

Socialist Republic of Viet Nam

FY2016 Ex-Post Evaluation of ODA Loan “Ho Chi Minh Water Environment Improvement
Project (I) (II) (III)”

External Evaluator: Akiko Ishii

Ernst & Young Shin Nihon LLC.

0. Summary

This project was implemented to prevent and mitigate flood damage by improving canals and developing drainage network; and to achieve the outlet water quality standard by constructing sewerage facilities, thereby improving the urban environment and water quality of canal within the center of old town (the Inner City¹) of Ho Chi Minh.

The objective of the project is consistent with national and municipal development and sector policies that have prioritized improving the urban drainage and sewerage system of Ho Chi Minh City and it is also consistent with Japan’s ODA policy in Viet Nam. Therefore, the relevance of this project is high.

The project period was significantly extended beyond the plan due to unsuccessful bidding of contractors, additional construction required for relocation due to unforeseen underground utility, etc., but the project cost remained within the plan. Therefore, the efficiency is deemed fair.

As for the operational indicator of the urban drainage project set at the time of appraisal, the flooding area and depth were mitigated beyond the target level. For the sewerage development project, the target indicators were achieved with an increasing volume of wastewater treatment, improvement in the Biochemical Oxygen Demand (BOD) level of outlet water and expansion of the sewerage service area. The water quality of canal was also improved. Therefore, effectiveness and impact of the project are high.

No major issue was observed in terms of organizational operation and maintenance aspects. Although the urban drainage and sewerage facility constructed under the project was mostly operated and maintained without any major problem, the operation of the composting facility at the wastewater treatment plant stopped operation and it was thought to have a technical problem. A budget for operation and maintenance was secured and no major issue emerged. Therefore, sustainability of the project effects is fair.

In light of the above, this project is evaluated to be satisfactory.

¹ The Inner City is located on the west side of Saigon River and comprises 1, 3, 4, 5, 6, 8, 10, 11 and Go Vap, Tap Binh, Binh Thanh and Phu Nhuan districts. Ho Chi Minh City is divided into the Inner City area and new urban area consisting of the five districts and suburban area.

1. Project Description



Project Location(s)



Binh Hung Wastewater Treatment Plant

1.1 Background

Ho Chi Minh City (hereinafter referred to as “HCMC”) is the largest city in Viet Nam as well as the economic center of the country. HCMC experienced continuous economic growth through the 1990s as the core of the country’s economic growth following the introduction of Doi Moi (renovation) policy and recorded average annual GDP growth of 12% from 1990 to 1998. About 75% of the population live in the Inner City, which makes up 140km² of the city area, namely 2,094km² and its average population density, exceeding 215 persons/ha, is the highest nationwide. Despite this fact, the socioeconomic infrastructure, such as the water supply system, drainage facilities and solid waste treatment plant were deteriorating and the development of such infrastructure has been significantly delayed. Therefore, the urban environmental issues, including pollution of rivers and canals, air pollution, the increasing volume of solid waste amid rapid urbanization and frequent flood damage due to inefficient drainage in the city area during the rainy season became serious. In particular, HCMC is surrounded by wet areas of downstream Saigon river and Saigon, Dong Nai and Nha Be rivers traverse the city as do intricate networks of waterways and drainage canals, which are easily affected by the tidal level. Furthermore, HCMC is geographically vulnerable to flood damage caused by precipitation and changes in the tidal level due to its low altitude.

The sewerage and drainage systems of HCMC were constructed by France as the former colonial power from the 1870s and subsequently expanded and developed with the support of other countries, like the US. However, the facility has deteriorated significantly and the treatment capacity for the increasing population declined to a considerable extent. Accordingly, the rainy season saw significant damage inflicted on people, including retention of rainwater, inundation of houses and frequent traffic jams due to flooding. Furthermore, the collected wastewater was released into Saigon river and its tributaries without being treated, which meant the waterway and drainage canal were significantly polluted and the impact on hygiene and the

health condition of neighboring residents was a concern.

The sewerage development area of this project is defined as the prioritized area (Sewerage development prioritized area in Figure 1). About 30% of the total prioritized area is covered under this project (“Ho Chi Minh Water Environment Improvement Project (I) (II) (III)”, hereafter “Phase 1”), with the remaining 70% covered under the “Second Ho Chi Minh Water Environment Improvement Project (I) (II) (III), hereafter “Phase 2”).

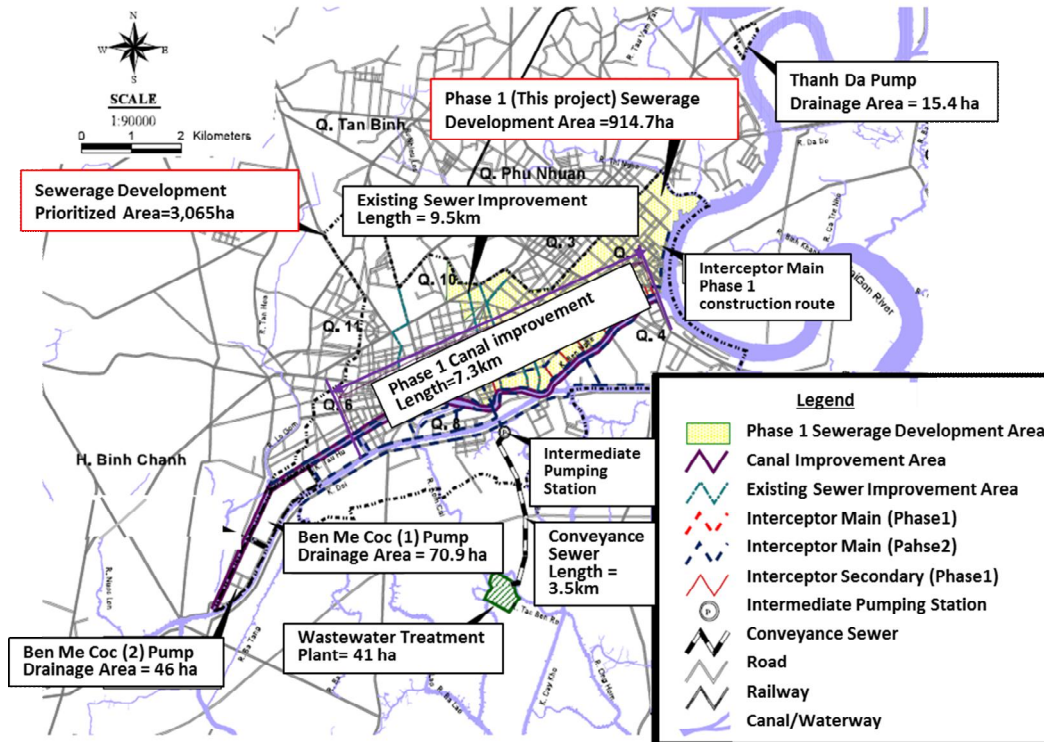


Figure 1. Project Site Overview (Plan)²

1.2 Project Outline

The objectives of this project are to: i) improve drainage capacity and prevent/mitigate frequent flood damage by improving the canal and developing the drainage network and ii) achieve outlet water quality by constructing wastewater collection and treatment facilities within the Inner City of HCMC, thereby helping to improve the water quality of canals and the living environment of the local residents, including their hygiene conditions.

