

FINANCIAL ANALYSIS

A. Introduction

1. The financial analysis for the project was undertaken by following Asian Development Bank (ADB) policies and guidelines.¹ A financial cost–revenue analysis was conducted for the revenue-generating wastewater and drainage, and solid waste management components, to determine their financial viabilities. The financial internal rates of return were negative in all cases as a result of projecting financial cash flows for 20 years after project completion, with revenues from wastewater fees or solid waste fees applied in other Cambodian towns.² This is common for urban wastewater, drainage, and sanitation services because of the high capital investments of these assets in Cambodia and other developing countries in the region.³

2. Kampong Cham, Kratie, and Stung Treng have no tariffs for wastewater and drainage services because of the absence of a centralized system. Solid waste fees are collected, but service delivery and fee collection are irregular. The objective of the financial analysis is to evaluate (i) the financial sustainability of operating the wastewater and drainage, solid waste management, and town center environmental enhancement infrastructure, including projected tariffs and operation and maintenance (O&M) costs, and the level of subsidies required to fill the financial gaps; (ii) the financial performance of the Ministry of Public Works and Transport (MPWT), the three provincial Departments of Public Works and Transport (DPWTs), and the town governments; and (iii) the affordability of the proposed tariffs to low-income households (Table 1).

Table 1: Scope of Financial Analysis

Component	Revenue-Generating Potential	Analysis of Tariffs to Cover operation and maintenance	Affordability Analysis	Fiscal Analysis
Urban drainage improvements	No	Yes	No	Departments of Public Works and Transport
Wastewater management	Yes	Yes	Yes	
Solid waste management	Yes	Yes	Yes	Town governments
Town center enhancement	No	Yes	No	

Source: Asian Development Bank

B. Financial Sustainability Analysis

1. Wastewater and Drainage Services

3. **Wastewater tariffs.** The DPWTs will be responsible for O&M of the wastewater and drainage services. In some Cambodian cities, a wastewater fee is collected directly by the DPWT or through the monthly water bill by the provincial waterworks (PWWs).⁴ Although the PWWs

¹ ADB. 2014. Financial Management, Cost Estimates, Financial Analysis, and Financial Performance Indicators. *Operations Manual*. OM G2/BP. Manila; ADB. 2005. *Financial Management and Analysis of Projects*. Manila; ADB. 2009. *Financial Due Diligence: A Methodology Note*. Manila.

² Calculated financial internal rates of return were –10.3% for wastewater and –4.7% for solid waste for Kampong Cham; –13.1% for wastewater and –5.0% for solid waste for Kratie; and –21.6% for wastewater and –7.5% for solid waste for Stung Treng.

³ For example: ADB. 2017. *Report and Recommendation of the President to the Board of Directors: Proposed Loan and Administration of Loan and Grant to the Kingdom of Cambodia for the Provincial Water Supply and Sanitation Project*. Manila; ADB. 2017. *Report and Recommendation of the President to the Board of Directors: Proposed Loans and Administration of Grants and Technical Assistance Grants to the Socialist Republic of Viet Nam for the Secondary Green Cities Development Project*. Manila.

⁴ In Siemreap and Sihanoukville, DPWT's semiautonomous wastewater unit bills customers directly. Sihanoukville's commercial and industrial customers contributed 76% of total revenues in 2015. In Phnom Penh and Battambang, a wastewater fee is included on the monthly water bill to capitalize on the water utility's customer base. In Phnom Penh, the fee is 10% of the water bill; in Battambang, it is KR100 per cubic meter (m³) of water billed.

indicated their willingness, no arrangements have been finalized at the time of project preparation. The MPWT will work with the provincial governments and the PWWs to assess feasibility and the administration fee to be paid to the PWWs. Alternatively, the government collects a fixed environmental fee from households. The MPWT and DPWTs will adapt an approach based on the customer profile, the level of infrastructure development, and willingness to pay.

