in all commissioned and operational wastewater treatment plants in Shanghai.

6. SMG has prepared a time-bound action plan for improving air quality in Shanghai

During APL3, SMG will expect to: (a) issue long-term bonds to finance its environmental infrastructure needs; (b) benefit from enhanced integrated institutional arrangements with suburban district governments; (c) corporatize more if its solid waste management operations; (d) improve the environment of its lower income inhabitants through upgraded environmental infrastructure services; and (e) improve the quality of its water resources and air through specific investments.

The APL3 project would have the following components: (a) environmental infrastructure improvements in the Upper Huangpu Catchment; (b) rehabilitation of antiquated wastewater infrastructure; (c) redevelopment of depressed and derelict areas, containing a high proportion of low-income communities and large industrial communities, including housing; (d) first phase investments to address agricultural pollution control; (e) air quality management improvement investments; and (f) institutional and executive management strengthening and training.

By the end of APL3, SMG will expect to have enhanced the economic, financial, trade and manufacturing stature of SM through achieving environmental and institutional and financial improvements and services. It will expect to have become more of a service facilitator rather than a service provider. It will expect to have a cleaner environment leading to improved health for its citizens.

C. Program and Project Description Summary

1. Project components (see Annex 2 for a detailed description and Annex 3 for a detailed cost breakdown):

APL 1 Project

Component	Indicative Costs (US$M)	% of Total	Bank-financing (US$M)	% of Bank-financing
Urban Wastewater Management	345.70	67.5	137.70	68.9
Urban Solid Waste Management	78.60	15.3	30.00	15.0
Urban Planning and Pilot Upgrading	14.80	2.9	5.90	3.0
Upper Huangpu Catchment Management	45.70	8.9	16.50	8.3
Institutional Strengthening and Training	9.00	1.8	7.90	4.0
Total Project Costs	493.80	96.4	198.00	99.0
Interest during construction	16.40	3.2	0.00	0.0
Front-end fee	2.00	0.4	2.00	1.0
Total Financing Required	512.20	100.0	200.00	100.0

2. Key policy and institutional reforms supported by the project:

Financial. Previous Bank-supported projects in Shanghai have engaged in significant institutional reforms in the water, wastewater and solid waste sectors. SMG was among the first municipal governments in China to corporatize wastewater management operations and to implement a wastewater tariff at levels adequate to sustain the operation. It was also the first to implement successfully a citywide urban information system for the planning and management of urban construction. This process of policy and institutional innovation would continue under the project, grouped into the five themes mentioned in paragraph B2 of this report. Some of the key policies and institutional reforms to be supported under APL1 include: the strengthening of the SWA to direct municipal-wide water resource management; corporatization of solid waste management services, enabling regulations for service/management contracts and/or concessions for a wastewater treatment facility or a solid waste service; enhanced tariffs for district wastewater companies; initiation of solid waste tariffs and charges in districts; and the design of the DFV.

3. Benefits and target population:

The target population is all the residents of the Municipality, with a special operational focus on those who are un- or underserved by urban environment services. This operational concentration on un- and underserved areas is both a matter of equity and a technically/economically valid way to optimize efficiency of infrastructure investments and environmental outcomes overall. The lack of urban environment services adversely affects all residents in terms of its impact on the quality of life and the constraints to economic opportunity and growth. Health and other economic benefits from delivery of urban environmental services are considerable, but not easily attributable; therefore economic cost/benefit analyses are usually not attempted for individual infrastructure investments. Cost-effectiveness standards are applied to determine the most effective investment choices. Recent country-wide studies have identified the emergence in China of a new class of urban poor, larger in number than the old definition, with rising inequality and starker contrast between the haves and the have-nots, and a larger share of the poor coming from those who are unemployed. The Shanghai authorities have identified an overlap between areas in the core city which are underserved or in need of major upgrading and those areas occupied by the relatively poorer sections of the population. Although not a part of a targeted poverty reduction program, the Shanghai urban environmental services strategy is expected to yield significant benefits to relatively poorer areas in the Municipality.

Benefits of the program are expected to include: (a) creation of a sustainable mechanism for financing urban environment services infrastructure; (b) improvements to the water environment (and, to a lesser extent, to air quality); (c) more effective provision and operation of urban environment services; and (d) an effective system to assure sustainable water resource management for the Municipality. Program activities are expected to also yield significant benefits in the form of protecting the key water sources for the metropolitan area in the upper reaches of the Huangpu River.

4. Institutional and implementation arrangements:

A program leading group has been established in SMG to provide policy guidance and to monitor progress in pursuing the overall urban environment improvement strategy. Under the leading group there is an APL Project Office composed of representatives of the Shanghai Development Planning Commission (SPC), the Shanghai Finance Bureau (SFB), the Shanghai Water Authority (SWA), the Shanghai Construction and Management Commission (SCC), and representatives of a number of bureaus and implementing agencies.

For APL1, the Project Office (PO) would be headed by SPC. The Shanghai Municipal Sewerage Company (SMSC), together with the Shanghai Water & Environment Construction Company (SWEC), would implement the urban wastewater component. The Shanghai City Appearance & Environmental Sanitation Administration Bureau (SCAESAB) and the Shanghai Chengtou Environment Industry Development Company Limited (CEIC) would implement the urban solid waste management component. The Hongkou District Government (HDG) would implement a pilot infrastructure upgrading program, only after Bank review and approval of resettlement action plans and environmental assessments, prepared in accordance with Bank and Chinese practices and procedures. Hongkou would, in addition, prepare urban upgrading proposals for implementation under APL2 and APL3. The wastewater collection, treatment and disposal investments under the Upper Huangpu River Catchment would be implemented by wastewater companies under the overall coordination of the Jinshan and Fengxian District Governments, as follows: (a) the Fengxian District: by the Nanpai Sewerage Disposal Company Limited (NSDC) and (b) the Jinshan District: in Fengjing, by the Fengjing Water Purification Company Limited (FWPC); and by the Jinshan Ocean Outfall Engineering General Company Limited (JOOC). Issuance of the long-term bonds has been assigned to SWAOD, which is responsible for raising finance for water and wastewater investments within the core city and will raise the counterpart financing for the

wastewater components of APL. Responsibility for designing the district financing vehicle has been assigned to the Shanghai UDIC, which would arrange to administer APL onlending to districts for environmental improvement projects.

The Shanghai International Tendering Company Limited (SITC) has been retained as the procurement agent for all aspects of civil and electrical and mechanical works requiring bidding through international competitive bidding (ICB) procedures. Construction management services would be provided by international firms using joint international/national supervision teams.

Onlending Arrangements: The proposed loan of $200 million would be made to the People's Republic of China. The loan would be for 20 years, including 5 years of grace, at the Bank's standard interest rate for LIBOR-based US Dollar single-currency loans. The proceeds of the loan would be onlent to SM on the same terms and conditions as the Bank loan to China, including passing on the front-end fee and a commitment charge of 0.75 percent per year. SM would onlend part of the proceeds of the Bank loan to SMSC, and to district wastewater companies, through the district governments, for 15 years including 5 years of grace, at an interest rate not less than the Bank's rate to China plus SM's portion of the front-end fee and a commitment charge of 0.75 percent per year. SM would pass on the balance of the loan proceeds to the other implementing agencies through budgetary allocations.

Financial Management: An assessment of project financial management including an assessment of the relevant revenue-earning implementing agencies was carried out prior to appraisal, to ensure that the Bank's minimum financial management requirements as stipulated in OP/BP 10.02 would be met. Traditional disbursement techniques would be used in accordance with an agreement reached between the Bank and the Ministry of Finance (MOF). To facilitate disbursements, a Special Account would be opened with an authorized allocation of $14 million, equivalent to the estimated average four months' expenditures to be financed by the Bank; the account would be opened in US Dollars in a bank acceptable to the Bank and be managed by SFB.

Auditing Arrangements: As with other Bank Group-financed projects in China, the Foreign Investment Audit Bureau of the China National Audit Office (CNAO), established in 1983 under the name of State Audit Administration, would have overall responsibility for auditing the accounts of the project. The actual auditing work would be conducted by the Shanghai Municipal Audit Bureau under CNAO's supervision. The Bank currently accepts audits performed under the responsibility of CNAO. Audits of the project accounts and the financial statements of implementing agencies and audits of the Special Account and Statements of Expenditures would be submitted to the Bank within six months after the end of the financial year. During appraisal, SMG confirmed that the audit reports of the implementing agencies would include opinions on whether the agencies were in compliance with their respective financial covenants, and that these agencies have taken out adequate insurance on goods and works financed from loan proceeds.

Monitoring and Evaluation Arrangements: The more routine aspects of monitoring are already in place. The Shanghai authorities are experienced in managing project investments following Bank guidelines, and the PO would produce semiannual status reports for the Leading Group and for the Bank. The first such report would be submitted by January 31, 2004. Adequate systems and facilities are in place to monitor the quality of the water and air environment, and the project would assist in the use of geographical information systems (GIS) to enhance the management information systems for solid waste. The Tenth Five-Year Plan has established interim and final targets for environmental service delivery that can be monitored with existing management information systems in the various utilities and government bureaus, e.g., share of population served, share of sorted collection of domestic solid waste,

share of wastewater collected, share of centralized treatment of food waste, m2 of green space per capita, etc.

The most important and challenging aspect of monitoring and evaluation would be tracking the pace toward fulfilling the overall development objectives, due to their longer-term nature and the interlinkages among phases and goals. Bank supervision would therefore give top priority to helping the Shanghai authorities understand the issues facing them, keep track of their progress, and maintain focus on what it takes to achieve their overall goals.

Given the innovative nature of some project initiatives and sometimes highly technical features being investigated, Bank supervision would also need to provide expert guidance on some matters. Even though significant technical assistance is projected within the project, it is likely that the Bank would need to supplement its own expertise with world-class practitioners, particularly for overseeing the development of innovative financing arrangements. The supervision strategy would emphasize outcomes, continuity of expertise and maintaining a high caliber of Bank supervisory staff.

Headquarters and country office staff would cooperate to handle the Bank's supervision responsibilities. Full supervision missions would be scheduled twice a year, with the country office staff also keeping in close contact on a regular basis through phone contacts and field visits as needed. A mid-term review would be undertaken jointly with SMG in 2006 to evaluate the project's achievements and identify any necessary corrective measures. An Implementation Completion Report would be prepared by SMG and submitted to the Bank within six months before the loan closing date as APL2 is expected to commence before completion of APL1.

D. Project Rationale

1. Project alternatives considered and reasons for rejection:

The overall water consumption in Shanghai is currently estimated to be about 8.5 million cubic meters per day (Mm3/day): 6.5 Mm3/day in the Shanghai Municipal Waterworks Company (SMWC) service area; 1.5 Mm3/day in the suburbs and districts; and 0.5 Mm3/day from groundwater abstraction. The citywide wastewater generated is about 5.75 Mm3/day, including some 0.7 Mm3/day of groundwater infiltration. The present collection rate (percent of overall wastewater collected) is about 68 percent, of which 24 percent is discharged through sewers to the local river system, including the Suzhou Creek and Huangpu River, and 48 percent is discharged following screening and gritting, and some treatment. Improved interceptors and collection capacity is clearly needed. About 1.8 Mm3/day (32 percent) of wastewater generated flows directly to the local river system. These data imply a current system utilization rate (current flow/design capacity and collected for possible - current and future - treatment) of about 60 percent. The present level of treatment (defined as a level higher than primary treatment) is 11 percent, which is low by comparison with other major Chinese cities.

In the urban areas remaining to be sewered, a number of options ranging from localized wastewater treatment for each area to collection for conveyance to centralized treatment, were explored. SMG has decided to make use of existing wastewater assets that have additional capacity as a result of relocation and restructuring of industry. Therefore, the preferred option would be centralized treatment, which also would provide economies of scale and a lower unit cost.

The overall principles of the updated Shanghai Wastewater Master Plan, prepared in draft and currently under review for approval, are as follows:

- Major urban area--centralized wastewater collection with remote treatment/discharge, mainly to the Yangtze River Estuary;
- New cities/towns--localized collection and treatment, grouped where appropriate;
- Increased utilization rate of existing facilities;
- Rational use of the Yangtze River Estuary's assimilative capacity, increasing levels of treatment in future, as appropriate; and
- Sludge management policy based on minimization, pollutant source control to minimize toxicity and use as a resource, whenever possible.

The total estimated wastewater flow for 2020 is 8.5 Mm3/d. The discharge standard and basis of control (total load control or concentration-based standards) need to be clarified before the treatment process selection can be finalized. It is of interest to note that the additional pollution load removed by secondary treatment is modest in relation to the assimilative capacity of the Yangtze River Estuary and the additional cost relative to chemical treatment is substantial. In particular, the chemical process is at least as effective as secondary treatment in the removal of phosphorus.

The existing sludge management proposals require considerably more investigation because they do not currently demonstrate sustainability. Sludge treatment and disposal is such an important and costly issue that there needs to be a Municipality-wide Sludge Management Master Plan to develop an overall system that is both cost-effective and sustainable. This would be addressed during APL1.

The Shanghai Solid Waste Disposal Development Plan identifies the broad range and quantity of different waste types that are generated in Shanghai. The present priorities of SCAESAB are to address domestic waste issues, expand landfill capacity and respond to a recent crisis in food waste disposal. Given the scarcity of landfill options in SM, the strategy is to keep disposable waste quantities at approximately present levels through a waste reduction, resource recovery and recycling approach which may include building incineration plants with energy recovery, composting plants, and enhanced recycling by means of separation at source. For incineration to be economically viable, the wet organic material of domestic waste, comprising two-thirds of the waste of Shanghai, needs to be separated at source. Significant waste reduction in Shanghai can be achieved by composting, but the cost of production would probably be considerably higher than the market price of soil and not financially viable. However, from an overall economic point of view, composting may be the least-cost solution, when account is taken of the avoided cost of transportation and disposal. Moreover, SMG's ongoing greening program (not Bank-financed) could be a significant user of good-quality compost.

2. Major related projects financed by the Bank and/or other development agencies (completed, ongoing and planned).

Sector Issue	Project	Latest Supervision (PSR) Ratings (Bank-financed projects only)	
		Implementation Progress (IP)	Development Objective (DO)
Bank-financed			
Urban Environment: water, wastewater, sanitation, solid waste, industrial pollution	Yunnan Environment Project (Ln.4055-CHA/Cr.2892-CHA)	S	S
Urban Environment: water, wastewater, sanitation, solid waste, industrial pollution	Guangxi Urban Environment Project (Ln.4348-CHA/Cr.3097-CHA)	S	S

Urban Environment: wastewater & tariff reform policy	Second Shanghai Sewerage Project (Ln.3987-CHA)	HS	S
Urban Environment: water, wastewater, district heating, industrial pollution	Shandong Environment Project (Ln.4237-CHA)	U	S
Urban Environment: water, wastewater, solid waste, pollution mitigation	Shanghai Environment Project (Ln.3711-CHA)	HS	S
Urban Environment: water, wastewater, sanitation, solid waste, industrial pollution	Sichuan Urban Environment Project (Ln.4496-CHA/Cr.3251-CHA)	S	S
Urban Environment: water, wastewater, solid waste	Chongqing Urban Environment Project (Ln.4561-CHA)	S	S
Urban Environment: water, wastewater, industrial pollution	Hebei Urban Environment Project (Ln.4569-CHA)	S	S
Urban Environment: industrial pollution management and control	Chongqing Industrial Pollution Control & Reform Project (Ln.4045-CHA)	S	S
Urban Environment: water, wastewater, solid waste, industrial pollution, environmental rehabilitation and reconstruction, environment revolving subloans	Liaoning Environment Project (Ln.3781-CHA)	S	S
River Basin Pollution Control: wastewater, industrial pollution in two provinces	Huai River Pollution Control Project (Ln.4597-CHA)	S	S
River Basin Pollution Control: wastewater, industrial pollution	Liao River Basin Project (Ln.4617-CHA)	S	S
Other development agencies			
The Asian Development Bank (ADB) has supported a range of investment programs in the urban sector of China, mainly supporting urban environmental services, in provinces that do not overlap with World Bank-supported programs.	Reported to have been generally successful investment programs. Expansion of ADB support to the urban sector is under way.		
Bilateral support from a number of sources including KfW and the Governments of Australia, Austria, Denmark, Finland and France, have financed equipment for urban water supply, wastewater and industrial waste treatment plants.	These investments have generally been successfully implemented, though attention has not always been paid to institutional and financial matters. Finance has been available mainly to support equipment sourced (restrictively) from the lending country.		

The Department for International Development--DfID--(of the United Kingdom) has focused support on institutional and financial development needs of urban utilities, and on broad aspects of environmental management.	Performance has been reported to be satisfactory.		
The Government of Japan remains a major source of international finance for equipment for urban water supply, wastewater and industrial waste treatment plants.	Performance is reported to be satisfactory.		

IP/DO Ratings: HS (Highly Satisfactory), S (Satisfactory), U (Unsatisfactory), HU (Highly Unsatisfactory)

3. Lessons learned and reflected in the project design:

Independent Projects Versus a Program Approach. The Bank supported development of urban environmental services in Shanghai through three separate investment projects--Shanghai Sewerage Project (SSP1, 1987-93), Shanghai Environment Project (SEP, 1994-2002) and Second Shanghai Sewerage Project (SSP2, 1996-2003). Total investment costs amounted to nearly $1.4 billion, with Bank financing of $555 million. SSP1 provided a catalyst for institutional and financial innovation in the drainage and sewerage subsector--with the creation of the Shanghai Sewerage Company, with powers to borrow and to charge for its services. However, even with the formal changes into company status, the company continued to operate as if it were still a government department, and introducing sewerage charges for households took longer than initially planned. Through SEP, the Shanghai Municipal Government worked on water supply investments, while at the same time reinforced work on identification and control of sources of pollution, improvements to municipal, environmental and utility management and finances, and supported training and technical assistance, including preparation of the Shanghai Environment Master Plan and the Hazardous Waste Management Study. During preparations for SSP2, the Shanghai Municipal Government made further improvements to the institutional and financial arrangements in the sector, creating SMSC, installing new management and adjusting wastewater tariffs to achieve cost recovery. During the course of these three projects, it became clear that a longer-term framework was necessary to guide work in the sector, in particular the policy and institutional reforms, where it is an iterative process, and the pace of reforms can be uneven and at times out of sync with each other. Trying to justify individual projects and investments against an institutional reform agenda that was still evolving was confusing to the Shanghai authorities and undermined the Bank's ability to engage constructively with a longer-term perspective. However, these three projects did help create enough ingredients and experience for the Shanghai authorities to move to a program approach, where the driving elements are no longer justifying individual investments, but rather how to build up the policies, institutions and infrastructure to contribute to the economic and social development goals of the city.

Greater Reliance on User Charges. A major finding from the Operations and Evaluation Department (OED) review of water and sanitation projects across all countries has been generally good achievement of physical targets but less success in sustaining the financial viability of municipal environmental service providers. The recent OED review of all Bank-financed water supply and wastewater projects in China confirmed that these findings also apply to Chinese projects. Therefore, based on earlier sector work for China ("Urban Environmental Service Management," Report No. 13073-CHA) the Bank is constructively engaged with the Chinese authorities about the need for greater reliance on user charges,

which are currently set by most borrowers at levels that would not sustain the services. In the case of SMSC, however, SMG has regularly authorized wastewater tariffs to be adjusted to ensure its financial viability and SMSC has been in full compliance with its financial covenants under SSP2 over the past four years. In the course of preparing the series of APLs, Bank dialogue with the Shanghai authorities has progressed even further, evidenced by SMG's commitment to establish appropriate tariffs for urban environmental services across the metropolitan area, as a key building block to arranging for private participation in urban environment infrastructure services as well as to opening these utilities to opportunities for project finance on the capital markets.

Support for Institutional Management. The establishment of financially autonomous utility enterprises to develop and manage urban services is a long-standing Chinese practice, and avoids many of the management difficulties of publicly-owned utilities in other countries. While wastewater collection and treatment has only recently been given the same autonomy, generally by organizing the existing drainage bureaus and construction management units into separate enterprises, SMG has already demonstrated its commitment to the concept of financial autonomy by establishing SMSC, which continues to perform well--institutionally, financially and technically. The establishment of district wastewater companies in Jinshan and Fengxian Districts prior to project implementation would provide sufficient time for management and operational issues for these district-owned utilities to be clarified.

4. Indications of borrower commitment and ownership:

Shanghai's vision is now to become one of the world's major megacities, as a competitive global municipality. It intends to accelerate its development to become a first-class international economic, financial, trade and shipping center, vigorously pursuing institutional innovation and comprehensive city management. The city's "corporate plan" includes objectives to enhance the existing infrastructure to meet the demands of population growth and achieve the highest standards of urban environment.

Shanghai has also committed to further modernizing its management, establishing an integrated legal framework for urban management, with rational division of responsibilities among local jurisdictions (cities, districts, and towns), and accelerate the development of new investment and financing systems with diversified market-based instruments.

The Letter of Development from the SMG is attached in Annex 1.

5. Value added of Bank support in this project:

The Bank brings considerable international experience in terms of assisting policy formulation and investment program design. Bank assistance will also draw upon our growing experience in addressing regional environmental issues in priority environmental improvement projects in China, including the cleanup of Dianchi Lake (as part of the Yunnan Environment Project), the Huai River Basin and the Liao River Basin in Liaoning Province, all included in China's priority "three rivers, three lakes" program.

The Bank has a long and productive collaboration with SMG in improving the city's urban environment and infrastructure. Past Bank-supported operations have engaged in significant institutional reforms in the water, wastewater, transport and energy sectors in Shanghai.

E. Summary Project Analysis (Detailed assessments are in the project file, see Annex 8)

1. Economic (see Annex 4):

○ Cost benefit NPV=US$ million; ERR = % (see Annex 4)

● Cost effectiveness

○ Other (specify)

This APL is designed as support to one of the specific macro objectives of SMG, as set out in the Tenth Five-Year Plan and associated documents. As such, its overall objective would be to help Shanghai to achieve its overall growth targets both while protecting the environment of the city and by improving the environment of the city for the benefit of its citizens and to attract business and visitors.

The investments proposed under the APL would provide environmental improvements and associated economic benefits to the city, by improving the quality of ambient water and air in the urban core, and water quality in the Upper Huangpu Catchment, and by upgrading the living environment through better solid waste management and improving services in underserved areas. However, it is difficult to put a value on incremental improvements in environmental quality and it is even more challenging to attribute such improvements to specific interventions. Therefore, although there would be measurable reductions in pollution loads associated with the investments and there would be specific physical improvements, it is not possible to calculate an EER for the project as a whole.

For the major investments in wastewater and in solid waste management, the appropriate criterion is cost-effectiveness. The wastewater investments are intended to complete the backlog of sewerage of Shanghai City by intercepting discharges to the urban creeks and taking the flows to points where they can be discharged back into the environment, with appropriate treatment, at the least overall system cost. This approach is based on a strategy that was established in 1985 at the time of the first Bank support for urban water protection in Shanghai (SSP1) and that was endorsed at the time of the second major Bank project in the sector (SSP2). Changes to the regulatory requirements, which are under discussion at present, are adding complication to the analysis but the principle of cost effectiveness remains the same. The water quality in the main urban waterways has demonstrated considerable improvement over the period of SSP1 and SSP2 and this has provided clear economic benefits in terms of both amenity and property value, but valuation and attribution of these benefits is not possible.

The main investment in solid waste is for an increase in the disposal capacity, by expanding the existing major landfill. This is again based on a least-cost approach but the project includes support to the relevant authorities to begin to calculate and use marginal disposal cost estimates for different components of the solid waste system, so as both to optimize the use of the system and to provide signals to waste generators of the real costs of their activities.

The pilot urban upgrading activities are intended to help Shanghai to improve urban planning, identify and implement improvements that do bring clear economic benefits to its citizens and therefore assessment of the benefits would be an essential part of the activities supported. However, since these interventions are currently at the pilot scale, it is not possible to estimate the economic rate of return for these Phase 1 activities.

The Upper Huangpu Catchment Management Program is intended to protect the water supply for Shanghai and as such has a large potential benefit, in terms of costs avoided. As the Program proceeds, estimates would be made of this benefit. It is not possible to define a relationship between specific

interventions and benefits (in terms of postponing water supply expenditures) and therefore the approach to be adopted is the identification of key parameters [probably chemical oxygen demand (COD) and nutrients] and the evaluation of potential investments in terms of cost effectiveness in reducing the levels of those pollutants. The marginal cost would be estimated (in the form of average incremental costs) for different interventions and compared with each other and with typical costs for other schemes. These average incremental cost figures would then provide benchmarks for assessing options and interventions.

2. Financial (see Annex 4 and Annex 5):
NPV=US$ million; FRR = % (see Annex 4)

The base cost estimates of the project reflect preliminary engineering designs and price levels prevailing in March 2003. The unit prices were derived from the following sources: (a) quotations obtained from manufacturers and suppliers; (b) prices of goods and works from recent contracts; and (c) construction costs according to prices published by the central and Shanghai governments, all adjusted for inflation. Physical contingencies have been applied to civil works base costs at the rate of 8 percent, based on the experience of SMSC and SWEC in project implementation under past Bank-financed projects, where physical contingencies have been in the range of 5 to 7 percent. This is due mainly to ground conditions (absence of rock) and the quality of detailed design. Construction supervision services costs have been included in the project cost estimates. Project management and engineering overhead costs of about 10 percent are also included. Price contingencies have been applied to expenditures at projected global foreign and local inflation rates, as follows: local: 2.0 percent in 2003 and 2004 and 3.0 percent in 2005 and thereafter; foreign: 1.7 percent in 2003, 2.2 percent in 2004 and 2.0 percent in 2005 and thereafter. The dollar/yuan exchange rate has been assumed to vary in order to maintain purchasing power parity.

The financial objectives set by SMG for its wastewater utility entities are to achieve at least full cost recovery on their operations and, in the case of SMSC, to also make a contribution to its capital investment program from internally generated sources. SMSC and the districts have enacted wastewater tariffs sufficient to meet SMG's financial objectives for 2003.

Within the provisions of the current national Price Law, SMG plans to further reform its tariff setting procedures, as follows:

- Codify the price structures of its service providers;
- Have various sector representatives work with the Price Monitoring and Supervising Department for the purpose of making price setting more transparent and responsive to needs; and
- Make the price setting process more accessible to the public.

Fiscal Impact:

Shanghai municipal on- and off-budget receipts and expenditures in 2001 totaled about Y49.8 billion ($6.0 billion equivalent) and Y72.6 billion ($8.8 billion equivalent), respectively. The central government, in keeping with the current fiscal arrangements between the central and local governments, transfers an amount to Shanghai. Taken together, Shanghai enjoys a modest surplus. Receipts and expenditures are both projected to grow at about 10 percent per year in current terms, respectively. SMG expects to pass on about 82 percent of the Bank loan proceeds to financially autonomous wastewater entities. Should these entities be unable to fulfill their obligations, SMG would have no difficulty in covering debt service through its own resources as the debt service represented by the project is small compared to total municipal receipts. SMG would provide all funding not met by (a) the proceeds of the Bank loan, (b) district contributions, and (c) funds generated internally by the implementing agencies. Prior to appraisal, SMG independently assessed the districts' ability to generate their required

counterpart funds from assured sources and have found these satisfactory.

3. Technical:

The proposed physical investments were designed by first-class Chinese design institutes, taking into account the latest Ministry of Construction (MOC) design standards. The engineering designs and bid documents were reviewed by international consultants and found to be satisfactory. The technologies involved are proven and within the capability of Chinese contractors and manufacturers if successful in winning bids.

4. Institutional:

4.1 Executing agencies:

The self-funding, self-accounting state-owned Shanghai Municipal Sewerage Company (SMSC) was established in December 1995, following the merger of the existing Shanghai Sewerage Company and the Shanghai Sewerage Project Construction Company (SSPCC). Since its establishment, SMSC has performed well, institutionally, financially and technically. In 2000, and as part of SMG's restructuring initiatives, SMSC was reorganized, creating three operating companies and the Shanghai Water & Environment Construction Company (SWEC), while retaining the SMSC Group Company. The SMSC Group Company retains all wastewater assets, and hires the operating companies on a contract basis to undertake operation and maintenance of the sewerage facilities. The role of SWEC is that of a construction-engineering firm (similar to the role of SSPCC in the First Shanghai Sewerage Project--Loan 2794-CHA/Credit 1779-CHA). SMSC and SWEC report to the Shanghai Water Authority (SWA), established in 2000, combining the former Water Conservancy Bureau, the Shanghai Municipal Waterworks Company (SMWC), and SMSC Group Company. (Previously SMWC reported to the Shanghai Public Utilities Bureau, and SMSC reported to the Shanghai Municipal Engineering Bureau.) SWA reports to the Municipal Construction and Management Commission.

Project implementation responsibilities are as follows: (a) urban wastewater component--SMSC/SWEC, the latter acting on behalf of, and under contract to SMSC; (b) urban solid waste component--SCAESAB and CEIC; (c) urban planning and pilot upgrading component--the District Government of Hongkou; (d) Upper Huangpu Catchment environmental management component--Fengjing Water Purification Company Limited and Jinshan Ocean Outfall Engineering General Company Limited of Jinshan District; and Nanpai Sewage Disposal Company Limited of Fengxian District; (e) bond issue--SWAOD; (f) district financing vehicle--Shanghai UDIC; and (g) institutional strengthening and training component--individual agencies.

4.2 Project management:

The Project Office (PO), working closely with SPC, SCC, SFB, SEPB and SWA and other interested agencies and its Design Review and Advisory (DRA) consultants, arranged for and coordinated the project preparation work to the satisfaction of SMG and the Bank. The PO, whose staff has been drawn from the above-mentioned government agencies and the implementing agencies, and which is experienced in implementing large-scale projects, would be strengthened, as necessary, and its personnel mix adjusted to reflect the needs of the implementation and construction phases of the project. In accordance with Chinese practice, implementing agencies would form, budget and staff their own project management offices (PMOs) or sub-project offices, which would be involved throughout project formulation and preparation. It is expected that the PMOs, with support from the PO, would significantly enhance project launch and subsequent implementation.

4.3 Procurement issues:

The Procurement Capacity Assessment (see Project File, Annex 8) found no concerns of substance. Attention would be given to procurement matters listed in its Action Plan during project supervision, building on the experience of Shanghai as an existing borrower from the World Bank Group.

4.4 Financial management issues:

The task team conducted a financial management assessment of the adequacy of the financial management arrangements of the project. The information presented in Annex 14 more fully describes the arrangements for financial management.

The PO would have overall responsibility for the coordination of preparation, training and implementation of the project. Implementation would be undertaken at the municipal, and district levels. The project would use "The Temporary Regulations on Financial and Accounting Management for Projects Financed by the World Bank" issued by MOF during the construction stage and switch to "Accounting Standards for Industrial Enterprises" upon operation. In terms of disbursements, the PO would produce project financial management reports in line with the format and content agreed to between the Bank and the Government of China. In addition, traditional disbursement techniques would be used as opposed to project management report (PMR)-based disbursements.

There is no noncompliance with audit covenants for existing Bank-financed projects in the wastewater sector in Shanghai.

5. Environmental: Environmental Category: A (Full Assessment)

5.1 Summarize the steps undertaken for environmental assessment and EMP preparation (including consultation and disclosure) and the significant issues and their treatment emerging from this analysis.

The environmental assessment has been undertaken in two stages as follows:

- A Framework environmental assessment (EA) comprising an overview of the key concepts of the APL, identifying potential environmental risks and providing a framework for assessment of individual interventions;
- Site-specific EAs for all APL1 investments.

The purpose of the framework EA is to provide the physical, institutional and regulatory context within which the APL would be implemented. It provides the background and rationale for individual components. It also sets out those cross-jurisdictional and cross-sectoral aspects of environmental management in the Municipality that require a comprehensive or coordinated management approach because they cannot be resolved by the actions of a single agency or an individual submunicipal government.

The project-specific EAs have been prepared in accordance with national and Bank Group requirements and procedures and with the "Circular on Strengthening Environmental Impact Assessment Management for Construction Projects Financed by International Financial Organizations (June 1993)." The Comprehensive APL1 EA documents such as the Environmental Assessment Report and the Executive Summary were prepared incorporating Bank comments. The Environmental Management Plan (EMP) is an integral part of the Environmental Assessment Report. A detailed annex covering environmental assessment and impact of the APL1 has been prepared (Annex 12), summarizing the findings of the Chinese EAs of the individual project components.

5.2 What are the main features of the EMP and are they adequate?

The EMP includes plans for mitigation of the adverse impacts of the project components, the implementation of which would be the responsibility of the implementing agencies, principally SMSC, SWEC, SCAESAB, CEIC, and district wastewater companies. Overall monitoring of the impacts of the project and the effectiveness of mitigation measures would be the responsibility of SWA and SEPB.

5.3 For Category A and B projects, timeline and status of EA:

Date of receipt of final draft: mid-February 2002. Supplementary Report April 2003.

5.4 How have stakeholders been consulted at the stage of (a) environmental screening and (b) draft EA report on the environmental impacts and proposed environment management plan? Describe mechanisms of consultation that were used and which groups were consulted?

A wide range of stakeholders were consulted including Shanghai government agencies, local government officials and community representatives. In addition, site-specific consultations were carried out in relation to local impacts and land acquisition. China has safeguard policies similar to those of the Bank Group and Shanghai, as an experienced Bank borrower, has a satisfactory track record of compliance with both sets of requirements.

5.5 What mechanisms have been established to monitor and evaluate the impact of the project on the environment? Do the indicators reflect the objectives and results of the EMP?

SWA and SEPB would be responsible for monitoring the overall impact of the project on the environment in Shanghai. A set of monitoring indicators were prepared reflecting the changes in environmental quality (air and water), effectiveness and quality of environmental service delivery and efficiency of resource utilization (e.g. water conservation).

6. Social:

6.1 Summarize key social issues relevant to the project objectives, and specify the project's social development outcomes.

The adverse social impacts of the project are largely related to land acquisition and demolition of structures for different components of the project. In accordance with local laws, regulations and the World Bank OD 4.30 on Involuntary Resettlement, five RAPs have been prepared for the project components of APL1. The Resettlement Policy Framework would also be applicable for future components. The five RAPs are based on a detailed census of the affected people, inventory of affected assets, socioeconomic surveys and extensive consultations with the project-affected people. The different components of APL1 would require 6,238 mu of land, demolition of 315,786 m2 of houses, relocation of 83 enterprises and business. These would affect 7,519 people, including 3,452 in 1,228 household who would need to relocate. Both cash compensation and replacement housing would be offered to those who would lose their residences, as well as enterprises to be affected. They can choose either one of them. For the employees whose employment would be affected temporarily, cash compensation would be paid for their income losses. The RAPs detail the census, inventory, project resettlement policy, compensation rates and budget, compensation and rehabilitation programs, institutional and monitoring arrangements. The estimated base cost of the land acquisition and resettlement is Y538.5 million, equivalent to $64.9 million. No indigenous ethnic minority communities have been identified as living in the project areas.

A two-step approach has been adopted for resettlement planning for the urban upgrading component of APL 1 and other phases of the proposed APL. A Resettlement Policy Framework has been prepared in

accordance with local laws, regulations and World Bank OD 4.30 on Involuntary Resettlement. In the case of resettlement needs during preparation of APL2 and APL3, RAPs would be prepared in accordance with the policy framework. The World Bank has reviewed and found the Framework and RAPs satisfactory.

6.2 Participatory Approach: How are key stakeholders participating in the project?

Consultation would continue with communities in the areas directly affected by the project works. All affected households and communities in APL1 have been identified through socioeconomic and inventory surveys. Project information, including resettlement policies, has been provided to the affected populations through different channels, including public meetings and newspapers. They were extensively consulted and participated in the finalization of the resettlement and rehabilitation program.

6.3 How does the project involve consultations or collaboration with NGOs or other civil society organizations?

Local government officials and community organizations in the areas affected have been consulted and participated in the resettlement program finalization. Households directly impacted by works have been surveyed. Neighborhood meetings have been organized to solicit their views and concerns, as well finalizing the resettlement program.

6.4 What institutional arrangements have been provided to ensure the project achieves its social development outcomes?

Internal and external monitoring would be undertaken continuously throughout the implementation period. Detailed institutional arrangements are included in the RAP.

6.5 How will the project monitor performance in terms of social development outcomes?

Standard monitoring requirements as set out in the Bank's procedures would be implemented.

7. Safeguard Policies:

7.1 Are any of the following safeguard policies triggered by the project?

Policy	Triggered
Environmental Assessment (OP 4.01, BP 4.01, GP 4.01)	● Yes ○ No
Natural Habitats (OP 4.04, BP 4.04, GP 4.04)	○ Yes ● No
Forestry (OP 4.36, GP 4.36)	○ Yes ● No
Pest Management (OP 4.09)	○ Yes ● No
Cultural Property (OPN 11.03)	● Yes ○ No
Indigenous Peoples (OD 4.20)	○ Yes ● No
Involuntary Resettlement (OP/BP 4.12)	● Yes ○ No
Safety of Dams (OP 4.37, BP 4.37)	○ Yes ● No
Projects in International Waters (OP 7.50, BP 7.50, GP 7.50)	○ Yes ● No
Projects in Disputed Areas (OP 7.60, BP 7.60, GP 7.60)*	○ Yes ● No

7.2 Describe provisions made by the project to ensure compliance with applicable safeguard policies.

Compliance would be monitored during routine project supervision and the Annual Safeguard Compliance Report would provide full details annually.

F. Sustainability and Risks

1. Sustainability:

The project would be sustainable in three respects: (a) financially; (b) institutionally; and (c) achieving its development objectives. Financially, the establishment of long-term financing mechanisms would lead to improved infrastructure service delivery. The revenue and service charge enhancements proposed under this project, together with the investments to improve the quality of water, the effective treatment and disposal of wastewater and cost-effective solid waste management, would provide a framework for urban service delivery sustainability. The incremental operations and maintenance cost would be provided through increased tariffs and charges. Institutionally, the technical assistance to strengthen utility management will build the necessary capacity to sustain the efforts. Finally, the project addresses an issue of high priority to both the local and the national governments: vital self-interest in achieving environmental conditions necessary for sustained economic growth are a strong motivation to continue implementing the long-term water resource strategy.

2. Critical Risks (reflecting the failure of critical assumptions found in the fourth column of Annex 1):

Risk	Risk Rating	Risk Mitigation Measure
From Outputs to Objective		
Innovative financing not achieved	M	Strong incentive from central and municipal governments to ensure success of APL
Tariffs and fees/charges not maintained at levels that recover costs for all concerned utilities	M	SMG to codify price structure and have various sectors work with Price Bureau to make tariff setting more transparent
SMG not committed to nonstate participation in environmental infrastructure	M	Dialogue with central and municipal governments to ensure such participation
From Components to Outputs		
Wastewater companies not sustained through timely tariff adjustments; management not strengthened	M	Loan covenant design and regular sustained Bank supervision to mitigate
Inadequate funding of solid waste management operations through increased user fees and budgetary allocation	M	Bank supervision missions to monitor
Government uncommitted to financing "intangibles"	N	In previous projects SMG has successfully implemented effective technical assistance and training programs
Overall Risk Rating	M	

Risk Rating - H (High Risk), S (Substantial Risk), M (Modest Risk), N(Negligible or Low Risk)

3. Possible Controversial Aspects:

Public reaction is possible during consultation with respect to proposed wastewater tariff increases and residential solid waste collection charges required to maintain the financial viability of the wastewater

companies and solid waste operators.

G. Main Loan Conditions

1. Effectiveness Condition

- Execution of subsidiary loan agreement between the Shanghai Municipality and the Shanghai Municipal Sewerage Company, satisfactory to the Bank.

2. Other [classify according to covenant types used in the Legal Agreements.]

Disbursement conditions

- The signing of a contract by the Shanghai Municipal Sewerage Company with a consultancy firm for construction management, as a condition of disbursement of the civil works urban wastewater management category; and
- the execution of acceptable subsidiary loan agreements between: (a) Jinshan District and its respective sewerage companies; and (b) Fengxian District and its respective sewerage company would be conditions of disbursement for the loan proceeds allocated to these investments.

Implementation covenants

At negotiations, assurances were obtained from Shanghai Municipality that it would:

- carry out or cause to be carried out the resettlement of persons affected by the project in a manner and according to the Resettlement Action Plans satisfactory to the Bank;
- cause the project agencies to carry out, in a manner satisfactory to the Bank, the findings of the Environmental Assessment and related implementation program;
- maintain the Project Office and implementing agencies' project management offices with functions and responsibilities satisfactory to the Bank, and with sufficient resources and competent staff in adequate numbers for the duration of the project;
- carry out or cause to be carried out a study to be completed no later than December 31, 2005 on the Upper Huangpu Catchment Management Plan, in accordance with terms of reference and schedule acceptable to the Bank, and discuss and agree on any revisions with the Bank;
- carry out or cause to be carried out a study to be completed no later than December 31, 2005 on measures to improve air quality in the core urban area, including institutional arrangements for supply and delivery, market expectations, pricing policies and a medium- and long-term investment program, in accordance with terms of reference and schedule acceptable to the Bank, and discuss and agree on recommendations derived from such study with the Bank;
- develop and adopt by no later than December 31, 2005, an administrative framework and implementing regulations for the execution of service or management contracts and/or concessions for wastewater services; and
- execute or cause to be executed, by no later than June 30, 2006, a contract for private sector participation in the design, construction, operation and maintenance of a wastewater treatment facility of a reasonable capacity for the Shanghai Metropolitan Area.