² The detailed design study on Ho Chi Minh City water environment improvement project in the Socialist Republic of Viet Nam Final Report, 2001, Pacific Consultants International

<ODA Loan Project>

Loan Approved Amount/ Disbursed Amount	28,321 million yen ³ (8,200 million yen (I) , 15,794 million yen (II) , 4,327 million yen (III)) /24,269 million yen (7,759 million yen (I) , 13,906 million yen (II) , 2,603 million yen (III))				
Exchange of Notes Date/ Loan Agreement Signing Date	March, 2001 (I) , March, 2003 (II) , May, 2010 (III) / March, 2001 (I) , March, 2003 (II) , May, 2010 (III)				
Terms and Conditions	Interest Rate		(I)	(II)	(III)
		Construction except wastewater treatment plant	1.3%	1.8%	1.2%
	Construction of wastewater treatment plant and consulting service	0.75%	0.75%	1.2%	
	Repayment Period (Grace Period)		(I)	(II)	(III)
		Except wastewater treatment plant	30 years (10 years)		
Conditions for Procurement	Wastewater treatment plant	40 years (10 years)	30 years (10 years)		
		(I): General Untied /Bilateral Tied (II): General Untied /Bilateral Tied (III): General Untied			
Borrower / Executing Agency(ies)	The Government of Socialist Republic of Vietnam/ People Committee of Ho Chi Minh City (PCHCMC)				
Project Completion	October, 2012				
Main Contractor(s) (Over 1 billion yen)	(I) Shimizu Corporation (Japan)/Nishimatsu Construction CO., Ltd (Japan)/Ebara Corporation (Japan) (JV), Shimizu Corporation (Japan), (II) Toa Corporation (Japan)				
Main Consultant(s) (Over 100 million yen)	Oriental Consultants Co., Ltd.(Japan)/Vietnam Water, Sanitation and Environment Corporation (Viet Nam)/Water and Sanitation Engineering (Viet Nam) (JV)				
Feasibility Studies, etc.	Development study on drainage and sewerage system planning in Ho Chi Minh City (1998-2000)				
Related Projects	<ul style="list-style-type: none"> • "Project for Capacity Development on Sewerage Management in Ho Chi Minh City" (Technical Assistance, May, 2009-Nov, 2010) • Second Ho Chi Minh Water Environment Improvement Project (I), (II), (III) (ODA loan, L/A (I) March, 2006, (II) March, 2008, (III) May, 2016) • Saigon East-West Highway Construction Project (ODA Loan, L/A March, 2000) 				

³ The loan approved amount identified at the time of appraisal of the Project (III) when an additional loan was decided is shown here based on the JICA provided document. Accordingly, the value differs from the planned amount at the time of appraisal of the Project (I) shown in Table 2.

	<ul style="list-style-type: none"> • Ho Chi Minh City Environmental Sanitation Project (World Bank) • Ho Chi Minh City Environmental Improvement Project (Asia Development Bank) • Tan Hoa-Lo Gian Canal Sanitation and Urban Upgrading Project (Belgium Government)
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2. Outline of the Evaluation Study

2.1 External Evaluator

Akiko Ishii,
Ernst & Young Sustainability Co., Ltd.

2.2 Duration of Evaluation Study

This ex-post evaluation study was conducted with the following schedule.

Duration of the Study: September 2016 - November 2017

Duration of the Field Study: December 4, 2016 - December 18, 2016,

March 26, 2017- April 1, 2017

3. Results of the Evaluation (Overall Rating: B⁴)

3.1 Relevance (Rating: ③⁵)

3.1.1 Consistency with the Development Plan of Viet Nam

National Development Policy

Vietnam's development policy at the time of appraisal *The Ten Year Socio Economic Development Strategy (SEDS) 2001-2010* stipulated the development of infrastructure to solve the issue of urban sewerage, which is consistent with this project aiming to develop wastewater treatment plant. *The Ten Year Socio Economic Development Strategy (SEDS) 2011-2020*, which was adopted in January 2011 and aimed to develop an urban wastewater treatment plant and solve the drainage problem, is also consistent with this project developing an urban drainage system and wastewater treatment plant.

At the time of the ex-post evaluation, Vietnam's policy document *The Five Year Socio Economic Development Plan, 2016-2020* states the need to reinforce climate change measures, disaster prevention and environmental conservation, which is consistent with the project targeting the prevention of flood damage and improvement of water quality of canals in the region.

⁴ A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

⁵ ③: High, ②: Fair, ①: Low

Sector Policy

At the time of appraisal, the *Vietnam national plan for the environment and sustainable development* set about solving the issue of urban drainage and the sewerage problem of HCMC as a priority issue. At the time of ex-post evaluation, the *Decree of the Government on the drainage, sewerage and treatment (Decree No. 80/2014/ND-CP)* also states the importance of urban drainage, wastewater treatment, which is consistent with the project aiming to develop an urban drainage system and wastewater treatment plant.

HCMC's Policy and Plan

HCMC issued the *Master Plan for Urban Development to 2020* (which was approved by the Prime Minister in July 1998) and sets out improvement of the water environment in the Inner City by enhancing canals, urban drainage and sewerage development as an urgent issue. In addition, the *Master plan on socio-economic development of HCMC through 2020, with a vision toward 2025* (Decision No. 2631/QD-TTg) approved by the Prime Minister on December 31, 2013, targeted efforts to eliminate inundation caused by rainwater, connect 90% of urban households to the sewerage system and treat 80% of daily urban drainage by 2020 during the period 2016-2020.

In summary, this project is consistent with national, city and sector policies in which urban drainage and the development of wastewater treatment plants were recognized as important and urgent issues.

3.1.2 Consistency with the Development Needs of Viet Nam

As mentioned above, issues in HCMC included a geographic condition vulnerable to flood damage and deterioration of the drainage and sewerage facility while facing rapid urbanization and a population increase. The abovementioned master plan set a target to achieve 80% of urban wastewater treatment by 2020. Also, *HCMC's master plan for the urban drainage system by 2020 (752/QD-TTg)* states that Than Da, Ben Me Coc (1) and Ben Me Coc (2) areas which are specially located at lowland require pumping stations with drainage capacities of 1.12, 1.5 and 1.0m³/sec respectively.

At the time of the ex-post evaluation, there were only two wastewater treatment plants, including Binh Hung (141,000m³/day) constructed under the project and Binh Hung Hoa (30,000 m³/day) and HCMC's wastewater treatment capacity (53,586,000 m³/year) comprises 7% of the total domestic wastewater of the city (791,792,000 m³/year), which is far lower than the 80% target. Therefore, the need to develop the wastewater treatment plant remained high. In addition, at the time of ex-post evaluation, the drainage capacity of the drainage pumping stations in Than Da was 0.7m³/sec and Ben Me Coc (1) was 0.7m³/sec, and there was no

pumping station in Ben Me Coc (2), hence the need to strengthen the drainage capacity remained high.

