Report and Recommendation of the President to the Board of Directors

Project Number: 48158-002
November 2017

Proposed Loan and Administration of Loan and Grant
Kingdom of Cambodia: Provincial Water Supply and Sanitation Project

Asian Development Bank

CURRENCY EQUIVALENTS

(as of 11 October 2017)

Currency unit	–	riel (KR)
KR1.00	=	$0.000247
$1.00	=	KR4,044

ABBREVIATIONS

ADB	–	Asian Development Bank
AFD	–	Agence Française de Développement
AIF	–	Asia Investment Facility
JFJCM	–	Japan Fund for the Joint Crediting Mechanism
km	–	kilometer
m^3/day	–	cubic meter per day
MIH	–	Ministry of Industry and Handicraft
MPWT	–	Ministry of Public Works and Transport
NSDP	–	National Strategic Development Plan
O&M	–	operation and maintenance
PAM	–	project administration manual
PPWSA	–	Phnom Penh Water Supply Authority
PWU	–	provincial wastewater unit
TA	–	technical assistance
WSS	–	water supply and sanitation
WWTP	–	wastewater treatment plant

NOTE

In this report, “$” refers to United States dollars unless otherwise stated.

Vice-President	Stephen Groff, Operations 2
Director General	Ramesh Subramaniam, Southeast Asia Department (SERD)
Directors	Vijay Padmanabhan, Urban Development and Water Division, SERD Samiuela Tukuafu, Cambodia Resident Mission, SERD
Team leader	Michael White, Urban Development Specialist (Water Supply and Sanitation), SERD
Team members	Linda Adams, Senior Social Development Specialist, SERD Baurzhan Konysbayev, Principal Counsel, Office of the General Counsel Rose Fatima Luistro, Associate Project Analyst, SERD Melody Ovenden, Social Development Specialist (Resettlement), SERD Genevieve O'Farrell, Environment Specialist, SERD Adoracion Senador, Senior Operations Assistant, SERD Stella Tansengco-Schapero, Senior Finance Specialist, SERD
Peer reviewer	Vivian Castro-Wooldridge, Urban Development Specialist, South Asia Department

CONTENTS

PROJECT AT A GLANCE

1. Basic Data

Project Number: 48158-002

Project Name	Provincial Water Supply and Sanitation Project	**Department /Division**	SERD/SEUW
Country	CAM	**Executing Agency**	Ministry of Industry and Handicraft
Borrower	Kingdom of Cambodia		

2. Sector

	Sector	Subsector(s)	ADB Financing ($ million)
✓	**Water and other urban infrastructure and services**	Urban policy, institutional and capacity development	11.78
		Urban sanitation	19.11
		Urban water supply	19.11
		Total	**50.00**

3. Strategic Agenda

Strategic Agenda	Subcomponents
Inclusive economic growth (IEG)	Pillar 2: Access to economic opportunities, including jobs, made more inclusive
Environmentally sustainable growth (ESG)	Global and regional transboundary environmental concerns Urban environmental improvement

Climate Change Information

Adaptation ($ million)	1.73
Climate Change impact on the Project	Medium

4. Drivers of Change

Drivers of Change	Components
Governance and capacity development (GCD)	Institutional development Organizational development
Knowledge solutions (KNS)	Knowledge sharing activities
Partnerships (PAR)	Bilateral institutions (not client government) Official cofinancing
Private sector development (PSD)	Conducive policy and institutional environment

Gender Equity and Mainstreaming

Effective gender mainstreaming (EGM)	✓

5. Poverty and SDG Targeting

Geographic Targeting	No
Household Targeting	No
SDG Targeting	Yes
SDG Goals	SDG6

Location Impact

Urban	High

6. Risk Categorization: Low

7. Safeguard Categorization

Environment: B **Involuntary Resettlement:** B **Indigenous Peoples:** C

8. Financing

Modality and Sources	Amount ($ million)
ADB	**50.00**
Sovereign Project (Concessional Loan): Ordinary capital resources	50.00
Cofinancing	**58.64**
Agence Francaise de Developpement - Loan (Partial ADB Administration)	43.54
Asia Investment Facility - Grant (Not ADB Administered)	5.09
Japan Fund for the Joint Crediting Mechanism - Grant (Full ADB Administration)	10.00
Counterpart	**10.54**
Government	10.54
Total	**119.17**

Source: Asian Development Bank

I. THE PROPOSAL

1. I submit for your approval the following report and recommendation on a proposed loan to the Kingdom of Cambodia for the Provincial Water Supply and Sanitation Project.[1] The report also describes (i) the proposed administration of a loan to be provided by the Agence Française de Développement (AFD), and (ii) the proposed administration of a grant to be provided by the Japan Fund for the Joint Crediting Mechanism (JFJCM) for the Provincial Water Supply and Sanitation Project, and if the Board approves the proposed loan, I, acting under the authority delegated to me by the Board, approve the administration of the loan and grant.

2. The project will expand and improve urban water supply and sanitation (WSS) services in four of Cambodia's largest provincial cities, which are important commercial, industrial, and tourist centers but lack access to piped WSS services. The project will also improve institutional capacity to provide sustainable WSS services.