Financial covenants

At negotiations, assurances were obtained from Shanghai Municipality that it would:

- onlend part of the loan proceeds to the Shanghai Municipal Sewerage Company, on terms and conditions satisfactory to the Bank;

- cause Jinshan and Fengxian Districts to onlend part of the loan proceeds to their respective sewerage companies, on terms and conditions satisfactory to the Bank;

- manage financial matters in accordance with the guidelines set out in the Financial Management System Manual, and arrange for the following annual audits to be submitted to the Bank within six months after the end of the financial year, commencing with fiscal year 2004: (a) audit of the project accounts maintained by the Project Office, the Project Management Offices, the Shanghai Water Authority, the Shanghai City Appearance & Environmental Sanitation Administration Bureau, the Shanghai Chengtou Environment Industry Development Company Limited, the Shanghai Water & Environment Construction Company, and the Hongkou District Government; (b) audit of the Special Account; (c) audit of statements of expenditures; and (d) audits of the financial statements of the Shanghai Municipal Sewerage Company, the Jinshan Fengjing Water Purification Company Limited, the Jinshan Ocean Outfall Engineering General Company Limited, and the Shanghai Nanpai Sewage Disposal Company Limited;

- commencing with fiscal year 2004, cause the Shanghai Municipal Sewerage Company to: (a) generate revenues from its sewerage operations sufficient to cover its operating and maintenance costs (before depreciation), increases in working capital, debt service requirements, and 10 percent of its average capital expenditures made in a three-year period (the year preceding the reference year, the reference year itself, and the year after the reference year); (b) incur no additional debt without the Bank's agreement, unless a reasonable forecast shows that the entity would have a debt service coverage of at least 1.3 times;

- commencing with fiscal year 2004, cause district wastewater entities to: (a) produce revenues from their wastewater operations sufficient to cover operations and maintenance costs (including depreciation), and the amount by which debt service requirements exceed the provision for depreciation; and (b) incur no additional debt without the Bank's agreement, unless a reasonable forecast shows that the entity would have a debt service coverage of at least 1.3 times; and

- cause the Shanghai Municipal Sewerage Company and district wastewater entities to prepare, before September 30, 2004, and in each of the following fiscal years, forecasts satisfactory to the Bank, (a) to review whether they would meet the covenanted requirements set forth above in such year and the following fiscal year, and (b) to furnish the results of such reviews to the Bank; if any such reviews would show that the entities would not meet the requirements set out above, the entities would take all necessary measures, including adjustments to the structure of its tariffs and charges, in order to meet the requirements.

Reporting and Monitoring

At negotiations, assurances were obtained from Shanghai Municipality that it would:

- cause each implementing agency to prepare semiannual project progress reports; the PO would then send a consolidated report to the Bank by January 31 and July 31 of each year, beginning on January 31, 2004; and

- carry out with the Bank a mid-term review of the project by September 30, 2006, and implement, or cause to be implemented, agreed recommendations.

H. Readiness for Implementation

☒ 1. a) The engineering design documents for the first year's activities are complete and ready for the start of project implementation.
☐ 1. b) Not applicable.

☒ 2. The procurement documents for the first year's activities are complete and ready for the start of project implementation.
☒ 3. The Project Implementation Plan has been appraised and found to be realistic and of satisfactory quality.
☐ 4. The following items are lacking and are discussed under loan conditions (Section G):

I. Compliance with Bank Policies

☒ 1. This project complies with all applicable Bank policies.
☐ 2. The following exceptions to Bank policies are recommended for approval. The project complies with all other applicable Bank policies.

Geoffrey Read
Team Leader

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Sector Manager/Director

Yukon Huang
Country Manager/Director

Mats Andersson
Co-Team Leader

Annex 1: Project Design Summary
CHINA: Shanghai Urban Environment Project

Hierarchy of Objectives	Key Performance Indicators	Data Collection Strategy	Critical Assumptions
Sector-related CAS Goal: Facilitate an environmentally sustainable development process	**Sector Indicators:** Net economic benefits are greater than costs	**Sector/ country reports:** National and Shanghai municipal government economic statistics; SEPB statistics for environmental quality	**(from Goal to Bank Mission)** Sustainable process is more effective in long run to reduce poverty
Program Purpose: Ensure that economic growth in the Shanghai Municipality takes place in an environmentally and institutionally sustainable manner	**End-of-Program Indicators:** Halt in deterioration of water quality; improved security of water supply sources; environment-related health problems reduced; increasing financial self-reliance for capital investments and O&M financing for urban environmental services	**Program reports:** Shanghai Development Planning Commission statistics; Shanghai EPB statistics; Shanghai Bureau of Public Health statistics; Shanghai Construction Commission statistics; Shanghai Water Authority and Shanghai Finance Bureau reports	**(from Purpose to Goal)** Demonstration of sustainable metropolitan/regional development in Shanghai Municipality can be used as a model for other municipalities in China
Redress imbalance of access to basic environmental services across the Shanghai Municipality	Coverage ratios for access to water supply, wastewater and solid waste services in currently un- and underserved areas; environmental infrastructure supply/demand	Shanghai Water Authority reports; Shanghai Municipal Sewerage Company statistics and reports; Shanghai City Appearance & Environmental Sanitation Administration Bureau statistics and reports; suburban district governments' reports	In addition to improving liveability for its citizens, improved environmental conditions in Shanghai Municipality will enhance its competitiveness
<u>Program Phasing</u> APL1 - Policy development and capacity building APL2 - Deepening the environmental agenda APL3 - Consolidation: Beginning to reap benefits of past efforts			
Project Development Objective: Put in place some of the underpinnings and enabling conditions to pursue an integrated, metropolitan-wide approach for managing the urban environment	**Outcome / Impact Indicators:** nvestment program/services ptimized across Shanghai Municipality; financed in a nore stable and market-based nanner; and organized, taking ull advantage of ublic/private possibilities	**Project reports:** Reviews of urban environmental infrastructure services strategies, investment programs and financing plan	**(from Objective to Purpose)** Public/private partnerships will lead to more effective management of urban environmental infrastructure services utilities; access by utilities to local capital markets will lead to more stable financing for the sector

Install, in both the city center and districts, facilities already known to be high priority to achieve metropolitan-wide environmental objectives	Share of wastewater collection systems, necessary additional treatment and disposal facilities completed to handle all wastewater generated within the outer ring road area Completion of fourth-stage expansion of existing Laogang sanitary landfill Completion of three wastewater treatment plants in two districts that protect the water supply resources in the Upper Huangpu Catchment	Project progress reports	Mutual interests and commitments to meet Tenth Five-Year Plan environment targets are sufficient to ensure cooperation and fair cost-sharing across the Region Investments will reduce strain on environment Facilities will generate benefits across the Municipality, including low-income areas
Output from each Component:	**Output Indicators:**	**Project reports:**	**(from Outputs to Objective)**
Launch of sustainable, metropolitan-wide system for water management, including priority investments	Updated Water Management Strategy; updated Water Supply Protection Plan and Water Intake Management Plan; Upper Huangpu Catchment Management Plan; regulations for service/ management contracts and concessions for nonstate involvement in wastewater services; study launched for options/ strategy to deal with agricultural pollution; utility finances	Supervision reports on the Bank's assessment of the quality of the plans, regulations, enabling/ establishment orders, credit rating process, prospectus, proposed approaches, and utility financial status	Implementation of needed tariffs and fees does not become a major political/ social impediment to utilities achieving full cost recovery and starting to contribute internal cash generation to help finance investments; industries adopt clean technology and end-of-pipe treatment, as appropriate; agro-industries adopt improved housekeeping and wastewater management and treatment practices; there is sufficient market interest in long-term bonds; local banks are allowed to provide/price long-term loans on commercially viable terms
Launch of sustainable, metropolitan-wide system for solid waste management, including priority investments	Updated Solid Waste Disposal Development Plan; user fees and charges/ cost recovery; share of services provided by private entities		
Updated legal, financial and regulatory framework for financing urban environment infrastructure services investments from	All national government and SMG approvals sought and draft institutional reforms are in place, including framework for credit rating of municipal		

nongovernmental sources on terms appropriate for the nature of the investment	entities, which would enable SWAOD to issue long-term bonds and/or local banks to provide long-term loans for urban environment infrastructure services investments; SMG prepared its plan for issuing prospectus for SWAOD long-term bonds; SMG established District Financing Vehicle, through UDIC		
Preparations for APL2 and APL3	(1) Updated programs meet Bank policy, feasibility and safeguard standards for the next phases of (a) water management, (b) solid waste management, (c) urban upgrading, and (d) Upper Huangpu Catchment Environmental Management; (2) launch of study to develop program for improving air quality, including sector strategies and policy options, and feasibility studies for pilots to be tested during APL2	Project progress reports on status of institutional and policy reforms, capacity building, studies/technical assistance, implementation of APL1; updated sectoral programs, proposed investments and financing plans; results of pilots; feasibility studies	Shanghai authorities continue to be interested in Bank involvement in their program; program activities that have the potential to raise controversial issues (e.g., heritage assets and land use policy) can be sufficiently well-formulated/justified that possible reputational risks to the Bank can be mitigated, and the Bank can proceed with a programmatic (instead of a project investment) approach
Project Components / Sub-components: **APL1** 1. Urban Wastewater Management 2. Solid Waste Management 3. Urban Planning & Pilot Upgrading 4. Upper Huangpu Catchment Management 5. Institutional strengthening, and training	**Inputs: (budget for each component)** $345.7 million $78.6 $14.8 $45.7 $9.0 **$493.8 million (Subtotal)** +16.4 (Int. During Constr.) +2.0 (Front-end Fee) **$512.2 million (Total)**	**Project reports:** During supervision, the Bank would review: component monitoring reports (Gantt charts, budgets, disbursements, physical implementation progress reports, construction supervision reports); consultant reports on their assignments for institution strengthening, capacity building, technical assistance/advice.	**(from Components to Outputs)** District-level governments are able to manage project activities to comply with Bank guidelines; Shanghai authorities are prepared to wait for results of pilots before expanding programs

Water Quality and Financial Performance Targets

The baseline and targets would be reviewed and updated during the Project Launch Workshop.

Indicator	2002 Base	2005	2007
1. Urban WW: Enhanced primary treatment (m3/d)	0	1,200,000	2,900,000
2. Urban WW: Secondary treatment of wastewater (m3/d)	0	400,000	900,000
3. Urban WW: Aggregate quantity of wastewater treated at wastewater treatment plants (% of system flow)	60	60	80
4. Upper Huangpu: WW treatment capacity (m3/d)	NA	20,000	70,000
5. Upper Huangpu: Agricultural wastes treatment (m3/day)	NA	*	*

* To be agreed during the Project Launch Workshop.

Indicator	2002 Actual	2005* Estimated	2007* Estimated
Wastewater tariffs implemented to meet financial projections (Yuan per m3)			
SMSC	0.51	1.18	1.71
Fengxian: Nanpai WW Co.	0.68	1.18	1.26
Jinshan: Xinjiang Ocean Outfall Co.	0.68	1.18	1.26
Jinshan: Fengjing Water Purification Co.	0.68	1.18	1.41

* Any tariff adjustments are subject to national and municipal laws and regulations.

Annex 1 (continued - see end footnote)

Shanghai Municipal People's Government (Letter)

Hufuhan (2002) No. 14

February 7, 2002

Letter from the Shanghai Municipal People's Government on Sending the Development Program for Shanghai APL Project

The World Bank,

Since China's reform and opening to the world and under the unified arrangement of the central government, Shanghai has achieved substantial progress in becoming an international economic, financial, trade and shipping center. In order to further attract foreign and nonstate funds into Shanghai's urban infrastructure and ecological environment construction, and to further deepen the reform in investment and financing system of infrastructure construction, the Shanghai Municipal People's Government (SMG) has, based on the repeated discussions with the World Bank on the implementation of Shanghai APL Project and with the principles of macro, strategy and policy, initially prepared the Development Program (please see the appendix) for Shanghai APL Project, which is now sent to the World Bank for its review.

The main contents of the Development Program are as follows:

1. Overall Objective of the Project Development Program

The implementation of Shanghai APL Project will help to speed up Shanghai's urban infrastructure construction, improve its urban environment and enhance its comprehensive competitiveness. The overall objective of the Development Program is closely related to the Tenth Five-Year Plan for Shanghai's national economic and social development. The specific objective is to strengthen and enhance Shanghai's comprehensive economic strength, service functions, development environment, innovative capability, management level, and quality of its people.

The objective is also consistent with the Shanghai General Master Plan and the master plans for the environment sectors. Through implementation of the project, breakthroughs will be made in five aspects: water environment treatment, solid waste disposal, air environment treatment, comprehensive treatment of key industrial areas, and greening construction so as to further enhance Shanghai's comprehensive service functions, environmental quality, ecological environment, innovative capability and management level.

2. Components of the Project

Based on repeated studies, the initial components for Shanghai APL Project 1, 2 and 3 are shown in Table 1. The key aim is to improve the wastewater collection, delivery and treatment facilities, strengthen solid waste collection, transport and disposal system, construct large public green spaces, strengthen the water source protection pollution control of the Upper Huangpu, and protect Shanghai's cultural heritage and support the rational treatment of comprehensive environment of industrial areas. Proper adjustment may be made to the specific components of different phases of the project within the framework of the Development Program according to the progress of the project and the requirements of future development.

Table 1: Proposed Components for Shanghai APL Project

Phase	Proposed Components
APL1 (2002-2007)	1)**Urban Wastewater Management**. Third Shanghai Sewerage Project; 2)**Urban Solid Waste Management.** Shanghai Solid Wastes Disposal Project, Phase 1; 3)**Urban Environment Improvement.** Urban public open space, Phase 1; 4)**Upper Huangpu Wastewater Management.** Sewerage Projects in Fengjin of Jinshan District and in Fengxian District.
APL2 (2003-2008)	1)**Urban Wastewater Management**. Mainly the treatment works in Upper Huangpu, Chongming County and the Sea Port City, etc. 2)**Urban Solid Waste Management.** Shanghai Solid Wastes Disposal Project, Phase 2 3)**Urban Infrastructure Upgrading.** Protective rehabilitation of Shanghai's Old City and comprehensive environment treatment of old industrial areas 4)**Urban Environment Improvement.** Urban public open space, Phase 2; 5)**Shanghai Environmental Quality Monitoring Project**
APL3 (2006-2010)	1)**Urban Wastewater Management**. Rehabilitation and upgrading of sewerage systems in old urban areas. 2)**Urban Infrastructure Upgrading.** Mainly comprehensive rehabilitation and redevelopment of old industrial areas. 3)**Urban Environment Improvement.** Urban public open space, Phase 3; CNG buses and filling stations; and rehabilitation of boilers.

3. Total Project Investment and Financing Measures

The total investment estimates and proposed financing plan for Shanghai APL Project in phases are shown in Table 2. During the implementation process, some necessary adjustments may be made according to the actual situations and conditions of the project preparation.

Table 2: Total Investment Estimates and Financing Plan for Shanghai APL Project in Phases

Phases	Implementation Period	Total Investment ($ million)	Proposed World Bank Loan		
			Amount ($ million)	%	Commence Date
APL 1	2002-2007	736.98	196.00	27%	07/2002
APL 2	2003-2008	996.39*	304.00	31%	07/2003
APL 3	2006-2010	722.00*	200.00	28%	01/2006

* Excluding the cost for land acquisition and resettlement.

4. Staged Performance Indicators during the Project Implementation

The staged performance indicators for APL1 during implementation are as follows:

- At the beginning of 2002, water taffiff in Shanghai was increased from Y0.88/m3 to Y1.03/m3, which created a better price environment for the launching of APL1;
- In 2003, the proportion of sorted collection of domestic solid waste in Shanghai urban area will reach 50 percent, the proportion of containerized collection/transportation will reach 24 percent and the proportion of closed transportation will reach 100 percent);
- In 2005, the proportion of wastewater collection in the built urban area will be increased from the present 68 percent to 70 percent.

The staged performance indicators for APL2 during implementation are as follows:

- In 2005, 90 percent of vehicles shall meet the required standard (2005);
- Sewage collection in urban area shall increase from current 68 percent to 90 percent (2005);
- Treatment will be increased from the present 44 percent to 70 percent;
- In 2005, the proportion of sorted collection of domestic solid waste in urban area will be increased to 70 percent;
- In 2005, take the lead in preliminarily establishing a food waste management system in China, and the proportion of centralized treatment of food waste in urban area will reach 95 percent);
- In 2005, the proportion of containerized collection/transportation of domestic solid waste in urban area will reach 64 percent, and
- In 2005, 90 percent of wastewater will be treated to the discharge standard;

The staged performance indicators for APL3 during implementation are as follows:

- In 2006, the comprehensive use or treatment rate of ordinary industrial solid waste will reach 95 percent; and through construction of the public open spaces along the two sides of the Huangpu River, increase green area per capita in the urban area by 0.5 m2.
- In 2010, within five years of project execution, 11,000 public buses will be renovated to use compressed natural gas (CNG), representing 80 percent of the total number of buses and 35 CNG stations will be built.
- The proportion of wastewater collection will be increased from present 68 percent to 80 percent, the proportion of wastewater treatment will be increased from present 44 percent to 80 percent and the proportion of utilization of the wastewater treatment facilities will be increased from present 59 percent to 80 percent).

5. Triggers for Different Phases of the Project

In order to carry forward the investment and financing reform in Shanghai environment protection sector and to ensure a smooth implementation of Shanghai APL Project, we will during the different implementation phases practice some necessary policies and institutional reform, shown in Table 3.

Table 3: Triggers for Shanghai APL Project in Phases

Phase	Policy and Institutional Reform Measures (Triggers)
APL1 (2002-2007)	1. A satisfactory Letter of Development Program, and related Project Program; 2. An updated Wastewater Management Master Plan, including related contents of sludge management; 3. An updated Municipal Solid Waste Disposal Master Plan; 4. Prepare terms of reference for following studies on: a) public/private participation in infrastructure financing; b) management, operation, and maintenance of municipality-wide water resource management (Shanghai Water Authority); c) market-based policies (to support solid waste recycling) regarding municipality-wide solid waste management and necessary institutional adjustment; d) establishment of a pilot municipal fund for district/county environmental infrastructure financing. 5. Initiate water resource protection program; 6. Agreement in principle of the following: a) strengthening of the role of Shanghai Water Authority b) gradually raising domestic capital by using appropriate financial instruments, and creating required environment; c) seeking private participation in municipal service area (through bidding process) and remove impediments over time; 7. Impose charges on food waste produced from enterprises.
APL2 (2003-2008)	1. Approval of Water Source Protection Plan for the Huangpu River and Water Intake Management Plan; 2. Implementation of a comprehensive publicity water conservation program; 3. Approval of the Solid Waste Disposal Master Plan, including adopting market-oriented charges on users, treatment, disposal, solid waste discharge fee, service charge policy, waste volume reduction, recovery and make waste becoming resource. 4. Start to prepare policies and regulations suitable for service/management contracts and/or a concession management, and sign a contract (BOT or concession management contract) for social capital participation in wastewater treatment project; 5. Completion of plan and prospectus for the issuance of long term domestic bonds to finance infrastructure. Shanghai will make its best efforts to obtain approval of the central government; 6. Study on policy and plan for establishment of a pilot water source protection fund; and 7. Draft and submit regulations for agricultural pollution control to municipal government for its approval.
APL3 (2006-2010)	1. Completion of implementation of the first stage of water resource protection and sludge treatment project; 2. Corporatization of 50 percent of solid waste services 3. Implementation of upgraded Municipal Solid Waste Disposal Master Plan, including waste discharge minimization, recovery and treatment, charges on users for solid waste treatment and other fees; 4. The level of social capital participation in and new financing approach for the water supply, wastewater and solid waste sectors reach at least 20 percent; 5. Issuance of planned long term domestic bonds subject to the approval from the central government; 6. Establish the water source protection fund subject to the approval from the central government; 7. Meet targets set in 10th Five-Year Plan for water, wastewater, solid waste and environmental pollution control.

6. Necessary Technical Assistance for Project Implementation

In addition to the present DRA technical assistance provided by the World Bank under PHRD, we hope during the preparation and implementation stage of the APL Project to have other grant money to carry out other studies such as institutional strengthening and training; study and consulting for sludge disposal; strategic study on urban energy structure adjustment; urban solid waste management and specific technology study; agricultural pollution source investigation and study for the Upper Huangpu Water Source Protection Zone, etc.

7. Supervision and Evaluation Plan for Project Implementation

Project Organization: SMG has paid great attention to preparation and implementation of the APL Project. At the initial stage of the project preparation, SMG decided to adopt a three-level operational structure to be responsible for coordination, management and supervision of the project. The first level is the steering committee responsible for the guidance and coordination of the major and important issues. Chaired by Mr. Qiang Si-xian, Secretary General of SMG, the steering committee has Mr. Wu Nian-zhu and Mr. Yang Xiong, both are Vice Secretary Generals of SMG, as its vice directors, and has the responsible leaders of Planning Commission, Construction Commission, Finance Bureau and other departments as its members. The second level is the working team. Headed by the Planning Commission, it has the staff from related departments of the Construction Commission and the Finance Bureau as its members. The responsibility of the team is to coordinate, manage and supervise the daily work, to communicate and coordinate with the State Development Planning Commission, the Ministry of Finance and the World Bank. The third level is project offices, i.e. subproject offices, respectively set up in Shanghai Water Authority, Shanghai City Appearance and Environmental Sanitation Bureau, and Shanghai Environment Protection Bureau, etc. responsible for project implementation. The project offices have regular staff working there and are also responsible for regularly reporting the project progress to the working team.

Supervision and Evaluation Plan: During the project implementation, the working team will coordinate, manage and supervise all activities contained in the Development Program to ensure a smooth implementation to be carried out according to the Development Program, report timely to the steering committee the progress of projects and keep contact and communication with the World Bank. For example, it will coordinate and supervise the preparation, design, investment, construction and progress program of the projects in all APL phases; evaluate whether the project agency abides by the relevant plans, terms of contracts, and other related regulatory documents. It will trace problems which may appear during the project implementation and give suggestions. It will forecast and evaluate the effectiveness of solutions, sum up the experience and lessons from the previous project, and provide policies and institutional guarantees for the smooth implementation of later projects.

In the last ten years, Shanghai and the World Bank have had a very successful cooperation in urban infrastructure and environment protection areas, which has deepened mutual understanding and trust. The implementation of Shanghai APL Project will provide a new opportunity for strengthening the cooperation between us in the environment protection field and for joint exploring reforms in the investment and financing system. We sincerely hope that the project will be carried out and completed smoothly and satisfactorily.

Shanghai Municipal People's Government

Appendix: Development Program for Shanghai APL Project

Please note: This is the translation and for reference only.

FOOTNOTE

This Letter of Development Program is as prepared by Shanghai and submitted to the Bank, dated February 7, 2002. It sets out Shanghai's Program which was confirmed at negotiations. In the course of detailed project preparation minor adjustments have been made, as set out in this PAD. There are therefore minor inconsistencies between some sets of figures and dates contained in the PAD and those in the Letter. The PAD contains the updated data.

Annex 2: Detailed Project Description
CHINA: Shanghai Urban Environment Project

The investments arising out of the policy themes being pursued by the Shanghai Municipal Government (SMG), embodied in APL1, can be grouped under four main themes.

Water Resources Protection. To support the policy that use of surface and groundwater resources should be balanced with their sustainable supply across all of Shanghai municipality, SMG would in the first phase of its Adaptable Program Loan (APL1) prepare a Metropolitan Shanghai Water Resources Conservation and Management Strategy comprising: (a) water use and conservation policies; (b) proposed regulations; (c) proposed enforcement mechanisms; (d) monitoring program design; (e) integrated capital investment plan for flood control, water extraction, water supply and wastewater management; and (f) a metropolitan-wide institutional design and implementation plan. This plan would be adopted by SMG during APL1, with implementation commencing in APL2. To support the policy that water across all of Shanghai should be available for required domestic, municipal, industrial and agricultural uses at quality appropriate to the intended uses, SMG would place particular emphasis on the protection of municipal water supply sources in the Upper Huangpu Catchment. This would be done through: (i) the preparation of the Upper Huangpu Catchment Management Plan in APL1, defining: (a) water quality objectives and performance criteria (including designation of industrial zoning and land uses); (b) regulations; (c) penalties and incentives; (d) enforcement mechanisms; (e) monitoring requirements; (f) wastewater treatment capital investment requirements; (g) wastewater treatment financing plan; (h) definition of institutional responsibilities; and (i) the adoption of the Management Plan by SMG and district governments. The latter would be achieved through enactment of discharge regulations and statutory land use zoning and development controls in all districts in the Catchment, enactment of penalties and incentive mechanisms to support these regulations, commencement of a water quality monitoring program throughout the Catchment, adoption of an Upper Huangpu Wastewater Treatment Capital Investment Plan with identified financing and implementation responsibilities, and institutional changes required to facilitate implementation of the plan. SMG would also strengthen capacities of district governments to monitor land uses and wastewater generation, to approve land use changes, to enforce discharge regulations, and to administer pollution reduction measures, a program of human resources development (HRD) in all three APLs, and continue the municipality's nascent pollution permit trading system in cooperation with district governments.

To support its policy that all wastewater and runoff in all urban areas and all sludge generated from municipal treatment is collected, treated and disposed in ways that protect public health, protect terrestrial and aquatic ecosystems, and conserve diminishing land resources, SMG would prepare an Integrated Wastewater and Sludge Management Plan for Metropolitan Shanghai in APL1. This plan is expected to become a model for other Chinese and Asian cities, and would be adopted by SMG during APL1, and would include: (a) wastewater and sludge treatment policies; (b) enactment or refinement of regulations to support these policies; (c) enactment or refinement of penalties and incentive mechanisms to support the regulations; (d) adoption of a Capital Investment Plan with identified financing; and (e) institutional changes required to facilitate implementation of the plan. To ensure that municipal wastewater assets are operated according to best international practices, SMG would implement a human resources development program for senior executives and middle managers in the Shanghai Municipal Sewerage Company (SMSC) and the Shanghai Water and Environment Construction Company (SWEC) in all three phases of the APL. SMG would also implement a municipal executive development program as part of the project.

SMG would prepare and adopt in APL2 an explicit Policy and Regulations on Nonstate Involvement in Wastewater Services to improve the enabling environment for concession, build-operate-transfer (BOT)

and management contracts in Shanghai. It would also promote regional service delivery of wastewater services in suburban districts through negotiation and finalization of Interdistrict Service Agreements where regional service delivery is found to be cost-effective. SMG would also ensure that all wastewater service providers in suburban districts are fully corporatized with autonomous financial accounting. Through the pursuit of this policy SMG would have entered into an agreement during APL1 for at least one treatment plant in the wastewater system to be managed under public-private participation arrangements.

In addition, to support its policy of attaining the State Environmental Protection Agency's (SEPA) ambient air quality standards across all of Shanghai for all regulated atmospheric pollutants, SMG would prepare an Air Quality Management Study in APL1 to define: (a) air quality goals, objectives, performance measures and policies; (b) key air quality priorities and major emission sources; (c) emission reduction substrategies and measures; (d) jurisdictional roles; (e) proposed regulations; (f) proposed enforcement mechanisms; (g) monitoring requirements; and (h) an integrated capital investment plan for using natural gas for conversion of industrial boilers. This study would be expected to become a model for other Chinese and Asian cities in improving urban air quality.

Solid Waste Management Improvements. To support its objective that solid waste from households, and the growing volume from food services, is collected, transferred, treated and disposed of in ways that protect public health and atmospheric, terrestrial and aquatic environments across all of Shanghai, SMG would pursue five principal targets during the period of the APL: (a) domestic and food services wastes would be managed in an integrated way at the metropolitan scale; (b) 70 percent of domestic solid waste in the "city proper" would be sorted at source by 2005 and collected for centralized treatment; (c) 64 percent of domestic and food services waste would be transferred in containers by 2005; (d) the balance of domestic and food services waste would be transferred in covered trucks and barges by 2005; and (e) urban and suburban domestic and food services waste would be collected, treated and disposed of in controlled landfills or incinerators through least-cost solutions that meet environmental objectives. SMG would prepare and adopt in APL1 a Solid Waste Disposal Development Plan for metropolitan Shanghai that defines: (i) collection, treatment and disposal objectives and quantifiable performance measures; (ii) regional service areas based on market demand; (iii) allowable technologies to be used in collection, treatment and disposal; (iv) regulations and administrative directives; (v) penalties and incentive measures to induce compliance; (vi) performance monitoring requirements and procedures; (vii) capital investment requirements; (viii) financing plan; and (ix) institutional responsibilities for all key domestic solid waste and food solid waste activities, including the clear allocation and codification of municipal and district responsibilities. The above policies and initiatives would be underpinned by a cost recovery plan. SMG has already begun collecting fees for the collection and disposal of food wastes. During APL1, SMG would develop and adopt market-oriented charges on users for the collection, treatment and disposal of municipal solid wastes.

SMG would also strengthen the capacities of suburban district agencies and providers of solid waste management services in demand analysis, engineering and design, public-private partnerships, project management and financial management. As with wastewater services, SMG would promote regional service delivery of municipal solid waste services in suburban districts through negotiation and finalization of Interdistrict Service Agreements where regional service delivery is found to be cost-effective. SMG would also ensure that all municipal solid waste service providers in urban and suburban districts introduce commercial accounting and management information systems, and are fully corporatized with autonomous financial accounting. SMG would prepare and adopt in APL2 an explicit Policy and Regulations on Nonstate Involvement in Municipal Solid Waste Management Services to improve the enabling environment for concession, build operate and transfer (BOT) and management contracts in Shanghai.

Recognizing the growing problem across all of Shanghai Municipality in collecting, treating and disposing of all categories of solid wastes, SMG would prepare a comprehensive Solid Waste Disposal Development Plan. This strategy and supporting regulations would be adopted by SMG in APL2 as the basis for investments in this subsector in APL3.

Urban Planning and Pilot Upgrading. SMG has plans for regeneration of older neighborhoods through upgrading infrastructure, revision of land use, and employment generation in the districts of Hongkou, Huangpu and Yangpu, which also contain the large lower-income industrial communities of the former state-owned enterprises. These areas are adjacent to the urban core of Shanghai with a population of around 3 million, and have extremely high densities, extreme overcrowding, poor housing without basic services, and infrastructure incapable of meeting current demands. These plans would be reviewed during APL1, to address key policies for planning and upgrading basic infrastructure and housing in Shanghai City: (a) providing basic services in these communities to standards that prevail in better-off areas in Shanghai City; and (b) upgrading services while minimizing resettlement and maximizing the retention of in-situ households. Policy and institutional actions would be clearly defined in the preparation of an urban planning and pilot upgrading program for Hongkou District in APL1, which would be adopted by SMG through statutory land use zoning and development controls, to avoid the unstructured development and loss of the cultural identity of the city. This framework would also include policies and regulations for the preservation and restoration of Shanghai's heritage assets.

Urban Environmental Infrastructure Services Financing. Innovations in urban environmental infrastructure services financing under the APL would be underpinned by SMG's policy that debt financing of capital investment in water, wastewater and solid waste infrastructure should be financed principally from beneficiary charges, supplemented by borrowers' general net assets with only limited and explicit commitment of municipal fiscal revenues, or direct or contingent government guarantees. This explicit recognition of the importance of project financing would be supported in the APL through: (a) the preparation of a policy outlining exceptions to full cost beneficiary charges, and allowable subsidies to poor households and distressed enterprises; (b) an incremental program of tariff adjustments to fully recover capital, debt servicing, depreciation, and operation and maintenance (O&M) costs of water, wastewater and solid waste management service delivery by the end of the APL; (c) independent oversight of the affordability and fairness of water, wastewater and solid waste tariffs; coordination of public inputs to rate-setting; and publicly recommend rate changes; and (d) preparation and enactment of municipal regulations that facilitate establishment of project revenue escrow accounts for debt servicing, or similar intercept mechanisms.

SMG's objective is that the debt portion of bulky capital investments in environmental infrastructure be financed through long-term borrowings from domestic capital markets that match the life span of the infrastructure asset. SMG policy is that the tenure of debt financing for capital investments in water, wastewater and solid waste management infrastructure assets should match the life cycle of the infrastructure assets that provide the basis for project revenue streams from which most of the debt would be repaid. This policy would be supported through the structuring and issuance in the APL of a long-term wastewater infrastructure enterprise bond on domestic capital markets, prepared and credit-rated to international best practices. The bond would be explicitly collateralized with revenue streams flowing from beneficiary charges levied for services provided from capital investment in infrastructure assets supported by the bond, and general net assets of the SMG-owned corporate issuer with no or limited recourse to SMG guarantees. The APL would be used for technical assistance in issuing the long-term bond, and in providing credit enhancements to the issue.

SMG would also enact under the APL a policy for long-term financing of capital investment in infrastructure in suburban districts, facilitated by SMG support of a financing mechanism to pool districts' credits and to systematically access domestic capital markets. This policy would be

implemented through the creation of a new financial intermediary--a district financing vehicle--modeled on best international practice in Municipal Development Funds, and financially supported through the APL.

The various achievements under APL1. APL2 and APL3 are indicated in the table below.

MILESTONE OUTPUTS UNDER APL

	APL1 2003-2008	APL2 2005-2010	APL3 2007-2011
Environmental Management Theme			
Policy Development and Implementation	• Wastewater Management Master Plan Finalization • Sludge Management Plan Development (TA) • Upper Huangpu Catchment Management Plan (TA) • DWW Tariff Adjustments • PPI participation	• Implementation of the Wastewater Management Master Plan • Implementation of the Sludge Management Plan • Implementation of the Upper Huangpu Catchment Management Plan • Implementation of the Water Conservation Program	
Institutional and Human Resource Development	• PPI Policy and Regulatory Development (TA) • **Asset Management Strengthening (TA)** • Executive development • Development of agricultural pollution control regulatory framework	• Strengthening of Shanghai Water Authority (TA) • **Implementation of Agricultural Pollution Control regulations** • Implementation of PPI regulations; standard contracts (BOT, concessions) • Implementation of Asset Management improvements and PPI • Executive development	
Investments	• Sewerage collection and transfer system in underserved urban areas; 1 WWTP; sludge disposal facilities • New wastewater infrastructure in Upper Huangpu Catchment	• **Continued expansion of wastewater infrastructure in urban area** • **Expansion of wastewater infrastructure in Upper Huangpu Catchment** • **Comprehensive environmental quality monitoring system** • **New wastewater infrastructure in** Upper Huangpu Catchment	• **Rehabilitation of wastewater infrastructure** in **urban area** • **Air pollution** control program • New wastewater infrastructure in Upper Huangpu Catchment
Solid Waste Management Theme			
Policy Development and Implementation	• Implementation of disposed solid waste tariffs and charges • Implementation of food services solid waste management charges • Solid Waste Disposal Development Plan (TA)	• Adjustments to full cost recovery levels of disposed solid waste tariffs	25% of total volume of solid waste in urban areas managed by corporate entities
Institutional and Human Resource Development	• PPI Policy and Regulatory Development (TA) • MIS/GIS for solid waste disposal facilities (INV) • Metropolitan solid waste management and technology upgrading (TA)	• Implementation of **PPI regulations; standard contracts (BOT, concessions)** • Asset Management improvements • Implementation of solid waste management institutional improvements	
Investments	• **Laogang Landfill Phase IV** • **Urban area food waste collection** and disposal	• Laogang Landfill Phase IV continued • Urban area source separation, containerization and transport	

	APL1 2003-2009	APL2 2005-2010	APL3 2007-2011
Urban Environmental Services Upgrading Theme			
Policy Development and Implementation	• Pilot study on urban services upgrading • Air quality study	Implementation of policies and regulations for cost-sharing and cost recovery in urban upgrading	
Institutional and Human Resource Development	• Executive development	Implementation of PPI institutions, and regulations and methodology for upgrading of large urban areas	• Executive development
Investments	• Pilot upgrading in one district	• Underserved urban area upgrading • Pilot redevelopment of industrial community in inner urban area • Time-bound action plan for air quality—possible pilot program	• Redevelopment of additional industrial community in urban area • Air quality management
Infrastructure Finance Theme			
Policy Development and Implementation	• Credit rating of long-term bond to international standards (TA) • National government approval sought of long-term infrastructure bond	Regulatory approval for purchase of long-term infrastructure bond by domestic and foreign insurance companies	
Institutional and Human Resource Development	• Prospectus to international standards for long-term infrastructure bond (TA) • Syndication of long-term credit to SWAOD for APL counterpart funding • Design of a DFV for suburban districts (TA)	• Issuance of long-term bond on domestic capital markets by UDIC • Listing of bond on Shanghai Stock Exchange • Establishment of a DFV • Establishment of oversight mandates	• Issuance of long-term bond on domestic capital markets by SWAOD • Possible privatization of DFV • Executive development
Investments		• Capitalization of DFV • Possible credit enhancement of long-term environmental infrastructure bond	

APL Adaptable Program Loan
BOT Build, Operate and Transfer
DFV District Financing Vehicle
DWW District Wastewater
INV Investment
MIS/GIS Management Information System/Geographic Information System
PPI Public-Private Investment
SWAOD Shanghai Water Services Assets Operation and Development Company
TA Technical Assistance
UDIC Urban Development Investment Corporation
WWTP Wastewater Treatment Plant

Detailed APL1 Project Description

The APL1 project would comprise five components: (a) *urban wastewater management*: to provide separate stormwater and wastewater networks in Baoshan, wastewater networks in Yangpu/Hongkou and Pudong, and wastewater interception and treatment at a new wastewater treatment plant at Zhuyuan; (b) *urban solid waste management*, to extend the Laogang landfill, and provide ancillary equipment and facilities; (c) *urban planning and pilot upgrading* of crowded and underserved areas of Hongkou District; (d) *Upper Huangpu Catchment environmental management*, to support environmental improvements and protect water resources, through construction of wastewater treatment plants and collection systems in three towns in the districts of Fengxian and Jinshan, outside the core Shanghai urban area, to treat wastewater and animal waste; and (e) *institutional strengthening and training*, to provide technical assistance for developing new financial instruments, construction supervision and project management, institutional and financial strengthening, other special studies and training.

Base cost is estimated to be Y3,568.8 million ($430.0 million), excluding physical and price contingencies (March 2003 prices). Summary project costs are provided below by component.

Component	Y million	$ million	% of Total
1. Shanghai Wastewater Management	2,489.5	299.9	70
2. Urban Solid Waste Management	571.9	68.9	16
3. Urban Planning and Pilot Upgrading	113.3	13.7	3
4. Upper Huangpu Environmental Management	329.2	39.7	9
5. Institutional Strengthening and Training	64.9	7.8	2
Base cost estimate	**3,568.8**	**430.0**	**100**
Physical contingencies	276.3	33.3	8
Price contingencies	315.8	30.5	7
Total Project Cost Estimate (March 2003 prices)	**4,160.9**	**493.8**	**115**

By Component:

Project Component 1 - US$345.70 million
Shanghai Wastewater Management (Total Cost Y2,914.20 million)

Objective. The objective of the project component is to complete wastewater collection systems in the urban core, and treatment and disposal facilities to treat all wastewater generated in the Shanghai urban area (within the Outer Ring Road), and support the first stage of a sludge management and disposal program.

Current Situation. With the recent update of the Shanghai Development Master Plan, the corresponding water supply and wastewater master plans were also updated in December 2001. Settlement trends and relocation of industry from the Shanghai urban area have resulted in the revision of wastewater generation projections in the Shanghai urban area, defined as the area within the outer Ring Road.

Prior to the early 1990s, most wastewater was discharged untreated into the waterways, canals and rivers flowing in and around the city; this posed considerable risks to public health and caused ongoing and noxious nuisance.

Shanghai Municipal Government has however, partially with World Bank support, made substantial investments in wastewater management over the past 15 to 20 years to intercept, collect, treat and dispose of wastewater generated in the urban area of the city. The collection system, includes six main trunks sewers, comprises 1,261 km of separate sewers, and 1,169 km of combined sewers. Including WWTPs completed and under construction, the design capacity of treatment plants discharging into the Yangtze River estuary and Hangzhou Bay amounts to 4.15 Mm3/day, comprising Shidongkou WWTP (under commissioning--design capacity 0.4 Mm3/day), Zhuyuan I WWTP (under advanced planning--design capacity 1.7 Mm3/day), Bailonggang WWTP (under construction--design capacity 1.2 Mm3/day), and 8 urban and 11 suburban small WWTPs located within the city, with capacities varying from 20,000 m3/day to 75,000 m3/day, totaling about 0.85 Mm3/day. These plants, when completed and commissioned, would have the capacity to treat about 72 percent of expected wastewater flows. Treated effluent is discharged to the Yangtze River through outfalls, and meets the receiving water quality standard of Class III.