Therefore, development of a drainage and wastewater treatment plant has been a important issue from the time of appraisal to the time of the ex-post evaluation, and there has been a high need. .

3.1.3 Consistency with Japan's ODA Policy

JICA's *Overseas economic cooperation implementation policy*, issued in Dec. 1999, set out environmental conservation measures as an important sector in Viet Nam. *The Country Assistance Plan for Viet Nam* issued in June 2000 by the Ministry of Foreign Affairs, also cited the environment as one of the key sectors. Furthermore, *the Country Assistance Plan for Viet Nam* issued in April 2004 also sets out a focus on developing, operating and maintaining urban water, sewerage and drainage facilities. Therefore, this project, which aims to improve water quality of urban canals and the urban environment, is consistent with Japan's ODA policy at the time of appraisal.

This project has been highly relevant to the country's development plan and development needs, as well as Japan's ODA policy. Therefore, its relevance is high.

3.2 Efficiency (Rating: ②)

3.2.1 Project Outputs

This project comprises five contract packages. The original plan and the final outputs of each package are compared in Table 1.

Table 1. Planned and actual outputs of each contract package

Contract Package		Original Plan (At the time of appraisal of the project (I))	Actual (At the time of ex-post evaluation)
Construction			
A	Improvement of Tau Hu-Ben Nghe Canal	<ul style="list-style-type: none"> • Canal improvement 7.3km • Dredging 300,000m³ 	<ul style="list-style-type: none"> • Canal improvement 5.8km • Dredging 481,756m³
B	Pump Drainage Improvement	<ul style="list-style-type: none"> • Pumping Station Thanh Da area 0.7m³/second Ben Me Coc (1) area 0.7m³/second • Drainage Pipe Thanh Da area : 680m Ben Me Coc (1) area : 4,620m Ben Me Coc (2) area : 4,190m 	<ul style="list-style-type: none"> • Pumping Station As planned • Drainage Pipe Thanh Da area : 478m Ben Me Coc (1) area : 2,668m Ben Me Coc (2) area : 2,920m
C	Interceptor Sewer Construction	<ul style="list-style-type: none"> Main interceptor sewer : 6,594m Secondary interceptor sewer : 7,018m 	<ul style="list-style-type: none"> Main interceptor sewer : 6,406m Secondary interceptor sewer : 3,519m

			Conveyance Sewer : 232m of 3,621m
	Intermediate Wastewater Pumping Station Construction	Capacity : 66.7m ³ /min×3units	As planned
D	Existing Combined Sewer Improvement	Additional : 6,530m, Replace : 3,182m	Additional : 7,443m, Replace : 2,349m,
	Conveyance Sewer Construction	Conveyance Sewer : 3,530m	Conveyance Sewer : 2,913m or 3,621m
E	Wastewater treatment plant Construction	Treatment Capacity : 141,100m ³ /day	As planned Conveyance Sewer : 476m of 3,621m
Consulting Services		International 335M/M Domestic 1,020M/M	International 596.54M/M Domestic 1,271.93 M/M

Source: The document provided by Executing Agency and JICA

The reason for the major changes in output are as follows:

- (Package A) Shortened distance of canal improvement: Due to the existence of a high voltage cable which was not recorded on the map and asset registration related to underground utility, construction in the area where the high voltage cable was found was eliminated from the project with the safety and potential impact on the electricity supply in mind. In addition, the area where a temporary bridge for the “Saigon East-West Highway Construction Project (ODA Loan)” was constructed before this project, the embankment construction in the area was implemented under the “Saigon East-West Highway Construction Project”. These changes, which were made considering the project site situation, had no impact on the project itself and were thus justified as reasonable.
- (Package A) Increased dredging volume: The additional dredging work for Tau Hu-Ben Nghe Canal was due to the increased volume of natural sedimentation, organic materials and waste having flowed into the canal with increasing population. The change was necessary to achieve the project goal.
- (Package B) Shortened drainage pipe distance: Since some existing sewer lines were functioning in Tan Da and Ben Me Coc (1) areas, the construction of some sewer lines was not implemented. The change was reasonable and had no impact on the project.
- (Package C) Shortened distance of the secondary interceptor sewer: At the time of appraising the project (III), the decision was made to eliminate part of the interceptor sewer construction based on PCHCMC’s budget and the distance of secondary sewer lines was shortened to 3,522m. In view of significant delay in the project, the decision to undertake the construction based on PCHCMC’s budget for some parts of the secondary sewer, which did not significantly impact the overall project, was considered reasonable.
- (Package D) Change in distance of additional and replacement of existing combined sewer:

The deterioration of some existing sewer lines, which were originally intended to link to the new sewer lines, was significant, making repair impossible and considerable number of new pipe lines had to be installed. The total distance of the additional and replacement sewer lines was almost as planned and had no impact on the project.

- (Package D) Conveyance Sewer Construction: The conveyance sewer between the intermediate wastewater pumping station to the wastewater treatment plant was constructed under packages C, D, or E. The distance constructed per package (Package C: 232m, Package D: 2,913m, Package E: 476m) differed from the original plan depending on the deflection location, while the total distance constructed (3,621m) was almost the same as the original plan 3,547m. This change was related to the border between packages and had no impact on the output and project effect.

Accordingly, the changes, except those for the secondary interceptor sewer under Package C, did not affect the project scope and were reasonable considering the project site conditions. The changes in the construction of part of the secondary interceptor sewer lines based on the PCHCMC budget were also reasonable in terms of the effectiveness of the project.

3.2.2 Project Inputs

3.2.2.1 Project Cost

As mentioned above, the intention was to install this project in two terms (Project (I), Project (II)) from the planning stage of project (I). Subsequently, the contracted project cost was expected to increase significantly compared to the original plan due to the escalation in price of the construction material which occurred globally after the appraisal of Project (II) and the delay in construction due to the project site condition (construction to relocate the underground utility found during the project, an explosive increase in traffic, additional dredging and construction to prepare the alternative dumping site for dredged soil, weak ground condition, etc.), increased volume of required materials, design change, additional construction and with the cost increase in consulting service due to the extension of the construction period. Accordingly, the Government of Viet Nam requested an additional ODA loan (Project III) in 2009. The planned cost at the time of appraisal of the Project (I) when original plan was made, and the planned cost at the time of the Project (III) when the additional ODA Loan was decided, and actual costs during the appraisal phase are shown in Table 2.

