Technical Assistance to the People’s Republic of China for Preparing the Hefei Urban Environment Improvement Project

August 2005

Asian Development Bank
CURRENCY EQUIVALENC

(as of 31 July 2005)

Currency Unit – yuan (CNY)
CNY1.00 = $0.123
$1.00 = CNY8.11

ABBREVIATIONS

ADB – Asian Development Bank
APG – Anhui provincial government
EA – executing agency
EIA – environmental impact assessment
EIRR – economic internal rate of return
EMP – environmental management plan
ERD – Economics and Research Department
HDPC – Hefei Development and Planning Commission
HMG – Hefei municipal government
IA – implementing agency
km$^{2}$ – square kilometer
m$^{3}$/day – cubic meter per day
PMO – project management office
O&M – operation and maintenance
PRC – People’s Republic of China
RP – resettlement plan
SEIA – summary environmental impact assessment
TA – technical assistance
WWTP – wastewater treatment plant

TECHNICAL ASSISTANCE CLASSIFICATION

Targeting Classification – General intervention
Sectors – Multisector (Water supply, sanitation, and waste management; transport and communications)
Subsectors – Water supply and sanitation, waste management; roads and highways
Themes – Sustainable economic growth, environmental sustainability
Subthemes – Developing urban areas, urban environmental improvement

NOTE

In this report, "$" refers to US dollars.

This report was prepared by E. A. Cua.
HEFEI URBAN ENVIRONMENT IMPROVEMENT PROJECT
IN THE
PEOPLE'S REPUBLIC OF CHINA

Map 1

- Provincial Capital
- City/Town
- Main Road
- Railway
- River
- Provincial Boundary

Boundaries are not necessarily authoritative.
I. INTRODUCTION

1. The Government of the People’s Republic of China (PRC) has requested the Asian Development Bank (ADB) to provide project preparatory technical assistance (TA) to help the Hefei municipal government (HMG) prepare the Hefei Urban Environment Improvement Project. The Fact-Finding Mission visited the project area in May 2005; held discussions with the Ministry of Finance, Anhui provincial government (APG), HMG, and other stakeholders; and prepared the detailed objectives, scope, cost estimates, financing plan, and implementation arrangements for the TA, which is listed in ADB’s country program for 2005.1

II. ISSUES

2. Rapid urbanization in the PRC not only has taken its toll on the environment but has also challenged the capacity of local governments to promote good urban governance, including the sustainable financing and timely delivery of public services. While some progress has been made in building urban infrastructure over the past two decades, such supply has been outstripped by the increased pressure arising from rapid industrial growth and increased migration to urban centers as the Government continues to promote urbanization to develop markets and create jobs. Consequently, major cities and towns are characterized by widespread industrial and vehicular air pollution, discharge of untreated wastewater into rivers and lakes, shortage of safe drinking water supply, and improper handling of solid waste, including hazardous waste. Major cities and towns, such as Hefei, urgently need to address the increasing demand for urban infrastructure to meet the anticipated rural–urban migration and further economic expansion, and to avoid further environmental degradation.

3. Hefei, capital of Anhui province, also serves as the commercial and industrial center of this inland province. With a total population of about 4.5 million, Hefei municipality includes four urban districts and three counties spread over 7,498 square kilometers (km2).2 Since 2000, the economy of Hefei has been growing at an annual average rate of 13.2%. The rapid economic growth, industrialization, and urbanization have led to discharge of large amounts of untreated or inadequately treated wastewater, improper disposal of solid wastes and hazardous wastes, and high air pollution. Untreated wastewater is discharged into the city rivers including the Nanfei River and the Shiwuli River, which flow southeasterly into the northern catchment area of Chao Lake, one of Hefei’s water sources, in central Anhui.3 Access to clean water supply has also been endangered with the deteriorating water quality of Chao Lake, threatening the health and living conditions of the residents.

4. Currently, wastewater discharge in Hefei is estimated at 595,000 cubic meters (m3) per day in the four urban built-up district areas. The three existing wastewater treatment plants (WWTPs) have a total capacity of 435,000 m3/day including the ADB-financed Wangxiaoying WWTP Phase II with a capacity of 150,000 m3/day. However, the existing sewer networks in each of the WWTPs’ service areas are inadequate to fully utilize the wastewater treatment

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2 The population in the four urban districts is 1.60 million, including an estimated floating population or nonregistered permanent residents of about 0.35 million.
3 In 1996, ADB provided two loans to improve Chao Lake: ADB. 1996. Report and Recommendation of the President to the Board of Directors on Proposed Loan to the People’s Republic of China for the Anhui Environmental Improvement Project for Municipal Wastewater Treatment: Manila (Loan 1490) and ADB. 1996. Report and Recommendation of the President to the Board of Directors on Proposed Loan to the People’s Republic of China for the Anhui Environmental Improvement Project for Industrial Pollution Abatement. Manila (Loan 1491). The Wangxiaoying wastewater treatment plant was constructed in Hefei under Loan 1490.
capacity. In the new southern urban development area, there is still no WWTP to treat wastewater before this is discharged into Shiwuli River. In total, the wastewater treatment rate in Hefei is about 50%, with the remaining untreated wastewater discharged into the river system that eventually feeds into Chao Lake. As a consequence, the water quality of Ershibu River, Sili River, Shiwuli River, and Nanfei River generally does not meet class V of the National Water Quality Standard. Untreated wastewater from these rivers has been causing severe pollution of Chao Lake, underscoring the need for Hefei to strengthen its wastewater management and protect its water resources. In addition, there is an urgent need to reduce flood damage along these rivers in the urban built-up areas, particularly in the Hefei section of the Chao Lake basin, which is primarily an agricultural area.

