Ex-Post Project Evaluation 2016: Package II-2 (Vietnam)

November 2017

JAPAN INTERNATIONAL COOPERATION AGENCY

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(Joint Venture)

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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 City[1]) 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 140km^2 of the city area, namely 2,094km^2 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").

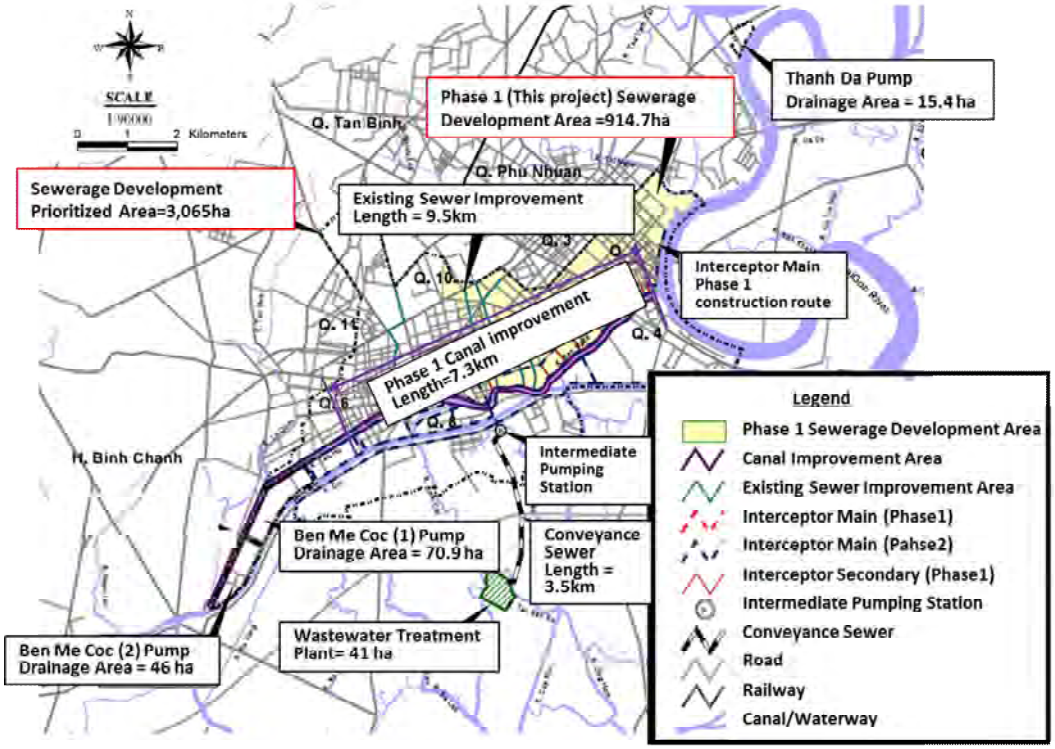


Figure 1. Project Site Overview (Plan)[2]