Table 2. Planned and Actual Project Cost (Unit: million yen)

At the time of appraisal of the Project (I) (2001)			At the time of appraisal of the Project (III) (Additional ODA Loan) (2010)			Actual			
ODA Loan		Viet Nam Government Budget	ODA Loan		Viet Nam Government Budget	ODA Loan		Viet Nam Government Budget	
(I)	8,200	9,382	(I)	23,994	11,802	(I)	7,759	4,733	
(II)	16,419 ⁶		(II)				(II)		13,906
-	-		(III)			4,327	(III)		2,603
Total	24,619	9,382	Total	28,321	11,802	Total	24,269	4,733	
Grand Total	34,001		Grand Total	40,123		Grand Total	29,002		

Source: The document provided by Executing Agency and JICA

As a result, the total project cost was 29,002 million yen (23,219 million yen from the Japanese ODA loan⁷) which was within (85%) the plan. The construction cost of the wastewater treatment plant which comprised 60% of the total construction cost was within the plan. Although the cost of additional drainage for canal improvement, improvement of existing combined sewer and conveyance sewer construction exceeded the budget, the estimated price escalation and contingency costs covered the increased cost which meant the total cost was within 100% of the planned cost.

3.2.2.2 Project Period

The project period was scheduled to last 60 months, from March 2001 to February 2006. However, the project actually took 140 months⁸, from March 2001 to October 2012, significantly longer than planned (233%). Due to unsuccessful bidding of the contractor, a delay between one and two and half years occurred in each package before starting construction. There was also a significant delay in resettlement implemented by PCHMC due to a delayed period for negotiation with the residences, including illegal residences, which meant a delay in starting Package A. The relocation construction of unexpected underground utilities, electricity lines, phone lines, water pipes, etc., additional dredging and securing the dump site for dredged soil, the change in the number and volume of materials and design considering the project site during the construction and the time required to obtain approval for design changes were the major reasons behind the significant delay of the project.

⁶ The planned value for Project (II) at the time of appraisal of Project (I), which thus differs from the breakdown of the loan approved amount described in section 1.2.

⁷ The yen value was calculated by applying the IMF rate to the local expenditure figures provided by the executing agency. Accordingly, the result differs from the information in the ODA Loan Information Sheet provided by JICA (24,269 million yen).

⁸ Although the definition of the end of the project was not clearly stated in the appraisal document for projects (I) and (II), it was defined as the start of the operation in the appraisal document of (III). Accordingly, the date that started operation (October 2012) was taken as the end of the project in this ex-post evaluation.

Table 3. Planned and Actual Project Period

Item	Plan	Actual
Signing Loan Agreement	March 2001	March 2001
Land Acquisition and Resettlement	December 2000 - June 2003 (31 months)	Completed in 2007 (Detail information is not available)
Bidding and Contract	March 2001 - May 2001 (3 months)	February 2003 - March 2006 (38 months)
Construction	July 2002 - February 2006 (44 months)	November 2004 - October 2012 (96 months)
Consulting Service	March 2001 - April 2006 (62 months)	June 2002 - July 2015 (158 months)

Source: The document provided by Executing Agency and JICA

3.2.3 Results of Calculations for Internal Rates of Return (Reference only)

Because of the difficulty in performing a quantitative analysis of economic benefit for the sewerage development project, the economic internal rate of return (EIRR) was calculated only for the drainage project at the time of appraisal for projects (I) and (II). Conversely, the EIRR, including the sewerage development project, was calculated at the time of appraising Project (III). The calculation condition and result are shown in Table 4. The EIRR calculated at the time of appraising project (I) was 15.54%, while the EIRR recalculated at the time of appraising Project (III) for an additional ODA loan was 10.8%. At the time of ex-post evaluation EIRR could not be calculated due to insufficient quantitative data required for analysis although attempts were made to do so. The financial internal rate of return (FIRR) was not calculated at the time of planning.

Table 4. Condition of EIRR calculation at the time of appraisal

	Appraisal (I) (2001) Appraisal (II) (2003)	Appraisal (III) (2010)
EIRR	15.54% (Only for urban drainage project)	10.8%
Cost	Construction cost, annual O&M cost (including the cost of replacing the equipment)	Project cost (excluding tax), O&M cost
Benefit	Direct benefit: Houses/cars, public facility, agricultural products Indirect benefit: Mitigation of damage to commercial activity, mitigation of income loss of workers, reduced medical expenses, navigation fees	Mitigation of flooding of houses, cars, public facility and damage on agricultural products. Improvement of water quality, and hygiene environment.
Project Life	50 years	50 years

Although the project cost was within budget, the project period exceeded the plan. Therefore, efficiency of the project is fair.

3.3 Effectiveness⁹ (Rating: ③)

3.3.1 Quantitative Effects (Operation and Effect Indicators)

The effectiveness was evaluated based on the operational indicator and effect indicator set for the urban drainage and sewerage development projects respectively at the time of appraisal.

a) Urban Drainage Project

【Operational Indicator】

The baseline, target and actual values for the operational indicator for the urban drainage project are summarized in Table 5. Although the average rainfall at the time of appraisal in Thanh Da and Ben Me Coc (1) significantly exceeded the baseline rainfall of the 5-year return period used to set the target, both the actual flood area and inundation depth were 0ha and 0cm respectively and achieved the target. The target inundation depth was also achieved in the existing combined sewer area. Thus, the improvement in drainage capacity and reduction in flood damage in the area for this urban drainage project were recognized.

Table 5. Baseline, Target, and Actual for Operational Indicator for urban drainage project

	Baseline	Target	Actual		
	2000	2010	2014	2015	2016
	Appraisal	4 years after completion	2 years after completion	3 years after completion	4 years after completion
Rainfall (mm/6hour)	5 year return period (113.47mm/6hr)		105.1	106.1	204.3
Thanh Da Drainage Improvement					
Flood Area (ha)	15.4	2.3	0	0	0
Inundation Depth (cm)	30-60	<15	0	0	0
Ben Me Coc (1) Drainage Improvement					
Flood Area (ha)	32.6	4.9	0	0	0
Inundation Depth (cm)	30-60	<15	0	0	0
Existing combined sewer improvement					
Inundation Depth (cm)	20-50	0	0	0	0

Source: The document provided by Executing Agency and JICA

b) Sewerage Development Project

【Operational Indicator】

The target and actual values for operational indicators for the sewerage development project are compared in Table 6. The amount of treated water reached more than 85% of the target volume, namely 140,000m³/day, every year including two, three and four years after completion of the project, which equated to facility utilization rates of 91, 96 and 84% of the

⁹ Sub-rating for Effectiveness is evaluated with consideration of Impact.

plant treatment capacity (141,000m³/day). The reduced amount of wastewater treated and decline in facility utilization rate in 2016 compared to 2014 and 2015 was due to construction to expand the electricity transmission line implemented from July to October 2016, which limited the inlet volume to secure the safety of the facility. The outlet BOD concentration is lower than the target 50mg/L, hence the target was achieved. Accordingly, improved wastewater treatment capacity and the achievement of the target water quality for outlet water were recognized.