5. HMG is addressing the need to install an advanced and efficient system for managing medical and hazardous solid wastes, particularly in the light of the recent outbreak of communicable diseases such as severe acute respiratory syndrome. Currently, about 71,400 tons of medical and hazardous industrial solid wastes are generated annually in Anhui, with much of it coming from Hefei. However, only 13,800 tons, or about 19%, are treated annually. The province has no medical waste treatment center. Overall the treatment requirement and standards for hazardous solid waste have not yet been met by the dispersed treatment facilities. Centralized treatment facilities with internationally advanced technology and strengthened management are urgently required in the province. A former landfill site northwest of the city is also in danger of contaminating the river system during the rainy season. Improper handling of solid waste, including hazardous and medical waste, continues to pose a serious threat to public health and the environment.

6. The present urban transport infrastructure and services in Hefei cannot meet the increasing traffic demand. The incomplete road network, low infrastructure standard, low flow capacity at surface intersections, and slow vehicle speed all contribute to traffic congestion, traffic accidents, and vehicle emissions. Road density in Hefei is relatively low; equivalent to 2.18 km per km² of land, lower than the national urban roads and transportation planning indicators: 5.3–7 km per km² of land. The number of registered vehicles has also been growing in Hefei, reflecting the national trend. As new areas are developed outside the old built-up districts to decongest the city center, the existing road network needs to be strengthened. The present road network, including trunk roads, secondary roads, and tertiary roads, has not been developed as envisaged. Hefei has a limited high-standard trunk road.

7. Aware of the environmental degradation caused by rapid urbanization, HMG is embarking on a multisector environment protection program to meet national environmental guidelines and to ensure Hefei’s sustainable economic growth. Generally, government policies require that urban environmental pollution and ecological damage be controlled by 2010. Major cities, such as provincial capitals, should attain a wastewater treatment rate of 70% by 2010. APG also aims to restore the average water quality in Chao Lake, one of three PRC lakes designated for priority environmental protection, from Class V to Class III at all control points throughout the lake by 2010. This implies that the water quality of the river system that feeds into Chao Lake should also be improved and maintained at Class III. Sustainable development

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4 The Environmental Quality Standards of the People’s Republic of China have five classes for surface water quality based on use: Class I: the water comes from the source of a river or stream or flows through a national nature reserve and is acceptable for any use; Class II: the water can be used for municipal drinking water in a conservation area for rare aquatic species or fish spawning; Class III: once treated, the water can be used for municipal drinking water in a conservation area for ordinary aquatic species, and for swimming; Class IV: the water can be used for industrial water supply and recreation other than swimming; and Class V: the water can be used only for industrial cooling water, irrigation, and ordinary landscaping.
also requires that Hefei strengthen its capacities, not only to manage wastewater, solid wastes and urban road network but also formulate more integrated and coherent urban planning, and monitor and enforce environmental compliance. HMG is adopting a more comprehensive approach toward improving its urban environment. With support from APG, HMG has identified a priority list of investment projects totaling $430 million, of which $150 million is proposed for ADB financing. The subprojects are grouped into four components: (i) urban water resource management and pollution control (rehabilitation of Ershipu, Banqiaohe, and Silihe rivers and Chao Lake flood control and ecological improvement); (ii) wastewater management and water supply (construction of three WWTPs, expansion of the urban sewer network, and construction of Dafangying water plant); (iii) solid waste management and ecological improvement (medical and hazardous waste disposal center, former landfill site enhancement, and pollution control); and (iv) northeast district road infrastructure development (expansion of urban roads and traffic management). In this connection, a TA has been requested to help prepare a multisector urban infrastructure development project that will help Hefei improve its urban environment and achieve long-term sustainable development. The Project is consistent with ADB’s water policy and will help the PRC achieve the Millennium Development Goals of environmental sustainability and increased access to safe drinking water and basic sanitation. In addition, the TA will formulate an institutional development component focusing on project implementation, urban planning techniques, environment monitoring and enforcement, water quality monitoring, road safety and traffic management, and financial management.

8. The proposed Project is consistent with ADB’s strategic objectives to make markets work more efficiently through infrastructure development and to promote environmental sustainability in the PRC. Over the past decade, ADB has stepped up its involvement in urban development and water resource management in the PRC through its lending and TA operations. The knowledge gained from similar investment projects in such urban centers as Shanghai, Tianjin, Wuhan, and Fuzhou and that generated from various policy-oriented studies have been incorporated in the design of the requested TA, which is packaging multisector intervention measures aimed at urban environment improvement. This will be the first ADB-financed urban development project in which the quality of urban life will be improved through urban transport development and its associated software aspects of road safety and vehicular emission reduction alongside the traditional investment projects aimed at strengthening wastewater and solid waste management. The Project will also complement two successful ADB-financed projects aimed at arresting the deteriorating water quality of Chao Lake (footnote 3). The two projects give important lessons for successful project implementation: (i) strong commitment of local governments in ensuring the availability of counterpart funding, (ii) adoption of cost recovery measures including tariff reforms, (iii) extensive training, and (iv) establishment of a full-time and adequately resourced project management office (PMO) to ensure efficient coordination of the multiple project components. Experience from this Project will provide valuable lessons for the PRC and ADB in designing future projects to address the adverse impact of rapid urbanization on the environment.