System Deficiencies. Despite the impressive achievements in recent years in developing the Shanghai wastewater system, only about 68 percent of city wastewater is intercepted, and the utilization of the collection system and treatment facilities, is still low. There are missing links and property connections, misconnections (i.e., wastewater connected to stormwater systems), and wastewater pipes discharging to rivers and canals, instead of to the collection system. Wastewater generated in the areas of Baoshan, Yangpu, Hongkou and Pudong do not enter the collection system. The extent of these deficiencies has not been fully assessed. Due to settlement trends and the relocation of industry, there is now a poor match between flows and facilities in the suburban areas, and treatment facilities are not evenly distributed in the urban area. There is concern that overflows from initial storm (first flush) flows cause pollution in the Suzhou Creek and the Huangpu River. Sludge treatment and disposal is poor. Only a small proportion of the 1.3 million tons of sludge generated annually is currently disposed in an environmentally acceptable manner.

Component Description. The component to be financed under the project would comprise collection and trunk sewers and pumping stations, wastewater treatment plant and outfall, and sludge treatment.

Collection System. The proposed collection system would include separate wastewater and stormwater collection systems in Baoshan (Area A), combined wastewater systems in Yangpu and Hongkou (Area B) and Pudong (Area C). The service area is about 167.7 km2 and covers a population of 2.13 million, with an estimated 2020 wastewater flow of 1.04 Mm3/day. The three areas lie to the south of the Shidongkou system and to the north of the first stage of the Zhuyuan system, and north of the Suzhou Creek, and the area north of Pudong Zhaojiagou, not covered by the first stage of the Zhuyuan system. It is proposed to convey 400,000 m3/day of wastewater generated from Area A to the Shidongkou WWTP currently under construction, and the balance conveyed to the new treatment plant at Zhuyuan (Phase II). The collection system would comprise 134.3 km of collection sewers (design diameters: 300 to 2,000 mm) including eight pumping stations, 9.5 km of trunk sewers (design diameters: 600 to 2,700 mm) including one pumping station, and 136.5 km of stormwater conveyors (design diameters: 800 to 3,500 mm) including 16 pumping stations.

Main Conveyor and Wastewater Treatment. Wastewater would be conveyed through a new 13.5 km main conveyor including a pumping station, to a new 500,000 m3/day treatment plant at Zhuyuan, incorporating full secondary treatment, and treated effluent discharged through existing outfalls to the Yangtze Estuary.

Sludge Disposal. The proposed method of sludge disposal is to dispose of sludge at the Bailonggang sludge landfill. Proposals for co-disposal of sludge at the Laogang solid waste landfill would be developed and implemented under APL1.

Project Component 2 - US$78.60 million
Urban Solid Waste Management (Total Cost Y660.60 million)

Objectives. Project component objectives are to: (a) establish environmentally sound and cost-effective Municipal Solid Waste Management services in the urban areas; (b) adopt user tariffs and handling charges that will ensure adequate cost recovery of the municipal solid waste services; (c) adopt a market-oriented institutional arrangement for the provision of municipal solid waste management services; and (d) introduce, on a pilot basis, a set of appropriate administrative and economic, market-based instruments to support waste recycling.

Current Situation. Waste collection is done through mechanical loading onto the collection vehicles. Docks along the Suzhou creek and the Huangpu River and unauthorized dumps have been removed or closed, and a modern collection and containerized transfer and road transport system has been implemented. The engineering works for the nightsoil wastewater entering into the urban wastewater treatment system after being discharged into the nightsoil pretreatment plant is in progress.

The Laogang landfill was established in 1987, and about 13 Mm3 of waste has been placed in the fill. The Laogang landfill was upgraded and the capacity increased from 3,750 to about 6,000 tons/day. A new landfill site was established at Liming in the Pudong District with 750 tons/day capacity to replace the Jiangzhen landfill, located near the new Pudong International Airport. An incinerator with capacity of 1,000 to 1,500 tons/day has been constructed in the Pudong District, and a second incinerator plant of similar capacity is planned. A transfer station constructed at Pudong handles about 1,200 tons/day (about 80 percent) of the district solid wastes. Small collection trucks bring waste to the station, where it is weighed, compressed (400 to 800 kg/m3) and loaded into 12-ton containers, and transported 25 km to the Liming landfill.

The district administrations are now responsible for the collection of municipal solid waste, while the Shanghai City Appearance & Environmental Sanitation Administration Bureau's (SCAESAB) responsibility is focused on overall management and planning, transportation and disposal. A separate company, the Shanghai Pu Cheng Heat & Power Energy Source Co., operates the Pudong incinerator and handles waste collection. Collection services are contracted out under competitive terms to groups within the Environmental Sanitation Bureau in Pudong and private enterprises. The terms of payment depend on the service area. The transfer and transport services are also contracted out by the District Administration for Y30 per ton. It pays about Y25 per ton for the disposal services.

Constraints. The Laogang landfill covers an area of about 3.2 km2, and is adequate until end-2004. No user charges are levied at present; the system costs are financed from the district's recurrent budget.

Component Description. The project would finance the implementation of the fourth-stage expansion works at the existing Laogang sanitary landfill, to increase the handling capacity to 4,900 tons/day, which would extend the useful life of this facility by another 18 years or more, and equipment requirements for waste transport and dock rehabilitation. Specifically, the component would include:

- *Landfill Improvements.* The component would include civil works for landfill extension, including installation of facilities for leachate collection and treatment, landfill gas collection and flaring, equipment for landfill operations, transport vehicles and dock rehabilitation.

- *Food Waste Collection System.* Equipment for setting up a safe and hygienic collection system for food wastes from large kitchens in restaurants, hotels, institutions, hospitals, estimated at about 750 tons/day.

- *Management Information System.* Design and installation of a computerized management information system, which would be compatible with the MIS and geographic information system (GIS), including data exchange.

Project Component 3 - US$ 14.80 million

Urban Planning and Pilot Upgrading (Total Cost Y124.80 million)

Current Situation. Adjacent to the center of the Shanghai city core are districts that have extremely high densities, poor housing and environmental conditions, and infrastructure that has outlived its useful life. These areas include parts of Nanshi, Hongkou and Yangpu districts. Ninety percent of the households have no sanitary facilities, and are not connected to sewer systems. These neighborhoods have high densities, averaging about 85,000 persons per square kilometer, highest levels of unemployment and poverty, very poor quality of urban environment, no open space, poor transport and urban facilities. These large pockets of urban poverty depress adjacent areas and pose unacceptable risks to safety and health. Communities exist under duress, the identity of the inhabitants has no expression, and these conditions increase the potential for crime. SMG has strategic planning policies for regeneration of infrastructure, land use, and revitalization of these areas. The districts have no comprehensive development and structure plans, and rely increasingly upon the initiatives of private enterprise to carry out the detailed development, upgrading and resettlement. The result is often an unstructured development of new high-rise apartments, as the development opportunities for renewal and maximization of profit accrue to developers. Planning authorities are, as yet, unable to adequately control design and construction through generally accepted policies, and do not have an established vision for the future.

Component Description. The component is concerned with urban planning, the upgrading of infrastructure services and regeneration, in the context of SMG's strategic urban development policies within the Municipality. The project would assess the existing environments, the evaluation of options, design, sustainability, planning policy and related controls, as the framework for attracting developers from the public and private sectors. The project seeks to assist in the planning, institutional and administrative frameworks for implementation, the creation of tangible economic, social and environmental benefits to the community, the improvement in health and safety, and strengthening environmental management. The project would identify institutional problems that may have arisen, and those that may impede the implementation and planning, construction and management goals of the district governments. Urban infrastructure upgrading would be continued through the three phases of the APL. Planning and upgrading proposals will be prepared for Hongkou, Yangpu and Huangpu districts, for implementation in APL2 and APL3. Pilot upgrading would be carried out in Hongkou District in APL1.

Support would be provided under APL1 to infrastructure upgrading, and to pilot projects in the Hongkou District. It would include selective renewal and upgrading of residential small-scale commercial environments, which would be done in a cost-effective manner and retain, as far as possible, a high proportion of residents and traders in their traditional but improved environments. The Hongkou pilot would comprise three areas on both sides of Liyang Road and on Changchun Road, having residents with varying incomes, different house types, all in extremely poor condition, with living space generally less than 15 m2 per household and basic services generally shared between multiple households. Financing of the Hongkou District pilot upgrading component would be subject to preparation of technical proposals, resettlement action plans and environmental assessments, satisfactory to the Bank.

Project Component 4 - US$45.70 million

Upper Huangpu River Catchment Environmental Management (Total Cost Y385.60 million)

Objective. The objective of this component is the improvement of environmental management of the Upper Huangpu River Catchment and protection of water resources.

Current Situation. The Huangpu River holds strategic importance to the city of Shanghai and other towns in the upper catchment because: (a) the upper reaches of the Huangpu are the primary water resources for the core city area and western suburbs, in addition to supporting agriculture and industry in the municipality; (b) the Huangpu River flows through the central business district of Shanghai which has high-value development of the riverfront for commercial, residential and leisure purposes; and (c) it is a major transportation route with large passenger and cargo terminals in the core city area.

Pollution from domestic, industrial and agricultural waste in the upper catchment of the Huangpu River is one of the major sources of pollution in the river. SMG data shows that despite cleanup efforts by the government in recent years, water quality in the upper Huangpu River has been deteriorating each year. The Upper Huangpu Catchment Environmental Management component is therefore a key component in APL1, and subsequent APL2 and APL3. The proposed investment program would: ensure the long-term sustainability of Shanghai's water source at Daqiao; enhance the local environment in the upper reaches; ensure the safety of district and township water supply intakes for a large population; and provide strong support to SMG's objective of raising the living standards of all residents, including in the suburban and rural areas.

The component would also contribute to the APL objectives of innovation through establishment of regional and cross-sectoral environmental management strategies to deal with multifaceted pollution sources and, in addition, address the important issue of municipal versus district and township responsibility (technical, financial, etc.) for environmental management and investments.

Component Description. The component comprises policy development and physical investments, as follows: (a) preparation of the Upper Huangpu Catchment Management Plan to establish pollution sources, and to develop strategies for their control, comprising data collection, modeling, analysis of pollution sources, policy development, and investment strategy; and (b) three wastewater collection, treatment and disposal systems covering several towns within two Upper Huangpu Catchment districts (Jinshan and Fengxian), to treat domestic, industrial and agricultural wastes.

The objective of the Catchment Management Plan for the Upper Huangpu catchment will be to provide the necessary planning, interagency coordination, regulatory framework, project and strategy development, to bring about the reduction of pollution in the watercourses of the Upper Huangpu area, and consequently an improvement in the water quality of the Huangpu River. The development of the plan would require significant mathematical modeling of the water quality and low regimes in the Upper Catchment. The Plan preparation will be a coordinated effort between relevant municipal and district level authorities, under the leadership of the Shanghai Water Authority.

Xingta (2001 population of about 25,000), has 2.5 km of collectors and two secondary branch collectors, link sewers and connections, a 50,000 m3/day pumping station, and a pilot 2,000 m3/day treatment plant. It is planned to construct a WWTP of 100,000 m3/day capacity in two phases, along with network improvements. Fengjing town (2001 population of about 40,000) has a combined wastewater and stormwater system in the old town area, constructed in the early 1990s, which discharges directly to the

urban rivers. A new separate wastewater network is planned, along with a treatment facility; the existing network system would also be upgraded. Nanqiao town, with an urban population (2001) of about 400,000, has a 22 km 600-1,500 mm diameter conveyor that is fed by 600 mm diameter secondary sewers collecting wastewater from 13 smaller towns. The conveyor starts at the Huangpu River in the north and terminates in a 1,856 meter outfall into Hangzhou Bay. The spinal conveyor system was constructed between 1997 and 1999. There are six pumping stations along this main spine. The town has plans to construct a wastewater treatment facility in three phases, and there will be a total of 19 pumping stations along the secondary sewers, which will collect sewage from 13 townships and deliver it to the main spine. The project investments are described below.

Jinshan Sea Outfall Wastewater Subcomponent: This project include a 17.5 km extension of an existing conveyor, mechanical and electrical equipment for two previously constructed pumping stations along the conveyor route, secondary and tertiary collection sewers in Tinglin, Zhuhang and Shanyang towns, connections to the conveyor, a 50,000 m3/day treatment plant with secondary treatment, and a sea outfall to Hangzhou Bay. Provision has been made in the conveyor to collect wastewater from two towns (Yexie and Zhangze) in part of the Songjiang District, south of the Huangpu River, which would include an extension of the conveyor to the two towns. The treatment process proposed comprises primary sedimentation followed by a modified A2O system with chemical treatment of the sludge stream to enhance phosphorus removal. The project is located on the western side of Jinshan district, and would collect domestic, industrial and agricultural wastewater. Some major animal husbandry enterprises located close to the conveyor in Zhuhang town would be connected to the conveyor.

Jinshan: Fengjing Wastewater Subcomponent: The Fengjing wastewater system is designed to collect domestic, industrial and agricultural wastewater from the two towns of Fengjing and Xingta, located in the secondary protection zone of the Upper Huangpu River. The component comprises secondary and tertiary collection sewers in the two towns, a conveyor from Xingta to Fengjing, and a 14,000 m3/day treatment plant with secondary treatment, which will discharge to a tributary of the Huangpu River. The proposed oxidation ditch process would be adequate to achieve the ammonia discharge standard. During the detailed design, measures to achieve the stringent discharge standard of 0.05 mg/l for phosphorus would be addressed.

Fengxian: Nanpai Wastewater Subcomponent: The town currently has a 22 km. trunk conveyor and a 20,000 m3/day wastewater treatment plant including a 1.86 km sea outfall, to serve the largest town of Fengxian (Nanqiao). The proposed Nanpai wastewater project comprises extension of the existing trunk conveyor, secondary and tertiary collection sewers in several towns, connection to the existing conveyor, construction of a 50,000 m3/day treatment plant with secondary treatment, and effluent discharge to Hangzhou Bay. The sewer system collects wastewater from several towns along the eastern edge of Fengxian. Although the existing 20,000 m3/day is currently scheduled for decommissioning following completion of the new proposed 50,000 m3/day wastewater treatment plant, consideration would be given in detailed design stage to the use of this plant to provide preliminary treatment of agricultural wastes. The proposed oxidation ditch process would be adequate to achieve the ammonia discharge standard. During the detailed design, measures to achieve the stringent discharge standard of 0.5 mg/l for phosphorus would be addressed.

Project Component 5 - US$9.00 million

Institutional Strengthening and Training (Total Cost Y75.80 million)

Under APL1, the project would support a range of technical assistance capacity-building activities in the implementing agencies and SMG. These include: (a) Upper Huangpu Catchment Management Plan, (b) construction supervision and project management services, (c) procedures for private sector participation in infrastructure provision, (d) pollution reduction measures, (e) support for local bond issue, (f) preparation of policy and operating rules for the District Financing Vehicle, (g) executive management training, (h) training for operational staff of Upper Huangpu WWTPs, (i) other special studies, (j) training and study tours, and (k) heritage strategy support. Additional parallel grant financing of about $1.3 million would be provided by the US Trade Development Agency, for technical assistance support for the solid waste component, and support and training for bond issuance; parallel grant financing of about $0.4 million in two grants would also be provided by CIDA INC. of Canada for technical assistance support for the district financing vehicle, and urban strategy formulation.

Annex 3: Estimated Project Costs
CHINA: Shanghai Urban Environment Project

Expenditure Accounts Project Cost Summary	(Local)			(US$)			% Foreign Exchange	% Total Base Costs
	Local	Foreign	Total	Local	Foreign	Total		
I. Investment Costs								
A. Civil Works	1,560.8	668.9	2,229.7	188.0	80.6	268.6	30	62
B. Equipment & Materials	262.2	112.4	374.5	31.6	13.5	45.1	30	10
C. Technical Assistance	26.3	32.4	58.7	3.2	3.9	7.1	55	2
D. Training	6.3	23.4	29.7	0.8	2.8	3.6	79	1
E. Land Acquisition & Resettlement	538.5	-	538.5	64.9	-	64.9	-	15
F. Construction Supervision Services-Wastew ater	2.8	11.2	14.0	0.3	1.3	1.7	80	-
G. Construction Supervision Services-Solid Waste	6.0	-	6.0	0.7	-	0.7	-	-
I. Construction Supervision Services-Upper Huangpu	3.4	-	3.4	0.4	-	0.4	-	-
J. Engineering & Management	314.3	-	314.3	37.9	-	37.9	-	9
Total BASELINE COSTS	2,720.6	848.2	3,568.8	327.8	102.2	430.0	24	100
Physical Contingencies	213.2	63.0	276.2	25.7	7.6	33.3	23	8
Price Contingencies	235.5	80.3	315.8	22.8	7.7	30.5	25	7
Total PROJECT COSTS	3,169.3	991.6	4,160.9	376.3	117.5	493.8	24	115

Table 1. Urban Wastewater Management
Detailed Costs
(Local)

	Base Cost								Totals Including Contingencies							
	2003	2004	2005	2006	2007	2008	2009	Total	2003	2004	2005	2006	2007	2008	2009	Total
I. Investment Costs																
A. Civil Works																
UWW/1.1 Advance Works: Access Road, Relocation of Services etc.	3.7	14.8	-	-	-	-	-	18.5	4.0	16.5	-	-	-	-	-	20.5
UWW/1.2 Advance Works: Power Supply	1.5	6.2	-	-	-	-	-	7.7	1.7	6.9	-	-	-	-	-	8.5
UWW/1.3 Advance Works: Water Supply	0.9	3.7	-	-	-	-	-	4.6	0.9	3.8	-	-	-	-	-	4.7
UWW/1.4A Wenshui Rd Inlet Pipe to Pump Station	-	6.4	6.4	8.0	6.4	3.2	1.6	32.0	-	7.1	7.3	9.4	7.7	4.0	2.1	37.6
UWW/1.4B Wenshui Rd Main Outlet Pipe from Pump Station	-	2.6	2.6	3.2	2.6	1.3	0.6	12.8	-	2.8	2.9	3.8	3.1	1.6	0.8	15.0
UWW/1.5 Jiangyang Rd Main Conveyor/Jiangyang & Wenshui Pump Stations	-	12.7	12.7	15.9	12.7	6.4	3.2	63.7	-	14.2	14.5	18.7	15.4	7.9	4.1	74.9
UWW/1.6 Linfen Garden Area Conveyor & Pump Station	-	6.5	6.5	8.1	6.5	3.2	1.6	32.3	-	7.2	7.4	9.5	7.8	4.0	2.1	38.0
UWW/1.7A Wusong Ind. Area Conveyor (A) & Pump Station	-	6.4	6.4	8.0	6.4	3.2	1.6	32.1	-	7.1	7.3	9.4	7.8	4.0	2.1	37.7
UWW/1.7B Wusong Ind. Area Trunk Conveyor (B)	-	6.3	6.3	7.9	6.3	3.1	1.6	31.4	-	7.0	7.2	9.2	7.6	3.9	2.0	36.9
UWW/1.7C Wusong Ind. Area Trunk Conveyor (C)	-	4.8	4.8	6.0	4.8	2.4	1.2	23.9	-	5.3	5.5	7.0	5.8	3.0	1.5	28.1
UWW/1.8A Songnan Area Trunk Conveyor (A) & Pump Station	-	13.0	13.0	16.3	13.0	6.5	3.3	65.0	-	14.5	14.8	19.1	15.7	8.1	4.2	76.4
UWW/1.8B Songnan Area Conveyor (B)	-	12.3	12.3	15.4	12.3	6.2	3.1	61.7	-	13.7	14.1	18.1	14.9	7.7	4.0	72.5
UWW/1.9A Minzhu Area Trunk Conveyor (A) & Pump Station	-	7.1	7.1	8.9	7.1	3.6	1.8	35.5	-	7.9	8.1	10.4	8.6	4.4	2.3	41.7
UWW/1.9B Minzhu Area Trunk Conveyor (B)	-	7.7	7.7	9.6	7.7	3.9	1.9	38.5	-	8.6	8.8	11.3	9.3	4.8	2.5	45.2
UWW/1.10 Zhangmaio Area Conveyor & Pump Station	-	1.8	1.8	2.2	1.8	0.9	0.4	8.8	-	2.0	2.0	2.6	2.1	1.1	0.6	10.3
UWW/1.11 Dachang Area Conveyor & Pump Station	-	6.3	6.3	7.9	6.3	3.2	1.6	31.5	-	7.0	7.2	9.3	7.6	3.9	2.0	37.0
UWW/1.12A Zhengnan-Dachang Area Conveyor (A) & Pump Station	-	5.3	5.3	6.6	5.3	2.7	1.3	26.5	-	5.9	6.0	7.8	6.4	3.3	1.7	31.1
UWW/1.12B Zhengnan-Dachang Area Trunk Conveyor (B) & Pump Station	-	9.9	9.9	12.4	9.9	5.0	2.5	49.7	-	11.1	11.3	14.6	12.0	6.2	3.2	58.4
UWW/1.13 Miaohang/Gongkang/Nanda Areas' Collector	-	5.7	5.7	7.1	5.7	2.8	1.4	28.3	-	6.3	6.5	8.3	6.8	3.5	1.8	33.3
UWW/1.14 Qilian Area Conveyor	-	5.7	5.7	7.1	5.7	2.9	1.4	28.5	-	6.3	6.5	8.4	6.9	3.6	1.8	33.5
UWW/1.15A Qilian Area Trunk Conveyor (A)	-	10.2	10.2	12.7	10.2	5.1	2.5	50.9	-	11.3	11.6	14.9	12.3	6.3	3.3	59.8
UWW/1.15B Qilian Area Trunk Conveyor (B)UWW	-	6.7	6.7	8.4	6.7	3.3	1.7	33.4	-	7.4	7.6	9.8	8.1	4.2	2.1	39.2
UWW/1.16 Qilian Area/Shanghai Univ. Conveyor	-	8.4	8.4	10.6	8.4	4.2	2.1	42.2	-	9.4	9.6	12.4	10.2	5.3	2.7	49.6
UWW/1.17 Qilian Area Collector	-	6.1	6.1	7.6	6.1	3.0	1.5	30.3	-	6.7	6.9	8.9	7.3	3.8	1.9	35.6
UWW/1.18 Rehabilitation of Pipes	-	3.8	3.8	4.7	3.8	1.9	0.9	18.8	-	4.2	4.3	5.5	4.5	2.3	1.2	22.1
UWW/2.1 Advance Works: Access Rd, Relocation of Services etc.	-	11.0	-	-	-	-	-	11.0	-	12.2	-	-	-	-	-	12.2
UWW/2.2 Advance Works: Power Supply	-	4.6	-	-	-	-	-	4.6	-	5.1	-	-	-	-	-	5.1
UWW/2.3 Advance Works: Water Supply	-	2.9	-	-	-	-	-	2.9	-	3.2	-	-	-	-	-	3.2
UWW/2.4 Puxi Main Conveyor at Zhengben/Guoshun Rds	-	13.0	13.0	16.3	13.0	6.5	3.3	65.0	-	14.5	14.8	19.1	15.7	8.1	4.2	76.4
UWW/2.5 Puxi Main Conveyor at Junlong/Qiangyin Rds	-	11.5	11.5	14.4	11.5	5.8	2.9	57.6	-	12.8	13.1	16.9	13.9	7.2	3.7	67.7
UWW/2.6 Huangpu River Siphon	-	10.8	10.8	13.5	10.8	5.4	2.7	54.0	-	12.0	12.3	15.9	13.1	6.7	3.5	63.5
UWW/2.7 Pudong Main Conveyor at Zhouhai/Puxing Rds	-	13.5	13.5	16.9	13.5	6.7	3.4	67.4	-	15.0	15.4	19.8	16.3	8.4	4.3	79.2
UWW/2.8 Pudong Main Conveyor at Hangjin/Puxing Rds	-	14.8	14.8	18.5	14.8	7.4	3.7	74.1	-	16.5	16.9	21.8	17.9	9.2	4.8	87.1
UWW/2.9 Lifting Pump Station	-	6.2	6.2	7.7	6.2	3.1	1.5	30.8	-	6.9	7.0	9.0	7.5	3.8	2.0	36.2
UWW/2.10 Interceptors etc. for 3 Pump Stations	-	5.4	5.4	6.8	5.4	2.7	1.4	27.2	-	6.1	6.2	8.0	6.6	3.4	1.7	32.0
UWW/2.11 Jiamusi Rd Interceptors & Pump Station	-	7.8	7.8	9.7	7.8	3.9	1.9	38.9	-	8.0	8.2	10.6	8.7	4.5	2.3	42.3
UWW/3.1 Advance Works: Access Rd, Relocation of Services etc.	-	6.7	-	-	-	-	-	6.7	-	7.5	-	-	-	-	-	7.5
UWW/3.2 Advance Works: Power Supply	-	2.7	-	-	-	-	-	2.7	-	3.0	-	-	-	-	-	3.0
UWW/3.3 Advance Works: Water Supply	-	1.6	-	-	-	-	-	1.6	-	1.8	-	-	-	-	-	1.8
UWW/3.4 Wuzhao-Dadao Trunk Collectors	-	9.1	9.1	11.4	9.1	4.6	2.3	45.5	-	10.1	10.4	13.4	11.0	5.7	2.9	53.5
UWW/3.5 Huadong Rd Collectors & Pump Stations	-	8.8	8.8	11.0	8.8	4.4	2.2	43.8	-	9.7	10.0	12.9	10.6	5.5	2.8	51.5
UWW/3.6 Tanglong Rd Collectors & Pump Stations	-	8.0	8.0	10.0	8.0	4.0	2.0	39.8	-	8.9	9.1	11.7	9.6	5.0	2.6	46.8
UWW/4.1 Advance Works: Access Road, Relocation of Services etc.	-	2.3	-	-	-	-	-	2.3	-	2.6	-	-	-	-	-	2.6
UWW/4.2 Advance Works: Power Supply	-	1.0	-	-	-	-	-	1.0	-	1.1	-	-	-	-	-	1.1
UWW/4.3 Advance Works: Water Supply	-	0.6	-	-	-	-	-	0.6	-	0.7	-	-	-	-	-	0.7
UWW/4.4 Bio-reactor & Settling Tanks at Zhuyuan	-	30.9	30.9	38.7	30.9	15.5	7.7	154.6	-	34.4	35.3	45.4	37.4	19.3	9.9	181.7
UWW/4.5 Pre-treatment Screens, Grit Removal Tanks, Inlet Pump Station at Zhuyuan	-	21.0	21.0	26.3	21.0	10.5	5.3	105.2	-	23.4	24.0	30.9	25.5	13.1	6.8	123.6
UWW/4.6 Sludge Disposal Infrastructure, Outlet Pump Station at Zuyuan	-	7.9	7.9	9.8	7.9	3.9	2.0	39.3	-	8.7	9.0	11.5	9.5	4.9	2.5	46.2
UWW/4.7 Auxiliary Structures, Roads etc. at Zuyuan	-	8.6	8.6	10.8	8.6	4.3	2.2	43.0	-	9.6	9.8	12.6	10.4	5.4	2.8	50.5
UWW/4.8 Outfall at Zhuyuan	-	5.4	5.4	6.7	5.4	2.7	1.3	26.9	-	6.0	6.1	7.9	6.5	3.4	1.7	31.6
Subtotal Civil Works	6.2	396.2	338.2	422.7	338.2	169.1	84.5	1,755.1	6.6	439.9	385.0	495.7	408.5	210.4	108.3	2,054.5
B. Equipment & Materials																
UWW/10.1 Pumps, Screen & Control Eqpt at Wenshui, Ziangyuan & Minzhu Rds	-	-	-	8.0	4.0	1.3	-	13.4	-	-	-	9.4	4.9	1.7	-	16.0
UWW/10.2 Pumps, Screen & Control Eqpt at Minzhu, Zhangmaio, Songnan, Jiangyang & Linfen Rds	-	-	-	17.3	8.7	2.9	-	28.9	-	-	-	20.4	10.5	3.6	-	34.5
UWW/10.3 Pumps, Screen & Control Eqpt at Jinquim, Jiazou, Shanghai Univ. & Dacang Rds	-	-	-	18.7	9.3	3.1	-	31.1	-	-	-	21.9	11.3	3.9	-	37.1
UWW/10.4 Electrical Equipment for Area A Pump Stations	-	-	-	19.1	9.6	3.2	-	31.9	-	-	-	22.5	11.6	4.0	-	38.0
UWW/20.1 Equipment for Lifting Pump Station	-	-	-	16.1	8.0	2.7	-	26.8	-	-	-	18.9	9.7	3.3	-	32.0
UWW/20.2 Equipment for Area B Pump Stations	-	-	-	9.7	4.9	1.6	-	16.2	-	-	-	11.4	5.9	2.0	-	19.3
UWW/30.1 Equipment for Area C Pump Station	-	-	-	7.4	3.7	1.2	-	12.4	-	-	-	8.7	4.5	1.5	-	14.8
UWW/40.1 Monitoring & Central Control Eqpt	-	-	-	11.3	5.6	1.9	-	18.8	-	-	-	13.3	6.8	2.3	-	22.4
UWW/40.2 Laboratory, Workshop & Transport Eqpt	-	-	-	1.3	0.6	0.2	-	2.1	-	-	-	1.5	0.8	0.3	-	2.5
Subtotal Equipment & Materials	-	-	-	109.0	54.5	18.2	-	181.6	-	-	-	128.0	65.9	22.6	-	216.5
C. Technical Assistance																
UWW/6.1 Development of Sludge Management Plan	-	-	1.7	1.7	-	-	-	3.3	-	-	1.9	1.9	-	-	-	3.8
UWW/6.2 Construction Management Services	-	2.1	3.5	4.2	2.6	1.4	-	14.0	-	2.3	4.0	4.9	3.4	1.7	-	16.4
UWW/6.3 Financial Strengthening & Tariff Policy Study	-	-	3.0	3.0	-	-	-	6.0	-	-	3.4	3.5	-	-	-	6.9
Subtotal Technical Assistance	-	2.1	8.2	8.9	2.6	1.4	-	23.3	-	2.3	9.3	10.4	3.4	1.7	-	27.2
D. Land Acquisition & Resettlement	-	91.6	122.1	91.6	-	-	-	305.3	-	101.9	139.3	107.6	-	-	-	348.8
E. Engineering & Management																
Civil Works	0.6	39.6	33.8	42.3	33.8	16.9	8.5	175.5	0.7	44.9	39.3	50.6	41.7	21.5	11.1	209.6
Equipment & Materials	-	-	-	10.9	5.4	1.8	-	18.2	-	-	-	13.0	6.7	2.3	-	22.1
Land Acquisition & Resettlement	-	9.2	12.2	9.2	-	-	-	30.5	-	10.4	14.2	11.0	-	-	-	35.5
Subtotal Engineering & Management	0.6	48.8	46.0	62.3	39.3	18.7	8.5	224.2	0.7	55.3	53.5	74.6	48.4	23.8	11.1	267.2
Total	6.8	538.7	514.5	694.5	434.7	207.4	93.0	2,489.5	7.3	599.4	587.1	816.3	526.2	258.5	119.4	2,914.2

Table 2. Urban Solid Waste Management
Detailed Costs
(Local)

	Base Cost								Totals Including Contingencies							
	2003	2004	2005	2006	2007	2008	2009	Total	2003	2004	2005	2006	2007	2008	2009	Total
I. Investment Costs																
A. Civil Works																
USW/1.1 Landfill Earthworks, Dams & Roads	-	4.4	7.4	11.8	4.4	1.5	-	29.4	-	4.9	8.4	13.8	5.3	1.8	-	34.3
USW/1.2 Sealing of Vertical Faces of Landfill	-	3.6	6.0	9.5	3.6	1.2	-	23.8	-	4.0	6.8	11.2	4.3	1.5	-	27.7
USW/1.3 Liner & Leachate Collection Cell 1	-	6.3	10.4	16.7	6.3	2.1	-	41.7	-	7.0	11.9	19.6	7.6	2.6	-	48.6
USW/1.4 Liner & Leachate Collection Cell 2	-	6.3	10.4	16.7	6.3	2.1	-	41.7	-	7.0	11.9	19.6	7.6	2.6	-	48.6
USW/1.5 Gas Collection & Flaring	-	1.1	1.9	3.0	1.1	0.4	-	7.6	-	1.3	2.2	3.6	1.4	0.5	-	8.9
USW/1.6 Wharf Reconstruction & Rehabilitation	-	0.2	0.4	0.6	0.2	0.1	-	1.4	-	0.2	0.4	0.7	0.3	0.1	-	1.6
USW/1.7 Pump Station & Pipeline to Bailonggang	-	0.6	1.0	1.5	0.6	0.2	-	3.8	-	0.6	1.1	1.8	0.7	0.2	-	4.4
USW/1.8 Earthworks for Open Channel to Sea	-	3.1	5.1	8.2	3.1	1.0	-	20.5	-	3.4	5.8	9.6	3.7	1.3	-	23.9
USW/1.9 Eastern Bank Drainage Ditch	-	2.8	4.6	7.4	2.8	0.9	-	18.4	-	3.1	5.2	8.6	3.3	1.1	-	21.4
USW/1.10 Western Bank Drainage Ditch	-	1.1	1.8	2.8	1.1	0.4	-	7.1	-	1.2	2.0	3.3	1.3	0.4	-	8.3
USW/1.11 North-South Cell Separation Ditch	-	1.1	1.8	2.8	1.1	0.4	-	7.1	-	1.2	2.0	3.3	1.3	0.4	-	8.3
USW/1.12 Leachate Treatment Works	-	1.8	2.9	4.7	1.8	0.6	-	11.7	-	2.0	3.3	5.5	2.1	0.7	-	13.6
USW/1.13 Garages (for Food Waste), Buildings & Equipment	-	0.6	1.0	1.6	0.6	0.2	-	4.1	-	0.7	1.2	1.9	0.7	0.3	-	4.8
USW/1.14 Pilot Bio-reactor	-	0.9	1.6	2.5	0.9	0.3	-	6.3	-	1.1	1.8	3.0	1.1	0.4	-	7.3
USW/1.15 Protective Forest Barrier	-	0.2	0.3	0.5	0.2	0.1	-	1.2	-	0.2	0.3	0.6	0.2	0.1	-	1.4
Subtotal Civil Works	-	33.9	56.5	90.3	33.9	11.3	-	225.8	-	37.7	64.4	106.1	41.0	14.1	-	263.2
B. Equipment & Materials																
USW/2.1 Central Monitoring Equipment	-	-	-	0.5	0.2	0.1	-	0.8	-	-	-	0.5	0.3	0.1	-	0.9
USW/2.2 Transport Vehicles	-	-	-	2.7	1.4	0.5	-	4.5	-	-	-	2.9	1.5	0.5	-	5.0
USW/2.3 Landfill Operating Equipment	-	-	-	8.6	4.3	1.4	-	14.3	-	-	-	9.3	4.8	1.7	-	15.8
USW/2.4 Cleaning Equipment	-	-	-	0.7	0.4	0.1	-	1.2	-	-	-	0.8	0.4	0.1	-	1.3
USW/2.5 Tools, Laboratory & Office Equipment	-	-	-	0.8	0.4	0.1	-	1.4	-	-	-	1.0	0.5	0.2	-	1.7
USW/2.6 IT Equipment for MIS., incl. Training	-	-	-	3.8	1.9	0.6	-	6.3	-	-	-	4.4	2.3	0.8	-	7.5
USW/2.7 Substation & Distribution Facilities	-	-	-	6.1	3.1	1.0	-	10.2	-	-	-	7.2	3.7	1.3	-	12.2
USW/2.8 Food Waste Vehicles (10 nos.)	-	-	-	3.9	2.0	0.7	-	6.5	-	-	-	4.2	2.2	0.8	-	7.2
USW/2.9 Supply & Install Liner #1	-	-	-	25.9	13.0	4.3	-	43.2	-	-	-	30.4	15.7	5.4	-	51.5
USW/2.10 Supply & Install Liner #2	-	-	-	25.9	13.0	4.3	-	43.2	-	-	-	30.4	15.7	5.4	-	51.5
Subtotal Equipment & Materials	-	-	-	79.0	39.5	13.2	-	131.6	-	-	-	91.3	47.0	16.1	-	154.5
C. Technical Assistance																
USW/3.1 Corporatization of Solid Waste Services & Training for Enterprise Operations	-	0.2	0.5	0.6	0.4	0.3	-	2.0	-	0.2	0.6	0.7	0.5	0.4	-	2.4
USW/3.2 Pilot Food-Waste Treatment Program	-	0.1	0.2	0.2	0.2	0.1	-	0.8	-	0.1	0.2	0.3	0.2	0.1	-	0.9
USW/3.3 DRA Services for APL2, Tariff Regimes & Market-based Instruments	-	1.3	2.0	1.7	1.7	-	-	6.6	-	1.5	2.3	1.9	2.0	-	-	7.7
Subtotal Technical Assistance	-	1.6	2.7	2.5	2.2	0.4	-	9.4	-	1.8	3.1	2.9	2.7	0.5	-	11.0
D. USW/3.4 Construction Supervision Services & Project Management	-	0.6	1.5	1.8	1.2	0.9	-	6.0	-	0.7	1.7	2.1	1.5	1.1	-	7.1
E. Land Acquisition & Resettlement	-	148.5	-	-	-	-	-	148.5	-	165.2	-	-	-	-	-	165.2
F. Engineering & Management																
Civil Works	-	3.4	5.6	9.0	3.4	1.1	-	22.6	-	3.8	6.6	10.8	4.2	1.4	-	26.8
Equipment & Materials	-	-	-	7.9	3.9	1.3	-	13.2	-	-	-	9.4	4.9	1.7	-	16.0
Land Acquisition & Resettlement	-	14.9	-	-	-	-	-	14.9	-	16.8	-	-	-	-	-	16.8
Total	-	202.8	66.3	190.5	84.1	28.2	-	571.9	-	226.0	75.7	222.7	101.2	35.0	-	660.6

Table 3. Urban Planning & Pilot Upgrading
Detailed Costs
(Local)

	Base Cost								Totals Including Contingencies							
	2003	2004	2005	2006	2007	2008	2009	Total	2003	2004	2005	2006	2007	2008	2009	Total
I. Investment Costs																
A. Civil Works																
UU/1.1 Hongkou District Pilot Off-site Infrastructure: Package 1	-	8.8	8.8	11.0	8.8	4.4	2.2	43.9	-	9.0	9.3	11.9	9.8	5.1	2.6	47.8
UU/1.2 Hongkou District Pilot On-site Infrastructure: Package 2	-	3.0	3.0	3.7	3.0	1.5	0.7	14.9	-	3.1	3.1	4.1	3.3	1.7	0.9	16.2
UU/1.3 Hongkou District Areas A & B Pilot Upgrading: Package 3	-	6.6	6.6	8.3	6.6	3.3	1.7	33.2	-	6.8	7.0	9.0	7.4	3.8	2.0	36.1
UU/1.4 Hongkou District Area C Pilot Upgrading: Package 4	-	1.1	1.1	1.4	1.1	0.6	0.3	5.6	-	1.2	1.2	1.5	1.3	0.6	0.3	6.1
Subtotal Civil Works	-	19.5	19.5	24.4	19.5	9.8	4.9	97.6	-	20.1	20.6	26.5	21.9	11.3	5.8	106.2
B. Equipment & Materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C. Land Acquisition & Resettlement	-	1.4	1.4	1.9	0.8	-	-	5.4	-	1.5	1.5	2.2	1.0	-	-	6.2
D. Engineering & Management																
Civil Works	-	2.0	2.0	2.4	2.0	1.0	0.5	9.8	-	2.2	2.3	2.9	2.4	1.2	0.6	11.7
Equipment & Materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Land Acquisition & Resettlement	-	0.1	0.1	0.2	0.1	-	-	0.5	-	0.2	0.2	0.2	0.1	-	-	0.6
Total	-	23.0	23.0	28.9	22.4	10.7	5.4	113.3	-	24.0	24.6	31.9	25.4	12.5	6.4	124.8

Table 4. Upper Huangpu Catchment Protection
Detailed Costs
(Local)