II. THE PROJECT

A. Rationale

3. **Macroeconomic context.** Cambodia's population was estimated at 15.2 million in 2016, spread across 24 provinces, 26 cities, and numerous district towns.[2] While Cambodia remains almost 80% rural, urbanization is accelerating and the urban population is expected to reach 30% of the national total by 2030. This urban growth has been centered mostly in and around the capital, Phnom Penh. Since 2000, provincial cities and towns have been impacted by the increasing urbanization and have played an increasingly important role in the country's economy. This is the case in the cities of Battambang, Kampong Cham, Siem Reap, and Sihanoukville, which have grown to become important secondary cities, commercial and connectivity hubs, and tourism centers.[3] Rapid economic development and urban migration in the cities highlighted the importance of basic urban services, especially WSS, and the necessity to upgrade and expand the infrastructure and improve service quality.

4. **Access to services**. Countrywide, population access to improved water supply in urban areas (excluding Phnom Penh) is 69.7%, while access to piped water supply is low at only 42.2%. Rapid expansion of the infrastructure is required to meet the government's 2025 target of 100% access to potable water for the entire population. Access to improved sanitation in urban areas is 80.2%, while access to sewerage and wastewater treatment is only 10.7%; a large proportion (69.3%) have individual systems (septic tanks). Open defecation in urban areas remains unacceptably high at 17.3%.[4] The low sanitation coverage across the country has led to widespread pollution, affecting rivers, coastal areas, and tourist areas. Except for Phnom Penh, the government has not been able to invest adequately in urban WSS since the mid-1990s resulting in significant service delivery gaps due to (i) inadequate funds for capital investment and operation, (ii) weak regulatory framework and sector planning, and (iii) weak institutional capacity to implement and provide sustainable services.[5]

---

[1] The design and monitoring framework is in Appendix 1.

[2] Government of Cambodia. 2014. Cambodia Inter-Censal Survey (CHDS) 2014. Phnom Penh.

[3] Estimated populations in 2015: Battambang (257,600), Kampong Cham (86,100), Siem Reap (200,000), and Sihanoukville (78,250).

[4] Improved urban water supply includes piped water to households, public tap and/or standpipe, bore holes, protected wells, and improved rainwater collection. Improved sanitation includes flush and/or pour flush to piped sewers, septic tanks, and pit latrines with slab. Government of Cambodia, Ministry of Planning. 2014. *Cambodia Socio-Economic Survey*. Phnom Penh (Tables 9 and 11).

[5] Urban water supply investments were mostly centered on Phnom Penh. The Phnom Penh Water Supply Authority is recognized as one of the most efficient water utilities in Asia. Nationwide sanitation is lagging significantly.

5. **Policy framework**. Cambodia's National Water and Sanitation Policy [6] laid basic principles for urban and rural WSS service delivery in the country, including duties and responsibilities for planning and implementation, standards, oversight, and evaluation. For urban areas, the National Strategic Development Plan (NSDP), 2014–2018 provides key actions for water supply, but actions for sanitation are not well-defined.[7] Consequently, the project team prepared a draft sanitation roadmap [8] under the technical assistance (TA) to support the subsector's development.[9]

6. **Institutional arrangements.** Responsibility for the WSS sector is fragmented, requiring cooperation among ministries and overcoming structural and organizational weaknesses. Urban water supply falls under the responsibility of the Ministry of Industry and Handicraft (MIH), and service delivery is entrusted to the provincial waterworks (PWWs) under provincial administation. The Ministry of Public Works and Transport (MPWT) is responsible for urban sanitation, while the provincial wastewater units (PWUs) under provincial administration are in charge of operation and maintenance. However, the PWWs and PWUs have limited autonomy—provincial waterworks operate using their revenues from water tariffs while PWUs operate with limited revenues as the recovery of sanitation tariffs is mixed with the provincial revenues. In late 2016, the government upgraded the Department of Potable Water Supply of MIH to a general department to better support the sector with increased staffing and improved organization of activities. While this change is significant for sector development, capacity development and training is required to support these expanded activities, which the project will support. The government created a dedicated Department for Urban Sanitation at MPWT with similar needs. Recent and continuing government reforms (para. 8) are transforming the sector and improving coordination between agencies, but additional support is needed to accelerate this work.

7. **Service delivery through the private sector.** In many cities and towns, small-scale private water operators have filled the gap, but these services generally only provide water to the more profitable core areas of the town and many households remain unconnected, particularly the poor.[10] However, the infrastructure, water quality, and service standards of private water operators remain poor and they lack the technical expertise and financial capacity to support any form of private sector development. Given the low participation levels by the private sector, MIH continues to expand service delivery by the provincial waterworks where there is significant demand.

8. **Sector reforms and improved financial performance.** In 2014, MIH launched a sector reform program to improve urban water supply services and the financial performance of

---

[6] Government of Cambodia. 2003. *National Water and Sanitation Policy*. Phnom Penh.

[7] Government of Cambodia. 2014. *National Strategic Development Plan, 2014–2018*. Phnom Penh. Key actions for water supply in the NSDP are (i) development of a legal framework for urban water supply; (ii) promotion of decentralization and deconcentration; (iii) transfer of full autonomy for service delivery to all provincial public waterworks; (iv) mobilization of urban water sector financing; (v) improvement of sector performance and public access to safe, affordable, and sustainable water supplies; and (vi) improvement in the protection of water sources and enforcement of regulations.

[8] The draft 20-year sanitation roadmap (expected to be adopted by 2020) provides directions on (i) tariff setting and cost recovery, (ii) subsidies to encourage increased uptake of sanitation, and (iii) city-wide sanitation planning and implementation. It also presents common aims and standards for all departments of public works and transport to (i) reduce the differences in capacity, (ii) improve planning for increased sanitation coverage, and (iii) improve coordination between the WSS subsectors.