4. **Financial projections and funding gaps.** In the base case, the revenue projections assume (i) a wastewater fee will be collected as a surcharge on the water bill starting in 2023; (ii) wastewater fees for households will be 10% of the water bill, 20% for government and industry, and 25% for commercial customers; (iii) water tariffs will increase by 10%, every 5 years, from 2022;⁵ (iv) the water consumption of households will increase by 10% every 5 years, from 2017;⁶ (v) the number of water connections will increase annually by 1%–2%; and (vi) Kampong Cham and Stung Treng will have large increases in water connections in 2022 when ongoing water supply improvement projects are completed.⁷ Annual wastewater and drainage O&M costs are estimated to be about 1% of the capital expenditure.⁸ To achieve full O&M cost recovery, three different tariff schemes were analyzed in addition to the base case (Table 2).

Table 2: Proposed Tariff Schemes

Tariff Scenario	Assumption
Base case (B)	Water bill: 10% for household, 20% for government and industry, 25% for commerce
Scenario 1 (S1)	Water bill: 20% for household, 25% for government and industry, 30% for commerce
Scenario 2 (S2)	Environmental fee: KR4,000 (about \$1) per month from each town household
Scenario 3 (S3)	Environmental fee: KR8,000 (about \$2) per month from each town household

Source: Asian Development Bank

5. Under the base case (Table 3), the analysis indicated that only Kampong Cham can achieve full O&M cost recovery, while Kratie and Stung Treng will have to rely heavily on central government subsidies. Annual subsidy requirements will be from KR0.60 billion to KR0.82 billion for Kratie and KR0.57 billion to KR0.92 billion for Stung Treng. For Kratie, full O&M cost recovery (i.e., positive net cash flow) can be achieved by scenario 3 in 2027 and by scenario 1 in 2042. For Stung Treng, full O&M cost recovery is only possible under scenario 3 in 2042.

Table 3: Wastewater and Drainage Projected Revenues, Operation and Maintenance, and Funding Gaps (KR billion)

	2024	2026	2028	2030	2032	2034	2036	2038	2040	2042
Kampong Cham										
Wastewater fee (B)	0.98	1.00	1.15	1.17	1.34	1.37	1.39	1.61	1.64	1.89
Wastewater O&M	(0.42)	(0.45)	(0.48)	(0.51)	(0.55)	(0.59)	(0.63)	(0.68)	(0.72)	(0.78)
Drainage O&M	(0.47)	(0.50)	(0.54)	(0.58)	(0.62)	(0.66)	(0.71)	(0.76)	(0.81)	(0.87)
Net cash flow (B)	0.09	0.05	0.13	0.08	0.17	0.12	0.05	0.17	0.10	0.24

⁵ The levels of water tariffs are (i) Kampong Cham: KR900 for the first 6 m³, KR1,250 for the next 9 m³, and KR1,600 above 15 m³; (ii) Kratie: KR1,650 for the first 7 m³, KR1,750 for the next 8 m³, and KR1,800 above 15 m³; and (iii) Stung Treng: KR1,500/m³.

⁶ The 2017 data obtained from the PWWs are (i) 21.0 m³/month per household in Kampong Cham, (ii) 21.0 m³/month per household in Kratie; and (iii) 21.7 m³/month per household in Stung Treng.

⁷ Two ongoing projects are ADB. 2014. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the Kingdom of Cambodia for the Urban Water Supply Project*. Manila; and ADB. 2017. *Report and Recommendation of the President to the Board of Directors: Proposed Loan and Administration of Loan and Grant to the Kingdom of Cambodia for the Provincial Water Supply and Sanitation Project*. Manila. As of 2017, the number of customers are: (i) Kampong Cham: 4,635 households, 160 government buildings, and 2,947 commercial connections; (ii) Kratie: 3,972 households, 98 government buildings, 173 commercial connections, and two industrial connections; and (iii) Stung Treng: 2,261 households, 60 government buildings, 122 commercial connections, and 92 industrial connections. Stung Treng customers classified as industry do not refer to big industrial companies.

⁸ The estimated O&M cost was 0.5%–0.7% of capital expenditure in three towns, including power and water supply, fuel, salary for workers, labor for desludging and pipe cleaning, maintenance for pumps, and mechanical equipment.