III. THE TECHNICAL ASSISTANCE

A. Impact and Outcome

9. The TA will prepare an investment project based on an assessment of the various urban infrastructure subprojects that will collectively improve the physical urban environment of Hefei and the quality of life of its residents. The Project will (i) enhance the quality of its water resources, (ii) strengthen its wastewater and solid waste management, (iii) reduce the
occurrence of flooding in Chao Lake, and (iv) improve urban air quality through a more efficient city road network and reduced vehicular emission. The project design and monitoring framework is in Appendix 1.

B. Methodology and Key Activities

10. Initially, the TA will conduct a situation analysis of Hefei’s urban development and its future directions in the context of PRC’s urbanization strategy and Hefei’s role as the growth center of Anhui Province and the surrounding areas. This key activity will involve a review of Hefei’s master or long-term urban development plan and interviews with concerned policy makers and planning officials. The TA will identify Hefei’s sector and investment priorities and use them as the basis to determine the adequacy of the list of proposed subprojects and any shortcomings in achieving the urban development objectives of Hefei. The TA will then review and assess the feasibility of the selected subprojects based on technical, institutional, environmental, social, economic, financial, and other relevant factors. The TA will also design an institutional development component based on an assessment of the needs of HMG and financial management of the implementing agencies (IAs) of the various subprojects. In formulating an overall project proposal for financing, the TA will follow ADB’s guidelines in addressing environmental and poverty and social issues pertaining to resettlement, gender, and indigenous peoples. Household surveys will be conducted to address such issues as public awareness and affordability. Consultation workshops and tripartite meetings will be scheduled strategically during TA implementation, which will also identify the stakeholders and develop a participatory approach to the design of the Project. The initial poverty and social analysis is in Appendix 2.

11. Major risks to the successful implementation of the TA include (i) inadequate counterpart support and performance, (ii) lack of adequate and timely provision of necessary data, (iii) delay in submitting required studies, (iv) delay in appointing and mobilizing consultants, and (v) inadequate performance of the consultants. Efforts will be made to ensure that competent consultants are recruited on time and their performance checked out regularly. The Government has agreed to provide adequate counterpart support, make all necessary data available when required, and undertake and update all required studies according to a timetable agreed upon with ADB. Close coordination among the consultants, executing agencies, IAs, and ADB will further mitigate the risks.

C. Cost and Financing

12. The total cost of the TA is estimated at $950,000 equivalent, comprising $489,000 in foreign exchange and $461,000 equivalent in local currency. The Government has requested that ADB finance $750,000 equivalent, covering the entire foreign exchange cost and $261,000 equivalent of the local currency cost. The TA will be financed on a grant basis by ADB’s TA funding program. The Government has agreed to provide the balance of the local currency cost, equivalent to $200,000 for counterpart staff, office space, furniture, administrative support services, and logistics. Details of the cost estimates and financing plan are in Appendix 3. The Government has been informed that approval of the TA does not commit ADB to finance any ensuing project.

D. Implementation Arrangements

13. HMG will be the Executing Agency of the TA. The Anhui Provincial Finance Bureau, which has had experience in implementing projects financed by ADB and the World Bank, will
provide overall guidance. HMG has established a steering committee, chaired by a vice mayor, with senior officials as members from Hefei Development and Planning Commission (HDPC), Hefei Finance Bureau, Hefei Construction Bureau, Hefei Environmental Protection Bureau (HEPB), Hefei Water Affairs Bureau, Hefei New Station Pilot District, and Hefei Urban Investment Company. A PMO has been established and will report to the steering committee. A vice director of HDPC will head the PMO to maintain interdepartmental coordination and ensure the study team’s access to relevant information and data, and to liaise with ADB on matters relating to TA implementation. The Government has agreed to provide an adequate number of experienced and qualified counterpart staff to work with the consultants on a full-time basis.

14. The TA will be implemented over 7 months from November 2005 to May 2006. The TA will require about 55 person-months of consulting services: 18 of international and 37 domestic. The international consultants will have expertise in water resource management including wastewater treatment, water supply and flood control, solid waste management, urban transport, financial and economic analyses, institutional and regulatory development, social analysis, resettlement, and the environment. The domestic consultants will have expertise similar to that of the international consultants. An international consulting firm, in association with domestic consultants, will be engaged in accordance with ADB’s Guidelines on the Use of Consultants and other arrangements satisfactory to ADB for selecting and engaging domestic consultants. ADB will select and engage consultants following the quality- and cost-based selection method, using simplified technical proposal procedures. The outline terms of reference for the consulting services are in Appendix 4.

15. The PMO will provide a suitably furnished office with utilities and telecommunication access, transport for consultants, materials, maps, data, and documents required by the TA, and will cover the cost of utilities for the use of consultants, counterpart professional staff, and support staff. Equipment will be procured by the consultants in accordance with ADB’s Guidelines for Procurement and transferred to HMG upon the completion of the TA.

16. The consultants will prepare TA inception, interim, draft final, and final reports. On the basis of the government reports, the consultants will prepare summary and full environmental impact assessments and resettlement reports in English for submission to ADB. Study findings will be presented in workshops, which will be attended by members of the steering committee, ADB, and other stakeholders.