	Base Cost								Totals Including Contingencies							
	2003	2004	2005	2006	2007	2008	2009	Total	2003	2004	2005	2006	2007	2008	2009	Total
I. Investment Costs																
A. Jinshan District: Jinshan Wastewater (Sea Outfall) Project																
1. Civil Works																
JDX/1.1 Wastewater Treatment Plant	-	3.5	4.7	5.9	5.9	2.4	1.2	23.5	-	3.9	5.4	6.9	7.1	2.9	1.5	27.7
JDX/1.2 Shanyang Trunk Sewer & Rehab. of Pump Station	-	2.0	2.6	3.3	3.3	1.3	0.7	13.1	-	2.2	3.0	3.8	4.0	1.6	0.8	15.5
JDX/1.3 Shanyang North Trunk Sewer	-	3.4	4.5	5.7	5.7	2.3	1.1	22.6	-	3.8	5.2	6.6	6.8	2.8	1.5	26.7
JDX/1.4 Tertiary & Link Sewers	-	1.1	1.5	1.9	1.9	0.8	0.4	7.5	-	1.2	1.6	2.0	2.1	0.9	0.4	8.2
JDX/1.5 Extension of Sea Outfall	-	2.0	2.7	3.4	3.4	1.4	0.7	13.5	-	2.3	3.1	4.0	4.1	1.7	0.9	15.9
Subtotal Civil Works	-	12.0	16.0	20.1	20.1	8.0	4.0	80.2	-	13.3	18.2	23.4	24.1	9.9	5.1	94.0
2. Equipment & Materials																
JDX/2.1 Wastewater Treatment Plant & Pump Station Equipment	-	-	-	13.4	6.7	2.2	-	22.4	-	-	-	15.8	8.1	2.8	-	26.7
JDX/2.2 Control Equipment	-	-	-	1.4	0.7	0.2	-	2.3	-	-	-	1.6	0.8	0.3	-	2.7
JDX/2.3 Laboratory Equipment	-	-	-	0.5	0.3	0.1	-	0.9	-	-	-	0.6	0.3	0.1	-	1.1
JDX/2.4 Maintenance Equipment & Vehicles	-	-	-	0.8	0.4	0.1	-	1.3	-	-	-	0.8	0.4	0.2	-	1.4
Subtotal Equipment & Materials	-	-	-	16.1	8.1	2.7	-	26.9	-	-	-	18.9	9.7	3.3	-	32.0
3. Technical Assistance																
Services for Detailed Design	-	1.6	-	-	-	-	-	1.6	-	1.8	-	-	-	-	-	1.8
4. Construction Supervision Services & Project Management	-	0.3	0.3	0.3	0.3	0.3	-	1.6	-	0.4	0.4	0.4	0.4	0.4	-	1.9
5. Land Acquisition & Resettlement	-	2.3	2.3	3.2	1.4	-	-	9.0	-	2.5	2.6	3.7	1.6	-	-	10.4
6. Engineering & Management																
Civil Works	-	1.2	1.6	2.0	2.0	0.8	0.4	8.0	-	1.4	1.9	2.4	2.5	1.0	0.5	9.6
Equipment & Materials	-	-	-	1.6	0.8	0.3	-	2.7	-	-	-	1.9	1.0	0.3	-	3.3
Land Acquisition & Resettlement	-	0.2	0.2	0.3	0.1	-	-	0.9	-	0.3	0.3	0.4	0.2	-	-	1.1
Subtotal Engineering & Management	-	1.4	1.8	3.9	2.9	1.1	0.4	11.6	-	1.8	2.1	4.7	3.6	1.4	0.5	14.0
Subtotal Jinshan District: Jinshan Wastewater (Sea Outfall) Project	-	17.6	20.4	43.6	32.7	12.1	4.4	130.9	-	19.5	23.2	51.1	39.5	15.0	5.6	154.0
B. Jinshan District: Fengjing Wastewater Management																
1. Civil Works																
JDF/1.1 Wastewater Treatment Plant	-	1.6	2.2	2.7	2.7	1.1	0.5	10.8	-	1.8	2.5	3.2	3.3	1.3	0.7	12.7
JDF/1.2 Pipelines & Pump Stations	-	3.3	4.4	5.5	5.5	2.2	1.1	21.8	-	3.6	5.0	6.4	6.6	2.7	1.4	25.7
JDF/1.3 Tertiary & Link Sewers	-	1.1	1.5	1.9	1.9	0.8	0.4	7.5	-	1.2	1.6	2.0	2.1	0.9	0.4	8.2
Subtotal Civil Works	-	6.0	8.0	10.0	10.0	4.0	2.0	40.1	-	6.6	9.0	11.6	12.0	4.9	2.5	46.7
2. Equipment & Materials																
JDF/2.1 Supply & Installation of Equipment	-	-	-	8.4	4.2	1.4	-	14.0	-	-	-	9.9	5.1	1.7	-	16.7
3. Technical Assistance																
Services for Detailed Design	-	1.6	-	-	-	-	-	1.6	-	1.8	-	-	-	-	-	1.8
4. Construction Supervision Services & Project Management	-	0.2	0.2	0.2	0.2	0.2	-	0.8	-	0.2	0.2	0.2	0.2	0.2	-	0.9
5. Land Acquisition & Resettlement	-	6.6	6.8	9.2	4.0	-	-	26.4	-	7.3	7.5	10.9	4.8	-	-	30.5
6. Engineering & Management																
Civil Works	-	0.6	0.8	1.0	1.0	0.4	0.2	4.0	-	0.7	0.9	1.2	1.2	0.5	0.3	4.8
Equipment & Materials	-	-	-	0.8	0.4	0.1	-	1.4	-	-	-	1.0	0.5	0.2	-	1.7
Land Acquisition & Resettlement	-	0.7	0.7	0.9	0.4	-	-	2.6	-	0.7	0.8	1.1	0.5	-	-	3.1
Subtotal Engineering & Management	-	1.3	1.5	2.8	1.8	0.5	0.2	8.1	-	1.4	1.7	3.3	2.2	0.7	0.3	9.6
Subtotal Jinshan District: Fengjing Wastewater Management	-	15.6	16.2	30.6	20.2	6.1	2.2	91.0	-	17.3	18.4	35.8	24.3	7.6	2.8	106.2
C. Fengxian District: Fengxian Wastewater Project																
1. Civil Works																
FDN/1.1 Wastewater Treatment Plant	-	2.6	3.5	4.4	4.4	1.7	0.9	17.4	-	2.9	4.0	5.1	5.3	2.2	1.1	20.5
FDN/1.2 Ancillary Buildings, Workshop & Roads	-	1.1	1.4	1.8	1.8	0.7	0.4	7.1	-	1.2	1.6	2.1	2.1	0.9	0.5	8.4
FDN/1.3 Greening Barrier	-	0.2	0.2	0.3	0.3	0.1	0.1	1.0	-	0.2	0.2	0.3	0.3	0.1	0.1	1.2
FDN/1.4 Pipelines & Pump Stations	-	0.8	1.1	1.4	1.4	0.5	0.3	5.4	-	0.8	1.1	1.5	1.5	0.6	0.3	5.9
Subtotal Civil Works	-	4.6	6.2	7.7	7.7	3.1	1.5	30.9	-	5.1	7.0	9.0	9.2	3.8	2.0	36.0
2. Equipment & Materials																
FDN/2.1 Electrical & Mechanical Equipment	-	-	-	10.2	5.1	1.7	-	17.0	-	-	-	12.0	6.2	2.1	-	20.3
FDN/2.1 Tools & Miscellaneous Equipment	-	-	-	0.2	0.1	0.0	-	0.3	-	-	-	0.2	0.1	0.0	-	0.4
Power Supply	-	-	-	1.9	0.9	0.3	-	3.1	-	-	-	2.2	1.1	0.4	-	3.7
Subtotal Equipment & Materials	-	-	-	12.2	6.1	2.0	-	20.4	-	-	-	14.4	7.4	2.5	-	24.3
3. Technical Assistance																
Services for Detailed Design	-	1.6	-	-	-	-	-	1.6	-	1.8	-	-	-	-	-	1.8
4. Construction Supervision Services & Project Management	-	0.2	0.2	0.2	0.2	0.2	-	1.0	-	0.2	0.2	0.2	0.2	0.2	-	1.2
5. Land Acquisition & Resettlement	-	11.0	11.0	15.4	6.6	-	-	43.9	-	12.2	12.5	18.0	8.0	-	-	50.7
6. Engineering & Management																
Civil Works	-	0.5	0.6	0.8	0.8	0.3	0.2	3.1	-	0.5	0.7	0.9	1.0	0.4	0.2	3.7
Equipment & Materials	-	-	-	1.2	0.6	0.2	-	2.0	-	-	-	1.5	0.8	0.3	-	2.5
Land Acquisition & Resettlement	-	1.1	1.1	1.5	0.7	-	-	4.4	-	1.2	1.3	1.8	0.8	-	-	5.2
Subtotal Engineering & Management	-	1.6	1.7	3.5	2.0	0.5	0.2	9.5	-	1.8	2.0	4.2	2.5	0.7	0.2	11.4
Total	-	52.2	55.8	113.2	75.6	24.1	8.3	329.2	-	58.0	63.3	132.7	91.1	29.8	10.6	385.6

Table 5. Institutional Strengthening & Training
Detailed Costs
(Local)

	Base Cost								Totals Including Contingencies							
	2003	2004	2005	2006	2007	2008	2009	Total	2003	2004	2005	2006	2007	2008	2009	Total
I. Investment Costs																
A. Technical Assistance																
IST/1.1 SWA-Upper Huangpu Catchment Plan & Water Modeling Study	-	1.4	2.3	2.3	2.3	0.9	-	9.0	-	1.5	2.6	2.6	2.7	1.1	-	10.6
IST/1.2 SWA/SCAESAB-Study Tours & Training for PSP Procurement Procedures	-	0.2	0.3	0.3	0.3	0.1	-	1.0	-	0.2	0.3	0.3	0.3	0.1	-	1.2
IST/1.3 SWA-Pollution Reduction Measures Study	-	0.3	0.5	0.5	0.5	0.2	-	2.0	-	0.3	0.6	0.6	0.6	0.2	-	2.3
IST/1.4 SWAOD-Support for Local Bond Issue	-	1.5	2.5	2.5	2.5	1.0	-	10.0	-	1.7	2.9	2.9	3.0	1.2	-	11.7
IST/1.5 SWAOD-Training for Bond Issues	-	0.6	1.1	1.1	1.1	0.4	-	4.2	-	0.6	1.1	1.1	1.2	0.5	-	4.6
IST/1.6 UDIC-Preparation of Policy & Operating Rules for DFV	-	0.6	1.0	1.0	1.0	0.4	-	4.0	-	0.7	1.1	1.2	1.2	0.5	-	4.7
IST/1.7 SPC-Executive Management Training	-	3.0	5.0	5.0	5.0	2.0	-	20.0	-	3.3	5.7	5.9	6.0	2.5	-	23.5
IST/1.8 SPC-Other Special Studies	-	0.8	1.3	1.3	1.3	0.5	-	5.0	-	0.8	1.4	1.5	1.5	0.6	-	5.9
IST/1.9 SPC-Training & Study Tours	-	0.8	1.3	1.3	1.3	0.5	-	5.0	-	0.8	1.4	1.5	1.5	0.6	-	5.9
IST/1.10 SWA-District WWTP Operational Staff Training	-	-	-	0.3	0.3	-	-	0.5	-	-	-	0.3	0.3	-	-	0.6
IST/1.11 SFB-Heritage Strategy Support	-	0.6	1.1	1.1	1.1	0.4	-	4.2	-	0.7	1.2	1.2	1.3	0.5	-	4.9
Total	-	9.7	16.1	16.4	16.4	6.4	-	64.9	-	10.7	18.3	19.1	19.7	8.0	-	75.8

Annex 4: Cost Effectiveness Analysis Summary
CHINA: Shanghai Urban Environment Project

Summary of benefits and costs:

Main Assumptions:

Cost-effectiveness indicators:

Macroeconomic and Institutional Context

This project would provide financial support and technical assistance to Shanghai Municipal Government (SMG) in implementing several key elements of Shanghai's development program. The city's approach is set out in the Tenth Five-Year Plan (TFYP) for 2001-2005, which was approved by the Municipal People's Congress in February 2001 after a considerable period of extensive structured discussion with different groups in the Municipality, with the National Government in Beijing and with a wide range of other parties. The TFYP has been endorsed by the National Government and provides the policy and planning framework for Shanghai in the medium term.

Shanghai Municipality had a gross domestic product (GDP) of about $57 billion ($4,173 per capita) in 2000. Its industrial base continues to diversify with an expanding services sector and it is responsible for about 5.5 percent of national industrial output.

Throughout the 1990s, when Shanghai had strong political support from the central government, the city underwent a major transformation, the centerpiece of which was the development of the Pudong New Area, which rose from farmland on the east bank of the Huangpu River, facing the traditional commercial center along the Bund (the quays along the west bank of the river). This new business district, which now has a population of close to 1 million, is linked to the rest of the municipality by a river tunnel, two bridges and light rail and has a sophisticated communications infrastructure. It is also served by the new Pudong International Airport. At the same time, urban upgrading and "suburbanization" are occurring in the Shanghai City, the established urban core of Shanghai, with a significant shift in patterns of investment and growth, and a blurring of the traditional distinction between the urban core and the rural outer districts.

The overall vision set out in the TFYP is of Shanghai as the center of a competitive "Global Metropolitan Region" covering close to 200 million people in the wider Yangtze Delta Region, including the heavily urbanized and industrialized corridor along the lower reaches of the Yangtze River. This broad area has a GDP estimated at around $300 billion (in 1995). The TFYP sets out five major goals for Shanghai:

- Accelerated restructuring to a market economy;
- Enhanced performance of all types of enterprises, with a new role for the municipal government in relation to enterprises;
- Accelerated economic development through integration of the municipality into the global economy, under the new World Trade Organization trade regime;
- Strengthening domestic and international competitiveness; and

- Improving the living conditions and economic livelihoods of Shanghai's residents.

These five goals are the basis for much more detailed development objectives and related policies for Shanghai, and are supported by six sets of priority actions, covering economic diversification, enterprise reform, infrastructure upgrading, building human capital and encouraging innovation, and fundamental change to urban governance and management at both municipal and district levels.

Finance for Infrastructure. SMG is looking to improve access to capital for its service companies and to bring increasing "social" (i.e., private) investment into the provision of infrastructure. The APL will address these issues with the objective of opening up alternative sources of finance for ongoing investment. There is strong state government support for exploring these opportunities. At present the level of the municipality's GNP that is invested in environment-related capital works is estimated at just under 3 percent over the past five years and this is expected to increase to 3 percent in the course of the TFYP. This is up from a reported 2 percent in 1995. The share of environment infrastructure in the external capital requirements of SMG is acceptable at present but is being monitored by the municipal finance officials. At the same time, in order to help the outer districts to access a range of sources for their investments, the APL will help Shanghai with the definition and establishment of a District Financing Vehicle that could blend different sources to provide competitive longer-term finance to the districts.

Indicators. The environmental section of the TFYP sets out numerical targets for pollution control and for coverage of environment services. Of direct relevance to this APL are a target of 70 percent rate of sewage treatment and 95 percent controlled treatment/disposal of municipal solid waste (with a subsidiary target of 50 percent of this waste to be recycled). These figures provide a framework for setting indicators within the APL, although the coverage of the indicators is much wider than the basic scope of the APL. An important consequence of the internal Shanghai discussions on the issue of targets is an increasing stress in policies and in management actions on service indicators as measures of outputs. This is a significant attitudinal change from tracking progress in terms of investment inputs. This approach will be supported and reinforced in all the components of the APL.

APL COMPONENTS

The overall APL covers a range of urban infrastructure and environment issues and would support investments in several subsectors. For the proposed APL1 investments, the economic analysis is typically based on cost-effectiveness.

Urban Wastewater Management. This component includes the third and final stage of backlog sewerage for Shanghai City, following Shanghai Sewerage Projects (SSP) 1 and 2 in the implementation of an 1985 sewerage strategy for Shanghai. The basis of that strategy, which was reviewed and endorsed during the preparation of SSP2, has been to intercept combined sewer outflows currently going into the creeks in Shanghai City and to take them to the Yangtze River for discharge. The rationale for this has been that treatment requirements for discharge to the Yangtze have been less stringent than for the Huangpu River in the city area, at least in the initial stages. SSP1 and 2 comprised a series of interceptors and two major trunk sewers draining the central and southern areas of the city to two preliminary treatment and outfall sites on the Yangtze River (at Zhuyuan and Bailonggang). Both of these systems are operating successfully and the resulting reduction of loads on the city waterways has produced significant improvements to the water environment in the center of Shanghai City and especially along Suzhou Creek and the Bund area.

The third and final stage of implementation of the strategy (known as SSP3 within APL1) covers the provision of backlog sewerage to the remaining northern areas of Shanghai City, serving a population of about 2.4 million in some of the poorest areas of Shanghai and collecting an average flow of just over 1 Mm3/d. The proposal for the wastewater componenet (designated SSP3) would take the flows to the existing Zhuyuan site where expansion of the current preliminary treatment and outfall facilities would be provided before discharge to the Yangtze.

Tightening of Wastewater Discharge Standards. China has a comprehensive system of water quality and wastewater discharge standards, which are consistent with good international practice. There has been flexibility in the past in the interpretation and application of these standards but rising concerns over the serious levels of water pollution in many parts of China have led to an increasing stringency in the application of these standards. Of particular relevance to the design of SSP3 is the insistence by the national authorities that the whole Yangtze River, including the estuary area be considered a Class II water body, requiring secondary treatment for any new wastewater discharges.

The existing SSP1 and SSP2 systems are designed with enhanced primary treatment (intended to reduce the solids load and also to remove phosphorus, which is the critical nutrient for the estuary area). This is adequate to meet the local water quality requirements and considerably cheaper than secondary treatment. Monitoring has shown that the existing systems are operating as predicted and that the local impacts systems are less significant than forecast at the design stage. Under the new requirements, the higher levels of treatment will provide some additional reduction in pollution loads but at significantly high costs, which changes the economics of the options for SSP3.

Wastewater Master Plan. A new Wastewater Master Plan has been prepared for the whole Municipality, in line with overall development planning under the TFYP for the period 2000-2005. This Wastewater Master Plan has been approved by the Shanghai Municipal Government and sets out the broad parameters for planning and investment in water pollution control over the coming five years and beyond.

The basic aims of the Wastewater Master Plan are to address not just domestic and industrial wastewater but also intensive animal raising (a key problem in the Upper Huangpu Catchment), and to deal with these in a mixture of "centralized" and "local" systems. ("Centralized" treatment systems are those based on major interceptors and large treatment plants.) Issues of particular concern in the development of the Master Plan are the low utilization of the existing facilities; a mismatch in the location of facilities (as population and industry moves from the overcrowded city center to the suburbs); the large areas still served by combined sewers, resulting in storm overflows to the waterways; and the need to deal better with the question of sludge.

The key principles of the Master Plan are expressed as: "*Three increases, Two strengthenings, and One utilization.*" These are as follows. The first principle is to increase the capture of wastewater flows and storm overflows into the sewer systems; to increase the utilization of the existing infrastructure; and to increase the percentage of flows that are treated before discharge. The strengthenings relate to wastewater treatment for Shanghai City and to protection of the Upper Huangpu. The "one utilization" refers to careful and suitable use of the water resources of the municipality for the benefit of the people of Shanghai. These principles provide a very sound basis for the future direction of the sector and are consistent with Bank objectives of focusing on results and ensuring cost effectiveness. In line with the Master Plan directions, the Municipality expects to invest about Y18 billion in wastewater systems over the TFYP, representing investment levels of about $430 million per year, across the whole area of the

Municipality.

Existing Systems. In moving to the implementation of these approaches, the Master Plan considers six major catchments for the Municipality, three of which include Shanghai City and some adjoining areas and the other three of which relate to the rural/suburban areas (and the islands in the Yangtze estuary). The remaining undrained catchments in Shanghai City (taken as the area inside the Ring Road) include some areas to the northeast that are not served and a number of older and poorer dense areas north of Suzhou Creek. There is also a small area between the city and the existing Zhuyuan plant which will be included in SSP3. The two city areas together cover about 150 km2 and would serve a population estimated at 2.3 million in 2002 (based on a *decrease* from existing population as redevelopment occurs and housing conditions are improved (especially in that area which includes parts of the Hongkou and Yangpu Districts, which are the most dense and poorest parts of Shanghai City).

Approach to Serving SSP3 Areas. Detailed estimates have been made of the design flows from these areas and these estimates total about 1.6 Mm3/d for the design year of 2020. Analysis carried out during project preparation compared two broad options for the treatment and disposal of these remaining loads. One is based on the original strategy of transport to the Yangtze and discharge after appropriate treatment, as has been implemented under SSP1 and SSP2. The most logical and favorable location for this discharge is adjacent to the existing Zhuyuan outfall site (as had been originally envisaged) and this option is known as Zhuyuan II. The alternative approach is based on sharing the loads between the remaining capacity in the Zhuyuan (SSP1) system and local treatment in the catchment at Minxing with discharge to the Huangpu.

The Zhuyuan II system has a number of advantages on environmental grounds, in particular the elimination of the discharge of treated effluent to the Huangpu (and the associated risk of overflow, malfunctions, etc.) and the location of the treatment plant in an area with significant industrial activity, away from the inner city. The selection of the Minxing site was also reviewed, to see if a viable lower-cost site could be found. However, the site is already at the northern edge of the service area. Other possibilities were eliminated by planning constraints (areas designated for urban redevelopment) or by the inability to buy land from major industrial enterprises along the river.

Least-cost analysis was carried out by the design team, with the design review and advisory (DRA) consultants, comparing both the capital and net present value (NPV) costs of the two options. The results showed that the options were close to each other but that the Zhuyuan II option had both lower capital costs [Y1.57 billion ($198 million) against Y1.86 billion ($223 million)] and a lower NPV (Y2.27 billion ($273 million) versus Y2,795 billion ($337 million). These estimates include costs of land, resettlement, and all construction costs. Foreign exchange requirements for both options are very similar and of the order of 10-14 percent of the costs of treatment. The most important cost components are civil works which account for 40 percent of total base costs and resettlement which accounts for about 32 percent of the total. A review of the details of the costs showed that the costs of the pumping stations and conveyors to Zhuyuan, which cross the increasingly built-up Pudong area are more than balanced by the higher land costs and treatment systems costs associated with the confined Minxing site.

Marginal Costs. The average incremental cost (AIC) values were calculated for these options and are in the range of from Y2.3 to 2.6 ($0.28 to 0.31) per m3 and are similar in both financial and economic terms.

Property Connection Costs. The costs of connecting properties to the new sewerage system need to be included in the economic assessment. Broad cost estimates were prepared on the basis of the number of

households and other properties to be connected, and unit connection costs provided by SMSC. The resulting estimates indicate total property connection costs of about Y800 million ($96 million), including the additional costs for nonresidential properties in both areas. For the purposes of analysis, it has been assumed that the costs will be incurred over a four-year period from 2007 to 2010.

Benefits of the Wastewater Component

In the late 1980s, SMG embarked on a major investment program to develop the City's wastewater network and sewage treatment facilities. Considerable progress has been made over the last 10 years with the active support of the World Bank. In this context, the Wastewater Component of SHUEP represents a logical extension of those works and will generate a wide range of environmental and public health benefits. To help to understand these, a Socioeconomic Survey of 600 households and 225 industrial and commercial enterprises was commissioned from the Shanghai Municipal Statistics Bureau (SMSB). Detailed information was sought also from relevant municipal agencies for a range of direct benefit areas such as: public health; potential cost savings in septic tank and nightsoil operations; flooding impacts; and land and property value impacts.

Property Rental Values. Data collected by the Shanghai Environmental Protection Bureau (EPB) demonstrate that the water quality in the Huangpu has improved significantly from the "days of the Black and Stink" which prompted SMG to undertake the sewerage program. Analysis done at the time of the initial Sewerage Strategy identified a number of potential benefits of the program, including increased property values along the major waterways. It has turned out that Suzhou Creek in the center of the city, which was formerly the most polluted tributary of the Huangpu, has become an axis for high-value property development, desirable for both commercial and residential purposes. Over the same period, the promenade beside the Huangpu River along the Bund, which was always a popular location, has undergone major redevelopment and is now a major attraction for domestic and foreign tourists, as well as locals. It is not possible to attribute a specific portion of the significant increase in economic value of the river precincts to the water quality improvements but clearly the sewerage program is bringing major economic benefits.

The provision of improved sewerage and stormwater drainage facilities will enhance property values in the project area. The results of the socioeconomic survey demonstrate the high to medium priority which respondents attach to improvements in their living environment, key urban services and measures that will enhance the status of Shanghai. Therefore, it is expected that the new wastewater and stormwater facilities will generate increased property values throughout the project area. This was confirmed in discussions with the Shanghai Municipal Housing, Land and Resources Administration Bureau, and local property consultants. An estimate was made of the size of the benefits associated with rental value increases.

The property market in Shanghai is still in the early stages of development, and most property is owned and controlled by the state. Therefore, residential household rents were used as a proxy for enhanced property values, although rents are acknowledged to be below realistic market levels in Shanghai. Based on the results of the socioeconomic survey, the average household rent in the project area is Y66.7 ($8) per month and amounts to 3.1 percent of average household income in 2002. Properties close to creeks, canals, tributaries and the main watercourses (Suzhou Creek and Huangpu River) will be the main beneficiaries in terms of enhanced environmental benefits (e.g. eliminated and reduced smells, periodic flooding from storm events, etc.). There is not sufficient data to make confident estimates of the increases in property values associated with the environmental improvements but reasonable estimates indicate incremental residential rents in the areas close to the waterways are projected to rise from Y315.2 million

($38 million) in 2007 to Y683.5 million ($82.3 million) by 2020. Potential property benefits attributable to commercial and industrial enterprises in the project area have not been estimated because of the lack of an adequate database.

Other Benefits. Other benefits that have not been quantified include:

- *Public health.* The project should lead to further improvements in public health. According to the socioeconomic survey (January 2002), waterborne and water-related diseases are more prevalent in the project area north of Suzhou Creek than in the southern districts of the city. Ten percent of respondents north of Suzhou Creek reported water-related illnesses, compared with 5.5 percent in the southern districts. This observation is also supported by information presented in the Suzhou Creek Rehabilitation Project Report which states that viral hepatitis and dysentery are the two leading water pollution-related diseases and that in the Suzhou Creek project area, the combined annual morbidity rate for the two diseases was nearly 10 percent higher than for urban Shanghai. The wastewater and stormwater project will reduce some of the physical vectors which convey waterborne and water-related diseases (e.g. septic tanks, nightsoil facilities, other basic sanitation facilities, vermin and rodents, unsanitary canals and waterways, etc.), but parallel initiatives will be needed in public health education and improvements in personal hygiene.

- *Septic tanks and nightsoil disposal.* The project would help to achieve significant cost savings through the replacement of septic tanks and nightsoil facilities which are still prominent forms of sanitation in large areas of Putuo, Zhabei and Hongkou Districts. There would also be significant amenity improvements.

- *Public health protection and improved urban services.* The safe collection, treatment and disposal of urban wastewater, the similar improvement in nightsoil disposal, and the proposed improvements in the municipal solid waste system in the Municipality (see subsequently) represent an important and cost-effective strategy for public health protection. Shanghai will reap the indirect non-quantifiable but not insignificant benefits of these city management decisions in the years to come, reducing the risks of diseases and epidemics, and sustaining economic growth and urban livability.

- *Flooding and overflows.* The proposed stormwater conveyors to be constructed in the northern area would alleviate the impact of frequent flood events during the rainy season, and eliminate unsanitary overflows from septic tanks and other sanitation facilities. It is reported that 80 percent of this area (117 km2) is prone to periodic flooding to depths of about 30 cm, which implies that about 1.1 to 1.2 million people are at risk, of whom approximately 120,000 (11 percent) are poor (income of below $1 per day). Flooding also disrupts normal commercial and industrial activities in the area, which has an adverse effect on the local economy.

- *Environmental impacts.* One of the central objectives is the rehabilitation and cleanup of the city's main waterways (Suzhou Creek and Huangpu River) and minor tributaries. In the socioeconomic survey, between 81 and 98 percent of respondents in the project area highlighted the importance of the environment in justifying further investment in the municipal sewerage and wastewater treatment system.

- *Tourism.* The socioeconomic survey also showed that 70 percent of respondents to the household questionnaire in the project area believe that further improvements and extensions of the city's sewerage and sewage treatment network would have a beneficial impact on tourism to Shanghai. The tourism sector accounts for 5 percent of GDP. In 2000, Shanghai received 64.3 million domestic

visitors and 1.8 million foreign visitors spending an estimated Y93.6 billion ($11.3 billion).

Ability to Pay

The City and the adjacent districts form a major growth region for the Chinese economy, with GDP growing at an average of 11 to 13 percent per year for the last decade, and expected to grow at 9 to 10 percent per year over the TFYP period (2001-2005). Average GDP per capita reached about Y34,640 ($4,173) in 2000 (the highest in China) and is expected to reach Y54,000 ($6,605) in 2005. Overall, these developments will generate a higher level of real income and increased ability to pay for environmental improvements, pollution reduction and urban services such as sewerage and stormwater drainage.

Based on the results of the Socioeconomic Survey, estimates have been made of the incremental ability to pay for improved sewerage services in the Project Area. In 2002, domestic households in the project area had an average income of Y2,140 ($258) per month, of which an average of Y11.1 per month ($1.3) or 0.5 percent was spent on sewerage services. Average household water consumption was about 17.8 m3 per month (189 liters/head/day). The resulting average sewerage charge was Y0.62 ($0.075) per m3 of water consumed (SMSC charges for sewerage services on the basis of water consumption). This proportion of household income spent on sewerage services (0.5 percent) is low by international standards. These results clearly indicate that domestic households and commercial/industrial enterprises are able to pay a higher proportion of their income to support an efficient and effective sewerage service, both now and in the future.

Poverty and Distributional Aspects

Poverty alleviation is an important issue for both SMG and the World Bank. The aim for this project is to ensure that low-income and other disadvantaged groups within the municipal area participate fully in the environmental benefits and improved urban services which would accrue from the successful implementation and operation of the wastewater management components of the APL1 investment package.

Official statistics for Shanghai indicate that poverty is not a significant problem in the city overall with less than 1 percent of the urban population below the World Bank's poverty guideline of $1 per day [equivalent to Y750 ($90) per month for a household of three persons]. However, the results of the socioeconomic survey indicate that more than 14 percent of the population in the districts north of Suzhou Creek is below this level. The survey results indicate average monthly household income of Y2,140 in the districts north of Suzhou Creek, with only small variations ranging from Y2,020 per month in Putuo District to Y2,385 per month in Yangpu District.

Based on the results of the socioeconomic survey, it is estimated that 340,000 people in about 113,000 poor households (14.1 percent of the target population of 2.4 million) would benefit from the proposed investment in new and improved sewerage systems, wastewater treatment facilities, stormwater drainage, and the resulting environmental improvements.

Table 1: Household Income Distribution in Districts North of Suzhou Creek

(Percent, unless otherwise noted)

Income Band (Yuan per month)	Yangpu	Hongkou	Putuo	Baoshan	Subtotal
Less than Y500	1.3	6.3		3.2	2.8
Y500 to 1,000	16.3	8.4	9.0	12.0	11.3
Y1,000 to 1,500	16.3	24.2	22.0	21.6	21.3
Y1,500 to 2,000	13.8	20.0	20.0	19.2	18.5
Y2,000 to 3,000	21.3	23.2	35.0	29.6	27.8
Y3,000 to 5,000	28.8	11.6	11.0	11.2	14.8
More than Y5,000	2.5	6.3	2.0	2.4	3.3
No response			1.0	0.8	0.5
Total	**100**	**100**	**100**	**100**	**100**
Average Income (Yuan)	2,385	2,105	2,020	2,110	2,140
Survey (nos.)	80	95	100	125	400

Source: Socioeconomic Survey, January 2002 (see: Appendix in Volume 1 of the Survey).

Urban Solid Waste Management

Context. The total amount of all types of solid waste generated in Shanghai is about 89,000 t/d of which domestic solid waste comprises about 12,500 t/d. This represents an average of about 0.84 kg/t/d which is typical for a large city at this stage of development. About 6,000 t/d of the domestic waste from the urban area (63 percent of the total generated) goes to controlled landfills at Laogang (which takes about 4,900 t/d) and at Li Ming. The remainder of the urban domestic waste and most of the rural domestic waste goes to open dumps, of which 219 have been identified.

There are two municipal solid waste incinerators in Shanghai Municipality, one recently completed in Pudong and a second under construction. There are also a number of small composting and other "treatment" plants.

In the urban area, collection and transportation of domestic waste is the responsibility of the Districts. The Shanghai Municipal Government (SMG) takes responsibility from the transfer stations onward. Outside this urban area, the Districts are fully responsible for managing the wastes. In Shanghai, as in all other large cities, space for landfill is very difficult to find and there is no realistic alternative for the city apart from expansion of the existing facility on land already allocated for this purpose. Songjiang District, one of the more wealthy of the suburban areas, has recently established a new sanitary landfill for its own use but--as in other environmental services--there is a lack in regional coordination and planning and the Songjiang site is not intended for the use of the whole metropolitan area.

Food waste. SMG has recently banned the traditional practice of farmers taking food waste from the urban restaurants and markets, to feed their pigs. This action, which was taken to protect agriculture from the risk of animal diseases being transmitted, has resulted in the need for the waste authorities to handle approximately 1,100 t/d of food waste. The high water content of this waste is causing problems in both transportation and landfilling.

Other solid wastes. In addition to the domestic waste and the food waste, there are several other waste

streams which are not included in this component but which may be addressed in APL2. These include large quantities of construction and industrial solid waste (much of which is recycled in one way or another) and hazardous waste, which is a small quantity but a very important part of the overall waste stream. A separate project is being developed to consolidate the management of medical wastes into a coherent system, based on good management and approved technology. There is also a separate nightsoil system which removes about 4,700 t/d of nightsoil from the urban area for use as fertilizer in rural areas.

Master Plan

There is a Solid Waste Disposal Master Plan, currently in draft, which sets out broad principles of comprehensive waste management and has an overall goal of reducing waste at source so that no further increases in total waste occur beyond 2010. It also sets out a vision of a balanced disposal system where recycling, composting and incineration (including energy recovery) reduce the reliance on landfilling. This Master Plan needs to be complemented by more specific action plans providing detail on issues such as transportation of wastes, organization and finance, closure (or upgrading) of existing dumps, and incentives for change.

The Master Plan provides estimates of the change in waste composition and the anticipated mix of facilities. However, beyond supporting the increasing use of market approaches and the involvement of the private sector, there is limited operational detail.

A key issue that would be addressed under the APL is the importance of regional cooperation for addressing some issues such as major disposal facilities. This would be encouraged by the gradual shift of SMG away from operation of facilities, which should allow a more commercial approach and the identification of cost effective regional initiatives, where appropriate.

Laogang Landfill. The existing Laogang landfill is located about 60 km from the center of the city, on reclaimed land along the Yangtze River estuary. Waste is transported to the site on a fleet of barges that collect from urban transfer stations and travel to the site along the canal system. The present landfill, which is nearing capacity, covers an area of about 2,000 by 800 meters and has been operated as a controlled landfill, although lacking an impermeable liner and some other features of a modern sanitary landfill. The rate of utilization of the landfill is about 4,900 t/d, which is controlled mainly by the barge system and the transfer facilities at the docks of the landfill.

The project would include a perimeter wall and road system which would create four large working areas, each about 1,000 by 800 meters, effectively doubling the area of the site. The working areas would each be divided into about 12 operating cells. Design improvements during the feasibility have resulted in a number of changes such as increasing the working height of a typical cell from the current practices, to provide an increased effective volume of about 35 Mm3. This would increase the project working life from 11 to about 18 years (at the current filling rate), greatly increasing the effectiveness of the investments.

The landfill would be provided with a high technology liner system to prevent the escape of leachate from each cell. The leachate will be collected and treated in an aeration system and then discharged by pipeline to a major domestic wastewater treatment plant. A landfill gas collection system would be installed. In the initial years the gas would be flared, until sufficient volumes are being released for power generation to be a realistic option. In addition, the project would include a trenched vertical wall around the current site to contain any leachate that may be leaking and the leachate system from the earlier stage would be linked into the new system. Other design details are in line with modern practice

and the design has been reviewed and revised to obtain a cost-effective approach.

Food Waste. The existing waste collection system has been severely stressed by the recent ban on food waste being taken for pig food. One consequence has been that there are insufficient collection vehicles and even those which are available are not adequate to transport the typically very wet wastes. As a result, there has been considerable spillage and leakage during transport of the wastes. The project would help with the purchase of sealed containers and appropriate vehicles. There are a number of pilots under way for treating and disposing of the waste and later phases of the APL may support the implementation of technical solutions, if appropriate.

Consideration of Alternatives

There is no real alternative to the Laogang site for the necessary short to medium expansion of landfill capacity for Shanghai. Shanghai's growth continues, especially in the suburbs as efforts continue to reduce overcrowding in the city center and land prices are rising as a functioning land market starts to emerge. However, design improvements made during project preparation resulted in a 60 percent increase in useable capacity for relatively small increases in construction cost. In this way, the efficiency of the planned investments have been increased significantly.

Consideration was given during design to installing a power generation system to be fueled by the landfill gas collected but the current relatively low rate of gas production and the distance from a source of power demand made this uneconomic at present. However, a gas collection system is included in the design and the feasibility of power generation will be kept under review as the new cells are filled and capped.

The food waste component is responding to an immediate need for a better collection system. No investments are being made under APL1 in treatment/disposal while various pilot activities continue in the city. If additional facilities are demonstrated to be necessary and cost effective, they can be considered for support under later stages of the APL.

Basis of Financial and Economic Analysis

An analysis has been carried out in constant early-2002 prices based on a comparison of the "with" and "without" project scenarios. All monetary values have been evaluated on an incremental basis over the economic life of the main proposed investments (18 years in the case of the Laogang project from 2004 to 2021), with capital replacement for components with a shorter asset life (e.g. 6 years for most machinery and equipment). Incremental operation and maintenance costs are included over the life of the assets. Shadow/conversion factors have been applied for the economic analysis.

Opportunity cost of land. Discussions with property consultants in Shanghai indicate that land in the area of the Laogang site has a current value of Y332 ($40) per m2. However, in view of the proximity of the existing landfill facility, the value has been halved to Y166 ($20) per m2 in order to provide a more realistic assessment for the economic evaluation. The economic assessment includes the closure costs (i.e., environmental rehabilitation) and the residual land value of the landfill site at the end of its operational life in 2021.

The estimated capital cost is about Y1.62 billion ($195 million), of which foreign exchange costs account for only 17 percent of the total--in financial prices. In economic prices, the capital costs are 6 percent lower at Y1.53 billion ($184 million). Per head of population, the investment for both the landfill and the

food waste system amounts to Y260 ($31) per head in financial prices and Y245 ($30) per head in economic prices. Per household, the respective figures are Y720 ($87) in financial prices and Y675 ($81) in economic prices.

Average Incremental Costs

At a discount rate of 10 percent (opportunity cost of capital used for China), the average incremental costs (AICs) are as follows:

- Laogang Landfill Extension: Y124 ($15) per ton in financial prices and Y117 ($14) per ton in economic prices. The Chinese feasibility study (December 2001) suggests an average charge of Y90 ($11) per ton. Therefore, the design, review and advisory (DRA) consultants' estimates are 38 percent higher in financial prices and 30 percent higher in economic prices. The difference is largely explained by the fact that the DRA calculations include a land value.

- Food Waste Collection: Y101 ($12) per ton in financial prices and Y92 ($11) per ton in economic prices. The Shanghai Price Bureau issued the first price guidelines for the food waste service on December 4, 2001 (Hu Jia Fei, 2001, No. 087). The document stipulates a maximum price of Y100 ($12) per ton for collection and Y115 ($13.8) per ton for disposal. For the collection service, the DRA estimates are very similar at a 10 percent discount rate.

The average cost of landfill can therefore be estimated at about $15/t taken over the life of the facility. This figure would be at the lower end of comparable international costs, reflecting the fact that much of the overall required infrastructure is already in place, including access roads, waste-handling facilities, power supply, offices, etc. However, given the distance of the site from the major areas of generation, the average cost of waste disposal will be much higher than $15/t and will depend on the exact place of generation, the system of waste transfer, bulk haulage (currently by barge), etc. One of the tasks under the APL would be to introduce proper costing for different collection, transfer and disposal options so that the overall waste management system can be optimized. Establishing the real cost of the landfill option would provide a base reference cost against which other options such as recycling, incineration and composting can be assessed.

It is important for the municipal authorities to recognize that these investments are creating an asset that has a total present worth of over half a billion dollars (based on the total volume available). This is a finite resource, which will be difficult to replace once it has been utilized, and it must therefore be used to generate the maximum possible financial returns and social benefits over its lifetime.

Socioeconomic Survey Results

The Client and the DRA Consultants commissioned a Socioeconomic Survey of 600 households and 225 industrial and commercial enterprises. Some of the main results relating to domestic solid waste and food waste provide useful insights. Significantly, the survey shows that households are willing and able to pay for an improved service. Some of the more interesting results are summarized as follows.

Domestic solid waste. More than 75 percent of respondents think that the solid waste service is average to good, and about 20 percent felt that it was unsatisfactory. There is considerable separation of waste, with more than 90 percent of those interviewed participating.

Less than 5 percent actually pay for the collection and removal of their solid waste but between 38 and 45 percent of households in the survey are reported to be ready to pay (although more than half those

interviewed expressed unwillingness). However, on average, most urban households in the survey would accept paying Y5 to 6 ($0.6 to 0.7) per month for solid waste services. This willingness to pay (WTP) figure would amount to less than 0.25 percent of average household income which is Y2,124 ($256) per month for all districts in the city

Food waste. The socioeconomic survey included 75 hotels, restaurants and other catering outlets generating food waste in the city districts north and south of Suzhou Creek. The responses indicate that commercial food outlets are generally aware of the need for efficient and clean solid waste disposal services, including a special service for the hygienic collection and disposal of food waste. Similar to the household survey, the results also indicate that enterprises are generally willing and able to pay for improved solid waste and food waste services.

More than 82 percent of food catering outlets interviewed pay for the collection and removal of their general solid waste. Based on 62 responses, the average payment is Y622 ($75) per month for all solid waste services. (The average quantity of solid waste is 1,254 kg per month of general solid waste and 522 kg per month of food waste.) 31 percent of catering enterprises in the survey are prepared to pay specifically for a food waste service and based on 23 responses, the average WTP is Y104 ($12.5) per month for a food waste service.