Table 6. Baseline, Target, Actual of operational indicator of sewerage development project

	Baseline	Target	Actual		
	2000	2010	2014	2015	2016
	Appraisal	4 years after completion	2 years after completion	3 years after completion	4 years after completion
Amount of wastewater treated (m ³ /day)	-	140,000	128,370	135,651	118,900
Rate of facility utilization (%)		-	91	96	84
BOD concentration					
Inlet	-	167mg/L	156mg/L	151mg/L	123mg/L
Outlet	-	<50 mg/L	16mg/L	12mg/L	8mg/L

Source: The document provided by Executing Agency and JICA

【Effect Indicator】

As an effect indicator of the sewerage development project, the target percentage of population served in the project area was set as the ratio of area to the total sewerage development area as 100% including Phase-I and II projects mentioned in “1.1 Background”. The ratio achieved 30% of the total project area and the target at the time of project completion.

Table 7. Baseline, Target, Actual of effect indicator of sewerage development project

	Baseline	Target	Actual		
	2000	2006	2014	2015	2016
	Appraisal Year	Completion year ^{Note 2)}	2 years after completion	3 years after completion	4 years after completion
Percentage of population served in the project area ^{Note1)} (%)	-	30	30	30	30

Note 1) Include the sewerage development project area of the “Second Ho Chi Minh Water Environment Improvement Project (Phase 2) (ODA Loan, L/A March, 2006)” planned from 2006 to 2010.

Note 2) Since the target set at the time of appraising project I in 2000 as the value for 4 years after completion (2010) included the effect of the area supposed to be developed in phase 2, the target set for the project completion year (2006) was used in this table to analyze the effect of this project (Phase 1).

3.3.2 Qualitative Effects (Other Effects)

At the time of appraisal, improved canal and river water and hygiene conditions under the sewerage project were expected. These effects are described in the next section of Impacts.

3.4 Impacts

3.4.1 Intended Impacts

(1) Improvement of urban environment

【Urban drainage project】

Regarding the change in the living environment queried during the beneficiary survey¹⁰ conducted in the area for the urban drainage project, 40% of respondents answered that it had significantly improved and 60% of respondents described it as having slightly improved. Many respondents stated the reduction in flood damage to houses and agricultural products as reasons for improvement and thus recognized the effect of mitigating flood damage after the project implementation. Conversely, the economic loss inflicted on buildings and agricultural products by the flood could not be quantitatively analyzed due to a lack of statistical data.

Table 8. The changes in living environment by the urban drainage project

	Largely improved	Slightly improved	Same	Slightly worsened	Largely worsened
Change in living environment	40%	60%	0%	0%	0%

Source: Result of beneficiary survey

【Sewerage Development Project】

According to the result of the beneficiary survey conducted in the area of the sewerage development project, 24% of respondents answered that the sewerage condition of households had largely improved and 58% of respondents described it as having slightly improved. The

¹⁰ This project comprises two components, drainage and sewerage development projects implemented in different areas. The urban drainage project site (Thanh Da and Ben Me Coc (1) and (2)) does not overlap the sewerage development area and is not connected to the wastewater treatment plant constructed by the project, which means the beneficiaries of each component, the urban drainage and sewerage development projects, differ. Accordingly, the beneficiary survey was conducted in each project area for urban drainage and sewerage. Since the total sample size was limited to 100, a survey of 50 samples for each project was conducted. Considering the total number of households in the drainage area (Thanh Da (1,500 households), Ben Me Coc (1) and (2) (9,000 households), 10 households in Thanh Da, 40 households in Ben Me Coc (1) and (2) were set as the number of respondents. About 20 wards were undergoing sewerage development. In Viet Nam, approval and accompaniment by the people's committee of each ward are required when interviewing residents. Accordingly, for efficiency and feasibility, the survey was conducted in wards selected beforehand. Since the beneficiaries of sewerage development project lived far away from the treatment plant itself and the sewerage pipes had existed since before the project, many beneficiaries were not aware of the project. Accordingly, to collect information about the impact of the project efficiently, even with a limited number of samples, 6 wards along the canal and in the area where the existing combined sewer improvement construction was implemented were selected for conducting the survey. It should be noted that some areas where the beneficiaries tended to recognize the effect of the project were selected from within the total project area and which resulted in a bias in the survey result.

reasons cited included improved frequency of stuck and backflow and speed of flow. In terms of the living environment, 14% of respondents answered that it had largely improved and 56% of respondents described it as having slightly improved. The reasons were cited as: the flow from the house increased, blockage stuck and backflow of street inlet and manhole on the neighboring road does not occur any longer.

Table 9. Sewerage treatment condition of households

	Largely improved	Slightly improved	Same	Slightly worsened	Largely worsened
Sewerage treatment condition of households	24%	58%	18%	0%	0%
Change in living environment	14%	56%	30%	0%	0%

Source: Result of beneficiary survey

(2) Improvement of water quality of canal

Improved water of the canal was expected by implementing the project, with baseline, target and actual water quality values in the project area summarized in Table 8. The baseline and target data were collected/estimated at the monitoring point using a monitoring method during F/S of the project. However, the actual values were data collected from the monitoring points by a monitoring method established by the Department of Natural Resources and Environment of HCMC after 2014, which meant the monitoring point and method differed from the baseline and target. However, an even higher end BOD measured at the time of low tide achieved the target in Tau Hu, Ben Nghe and Doi canals, which meant water quality improved. Accordingly, the water quality of the canal was improved in the project area.

Table 10. Baseline, target, and actual value of water quality of canals

Canal	Baseline	Target	Actual	
	2000	2010	2016	
	Appraisal Year	4 years after completion	4 years after completion	
	(mg/L-BOD75% value ^{Note1})		Point name ^{Note2}	(mg/L)
Tau Hu	89	40	C07	(L)30, (H)24
			C09	(L)24, (H)18
Ben Nghe	42	16	C13	(L)15, (H)14
			C14	(L)12, (H)11
Doi	71	43	C10	(L)21, (H)16
Te ^{Note3}	22	10	-	-

Note 1) 75 quintile data by assigning 1 to 100 as the lowest to highest value among the data collected at the monitoring point.

Note 2) The monitoring point of water quality differs from the appraisal year and actual year. Actual data was collected at the monitoring points designated for each canal by the Department of Natural Resources and Environment (DONRE), HCMC (C07: Rạch Ngựa, C09: Chà Và, C13: Cầu chữ Y, C14: Cầu Mống, C10: Nhị thiên Đường). For Te Canal, no monitoring point had been set by DONRE as of 2016. The monitoring is conducted monthly during low tide (L) hours and high tide (H) hours on a stated day. The values shown in Table 8 are the average data for 12 months.

Note 3) For the Te canal, since water quality is not measured at the time of ex-post evaluation, no data was available.

However, since the Te canal is not located in the area of the sewerage development project and was not included in the canal improvement project, no impact is expected under the project. Thus, it was excluded from the analysis.