	2024	2026	2028	2030	2032	2034	2036	2038	2040	2042
Kratie										
Wastewater fee (B)	0.35	0.37	0.45	0.46	0.56	0.59	0.61	0.74	0.77	0.95
Wastewater fee (S1)	0.62	0.64	0.79	0.82	1.01	1.05	1.09	1.34	1.40	1.73
Environmental fee (S2)	0.42	0.45	0.57	0.61	0.78	0.83	0.89	1.14	1.22	1.57
Environmental fee (S3)	0.85	0.90	1.15	1.22	1.57	1.67	1.78	2.29	2.44	3.14
Wastewater O&M	(0.51)	(0.54)	(0.58)	(0.62)	(0.67)	(0.72)	(0.77)	(0.82)	(0.88)	(0.94)
Drainage O&M	(0.44)	(0.47)	(0.51)	(0.54)	(0.58)	(0.62)	(0.67)	(0.72)	(0.77)	(0.82)
Net cash flow (B)	(0.60)	(0.65)	(0.64)	(0.71)	(0.69)	(0.75)	(0.83)	(0.79)	(0.88)	(0.82)
Net cash flow (S1)	(0.33)	(0.38)	(0.30)	(0.35)	(0.24)	(0.29)	(0.35)	(0.19)	(0.25)	(0.04)
Net cash flow (S2)	(0.53)	(0.57)	(0.51)	(0.56)	(0.47)	(0.50)	(0.55)	(0.39)	(0.43)	(0.19)
Net cash flow (S3)	(0.10)	(0.12)	0.06	0.05	0.32	0.33	0.34	0.75	0.79	1.38
Stung Treng										
Wastewater fee (B)	0.16	0.16	0.20	0.21	0.26	0.27	0.28	0.34	0.35	0.43
Wastewater fee (S1)	0.29	0.30	0.37	0.38	0.47	0.49	0.51	0.63	0.66	0.81
Environmental fee (S2)	0.20	0.22	0.28	0.30	0.39	0.41	0.44	0.57	0.61	0.79
Environmental fee (S3)	0.41	0.44	0.56	0.60	0.77	0.83	0.89	1.15	1.22	1.58
Wastewater O&M	(0.40)	(0.43)	(0.46)	(0.49)	(0.53)	(0.56)	(0.60)	(0.65)	(0.69)	(0.74)
Drainage O&M	(0.33)	(0.35)	(0.38)	(0.41)	(0.44)	(0.47)	(0.50)	(0.54)	(0.57)	(0.61)
Net cash flow (B)	(0.57)	(0.62)	(0.64)	(0.69)	(0.71)	(0.76)	(0.83)	(0.84)	(0.91)	(0.92)
Net cash flow (S1)	(0.44)	(0.48)	(0.47)	(0.52)	(0.49)	(0.54)	(0.59)	(0.55)	(0.61)	(0.54)
Net cash flow (S2)	(0.53)	(0.56)	(0.56)	(0.60)	(0.57)	(0.62)	(0.66)	(0.61)	(0.65)	(0.56)
Net cash flow (S3)	(0.32)	(0.35)	(0.28)	(0.30)	(0.19)	(0.20)	(0.22)	(0.04)	(0.04)	0.23

() = negative, O&M = operation and maintenance.

Source: Asian Development Bank

2. Solid Waste Management Services

6. **Solid waste tariffs.** In all towns, only 30%–36% of households are served by solid waste management services. In Kampong Cham and Kratie, the town governments have contracted private service providers. The monthly Solid Waste Management (SWM) fee for households is KR4,000–KR6,000, and KR3,000 and above for other customers. Tariff collection is door-to-door and inefficient, and most households have little willingness to pay.⁹ Town governments prefer to collect the fee as a surcharge on a utility bill to ensure higher revenue collection.

Table 4: Solid Waste Projected Revenues, Operation and Maintenance, and Funding Gaps (KR billion)

	2024	2026	2028	2030	2032	2034	2036	2038	2040	2042
Kampong Cham										
SWM fees	1.20	1.24	1.42	1.47	1.68	1.75	1.82	2.09	2.19	2.51
SWM O&M	(0.41)	(0.44)	(0.47)	(0.51)	(0.54)	(0.58)	(0.62)	(0.67)	(0.71)	(0.76)
Net cash flow	0.79	0.80	0.95	0.97	1.14	1.17	1.20	1.43	1.47	1.75
Kratie										
SWM fees	0.68	0.72	0.86	0.90	1.09	1.15	1.21	1.50	1.58	1.98
SWM O&M	(0.36)	(0.38)	(0.41)	(0.44)	(0.47)	(0.51)	(0.54)	(0.58)	(0.62)	(0.67)
Net cash flow	0.32	0.33	0.44	0.46	0.62	0.64	0.67	0.92	0.96	1.31
Stung Treng										
SWM fees	0.53	0.56	0.66	0.70	0.85	0.90	0.95	1.15	1.22	1.48
SWM O&M	(0.37)	(0.40)	(0.43)	(0.46)	(0.49)	(0.53)	(0.56)	(0.61)	(0.65)	(0.69)
Net cash flow	0.15	0.16	0.23	0.24	0.35	0.37	0.38	0.54	0.57	0.79

() = negative, O&M = operation and maintenance, SWM = Solid Waste Management.