Benefits

Household payments. Based on the results of the Socioeconomic Survey estimates have been made of the incremental ability to pay for the improvement and extension of the domestic solid waste services provided by the Laogang Landfill operation for Shanghai City. The results of the socioeconomic survey indicate that households are prepared to pay an average of Y5 ($0.6) per month or 0.24 percent of income for domestic solid waste services.

The ability to pay is projected to rise from Y163.1 million ($19.6 million) in 2005 to Y196.5 million ($23.7 million) in 2010 and Y264.1 million ($31.8 million) by 2020, based on the same percentage but taking into account increase in household income.

Property rental values. The proposed improvement and extension of the services provided by the Laogang Landfill facility will allow efficient solid waste disposal services throughout the city to be maintained, which will help to sustain and enhance property values in Shanghai. This was confirmed in discussions with the Shanghai Municipal Housing, Land and Resources Administration Bureau, and local property consultants.

Residential household rents have been used as a proxy for enhanced property values and a general approach has been adopted based on assuming a small increase in residential property rents. These estimates amount assuming that about 3 percent of the increase in rents can be attributed to the general cleanliness of the urban environment. This amounts to between 0.2 and 0.4 percent of average household income. The value of such an incremental portion residential property rents are projected to rise from Y56.1 million ($6.7 million) in 2005 to Y171 million ($20.6 million) in 2010 and Y463.2 million ($55.8 million) by 2020.

The estimated residential property benefits will not reflect the total potential property benefits. This is particularly significant for the business districts and the industrial enterprises within the Outer Ring Road which are expected to mainly tertiary industries under the Shanghai Master Plan; and, therefore, more conscious of the need for modern urban services and an improved living environment for which they will

be prepared to pay higher property prices and rents.

Food waste service. The results of the socioeconomic survey indicate that food catering outlets (hotels, restaurants, and others) in Shanghai are aware of the need for hygienic disposal of food waste and are willing to pay for the service. The survey respondents in the commercial catering sector indicated average food waste of 522 kg per month and a willingness to pay of Y104 ($12.5) per month for a disposal service, which is equivalent to an average value of Y200 ($24) per ton.

On December 4, 2001, the Shanghai Price Bureau (SPB) issued the price guidelines for the proposed food waste service (Hu Jia Fei, 2001, No. 087). The document stipulates a maximum charge of Y100 ($12) per ton for collection and Y115 ($13.8) per ton for disposal. The combined charge of Y215 ($26) per ton is very similar to the willingness to pay figure derived from the socioeconomic survey.

Rates of return. These benefits, estimated above, can be attributed to the broad improvement of the municipal solid waste management and demonstrated that the project can contribute to the achievement of significant benefits. However, the full amount of the benefits cannot be attributed to the investments under this project and so it is not appropriate to use the broad benefits to calculate specific rates of return for these investments.

Public health benefits. These have been discussed previously, together with the wastewater component.

Urban Planning and Pilot Upgrading. This component will support rehabilitation of some of the older and poorer areas of the inner urban area, to provide immediate improvement in environmental services and also to establish physical parameters and institutional mechanisms which can be used on a larger scale. The focus of the rehabilitation is the Hongkou District, where there is high density housing and a source of recognized cultural heritage sites. The District Government has prepared a Plan to control rapid and intrusive new development, upgrade conditions for the residents and preserve the heritage assets. Housing renewal and renovation will be mainly carried out by the District Government program.

The component would be a pilot program, with the objective of upgrading the housing quality and services in the area while preserving the overall neighborhood character. If this can be carried out successfully, it would allow significant benefits to accrue to those who chose to remain in the area, while also providing the opportunity for those who wish to move to more spacious accommodation further out from the city center. Since this is one of the poorer areas of the city, achieving this objective would have social and economic benefits.

Since this component is focusing on identifying cost effective approaches to upgrading the services in the older areas and on helping the District Government to find ways to increase the value of these neighborhoods, it is not possible at this stage to estimate rates of return to investments. An output of this work should be a much better understanding of the costs and benefits of upgrading efforts in the older historic parts of Shanghai.

Upper Huangpu Catchment Environmental Management. SMG established the Shanghai Water Authority in 2000 with a mandate to address water resources and water quality in the whole area of the Municipality. It has, in its short existence, identified the protection of the Upper Huangpu catchment as a critical factor for the water supply of the city but has not yet been able to pay it adequate attention. This component would provide assistance for the development of an Upper Huangpu Catchment Management Plan and would support a number of pilot investments in municipal and agricultural wastewater treatment. Among the objectives of this work are to develop a number of cost effective potential

interventions and to promote the institutional and financial mechanisms to ensure that investments under a future Catchment Management Plan would be sustainable. Any mechanisms that increase the financial costs to agriculture (even if these are based on the polluter pays principle) may have an impact on the viability of individual enterprises or categories of rural industry and these impacts will be analyzed and addressed if necessary.

A number of possible priority interventions have been identified, including three wastewater treatment plants that would treat both municipal wastes and wastes from intensive agricultural activities. Evaluation of these investments would be against cost effectiveness in reduction of loads on the river system, including both oxygen demand and nutrients. This analysis would help to define values for unit reductions in key pollutants and these would be used as benchmarks for the evaluation of interventions under the Catchment Management Plan.

Annex 5: Financial Summary
CHINA: Shanghai Urban Environment Project

MAIN ASSUMPTIONS:

Municipal and District Finances

1. **Assumptions for Financial Projections.** The assumptions made when calculating the projections of the on-budget and off-budget revenue and expenditure statements of Shanghai Municipality (SM) for the period 1999-2008 are set out below. Financial revenues are those arising from taxes, levies, administrative fees and other revenues.

2. **Revenue Forecast.** The actual (1999-2002) financial revenue figures have been derived from data provided by the Shanghai Finance Bureau (SFB). To estimate future revenues, an overall conservative average annual increase of about 10 percent in current terms has been assumed using 2002 as the base year.

3. **Expenditure Forecast.** Between 1998 and 2002, budgetary expenditures registered or projected to register, between 122 and 126 percent of revenues. SFB projects the ratio of expenditures to revenues to remain high through 2010. To estimate future expenditures, an overall average annual increase of about 10 percent in current terms has been assumed using 2002 as the base year.

Table 1: Shanghai Municipal Finances
(Y billion, current terms)

	Actual				Budget	Projected				
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Receipts /a	43.4	50.0	62.0	72.0	77.1	84.8	93.3	102.7	113.0	124.3
Expenditures	54.6	62.2	72.6	87.7	96.5	106.2	116.8	128.5	141.4	155.5
Project Expenditures as % of Receipts /b				0.0	0.002	0.004	0.004	0.002	0.002	0.002

/a The central government transfers a certain amount to Shanghai through the fiscal settlement arrangement under the current fiscal system. Shanghai achieves an overall balance in terms of annual budgetary revenue and receipts.

/b Includes expected expenditures under APL2 and APL3.

4. The self-funding, self-accounting state-owned Shanghai Municipal Sewerage Company (SMSC) was established in December 1995, following the merger of the existing Shanghai Sewerage Company and the Shanghai Sewerage Project Construction Company (SSPCC). Since its establishment, SMSC has performed well, institutionally, financially and technically. In 2000, and as part of SMG's restructuring initiatives, SMSC was reorganized, creating three operating companies and the Shanghai Water & Environment Engineering Company (SWEC), while retaining the SMSC Group Company. The SMSC Group Company retains all wastewater assets, and hires the operating companies on a contract basis to undertake operation and maintenance of the sewerage facilities. The role of SWEC is that of a construction-engineering firm (similar to the role of SSPCC in the First Shanghai Sewerage Project--Loan 2794-CHA/Credit 1779-CHA). SMSC and SWEC report to the Shanghai Water Authority (SWA), established in 2000, combining the former Water Conservancy Bureau, the Shanghai Municipal Waterworks Company (SMWC), and SMSC Group Company, which previously reported to the Shanghai Public Utilities Bureau, and the Shanghai Municipal Engineering Bureau, respectively.

5. In Jinshan District, two wastewater projects would be undertaken. The Jinshan Ocean Outfall Engineering General Company Limited (JOOC) was established in 1993 as a self-funding, self-accounting state-owned enterprise. JOOC reports to the Jinshan Urban Construction & Development General Corporation (JUDIC). In 2002 Fengjing township established a similar enterprise named the Fengjing Water Purification Company Limited (FWPC). It reports to the Jinshan District Construction Commission. In Fengxian District, the Nanpai Sewage Disposal Company Limited (NSDC) was established in 2002. It reports to the Fengxian District Construction Commission. Both districts have recently introduced wastewater tariffs of Y0.68/m3, the tariffs being collected the by districts' water supply companies.

ASSUMPTIONS TO UTILITY FINANCIAL PROJECTIONS

Shanghai Municipal Sewerage Company

6. Assumptions to the projections of the main financial statements of the Shanghai Municipal Sewerage Company Ltd. (SMSC) and district wastewater companies of Jinshan District: (a) Fengjing Water Purification Company Limited (FWPC); (b) Jinshan Ocean Outfall Engineering General Company Limited (JOOC); and (c) Fengxian District: Nanpai Sewage Disposal Company Limited (NSDC), for the period 2002-2015 have been prepared.

7. **Inflation and Exchange Rates.** Yearly general domestic inflation rates used in the projections are 2 percent in 2003 and 2004 and 3 percent in 2005 and thereafter. Foreign price increases are estimated at 1.7 percent in 2003, 2.2 percent in 2004, 2.0 percent in 2005 and thereafter. The exchange rate used to convert foreign costs to local currency, where applicable, was Y8.3 per $1.0. It is assumed that exchange rate adjustments would, on average, maintain purchasing power parity over the projection period.

Income Statement

8. **Sales.** Projections of sewage quantities are based on "minimum demand" and maximum capacity figures, and at the equivalent of 100 percent of water supplied and billed to the Shanghai Municipal Waterworks Company's (SMWC) domestic consumers, and 90 percent of water supplied to nondomestic consumers. Other operating revenue for SMSC is derived from the proceeds of the 5 percent public utilities tax collected by SMWC as part of its water supply tariffs, which are turned over to SMSC monthly. Nonoperating income includes transfers from SMG to cover the costs incurred by SMSC in stormwater removal, estimated to be 23.5 percent of SMSC's operations and maintenance costs.

9. **Tariffs.** The following average tariffs expressed in yuan per m3 have been estimated for the years 2003 to 2008, in order to meet SMG's financial objectives for: (a) SMSC, including making a contribution to capital investment of 10 percent; and (b) the district wastewater companies of: Jinshan District: FWPC and JOOC, and Fengxian District: NSDC. The legal procedures of SMG would need to be followed before any tariff adjustment is authorized and implemented.

Company	2002	2003	2004	2005	2006	2007	2008
SMSC	0.51	0.69	1.18	1.18	1.71	1.71	1.71
FWPC	0.68	0.68	0.68	0.84	1.04	1.18	1.34
JOOC	0.68	0.68	0.68	0.84	1.04	1.04	1.18
NSDC	0.68	0.68	0.68	0.84	1.04	1.04	1.18

10. **Operating Costs.** Salaries, wages and staff benefits are assumed to increase at the rates given in para. 8 above. Energy, materials and other costs are assumed to increase in line with general inflation also. Long-term assets are depreciated at 2.5 percent (40 years) and short-term assets at 6.67 percent (15 years). The split of assets is assumed at 80 percent long-term and 20 percent short-term, based on project cost estimates and information supplied from SMSC. The composite depreciation rate is 3.8 percent. It is assumed SMSC and the district wastewater companies would pay a business tax of 3.7 percent a year and income tax of 33 percent.

11. **Interest and Amortization Expenses.** The proceeds of the IBRD loan are assumed to be onlent to the wastewater companies at 3.0 percent a year. Amortization of loans would be on the basis of equal payments of principal and interest. The companies would bear the foreign exchange risk. Shanghai Municipality would provide the local capital counterpart funds as capital grants.

Balance Sheet

12. **Inventories.** Inventories have been projected to take into account general inflation as well as any expanded levels of operations and construction.

13. **Accounts Receivable.** Accounts receivable is assumed to be about 29 days of billings. The collection period is based on the following: (a) domestic water bills are collected on behalf of SMSC by SMWC; and (b) nondomestic bills are collected by SMSC through direct debit.

14. **Bad Debts.** Bad debts are assumed to be 2.0 percent of billings.

15. **Accounts Payable.** Accounts payable are assumed to be two months' chemicals, utilities and maintenance materials from 2002.

Source and Application of Funds

16. **Working Capital Needs.** Working capital needs represent the excess, or otherwise, of the current year's current assets (net of cash), less the excess of the previous year's current assets (net of cash) over current liabilities.

17. **Change in Cash.** Change in cash (which includes short-term investments) calculates the balance sheet cash balance for the current year.

Annex 6: Procurement and Disbursement Arrangements
CHINA: Shanghai Urban Environment Project

Procurement

1. **Procurement Capacity Assessment** Two sets of procurement laws and regulations exist in China for procurement administration--Chinese regulations, and procedures for procurement financed by external donors. Bank-financed procurement has been carried out satisfactory through exemptions to the domestic bidding requirements. The Chinese procurement regulations for national competitive bidding (NCB) are prescribed in the Shanghai Administration Regulation on Tendering and Bidding of Construction Projects, issued by Shanghai Municipal Government in 1998. Provisions in these regulations that are inconsistent with Bank procurement Guidelines are: the merit point system, used for the pre-qualification evaluation and bid evaluation; limit on the number of bidders; rejection of bids outside a narrow price range; application of a geographic preference through use of a prior approval procedure; low bid security, ranging from 0.05 to 1 percent; levy of a charge of 0.02 percent of the contract price to the Construction Project Bidding and Tendering Office as administration fee; short bidding period (as little as 20 days); and selection of local construction supervision firms using the same procedures as for civil works contracts.

2. Special provisions in the Chinese public procurement regulations specify that Bank-financed procurement is exempt from the requirement to observe Chinese bidding regulations. In past Bank-financed projects in Shanghai, Bank procurement guidelines and procedures have been used satisfactorily without exception. The State Development & Reform Commission (SDRC) issued instructions in 2000 regarding bid invitation notification in designated national newspapers. Bid notices are also posted in the various ministry websites.

3. The Project Office (PO) has been designated as the main coordinating agency for APL1. Under APL1, the urban wastewater component is the largest component (about 67 percent). It would be implemented by the Shanghai Water and Environment Company (SWEC), on behalf of the Shanghai Municipal Sewerage Company (SMSC) under a contractual arrangement. The staff of SWEC, which has been drawn from SMSC, has considerable experience of World Bank procurement procedures through implementing Bank-financed projects over the past 15 years. SWEC has considerable experience in implementing international competitive bidding (ICB) and NCB procurement under three Bank-financed projects. All procurement and project management is handled by the Planning and Technology Unit of SWEC. SWEC has a solid core of professional staff, and has continuously engaged external consultants to assist in construction supervision and contract administration. SWEC would be directly responsible for procurement of the urban wastewater component under APL1 on behalf of SMSC. The latter would sign all procurement contracts, however, as it is the borrower of World Bank loan proceeds.

4. SWEC has the specific responsibility under APL1 to assist and advise "new" project management offices (PMOs) in procurement management. One training workshop has already been carried out for implementing agency staff. Further training would be carried out when procurement staff are recruited by the "new" project agencies. The other PMOs would recruit procurement agents to assist them in procurement management and contract administration.

5. Major actions agreed during the Procurement Capacity Assessment Report (a copy is in the Project File, see Annex 8) include: (a) individual PMOs would appoint experienced and adequately qualified staff dedicated for procurement activities; (b) all PMOs should select their ICB procurement

agents; and (c) SWEC will update its procurement manual for procurement staff in all PMOs.

6. Procurement procedures and arrangements satisfactory to the Bank, as reflected in Table A, were agreed upon with the Project Office (PO) and the implementing agencies. All procurement would be undertaken in accordance with the Bank Group's Procurement Guidelines, January 1995 and revised in January and August 1996 and January 1999, and "Selection and Employment of Consultants by World Bank Borrowers" dated January 1997 and revised in September 1997, January 1999 and May 2002. Chinese Model Bidding Documents and Bank Standard Bidding Documents would be used for procurement of goods and works.

7. **Civil Works.** The total of civil works is estimated at about $308.3 million, of which about $36.1 million (12 percent) would be procured using ICB procedures. ICB procedures would be used for all civil works contracts of estimated value over $10.0 million equivalent each. Civil works that are small, scattered or scheduled too far apart to be packaged into larger contracts, or would not attract the interest of foreign bidders, estimated to cost about $272.2 million (88 percent), would be awarded through NCB procedures, acceptable to the Bank. The NCB procedures to be used in Shanghai for Bank-financed procurement have been reviewed by the Bank recently, and were found to be satisfactory. They include: use of Model Bidding Documents agreed between the Bank and the Ministry of Finance; publication of bid invitations in national newspapers; provision of a minimum 30-day bidding period; use of post-qualification criteria as necessary; public bid opening; and allowance for interested foreign bidders to bid for NCB contracts. Restrictive practices applicable to procurement using on financing would be specifically excluded through provisions in the legal agreements. Domestic preference would not apply for works contracts.

8. **Goods.** The total of goods is estimated at about $52.4 million, of which about $51.0 million (97 percent) would be procured using ICB procedures. All goods contracts of estimated value more than $500,000 equivalent each, would be procured using ICB procedures. Goods estimated to cost less than $500,000 equivalent per contract, would be procured using NCB procedures acceptable to the Bank, up to an aggregate amount of $1.2 million (2 percent). In the evaluation of bids, a margin of preference would be granted for domestic manufactured goods.

9. **Technical Assistance and Training.** All consultants to be engaged under the project would be procured in accordance with the World Bank's "Guidelines for Selection and Employment of Consultants by World Bank Borrowers—January 1997," and revised in September 1997, January 1999 and April 2002 (Table A1 of this Annex). Contracts estimated to cost the equivalent of $200,000 or more would be procured using Quality and Cost-Based Selection (QCBS) procedures, seeking expressions of interest through notification in the *UN Development Business*. For contracts estimated to cost less than $200,000 equivalent, national consultants may be engaged using QCBS or Quality-Based Selection (QBS), Least Cost Selection (LCS) and Selection on Fixed Budget (SFB) procedures. For contracts estimated to cost less than $100,000 equivalent for firms or $50,000 equivalent for individuals, single-source selection may be used, with the prior agreement of the Bank. All consulting assignments will follow the Standard Request for Proposals dated July 1997, revised April 1998 and July 1999. The estimated value of technical assistance is $ 8.1 million base cost. Major consultant assignments include: Construction Management Services (UWW/6.2--QCBS); Corporatization of Solid Waste Services and Training for Enterprise Operations (USW/3.1--CQ); Upper Huangpu Catchment Management Study (IST/1.1--QCBS); Pollution Reduction Measures (IST/1.3--QBS); Support for Local Bonds Issue (IST/1.4--QCBS); Preparation of Policy and Operating Rule for DFV (IST/1.6--SFB); Executive Management Training (IST/1.7--SFB); Training and Study Tours (IST/1.9--SFB).

10. **Retroactive Financing.** Retroactive financing of up to $5.0 million would be applied to expenditures made after October 1, 2002 for civil works, goods and services. Procurement would be carried out in accordance with World Bank procurement guidelines, and at the risk of the proposed Borrower.

11. **Engineering and Management Costs.** Engineering and management overhead of implementing agencies, not financed under the project is estimated at $44.4 million equivalent.

Procurement Contract Packaging

12. The contract packaging for the project for works and goods is provided in Table D; for service contracts, Table E.

13. **Procurement Schedule for Civil Works and Goods.** This schedule is in the Project File (Annex 8).

Procurement methods (Table A)

Table A: Project Costs by Procurement Arrangements
(US$ million equivalent)

Expenditure Category	Procurement Method[1]				Total Cost
	ICB	NCB	Other[2]	N.B.F.	
1. Works	36.10	272.20	0.00	0.00	308.30
	(16.90)	(127.40)	(0.00)	(0.00)	(144.30)
2. Goods	51.00	1.40	0.00	0.00	52.40
	(41.80)	(1.20)	(0.00)	(0.00)	(43.00)
3. Services and Training	0.00	0.00	11.40	4.00	15.40
	(0.00)	(0.00)	(10.70)	(0.00)	(10.70)
4. Miscellaneous	0.00	0.00	0.00	117.70	117.70
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
5. Interest during construction	0.00	0.00	0.00	16.40	16.40
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
6. Front-end fee	0.00	0.00	2.00	0.00	2.00
	(0.00)	(0.00)	(2.00)	(0.00)	(2.00)
Total	87.10	273.60	13.40	138.10	512.20
	(58.70)	(128.60)	(12.70)	(0.00)	(200.00)

[1/] Figures in parentheses are the amounts to be financed by the Bank Loan. All costs include contingencies.

[2/] Includes consulting services, training, and technical assistance services.

Table A1: Consultant Selection Arrangements (optional)
(US$ million equivalent)

Consultant Services Expenditure Category	Selection Method							
	QCBS	QBS	SFB	LCS	CQ	Other	N.B.F.	Total Cost[1]
A. Firms	5.10	0.30	5.50	0.00	0.50	0.00	4.00	15.40
	(4.60)	(0.30)	(5.30)	(0.00)	(0.50)	(0.00)	(0.00)	(10.70)
B. Individuals	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Total	5.10	0.30	5.50	0.00	0.50	0.00	4.00	15.40
	(4.60)	(0.30)	(5.30)	(0.00)	(0.50)	(0.00)	(0.00)	(10.70)

1\ Including contingencies

Note: QCBS = Quality- and Cost-Based Selection
QBS = Quality-based Selection
SFB = Selection under a Fixed Budget
LCS = Least-Cost Selection
CQ = Selection Based on Consultants' Qualifications
Other = Selection of individual consultants (per Section V of Consultants Guidelines), Commercial Practices, etc.
N.B.F. = Not Bank-financed
Figures in parentheses are the amounts to be financed by the Bank Loan.

Prior review thresholds (Table B)

14. Prior review procedures would be used for: (a) civil works contracts estimated to cost the equivalent of $10.0 million or more per contract; (b) goods contracts estimated to cost the equivalent of $500,000 or more per contract; and (c) consultant services contracts estimated to cost the equivalent of $100,000 or more per contract for firms. In the case of consultant services, all terms of reference, regardless of their value, would be subject to prior review. In 2004, about 20 percent of the contracts not subject to prior review would be subject to ex-post review; the ex-post review levels would be reduced in subsequent years, depending on Shanghai's procurement performance.

Table B: Thresholds for Procurement Methods and Prior Review [1]

Expenditure Category	Contract Value Threshold ($ million)	Procurement Method	Contracts Subject to Prior Review ($ millions, base costs)
1. Works	More than $10.0 million	ICB	2 contracts, $31.3 million, subject to prior review
		NCB	79 contracts, $237.4 million, not subject to prior review
2. Goods	More than $0.5 million	ICB	19 contracts, $43.8 million) subject to prior review
	Between $0.5 and $0.05 million	NCB	7 contracts, $1.0 million, not subject to prior review
	Up to $0.05 million	National Shopping	Nil
3. Services	More than $0.10 million for firms	QCBS or QBS or CQ or SFB	$9.8 million subject to prior review
4. Miscellaneous			
5. Miscellaneous			
6. Miscellaneous			

Total value of contracts subject to prior review: $84.9 million (26%)

Overall Procurement Risk Assessment

Average

Frequency of procurement supervision missions proposed: One every six months (includes special procurement supervision for post-review/audits)

[1] Thresholds generally differ by country and project. Consult OD 11.04 "Review of Procurement Documentation" and contact the Regional Procurement Adviser for guidance.

Disbursement

Allocation of loan proceeds (Table C)

15. **Allocation of Loan Proceeds (Table C).** Allocation of loan proceeds is shown in Table C.

Table C: Allocation of Loan Proceeds

Expenditure Category	Amount in US$million	Financing Percentage
Civil Works	137.00	48%
Goods	40.90	100% foreign exchange, 100% local (ex-factory) and 75% local expenditures
Consultancy Services	6.70	91%
Training	3.40	100%
Unallocated	10.00	
Total Project Costs	198.00	
Interest during construction		
Front-end fee	2.00	100%
Total	200.00	

Use of statements of expenditures (SOEs):

16. Withdrawal from the loan account would be made on the basis of statements of expenditures (SOEs) for: (a) civil works contracts costing less than $10.0 million; (b) goods contracts costing less than $500,000; (c) training; (d) services provided by consulting firms for contracts costing less than $100,000; and (e) training.

Authorization, Allocation and Operation of Special Account:

17. To facilitate disbursements, a special account would be opened with an authorized allocation of $14 million, the estimated average expenditures for about a four-month period.

Table D: Contract Packaging and Procurement Method

(Note: Contract packages indicated below shall not be further subdivided or sliced without prior approval of the World Bank)

Contract Package #	Description of Item	Base Cost (Y million)	*Procurement Method*
Urban Wastewater Management			
Area A (Baoshan): Civil Works for Main Conveyor and Collecting System			
UWW 1.1	Advance works: Access road, relocation of services, etc.		NCB
UWW 1.2	Advance works: Power supply		NCB
UWW 1.3	Advance works: Water supply		NCB
UWW 1.4A	Wenshui Rd WW main conveyor inlet pipe to PS		NCB
UWW 1.4B	Wenshui Rd WW main conveyor outlet pipe from PS		NCB
UWW 1.5	Jiangyang Rd drainage trunk, Jiangyang and Wenshui PSs		ICB
UWW 1.6	WW & SW trunk conveyor & SW PS in Linfen Garden area		NCB
UWW 1.7A	WW & SW trunk conveyor (A) & SW PS in Wusong Ind. Area		NCB
UWW 1.7B	WW & SW trunk conveyor (B)in Wusong Ind. Area		NCB
UWW 1.7C	WW & SW trunk conveyor (C)in Wusong Ind. Area		NCB
UWW 1.8A	WW & SW trunk conveyor (A) & SW PS in Songnan area		ICB
UWW 1.8B	WW & SW trunk conveyor (B) in Songnan area		ICB
UWW 1.9A	WW & SW trunk conveyor (A), WW & SW PSs in Minzhu area		NCB
UWW 1.9B	WW & SW trunk conveyor (B) in Minzhu area		NCB
UWW 1.10	WW & SW trunk conveyor & SW PS in Zhangmiao area		NCB
UWW 1.11	WW & SW trunk conveyor & SW PS in Dachang area		NCB
UWW 1.12A	WW & SW trunk conveyor (A) & SW PS in Zhengnan-Dachang area (Zhengnanbei system)		NCB
UWW 1.12B	WW & SW trunk conveyor (B) & SW PS in Zhengnan-Dachang area		NCB
UWW 1.13	WW collector in Miaohang, Gongkang, Nanda areas		NCB
UWW 1.14	WW & SW trunk conveyor in Qilian area (Qilian Xincun system)		NCB
UWW 1.15A	WW & SW trunk conveyor (A) in Qilian area (Jinqiu Jiazhou system)		NCB
UWW 1.15B	WW & SW trunk conveyor (B) in Qilian area (Jinqiu Jiazhou system)		NCB
UWW 1.16	WW & SW trunk conveyor & SW PS in Qilian area (Shanghai Univ. system)		NCB
UWW 1.17	WW collector in Qilian area (Xinkaihe & Qianxi system)		NCB
UWW 1.18	Rehabilitation of pipes		NCB
	Subtotal civil works	***808.8***	
Area A (Baoshan): Equipment for Main Conveyor and Collecting System			
UWW 10.1	Pumps, screen and control equipment for 3 WW PSs at Wenshui Rd., Jiangyang Rd. (Zhangmiao) & Minzhu		ICB
UWW 10.2	Pumps, screen and control equipment for 5 SW PSs at Minzhu, Zhangmiao, Songnan, Jiangyang & Linfen areas.		ICB
UWW 10.3	Pumps, screen and control equipment for 5 SW PSs at Jinqiu Jiazhou, Shanghai Univ, Zhengda, Zhengnanbei & Dachang areas		ICB
UWW 10.4	Equipment for pump stations in Area A		ICB
	Subtotal equipment	***105.3***	
	Subtotal Area A	**914.1**	

Contract Package #	Description of Item	Base Cost (Y million)	*Procurement Method*
Urban Wastewater Management			
Area B (Yangpu and Hongkou): Civil Works for Main Conveyor and Collecting System			
UWW 2.1	Advance works: Access road, relocation of services, etc.		NCB
UWW 2.2	Advance works: Power supply		NCB
UWW 2.3	Advance works: Water supply		NCB
UWW 2.4	Puxi WW main conveyor at Zhengben & Guoshun Rds.		NCB
UWW 2.5	Puxi WW main conveyor at Jungong & Qiangyin Rds, etc.		NCB
UWW 2.6	Siphon under Huangpu river		NCB
UWW 2.7	Pudong WW main conveyor at Zhouhai &Puxing Rds.		NCB
UWW 2.8	Pudong WW main conveyor at Hangjin &Puxing Rds.		NCB
UWW 2.9	Civil works of lifting PS		NCB
UWW 2.10	WW interceptors (A) & facilities for 3 WW PSs		NCB
UWW 2.11	WW interceptors (B) & WW PS at Jiamusi Rd		NCB
	Subtotal civil works	***433.5***	
Area B (Yangpu and Hongkou): Equipment for Main Conveyor and Collecting System			
UWW 20.1	Equipment for lifting PS		ICB
UWW 20.2	Equipment for PSs of collecting systems in Area B		ICB
	Subtotal equipment	***43.0***	
	Subtotal Area B	***476.5***	

Contract Package #	Description of Item	Base Cost (Y million)	*Procurement Method*
Urban Wastewater Management			
Area C (Pudong): Civil Works for Area B Main Conveyor and Collecting System			
UWW 3.1	Advance works: Access road, relocation of services, etc		NCB
UWW 3.2	Advance works: Power supply		NCB
UWW 3.3	Advance works: Water supply		NCB
UWW 3.4	WW trunk collector at Wuzhou Dadao, Huandongyi Dadao & P1 WW PS		NCB
UWW 3.5	WW trunk collector in Huadong Rd and P2' and P2 WW PSs		NCB
UWW 3.6	WW trunk collector at Tanglong, Huaxia Rds. etc. & P3, P3', P4 & P11 WW PSs		NCB
	Subtotal civil works	***140.1***	
Area C (Pudong): Equipment for Main Conveyor and Collecting System			
UWW 30.1	Equipment for PSs of Pudong collecting system in Area C		ICB
	Subtotal equipment	***12.4***	
	Subtotal Area C	***152.5***	

Contract Package #	Description of Item	Base Cost (Y million)	*Procurement Method*
Urban Wastewater Management			
Civil Works for Zhuyuan Wastewater Treatment Plant			
UWW 4.1	Advance works: Access road, relocation of services, etc		NCB
UWW 4.2	Advance works: Power supply		NCB
UWW 4.3	Advance works: Water supply		NCB
UWW 4.4	A/O bio reactor & parallel settling tanks		ICB
UWW 4.5	Pretreatment screens, grit removal tanks, inlet PS, etc.		ICB
UWW 4.6	Sludge disposal structure, sludge storage tanks, outlet PS, etc.		NCB
UWW 4.7	Auxiliary structures, SW & WW PS and pipes, roads, landscaping within plant, etc.		NCB
UWW 4.8	Outfall (4200 dia – 1300 m)		NCB
	Subtotal civil works	***372.9***	
Laboratory and Control Equipment			
UWW 40.1	Monitoring system and central control system		ICB
UWW 40.2	Laboratory equipment, repair workshop & transport facilities		ICB
	Subtotal equipment	***20.9***	
	Subtotal Zhuyuan Wastewater treatment plant	**393.8**	
Other			
	Land acquisition for WWTP and conveyor		NBF
	Resettlement for WWTP		NBF
	Resettlement for conveyor		NBF
	Subtotal	***305.3***	
Engineering Services			
UWW 6.1	Development of joint sludge/residual management plan (jointly with SCAESAB)		QCBS
UWW 6.2	Construction management services		QCBS
UWW 6.3	Financial Strengthening & Tariff Policy Study		NBF
	Subtotal	***23.3***	
Total Base Cost: Urban Wastewater Component		***2265.5m*** ***$272.9 m***	

Contract Package #	Description of Item	Base Cost (Y million)	*Procurement Method*
Urban Solid Waste Management			
Civil Works			
USW 1.1	Landfill earthworks, dams ad roads		NCB
USW 1.2	Sealing vertical sides of landfill		NCB
USW 1.3	Landfill leachate collection Cell I		NCB
USW 1.4	Landfill leachate collection Cell II		NCB
USW 1.5	Gas collection and flaring		NCB
USW 1.6	Wharf reconstruction and rehabilitation		NCB
USW 1.7	Pump station and leachate pipeline to Bailonggang		NCB
USW 1.8	Earthworks for open channel to sea		NCB
USW 1.9	Eastern bank drainage ditch		NCB
USW 1.10	Western bank drainage ditch		NCB
USW 1.11	North-south cell separation ditches		NCB
USW 1.12	Leachate treatment works		NCB
USW 1.13	Garage (for food waste trucks), buildings and equipment		NCB
USW 1.14	Pilot bio-reactor		NCB
USW 1.15	Protective forest barrier		NCB
	Subtotal civil works	***225.8***	
Materials and equipment			
USW 2.1	Central monitoring equipment		NCB
USW 2.2	Transport vehicles (30 – 8 ton)		ICB
USW 2.3	Landfill operating equipment		ICB
USW 2.4	Cleaning equipment		NCB
USW 2.5	Tools, laboratory and office equipment		NCB
USW 2.6	IT equipment for MIS, including training		ICB
USW 2.7	Substation and distribution facilities		ICB
USW 2.8	Food waste vehicles (10 No.)		ICB
USW 2.9	Supply and Install Liner I		ICB
USW 2.10	Supply and Install Liner II		ICB
	Subtotal Materials and Equipment	**131.6**	
Other- (Land and Resettlement)			
	Land compensation charges		NBF
	Subtotal -Other	***148.5***	
Technical assistance			
USW 3.1	Corporatization of solid wastes services, and training for enterprise operations		CQ/LC
USW 3.2	Pilot food waste treatment program		CQ/LC
USW 3.3	Tariff regimes and market-based instruments and DRA for APL II		NBF
USW 3.4	Construction supervision services		NBF
	Subtotal services	***15.4***	
Total Base Cost: Urban Solid Waste Management		***521.3 m*** ***$62.8 m***	

Contract Package #	Description of Item	Base Cost (Y million)	*Procurement Method*
Urban Planning and Pilot Upgrading			
Civil Works			
	Pilot infrastructure upgrading in Hongkou District, including several infrastructure service contracts		
UIU 1.1	Package I: Off –site infrastructure (about 3 to 4 contracts)		NCB
UIU 1.2	Package II: On-site infrastructure		NCB
UIU 1.3	Package III: Areas A and B		NCB
UIU 1.4	Package IV: Area C		NCB
	Subtotal civil works	***97.6***	
Other- (Land and Resettlement)			
	Compensation for land		NBF
	Temporary resettlement		NBF
	Subtotal- Other	***5.4***	
Total Base Cost:	***Urban Planning and Pilot Upgrading***	***103.0m*** ***$12.4m***	

Contract Package #	Description of Item	Base Cost (Y million)	*Procurement Method*
Upper Huangpu Catchment Environmental Management			
Jinshan District: Fengjing Wastewater Project			
Civil Works			
JDF 1.1	Wastewater treatment plant structures and administration buildings		NCB
JDF 1.2	Collection and conveyance pipelines and pump station		NCB
JDF 1.3	Tertiary and link sewers		NCB
	Subtotal civil works	***40.1***	
Materials and Equipment			
JDF 2.1	WWTP electrical and mechanical equipment		ICB
	Subtotal materials and equipment	***14.0***	
Other (Land and Resettlement)			
	Land acquisition and resettlement		NBF
	Subtotal - Other	***26.4***	
Engineering Services			
	Services for detailed designs		NBF
	Services for construction supervision		NBF
	Subtotal Engineering Services	***2.4***	
	Subtotal Jinshan Fengjing wastewater component	***82.9*** ***$10.0m***	

Contract Package #	Description of Item	Base Cost (Y million)	*Procurement Method*
Jinshan District: Jinshan Wastewater (Sea Outfall) Project			
Civil Works			
JDX 1.1	Wastewater treatment plant structures and administration buildings		NCB
JDX 1.2	Shanyang trunk sewer, including rehabilitation of PSs		NCB
JDX 1.3	Shanyang north trunk sewer		NCB
JDX 1.4	Tertiary and link sewers		NCB
JDX 1.5	Extension of sea outfall		NCB
	Subtotal civil works	***80.2***	
Materials and Equipment			
JDX 2.1	Electrical and mechanical equipment for WWTP and PSs		ICB
JDX 2.2	Control equipment		NCB
JDX 2.3	Laboratory equipment		NCB
JDX 2.4	Maintenance equipment and vehicles		NCB
	Subtotal materials and equipment	***26.9***	
Other (Land and Resettlement)			
	Land acquisition and resettlement		NBF
	Subtotal - Other	***9.0***	
Engineering Services			
	Services for detailed designs		NBF
	Services for construction supervision		NBF
	Subtotal Engineering Services	***3.2***	
	Subtotal Jinshan Xinjiang (Sea Outfall) Project	***119.3m*** ***$14.4 m***	

Contract Package #	Description of Item	Base Cost (Y million)	*Procurement Method*
Fengxian District Wastewater Project			
Civil Works			
FDN 1.1	Wastewater treatment plant structures and administration buildings		NCB
FDN 1.2	Auxiliary buildings, workshop, roads, etc.		NCB
FDN 1.3	Greening barrier		NCB
FDN 1.4	Collection and conveyance pipelines and pump station		NCB
	Subtotal civil works	***30.9***	
Materials and Equipment			
FDN 2.1	Electrical and mechanical equipment		ICB
FDN 2.2	Tools and miscellaneous equipment		NCB
	Subtotal materials and equipment	***17.3***	
Other (Land and resettlement, power, etc.)			
	Land acquisition and resettlement		NBF
	Power supply		NBF
	Subtotal - Other	***47.0***	
Engineering Services			
	Services for detailed designs		NBF
	Services for construction supervision		NBF
	Subtotal Engineering Services	***2.6***	
	Subtotal Fengxian District Wastewater Project	***97.8m***	
		$11.8	
Total Base Cost: Upper Huangpu Catchment Environmental Management		**300.0m**	
		$36.2 m	

TABLE E: Contract Packaging and Procurement Method

Institutional Strengthening and Training

TA Ref.	Title	Agency/ (Proc. Method)	Junior Person-months/a	Senior Person-months/a	Training Y million	Base Cost Y million ($ million)
IST 1.1	Upper Huangpu Catchment Management Plan	SWA (QCBS)	125	30	1.0	
IST 1.2	Study Tour & Training for PSP Procurement Procedures	SWA/ SCAESAB (CQ)	15	2	0.3	
IST 1.3	Pollution Reduction Measures	SWA (QBS)	25	5	0.5	
IST 1.4	Support for Local Bond Issue	SWAOD (QCBS)	150	30	1.5	
IST 1.5	Training for Bond Issues	SWAOD (NBF)			4.2	
IST 1.6	Preparation of Policy & Operating Rules for DFV	UDIC (SFB)	55	10	1.0	
IST 1.7	Executive Management Training	SPC (SFB)			20.0	
IST 1.8	Other Special Studies	SPC (SFB)	60	15	1.0	
IST 1.9	Training and Study Tours	SPC (SFB)			5.0	
IST 1.10	District WWTO Operational Staff Training	SWA (SFB)			0.5	
IST 1.11	Heritage Strategy Support	SFB (SFB)				
Total : All Contract Packages						**64.9 (7.9)**

/a Person-month budgets include personnel and systems development and equipment.

Annex 7: Project Processing Schedule
CHINA: Shanghai Urban Environment Project

Project Schedule	Planned	Actual
Time taken to prepare the project (months)	21	21
First Bank mission (identification)	07/01/2001	07/15/2001
Appraisal mission departure	03/20/2002	03/25/2002
Negotiations	04/29/2002	04/14/2003
Planned Date of Effectiveness	01/01/2004	

Prepared by:
Shanghai Municipal Government through the Shanghai Development Planning Commission, the Shanghai Construction Commission, the Shanghai Finance Bureau and the Shanghai Water Authority. The Project Office (PO) operates under the direction of the Shanghai Municipal Government Leading Group. Financial policies and initiatives were managed in coordination with the Shanghai Finance Bureau. Environmental matters and related policy work was under the direction of the Shanghai Water Authority and Shanghai Environmental Protection Bureau.

Preparation assistance:
Formulation of the project Development Strategy and the development framework assisted by national consultants, financed mainly by Shanghai. PHRD funds, provided by the Government of Japan; trust funds from Canada and Denmark; and loan funds from the ongoing Second Shanghai Sewerage Project (3978-CHA) were also utilized.