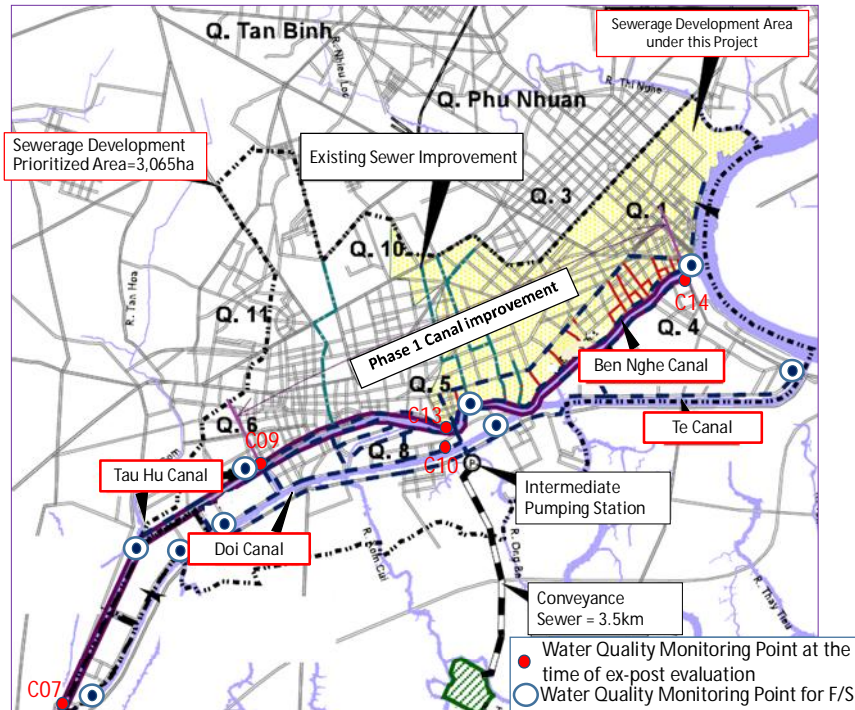


Figure 2. Location and name of canal¹¹

Note) Q in the map means “Quận (district)”

3.4.2 Other Positive and Negative Impacts

(1) Impacts on natural environment

Air pollution, water quality, noise and vibration during the construction satisfied Viet Nam’s national environmental standards by implementing mitigation measures, like sprinkling water, setting a settling tank and erecting a noise barrier. Also, no negative environmental impact, including air pollution, water quality, noise and vibration, was recognized after commission. On the other hand, the composting facility for sludge at the wastewater treatment plant was subject to frequent complaints from the neighboring community due to odor and neighboring residents protested in 2012. The fact that houses were constructed within 100-150m of the wastewater treatment plant after 2012 was also one of the reasons for the complaints, although the plant was surrounded by agricultural land and satisfied the construction standard for wastewater treatment plant¹² which imposed a distance of 300-500m from residential areas at the time of construction. After neighboring residents protested in 2012, the O&M agency took several measures, such as controlling temperature, water content and covering compost by the sheet and temporarily restricted odors. However, no long-term solution could be achieved.

¹¹ Prepared based on *The detailed design study on Ho Chi Minh City water environment improvement project in the socialist republic of Viet Nam* Final Report, 2001, Pacific Consultants International

¹² TCVN 7222: 2002 - *General environmental requirements for centralized domestic wastewater treatment stations*

Accordingly, the operation of the composting facility was stopped in 2014 and the composting of sludge was outsourced to a private company located 13km from the wastewater treatment plant at the time of ex-post evaluation. According to the O&M agency, no complaint was received from neighboring residences at the time of ex-post evaluation.

(2) Land Acquisition and Resettlement

Following the Resettlement Action Plan prepared by Viet Nam (Resettlement Action Plan: RAP), the resettlement of all households was completed in 2007 with adequate consideration to the impact on lives of people including illegal residences, and compensation. About 67ha of land was acquired and 2,573 households were resettled (of which about 2,000 households were resettled due to improvement of canals). Of this total, 1,773 households received compensation and sought out new residences by themselves and 800 households purchased and moved to apartments offered by HCMC with a 10-year low interest loan. The whole process was carried out in line with national legislation and that of HCMC¹³ stipulating resettlement and compensation. According to the executing agency, after resettlement, at the time of ex-post evaluation, no complaint was received.

As mentioned above, the targets for mitigating and avoiding flood damage and improving the outlet water quality were achieved and the effect of the project was confirmed. The impact on improving the urban environment and water improvement of canal were also confirmed.

This project has mostly achieved its objectives. Therefore, effectiveness and impact of the project are high.

3.5 Sustainability (Rating: ②)

3.5.1 Institutional Aspects of Operation and Maintenance

The Steering Committee for Flood Control (SCFC) under the PCHCMC is the asset owner of the wastewater treatment plant and drainage facilities constructed under the project and is responsible for managing and supervising O&M. The Urban Drainage Company (UDC) is commissioned by SCFC to carry out O&M of wastewater treatment plants, intermediate wastewater pumping stations and drainage pumping stations in Ben Me Coc (1) and Thanh Da and drainage facilities including drainage pipes. The Inland Waterway Management Office (IWMO) under the transportation and public works department is responsible for the O&M of embankments, waterways and drainage channels in Thanh Da and Ben Me Coc.

¹³ Decree 69/2009/ND-CP: *Additionally providing for land use planning, land prices, land recovery, compensation, support and resettlement.*

Decision 35/2010/QĐ-UBND: *Decision on compensation and relocation by the PCHCMC.*

Table 11. Organization in charge of O&M and roles

Organization	Role
Steering Center of the Urban Flood Control (SCFC)	An asset owner of Binh Hung wastewater treatment plant, Dong Dieu intermediate pumping station, Ben Me Coc (1), and Thanh Da drainage pumping station. Management and supervision of O&M of UDC for wastewater treatment plant and pumping stations.
Urban Drainage Company (UDC)	Commisioned to executing O&M of Binh Hung wastewater treatment plant, Dong Dieu intermediate pumping station, and drainage pumping station and drainage pipe in Thanh Da and Ben Me Coc (1).
Inland Waterway Management Organization (IWMO)	Executing O&M of embankment, waterway, and drainage channel in Thanh Da, and Ben Me Coc.

SCFC employs around 200 people, three of whom are stationed at the Binh Hung wastewater treatment plant on a full-time basis. The number of UDC employees is 1,500, with 12 employees deployed at each drainage pumping station in Thanh Da and Ben Me Coc (1) respectively in shifts. The O&M contract between SCFC and UDC was concluded annually before 2012 and for five years after June 2012¹⁴. SCFC is responsible for managing and supervising the O&M of the facility based on a plan which UDC submits to SCFC every month. UDC also reports on the O&M activity result to SCFC every month. IWMO belongs to the Transportation and Public Works Department and is responsible for the O&M of waterways used for vessel transportation in the city, thus overseeing the O&M of Tau Hu and Ben Nghe Canal. IMWO of HCMC has 142 employees, six of whom oversee O&M of Tau Hu and Ben Nghe Canals.

At the time of ex-post evaluation, the institutional aspects of O&M were clearly defined and no shortage of human resources was observed, hence no major problems were observed.