Source: Asian Development Bank

7. **Financial projections and funding gaps.** Revenues from solid waste management services were projected from 2024 to 2042 (Table 4). The revenue projections assume that (i) the

⁹ The towns' solid waste operators are (i) Centri Co. Ltd., serving about 3,850 customers, including 1,860 households, in Kampong Cham; (ii) a private company serving 2,674 customers, including 2,572 households, in Kratie; and (iii) the municipal government, serving about 2,225 customers, including 1,969 households, in Stung Treng.

fee for households will be kept at current levels but collected on the electricity bill (e.g. 95% of households are billed);¹⁰ (ii) private operators or town governments will directly bill large customers (e.g., markets); and (iii) fees will increase by 10% every 5 years. The cost projections assume that (i) the electricity company will charge an administration fee of 15% of the collected fees; and (ii) annual O&M costs will be 1% of the capital expenditure (footnote 8). The analysis concluded that the service will generate sufficient surplus for sustainable O&M. The projected surplus will be KR0.79 billion–KR1.75 billion for Kampong Cham, KR0.32 billion–KR1.31 billion for Kratie, and KR0.15 billion–KR0.79 billion for Stung Treng in 2024–2042.

3. Sustainability Assessment

8. The analysis demonstrates that while the solid waste management tariffs and collection scheme assumed above are projected to fully cover O&M, fees for wastewater and drainage services should be carefully determined in the project towns. The towns will struggle to generate enough revenue because of (i) low water supply tariffs, (ii) low coverage and water connections, and (iii) high O&M cost for wastewater and drainage services. The different agencies in charge of operating the services—PWWs under the Ministry of Industry and Handicraft for water supply; DPWTs under the MPWT and/or provincial government for wastewater and drainage; and town governments for solid waste management—should discuss and agree on the most appropriate public utility tariff schemes, collection methods, and financial management, including cross-subsidization to ensure the financial sustainability of urban services in each province.

9. **Provincial Departments of Public Works and Transport and town governments.** The fiscal revenue and expenditure of DPWTs and town governments in 2015–2017 indicated no fiscal surplus (Table 5).¹¹ DPWTs' fiscal revenues are heavily dependent on the national government's budget allocation (i.e., 77%–97% of 2017 budgeted revenues), which transfers the funds through the MPWT. DPWTs have small revenues from the sale or lease of properties, fines, and penalties; with O&M expenditure mainly for roads instead of wastewater and drainage related infrastructures. This is the same for all three town governments. About 92%–98% of the revenue comes from the national government's budget transfer (Table 6). The main recurrent costs are salaries and administrative costs, with small funds for O&M expenses of infrastructures.

Table 5: Fiscal Revenues and Expenditures of Department of Public Works and Transport, 2015–2017 (KR million)

Item	Kampong Cham			Kratie			Stung Treng		
	2015	2016	2017	2015	2016	2017	2015	2016	2017
Revenues									
Properties sales, rentals and services	1,631	1,276	1,121	417	189	416	5	6	81
National government allocations	711	3,502	5,718	23,147	22,400	24,945	5,409	9,624	6,481
Others	973	518	518	0	0	0	0	0	0
Total revenues	3,313	5,296	7,357	23,564	22,588	25,361	5,414	9,630	6,562
Expenditures									
Personnel	1,807	2,224	1,812	688	915	984	454	596	1,029
External services (including O&M)	160	140	140	397	574	577	930	930	852
Others	149	171	171	210	98	86	207	212	270
Total expenditures	2,116	2,535	2,123	1,295	1,587	1,647	1,591	1,738	2,151
Revenue surplus/(Deficit)	1,198	2,760	5,233	22,270	21,002	23,713	3,823	7,892	4,411
Capital investment	1,198	2,760	5,233	22,270	21,002	23,713	3,823	7,892	4,411

Note: Numbers may not sum precisely because of rounding.