[9] Technical assistance supported the development of prefeasibility studies and preliminary engineering designs for the project and a draft sanitation roadmap. ADB. 2013. *Technical Assistance for Supporting the Cities Development Initiative for Asia*. Manila.

[10] Investment by the private sector has been hindered by the use of 3-year water licenses, limited access to finance, and poor capacity. In 2014, MIH issued a ministerial decree that provides more clarity about the licensing process and grants a 20-year license term for operators in a defined service area.

provincial waterworks, focusing on operational improvements and efficiency gains. The program is based on the reforms that made the Phnom Penh Water Supply Authority (PPWSA) one of the most efficient water utilities in Asia.[11] The government introduced minor tariff increases where needed, as the law only permits tariffs adjustments every 5 years. Based on MIH's reform program, in 2017 (i) all provincial waterworks are recording positive incomes, (ii) nonrevenue water is mostly below 20%, and (iii) service quality has improved. Tariffs are now at sustainable levels for financing operation and maintenance (O&M) but are insufficient to finance the capital costs required for system expansion. Support for capital investments to expand infrastructure coverage and increase the customer base is an urgent priority for the MIH and is crucial for provincial waterworks to achieve financial autonomy by 2019 in line with the NSDP, 2014–2018.

9. **Support to the sanitation subsector.** Although the sanitation subsector has made positive steps in terms of coverage, overall, the wastewater (including collection and treatment) remains in the early stages of development. A new focus on sanitation has evolved through recent Asian Development Bank (ADB) urban development projects and good government support now exists to increase sanitation coverage, enhance sustainability through improving revenues for O&M, and reduce pollution of watercourses draining to the Tonle Sap lake and the sea.[12] Piped sewer systems and wastewater treatment plants (WWTPs) are present in only three provincial cities,[13] and expansion is needed for the environmental and health benefits to be realized. For other cities and towns, like Kampong Cham, formal sanitation services are absent, and septage management needs to be introduced as a first step in mainstreaming sanitation countrywide.

10. **Project-specific constraints.** Given that the government's ongoing sector reform is showing good results, the immediate demand is for capital investment to support the expansion of services. The project will support ongoing water supply and sanitation service improvement in key economic growth centers that experience the following constraints:[14]

(i) In Battambang, the population with access to piped water supply is about 31% and to sewerage is about 5%. WWTP capacity is inadequate to treat the sewage.
(ii) In Kampong Cham, the population with access to piped water supply is about 37% and there is no access to a formal sanitation system.
(iii) In Sihanoukville, while other projects are expanding access to water supply, the population with access to sewerage is about 22% but WWTP capacity is inadequate and needs expansion together with the sewerage system.
(iv) In Siem Reap, while other ongoing projects will expand access to water supply, the population with access to sewerage is about 50%. However, the trunk sewer is structurally and hydraulically inadequate, resulting in pollution of local watercourses.

11. **ADB's assistance and lessons learned.** ADB has supported the urban WSS sector since 1995, starting with support for water supply improvements in Phnom Penh. The project incorporates lessons learned in implementation: (i) improving specifications for materials and equipment to enhance project quality and sustainability; (ii) introducing energy efficiency measures to reduce O&M and capture carbon emissions; (iii) providing higher levels of project supervision to improve project deliverable quality; (iv) continuing provision of capacity building

[11] The success of PPWSA is characterized by strong and long-lasting leadership, autonomy to allow the freedom to operate on corporate principles, continuous staff development, performance-based bonus system, customer-oriented service, high-quality infrastructure and equipment, and a strong focus on nonrevenue water reduction, energy efficiency, and expansion of coverage.
[12] Battambang, Kampong Cham, and Siem Reap are cities in the Tonle Sap basin whose drainage systems flow to the Tonle Sap lake. Sihanoukville is the main coastal city where drainage systems discharge to the sea.
[13] Battambang, Siem Reap, and Sihanoukville—all with support from previous ADB-financed projects.
[14] The existing situation and proposed options in each town are included in the Pre-engineering Design Reports (accessible from the list of linked documents in Appendix 2).

support to improve sector sustainability; and (v) considering the use of design–build contracts to promote design flexibility and expedite project delivery through private sector efficiency.

12. **Development coordination.** The project has been closely designed with the Japan International Cooperation Agency and the AFD, which are active in this sector. While the World Bank has been less active, coordination continues as it has plans to re-enter the sector. The Japan International Cooperation Agency is working in numerous provinces to increase urban water supply coverage in core areas, and is providing extensive capacity development support for provincial waterworks. AFD is financing a new water treatment plant in Phnom Penh, and has a parallel cofinanced project in Siem Reap for a water treatment plant to provide water for the distribution zone financed by ADB.

13. **Strategic context.** The project is aligned with (i) phase 3 of the government's rectangular strategy for growth, employment, equity, and efficiency;[15] (ii) Cambodia's NSDP, 2014–2018; (iii) the action plans of the MIH to strengthen the management of publicly owned waterworks and integrate urban water supply with urban environmental management; and (iv) MPWT requirements for improved and effective urban sanitation. The project is consistent with the three pillars of the ADB country partnership strategy, 2014–2018 for Cambodia and supports ADB's Water Operational Plan and ADB's Urban Operational Plan.[16]

14. **Value added by ADB assistance.** ADB's continued assistance to the government's sector development strategy is important to ensure access to equitable WSS services in Cambodia's towns and cities. It will provide the finance and capacity development required to implement the project as well as (i) incorporate high-level technologies addressing cost-effective wastewater treatment, energy efficiency, and advanced construction techniques (trenchless methods for pipe laying); (ii) use design–build procurement modalities to expedite design and construction and benefit from private sector experience and capacity; (iii) support provincial waterworks' progress toward financial autonomy by 2019 by expanding the customer base; and (iv) promote sustainability of the PWUs, through ring-fencing of revenues dedicated for O&M and development of a financially sustainable tariff policy.