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>

<table>
<tr><td>Loan Approved Amount/
Disbursed Amount</td><td>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））</td></tr>
<tr><td>Exchange of Notes Date/
Loan Agreement Signing Date</td><td>March, 2001（I）, March, 2003（II）, May, 2010（III） / March, 2001（I）, March, 2003（II）, May, 2010（III）</td></tr>
<tr><td>Terms and Conditions</td><td>
Interest Rate
<table>
<tr><td></td><td>(I)</td><td>(II)</td><td>(III)</td></tr>
<tr><td>Construction except wastewater treatment plant</td><td>1.3%</td><td>1.8%</td><td>1.2%</td></tr>
<tr><td>Construction of wastewater treatment plant and consulting service</td><td>0.75%</td><td>0.75%</td><td>1.2%</td></tr>
</table>
Repayment Period (Grace Period)
<table>
<tr><td></td><td>(I)</td><td>(II)</td><td>(III)</td></tr>
<tr><td>Except wastewater treatment plant</td><td colspan="3">30 years (10 years)</td></tr>
<tr><td>Wastewater treatment plant</td><td colspan="2">40 years (10 years)</td><td>30 years (10 years)</td></tr>
</table>
Conditions for Procurement
(I): General Untied /Bilateral Tied
(II): General Untied /Bilateral Tied
(III): General Untied
</td></tr>
<tr><td>Borrower /
Executing Agency(ies)</td><td>The Government of Socialist Republic of Vietnam/ People Committee of Ho Chi Minh City (PCHCMC)</td></tr>
<tr><td>Project Completion</td><td>October, 2012</td></tr>
<tr><td>Main Contractor(s)
(Over 1 billion yen)</td><td>(I) Shimizu Corporation (Japan)/Nishimatsu Construction CO., Ltd (Japan)/Ebara Corporation (Japan) (JV), Shimizu Corporation (Japan), (II) Toa Corporation (Japan)</td></tr>
<tr><td>Main Consultant(s)
(Over 100 million yen)</td><td>Oriental Consultants Co., Ltd.(Japan)/Vietnam Water, Sanitation and Environment Corporation (Viet Nam)/Water and Sanitation Engineering (Viet Nam) (JV)</td></tr>
<tr><td>Feasibility Studies, etc.</td><td>Development study on drainage and sewerage system planning in Ho Chi Minh City (1998-2000)</td></tr>
<tr><td>Related Projects</td><td>・”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)</td></tr>
</table>

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.

	・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)

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: B[4])

3.1 Relevance (Rating: ③[5])

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 1.0m^3/sec respectively.

At the time of the ex-post evaluation, there were only two wastewater treatment plants, including Binh Hung (141,000m^3/day) constructed under the project and Binh Hung Hoa (30,000 m^3/day) and HCMC's wastewater treatment capacity (53,586,000 m^3/year) comprises 7% of the total domestic wastewater of the city (791,792,000 m^3/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 0.7m^3/sec and Ben Me Coc (1) was 0.7m^3/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	・Canal improvement 7.3km ・Dredging 300,000m^3	・Canal improvement 5.8km ・Dredging 481,756m^3
B	Pump Drainage Improvement	・Pumping Station Thanh Da area 0.7m^3/second Ben Me Coc (1) area 0.7m^3/second ・Drainage Pipe Thanh Da area：680m Ben Me Coc (1) area：4,620m Ben Me Coc (2) area：4,190m	・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	Main interceptor sewer：6,594m Secondary interceptor sewer：7,018m	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 ofnew 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 flection 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 loan[7]) 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 months[8], 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 Effectiveness[9] (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 140,000m^3/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 (141,000m^3/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 Outlet	 - -	 167mg/L <50 mg/L	 156mg/L 16mg/L	 151mg/L 12mg/L	 123mg/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 survey[10] 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, blockagestuck and backflow of street inlet and manhole on the neighboring road does not occure 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.

Note3) 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.