Bank staff who worked on the project ncluded:

Name	Speciality
Mats Andersson	Finance and Institutional Analysis, Co-Task Manager
Chandra Godavitarne	Municipal Engineering
David Hanrahan	Project Economics
Meredith Dearborn	Document Production
Vellet Fernandes	Program Assistant
Tony Shen	Financial Management
Dong Yi	Financial Management
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Keiko Sato	Institutional Analysis
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Zhentu Liu	Procurement
George Taylor	Water Quality & Wastewater Treatment Strategies
Chaogang Wang	Resettlement
Chaohua Zhang	Resettlement
Jeffrey Lecksell	Cartography
Geoffrey Read	Task Manager

Annex 8: Documents in the Project File*
CHINA: Shanghai Urban Environment Project

A. Project Implementation Plan

1. See Item 27 below, supplemented by Items

B. Bank Staff Assessments

1. "Environmental Assessment for Shanghai Urban Environment Project - Final", May 2002
2. "Promoting Sustainable Urban Transition (CAS)", EASUR, February 2002
3. "Procurement Capacity Assessment Report", Final, April 2002
4. Aide Memoire Nos. 1, 2 & 3, prepared during missions 2001 & 2002
5. China Country Assistance Strategy 2003-2005, January 2003

C. Other

1. Shanghai Environmental Master Plan "Action Plan" Report, Kinhill – Rust PPK Joint Venture and Shanghai Academy of Environmental Sciences, April 1995
2. Shanghai Environmental Master Plan "Final Report", Kinhill-PPK Joint Venture and Shanghai Academy of Environmental Sciences
3. "Resettlement Action Plan for Shanghai Lao Gang Sanitary Landfill Project (Phase IV)" Shanghai Bohong Project Construction Company Ltd., January 2002
4. "Resettlement Action Plan for Shanghai Sewerage Project Phase III-Option I", Shanghai Water Environment Construction Co. Ltd., January 2002
5. "Resettlement Action Plan for Shanghai Sewerage Project Phase III-Option II", Shanghai Water Environment Construction Co. Ltd., January 2002
6. "Final Report for Yangtze Urban Water Resource Sector Strategy Study – Modeling of Yangtze River & Outfall Discharge Impacts, Volume I", DHI Water & Environment, June 2001
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10. "Inflation Projection and Exchange Rates in China", Xiaofan Liu, December 2001
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19. "Water Quality Management Planning Report for Suzhou Creek--Interim Report", Delft

Hydraulics/AEA Technology, October 1997
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21. "Resettlement Action Plan of Shanghai Sewage Treatment Project (Phase Two) for Collecting Wastewater in Pudong (1st Version)", Shanghai Urban Drainage Company Ltd., December 2000
22. "Environmental Impact Assessment for Shanghai Laogang Municipal Solid Waste Sanitary Landfill Stage-4 Project", Shanghai Academy of Environmental Science, January 2002
23. "Environmental Impact Assessment for Shanghai Sewerage Project Phase III", Shanghai Water & Environment Construction Co. Ltd., January 2002
23. Shanghai Atlas of Graphical Image Maps (Urban Areas), September 2001
24. "Draft Final Report on Urban Poverty in PRC, TAR: PRC 33448"
25. "Millennium Developmnet Goals (MDGs)", February 2002
26. *Regional Operations Committee Review (ROC) Package, February 2002
27. Project Implementation Plan. SWEC. Final May 2002. Updated April 2003
28. Financial Projections of:
    (a) Shanghai Municipal Sewerage Company
    (b) Jinshan Ocean Outfall Engineering General Company Limited
    (c) Fengjing Water Purification Company Limited
29. Feasibility Study of Shanghai Sewerage Project (Phase III) Supplementary Report. SMEDRI, SUCDRI Shanghai, October 2002
30. Supplement to Environmental Assessment for Shanghai Urban Environment Project--EA Adjustment. Shanghai Academy of Environmental Sciences, April 2003
31. Environmental Impact Assessment Report--Liyang Road--Hongkou District, Tongji Research Institute, December 2002
32. Resettlement Action Plan--Liyang Road--Hongkou District, Shanghai Zongfang Real Estate Exchange Company, December 2002
33. Financial Management System (FMS) Manual, April 2003
34. Project Feasibility Studies--Multiple Volumes--Binnie Black & Veatch (BBV), October 2001 through March 2002
35. Project Review Studies, Shanghai International Consulting Company (SICC), October 2001 throgh March 2002
36. Draft Terms of Reference for principal institutional strengthening assignments, April 2003
37. Urban Planning and Pilot Upgrading--Concept Studies, Chreod, March 2002.
*Including electronic files

Annex 9: Statement of Loans and Credits

CHINA: Shanghai Urban Environment Project

16-Apr-2003

Project ID	FY	Purpose	Original Amount in US$ Millions					Difference between expected and actual disbursements*	
			IBRD	IDA	GEF	Cancel.	Undisb.	Orig	Frm Rev'd
P068058	2003	CN-Yixing Pumped Storage Project	145.00	0.00	0.00	0.00	145.00	0.00	0.00
P070441	2003	CN-Hubei Xiaogan Xiangfan Hwy	250.00	0.00	0.00	0.00	247.50	22.83	0.00
P058847	2003	CN-3rd Xinjiang Hwy Project	150.00	0.00	0.00	0.00	141.50	6.50	0.00
P060029	2002	Sustainable Forestry Dev(Natural Forest)	0.00	0.00	16.00	0.00	16.57	0.30	0.00
P064729	2002	SUSTAINABLE FORESTRY DEVELOPMENT PRO	93.90	0.00	0.00	0.00	88.46	-2.30	0.00
P058846	2002	CN-Natl Railway Project	160.00	0.00	0.00	0.00	65.33	-7.17	0.00
P070459	2002	CN-Inner Mongolia Hwy Project	100.00	0.00	0.00	0.00	95.50	0.50	0.00
P068049	2002	CN-Hubei Hydropower Dev in Poor Areas	105.00	0.00	0.00	0.00	105.00	8.50	0.00
P071147	2002	CN-Tuberculosis Control Project	104.00	0.00	0.00	0.00	95.33	-8.67	0.00
P058845	2001	Jiangxi II Hwy	200.00	0.00	0.00	0.00	161.23	-1.77	0.00
P051859	2001	CN-LIAO RIVER BASIN	100.00	0.00	0.00	0.00	83.15	14.23	0.00
P056199	2001	CN-3rd Inland Waterways	100.00	0.00	0.00	0.00	93.34	2.84	0.00
P045915	2001	CN-Urumqi Urban Transport	100.00	0.00	0.00	0.00	65.26	31.16	0.00
P056596	2001	CN-Shijiazhuang Urban Transport	100.00	0.00	0.00	0.00	92.28	41.68	0.00
P056516	2001	WATER CONSERVATION	74.00	0.00	0.00	0.00	50.59	3.14	0.00
P047345	2001	CN-HUAI RIVER POLLUTION CONTROL	105.50	0.00	0.00	0.00	98.31	-7.19	0.00
P056424	2000	TONGBAI PUMPED STORA	320.00	0.00	0.00	0.00	301.06	75.46	0.00
P049436	2000	CN-CHONGQING URBAN ENVMT	200.00	0.00	0.00	0.00	179.86	37.26	0.00
P042109	2000	CN-BEIJING ENVIRONMENT II	349.00	0.00	25.00	0.00	312.22	142.08	0.00
P045264	2000	SMALLHLDR CATTLE DEV	93.50	0.00	0.00	0.00	32.43	17.48	0.00
P045910	2000	CN-HEBEI URBAN ENVIRONMENT	150.00	0.00	0.00	0.00	135.81	36.56	0.00
P058844	2000	3rd Henan Prov Hwy	150.00	0.00	0.00	0.00	105.29	32.29	0.00
P064730	2000	Yangtze Dike Strengthening Project	210.00	0.00	0.00	0.00	140.48	79.48	0.00
P058843	2000	Guangxi Highway	200.00	0.00	0.00	0.00	137.17	44.67	0.00
P064924	2000	CH-GEF-BEIJING ENVMT II	0.00	0.00	25.00	0.00	24.19	13.76	0.00
P042299	1999	TEC COOP CREDIT IV	10.00	35.00	0.00	0.00	37.39	-7.35	0.00
P041890	1999	CN-Liaoning Urban Transport	150.00	0.00	0.00	0.00	56.61	45.41	0.00
P036953	1999	CN-HEALTH IX	10.00	50.00	0.00	0.00	40.86	16.62	0.00
P038121	1999	CN-GEF-RENEWABLE ENERGY DEVELOPMENT	0.00	0.00	35.00	0.00	26.93	19.72	2.46
P043933	1999	CN-SICHUAN URBAN ENVMT	150.00	2.00	0.00	0.00	97.50	55.12	12.17
P046829	1999	RENEWABLE ENERGY DEVELOPMENT	100.00	0.00	0.00	0.00	12.87	99.87	0.00
P041268	1999	CN-Nat Hwy4/Hubei-Hunan	350.00	0.00	0.00	0.00	107.40	39.65	0.00
P046564	1999	Gansu & Inner Mongolia Poverty Reduction	60.00	100.00	0.00	0.00	79.01	35.76	-8.01
P046051	1999	CN-HIGHER EDUC. REFORM	20.00	50.00	0.00	0.00	27.96	27.70	0.00
P049665	1999	ANNING VALLEY AG.DEV	90.00	30.00	0.00	0.00	34.04	7.65	0.00
P003653	1999	CN-Container Transport	71.00	0.00	0.00	18.61	3.89	22.35	0.00
P051856	1999	ACCOUNTING REFORM & DEVELOPMENT	27.40	5.60	0.00	0.00	20.83	20.53	0.00
P060270	1999	CN-ENTERPRISE REFORM LN	0.00	5.00	0.00	0.00	2.75	4.44	2.93
P051888	1999	GUANZHONG IRRIGATION	80.00	20.00	0.00	0.00	54.25	32.55	0.00
P051705	1999	Fujian II Highway	200.00	0.00	0.00	0.00	94.56	77.06	0.00
P050036	1999	Anhui Provincial Hwy	200.00	0.00	0.00	0.00	70.08	28.58	0.00
P056216	1999	LOESS PLATEAU II	100.00	50.00	0.00	0.00	60.60	48.82	0.00
P058308	1999	CN-PENSION REFORM PJT	0.00	5.00	0.00	0.00	1.89	2.04	0.00
P057352	1999	CN-RURAL WATER IV	16.00	30.00	0.00	0.00	27.99	15.95	1.08
P037859	1998	CN-GEF Energy Conservation	0.00	0.00	22.00	0.00	4.11	21.97	0.00
P049700	1998	IAIL-2	300.00	0.00	0.00	0.00	16.67	6.59	0.00
P046952	1998	FOREST. DEV. POOR AR	100.00	100.00	0.00	0.00	54.11	-52.96	9.39
P040185	1998	CN-SHANDONG ENVIRONMENT	95.00	0.00	0.00	1.40	28.29	25.29	0.00
P051736	1998	E. CHINA/JIANGSU PWR	250.00	0.00	0.00	86.00	62.95	148.95	4.36
P046563	1998	TARIM BASIN II	90.00	60.00	0.00	2.67	45.26	39.17	0.00
P003619	1998	CN-2nd Inland Waterways	123.00	0.00	0.00	0.00	69.06	61.06	0.00
P035698	1998	HUNAN POWER DEVELOP.	300.00	0.00	0.00	145.00	84.76	211.76	9.16
P003614	1998	CN-Guangzhou City Transport	200.00	0.00	0.00	0.00	129.54	128.46	0.00

Project ID	FY	Purpose	Original Amount in US$ Millions					Difference between expected and actual disbursements*	
			IBRD	IDA	GEF	Cancel.	Undisb.	Orig	Frm Rev'd
P003566	1998	CN-BASIC HEALTH (HLTH8)	0.00	85.00	0.00	0.00	36.28	21.88	0.00
P003606	1998	ENERGY CONSERVATION	63.00	0.00	22.00	0.00	42.34	15.01	0.00
P003539	1998	SUSTAINABLE COASTAL RESOURCES DEV.	100.00	0.00	0.00	2.31	50.84	40.65	4.27
P045788	1998	Tri-Provincial Hwy	230.00	0.00	0.00	0.00	48.00	29.20	0.00
P036949	1998	CN-Nat Hwy3-Hubei	250.00	0.00	0.00	0.00	33.00	10.50	0.00
P036414	1998	CN-GUANGXI URBAN ENVMT	72.00	20.00	0.00	0.00	76.87	58.92	8.47
P003590	1997	QINBA MOUNTAINS POVERTY REDUCTION	30.00	150.00	0.00	0.00	47.61	51.05	0.00
P003643	1997	CN-2nd Xinjiang Hwy	300.00	0.00	0.00	60.00	9.78	69.78	9.78
P003637	1997	CN-NAT'L RURAL WATER 3	0.00	70.00	0.00	0.00	3.84	6.43	6.26
P044485	1997	SHANGHAI WAIGAOQIAO	400.00	0.00	0.00	0.00	122.29	79.59	19.34
P036405	1997	WANJIAZHAI WATER TRA	400.00	0.00	0.00	75.00	49.86	124.86	24.86
P035693	1997	FUEL EFFICIENT IND.	0.00	0.00	32.80	0.00	8.79	32.81	0.00
P038988	1997	HEILONGJIANG ADP	120.00	0.00	0.00	0.00	13.08	13.08	0.00
P034081	1997	XIAOLANGDI MULTI. II	430.00	0.00	0.00	78.53	0.28	118.73	7.88
P003654	1997	Nat Hwy2/Hunan-Guangdong	400.00	0.00	0.00	0.00	71.59	71.59	0.00
P003650	1997	TUOKETUO POWER/INNER	400.00	0.00	0.00	102.50	41.31	129.86	-3.43
P003599	1996	CN-YUNNAN ENVMT	125.00	25.00	0.00	19.48	53.28	72.17	-4.56
P040513	1996	2nd Henan Prov Hwy	210.00	0.00	0.00	0.00	42.88	42.88	12.88
P003602	1996	CN-HUBEI URBAN ENVIRONMENT	125.00	25.00	0.00	28.32	44.54	74.90	7.90
P003649	1996	SHANXI POVERTY ALLEV	0.00	100.00	0.00	0.00	2.12	11.40	0.00
P003648	1996	CN-SHANGHAI SEWERAGE II	250.00	0.00	0.00	0.00	60.16	60.16	-0.70
P034618	1996	CN-LABOR MARKET DEV.	10.00	20.00	0.00	0.00	5.54	7.77	0.00
P003646	1996	CN-CHONGQING IND POL CT	170.00	0.00	0.00	164.82	1.31	166.13	1.31
P003589	1996	CN-DISEASE PREVENTION (HLTH7)	0.00	100.00	0.00	0.00	13.07	22.68	0.00
P003594	1996	GANSU HEXI CORRIDOR	60.00	90.00	0.00	0.00	78.39	57.14	0.00
P003638	1996	SEEDS SECTOR COMMER.	80.00	20.00	0.00	16.00	5.20	22.25	-0.57
P003571	1995	CN-7th Railways	400.00	0.00	0.00	119.00	50.25	169.25	40.28
P003585	1995	SHENYANG IND. REFORM	175.00	0.00	0.00	0.00	33.02	33.02	0.00
P036947	1995	CN-Sichuan Power Transmission Project	270.00	0.00	0.00	95.00	11.79	106.79	6.59
P003647	1995	China Economic Law Reform -LEGEA	0.00	10.00	0.00	0.00	3.40	3.92	0.00
P003642	1995	CN-ZHEJIANG POWER DEVT	400.00	0.00	0.00	0.00	34.79	40.29	0.00
P003598	1995	CN-LIAONING ENVIRONMENT	110.00	0.00	0.00	8.50	0.30	8.80	8.80
P003603	1995	CN-ENT HOUSING & SSR	275.00	75.00	0.00	50.36	59.67	108.34	7.31
P003404	1994	SICHUAN GAS DEV. CON	0.00	0.00	10.00	0.00	0.02	0.78	0.00
P003644	1994	XIAOLANGDI RESETTLEMENT	0.00	110.00	0.00	0.00	0.04	-1.85	-1.95
P003626	1994	Fujian Prov Highway	140.00	0.00	0.00	18.11	6.65	24.76	24.74
P003609	1994	SICHUAN GAS DEV & CONSERVATION	255.00	0.00	10.00	37.67	9.11	46.78	0.00
P003595	1994	RED SOILS II AREA DEVELOPMENT PROJECT	0.00	150.00	0.00	0.00	4.95	0.10	-1.73
P003473	1993	CN-ZHEJIANG MULTICITIES DEVELOPMENT	0.00	110.00	0.00	0.00	0.14	0.30	-2.02
P003592	1993	REF. INST'L.& PREINV	0.00	50.00	0.00	0.00	2.07	2.48	2.48
		Total:	12902.30	1752.60	197.80	1129.27	5543.44	3721.53	211.72

CHINA
STATEMENT OF IFC's
Held and Disbursed Portfolio
Jun 30 - 2002
In Millions US Dollars

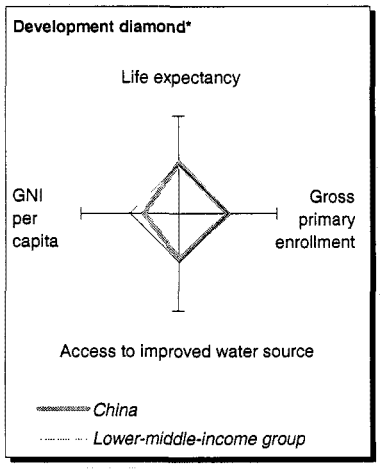
		Committed				Disbursed			
		IFC				IFC			
FY Approval	Company	Loan	Equity	Quasi	Partic	Loan	Equity	Quasi	Partic
1997	Orient Finance	9.52	0.00	0.00	11.90	9.52	0.00	0.00	11.90
1997/00	PTP Holdings	0.00	0.03	0.00	0.00	0.00	0.03	0.00	0.00
1997	PTP Hubei	11.72	0.00	0.00	23.29	11.72	0.00	0.00	23.29
1996	Pacific Ports	0.00	2.54	0.00	0.00	0.00	2.54	0.00	0.00
2001	Peak Pacific	0.00	0.00	25.00	0.00	0.00	0.00	0.00	0.00
1998	Rabobank SHFC	0.90	0.00	0.00	0.90	0.90	0.00	0.00	0.90
2000	SSIF	0.00	6.00	0.00	0.00	0.00	0.45	0.00	0.00
1998	Shanghai Krupp	30.00	0.00	0.00	68.80	19.74	0.00	0.00	45.26
1999	Shanxi	17.87	0.00	0.00	0.00	15.32	0.00	0.00	0.00
1993	Shenzhen PCCP	3.76	0.99	0.00	0.00	3.76	0.99	0.00	0.00
2001	Sino-Forest	25.00	0.00	0.00	0.00	20.00	0.00	0.00	0.00
1995	Suzhou PVC	0.00	2.48	0.00	0.00	0.00	2.48	0.00	0.00
1998	WIT	5.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00
2000	Wanjie Hospital	15.00	0.00	0.00	0.00	15.00	0.00	0.00	0.00
1996	Weihai Weidongri	1.92	0.00	0.00	0.00	1.92	0.00	0.00	0.00
1993	Yantai Cement	11.13	1.95	0.00	0.00	11.13	1.95	0.00	0.00
1998	Zhen Jing	0.00	2.00	0.00	0.00	0.00	2.00	0.00	0.00
2002	Advantage	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00
1999/00/02	Bank of Shanghai	0.00	24.67	0.00	0.00	0.00	24.67	0.00	0.00
1996	Beijing Hormel	2.50	0.50	0.00	1.65	2.50	0.50	0.00	1.65
1998/00	CIG Holdings PLC	0.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00
2002	CPEF	0.00	20.00	0.00	0.00	0.00	0.00	0.00	0.00
1996	Caltex Ocean	18.53	0.00	0.00	28.64	18.53	0.00	0.00	28.64
1998	Chengdu Huarong	7.40	3.20	0.00	8.60	3.70	3.20	0.00	4.30
1998	Chengxin-IBCA	0.00	0.36	0.00	0.00	0.00	0.36	0.00	0.00
1987/92/94	China Bicycles	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1994	China Walden Mgt	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00
1994	China Walden Ven	0.00	0.21	0.00	0.00	0.00	0.21	0.00	0.00
1994	Dalian Glass	0.00	2.40	0.00	0.00	0.00	2.40	0.00	0.00
1999	Dujiangyan	25.59	0.00	0.00	30.00	16.11	0.00	0.00	18.89
1995	Dupont Suzhou	12.46	4.15	0.00	10.40	12.46	4.15	0.00	10.40
1994	Dynamic Fund	0.00	9.75	0.00	0.00	0.00	8.09	0.00	0.00
1999	Hansom	0.00	16.10	0.00	0.00	0.00	16.10	0.00	0.00
2002	Huarong AMC	31.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2002	IEC	20.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1996	Jingyang	32.50	0.00	0.00	69.23	32.50	0.00	0.00	69.23
1998	Leshan Scana	6.10	1.35	0.00	0.00	4.50	1.35	0.00	0.00
2001	Maanshan Carbon	9.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
2002	NCCB	0.00	26.58	0.00	0.00	0.00	26.46	0.00	0.00
1996	Nanjing Kumho	6.82	3.81	0.00	19.38	6.82	3.81	0.00	19.38
2001	New China Life	0.00	30.70	0.00	0.00	0.00	23.32	0.00	0.00
1995	Newbridge Inv.	0.00	1.95	0.00	0.00	0.00	1.95	0.00	0.00
	Total Portfolio:	304.22	166.98	25.00	277.79	206.13	127.02	0.00	233.84

		Approvals Pending Commitment			
FY Approval	Company	Loan	Equity	Quasi	Partic
2002	Darong	10.00	0.00	1.50	8.00
2002	Narada Battery	6.60	0.00	0.00	0.00
2002	Zhong Chen	25.00	0.00	0.00	32.00
2002	ASIMCO	0.00	13.50	1.50	0.00
2002	Sino Mining	5.00	0.00	0.00	5.00
2002	Shuang Deng	12.50	0.00	2.80	0.00
2002	KHIT	0.00	0.00	3.00	0.00
2002	SML	0.00	0.00	6.00	0.00
1996	Jingyang	4.00	0.00	0.00	0.00
1998	PTP Hubei BLINC	0.00	0.00	0.00	1.50
2000	CIG Zhapu	6.00	5.00	0.00	0.00
2000	Meijing	9.00	0.00	0.00	7.30
2000	CIMIC Tile	15.00	5.00	0.00	15.00
2001	Daning Coal	0.00	0.00	2.00	15.00
2001	AACI	0.00	0.00	2.00	0.00
2001	Minsheng	0.00	23.50	0.00	0.00
2002	Huarong AMC	15.00	0.00	3.00	0.00
2002	IEC	0.00	5.00	0.00	0.00
	Total Pending Commitment:	108.10	52.00	21.80	83.80

Annex 10: Country at a Glance

CHINA: Shanghai Urban Environment Project

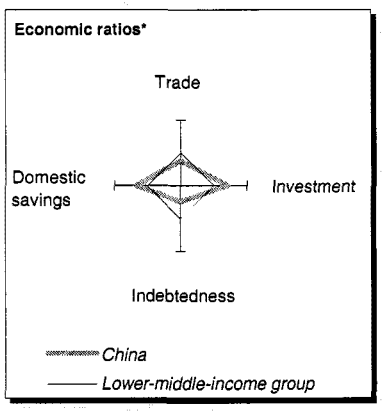
POVERTY and SOCIAL	China	East Asia & Pacific	Lower-middle-income
2001			
Population, mid-year *(millions)*	1,271.9	1,826	2,164
GNI per capita *(Atlas method, US$)*	890	900	1,240
GNI *(Atlas method, US$ billions)*	1,129.3	1,649	2,677
Average annual growth, 1995-01			
Population *(%)*	0.9	1.1	1.0
Labor force *(%)*	1.0	1.3	1.2
Most recent estimate (latest year available, 1995-01)			
Poverty *(% of population below national poverty line)*	5	..	..
Urban population *(% of total population)*	38	37	46
Life expectancy at birth *(years)*	71	69	69
Infant mortality *(per 1,000 live births)*	32	36	33
Child malnutrition *(% of children under 5)*	10	12	11
Access to an improved water source *(% of population)*	75	74	80
Illiteracy *(% of population age 15+)*	15	14	15
Gross primary enrollment *(% of school-age population)*	107	107	107
Male	106	106	107
Female	109	108	107



KEY ECONOMIC RATIOS and LONG-TERM TRENDS

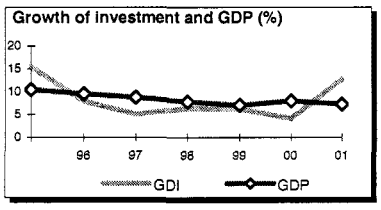
	1981	1991	2000	2001
GDP *(US$ billions)*	228.3	402.6	1,077.5	1,150.1
Gross domestic investment/GDP	32.5	34.8	36.1	37.9
Exports of goods and services/GDP	8.6	19.4	25.9	25.8
Gross domestic savings/GDP	32.9	38.1	38.8	40.3
Gross national savings/GDP	32.8	38.5	38.0	39.4
Current account balance/GDP	0.4	3.8	1.9	1.5
Interest payments/GDP	0.2	0.7	0.6	0.6
Total debt/GDP	2.5	15.0	13.9	14.8
Total debt service/exports	6.9	10.1	7.4	6.8
Present value of debt/GDP	..	..	12.5	11.7
Present value of debt/exports	..	..	46.0	43.5

	1981-91	1991-01	2000	2001	2001-05
(average annual growth)					
GDP	10.0	9.7	8.0	7.3	6.9
GDP per capita	8.4	8.6	7.1	6.6	6.1
Exports of goods and services	12.1	8.3	30.6	5.0	7.7

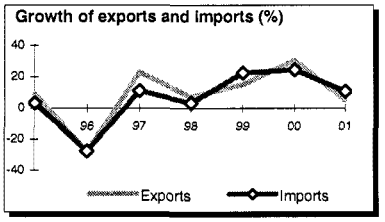


STRUCTURE of the ECONOMY

	1981	1991	2000	2001
(% of GDP)				
Agriculture	31.8	24.5	15.9	15.2
Industry	46.4	42.1	50.9	51.1
Manufacturing	38.5	32.7	34.5	35.4
Services	21.8	33.4	33.2	33.6
Private consumption	..	..	..	..
General government consumption	14.5	13.1	13.1	13.7
Imports of goods and services	8.2	16.1	23.2	23.4



	1981-91	1991-01	2000	2001
(average annual growth)				
Agriculture	5.2	4.0	2.4	2.8
Industry	11.4	12.6	9.6	8.7
Manufacturing	11.1	11.6	9.1	9.0
Services	12.6	8.7	7.8	7.4
Private consumption	8.3	8.6	8.7	6.2
General government consumption	9.9	8.5	12.2	11.5
Gross domestic investment	10.4	10.3	4.2	12.8
Imports of goods and services	9.6	6.4	24.5	10.8

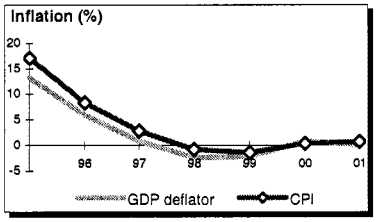


Note: 2001 data are preliminary estimates.

* The diamonds show four key indicators in the country (in bold) compared with its income-group average. If data are missing, the diamond will be incomplete.

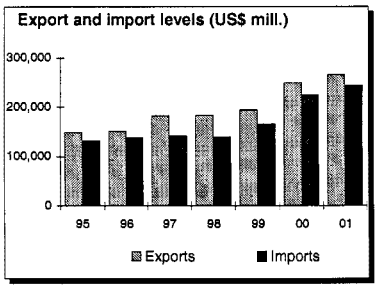
PRICES and GOVERNMENT FINANCE

	1981	1991	2000	2001
Domestic prices				
(% change)				
Consumer prices	25.7	3.4	0.4	0.7
Implicit GDP deflator	2.3	6.7	0.9	0.0
Government finance				
(% of GDP, includes current grants)				
Current revenue	24.2	16.9	15.3	17.2
Current budget balance	..	2.3	0.6	1.0
Overall surplus/deficit	0.8	-1.1	-3.6	-3.2



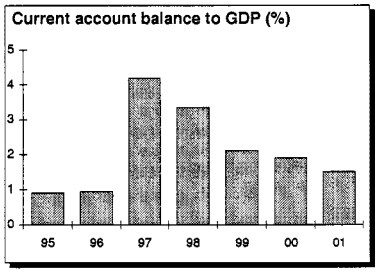
TRADE

	1981	1991	2000	2001
(US$ millions)				
Total exports (fob)	22,007	71,843	249,210	266,155
Food	2,924	7,226	12,282	12,780
Fuel	5,228	4,754	7,851	8,420
Manufactures	11,759	55,698	223,752	239,800
Total imports (cif)	22,015	63,791	225,097	243,610
Food	3,622	2,799	4,758	4,980
Fuel and energy	83	2,113	20,637	17,490
Capital goods	5,866	19,601	91,934	107,040
Export price index *(1995=100)*	16	51	67	65
Import price index *(1995=100)*	13	49	75	73
Terms of trade *(1995=100)*	118	103	90	90



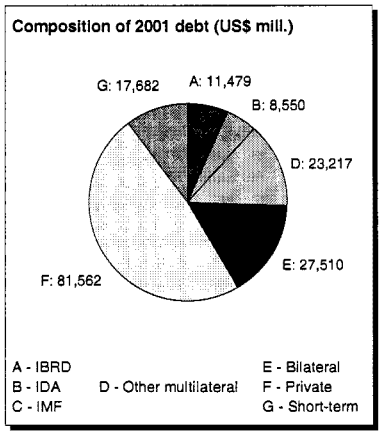
BALANCE of PAYMENTS

	1981	1991	2000	2001
(US$ millions)				
Exports of goods and services	24,410	78,909	279,561	299,410
Imports of goods and services	23,426	65,339	250,688	271,324
Resource balance	984	13,570	28,873	28,086
Net income	-124	840	-14,666	-19,173
Net current transfers	..	830	6,311	8,492
Current account balance	860	15,240	20,519	17,405
Financing items (net)	..	-4,149	-9,971	29,920
Changes in net reserves	..	-11,091	-10,548	-47,325
Memo:				
Reserves including gold *(US$ millions)*	..	48,154	171,753	219,970
Conversion rate *(DEC, local/US$)*	2.1	5.4	8.3	8.3

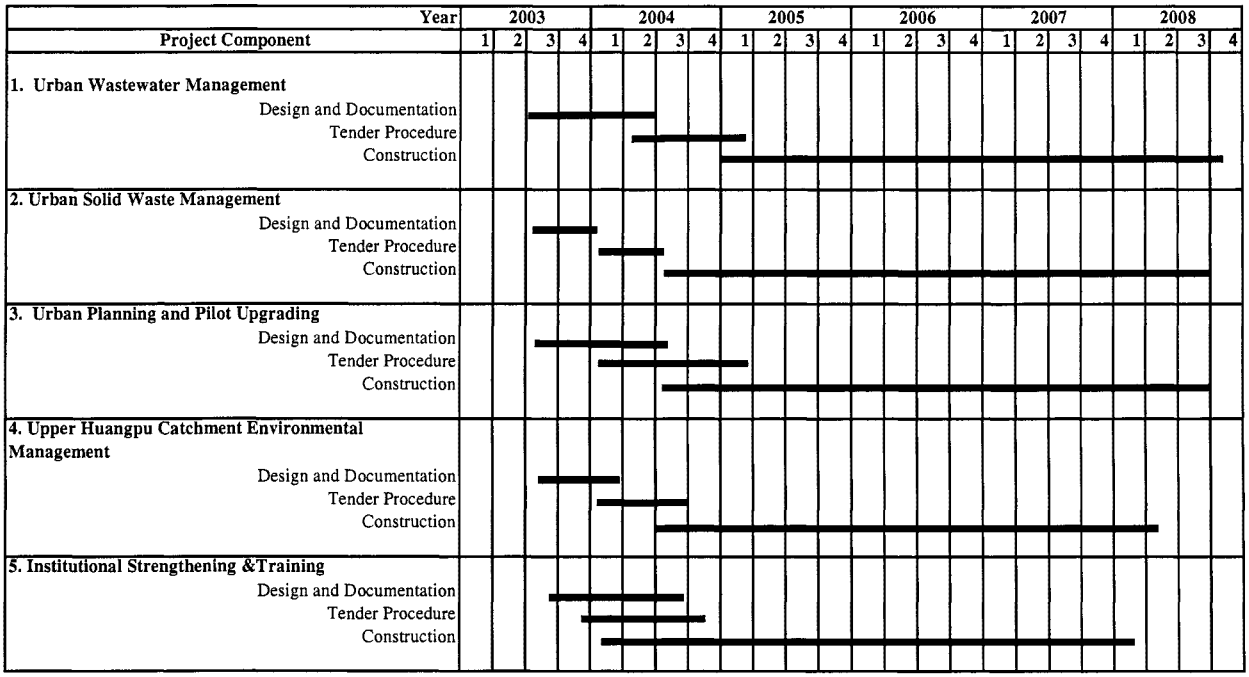


EXTERNAL DEBT and RESOURCE FLOWS

	1981	1991	2000	2001
(US$ millions)				
Total debt outstanding and disbursed	5,798	60,259	149,800	170,000
IBRD	0	3,494	11,118	11,479
IDA	0	3,672	8,771	8,550
Total debt service	1,744	8,305	21,728	20,900
IBRD	0	357	1,291	1,716
IDA	0	23	131	164
Composition of net resource flows				
Official grants	19	406	147	..
Official creditors	506	2,044	1,927	..
Private creditors	89	2,493	-2,302	..
Foreign direct investment	0	4,366	42,096	47,052
Portfolio equity	0	565	7,814	2,404
World Bank program				
Commitments	196	2,622	1,536	1,230
Disbursements	0	1,280	1,907	1,947
Principal repayments	0	131	644	999
Net flows	0	1,149	1,263	948
Interest payments	0	250	778	881
Net transfers	0	899	485	67



Additional Annex 11: Project Implementation Schedule
CHINA: Shanghai Urban Environment Project



Additional Annex 12: Environmental Assessment and Mitigation Measures Summary
CHINA: Shanghai Urban Environment Project

A. PROJECT OBJECTIVES

This project has the basic objective of supporting Shanghai Municipal Government (SMG) in urban environment management and in the sustainable provision of urban environment infrastructure services. It builds on more than 15 years of cooperation with SMG on water, sanitation and solid waste issues during which significant improvements have been made, both in service delivery and in environmental improvements in some areas of the city. In particular the condition of the Huangpu River, for centuries the main thoroughfare of Shanghai, has seen marked improvement.

The project would support both management/institutional advances and specific investments in urban infrastructure. Some of these investments are large in size and would have significant potential impacts on the local environment. As a result, although the overall goal is broad environmental improvement, the APL has been given an environmental assessment (EA) "A" category in order to address possible negative impacts of individual components.

Structure of the APL and EA procedures

The APL has been designed in three phases, each of which would have several components. The components for the first phase (APL1) have been identified and prepared for appraisal. The components for subsequent phases have been agreed in principle but would be subject to review and revision as the program advances. The whole APL is subject to the requirements of the Environment Assessment Operational Policy (OP 4.01). Given the scale of some of the investments proposed (wastewater treatment plants, landfill expansion, etc.), the overall APL has been categorized by the Bank as an "A", requiring a full EA.

Each of the components in APL1 is subject to EA. The major investment components require state-level (State Environmental Protection Agency - SEPA) EAs under the Chinese system and have been carried out in a manner consistent with OP 4.01 Category A. Some components only require municipal-level EAs in the Chinese system but are still subject to full EAs for Bank purposes.

To put the individual investments in context and to address the organizational and policy dimensions of APL1, a project-wide EA summary has been prepared, together with an APL "Framework EA" which addresses the whole set of interventions proposed for the APL and outlines the environmental objectives, the monitoring systems and the EA review procedures that will apply to the APL. A supplementary EA was prepared in early 2003 to reflect updated costs and updated design decisions.

APL Framework

The broad framework for the APL is defined by the Tenth Five-Year Plan (TFYP) of the Shanghai Municipal Government, in its various policy and implementation documents, and by the Development Program for the APL agreed between SMG and the Bank. The overall objective is to help SMG to implement a sustainable development strategy through efforts on environmental improvement and institutional strengthening, in order to provide its over 13 million citizens with extensive and long-term environmental benefits, and also to achieve the aims of promoting innovation, enhancing institutional reform and improving financial mechanisms.

The APL has been developed to be consistent with the different Master Plans in key environmental areas, as well as with the directions set for institutional reform. In broad terms the APL will address six broad areas, with the balance between these varying over the different phases of the APL.

- Urban wastewater management
- Protection of the water sources area
- Urban solid waste management
- Urban environmental infrastructure services upgrading
- Urban environment improvement
- Air quality improvement

The proposed coverage of the different phases is as follows (see Table 1 below for more detail).

- **APL1:** Major investments would include the completion of the sewerage system for the inner city; expansion of the city's main landfill and support to other solid waste management (SWM) activities; urban infrastructure upgrading in Hongkou District; urban environment improvements; planning and initial investments in protection of the Upper Huangpu Catchment (municipal wastewater and agricultural waste collection, treatment and disposal).

- **APL2:** This phase would continue to support SWM, including addressing industrial waste; would increase investments in the Upper Huangpu Catchment protection; and would expand the urban infrastructure upgrading efforts to poorly serviced areas.

- **APL3:** The third phase is expected to address the consolidation and site redevelopment of older urban wastewater treatment plants (WWTP); complete the establishment of systems for continued investment in the Upper Huangpu Catchment; expand the scope of the urban infrastructure upgrading, and support a number of activities to address the more complex air pollution abatement problems.

Within this broad outline, the specifics of each component of each phase have been agreed and appraised by the Bank and the appropriate level of environmental assessment has been be undertaken, in accordance with Chinese and Bank requirements.

Indicators

Broad performance indicators have been set out in the Development Program for the main sectors being addressed in the APL. The parameters used are consistent with those set out in the TFYP and cover issues such as coverage of wastewater collection, proportion of wastewater treated, efficiency of solid waste collection, recycling rates, per capita open space and green areas. In addition, regular monitoring of water quality continues, both in the urban reaches of the rivers and creeks and also in relation to the protection of the water supply intakes. Each component would have relevant progress indicators, based on these overall performance indicators.

B. BACKGROUND TO EA FOR THE PROJECT (APL1)

The Shanghai Academy of Environmental Sciences (SAES) carried out the Environmental Assessment (EA) of the proposed Shanghai Urban Environment Project (SHUEP), representing Phase 1 of the APL, in accordance with Chinese national and Bank procedures, with support from independent international consulting specialists. Various drafts were reviewed and discussed in detail during project preparation.

The draft EA documents were submitted to the Bank in February 2002. The final EA Report, Environmental Action Plan (EAP) and Executive Summary (ES) were submitted to the Bank in March 2002 and found to be satisfactory. The EA Report was sent to the Bank's Information Center in February 2002. During the EA work, the local people were consulted, and their opinions have been reflected in the project design and environmental mitigation measures, as appropriate. A supplementary EA Report was prepared as an update in April 2003.

The policy and administrative requirements for environmental assessment of development projects in China were followed during preparation and evaluation of the EA, as well as the Bank's policy. Major laws and regulations applied to the EA are as follows: (a) Environmental Protection Law of the People's Republic of China; (b) Atmospheric Pollution Control Law; (c) Environmental Noise Control Law; (d) Water Pollution Control Law; (e) Cultural Heritage Protection Law; (f) Notice of Strengthening the EA Management Work of Construction Projects financed by International Financial Organizations; and (g) Technical Guidelines for Environmental Impact Assessment.

C. BRIEF PROJECT DESCRIPTION

The Shanghai Urban Environment Project would include the following components for which EAs have been completed:

- **Urban Wastewater Management:** Completion of wastewater collection systems and treatment facilities to treat all wastewater generated in the Shanghai metropolitan urban area, including sludge disposal;
- **Urban Solid Waste Management:** Expansion of the existing Laogang sanitary landfill, setting up a collection system for food waste, and developing a GIS-based computerized management information system (MIS);
- **Urban Planning and Pilot Upgrading:** Repair and renewal of infrastructure that has served its useful life;
- **Upper Huangpu Catchment Environmental Management:** Wastewater collection and treatment for priority towns in the Upper Huangpu River Catchment.

Central to the project are capacity and institution building measures and training.

D. BASELINE ENVIRONMENTAL DESCRIPTION

Socioeconomic Situation

Shanghai Municipality is one of four provincial-level cities in China and its largest urban center, with a permanent, registered population approaching 14 million and an additional temporary population of about 3 million. The city is China's most important industrial base, and the major center of commerce, trade, finance and science, accounting for about 5 percent of its national gross domestic product (GDP). The reported GDP per capita was the highest among the provinces/national-level cities in China (about $4,173 in 2000, more than four times the national average - reported figures would vary depending on population assumptions made). There is, nevertheless, a significant income disparity between the urban and rural population, and over 3 percent of even the urban population within the municipality have an income lower than the locally defined poverty lines; in addition, over 15% of the non-registered urban population are currently below the poverty line.