B. Impact and Outcome

15. The project is aligned with the following impact: improved urban environments and quality of life for the urban residents. The project will have the following outcome: sustainable piped WSS services provided in selected provincial cities.

C. Outputs

16. **Output 1: Improved piped water supply.** The project will finance two water supply subprojects (in Battambang and Kampong Cham), including two new water treatment plants with a combined capacity of 61,600 cubic meters per day (m^3/day) and new distribution networks with a combined length of 161 kilometers (km), which will also assist in reducing nonrevenue water. The expanded systems will serve an additional 209,000 people (about 40,000 connections) by 2022 (achieving a population coverage of about 90%), increasing revenues and reducing unit costs through increased economies of scale. The project will assist the government to develop a

[15] Government of Cambodia. 2013. *Rectangular Strategy for Growth, Employment, Equity, and Efficiency, Phase III.* Phnom Penh.

[16] ADB. 2014. *Country Partnership Strategy: Cambodia, 2014–2018.* Manila; ADB. 2011. *Water Operational Plan, 2011–2020*. Manila; and ADB. 2012. *Urban Operational Plan, 2012–2020*. Manila.

subsidized connection policy, similar to the PPWSA approach,[17] to encourage connection by poor and disadvantaged households (covering about 15% of connections). New laboratory equipment will improve monitoring and water quality testing.

17. **Output 2: Improved sanitation.** The project will finance four sanitation subprojects: (i) a new 10,625 m^3/day capacity WWTP at Battambang and 15.4 km of new sewers; (ii) a septage management system (collection, treatment, and disposal) in Kampong Cham; (iii) expansion of the Sihanoukville WWTP from 6,900 m^3/day to 20,500 m^3/day and 32.1 km of new sewers; and (iv) a new 3.7 km trunk sewer in Siem Reap, constructed using trenchless technology to limit disturbance to business and tourism activities.

18. **Output 3: Improved institutional effectiveness.** The project will strengthen institutional effectiveness through improved coordination between MIH and MPWT, provide continued support to help provincial waterworks and PWUs achieve financial autonomy, and support the MIH to develop its regulatory role. It will improve staff capacity in project implementation of urban WSS projects and O&M through on-the-job training. The project will help develop a new master's program in water and wastewater engineering with the Institute of Technology of Cambodia to support future graduates in the sector.[18]

D. Summary Cost Estimates and Financing Plan

19. The project is estimated to cost $119.17 million (Table 1).

Table 1: Summary Cost Estimates
($ million)

Item		Amount [a]
A.	**Base Costs**[b]	
	1. Improved piped water supply	45.70
	2. Improved sanitation	46.41
	3. Improved Institutional effectiveness	11.77
	Subtotal (A)	**103.88**
B.	**Contingencies**[c]	13.91
C.	**Financing Charges During Implementation**[d]	1.38
	Total (A+B+C)	**119.17**

[a] Includes taxes and duties of about $9.45 million, though exemption and cash. The government will pay value-added tax on civil works of about $8.44 million in cash. The Agence Française de Développement loan, Asia Investment Facility grant, and the Japan Fund for the Joint Crediting Mechanism grant will not finance taxes and duties.
[b] Prices as of August 2017.
[c] Physical contingencies computed at 10% for civil works including field research and development, training, surveys, and studies. Price contingencies computed at 1.5% on foreign exchange costs and 3.5% on local currency costs; includes provision for potential exchange rate fluctuation under the assumption of a purchasing power parity exchange rate.
[d] Includes interest during construction computed at 1% per year on the Asian Development Bank loan and zero on the Agence Française de Développement loan.
Source: Asian Development Bank estimates.

20. The government has requested (i) a concessional loan of $50 million from ADB's ordinary capital resources, and (ii) a grant of $10 million from JFJCM, funded by the Government of Japan and fully administered by ADB, to help finance the project. The loan will have a 32-year term, including a grace period of 8 years; an interest rate of 1.0% per year during the grace period and

[17] PPWSA approach provides subsidies of 100%, 70%, 50%, and 30% depending on household income and financial situation. The balance after the subsidy can be paid over a period of up to 24 months through water billing.
[18] Further information is provided in the Project Administration Manual (accessible from the list of linked documents in Appendix 2).

1.5% per year thereafter; and such other terms and conditions set forth in the draft loan agreement. The summary financing plan is in Table 2.

Table 2: Summary Financing Plan

Source	Amount ($ million)	Share of Total (%)
Asian Development Bank ordinary capital resources (concessional loan)	50.00	41.96
AFD (loan)[a]	43.54	36.54
JFJCM grant[b]	10.00	8.39
Government	10.54	8.84
EU–AIF grant[c]	5.09	4.27
Total	**119.17**	**100.00**

AFD = Agence Française de Développement, AIF = Asia Investment Facility, EU = European Union, JFJCM = Japan Fund for the Joint Crediting Mechanism

[a] €40 million loan amount excludes administration fees and other charges as may be deducted pursuant to the cofinancing agreement. Partial administration by the Asian Development Bank (ADB).

[b] ADB will provide procurement and disbursement services only.

[c] €4.67 million grant, parallel collaborative cofinancing to be administered by AFD, which is integral to the delivery of the project outputs.