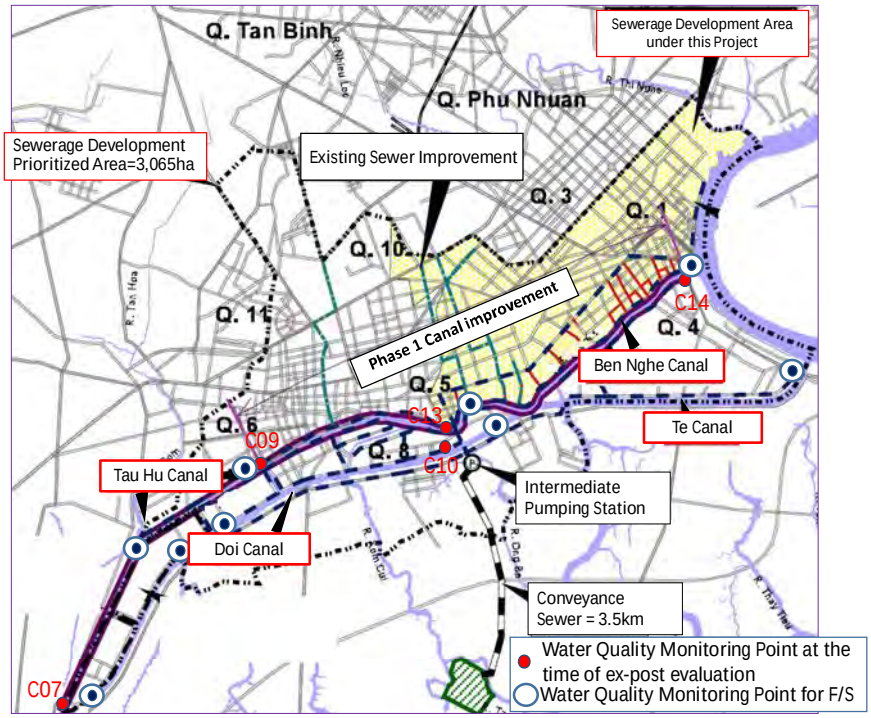


Figure 2. Location and name of canal[11]

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 plant[12] 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 HCMC[13] 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/QD-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 2012[14]. 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 JICA[15], 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 station[17].

Accordingly, no major problems were observed in terms of technical aspects. However, there was apossibility 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 outsoursing expenses and that of the drainage facility development project not under this project.

Table 15. Change of environment conservation tax of HCMC

（Unit：VND/m^3）

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 speare 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 m^3/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

<u>Executing organization of O&M and the training period for the handover</u>

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 station[18]. 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	・Canal improvement 7.3km ・Dredging 300,000m^3	・Canal improvement 5.8km ・Dredging 481,756m^3
B	Pump Drainage Improvement	・Pumping Station Thanh Da area 0.7m^3/second Ben Me Coc (1) area 0.7m^3/second ・Drainage Pipe Thanh Da area：680m Ben Me Coc (1) area：4,620m Ben Me Coc (2) area：4,190m	・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	・Main interceptor sewer：6,594m ・Secondary interceptor sewer：7,018m	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 Local Currency Total ODA Loan Portion Exchange Rate		 18,900 million yen 15,101 million yen (1,986,973 million VND) 34,001 million yen 8,200 million yen (Only for Project (I)) 16,419 million yen[19] (Only for Project (II))[Note1] 1USD ＝ 108 yen 1VND ＝ 0.0076 yen (As of March, 2001)	 16,140 million yen 12,862 million yen (2,111,643 million VND) 29,002 million yen 24,269 million yen 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.

Socialist Republic of Viet Nam

FY2016 Ex-Post Evaluation of Japanese ODA Loan

"Dong Nai and Ba Ria-Vung Tau Water Supply Project (I) (II)"

External Evaluator: Kenichi Inazawa, Octavia Japan Co., Ltd.

0. Summary

This project was planned to meet water demand for household and industrial use and to improve the living condition of local residents by constructing a water supply system in the province of Dong Nai and Ba Ria-Vung Tau, thereby contributing to improve the health condition of the residents and to promote the industrial development around the area, including foreign investment. However, the system was only developed for Dong Nai Province under this project. With regard to relevance, this project has been relevant to the Vietnam's national development plan and development needs both at the time of appraisal and ex-post evaluation. This project was also relevant to Japan's ODA policy at the time of appraisal. However, regarding the project components of Ba Ria-Vung Tau Province, it is hard to say that there was no problem in the procedures and approach under implementation of the project, because the necessary procedure to cancel had not actually been carried out. Therefore, it is judged that its relevance is fair. Instead, the other aspects of this ex-post evaluation will be judged based only on Dong Nai Province. As the project cost and project period significantly exceeded the plan, efficiency of the project is low. In terms of effectiveness and impact, most operation and effect indicators came close to achieving the target value. Concerning population served, it is highly thought to achieve the target in the near future. Positive answers about water pressure and volume, satisfaction and reductions in labor and the time required for obtaining water were confirmed in the results of the beneficiary survey. In addition, it is presumed that this project, by securing stable water supply, is supporting the enhancement of productivity for manufacturing companies in Dong Nai Province, thereby creating a base for more domestic and foreign investments. Therefore effectiveness and impact of the project are high. In terms of sustainability, no major problems have been observed in institutional, technical and financial aspects of the operation and maintenance. Therefore, the sustainability of the project effects is high.