Natural Environment

Shanghai is the largest and most heavily industrialized conurbation in China, producing about 11 percent of national industrial output. Shanghai Municipality, located in the Yangtze River delta plain, occupies an area of 6,200 square kilometers (km2), of which 300 km2 are classified as urban. The Shanghai Municipality area (population 7.5 million in the 12 districts in Shanghai City and a further 6 million in the adjacent suburban districts and one county) is bordered to the north by Jiangsu Province and to the east by Zhejiang Province. The City lies in a convergence zone of cold, dry and warm, humid air masses. Rainfall patterns are influenced both by monsoons and temperate cyclones. There are well-defined seasons with average monthly temperatures ranging from 3.4°C in January to 27.2°C in August. Annual average rainfall is 1,148 millimeters (mm) with a pronounced rainy season from June to September. The prevailing wind is northwesterly in winter and southeasterly in summer.

The Yangtze River is the longest and largest river in China and the fourth largest in the world in terms of flow. The river rises on the border with Tibet, and its total catchment area of 1.8 million km2 covers approximately 19 percent of the total land area of China. It traverses a total of approximately 6,300 river km before discharging to the East China Sea to the east of Shanghai. The mean net downstream flow in the Yangtze River at its most downstream gauging station at Datong (550 km upstream of the confluence with the Huangpu) is approximately 30,000 cubic meters per second (m3/s), with typical dry-season flows in the range of 10,000 to 15,000 m3/s and wet-season flows in excess of 50 000 m3/s. The flow regime will be modified as a consequence of both the Three Gorges Project and the major diversion of water from the Yangtze River to the water-short northern provinces. The diversion may reduce dry-season flows by about 10 percent. On an annual average basis the tidal inflow at the river mouth could be approximately 266,000 m3/s, some nine times the average river flow. The inflow on a spring tide could be of the order of 5 billion m3.

The Huangpu River flows through the Shanghai municipal area, discharging into the Yangtze River at Wusongkou some 18 km to the north of the city. Flows in the Huangpu are measured at the gauging station at Mishidu, about 70 km upstream of the confluence with the Yangtze River. The river is tidal at Mishidu and the mean net downstream flow is approximately 340 m3/s, about 1 percent of that in the Yangtze. Under extreme conditions of low natural flow in the Huangpu and peak tidal influence from the Yangtze, there can be net upward flows at Mishidu for periods of up to several days.

Water Quality

Water quality in the Yangtze River upstream of the confluence with the Huangpu is generally good. Existing wastewater discharges from Shanghai through the outfalls at Zhuyuan and Bailonggang have been demonstrated to be well-dispersed and have very limited impact on water quality. The Yangtze carries very substantial quantities of silt, with suspended solids concentrations exceeding 500 mg/liter on average and annual silt loads of the order of 500 million tons. In the estuary the silt is mainly fine sand and clay, which has a strong adsorption capacity for a range of pollutants, particularly heavy metals. The previous Shanghai sewerage projects supported by the Bank included diversion of about 2 Mm3/d of wastewater from the Huangpu catchment for discharge to the Yangtze through long tunneled outfalls at Zhuyuan and Bailonggang. Monitoring of water quality in the Yangtze River in the region of these outfalls has shown that the discharges are well-dispersed with minimal impact on local water quality.

The quality of the Yangtze River, in particular the concentrations of nutrients nitrogen and phosphorus, is also important in that it is a major source of water entering Hangzhou Bay, which is experiencing increasing problems of red tides. The Yangtze receives numerous discharges of urban and industrial wastewater and extensive drainage from agricultural areas. As a result, concentrations of nitrogen and

phosphorus are high, particularly during the dry season when concentrations are of the order of 0.5 mg/l and 0.17 mg/l on average respectively, and the Yangtze accounts for up to 90 percent of the nutrient loads entering Hangzhou Bay. The loads are dominated by agriculture (fertilizer runoff) in the case of nitrogen and animal wastes in the case of phosphorus. Control of point-source loads from urban wastewater would not in isolation be sufficient to reduce the nutrient loads of the Yangtze substantially. Significant reductions in these loads would require comprehensive agricultural waste and fertilizer management on a catchment-wide basis.

All sources of the Huangpu are generally of good quality although showing some evidence of decline. However water quality in the Huangpu declines significantly as it traverses the Shanghai Municipality area as a result of discharges of domestic and industrial wastewater and runoff from agricultural areas. Water quality problems are exacerbated under conditions of low natural flow in the Huangpu, when the tidal influence of the Yangtze River causes extensive upstream movement of pollution from the lower reaches of the river. Water quality in the Huangpu in the urban area has progressively improved as a result of the major sewerage investments undertaken by SMG based on a policy of diversion of wastewater out of the Huangpu catchment for discharge into the Yangtze. However, in the Upper Huangpu, where the key strategic water supply intake at Daqiao is located, there is evidence of declining water quality as a result of discharges of untreated wastewater from the outlying districts and from agriculture, particularly intensive animal rearing.

Future Water Quality Objectives

The future water quality objective for the Huangpu is the Category III standard of the Chinese Environmental Quality Classification, representing water quality suitable for abstraction of water and potable supply after treatment. Although it has considerable assimilative capacity, there is concern at a national level in respect of a potential decline in water quality in the Yangtze. This concern is largely as a consequence of the changing flow regime in the Yangtze arising out of its strategic role in China's water resources through the key water transfer project, and also the implications of water storage in the Three Gorges Dam. As a result of these concerns, water quality objectives for the Yangtze River over its entire length have been made more stringent, the target being Category II.

Water and Wastewater Management

The overall water consumption in Shanghai is 8.5 million cubic meters per day (Mm3/day) The citywide wastewater generated is 5.75 Mm3/day, including 0.7 Mm3/day of groundwater infiltration. The present citywide collection rate is about 68 percent, and about 1.8 Mm3/day (32 percent) of wastewater generated flows directly to the local river system. These data imply a current system utilization rate of about 60 percent. The present level of treatment (defined as a level higher than primary treatment) is 11 percent.

The overall principles of the recently updated Shanghai Wastewater Master Plan are as follows:

- Major urban area--centralized wastewater collection with remote treatment/discharge, mainly to the Yangtze River Estuary;
- New cities/towns--localized collection and treatment, grouped where appropriate;
- Increased utilization rate of existing facilities;
- Rational use of the Yangtze River Estuary's assimilative capacity, increasing levels of treatment in future, as appropriate; and

- Sludge management policy based on minimization, pollutant source control to minimize toxicity and use as a resource, whenever possible.

The total estimated wastewater flow for the year 2020 is 8.5 Mm3/d. The discharge standard appropriate for treated wastewater discharged to the Yangtze River is the national integrated wastewater discharge standard and this is the long-term objective for all treated wastewater discharges from Shanghai. The present proposal for the discharge at Zhuyuan is for secondary treatment. The additional pollution load removed by secondary treatment in relation to the chemically enhanced primary treatment process proposed, at least as an interim measure, for the other discharges to the Yangtze at Zhuyuan and Bailonggang is modest in relation to the very large assimilative capacity of the Yangtze River Estuary. However, the additional cost of secondary treatment relative to chemically assisted primary treatment is substantial, in the order of double on a capital cost basis. Moreover, the chemical process is at least as effective as secondary treatment in terms of the removal of the important pollutant phosphorus. The final selection of treatment processes to meet secondary treatment discharge standards would be made during the detailed design stage.

Wastes Management

The quantity of waste generated in Shanghai is very substantial and disposal costs are high because of the lack of disposal opportunities in or close to the urban area. The municipal solid waste in Shanghai contains a high proportion of organic waste and therefore has a high moisture content, which restricts effective treatment/disposal options. There is some degree of recycling of certain components of municipal solid waste in Shanghai but generally on an informal basis.

The major Laogang landfill site that receives municipal solid waste from the urban area of Shanghai has been developed in two stages, beginning operation in 1989. The site is located some 60 km from the Shanghai city center on the East China Sea coast in Nanhui District. The Phase 1 site capacity was 3,000 t/d of solid waste, based on a filling area of 3,000 mu (200 ha), and this was increased to 6,000 t/d in 1992. Although there is effective cover for deposited waste, compaction of waste on the site is limited to that achieved by the bulldozers used for movement and spreading of waste within the site, and the controls on leachate and landfill gas are inadequate.

E. ENVIRONMENTAL BENEFITS

The project as a whole is substantially positive in environmental terms, with the benefits greatly outweighing the negative impacts. Collection and treatment of the remaining wastewater in the urban areas of Shanghai (from areas designated "A", "B", and "C") will reduce substantially the pollution loads discharged to the lower Huangpu and thereby improve water quality. The diversion of wastewater away from the Huangpu catchment for treatment at Zhuyuan is the preferred solution in terms of level of improvement in water quality in the Huangpu, and risk minimization. Moreover it would not result in deterioration of water quality in the Yangtze River. The alternative for Area B of secondary wastewater treatment and discharge to the Huangpu was rejected as being less effective in terms of water quality improvement in the Huangpu by virtue of the impact of the residual pollution load associated with the treated wastewater, particularly under low flow conditions in the Huangpu. In addition this option would be more costly and would have greater engineering risks in both construction and operation.

The investments in the Upper Huangpu catchment are particularly important in terms of safeguarding water quality and enabling compliance with water quality objectives in the Upper Huangpu and in particular the sustainability of the key strategic water supply abstraction at Daqiao. The proposed initiatives represent the beginning of a major program of water quality improvements in the catchment,

and will also for the first time bring pollution from agricultural waste under a degree of control.

The waste management component would improve the efficiency of the waste management service and would reduce the environmental impact of landfill operations at Laogang through better standards of operation, improved control and management of leachate and the introduction of more effective controls on landfill gas. The landfill site at Laogang would be operated to international standards of sanitary landfills and would form part of an overall integrated waste management system for Shanghai involving additionally incineration and composting. The improvements in waste collection, segregation and recycling would improve the flexibility and extend the options for waste treatment/disposal and would reduce the overall environmental burden of waste management by reducing the quantities of waste that require transport and disposal. In particular the proposed separate collection and disposal of food wastes will avoid health-related concerns in respect of the present practice of use of food waste for animal feed.

F. POTENTIAL ENVIRONMENTAL IMPACTS AND THEIR MITIGATION MEASURES

Although the balance of the project in environmental terms is substantially positive, nevertheless some negative impacts have been identified in the EA process for all components, and these require mitigation measures. The principal impacts and their appropriate mitigation measures are described below.

Sludge Production. Treatment of wastewater at the treatment plants proposed would generate substantial quantities of sludge. The aggregate quantity of sludge produced at the treatment plants in Shanghai would be in the order of 3,000 tons of dewatered sludge cake per day. It is doubtful whether adequate outlets exist for the beneficial use of this quantity of sludge on a sustained basis. Disposal of the sludge would therefore have to be, at least in part, by landfill, and environmentally secure landfill facilities would be provided where these do not already exist. A comprehensive sludge management plan is under preparation as a component of the overall Wastewater Master Plan for Shanghai Municipality. The APL1 component of Urban Wastewater Management has a provision for sludge treatment and disposal.

Dispersion of Wastewater Discharges. The degree of wastewater treatment has yet to be finalized, but regardless of the level of treatment afforded to wastewater, there may be a zone close to the point of discharge where there is significant impact upon local water quality and local water quality objectives cannot be met. Initial water quality modeling carried out to predict the impact of discharges at Zhuyuan indicated that chemically enhanced primary treatment of both SSP1 and APL1 discharges at Zhuyuan would result in a very small mixing zone of area 0.6 km2, in which water quality would be no worse than Category III. In the case of secondary treatment for both discharges there would be no deterioration in water quality below Category II.

To maximize the initial dispersion of the wastewater discharges, and thereby minimize the area of the so-called mixing zone required for water quality to return to background levels, the treated wastewater would be discharged through efficient diffuser systems. The detailed configuration of these diffuser systems would be designed on the basis of mathematical dispersion and water quality modeling.

The environmental investments proposed (principally in wastewater and solid waste collection, treatment and safe disposal), would have significant though indirect benefits to public health and hygiene, and are vital inputs to health risk mitigation. These far-reaching and long-term benefits would contribute to urban efficiency, economic growth, public dynamism and creativity.

Impact of Landfill. Increases in the operational area and the quantities of waste disposed of at Laogang will exacerbate the key environmental impacts of landfill, namely leachate and landfill gas. The project will include enhanced controls on the generation of leachate and more effective treatment and the effective collection and safe management of landfill gas. Depending upon the overall level of gas generation it is expected that gas will be exploited for beneficial use. The overall burden of waste management in terms both of transport and disposal would be reduced by proposed initiatives for waste minimization and treatment/recycling.

Construction Spoil. Substantial quantities of spoil would be generated as a result of excavation for pipeline installation and for the construction of wastewater treatment plants. Most of the material would be reused on site, and spoil disposal plans have been prepared for each project component where excess spoil would be generated. It is expected that all spoil would be beneficially used in other local construction activities and therefore spoil disposal would not be problematic.

Other Construction Impacts. Other impacts of construction include noise from construction machinery, generation of dust and disruption of local traffic. These would be minimized by appropriate restrictions on working hours and the operational procedures of the contractors concerned.

Other Operational Impacts. The other significant potential impacts of the operation of wastewater treatment plants and pumping stations are noise and, in the case of wastewater treatment plants, odor. These would be minimized by the careful siting of the facilities and by the provision of buffer zones and landscaping as appropriate. Where there are sensitive noise receptors close to the facilities, the noise emissions would be minimized by appropriate acoustic insulation of machinery.

G. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

The public participation exercise was undertaken in three forms: bulletins in the press, public opinion questionnaires and surveys of the public. The phasing of the public participation exercise is shown in the following table.

Public Participation Phasing and Goals

Round	Round separation	Major participation goals
1st round (screening)	Environmental screening	Identify stakeholder groups; secure proponent commitment to public participation program; agree on extent and mode of participation
2nd round	Shortly after environmental screening, before the EA terms of reference finalized	Identify stakeholders; disclose relevant project information; determine stakeholder concerns and include them in the terms of reference.
3rd round	After EA report (draft) is prepared	Disclose information on study methods and findings; agree on proposed mitigation measures with stakeholders; let stakeholders determine whether their concerns are adequately addressed

- **Bulletins in the Press**: Bulletins were published in the local press containing the general environmental situation and the objectives of the project investments

- **The Willingness-to-Pay Surveys**: These surveys were carried out at an early stage of the project preparation to assess the overall acceptability of the project to the people in the light of increased

tariffs.

- **Public Opinion Questionnaire**: Opinion polls were carried out in the districts affected by the project. The questionnaire obtained written individual opinions of the project.

- **Survey of the Public**: The survey invited 825 members of the public, whose opinions were considered and inquiries answered.

- **Survey of the Project-Affected People**: The survey covered 19,116 people in 5,623 households, 328 enterprises and 175 businesses.

The EA and ES were made public locally in the project cities; this availability was advertised through the local press. Following submission to the Bank, the documents were sent to the Bank's Public Information Center.

Details pertaining to the public consultations and information disclosure for each of the project components are provided in the following tables.

Urban Wastewater Management

Public Consultation

Substance	By whom, with whom	When	Where	Bank's requirement
Project announcement, call for public comments	By SWEC, with public	12 Dec. 2001	Wenhui Daily	OP4.01
Project briefing	By SAES	26 Dec. 2001 ~ 15 Jan. 2002	Shanghai Environment Online website	OP4.01
EA TOR, using public opinion questionnaires and interviews	By SAES, with 150 potentially affected residents near the project sites	18 ~ 22 Dec. 2001	Interviews and handout of questionnaire at project pumping stations and two WWTP sites	OP4.01
EA TOR, with public meeting	By SAES, with relevant government agencies and other stakeholders	24 Dec. 2001	Yangpu District Office	OP4.01
EA draft report, using public meetings	By SAES, with potentially affected residents and project stakeholders	End of February to early March 2002	WWTP site at Minxing Road	OP4.01

Information Disclosure

Document	Date of disclosure	Location	Bank's requirement
Project background and EA process and public consultation program	December 12, 2001	Weihui Daily	OP4.01
Project background and EA process and public consultation program	December 24, 2001 to January 15, 2002	Shanghai Environment Online (Website)	OP4.01
EA TOR	28 Dec. 2001	SEPB office	OP4.01
Draft EA report	22 Jan. 2002	SEPB office	OP4.01

Document	Date of disclosure	Location	Bank's requirement
Final EA Report	March 31, 2002	SEPB & SWEC Office	OP4.01
Supplementary EA Report	April 15, 2003	SEPB & SWEC Office	OP4.01

EA Environmental Assessment
SAES Shanghai Academy of Environmental Sciences
SEPB Shanghai Environmental Protection Bureau
SWEC Shanghai Water and Environment Construction Company
TOR Terms of Reference

Note: The Final Environmental Assessment Report for the overall Project was submitted to the World Bank on May 7, 2002, and found satisfactory.

Urban Solid Waste Management

Public Consultation

Substance	By whom, with whom	When	Where	Bank's requirement
EA TOR, with public opinion questionnaire and meetings	By SAES and Laogang Township Government with 100 potentially affected rural residents near the project site	December 10-14, 2001	Interviews and distributions of questionnaire at project pumping stations and two WWTP sites	OP4.01
News release about project	By SAES	Dec. 25, 2001 ~ Jan. 15, 2002	Shanghai Environment Online website	OP4.01
EA TOR, with interviews	By SAES, with relevant rural residents	December 25, 2001	Laogang landfill site	OP4.01
Project announcement, call for public comments	By project component office, with public	December 29, 2001	Wenhui Daily	OP4.01
Draft EA report, using public meeting and opinion poll	By SAES, with potentially affected residents	(Scheduled for) end of March	Villages near the Laogang landfill site	OP4.01

Information Disclosure

Document	Date of disclosure	Location	Bank's requirement
Project background and EA process and public consultation program	December 29, 2001	Weihui Daily	OP4.01
Project background and EA process and public consultation program	December 25, 2001 to January 15, 2002	Shanghai Environment Online (website)	OP4.01
EA TOR	December 28, 2001	SAES office	OP4.01
Draft EA report	January 22, 2002	SAES office	OP4.01

EA Environmental Assessment
SAES Shanghai Academy of Environmental Sciences
SEPB Shanghai Environmental Protection Bureau
SWEC Shanghai Water and Environment Construction Company
TOR Terms of Reference

Upper Huangpu Wastewater Management

Public Consultation

Substance	By whom and with whom	When	Where	Bank's requirement
Interview during field social economic survey	Fengxian Construction and Investment Co. Ltd., Shanghai Jinshan Ocean Outfall Engineering General Company Limited, Shanghai Bohong Engineering and Construction Company Ltd., The Public	January and February, 2002	At sites and village	OD 4.30 and OP 4.01
RAP outline consultation	Fengxian Construction and Investment Co. Ltd., Shanghai Jinshan Ocean Outfall Engineering General Company Limited, Shanghai Bohong Engineeering and Construction Company Ltd.	January and February, 2002	Local township, government and village committee	
EA TOR, using public opinion polland interviews	By SAES and Tongji University, with 200 potentially affected residents near the project sites	February, 2002	Interviews and distributions of questionnaire at two WWTP sites	OP4.01
EADraft report, using public meetings and opinion poll	By SAES and Tongji University, with potentially affected residents	(Scheduled for) end of March	All WWTP sites	OP4.01
Distribution of questionnaires and key EA and RAP messages in bullet point format in first public meetings	Fengxian Construction and Investment Co. Ltd., Shanghai Jinshan Ocean Outfall Enginering General Company Limited, Shanghai Bohong Engineering and Construction Company Ltd.	January and February, 2002	At sites and village committee	
Distribution of project information and draft EA and RAP in second public meetings	Ditto	January and February, 2002	At sites and Governments	OP4.01: Consultation prior to finalization of draft report
Final EA	Ditto, with SAES	March 31, 2002	SEPB & SWEC office	OP4.01
Final RAP	Fengxian Construction and Investment Co. Ltd., Shanghai Jinshan Ocean Outfall Enginering General Company Limited, Shanghai Bohong Engineering and Construction Company Ltd.	February and March, 2002	Township Governments	OD4.30

Information Disclosure

Document	Date of Disclosure	Location	Bank's Requirement
Copies of EA and TOR and RAP outline		District PMO, SWEC, SAES	OP 4.01; OD 4.30; BP 17.50
Questionnaires and key EA and RAP messages		District PMO	
EA TOR	February 1, 2001	SAES office	OP4.01
Draft EA report	March 3, 2002	SAES office	OP4.01
Notice for availability of EA and RAP reports at PMO and CDC	December 2001	District PMO	OP4.01, OD 4.30
Resettlement information booklet	Under finalization	SWEC, District PMO	OD 4.30

Note

A Framework EA and RAP were prepared for the overall project. These were reviewed and found satisfactory by the Bank These would be utilized and implemented for the Urban Planning and Pilot Upgrading components.

Additional Annex 13: Resettlement
CHINA: Shanghai Urban Environment Project

Project Description

1. The proposed Adaptable Program Loan (APL) project consists of three phases. APL1 includes the construction of one wastewater treatment plant and collection system for the urban core currently not served, development of a solid waste disposal site, urban planning and pilot upgrading, and Upper Huangpu catchment environmental management, including the development of wastewater collection and treatment systems in the upper catchment. Five resettlement action plans (RAP) have been prepared for APL1 and one resettlement policy framework has been developed to guide resettlement planning for the urban upgrading component in APL1 and project proposals in APL 2 and 3.

Resettlement Planning

2. The Shanghai Water Authority (SWA), through SWEC, was responsible for the resettlement planning of APL1 and organized different teams to carry out the assignment. Resettlement planning included detailed census of affected people, inventory of impacts and socioeconomic surveys. These resettlement planning activities provide a detailed record of adverse project impacts, including land, houses, businesses, institutions, and the number of people affected. Socioeconomic surveys were conducted through questionnaires, interviews and focus group discussions as part of the resettlement planning process. The following RAPs were developed:

- Resettlement Action Plan for Wastewater Sewerage System (Zhuyuan),
- Resettlement Action Plan for Laogang Solid Waste Disposal Site,
- Resettlement Action Plan for Fengjin Wastewater Treatment Plant,
- Resettlement Action Plan for Jingshan Sea Outfall Program, and
- Resettlement Action Plan for Fengxian Wastewater Treatment Plant.

Project Impacts

3. The project components would require land acquisition, temporary leasing of land, and relocation of houses and businesses. The details of impacts are provided in the following table.

Summary of Project Impacts

Impacts	Unit	Wastewater Pipelines	Solid Waste Site	Upper Huangpu Environment	Total
Land	mu	767	5,190	281	6,238
House	m2	298,973	0	16,813	315,786
Enterprise	no.	73	0	10	83
Project-affected persons	No.	7005	0	514	7,519

Legal Framework

4. The RAP was prepared in line with relevant Chinese laws, regulations and World Bank OD 4.30 on Involuntary Resettlement. The following basic principles were adopted for resettlement planning:

- Compensation will be paid at replacement cost without depreciation;
- Land compensation will be paid before acquisition ;
- House compensation will be paid before construction of the new house;
- Compensation rates must be finalized through consultation;
- Lack of legal title will not bar an affected person from his or her resettlement entitlements; and
- The objective of resettlement is to enable the affected persons to improve or at least restore their living standard.

Rehabilitation Strategy and Measures

5. Three components would require acquisition of farm land. For farmers who lose farm land, the livelihood rehabilitation strategy follows the traditional Chinese approach, which is land- and agriculture-based, and depends on village collectives for livelihood restoration. All affected farmers would be allocated farm land within the village and the land compensation fund would be paid to the village and used collectively in the villages for agriculture and sideline development.

6. About 3,452 people in 1,228 households would lose their residential houses due to project activities. The majority of these households are urban residents. After extensive consultations with the affected population, the project has planned to offer two options for their relocation, i.e., cash compensation and replacement housing. Urban residents could choose to find and buy their own replacement housing with the cash compensation. For those who do not want to find and buy their own replacement housing, the project would provide ownership of a replacement housing unit in government-built apartments. For relocating rural residents, the project would provide compensation at replacement cost with no depreciation.

7. A total of 80 business enterprises would be affected. Most of them would be affected temporarily during the construction period and would resume business after construction. Compensation for business loss has been provided for in the RAPs. A few government agencies would require relocation and new sites have been planned for them. The project would also impact some public infrastructure. Compensation based on replacement value would be paid to the relevant government agencies or local governments to restore the affected infrastructure and services.

Management Organization

8. A multilevel organization has been established for the implementation of the RAPs. This organization includes the Project Resettlement Office, and project offices in the drainage companies. An independent monitor has been selected for resettlement implementation. Details of staffing and their responsibilities are provided in the RAPs.

Public Consultation And Participation

9. Public consultation and participation have played a key role in formulating the RAPs. The affected residents, business people and district governments participated in the census, inventory and formulation of the livelihood rehabilitation strategy, measures and relocation sites. Their feedback has

been incorporated in the RAPs. The RAP contains a list of major consultation sessions.

10. Public consultation and participation would continue during the RAP implementation. Project information would be provided to the affected people through television, radio broadcast, newspapers, bulletins and posters. The RAP would be summarized into a resettlement information booklet (RIB) and distributed to every affected household. Regular consultation meetings would be held in the neighborhoods.

Grievance Redressal Mechanism

11. A mechanism has been designed for grievance redressal under each of the project components. All grievances can be filed in either written or verbal form. The redressal channel lies within the project management and government systems. Recording requirements and timeframe have been established for grievance resolution. This mechanism would be disclosed as part of the RIB.

Resettlement Implementation Monitoring

12. Internal and external monitoring have been designed as part of the project resettlement management. The project resettlement offices would 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 contracted for independent monitoring of the RAP implementation. Independent monitoring would cover physical progress of RAP implementation, including compensation payment, allocation of residential sites, farmland allocation, and restoration of infrastructure. The independent monitor would also review the public consultation process, operation of the resettlement project offices, grievance redressal mechanisms and restoration of livelihood of the affected farmers. Independent monitoring would be conducted twice a year during the project implementation period.

Compensation And Resettlement Budget

13. The RAPs contain compensation rates for various impacts. Land compensation rates included a land compensation and resettlement subsidy. Compensation rates for structures are calculated for replacement costs. The affected infrastructure would be compensated for reconstruction and the compensation budget was finalized through negotiation with the owning government agencies.

14. The RAPs contain a detailed resettlement budget that covers all basic resettlement costs, management costs, contingencies, survey, design and monitoring costs. The basic resettlement cost includes compensation for land, house, other structures, standing crops and trees, business profit loss, reconstruction of affected infrastructure and relocation subsidies. A management cost is included in the budget as well. The land acquisition and resettlement costs are estimated to have a base cost of at Y538.5 million, equivalent to $64.9 million. Resettlement funds would be financed through counterpart funds. Fund disbursement procedures and monitoring mechanisms have been designed and documented in the RAPs.

Additional Annex 14: Project Financial Management System
CHINA: Shanghai Urban Environment Project

Executive Summary and Conclusion

1. The task team has conducted an assessment of the adequacy of the project financial management system of the Shanghai Urban Environment Project. The assessment, based on guidelines issued by the Financial Management Sector Board on June 30, 2001, has concluded that the project meets minimum Bank financial management requirements, as stipulated in BP/OP 10.02. In the team's opinion, the project will have in place an adequate project financial management system that can provide, with reasonable assurance, accurate and timely information on the status of the project in the reporting format agreed with the project and as required by the Bank.

2. Funding sources for the project include the Bank loan and counterpart funds. The Bank loan proceeds would flow from the Bank into the project special account to be set up at and managed by the Shanghai Finance Bureau (SFB), to project implementing agencies (or project companies), and finally to contractors or suppliers. The Bank loan would be signed by the Bank and the People's Republic of China through its Ministry of Finance (MOF), and onlending arrangements for the Bank loan would be signed between the People's Republic of China through its MOF and Shanghai Municipality through its SFB and then between SFB and the implementing agencies. In terms of disbursement technique, the project would be disbursing based on traditional disbursement techniques and would not be using project management report (PMR)-based disbursements, in accordance with the agreement between the Bank and MOF. The counterpart funds would be raised and contributed on behalf of the Shanghai Municipal Government to the project by urban development and investment companies at the municipal and district levels.

3. No outstanding audits or audit issues exist with any of the implementing agencies involved in the proposed project. The task team, however, would continue to be attentive to financial management matters and audit covenants during project supervision.

Summary Project Description

4. The objectives of the proposed Shanghai Urban Environment Project are:

- Providing facilities for the collection, treatment and disposal of wastewater;
- Providing environmentally secure solid waste disposal facilities;
- Supporting urban planning and upgrading;
- Improving municipality-wide water resources and solid waste management;
- Strengthening of institutions with responsibility for environmental management; and
- Implementing sustainable financing of environmental infrastructure.

5. The main components of the project include:

- **Urban Wastewater Management**: Completion of wastewater collection systems and treatment facilities to treat all wastewater generated in the Shanghai urban area, including sludge disposal;
- **Urban Solid Waste Management**: Expansion of the existing Laogang sanitary landfill, setting up a collection system for food waste, and developing a geographic information system- (GIS) based computerized management information system (MIS);

- **Urban Planning and Pilot Upgrading**: Support for upgrading environmental infrastructure services in underserved areas and preservation of certain cultural heritage assets;
- **Upper Huangpu Catchment Environmental Management**: Wastewater collection and treatment for three towns in the Districts of Fengxian and Jinshan; and
- **Institutional Strengthening and Training**: Technical assistance for capacity building in implementing agencies, including a senior municipal executive development program.

6. The estimated base cost of APL1 is Y3,568.8 million ($430.0 million), and the proposed Bank loan amount is $200.0 million. The implementation period is expected to be July 2003 to end September 2008.

7. The project implementing entities include:

- **Urban Wastewater Management:** Shanghai Water and Environment Construction Company Limited (SWEC) on behalf of the Shanghai Municipal Sewerage Company (SMSC).
- **Urban Solid Waste Management:** Shanghai City Appearance and Environment Sanitation Administration Bureau (SCAESAB), and Shanghai Chengtou Environment Industry Development Corporation Limited (CEIC).
- **Urban Planning and Pilot Upgrading:** District Government of Hongkou.
- **Upper Huangpu Catchment Environmental Management:** Jinshan Ocean Outfall Engineering General Company Limited, Fengjing Water Purification Company Limited and Nanpai Sewage Disposal Company Limited.
- **Institutional Strengthening and Training:** To be implemented through the PO.

Country Issues

8. To date, no Country Financial Accountability Assessment (CFAA) has been performed for China, though dialogue with the Government of China in respect of the CFAA exercise has been initiated and is currently underway. No CFAA would be carried out in FY03, and the Bank has relied on a similar exercise carried out by the Asian Development Bank in 2000 for reference.

9. However, based on observations of developments in the areas of public expenditures, accounting and auditing, and Bank experience with China projects for the past few years, it is noted that substantial achievement in the aforementioned areas has been made and further improvement is expected in the next few years. As the economic reform program further unfolds, the Government of China has come to realize the importance of establishing and maintaining an efficient and effective market mechanism to ensure transparency and accountability, and minimize potential fraud or corruption.

10. Due to a unique arrangement by the Government of China, funding (in particular Bank loans) of Bank projects is controlled and monitored by MOF and its extension, i.e. finance bureaus at the provincial, municipal/prefecture and county levels. However, project activities are usually carried out by implementing agencies of a specific industry or sector due to the level and complexity of expertise involved. The above arrangement usually requires more and closer coordination on the project, as the multilevel management of the funding and implementation mechanism sometimes works to the detriment of smooth project implementation.

Risk Analysis

11. The following risks with corresponding mitigating measures have been identified during assessment:

Risk	Risk Rating	Mitigating Measures
I. Inherent Project Risk	Moderate	Many implementing agencies involved in the project have no prior Bank experience; Close monitoring by the task team is extremely important, particularly at the initial stage
II. Control Risk		
a. Implementing Entity	Moderate	Close monitoring by the task team is needed to ensure all the implementing entities are familiar with the Bank's procedures and requirements
b. Funds Flow	Moderate	The task team would ensure that a mechanism would be in place to ascertain Bank and counterpart funds would be released to the ultimate beneficiaries on a timely basis
c. Staffing	Moderate	Periodic checking on accounting work by project management offices at various levels and task teams should be performed
d. Accounting Policies and Procedures	Low	Accounting policies and procedures are already in place
e. Internal Audit	Moderate	No internal audit arrangement for the project; however, some implementing entities would be supervised by the internal audit department of their own supervising agencies
f. External Audit	Low	The external auditors, the Shanghai Municipal Audit Bureau, have extensive audit experience with Bank projects
g. Reporting and Monitoring	Low	Format of financial statements and frequency of submission have been clearly defined by the Bank and MOF
h.. Information Systems	Moderate	Checking by the task team at the initial implementation stage to ensure correct setup, which should be followed up by regular supervision missions

Strengths and Weaknesses

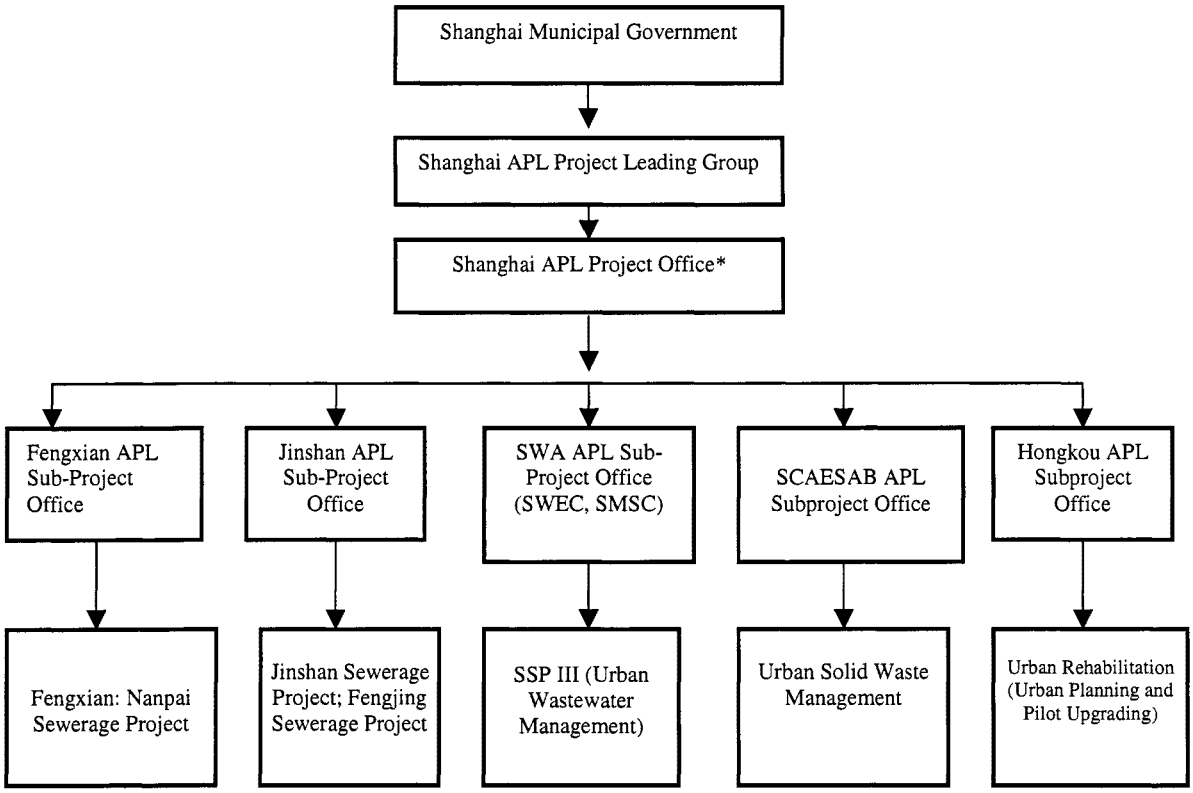
12. **Strengths.** Strong financial supports from Shanghai Municipal Government, especially counterpart funds, is one of the positive factors of ensuring smooth project implementation. SWEC and SFB have been involved in previous environmental projects supported by the World Bank and executed in Shanghai, including the Second Shanghai Sewerage Project (Loan 3987-CHA) and the Shanghai Environment Project (Loan 3711-CHA), have accumulated extensive experience and are familiar with Bank requirements.

13. **Weaknesses.** The following weaknesses with resolution have been identified:

Weaknesses	Resolution
1. Some financial staff are new to Bank supported projects and are short of relevant experience	Strong assistance and a training program would be provided by the task team and governing agencies
2. The financial management manual has been prepared and found acceptable	The final manual would be distributed to all financial staff before effectiveness, and the agreed procedures put into practice

Implementing Entity

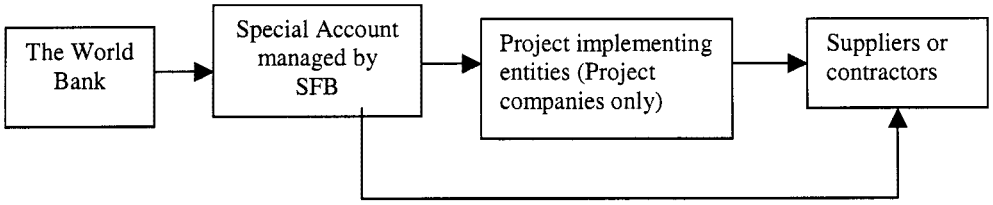
14. The project organization and implementation arrangements have been established formally through a notification entitled "Notice on Adjustment and Perfection of Shanghai World Bank Loan APL Project Office", Shanghai Development Planning Commission, November 12, 2002. There is a Leading Group at the highest level to provide policy guidance and coordination of major items. The Secretary-General of Shanghai Municipal Government has been appointed as the leader of the group and the Deputy Secretary-General as deputy. Under the Leading Group, a Shanghai APL Project Office (PO) has been established, led by the Shanghai Development Planning Commission with representation from the relevant authorities and project agencies. The PO is located in SWEC. The organizational chart is shown below:



* The Shanghai APL Project Office, led by SPC, also comprises: the SCC, SFB, SWA, SCAESAB, and other related authorities. The office is located in SWEC, which would be responsible for daily work. Staff would be drawn from the related project agencies/companies.

Funds Flow

16. Funding for the project includes Bank loan and counterpart funds. One special account would be set up and managed by SFB. Onlending agreements would be signed between the Ministry of Finance and SFB, between SFB and project implementing agencies (project companies). The funds flow is as follows:



17. Counterpart funds would be raised and contributed to the project by urban development and investment companies established by SMG to take charge of raising and investing counterpart funds at municipal and district level, except that the Shanghai Water Assets Operation and Development Company (SWAOD) would raise the counterpart funds for the urban wastewater component.

Staffing

18. Adequate project accounting staff with educational background and work experience commensurate with the work they are expected to perform is one of the factors critical to successful implementation of project financial management. Based on discussions, observation and review of educational background and work experience of the staff identified for financial and accounting positions in implementing entities (both "project" and "entity"), the task team note that the staff are qualified and appropriate to the work they are expected to assume.

19. To strengthen the financial management capacity and achieve consistent quality of accounting work, the task term has suggested that a project financial management manual (Manual) be prepared. The manual would provide detailed guidelines on financial management, internal controls, accounting procedures, fund and asset management and withdrawal application procedures. The financial management manual has been prepared and found acceptable. It would be made available to all relevant project staff before project effectiveness.

20. As most implementing entities are new to the Bank's projects, a well-designed and focused training program in project financial management would be provided prior to project effectiveness by PO and SFB to all financial and accounting staff to ensure a good understanding and knowledge of the following:

- Bank's financial management policy and disbursement procedures,
- Fund/asset/contract management,
- Format and content of project financial statements, and
- Audit requirement.

The Bank task team would provide training assistance as and when needed.

Accounting Policies and Procedures

21. The administration, accounting and reporting of the project would be set up in accordance with the following regulations/circulars issued by MOF:

a. In line with other Bank-financed projects in China, the project would use the "Temporary Regulations on Financial and Accounting Management for Projects Financed by the World Bank" (Circular #127 issued in 1993) by MOF as a basis for bookkeeping and preparation of project financial statements and management reports. Accrual accounting and double-entry bookkeeping

would be adopted by the project.

b. Circular #12: "Regulation for the Submission of Withdrawal Applications" issued in December 1996 by MOF, includes detailed procedures for preparing and submitting withdrawal applications and retention of supporting documentation.

c. Circular #13: "Accounting Regulations for World Bank-Financed Projects" issued in January 2000 by MOF. The circular provides in-depth instructions of accounting treatment of project activities and covers the following:

- Chart of account
- Detailed accounting instructions for each project account
- Standard set of project financial statements
- Instructions on the preparation of project financial statements

The standard set of project financial statements mentioned above has been agreed to between the Bank and MOF and applies to all Bank projects appraised after July 1, 1998 and includes the following:

- Balance sheet
- Statement of source and use of fund
- Statement of implementation of credit/loan agreement
- Statement of special account

22. Both circular #127 and #13 are simplified versions of the Accounting Standards for State-owned, Infrastructure Oriented Projects (the "Standards"), taking into consideration the unique characteristics of Bank projects. The Standards are modeled after the principles of International Accounting Standards and provides detailed guidelines to accounting for activities of Bank financed projects.