Source: Asian Development Bank.

21. ADB will finance the expenditures in relation to civil works, equipment, and capacity development. The AFD will provide loan cofinancing of €40 million, which is partially administered (procurement and disbursement) by ADB. The AFD loan will have a 20-year term, including a grace period of 7 years; a tentative interest rate of 1.33% per year for the entire period of the loan.[19] The European Union (EU)–Asia Investment Facility (AIF) will provide a grant of €4.67 million, which is fully administered by the AFD.

22. Climate adaptation is estimated to cost $1.73 million and the ADB loan will fully finance the adaptation costs. The adaptation measures will cover protection of subprojects from rains and floods, adoption of water safety plans for water supply subprojects, and provision of public awareness and O&M training to manage water shortages during drought events. Climate mitigation is estimated to cost $8.33 million and the JFJCM and EU–AIF grants will finance the costs. Mitigation measures include installation of energy-efficient equipment in the WWTPs.

E. Implementation Arrangements

23. The implementation arrangements are summarized in Table 3 and presented in detail in the project administration manual (PAM).[20] The project is subject to universal procurement.[21]

Table 3: Implementation Arrangements

Aspects	Arrangements
Implementation period	January 2018–December 2022
Estimated completion date	31 December 2022 (loan and grant closing: 30 June 2023)
Management	
(i) Oversight body	Coordinating committee - representatives from MIH, MPWT, and MEF
(ii) Executing agency	MIH
(iii) Implementing agency	MPWT for sanitation
(iv) Implementation units	PWWs for water supply subprojects. PWUs for sanitation subprojects

[19] Tentative interest rate provided by AFD, final figure may vary based on AFD's negotiations with the government.

[20] Project Administration Manual (accessible from the list of linked documents in Appendix 2).

[21] ADB. 2013. *Blanket Waiver of Member Country Procurement Eligibility Restrictions in Cases of Cofinancing for Operations Financed from Asian Development Fund Resources.* Manila.

Aspects	Arrangements		
Procurement	International competitive bidding	MIH: 2 contracts MPWT: 3 contracts	$45,407,000 $46,680,000
	National competitive bidding	MIH: 1 contract MPWT: 2 contracts	$175,000 $1,030,000
	Shopping	MIH: 2 contracts MPWT: 3 contracts	$65,000 $113,000
Consulting services	Quality and cost-based selection	581 person-months JFJCM package	$5,032,000 $1,480,000
Advance contracting	Advanced action for consulting services and procurement of three works packages.[a]		
Disbursement	The loan proceeds will be disbursed in accordance with ADB's Loan *Disbursement Handbook* (2017, as amended from time to time) and detailed arrangements agreed upon between the government and ADB.		

ADB = Asian Development Bank, DPWT = Department of Public Works and Transport, GDPWS = General Department of Potable Water Supply, GDPW = General Department of Public Works, MEF = Ministry of Economy and Finance, MIH = Ministry of Industry and Handicrafts, MPWT = Ministry of Public Works and Transport, PWU = provincial wastewater unit, PWW = provincial waterworks.

[a] Recruitment of consultants commenced in November 2017 together with procurement of design–build contracts for (i) the Siem Reap trunk sewer, (ii) Kampong Cham water supply, and (iii) Battambang water supply.

Source: Asian Development Bank.

III. DUE DILIGENCE

A. Technical

24. The subprojects will adopt a lowest life-cycle cost solution that considers operational issues for WSS services and where each component operates efficiently when completed. Improved specifications for products and construction techniques for pipelines will ensure the long-term integrity of the water supply and sewer networks. To expedite project implementation and promote the use of high-level technologies, design–build contracts will be used for the (i) water supply subprojects at Battambang and Kampong Cham, including water source, treatment, and distribution system; (ii) WWTP at Sihanoukville, where solar-powered aerators will be employed to increase capacity and reduce energy and carbon emissions;[22] (iii) WWTP at Battambang, where a more advanced process (based on modified trickling filters, but open to other processes) will be used to avoid land acquisition and reduce energy and carbon emissions;[23] and (iv) trunk sewer at Siem Reap, where trenchless construction will minimize resettlement and compensation costs, and reduce pollution of the local watercourses. The project is classified *medium risk* for future climate change impacts. The climate adaptation measures are small and are included in the normal engineering design process. The most critical item is water abstraction from the river at Battambang. MIH will facilitate this process in close cooperation with the Ministry of Water Resources and Meteorology to secure sufficient water during the dry season.

B. Economic and Financial

25. **Economic analysis.** The project is economically viable.[24] The benefits of the water supply components were quantified based on (i) resource cost savings on non-incremental water consumed, (ii) value of incremental water consumed and billed, and (iii) value of incremental water consumed but not billed (nontechnical losses). The sanitation components' benefits were quantified in terms of health and environmental benefits and were measured using the disability-

[22] EU–AIF grant will finance energy-efficient improvements to the WWTP.

[23] JFJCM grant will finance the incremental cost of introducing a more advanced and energy-efficient WWTP.

[24] Financial Analysis and Economic Analysis (accessible from the list of linked documents in Appendix 2).

adjusted-life-year approach.[25] The base case economic internal rates of return for (i) water supply are 18.9% (Battambang) and 15.1% (Kampong Cham); and (ii) sanitation are 27.9% (Battambang), 19.1% (Kampong Cham) and 20.5% (Sihanoukville), higher than the social discount rate of 9%.