IV. THE PRESIDENT’S DECISION

17. The President, acting under the authority delegated by the Board, has approved the provision of technical assistance not exceeding the equivalent of $750,000 on a grant basis to the Government of the People’s Republic of China for preparing the Hefei Urban Environment Improvement Project, and hereby reports this action to the Board.
## DESIGN AND MONITORING FRAMEWORK

<table>
<thead>
<tr>
<th>Design Summary</th>
<th>Performance Targets</th>
<th>Data Sources/Reporting Mechanism</th>
<th>Assumptions and Risks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact</td>
<td>Water quality of the city river system is improved to Class IV. Wastewater treatment rate is increased from the current level of 50% to 70% by 2010. Medical and hazardous solid waste treatment capacity is increased by about 50% to 21,000 tons/year. Flooding incidence in the southern part of Hefei near Chao Lake is reduced. Vehicular traffic flow improves and vehicular emission is reduced in the new railway zone.</td>
<td>Monitoring reports of the Hefei Environmental Protection Bureau and Water Resources Conservancy Bureaus Monitoring reports of Hefei Communications Bureau</td>
<td>Assumptions • Project design is implemented effectively. • Provision of project financing requirements, including loan from the Asian Development Bank (ADB), is timely.</td>
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<tr>
<td></td>
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<td></td>
<td>Risks • Urban growth, including influx of migrants, in Hefei exceeds forecasts and exerts more pressure on available urban infrastructure. • Enforcement of environmental laws and regulations is weak.</td>
</tr>
<tr>
<td>Outcome</td>
<td>Memorandum of Understanding (MOU) signed by Government and ADB during appraisal mission</td>
<td>MOU of loan appraisal mission</td>
<td>Assumptions • The Hefei municipal government (HMG) remains committed to the project proposed for ADB financing. • Priorities for improving the environment of Hefei do not change.</td>
</tr>
<tr>
<td></td>
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<td>Risk • HMG uses other funding sources rather than ADB loan proceeds.</td>
</tr>
<tr>
<td>Outputs</td>
<td>Analysis of current urban situation and future directions to be completed by the second month of the project preparatory technical assistance (TA). Consensus reached on the midterm draft report by fourth month</td>
<td>Inception report and first tripartite review meeting (month 2) Midterm report and second tripartite review meeting (month 4)</td>
<td>Assumptions • Effective stakeholder participation and ownership are developed. • There is strong support from the Anhui provincial and Hefei municipal governments • Requisite data are made available and social surveys are successfully conducted.</td>
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</table>
### Design Summary

<table>
<thead>
<tr>
<th>Design Summary</th>
<th>Performance Targets</th>
<th>Data Sources/Reporting Mechanism</th>
<th>Assumptions and Risks</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Socioeconomic impact of subprojects and policy options on vulnerable groups and implications on resettlement</td>
<td>Completion of household surveys by third month of TA</td>
<td>Survey findings and affordability analysis and draft resettlement plans</td>
<td>Risks</td>
</tr>
<tr>
<td></td>
<td>Draft SEIA and EMP are submitted for review by the end of the TA</td>
<td>EIAs of various subprojects and final consultant report</td>
<td>• Delay in the completion of the various studies caused by negligence of the consultants</td>
</tr>
<tr>
<td></td>
<td>HMG agrees, in principle, to include the capacity-building component in the project design and to introduce good corporate governance in relevant agencies.</td>
<td>Draft final report of the consultants</td>
<td>• Weak coordination by the project management office of the executing agency</td>
</tr>
<tr>
<td></td>
<td>Three stakeholder workshops to be conducted at inception, midterm, and final tripartite meeting</td>
<td>Survey findings and minutes of the stakeholders workshops</td>
<td>• Resistance by some stakeholders</td>
</tr>
<tr>
<td></td>
<td>Draft proposal is prepared as part of the consultant final report submitted to ADB by the seventh month</td>
<td>Consultant final report and comments from HMG</td>
<td></td>
</tr>
</tbody>
</table>

### Activities with Milestones

1. **Review and analysis of Hefei’s urban development plans and programs and their financing requirements (month 1).**
2. **Holding of TA Inception tripartite meeting report and first stakeholder workshop (month 2).**
3. **Assessment of the technical, financial, economic, environmental, and social viability of subprojects, including conducting of household survey (month 1–3).**
4. **Analysis of the subproject/policy options for environment impact, poverty reduction, social impact, and involuntary resettlement (month 2–4).**
5. **Estimation of detailed costs and financing plan and institutional arrangements for different subproject/policy options (month 3–5).**
6. **Establishment of monitoring and evaluation system for project (month 4).**
7. **Development of capacity building and financing components (month 4).**
8. **Conduct of stakeholder workshop and second tripartite meeting (month 4).**
9. **Fine-tuning of the technical, financial, economic, environmental, and social assessments based on tripartite discussions (month 5–6).**
10. **Holding of final stakeholder workshop (month 6).**
11. **Final report and third tripartite meeting (month 7).**

### Inputs:
- **International consultants:** 18 person-months
- **Domestic consultants:** 37 person-months
- **ADB:** $750,000
- **Government:** $200,000
### INITIAL POVERTY AND SOCIAL ANALYSIS

#### A. Linkages to the Country Poverty Analysis

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the sector identified as a national priority in country poverty analysis?</td>
<td>☑️</td>
<td></td>
</tr>
<tr>
<td>Is the sector identified as a national priority in country poverty partnership agreement?</td>
<td>☑️</td>
<td></td>
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</tbody>
</table>