3.5.2 Technical Aspects of Operation and Maintenance

SCFC was sending its staff to O&M training for wastewater treatment plants conducted by JICA¹⁵, periodically. UDC was also implementing O&M, prescribed inspection and cleaning following the manuals prepared in each facility, including wastewater treatment plants and pumping stations. The staff overseeing each facility have opportunities to take training conducted internally. UDC sends staff to training conducted overseas and also trains its staff to be trainers internally through training conducted by international donor agencies, such as

¹⁴ According to *Decree No. 130/2013/ND-CP of October 16, 2013, for producing and providing public-utility products and services*, organizations providing services related to public utilities should be determined through a bidding process. Following this Decree, SCFC conducted bidding for the O&M agency of wastewater treatment plant and drainage facility, but the result remained pending as of July 2017.

¹⁵ "Project for Capacity Development on Sewerage Management in Ho Chi Minh City" (May 2009 - Nov. 2010) and Project for Capacity Improvement for Urban Drainage Management in Ho Chi Minh City Vietnam (grassroots technical assistance project), (June 2013 –March 2016).

German Agency for International Cooperation (GIZ)¹⁶ and conducts training by its internal trainers.

The O&M of the wastewater treatment plant and intermediate pumping station was implemented based on manuals and no major problems were observed in terms of the technical aspects of O&M at the time of ex-post evaluation.

However, the composting facility of the wastewater treatment plant stopped its operation after 2014 because the odor issue remained unsolved and also because of the change in the neighboring environment. Although the composting process requires know-how in terms of normalizing the characteristics of input mixed sludge and managing temperature and moisture, the appropriate O&M skills had not been inculcated, and this was one of the reasons why the operation of the composting facility was shut down.

The training period for O&M operators of the wastewater treatment plant by the EPC (Engineering Procurement Construction) contractor of the project was three months. Considering the large scale of the wastewater treatment plant constructed under the project and the fact that UDC did not have O&M experience of large scale wastewater treatment plants before the project, a three-month training period was considered insufficient. Accordingly, the provision of O&M training for one year by an EPC contractor was negotiated but the contract was not concluded, hence UDC concluded a contract with another contractor for O&M advisory services for the wastewater treatment plant and pumping station¹⁷.

Accordingly, no major problems were observed in terms of technical aspects. However, there was a possibility that training in terms of technical insights into the treatment process and operation of the composting facility was insufficient.

3.5.3 Financial Aspects of Operation and Maintenance

For the O&M cost of the wastewater treatment and drainage facility, the necessary amount was allocated from HCMC's budget every year. SCFC requested a budget to PCHCMC based on the O&M cost estimated by UDC every year. SCFC's budget is shown in Table 12 and SCFC indicated that the budget had been secured every year and that there was no problem at the time of ex-post evaluation.

Table 12. Budget of SCFC (Budget allocation from PCHCMC)

(Unit : million VND)

	2012	2013	2014	2015
O&M of sewerage and drainage	501,683	650,000	555,000	702,450
General administration	14,696	15,236	13,834	16,628
Total	516,379	665,236	568,834	719,078

¹⁶ Deutsche Gesellschaft für Internationale Zusammenarbeit

¹⁷ Source: The document provided by JICA

The breakdown and change in the O&M cost of the Binh Hung wastewater treatment plant and Dong Dieu intermediate pumping station and drainage facility in Tan Da and Ben Me Coc are shown in Tables 13 and 14.

Regarding the O&M cost of the wastewater treatment plant and intermediate pumping station, the sludge treatment cost more than doubled compared to the previous year of 2013. This sludge treatment cost comprised the cost of composting sludge and 1.3 million VND to treat one ton of sludge was required to outsource the treatment to the private company after operation of the composting facility stopped in 2014. The total O&M cost of the wastewater treatment plant and intermediate pumping station had increased slightly, while the O&M cost of the drainage facility in Tan Da and Ben Me Coc was also increasing yearly. At the time of ex-post evaluation, the budget required for O&M of the wastewater treatment and drainage facility was secured every year and no major problems were observed in terms of the financial aspects.

Table 13. Annual O&M cost for Binh Hung wastewater treatment plant, Dong Dieu intermediate pumping station

(Unit: million VND)

	2012	2013	2014	2015	2016
Electricity cost	16,652	20,331	18,551	20,193	18,717
Spare parts and equipment, facility repair	14,837	4,682	5,520	1,261	9,246
Fuel cost for operation of machine	690	754	932	927	612
Office maintenance and safety	1,942	1,864	1,884	1,410	1,737
Sludge treatment cost	4,997	11,554	13,615	17,372	14,094
Direct labour & supervisor cost	8,787	11,158	11,590	10,747	9,606
Administration	6,146	6,856	7,362	6,874	6,414
Total Annual O&M Cost	56,361	56,446	56,988	57,857	57,826

Table 14. Annual O&M cost for drainage facility Thanh Da and Ben Me Coc

(Unit: million VND)

	2012	2013	2014	2015	2016
Drainage system	502	650	555	702	702
Thanh Da pumping station	1,178	940	1,240	2,000	1,741
Ben Me Coc pumping station	1,632	1,285	1,687	2,635	2,134
Total Annual O&M Cost	3,312	2,875	3,482	5,337	4,577

However, the Government of Viet Nam is aiming to cover the O&M cost of the wastewater treatment and drainage facility by collecting a sewerage tariff and decided to collect at least 10% of the clean water tariff as environmental conservation tax. Based on this regulation, HCMC decided to collect environmental conservation tax in July 2001. In March 2010, the price of clean water and environmental conservation tax for household was changed. The

collected environmental conservation tax is used to cover the O&M cost paid to UDC as outsourcing expenses and that of the drainage facility development project not under this project.

Table 15. Change of environment conservation tax of HCMC

(Unit : VND/m³)

Volume of monthly water consumption for a household	2010	2011	2012	2013~
< 4 m ³	400	440	480	530
4 m ³ < 6 m ³	750	830	920	1,020

Income from environmental conservation tax of HCMC is shown in Table 16. Although the income increased annually from 2012 to 2015, only half the O&M cost among the SCFC budget for drainage and sewerage development projects shown in Table 12 was achieved and it was not possible to maintain the O&M cost of drainage and sewerage using income from the sewerage tariff alone. Accordingly, it is still expected that operation will continue under the HCMC budget.

Table 16. Income from environment conservation tax of HCMC

(Unit : Million VND)

	2012	2013	2014	2015	2016
Income from sewerage tariff	249,684	288,169	306,239	330,765	371,886

The Government Decree 80/2014/ND-CP on the drainage and treatment of wastewater issued on August 6, 2014 stipulated that the cost of construction and O&M of wastewater treatment services should be borne by users. *Circular No. 02/2015/TT-BXD Guidance on valuation of drainage service* providing guidance on valuing drainage and wastewater treatment services was issued in April 2015. However, at the time of ex-post evaluation, the collection of tariff following the Decree and the Circular has not been started in HCMC.

3.5.4 Current Status of Operation and Maintenance

At the time of ex-post evaluation, daily inspection on cleaning conditions and water quality monitoring of wastewater treatment plants, drainage facilities and canals constructed under the project were implemented as planned and no major problem was observed overall. However, operation of the composting facility which comprises one part of the process of wastewater treatment plant was stopped after 2014 due to the odor issue mentioned above.