Source: Asian Development Bank

¹⁰ In Phnom Penh, the solid waste management fee collected through the electricity bill is \$1–\$5 per month for households and higher for other customers.

¹¹ The national government finances more than 97% of the MPWT's annual budget through transfers. Other sources of revenue include revenue relating to state property (including sales and rental) and fines and penalties. A large portion of its expenditures is for investments in infrastructure, followed by external services and staff salaries.

Table 6: Three Towns' Fiscal Revenues and Expenditures, 2015–2017 (KR million)

Item	Kampong Cham			Kratie			Stung Treng		
	2015	2016	2017	2015	2016	2017	2015	2016	2017
Revenues									
Properties sales, rentals and services	196	195	150	190	122	128	59	47	50
National Government allocations	1,273	1,496	1,847	1,164	1,401	1,471	1,290	2,275	2,389
Others	0	0	0	0	0	0	0	3	3
Total Revenues	1,469	1,690	1,997	1,354	1,523	1,599	1,349	2,325	2,441
Expenditures									
Personnel	356	564	962	382	460	483	514	678	712
External services (including O&M)	217	363	1,122	322	365	384	336	308	323
Others	27	30	48	33	36	38	46	45	47
Total Expenditures	600	957	2,132	737	861	905	896	1,031	1,082
Revenue Surplus/(Deficit)	869	733	(135)	617	662	694	453	1,294	1,359
Transfers to Sangkat	699	785	23	606	697	731	524	607	637
Capital investment	0	0	0	0	0	0	168	385	404
Year-end Revenue Surplus/(Deficit)	170	(52)	(158)	11	(35)	(37)	(239)	302	318

Note: Numbers may not sum precisely because of rounding.

Source: Asian Development Bank

C. Affordability Analysis

10. The affordability of water supply, wastewater and drainage, and solid waste fees was assessed (Table 7). The analysis indicated that the level of public utility fees in low-income households under all tariff scenarios will be 2.0%–2.9% for Kampong Cham, 2.4%–4.4% for Kratie, and 2.5%–4.7% for Stung Treng. The government needs to achieve a balance between full O&M cost recovery (Tables 3 and 4) and the affordability of low-income households (Table 7).

Table 7: Affordability of Monthly Utility Bills for Low-Income Households

Urban Service	2024–2026	2027–2031	2032–2036	2037–2041
Kampong Cham				
Water fee ^a	12,500	13,800	15,200	16,700
Wastewater fee (B)	1,250	1,380	1,520	1,670
Solid waste fee	6,600	7,300	8,000	8,800
% of monthly low-income household	2.6%–2.9%	2.4%–2.7%	2.2%–2.5%	2.0%–2.4%
Kratie				
Water fee ^a	20,000	22,000	24,200	26,600
Wastewater fees (B)	2,000	2,200	2,420	2,660
Wastewater fees (S1)	4,000	4,400	4,840	5,330
Wastewater fees (S2)	4,040	4,440	4,880	5,370
Wastewater fees (S3)	8,070	8,880	9,760	10,740
Solid waste fee	5,500	6,050	6,660	7,320
% of monthly low-income household	3.2%–4.4%	2.9%–4.1%	2.6%–3.8%	2.4%–3.4%
Stung Treng				
Water fee ^a	17,800	19,600	21,600	23,700
Wastewater fees (B)	1,780	1,960	2,160	2,370
Wastewater fees (S1)	3,560	3,920	4,310	4,740
Wastewater fees (S2)	4,040	4,440	4,880	5,370
Wastewater fees (S3)	8,070	8,880	9,760	10,740
Solid waste fee	4,400	4,800	5,250	5,650
% of monthly low-income household	3.3%–4.7%	3.0%–4.4%	2.7%–4.0%	2.5%–3.7%

^a Estimated as household monthly water consumption of 11 cubic meters per month.

Source: Asian Development Bank

D. Proposed Covenants

11. The proposed covenants include the formulation of the financial sustainability road map, which ensures to fund the O&M financial gaps, establish an appropriate institutional framework for tariff collection and financial management, and achieve affordability of poor households.