23. Each of the implementing entities would be managing, monitoring and maintaining respective project accounting records. Original supporting documents for project activities would be retained by originating implementing entity. In addition, each implementing entity would prepare financial statements, which would then be reviewed, approved and consolidated by the PO before submission to the Bank for review and comment on a regular basis.

Internal Audit

24. There is no formal independent Internal Audit department for the project. Disbursement reviews by SFB and supervision mission by Bank task team would be relied upon to provide part of the internal audit functions.

External Audit

25. The Bank requires that project financial statements be audited in accordance with standards acceptable to the Bank. In line with other Bank-financed projects in China, the project would be audited in accordance with the Government Auditing Standards of the People's Republic of China (1997 edition). The Shanghai Municipal Audit Office has been identified as auditors for the project. Annual audit reports would be issued in the name of Shanghai Municipal Audit Bureau.

26. The annual audit reports of project consolidated financial statements would be due within 6 months of the end of each calendar year, with a separate opinion on Statement of Expenditures and Special Account. In addition, once operations commence, annual audit reports on financial position and operating results of the following implementing entities would be due to the Bank within 6 months of the end of each calendar year:

- Shanghai Municipal Sewerage Company
- Shanghai Water Authority
- Shanghai Water & Environment Construction Company
- Shanghai Chengtou Environment Industry Development Company Limited
- Fengjing Water Purification Company
- Jinshan Ocean Outfall Engineering General Company
- Nanpai Sewage Disposal Company

27. The project accounts of the following agencies would be audited, as appropriate:

- the Project Office
- the Project Management Offices
- the Shanghai City Appearance & Environment Sanitation Administration Bureau
- the District Government of Hongkou
- the Shanghai Water Authority
- the Shanghai Water & Environment Construction Company
- the Shanghai Chengtou Environment Industry Development Company Limited

Reporting and Monitoring and Format of Financial Statements

28. Each implementing entity would prepare its own project financial statements, which would then be consolidated by the PO. The project consolidated financial statements and financial statements of each implementing entities would be sent by the PO to SFB for final verification before being sent to the Bank for further disbursement processing.

29. The format and content of the following project financial statements represents the standard project financial reporting package agreed to between the Bank and MOF, and have been discussed and agreed with all parties concerned. In line with the newly issued Financial Monitoring Report (FMR) guidelines, the project consolidated financial statements would be submitted as part of FMR to the Bank on a semiannual basis (prior to August 15 and February 15 of the following year), and include the following four statements:

- Balance Sheet;
- Summary of Sources and Uses of Funds by Project Component;
- Statement of Implementation of Loan Agreement; and
- Statement of Special Account

Information Systems

30. Accounting software developed by the Bank would be recommended to all implementing agencies under the project during construction phase; For operating phase, "Langchao," an accounting software package well developed and widely used in business community in China, has been used by SWEC for Shanghai Sewerage II project, and would continue to be used for the project. The Bank task team would closely monitor the financial management information system, especially at the initial setup and preparation of financial statements, and provide assistance, if required.

Impact of Procurement Arrangements

31. The threshold set for procurement post-review would be consistent with that set for SOE for disbursement purpose. To have maximum effectiveness and efficiency, financial management specialist and procurement staff should jointly participate in supervision missions to ensure the following:

- Contracts awarded are in line with the Bank's procurement guidelines;
- Contract payments made are in accordance with the terms of the contract and well supported

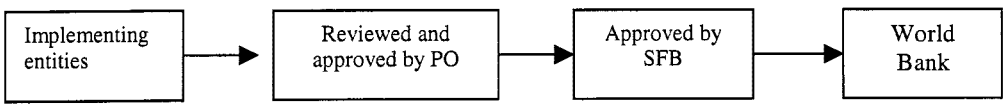
Disbursement Arrangements

32. The project would be disbursing according to traditional disbursement techniques and would not be using project management report-based disbursements, in accordance with the agreement between the Bank and MOF.

33. Bank loan proceeds would be disbursed against eligible expenditures as follows (a) civil works--48 percent of expenditures, (b) equipment--100 percent of foreign expenditures, 100 percent of local expenditures (ex-factory) and 75 percent of other items procured locally, (c) consulting services--91 percent of expenditures, and (d) training--100 percent of expenditures.

34. Disbursement methods, such as replenishment, direct payment and special commitment, are available for the project. The SOE limits would be set up in line with procurement post-review threshold, as follows: (a) all contracts for goods estimated to cost the equivalent of $500,000 or less; (b) all contracts for civil works estimated to cost the equivalent of $10,000,000 or less; (c) consultant contracts estimated to cost $100,000 (firms)/$50,000 (individuals) or less. A special account (SA) would be established in SFB, with an authorized allocation of $14 million; Bank funds would be disbursed to the special account and then to project implementing entities and/or suppliers and contractors.

35. SFB would be directly responsible for the management, monitoring, maintenance and reconciliation of the Special Account activities of the project. Supporting documents required for Bank disbursements would be prepared and submitted by respective project implementing entities to the PO for consolidation. The consolidated documents would then be submitted to SFB for final verification before being sent to the Bank for further disbursement processing. The flow of withdrawal application is as follows:



Action Plan

36. The following proposed time-bound actions have no major impact on project preparation or Board presentation, but should be adequately addressed by the project:

Action	Responsible person	Completion Date
1. Financial management training to all relevant project staff	SFB/Bank task team	Before effectiveness
2. Financial management manual issued and proceedures implemented	PO/SPB	Before effectiveness

Financial Covenants

37. In addition to the standard financial covenants contained in the legal documents (including maintaining project accounts in accordance with sound accounting practices, audit requirements and SOE), specific financial covenants applicable to project "entities" are detailed in Section G of this report.

Supervision Plan

38. As there are a number of implementing agencies involved in the project, supervision coverage for each mission is expected to be limited and therefore rotational basis should be adopted. Furthermore, to maximize effectiveness and efficiency, procurement and financial management and disbursement specialists should jointly participate in supervision missions for procurement and SOEs reviews. During the initial implementation stage, more supervision missions (initially twice a year) should be carried out to have better coverage and ensure that procurement guidelines are followed and expenditures incurred are eligible and well supported. More detailed reviews at the initial implementation phase can also help ensure that the financial management system is properly set up and financial statements are prepared in line with stipulated format and content. The mission frequency can then be subsequently reduced to a normal level.

Additional Annex 15: Financial Policy Objectives and Financial Innovations
CHINA: Shanghai Urban Environment Project

Introduction

1. The financing components of the APL are designed to support the overall APL policy vision, while at the same time moving forward the national agenda for financial sector reform as applied to the municipal sector. Four objectives have been identified for the financial initiatives:

- To develop long-term, stable sources of financing for Shanghai's environmental infrastructure investments.

- To reflect the environmental connection between Shanghai's districts and the core city by using the municipality's financial strength to help districts gain access to long-term financing for environmental infrastructure.

- To have Shanghai take the lead among municipal governments in applying to the municipal sector the financial sector reform agenda identified at the national level, including building direct access to the capital market for municipal enterprise bond issues, and establishing higher standards of disclosure and transparency in capital financing.

- To strengthen the financial management capacity of Shanghai's municipal agencies responsible for planning and financing environmental infrastructure investments.

2. During the appraisal process, the Shanghai Municipal Government (SMG) and the Bank agreed that these policies could most effectively be achieved through two specific financial innovations: the introduction of a program of municipal enterprise bond issuance to help pay for environmental investments through long-term bond financing, and the establishment of a District Financing Vehicle which would help district governments raise long-term financing to carry out high-priority environmental investments in the districts.

Magnitude of Shanghai's Financing Challenge

3. Shanghai officials estimate that over the next five years they would have to finance approximately Y40 billion (or $4.85 billion) in the water and wastewater sector alone, in projects covering water supply, wastewater collection and treatment, and drainage and containment. Both national and Shanghai municipal policy call for strictly limiting the amount of capital investment financed from the State and municipal budgets in the form of contributed equity. Funding from this source is estimated at only Y6 billion. Multilateral and international donor agencies would provide loan funds to cover a small part of the remaining financing gap. However, the great bulk of financing would have to be raised from domestic nonstate sources or the international private capital market.

4. In broad terms, Shanghai is committed to raising nonstate capital financing for the environmental sector through four basic strategies. Each of these strategies seeks to generate longer-term financing. The strategies include:

- Attracting equity investments, from both domestic and international investors, to finance new capital projects like wastewater treatment plants and water supply systems.

- Generating capital to help finance new environmental projects through the sale of existing assets in the environmental sector.

- Borrowing from domestic commercial and development banks. Bank loans are presently the standard way for local government entities to access the credit market. However, the maturity of bank loans would have to be extended considerably if they are to serve as a stable source of financing for long-term investments.

- Accessing the domestic capital market directly through the issuance of longer-term bonds.

5. All of these financing options would be pursued by Shanghai during the APL and are consistent with APL policy objectives. The magnitude of financing that has to be raised makes it necessary to pursue all possible avenues of efficient access to financial markets--from equity investments to intermediated borrowing from banks to direct borrowing from the capital market via bond issues. The use of multiple channels for accessing capital should encourage competition across the subsectors, helping to drive down the long-term costs of capital to Shanghai.

6. The principal counterpart institution for the APL's wastewater investment program would be the Shanghai Water Assets Operation and Development Company (SWAOD). This company faces an immediate financing challenge to meet its counterpart financing obligations and to finance the rest of its capital budget. SWAOD estimates that it would need to generate Y3.5 billion in new domestic financing over the next three years just to meet its counterpart financing obligations to the World Bank under SSP2 and the APL. It would also have to refinance Y2.3 billion of existing debt.

Present Credit Mechanisms and the Need for Longer-Term Borrowing

7. At present, credits for local-level infrastructure investment are provided primarily by commercial banks in the form of three- to five-year loans. Most loans carry three-year maturities. The use of short-term loans to finance long-term investment projects has several disadvantages and creates significant financial risks.

8. First, local-level borrowers generally are not in position to repay loans of this type on schedule. Major infrastructure projects may require two years to complete, with the result that a project has very little revenue-generating experience before the entire loan repayment becomes due. In practice, municipalities investing in long-term environmental projects generally are unable to repay the principal on their short-term loans, and have resorted to rolling over short-term debt. This makes them vulnerable to any changes in policy or external circumstances that could interfere with rolling over future loans. An economic slowdown or a surge in local-level debt could make banks unwilling to continue to roll over short-term loans, precipitating a financial crisis in the municipal sector.

9. Second, from the perspective of the banking sector, China as part of World Trade Organization (WTO) entry has embarked on a policy of cleaning up the banking sector, which is now burdened by a very high rate of nonperforming loans. If new policies are introduced to prohibit banks from making loans that cannot be repaid according to the literal terms of the lending agreement, the practice of rolling over short-term loans to finance long-term investments, would be greatly curtailed. The present financing system thus is vulnerable to banking sector reform, as well. In fact, the existence of large amounts of outstanding short-term bank loans to municipal-level entities, whose principal cannot be repaid when nominally due, has become one of numerous obstacles to thorough banking-sector reform.

10. Third, financing infrastructure investment through short-term borrowing severs the economic

link between debt repayment and tariff structure. Tariff rates cannot be adjusted so that consumers pay the full costs of debt service when loans are for a three- to five-year period, much of which is spent in project construction. To obtain the efficiency advantages of full cost recovery through tariffs, the borrowing period has to be stretched out. Ideally, the borrowing period should roughly coincide with the useful life of the infrastructure, so that users of different generations contribute proportionately to the costs of construction and depreciation.

11. All of the financing strategies identified in the previous section potentially can provide access to longer-term financing. In fact, some movement in this direction already has occurred. The China Development Bank (CDB) is now making longer-term loans to local government entities for projects of national importance. One of the districts in the Shanghai periphery recently received a 10-year loan from CDB to finance infrastructure associated with a new port and associated new town. In the team's meetings with commercial banks, the banks indicated a willingness in principle to extend loan maturities for well-prepared infrastructure investment projects, especially if these had been reviewed and approved by the World Bank.. The Shanghai Urban Development Investment Corporation (UDIC) has issued bonds to help finance infrastructure investments, primarily in the transportation sector. One bond of Y1 billion carried an eight-year maturity, the longest maturity to date.

12. Some of the financing strategies also carry special risks. The sale of environmental assets--though appropriate in principle when funds are reinvested in new infrastructure projects--has placed a financial burden on SWAOD in practice. SWAOD is divesting itself of potential income-generating assets, while the terms of sale require SWAOD to devote a significant portion of its capital budget to recurring subsidies to the private purchaser.

Financial Sector Reform

13. China's transition to the post-WTO world is a major policy theme, both for China's national institutions and for international policy dialogue with China. A key component in adjusting to the post-WTO world is reform of the financial sector. Financial sector reform has been identified as a high priority by China, the World Bank, the IMF and other international institutions. China has committed itself to permitting international competition within the banking sector and throughout the financial sector within five years of WTO entry. This timetable gives extra urgency to reform of domestic financial institutions and to revamping regulatory oversight.

14. Key elements in financial sector reform have been identified by the World Bank's China Financial Sector Program. These include:

- Strengthening capital market development. At present, the banking sector dominates financial activity in China. Almost all banks and other financial institutions are state-owned. The capital market is underdeveloped, especially as a source of financing for corporate and municipal investment financing (see Table 1).

- Modernizing financial-sector regulation. At present, regulation typically takes the form of direct control. All bond issues, for example, must be approved on a case-by-case basis by State Development & Reform Commission (SDRC) and other national-level institutions.

- Broadening the scope for market signals in the financial sector. Financial sector regulation currently makes relatively little use of market signals. All bonds are issued at an interest rate dictated by the People's Bank of China, which takes into account macroeconomic conditions, but does not distinguish bond yields by credit risk or allow the market to establish interest-rate differentials to reflect risk at the time of bond issuance.

- Strengthening or creating long-term bond markets. Only in the last year has the national government begun to issue long-term bonds, with small issues of 10, 15, and 20 years. Establishment of a robust risk-free yield curve should encourage the rest of the market, including the subnational sector, to begin issuance of longer-term debt, and provide a basis for market pricing of this debt.

- Increasing disclosure and transparency. China's financial sector currently operates in an opaque manner. This extends both to the overall financial position of key institutions and to the financial backing that supports individual loans or individual bond issues. Municipal enterprise bond issues in particular are bought on the "reputation" of the issuer and an implied guarantee that the municipality would not let the issuer fail. There is little market scrutiny of underlying financial conditions, and little information on which to base such a judgment.

15. The financial innovations incorporated into the Shanghai APL are designed to help establish a municipal-level bond market that introduces the most important elements of financial sector reform into municipal-level enterprise bonds, while at the same time lengthening credit maturities. The APL's financial program provides an opportunity to fit subnational ("municipal") capital financing into the reform framework being pursued at the national level. Such integration is critical to the long-term success of local financing initiatives. Local government capital finance cannot strengthen its market orientation if it is kept as a separate channel of the credit market, insulated from competition with the rest of the financial sector.

Table 1: Financial Assets, China, 2001

Total Financial Assets	Y21.0 trillion
Bank Deposits	Y16.6 trillion
Equity Shares (Stocks)	Y 1.2 trillion
Insurance Companies	Y 0.4 trillion
Bonds	Y 2.8 trillion
—Of which, Govt. and Financial Sector Bonds	——Y 2.76 trillion
—Of which, Corp. and Municipal Enterprise Bonds	——Y 0.04 trillion

Source: China Development Bank and China Securities Regulation Commission.

APL Financial Instrument Development: Bond Issues

16. Discussion with Shanghai counterpart institutions and with the Bank's financial sector reform team has identified *a program of continuing, long-term bond issuance* as the financial innovation that offers the best opportunity for combining Shanghai's need to access long-term capital on a stable, continuing basis with the financial sector reform objectives outlined above.

17. A municipal-level bond issue in itself is not a novel instrument. There was a flurry of local government bond issuance in the early 1990s, which resulted in a number of subsequent defaults by the issuers. This history is one reason that national authorities established the strict regulatory regime now in place. The Shanghai UDIC has been a successful recent issuer. It has issued bonds as one means of raising capital finance, especially for transportation projects. A bond issue is an appropriate instrument for introducing fundamental reforms, important both to Shanghai's future capital financing of environmental projects and as a precedent for municipal-level capital financing elsewhere. Key reforms to be incorporated in a local bond issue include:

- **Maturities.** The policy objective is to move toward truly long-term bond issuance. However, there are limits on how greatly bond maturities can be changed at once. As noted, Shanghai has experience with one small bond issue of eight-year maturity. Otherwise, all bond issues have been for five years or less. The national government has begun longer-term bond issuance, also on a relatively small scale, only in the last few years. A two-step process therefore may be necessary, in which the Shanghai institution first issues a bond in the 8- to 10-year range, then, following market acceptance, moves toward longer-term issuance.

- **Accessing Long-Term Institutional Savings.** A bond is an appropriate instrument for tapping long-term institutional savings. In the Chinese market, this means tapping insurance company savings. There are no other substantial institutional investors (commercial banks are prohibited from purchasing bonds; pension funds are not yet significant buyers). To be eligible for insurance company purchase, a bond must be approved for this purpose by the Insurance Regulatory Commission (IRC). The IRC must judge the safety of the bond; it also examines whether the bond issue is sufficiently large to justify institutional purchase. In practice, IRC responds to insurance companies' requests to authorize purchase of specific bond issues. *Securing IRC approval for insurance company purchase of Shanghai environmental bond issues would represent a major breakthrough in sustainable capital financing.* No subnational government bond has yet received approval. The initial bond issue is likely to be too small to achieve this breakthrough. However, it should be an important goal for the overall program of bond issuance.

- **Liquidity.** One way of supporting long-term bond issuance is development of a liquid secondary market, so that purchasers are not locked into holding a bond issue for its entire lifetime, but can sell the bond on the market if their circumstances change. The Shanghai Stock Exchange lists some bonds. However, the market for bond trades is extremely thin. There is no market-maker system. Trades occur very infrequently and in small volumes. Improvement of the bond listing and bond trading procedures is a policy goal of financial sector reform. Shanghai should be ready to take advantage of any reforms that strengthen the secondary bond market in China, by preparing to meet listing requirements. Given the time required to obtain listing under current rules--estimated by the Stock Exchange at 12 to 18 months when all goes smoothly--such listing may or may not be worthwhile for an initial bond issue, depending upon the gains in liquidity that can be achieved through listing.

- **Disclosure.** A bond issue can be a very effective device for increasing financial disclosure and transparency, two goals that rank high in China's capital market development. Past Offering Statements provide very little information either on the financial condition of the issuer, the investment projects that bond proceeds would finance, or the sources of funds to be used for repayment. There is no presentation of the issuer's annual budgets or financial statements. There is no disclosure of the issuer's balance sheet. There is no disclosure of the revenue sources to be used for debt servicing or the connection between debt service and tariff charges. Fuller disclosure would help greatly in capital market development for the municipal sector and in particular in moving toward public sector project financing, where borrowing is secured solely by project revenues. Under these conditions, a solid understanding of fully disclosed project revenues and costs, plus regulatory and other risks, must substitute for implicit or explicit guarantees as security for the bond issue. Preparation of Offering Statements that move toward full disclosure and lay the groundwork for future project financing is a priority goal for the APL.

- **Interest Rate.** Interest rates for bond issues are set by the People's Bank of China. Rates are set below the cost of bank loans, thus providing another incentive for developing this type of capital market access. It would be desirable to have interest rates set by the market, and this is a policy reform objective at the national level. However, a Shanghai-level issue cannot be expected to be the vehicle for such a fundamental change in national policy.

Mechanics of a Local Bond Issue

18. Bond issuance in China is highly regulated. In addition to obtaining the case-by-case approval of SDRC for a bond issue, issuers must comply with a set of general regulations. As these pertain to the local government sector, regulations include:

- Municipalities (i.e., municipal governments) are now prohibited from issuing bonds directly or guaranteeing the bonds of others.

- Local government bonds can be issued only by asset-owning companies. Local government institutions have been reorganized so as to separate asset ownership and asset management from service delivery functions. The assets serve as collateral for bonded debt.

- Bonds must be guaranteed by a third-party asset-owning or financial enterprise.

- In order to issue bonds, an institution must have a three-year track record of profitable operation.

- Cumulative outstanding bonds cannot exceed 40 percent of the issuing institution's assets.

- Bonds cannot be used to finance more than 30 percent of a project's cost.

Bond-Issuing Institution and Preparation for Issue

19. SMG has identified SWAOD as the bond issuer. SWAOD is a municipal enterprise 100 percent owned by UDIC. It was established in December 2000. Under its charter SWAOD owns and manages water and wastewater assets in the core city and is responsible for obtaining financing for new investments in these sectors. It can also invest in the remainder of the municipality, either directly as a fixed asset owner, or indirectly as a shareholder in project companies.

20. SWAOD is one of what is envisioned to be a series of specialized sectoral subsidiaries under UDIC. When SWAOD was established, UDIC transferred to its balance sheet both water and wastewater assets and the corresponding financial liabilities. SMG has identified SWAOD as the agency responsible for raising the counterpart funds for APL investments in wastewater collection and treatment in the core city.

21. The World Bank team was provided with SWAOD's financial statements for calendar 2001 (income and cash flow statements), as well as its balance sheet as of the beginning and end of 2001. The consolidated balance sheet is set forth in Table 2. It shows that as of year-end 2001, SWAOD had net assets (owner's equity) of approximately Y9.9 billion. This is sufficient coverage to start SWAOD's bond issuance program. Continuation of the bond-issuance program over the long run would require that tariff policies be put in place that increase SWAOD's return on capital.

Table 2: SWAOD, Consolidated Balance Sheet
December 31, 2001

ASSETS	Y million	LIABILITIES	Y million
Cash and Short-Term Investments	2,439	Short-Term Debt	1,288
Receivables and Other	1,547	Accounts Payable and Other	3,295
Total Current Assets	**3,986**	**Total Current Liabilities**	**4,583**
Long-Term Investments (principally equity in project and service delivery companies)	**1,428**	**Long-Term Debt** (more than one year; average remaining term is 2+ years)	**1,044**
Fixed Assets, at Cost	16,225	Long-Term Payables and Other	1,962
Accumulated Depreciation	3,788	**Total Long-Term Liabilities**	**3,006**
Net Value of Fixed Assets	12,437	**Minority Shareholders' Rights**	**2,447**
Projects under Construction	1,628	Paid-In Capital	9,571
Total Fixed Assets	**14,066**	Retained Profit and Special Surplus	287
Intangible Assets (principally land-use rights)	**413**	**TOTAL OWNER'S EQUITY**	**9,858**
TOTAL ASSETS	**19,894**	**TOTAL LIABILITIES AND OWNER'S EQUITY**	**19,894**

22. SWAOD's income statement for its first year of operation, 2001, shows a net profit of Y253 million, representing a return on total assets of approximately 1.3 percent. The current regulations in effect for enterprise bond issues require that an issuer have a three-year financial history of profitable operation. SWAOD therefore must compile two additional years of profitable operation before it can meet the issuance requirement. If SWAOD continues to be profitable, it would complete the three-year period in December 2003, with audited financial statements confirming its profitability available in June 2004. Allowing time for formal bond issuance approvals by SMG and SDRC, under the current bond issuance regulations, the first half of 2005 represents the earliest target date by which SWAOD could reasonably be expected to issue a bond. SWAOD intends to use the proceeds from its initial bond issue to repay short-term debt used as construction financing.

23. Consideration was given to having UDIC issue the first bond, so that the bond issuance program could start at an earlier date. However, UDIC's borrowing capacity would be fully utilized in raising funds for investment in other sectors. SWAOD has been established specifically for the purpose of financing and managing assets in the water and wastewater sectors. It was judged to be desirable to focus on strengthening SWAOD's financing and financial management capacity, as the institution that would

have long-term responsibility for this aspect of environmental capital financing.

24. Work in Phase One of the APL would prepare for a program of SWAOD bond issuance, as part of an overall strategy of long-term capital financing of SWAOD's budget. All of the general financial preparation for bond issuance can be completed in Phase One, as well preliminary design of the initial bond issue and testing of its marketability. The formal approval process cannot start until SWAOD actually meets the threshold test of three years of profitable operation. Detailed design of the first bond issue cannot start until a reasonable time before the planned issuance date, since the design would depend upon SWAOD's actual financial condition at the time, other sources of long-term capital financing, the tariff regime that has been approved, and general conditions in the economy and bond market. In addition, national-level regulations concerning municipal enterprise bond approvals, financial disclosure, and secondary market operations are now under review. It is universally expected that the current regulations, adopted in 1993, would be substantially revised before the time of SWAOD's first bond issue.

25. In China, the bond underwriter plays an active role in design of a bond issue, preparation of the Offering Statement, and shepherding the bond issue through the central government approvals process.

Financial Management Assistance to SWAOD

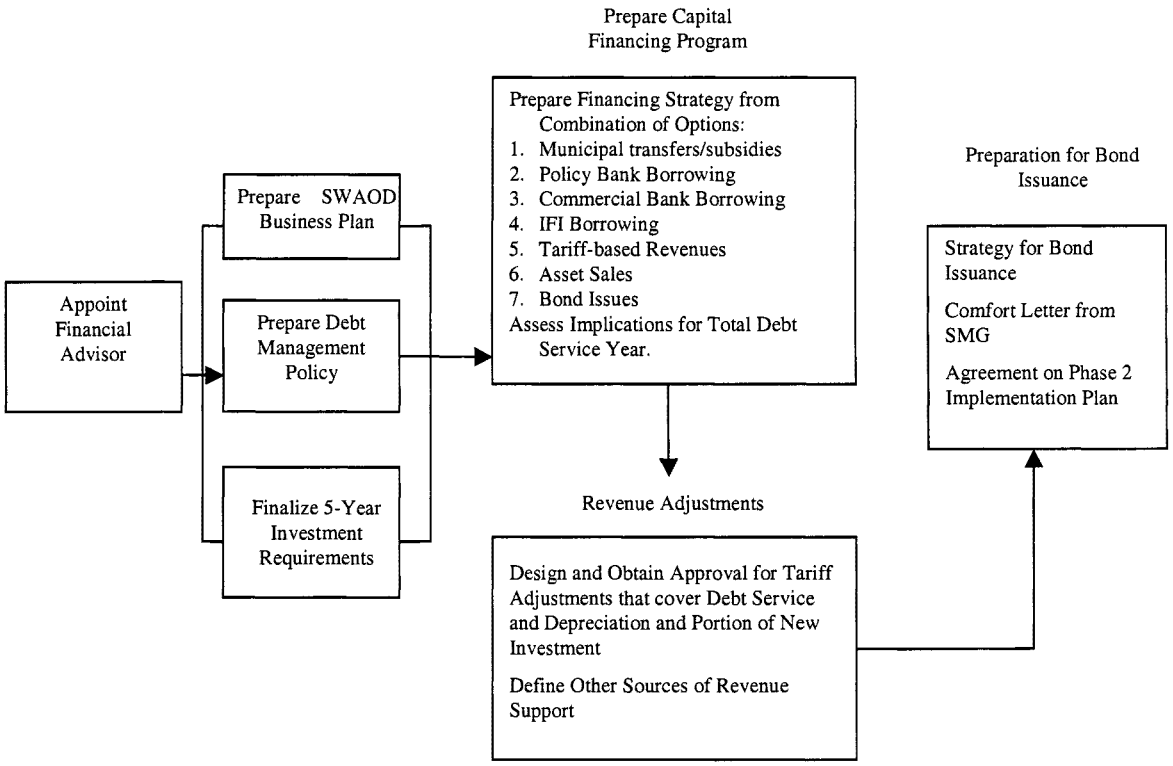
26. A municipal enterprise bond issue, or even a series of bond issues, would not on their own solve the financing challenge for SWAOD or for the wastewater environmental sector in Shanghai. Credit financing of this kind must be placed within an overall financial management strategy that assures the capacity to repay debt and adhere to a business plan. Collaboration with SWAOD during APL1 would focus on building up the financial management capacity of this new institution, while preparing for bond issuance in APL2.

27. The flow chart, entitled Bond Preparation Process, Phase 1, illustrates the financial management capacity building to take place in APL1. A Financial Advisory team, consisting of domestic and international experts, would be selected to work with SWAOD to: (1) translate its Charter into a multiyear Business Plan with clear objectives, output targets, and performance measures regarding the development and management of water supply and wastewater assets; (2) prepare a Debt Management Policy, which projects future-years' debt service and sources of financing for debt service for existing debt obligations, sets targets for the capital financing mix taking into account the various legal and institutional constraints, and sets goals for establishing and maintaining a good credit rating with implications for debt management; and (3) finalizes a five-year investment plan, so that there is greater clarity regarding just which investments SWAOD is expected to finance.

28. Once this preparatory work has been completed, SWAOD and the financial advisory team would prepare a Capital Financing Program, indicating how all of the investments it is tasked with undertaking would be financed. SWAOD and the financial advisory team would assess the implications that the capital financing strategy has for total debt service by year, and the implications in turn of debt service requirements for water and wastewater tariffs. The national State Development and Reform Commission (SDRC) and the national Ministry of Construction have in recent years notified provincial-level cities that they are expected to set water and wastewater tariff and fee schedules in the future so as to recover from users the full operating costs of systems plus depreciation, debt service, and other costs of capital. Implementation of these instructions should both simplify future capital finance planning and place environmental sector investment on much more solid ground. SWAOD and the financial advisory team would prepare recommended tariff schedules and identify SWAOD's other sources of recurring revenue.

29. SWAOD and the financial advisory team can then turn to preparation of a strategy of continuing bond issuance, including advance preparation of SWAOD's initial bond issue.

BOND PREPARATION PROCESS, PHASE 1



Agreed Outputs by Phase and Risks

30. During appraisal, it was agreed that the following products or outputs would be achieved during Phase 1, before moving forward to APL2:

- Preparation and approval of SWAOD's capital financing program
- Preparation and approval of SWAOD's debt management policy and debt servicing plan
- Submission by SWAOD to SMG of a plan for adjusting water and wastewater tariffs and charges, adequate to cover SWAOD's debt servicing obligations with margins as approved in SWAOD's debt management policy

31. At negotiations, it was agreed that: a) SWAOD would: (i) prepare and adopt a five-year capital investment plan which includes a capital financing plan, a debt management plan and a revenue adjustment plan; and (ii) formulate the preliminary design of long-term bonds to finance environmental infrastructure; and (b) SMG would: (i) review the said preliminary design and submit it to the central government for approval; and (ii) complete a time-bound action plan for Phase 2 in preparation for bond

issuance. It was further agreed that, providing approval of the National Government was obtained, SWAOD's initial bond would be issued during Phase 2, before moving forward to APL3, with a target date for issuance of June-July 2005.

32. The primary risks to this schedule are threefold. First, SWAOD may fail to compile three years of profitable operation or fail to meet some of the other output requirements of Phase 1. This risk is judged to be small, given the importance to SWAOD of establishing its creditworthiness and the flexibility that SWAOD and SMG have of increasing its revenues. Second, SDRC may not approve a SWAOD bond issue, or SWAOD may fail to meet whatever replacement requirements are in effect at the national level at the time of proposed bond issuance. This risk is more substantial, as SDRC has strictly limited the aggregate volume of subnational bond issues. The future rules that may be incorporated in the bond-approval process are unknown. Based on discussions to date, however, it appears that the National Government would welcome a SWAOD bond issue if it sets a precedent for prudent financial management and longer-term financing within the municipal environmental sector. Third, there is a risk that SMG would not approve the tariff adjustments or alternative revenue sources necessary to assure SWAOD's debt servicing capacity. This risk also is significant. Tariff adjustments are subject to a public hearing process. The tariff increases necessary are significant. At the same time, guidance has been given from the National Government to set tariffs and charges at cost-recovery levels. Any shortfalls are likely to be compensated by assigning SWAOD other revenue sources. It is by no means certain, however, that the revenue-generation system would be made predictable, reliable, and transparent, as well as adequate to cover SWAOD's debt service. This would be a continuing focus of the Project, and so is partly within the influence of APL implementation.

Financing the Environmental Infrastructure Requirements of Districts

33. The investment program laid out in the APL recognizes the interdependence of Shanghai's traditional urban core and the surrounding administrative areas, now established as districts. Water supply intakes for the traditional core would be protected by district investments aimed at improving river water quality. Much of the business investment now driving the Shanghai region's economic growth takes place in the districts.

34. This interdependence is not reflected in capital financing arrangements. District governments are responsible for financing their infrastructure investment requirements on their own, using their own budget resources and their own access to the capital market. Exceptions are made only on a case-by-case basis, and are rare.

35. Discussions during APL preparation have produced a shared vision that extends to financing mechanisms some of the interdependence already recognized in infrastructure priority-setting, without violating the general rule that SMG would not subsidize the districts' infrastructure investments. SMG would *extend to the districts its favorable access to capital and credit markets through onlending, shared borrowing, or other forms of agreement.* This change in policy promises to create expanded financing opportunities for the districts at competitive costs. Districts, for example, have not been permitted to issue their own bonds, and generally have been unable to match the credit terms available to SMG or to attract private-sector investors to the environmental sector.

36. The institutional form and *modus operandi* of the District Financing Vehicle (DFV) would be developed during APL1. Several different models have been discussed. One model would create a revolving loan fund that would be financed both by a share of the World Bank loan and a share of the initial Shanghai bond issue or some other source of domestic credit. The DFV would operate like a metropolitan-scale Municipal Development Fund. It would onlend to District environmental asset

companies to help finance key environmental projects. The World Bank and other international financial institutions (IFIs) have substantial experience with municipal development funds and similar intermediary institutions used to finance smaller-scale investment projects through onlending. The results, both in China and elsewhere, have been mixed. To be successful municipal development funds would: (a) operate in institutionally familiar ways so that projects can be approved and funds disbursed swiftly: (b) be able to provide credit, after allowance for administrative costs and bad-loan risks, at rates that are at least competitive with domestic banks; and (c) support, rather than supplant, development of the domestic credit market.

37. A second model that has been discussed involves creation of a Joint Venture entity, where onlending of World Bank funds might be coupled with equity investments by a joint venture partner. In a third model, the DFV would serve a facilitative rather than direct financing role. It would review district project proposals, confirm that a proposed project is well designed and cost-effective, then assign it a special credit enhancement, such as fiscal intercept authority (i.e., the right of lenders or investors to "intercept" fiscal transfers in the event that a district fails to meet its debt service obligations, during the process of financial settlement between the municipal and district governments). Backed by this kind of support, a district project then could qualify for a preapproved line of credit from a participating domestic bank, or present a low-risk profile to a potential nonstate investor. In this model, domestic bank lending to approved projects could be matched with World Bank loan funds provided to district project companies through the district finance bureaus, the same channel that is being used to supply WB financing to district projects in APL1.

38. SMG has assigned to UDIC lead responsibility for evaluating the various options and establishing the DFV. An SMG Steering Committee, consisting of representatives of the Development Planning Commission, the Finance Bureau, the Construction and Management Commission, other project agencies as needed and local banks, would be formed to work with UDIC on program design. UDIC has expressed a strong preference, consistent with APL goals, that the DFV operate on commercial terms with limited credit risk exposure.

Key Issues to Be Resolved

39. Several key issues regarding the DFV operations have been identified for resolution during Phase One.

(1) **Credit Risk of Subloans**. A lending or onlending model can operate commercially only if there is low risk in underlying loan repayments. UDIC characterized the districts and district project companies as generally low credit risks, but felt that repayment risk still was too high to make onlending attractive to commercial investors. Repayment risk is perhaps higher for an institution like UDIC, which in the past has provided districts with funds that are not expected to be repaid, than the risk for clearly identified commercial lenders.

International experience indicates that the surest way to eliminate onlending risk is to introduce "intercept" authority, which permits the DFV or other lender to be paid directly by the municipal government from funds otherwise due to the district, in the event that debt service payments are not made on time. Alternatively, lending contracts can require that borrowing districts establish dedicated reserve accounts that can be tapped directly by the DFV for debt service payment. Certain types of revenue collected at the district level may be paid directly into these dedicated reserve accounts.

The Shanghai Finance Bureau indicated that there are now two types of fiscal flows between the SMG

and district-level governments. First, districts receive an amount of transfer from the municipal government. Second, there are taxes that districts collect on behalf of the municipal and district governments. Districts transfer a portion of the receipts to the municipal government, and a percentage of the portion is later refunded back to the districts under the current tax-sharing program. It was agreed that during Phase One, it would be determined whether fiscal "intercept" arrangements are institutionally feasible, and whether alternative forms of credit risk mitigation are feasible. Reduced credit risk would enhance the operation of all models of the DFV.

(2) **World Bank and DFV Project Review.** Many Municipal Development Funds have failed because there are elaborate requirements regarding project review and approval. Streamlined loan applications and timely loan decisions are essential to the success of a commercial model of lending. It was agreed that the UDIC Steering Committee would try to identify the most straightforward institutional arrangements and loan approval processes acceptable to both SMG and the World Bank.

(3) **Domestic Bank Lines of Credit.** It was agreed that early in Phase One the UDIC Steering Committee would meet with local banks to determine their interest in financing or cofinancing district loan projects, or participating in other forms of credit financing for district projects. Banks could be invited to be permanent members of the Steering Committee. One goal would be to structure the DFV so that it had the greatest value-added in helping districts get access to longer-term financing from banks for environmental projects. Banks would be asked to identify the critical gaps that a DFV could fill to support longer-term lending--whether this involved technical project review, credit enhancement, or other steps.

APL1 and APL2 Work Products

40. It was agreed during appraisal that all preparatory work for the DFV would be completed during APL1. Before moving to APL2, the Steering Committee and UDIC would recommend a specific version of the SPV for adoption. A timetable for establishing the DFV would be agreed between SMG and the Bank before moving to APL2, and a mutually acceptable Work Plan for implementation would be adopted. Actual establishment of DFV would occur in APL2, along with the initial environmental project financings supported by the DFV. It is recognized that it is possible that UDIC, SMG, and the Bank may conclude as a result of APL1 investigations that it is not practicable to set up a DFV or that such a Vehicle would add only minimally to financing opportunities already available.

41. A domestic and international advisory team would be selected to work with UDIC and the Steering Committee on DFV design and implementation. The advisory team would provide international experience with similar financial intermediaries, including experience with Environmental Revolving Funds elsewhere in China. It also would collaborate with UDIC and the Steering Committee in assessing districts' demands for capital financing from a DFV and their preferences regarding institutional structure; in working with banks and other SMG institutions to identify the step-by-step procedures that would be involved in loan or investment approval and the disbursement of funds; in establishing eligibility criteria for district projects; and in all other aspects of institutional design.

TIMETABLE FOR ACTION STEPS FOR BOTH FINANCIAL INITIATIVES

42. The two Gant charts, labeled Timeline for Action Steps, summarize the steps to be completed during Phase 1 for both financial initiatives and the approximate timetables for completion.

TIMELINE FOR ACTION STEPS
DISTRICT FINANCING VEHICLE

ACTION	MONTHS FROM LOAN EFFECTIVENESS																					
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1. Formation of Policy and Design Group[a]	■																					
2. Identify Key Design Issues		■	■	■																		
3. Prepare/Issue RFP for Financial Advisors				■	▨	▨																
4. Appoint Financial Advisors							■															
5. Preliminary Assessment of Financing Demand From Districts								■	■													
6. Detailed Institutional Design									■	■	■	■	■	■								
7. Eligibility Criteria/Policies									■	■	■	■	■	■								
8. Credit Enhancement (Intercept Arrangement)									■	■	■	■	■	■								
9. Onlending of World Bank Funds									■	■	■	■	■	■								
10. Domestic Bank Counterpart Financing									■	■	■	■	■	■								
11. Identify/Define Role of Joint Venture Partner									■	■	■	■	■	■								
12. Prefeasibility of Initial Projects													■	■	■	■						
13. Design HRD/Training Program														■	■	■						
14. Final Decision on Mechanism																	■					
15. APL2 Appraisal																		■				
16. Establish Mechanism																				■	■	■
	APL Phase 1																			Phase 2		

[a] Representatives of UDIC, Construction Commission, Planning Commission, Finance Bureau, Others.

TIMELINE FOR ACTION STEPS
SWAOD BOND ISSUE

ACTION	MONTHS FROM LOAN EFFECTIVENESS																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
1. Prepare/Issue RFP Financial Advisors	■	■	■																			
2. Appoint Financial Advisors				■																		
3. Prepare SWAOD Business Plan					■	■	■															
4. Prepare SWAOD Debt Management Policy					■	■	■															
5. Finalize 5-Year Capital Investment Requirements					■	■	■															
6. Prepare Capital Financing Program							■	■	■													
7. Prepare Comprehensive Debt Servicing Plan									■	■	■	■										
8. Prepare/Submit Plan for Tariff and Revenue Adjustments									■	■	■	■										
9. Prepare Preliminary Plan for Series of Bond Issues												■	■	■								
10. Obtain Comfort Letter from SMO for Bond Issuance															■							
11. Prepare Workplan for Phase 2																■	■					
12. APL Phase 2 Appraisal																		■				
13. Discussions with SDPC, PBC, CSRC, Insurance Co's Regarding Bond Issue Approvals																				■	■	■
14. Target Date for First Bond Issue																						
	APL Phase 1																			Phase 2		

MAP SECTION