Also, it was indicated that it would take time to procure some spare parts, particularly those made in Japan and they would be expensive. UDC and SCFC experienced considerable time to procure equipment used as part of the dewatering facility from Japan and purchased

alternative equipment from Germany. At the time of ex-post evaluation, no major issue had arisen regarding the procurement method, nor were any serious problems found in terms of the operation of machines according to UDC and SCFC.

Accordingly, some minor problems have been observed in terms of the technical aspect and current status. Therefore, sustainability of the project effects is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project was implemented to prevent and mitigate flood damage by improving canals and developing drainage network; and to achieve the outlet water quality standard by constructing sewerage facilities, thereby improving the urban environment and water quality of canal within the Inner City of Ho Chi Minh.

The objective of the project is consistent with national and municipal development and sector policies that have prioritized improving the urban drainage and sewerage system of Ho Chi Minh City and it is also consistent with Japan's ODA policy in Viet Nam. Therefore, the relevance of this project is high.

The project period was significantly extended beyond the plan due to unsuccessful bidding of contractors, additional construction required for relocation due to unforeseen underground utility, etc., but the project cost remained within the plan. Therefore, the efficiency is deemed fair.

As for the operational indicator of the urban drainage project set at the time of appraisal, the flooding area and depth were mitigated beyond the target level. For the sewerage development project, the target indicators were achieved with an increasing volume of wastewater treatment, improvement in the Biochemical Oxygen Demand (BOD) level of outlet water and expansion of the sewerage service area. The water quality of canal was also improved. Therefore, effectiveness and impact of the project are high.

No major issue was observed in terms of organizational operation and maintenance aspects. Although the urban drainage and sewerage facility constructed under the project was mostly operated and maintained without any major problem, the operation of the composting facility at the wastewater treatment plant stopped operation and it was thought to have a technical problem. A budget for operation and maintenance was secured and no major issue emerged. Therefore, sustainability of the project effects is fair.

In light of the above, this project is evaluated to be satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

For the wastewater treatment plant constructed under the project, composting was adopted as the sludge treatment process. However, operation of the composting facility was stopped its operation and sludge treatment were outsourced privately at the time of ex-post evaluation because the odor issue remained unsolved. The capacity of the wastewater treatment plant was planned to be increased to 469,000 m³/day which is 3.3 times the capacity of the plant at the time of ex-post evaluation by the “Second Ho Chi Minh Water Environment Improvement Project (Phase 2)”, accordingly the volume of sludge was also predicted to triple. The Phase 2 project was under implementation at the time of ex-post evaluation. If the volume of sludge were to triple over its current volume, it would be questionable whether the sludge treatment facility of the private company to which sludge treatment is outsourced would be able to accept the total volume; considering not only the potential for facility expansion but also the market environment of the compost produced. Accordingly, the executing agency and SCFC should consider an institution to ensure continuous sludge treatment. Continuing to outsource the sludge treatment would also increase the O&M cost. The executing agency and SCFC were expected to analyze the technical and financial issues related to sludge treatment as soon as possible, apply appropriate technology to solve the odor issue for sludge treatment and plan an adequate training program for O&M technology under the “Second Ho Chi Minh Water Environment Improvement Project (Phase 2)”.

4.2.2 Recommendations to JICA

None

4.3 Lessons Learned

Executing organization of O&M and the training period for the handover

The period for training O&M operators of the wastewater facility by the EPC (Engineering Procurement Construction) contractor of the project was three months. Because UDC lacked any O&M experience for large-scale wastewater treatment plants before this project, the training period for three months was considered insufficient. Accordingly, the EPC contractor engaged in negotiation with PCHCMC concerning a service to provide O&M training to UDC for one year but was unable to conclude a contract, whereupon UDC contracted with another contractor for a one-year advisory service for O&M of the wastewater treatment plant and pumping station¹⁸. The wastewater treatment plant comprises a process like a composting facility which requires operational know-how. It is expected to consider a suitable scheme for the O&M executing agency to obtain appropriate O&M know-how and technical skills for operating the installed facility and machines from an EPC contractor and engineers, or with sufficient training during a handover period at the time of appraisal.

¹⁸ The document provided by JICA

Comparison of the Original and Actual Scope of the Project

Item	Plan	Actual
1. Project Outputs		
A Improvement of Tau Hu-Ben Nghe Canal	<ul style="list-style-type: none"> • Canal improvement 7.3km • Dredging 300,000m³ 	<ul style="list-style-type: none"> • Canal improvement 5.8km • Dredging 481,756m³
B Pump Drainage Improvement	<ul style="list-style-type: none"> • Pumping Station Thanh Da area 0.7m³/second Ben Me Coc (1) area 0.7m³/second • Drainage Pipe Thanh Da area : 680m Ben Me Coc (1) area : 4,620m Ben Me Coc (2) area : 4,190m 	<ul style="list-style-type: none"> • Pumping Station As planned • Drainage Pipe Thanh Da area : 478m Ben Me Coc (1) area : 2,668m Ben Me Coc (2) area : 2,920m
C Interceptor Sewer Construction	<ul style="list-style-type: none"> • Main interceptor sewer : 6,594m • Secondary interceptor sewer : 7,018m 	<ul style="list-style-type: none"> Main interceptor sewer : 6,406m Secondary interceptor sewer : 3,519m Conveyance Sewer (Package D) : 232m of 3,621m
Intermediate Wastewater Pumping Station Construction	Capacity : 66.7m ³ /min×3units	As planned
D Existing Combined Sewer Improvement	Additional : 6,530m, Replace : 3,182m	Additional : 7,443m, Replace : 2,349m
Conveyance Sewer Construction	Conveyance Sewer : 3,530m	Conveyance Sewer : 2,913m or 3,621m
E Wastewater treatment plant Construction	Treatment Capacity : 141,100m ³ /day	As planned Conveyance Sewer (Package D) : 476m of 3,621m
Consulting Services	International 335M/M Domestic 1,020M/M	International 596.54M/M Domestic 1,271.93 M/M
2. Project Period	March, 2001 -February, 2006 (60 months)	March, 2001 -October, 2012 (140 months)
3. Project Cost		
Foreign Currency	18,900 million yen	16,140 million yen
Local Currency	15,101 million yen (1,986,973 million VND)	12,862 million yen (2,111,643 million VND)
Total	34,001 million yen	29,002 million yen
ODA Loan Portion	8,200 million yen (Only for Project (I)) 16,419 million yen ¹⁹ (Only for Project (II)) ^{Note1}	24,269 million yen
Exchange Rate	1USD = 108 yen 1VND = 0.0076 yen (As of March, 2001)	1USD = 105 yen 1VND = 0.00609 yen (Average between January, 2002 and Dec, 2015 average)
4. Final Disbursement	March, 2014(I), April, 2013(II), September,2014 (III)	

Note 1 Exchange Rate (As of October, 2002) 1USD=121yen, 1VND=0.00788yen

¹⁹ The planned value for the project (II) at the time of appraising project (I). Accordingly, it differs from the breakdown of the loan approved amount described in section 1.2.