**Contribution of the sector or subsector to reduce poverty in the People’s Republic of China:** The Hefei Urban Environment Improvement Project will improve the urban environment of Hefei municipality and enhance the quality of life and health conditions of the 4.5 million residents. Hefei is the capital of Anhui, one of the less developed provinces in the People’s Republic of China (PRC). Changfeng, one of the three counties in Hefei, is a designated national-level poverty county and is the site of the Chao Lake flood control subproject, which will reduce the incidence of flood and prevent loss of crops and human lives in the mainly agricultural areas. Overall, the environmental benefits of the Project will include improved health conditions, especially for the poor who are most vulnerable to environment-related diseases.

#### B. Poverty Analysis

**Targeting Classification:** General intervention

**What type of poverty analysis is needed?**

Poverty analysis will be carried out to develop pro-poor design and quantify how the Project will help to reduce poverty, and incorporate other social dimensions within the scope of project implementation. The analysis will be conducted, following the guidelines in ADB’s *Handbook on Poverty and Social Analysis*.

#### C. Participation Process

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is there a stakeholder analysis?</td>
<td>☑️</td>
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</table>

Major stakeholders include national, provincial, municipal, and county governments; wastewater and solid waste management companies; and project beneficiaries including residents near the rivers to be cleaned up, villagers residing near the site of the flood control subproject, and Hefei commuters. Further stakeholder analysis, including a household survey, will be conducted during implementation of the technical assistance (TA).

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is there a participation strategy?</td>
<td>☑️</td>
<td></td>
</tr>
</tbody>
</table>

Three stakeholders’ workshops will be conducted during TA implementation. Findings from the household survey will be used as inputs. Public consultation will be carried out by the Executing Agency (EA), local government officials, design institute, and other institutes during preparation of the feasibility study, poverty and social assessment, environmental impact assessment, and resettlement plan.

#### D. Gender Development

**Strategy to maximize impacts on women:**

ADB’s *Policy on Gender and Development* will be followed by the EA during project preparation and implementation. The gender aspect will be incorporated in the design and implementation of some project components, particularly in relation to employment opportunities and the resettlement plan.

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has an output been prepared?</td>
<td>☑️</td>
<td></td>
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</tbody>
</table>

This will be prepared during TA implementation.
### E. Social Safeguards and Other Social Risks

<table>
<thead>
<tr>
<th>Item</th>
<th>Significant/ Not Significant/ None</th>
<th>Strategy to Address Issues</th>
<th>Plan Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resettlement</td>
<td>☒ Significant ☐ Not significant ☐ None</td>
<td>The resettlement plan (RP) will be prepared following the Land Administration Law and ADB's policy on involuntary resettlement. The RP will be disclosed to the public and affected people. Internal and external monitoring arrangements will be developed.</td>
<td>☒ Full ☐ Short ☐ None</td>
</tr>
<tr>
<td>Affordability</td>
<td>☐ Significant ☐ Not significant ☒ None</td>
<td>Economic and financial analyses will be conducted to determine affordability issues in all subprojects.</td>
<td>☐ Yes ☒ No</td>
</tr>
<tr>
<td>Labor</td>
<td>☐ Significant ☒ Not significant ☐ None</td>
<td>The Project will not have any negative impact on labor issues.</td>
<td>☐ Yes ☒ No</td>
</tr>
<tr>
<td>Indigenous Peoples</td>
<td>☐ Significant ☒ Not significant ☐ None</td>
<td>There are no ethnic minority groups in the project area. Of the targeted population, 99% belongs to ethnic Han and the rest of ethnic groups have similar customs and economic activities.</td>
<td>☐ Yes ☒ No</td>
</tr>
<tr>
<td>Other Risks and/or Vulnerabilities</td>
<td>☐ Significant ☒ Not significant ☐ None</td>
<td>The Project may have a negative impact on the poor due to land acquisition. The needs of vulnerable groups will be addressed in the RP.</td>
<td>☐ Yes ☒ No</td>
</tr>
</tbody>
</table>
## COST ESTIMATES AND FINANCING PLAN

($'000)