26. **Financial analysis.** The government will use the proceeds of the loans and grant for the WSS subprojects in all four provincial cities. The implementing agencies will be expected to fully cover O&M costs from fees collected to ensure sustainability, requiring tariff increases to be continued during and after the project, currently every 5 years.

(i) **Water supply.** Water tariffs are considered affordable as they remain within the affordability limit of 5% of average monthly household income. MIH reviews and adjusts water tariffs every 5 years, and they are required to be increased to ensure sustainability. Cash flows of provincial waterworks are positive in 2015 and for projected periods.

(ii) **Sanitation.** The financial assessment of the sanitation components confirmed that the proposed tariffs and/or fees fully recover O&M costs and partially recover depreciation. Cash flows of the Department of Public Works and Transport are positive in 2015 and for projected periods, and income will more than cover O&M expenses. The sanitation subprojects are considered financially sustainable as they too generate positive cash balances annually. Net cash inflows accumulated are adequate to finance the replacement of equipment. As part of the project, revenues from proposed sewerage tariffs will be ring-fenced for PWU operations and collected through the water billing.

C. Governance

27. The financial management risk is *moderate*. The financial management capacity of staff at the provincial level requires strengthening. The external audit oversight functions also need improvement. The appointment of experienced and qualified staff at MIH and MPWT is ongoing to strengthen their project management units. To mitigate the capacity risks, project implementation assistance consultants will conduct training on ADB procurement and disbursement guidelines, project accounting, and reporting.

28. ADB's Anticorruption Policy (1998, as amended to date) was explained to and discussed with the government. The specific policy requirements and supplementary measures are described in the PAM.

D. Poverty, Social, and Gender

29. The project will contribute to poverty reduction, improve health and hygiene, and the extended water supply systems should benefit some 107,400 women (51% of the population). The sanitation improvements should directly benefit some 47,400 women (51% of the population). The replacement of the Siem Reap interceptor sewer will provide an immediate benefit to some 25,400 people either connected to the system or within the vicinity of the trunk sewer route (by stopping sewage overflow along damaged sections). The key poverty reduction and social inclusive design features of the project include (i) subsidized water supply connections, and (ii) free sewer connections.

30. Based on the gender analysis and proposed actions, the project is *effective gender mainstreaming*. The gender assessment identified women's low participation in the sector,

[25] Harvard University developed the approach for the World Bank in 1990 for a study that provided a comprehensive assessment of mortality and disability from diseases, injuries, and risk factors. The World Health Organization adopted the method in 1996.

reflected in few women in decision-making positions within the executing agency and implementing agencies; low employment opportunities for women (arising from capacity and skill constraints) and opportunities for institutional advancement; lack of bathrooms and latrines for poor women affecting privacy and safety; and low affordability of connections and tariffs. The project will support increased women's representation in the urban WSS sector by setting female targets for staffing in project management units and project implementation units and providing capacity-development activities and employment opportunities during construction.

E. Safeguards

31. In compliance with ADB's Safeguard Policy Statement (2009), the project's safeguard categories are as follows.[26]

32. **Environment (category B).** The project team prepared two initial environmental examination reports based on the preliminary engineering designs, one each for water supply and sanitation.[27] Each initial environmental examination includes an environmental management plan for each group of subprojects with specific mitigation and monitoring measures for each. Public consultations were conducted to inform the project design and environmental assessment process and will continue during project detailed engineering design and implementation. The project team prepared the reports in compliance with government regulations and these reports were disclosed on ADB's website on 10 October 2017. The environmental management plans identify institutional arrangements and budget for implementation and are supported by loan covenants, capacity development, and consulting services. A grievance redress mechanism will facilitate resolution of complaints during implementation.

33. **Involuntary resettlement (category B).** The project has limited land acquisition and resettlement impacts. A land acquisition screening indicated no severely affected households. Impacts can be largely mitigated by applying defined design and construction approaches that confine construction works to public land and road right-of-way, avoiding any informal or formal occupation. Temporary impacts during pipeline construction, including other unanticipated impacts, will be addressed during implementation based on actual impacts and in accordance with the resettlement framework as disclosed on 10 October 2017. The project team prepared two resettlement plans for Battambang (one for water supply and one for wastewater). Land acquisition is required for 2.4 hectares (ha) of government land for water supply (four affected households), while the JFJCM grant avoids any land acquisition for the WWTP. The project team prepared four due diligence reports for subprojects with no land acquisition—one for the Kampong Cham water supply subproject and three for the wastewater subprojects at Kampong Cham, Siem Reap, and Sihanoukville.[28] The government will acquire land for the project facilities in accordance with government and ADB policies and procedures.

34. **Indigenous peoples (category C).** Very few ethnic minorities were identified during the socioeconomic survey undertaken for project preparation—the survey identified ethnic minorities only in Trakuan village in the Kampong Siem district of Kampong Cham province. 12 households (4.5%) are Cham, and two households (0.5%) are Vietnamese. Given the full integration of ethnic Cham into mainstream Khmer, the very small number of Vietnamese households encountered (who have also been integrated), and the identical impacts and benefits that will be realized by all households in the target areas, the project team did not prepare an indigenous peoples' plan.

[26] ADB. Safeguard Categories. https://www.adb.org/site/safeguards/safeguard-categories.
[27] Initial Environmental Examinations (accessible from the list of linked documents in Appendix 2).
[28] Resettlement Framework, Resettlement Plans, and Resettlement Due Diligence Reports (accessible from the list of linked documents in Appendix 2).