<table>
<thead>
<tr>
<th>Item</th>
<th>Foreign Exchange</th>
<th>Local Currency</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Asian Development Bank Financing</strong>&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Consultants</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Remuneration and Per Diem</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i. International (18 person-months)</td>
<td>378.0</td>
<td>-</td>
<td>378.0</td>
</tr>
<tr>
<td>ii. Domestic (37 person-months)</td>
<td>-</td>
<td>185.0</td>
<td>185.0</td>
</tr>
<tr>
<td>b. International and Local Travel</td>
<td>45.0</td>
<td>6.0</td>
<td>51.0</td>
</tr>
<tr>
<td>c. Reports and Communications</td>
<td>-</td>
<td>10.0</td>
<td>10.0</td>
</tr>
<tr>
<td>2. Equipment and Software&lt;sup&gt;b&lt;/sup&gt;</td>
<td>16.0</td>
<td>-</td>
<td>16.0</td>
</tr>
<tr>
<td>3. Survey</td>
<td>-</td>
<td>20.0</td>
<td>20.0</td>
</tr>
<tr>
<td>4. Miscellaneous Administration and Support Costs&lt;sup&gt;c&lt;/sup&gt;</td>
<td>-</td>
<td>16.0</td>
<td>16.0</td>
</tr>
<tr>
<td>5. Representatives for Contract Negotiations</td>
<td>5.0</td>
<td>-</td>
<td>5.0</td>
</tr>
<tr>
<td>6. Contingencies</td>
<td>45.0</td>
<td>24.0</td>
<td>69.0</td>
</tr>
<tr>
<td><strong>Subtotal (A)</strong></td>
<td><strong>489.0</strong></td>
<td><strong>261.0</strong></td>
<td><strong>750.0</strong></td>
</tr>
<tr>
<td><strong>B. Government Financing</strong></td>
<td></td>
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<td></td>
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<tr>
<td>1. Office Accommodation and Transport</td>
<td>-</td>
<td>70.0</td>
<td>70.0</td>
</tr>
<tr>
<td>2. Remuneration and Per Diem of Counterpart Staff</td>
<td>-</td>
<td>70.0</td>
<td>70.0</td>
</tr>
<tr>
<td>3. Others</td>
<td>-</td>
<td>60.0</td>
<td>60.0</td>
</tr>
<tr>
<td><strong>Subtotal (B)</strong></td>
<td>-</td>
<td><strong>200.0</strong></td>
<td><strong>200.0</strong></td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>489.0</strong></td>
<td><strong>461.0</strong></td>
<td><strong>950.0</strong></td>
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</tbody>
</table>

<sup>a</sup> Financed from the Asian Development Bank’s technical assistance funding program.

<sup>b</sup> Includes two desktop and two laptop computers, one photocopier, one laser printer, one scanner, one facsimile machine and MS software.

<sup>c</sup> Include associated costs for workshops.

Source: Asian Development Bank estimates.
OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

A. Scope of Work

1. The consultants will (i) conduct an analysis of Hefei’s urban development; (ii) review the domestic feasibility studies of the various subprojects; (iii) prepare a feasibility study report, including an assessment of the financial, economic, social, and environmental impacts of the Project, and a design and monitoring framework for the Project in accordance with policies and guidelines of the Asian Development Bank (ADB); and (iv) formulate an investment project to improve the urban environment of Hefei that is suitable for ADB financing.

B. Technical Aspects

2. The consultants will assess the technical aspects for all subprojects included in the four infrastructure components: (i) urban water resource management and pollution control (rehabilitation of Ershipu, Banqiaohe, and Silihe rivers and Chao Lake flood control and ecological improvement); (ii) wastewater management and water supply (construction of three wastewater treatment plants [WWTPs], expansion of the urban sewer network, and construction of Dafangying water plant); (iii) solid waste management and ecological improvement (medical and hazardous waste disposal center and former landfill site enhancement and pollution control); and (iv) northeast district road infrastructure development (expansion of urban roads and traffic management). For each subproject, the consultants will (i) review and update the feasibility studies, environmental assessments, and social surveys and relevant socioeconomic, environmental, hydrological, hydraulic, and other reports; (ii) assess the design criteria and standards and technical viability; (iii) identify the major items of civil works, plant, and equipment, and staffing requirements for operation and maintenance (O&M), and update cost estimates; (iii) prepare the implementation schedule and procurement packages; and (iv) identify the consulting inputs needed for project implementation, including institutional strengthening and development.

3. For the water supply and wastewater management subprojects, specific tasks will include, but will not be limited to, the following: (i) review the sewerage system in Hefei and identify major water users and major effluent discharges to evaluate the subprojects’ overall environmental impacts and benefits; (ii) for each catchment area, identify the current status of branch sewer connections and determine the targets of sewer construction and how each WWTP interconnects with the existing and proposed sewerage network; (iii) review and evaluate the standards or targets for surface water quality and effluent discharge; (iv) assess domestic, commercial, and industrial water demands and resulting wastewater discharges; (v) assess the optimum size of treatment plants and sewer mains based on assessed wastewater flow rates in their planning horizon; (vi) review, confirm, or advise on changes to the options for effective wastewater treatment as regards volumes, influent characteristics, climatic conditions, effluent standards, recycling, and sludge treatment and disposal; (vii) evaluate and recommend ways to improve the technical O&M procedures to ensure efficiency and longevity of the sewer, pumping stations, WWTPs, and all associated equipment; and (viii) assess the various technical options for the Dafangying water supply project and its impact on the watercourses in Hefei.

4. For urban river rehabilitation and Chao Lake flood control subprojects, the consultants will (i) review and assess historical flood records and existing flood protection levels relative to required standards for urban flood protection; (ii) identify and confirm areas with localized flood risks, the population at risk from urban flooding based on the stipulated standards, and the
potential damage from flooding incidents; (iii) evaluate the technical options and viability of the subprojects; (iv) review and make appropriate recommendations on field methods for investigating sludge quality and quantity, and extent of dredging requirements of the Ershipu, Banqiaohe, and Silihe subprojects; (v) review the flood storage and pumping requirements recommended to achieve flood protection; and (vi) assess the extent and identify potential causes of the deterioration of riverbanks and lake embankments.