F. Summary of Risk Assessment and Risk Management Plan

35. Significant risks and mitigation measures are summarized in Table 4 and described in detail in the risk assessment and risk management plan.[29]

Table 4: Summary of Risks and Mitigation Measures

Risks	Mitigation Measures
Governance: limited absorptive capacity and skills of the PMUs and PIUs could delay project implementation.	Several subprojects will use design–build contracts to expedite the project and support new technology and construction techniques, requiring new skills for monitoring by the PMUs and PIUs. Required skills will be strengthened through capacity building and on-the-job training by the PIAC.
Public financial management: inadequate tariff structures and irregular tariff adjustments could adversely affect the financial sustainability of provincial waterworks and PWUs.	The project will support the GDPWS within MIH in making the tariff adjustments that are necessary to keep pace with cost escalation and cost recovery. Participating provincial waterworks are to become autonomous state-owned enterprises by 2019. The project will support the GDPW within MPWT in the structuring of appropriate tariffs with uniformity between the DPWTs and PWUs, and management processes for improving the recovery of fees and charges for operations and maintenance.
Procurement: unfamiliarity with procurement processes could cause delays.	Support and training during start-up activities (advance actions), support from the PIAC, and adoption of ADB procurement processes and practice.

ADB = Asian Development Bank, DPWT = Department of Public Works and Transport, GDPW = General Department of Public Works, GDPWS = General Department of Potable Water Supply, MIH = Ministry of Industry and Handicraft, MPWT = Ministry of Public Works and Transport, PIAC = project implementation assistance consultant, PIU = project implementation unit, PMU = project management unit, PWU = provincial wastewater unit.
Source: Asian Development Bank.

IV. ASSURANCES

36. The government has assured ADB that implementation of the project shall conform to all applicable ADB policies, including those concerning anticorruption measures, safeguards, gender, procurement, consulting services, and disbursement as described in detail in the project administration manual and loan covenants.

37. The government has agreed with ADB on certain covenants for the project, which are set forth in the draft loan agreement and grant agreement.

V. RECOMMENDATION

38. I am satisfied that the proposed loan would comply with the Articles of Agreement of the Asian Development Bank (ADB) and recommend that the Board approve the loan of $50,000,000 to the Kingdom of Cambodia for the Provincial Water Supply and Sanitation Project, from ADB's ordinary capital resources, in concessional terms, with an interest charge at the rate of 1.0% per year during the grace period and 1.5% per year thereafter; for a term of 32 years, including a grace period of 8 years; and such other terms and conditions as are substantially in accordance with those set forth in the draft loan agreement presented to the Board.

Takehiko Nakao
President

16 November 2017

[29] Risk Assessment and Risk Management Plan (accessible from the list of linked documents in Appendix 2).

DESIGN AND MONITORING FRAMEWORK

Impacts the Project is Aligned with Improved urban environments and quality of life for the urban residents (National Strategic Development Plan, 2014–2018). [a]			
Results Chain	**Performance Indicators with Targets and Baselines**	**Data Sources and Reporting Mechanisms**	**Risks**
Outcome Sustainable piped water supply and sanitation services provided in selected provincial cities	By 2023: a. Access to piped water[b] supply provided to an additional 209,000 residents in participating cities (2016 baseline: 99,800). b. Nonrevenue water reduced to 15% in participating cities (2016 baseline: 25%). c. Access to sanitation services provided to an additional 91,000 residents in participating cities (2016 baseline: 20,200).	a–b. Annual reports by provincial waterworks and MIH c. Annual reports by DPWTs and MPWT a–c. Monitoring reports, ADB loan missions, and baseline follow-up surveys	Inadequate and irregular tariff adjustments could adversely affect the sustainability of provincial waterworks and PWUs
Outputs 1. Improved piped water supply	By 2022: 1a. New water treatment plants of 61,600 m^3/day capacity provided in participating cities (2016 baseline: 0). 1b. Water supply pipe network extended by 161 km in participating cities (2016 baseline: 414 km). 1c. Additional 40,000 water connections provided in participating cities (2016 baseline: 22,020).	1a–1b. Construction records 1c. Water utility records and customer databases	Inadequate availability of raw water sources at Battambang during the dry season Political interference could adversely affect bidding and plan operations, and corruption could impair procurement and implementation
2. Improved sanitation	By 2022: 2a. Wastewater treatment plants of 31,125 m^3/day capacity provided in participating cities (2016 baseline: 457 m^3/day). 2b. Sewer system extended by 51.2 km in participating cities (2016 baselines: 0) 2c. New septage treatment facility of 2,400 m^3 capacity constructed (2016 baseline: 0). 2d. Free household sewer connections provided to 16,700 households in participating cities (2016 baseline: 0).	2a–2d. Construction records 2c–2d. Wastewater utility asset and customer databases	
3. Improved institutional effectiveness	By 2022: 3a. Sanitation roadmap adopted by MPWT (2016 baseline: none). 3b. At least 20% of all executing agency and implementing agencies' staff with increased knowledge in WSS service delivery, with at least 20% of the	3a. Project progress reports 3b–3c. Training records and attendance lists 3b–3h. Baseline and	

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting Mechanisms	Risks
	trained staff being women (2016 baseline: 0). 3c. 20 scholarship placements for new WSS master's program (2016 baseline: 0). 3d: At least 15% of GDPWS (MIH) management or supervisory staff are female (2016 baseline: 14%). 3e: At least 10% of provincial waterworks (PIU) management or supervisory staff are female (2016 baseline: 7%). 3f: At least 15% of GDPW (MPWT) management or supervisory staff are female (2016 baseline: <5%). 3g: At least 5% of PWU (PIU) management or supervisory staff are female (2016 baseline: <5%). 3h: Employment targets (at least 15%) for women hired by civil works contractors with further skills training (2016 baseline: 10% UWSP)	follow-up surveys in project cities 3h. Construction records and labor statistics	