5. For solid waste management, the consultants will (i) analyze the current situation of solid waste management (including its implications and impact on Hefei’s water resources) and the government’s proposals for medical and hazardous solid waste collection, pretreatment, incineration and sanitation landfill, ecological improvement of the former landfill site, and provision of recommendations based on international good practices and standards; (ii) identify and assess the subproject alternatives and confirm the least-cost solution, in particular the least-cost and environment-friendly options with regard to the incinerator plant, for meeting the medical and hazardous solid waste collection and treatment requirements in the subproject area; (iii) review the sites allocated for medical and hazardous solid waste treatment and disposal, and comment on suitability for the purpose, adequacy, and limitations; (iv) assess the maintenance requirements and associated staffing and financial commitment for managing and maintaining facilities for the two subprojects; (v) assess the possibility of incorporating landfill gas evacuation measures and clean development mechanisms as a way for enhancing revenues; and (vi) review quantities and costing of proposed collection and transfer plant and equipment, materials separation, and waste treatment facility construction.

6. For the northeast district road infrastructure development component, the consultants will (i) review all aspects related to road engineering, traffic management and road safety, and urban transport planning in connection with road network improvement in the new railway pilot zone; (ii) assess the subproject’s compatibility with the urban development plan and urban road network in the context of Hefei’s urban growth expansion, and recommend methods and guidelines for urban transport planning; (iii) review and update all aspects presented in the feasibility study and the preliminary design; (iv) define baseline and target values and dates for the selected indicators, covering economic, financial, transport, poverty impact, environmental, and resettlement aspects as inputs for the project design and monitoring framework; (v) review the current and potential parking regime, heavy vehicle operations and management, road safety practice and traffic enforcement practice, and vehicle emissions, and provide policy alternatives and actions; and (vi) develop a comprehensive package of traffic management measures and strategies, and prepare an institutional development program on urban transport planning and safety, and strategies and measures to reduce air pollution from vehicular emission.

C. Environmental Impact Assessment

7. The consultants will review the environmental impact assessments (EIAs) of the subprojects, suggest improvements, and help the Hefei municipal government (HMG) prepare a summary environmental impact assessment (SEIA) and an environmental management plan (EMP) for each subproject, following ADB’s Environmental Guidelines for Selected Infrastructure Projects (1993), Environmental Policy, (2002), and Environmental Assessment Requirements and Environmental Review Procedures. They should identify any gaps between the EIAs and the requirements of ADB’s environmental policy, and recommend additional studies to fill these gaps and improve the EIAs. Other specific duties will include the following: (i) identify risks and provide mitigating measures, where appropriate, and provide inputs in the write-ups for the EIAs and relevant sections of the feasibility studies; (ii) assist HMG with
stakeholder participation, consultation, and involvement during EIA/SEIA preparation and document these consultations and results in the EIA and SEIA; (iii) evaluate the environmental appropriateness of the subprojects and the use of the proposed technology, such as the incinerator for solid waste management, and describe other technical alternatives; (iv) provide the necessary environment analysis and justification inputs for the financial and economic analyses of each subproject; (v) establish environmental baseline indicators and performance targets such as water and air quality for the design and monitoring framework; (vi) prepare policy notes for discussion of urban air quality improvement, and environmental and land use planning and management; (vii) prepare the terms of reference and budgetary requirements for independent environment monitoring and evaluation during project implementation; and (viii) ensure that the SEIA and EMP are prepared in conformity with ADB’s guidelines.

D. Financial Analysis and Management Assessment

8. The consultants will make a financial analysis of each subproject and an analysis of the financial performance of the relevant revenue-generating entity in accordance with ADB’s Handbook for the Economic Analysis of Water Supply Projects and Guidelines for the Financial Governance and Management of Investment Projects Financed by the Asian Development Bank. In particular, they will (i) work with the economists to provide financial information and analysis relevant to a review of policy and practice in setting user charges or tariffs for public services (such as water and wastewater tariff level and structure, and medical and hazardous solid waste charges), following ADB’s position on tariffs as outlined in Technical Note No. 9 and other relevant publications from ADB’s Economics Research Department (ERD); (ii) assess the financial sustainability of the subprojects, including their financial internal rates of return, and perform sensitivity and risk analysis including switching value calculation and calculation of the real weighted average cost of capital; (iii) document and present the historical financial statements of the relevant subproject entities in the project area for the past 5 years; (iv) identify areas for improvement and training needed with respect to the quality of financial statements, disclosure, and notes to the financial statements; (v) review the past 5 years financial performance and evaluate their financial capacity regarding cost recovery, borrowing capacity, billing and collection, accounts receivable, and subsidies, as appropriate; (vi) prepare income statements, balance sheets, and cash flow statements for relevant subproject entities in nominal terms, forecast the results for 20 years after the beginning of full project operation, and calculate relevant financial ratios; (vii) review thoroughly the detailed cost tables with unit costs, physical quantities, and phasing of the project cost; and review and identify contract packages and the financing plan; (viii) analyze and summarize project costs using COSTAB or a similar software; and (ix) on the basis of the questionnaire checklist provided by ADB, assess financial management and review current accounting and administrative capacities for each implementing agencies (IAs), the internal control system employed, current internal audit, external or government audit; and recommend any changes as appropriate.