Key Activities with Milestones

1. Improved piped water supply

1.1 Complete design–build documents of water treatment plants and distribution networks by November 2017
1.2 Complete bidding and contract award by June 2018
1.3 Construct and commission treatment plants by June 2021
1.4 Construct and commission water supply networks by June 2022

2. Improved sanitation

2.1 Siem Reap Trunk Sewer
2.1.1 Complete bidding documents for design–build contract by November 2017
2.1.2 Complete bidding and contract award by June 2018
2.1.3 Construct and commission trunk sewer and associated works by December 2019
2.2 Wastewater and Septage Treatment Facilities
2.2.1 Complete design–build documents for wastewater and septage treatment plants by October 2018
2.2.2 Complete bidding and contract award by April 2019
2.2.3 Complete the construction and commissioning of treatment plants by December 2021
2.3 Wastewater Networks
2.3.1 Prepare detailed design and bidding documents for wastewater networks by October 2018
2.3.2 Complete bidding and contract award by April 2019
2.3.3 Construct wastewater networks and provide wastewater connections by December 2022

3. Improved institutional effectiveness

3.1 Provide project management assistance and hands-on training to PMU and PIU throughout the project
3.2 Establish monitoring system to report on outputs and outcomes by June 2018
3.3 Check and validate NRW, gender, and other baseline data by June 2018
3.4 Design capacity development program for the executing agency and implementing agencies to support institutional reform, sector regulation, and private sector development by December 2018
3.5 Implement capacity development program for the executing agency and implementing agencies from January 2019 to September 2022
3.6 Develop Master's degree program in water and wastewater with Institute of Technology of

Key Activities with Milestones
Cambodia by September 2019 3.7 Implement Master's program and scholarship program October 2019 to September 2022 3.8 Develop and implement water supply and sanitation communication strategies by December 2018
Inputs
ADB: $50.00 million loan Government: counterpart staff: $10.54 million (estimated in cash and in-kind) to cover taxes and duties, and AFD: €40.00 million loan JFJCM: $10.00 million grant to support energy-efficient designs EU (AIF) €4.67 million[c]
Assumption for Partner Financing
None.

ADB = Asian Development Bank; AFD = Agence Française de Développement; AIF = Asia Investment Facility; CMDG = Cambodian Millennium Development Goal; DPWT = (provincial) departments of public works and transport; EMP = environmental management plan; EU = European Union; GDPWS = General Department of Potable Water Supply, JFJCM = Japan Fund for the Joint Crediting Mechanism; IEE = initial environmental examination; km = kilometer; m^3 = cubic meter, m^3/day = cubic meter per day, MIH = Ministry of Industry and Handicrafts, MPWT = Ministry of Public Works and Transport; NRW = nonrevenue water; NSDP = National Strategic Development Plan; O&M = operation and maintenance; PIU = project implementation unit; PMU = project management unit; PPP = public–private partnership; PWU = provincial wastewater unit, UWSP = Urban Water Supply Project; WSS = water supply and sanitation.

[a] Government of Cambodia. 2014. *National Strategic Development Plan, 2014–2018*. Phnom Penh. Key actions for water supply in the NSDP are (i) development of a legal framework for urban water supply; (ii) promotion of decentralization and deconcentration; (iii) transfer of full autonomy for service delivery to all provincial waterworks; (iv) mobilization of urban water sector financing; (v) improvement of sector performance and public access to safe, affordable, and sustainable water supplies; and (vi) improvement in the protection of water sources and enforcement of regulations.

[b] To Cambodian national drinking water standards.

[c] Integral part of the project and factors into the project assumptions. Full administration of the grant by AFD.

Source: Asian Development Bank.

LIST OF LINKED DOCUMENTS

http://www.adb.org/Documents/RRPs/?id=48158-002-3

1. Loan Agreement
2. Grant Agreement
3. Sector Assessment (Summary): Water and Other Urban Infrastructure and Services
4. Project Administration Manual
5. Contribution to the ADB Results Framework
6. Development Coordination
7. Financial Analysis
8. Economic Analysis
9. Country Economic Indicators
10. Summary Poverty Reduction and Social Strategy
11. Risk Assessment and Risk Management Plan
12. Climate Change Assessment
13. Gender Action Plan
14. Initial Environmental Examination: Water Supply Subprojects
15. Initial Environmental Examination: Wastewater Subprojects
16. Resettlement Plan: Battambang Water Supply Subproject
17. Resettlement Plan: Battambang Wastewater and Sanitation Subproject
18. Resettlement Framework

Supplementary Documents

19. Project Participation Plan
20. Preliminary Engineering Design Reports: Battambang, Kampong Cham, Siem Reap, and Sihanoukville
21. Poverty, Social Impact and Gender Analysis
22. Summary Stakeholder Communication Strategy
23. Complete Economic and Financial Analysis
24. Climate Risk and Vulnerability Assessment
25. Resettlement Due Diligence Report: Kampong Cham Water Supply Subproject
26. Resettlement Due Diligence Report: Preah Sihanoukville Wastewater Subproject
27. Resettlement Due Diligence Report: Siem Reap Wastewater Subproject
28. Resettlement Due Diligence Report: Kampong Cham Septage Subproject