E. Economic Analysis

9. The consultants will work with the appointed design institutes to design and appraise each subproject. The economic analysis will include, but will not be limited to, the following: (i) review the terms of reference for economic analysis in the domestic feasibility studies and identify any divergence from ADB’s Guidelines for the Economic Analysis of Projects and other relevant publications; (ii) review the economic rationale for each subproject, and recommend changes to the proposed role of government in each subproject as needed; (iii) review the economic motivation or justification for each subproject, based on economic development plans, urban development plans, EMPs, or other relevant strategic plans and use the results of the
reviews to determine the extent of further benefit-cost analysis required to appraise the economic basis for each subproject, including estimating the economic internal rate of return (EIRR), and conduct that appraisal accordingly; (iv) work with the financial specialists to review the policy and practice in setting user charges or tariffs for public services relevant to the subprojects, following ADB's position on tariffs as outlined in ERD Technical Note No. 9, and other relevant publications from ERD, and recommend changes to policy and practice as needed; (v) review the demand forecasts relevant to each subproject, ensuring that forecasts are based on the projected tariffs or other charges, and all other relevant socioeconomic factors; (vi) review the analysis of options for each subproject, and ensure that the least-cost option is identified, taking into account policy changes, location, technology, timing, scale, and all other relevant factors; (vii) if additional information is needed to appraise each subproject, design questions and use the responses from the household survey to evaluate public preferences for the subprojects relative to other opportunities for public investment, applying various aggregation methods from social choice theory, including estimating the EIRR and net present value, as needed or relevant; (viii) ensure that the questionnaire used in the household survey collects economically meaningful and relevant information; (ix) apply the modern welfare theory to estimate the welfare impact of each subproject on the poorest households; (x) develop economically sound indicators of the health impact of the projects, and use the household survey and other relevant sources to develop baseline estimates of those indicators; (xi) evaluate economic risks to the projects, including risks from uncertain policy changes, implementation of policy, organizational changes, and others; (xii) determine if ADB's funds are fungible and, if so, investigate the marginal impact of ADB's funds on government expenditure; and (xiii) evaluate local policies and procedures relative to ADB's, and the role of ADB relative to any other foreign aid agencies working in Hefei, and identify potential conflicts in policies and procedures.

F. Social Dimensions and Resettlement

10. The consultants will (i) based on the initial poverty and social assessment, review the poverty situation in Hefei city and assess the project's impact on the poor; (ii) survey project beneficiaries by gender and income group, estimate the number of beneficiaries with income below the official poverty line, conduct affordability analysis, identify vulnerable groups (including ethnic minorities), assess project impacts, and recommend mitigating measures; (iii) work with the economists to design the questionnaire for the household survey and use the survey results to assess the social and poverty reduction impact, including willingness to pay, affordability analysis, income levels and distribution, socioeconomic and health benefits, and maximizing project benefit to women and assist in conducting a distribution analysis; (iv) collect and analyze health data, including morbidity and mortality rates due to waterborne diseases, which will be used to develop a project performance monitoring system to estimate benefits and impacts, including relevant benchmark such on the health impact; (v) orient HMG on ADB's *Involuntary Resettlement Policy* requirements and procedures and assess the policy and legal framework for resettlement in the PRC, identify any gaps compared with ADB policy, and propose measures to bridge the gap between ADB and PRC policies; (vi) review the draft resettlement plans (RPs) and prepare modifications as required in compliance with ADB’s *Handbook on Resettlement* and assist the IAs in finalizing the RPs; (vii) define categories for impact and compensation eligibility of affected people, and prepare an entitlements matrix (based on the PRC Land Administration Law, recent policy documents, local government regulations, and ADB’s *Policy on Involuntary Resettlement*); (viii) identify compensation and rehabilitation options, and develop livelihood rehabilitation and improvement programs in consultation with affected people; (ix) assist HMG in preparing a public consultation and disclosure plan, develop a format for documenting consultation with affected people, and initiate
a participatory process for RP preparation and implementation among affected communities, local leaders, proponents, and stakeholders; (x) as part of the socioeconomic baseline survey, assess the socioeconomic condition, needs, and priorities of women affected by land acquisition and resettlement, and identify specific measures to assist them and ensure that the process of land acquisition and resettlement does not disadvantage women; (xi) assess whether (a) the compensation standards are based on replacement value; (b) the overall resettlement budget is sufficient to acquire the land and implement the RP based on the proposed entitlements and rehabilitation plans; (c) if land redistribution will be undertaken, there is enough village reserve land available for reallocation to villagers and confirm that land readjustment will not negatively affect the host population; and (d) if relocation sites will be developed, affected persons will be consulted on the sites and services; (xii) review the organizational structure and capacity for resettlement implementation and recommend improvements and actions required before the start of land acquisition; (xiii) prepare a summary RP and a detailed resettlement implementation schedule that is linked to the overall project implementation schedule; and (xiv) help HMG develop an internal and external monitoring and evaluation plan, specifying key indicators of progress, mechanisms for reporting, resource requirements, and database maintenance.

G. Institution Development, Capacity Building, and Training

11. The consultants will (i) assess the capacity of HMG to formulate an urban development plan and IAs to implement, operate, maintain, and manage the facilities to be constructed under the Project in terms of technical and managerial expertise of staff; (ii) prepare institutional capacity-building programs for relevant subproject proponents concerned with water and HMG; (iii) assess the concerned IAs requirements and propose detailed, realistic, and operational organization of the PMO to ensure efficient implementation of the Project as well as an efficient structure for the IAs; and (iv) identify the consulting services required for project implementation and training for developing training programs under the loan; and (v) in consultation with the financial management specialist, prepare a corporate development plan and an associated training program for the relevant subproject companies—water supply, wastewater, and solid waste management companies in line with ADB’s Guidelines for Financial Governance and Management of Investment.