In light of the above, this project is evaluated to be partially satisfactory[1].

[1] Nevertheless, the component for Dong Nai Province is evaluated to be satisfactory.

1. Project Description

Project Location

Constructed Water Treatment Plant in Dong Nai Province

1.1 Background

In Vietnam, the urban population grew rapidly in parallel with the fast-track economic growth in the 1990s. Influx of population to urban centers was remarkable in Southern Vietnam, including Dong Nai Province and Ba Ria-Vung Tau Province. Many industrial parks also started being constructed during this period, as a result of the advancement of foreign companies to Vietnam. It was important to secure industrial water and safe household water, since the water demand for industrial and household use was particularly increasing in the region. Therefore, it was an urgent task to develop water supply facilities in both provinces.

1.2 Project Outline

The objective of this project is to meet water demand for household and industrial use and to improve the living condition of local residents in the province of Dong Nai and Ba Ria-Vung Tau by constructing a water supply system, thereby contributing to improve the health condition of the residents and to promote the industrial development around the area, including foreign investment.

Loan Approved Amount/ Disbursed Amount	Phase I: 5,771 million yen / 4,859 million yen
	Phase II: 3,308 million yen / 3,188 million yen
Exchange of Notes Date/	Phase I: March 1998 / March 1998

Loan Agreement Signing Date	Phase II: March 2004 / March 2004
Terms and Conditions	Phase I: Construction: Interest Rate:1.3% / 0.75% Repayment Period : 30 years (Grace Period: 10 years) Conditions for Procurement: General Untied Consulting Service: Interest Rate: 0.75% Repayment Period: 40 years (Grace Period: 10 years) Conditions for Procurement: Partially Untied Phase II: Construction: Interest Rate:1.3% Repayment Period : 30 years (Grace Period: 10 years) Conditions for Procurement: General Untied Consulting Service: Interest Rate: 1.3% Repayment Period: 30 years (Grace Period: 10 years) Conditions for Procurement: General Untied
Borrower / Executing Agency(ies)	The Government of the Socialist Republic of Vietnam / People's Committee of Dong Nai (hereafter referred to as "PCDN") People's Committee of Ba Ria-Vung Tau (hereafter referred to as "PCBR-VT")
Project Completion	April 2014
Main Contractor (Over 1 billion yen)	Degremont (France), Salcon Engineering BHD (Malaysia), Kubota Corporation (Japan)
Main Consultant (Over 100 million yen)	Nippon Koei (Japan)/Nippon Suido Consultants (Japan)/Vietnam Consultation Water Supply, Sanitation & Environment (Vietnam) (JV)
Feasibility Studies, etc.	F/S (Own fund by Vietnamese side, 1998)
Related Projects	【Japanese Technical Cooperation】 "Master Plan Study on Dong Nai River and Surrounding Basins Water Resource Development" (1996) (JICA) 【ODA Loan Project】 "Dong Nai Province Water Infrastructure Construction Project" (2015) (JICA) 【Other Donors' Cooperation】 "Thien Tan Water Supply Project Phase I (2000-2004), Phase II" (2015), Economic Development Cooperation Fund (EDCF), The Import-Export Bank of Korea)

2. Outline of the Evaluation Study

2.1 External Evaluator

Kenichi Inazawa, Octavia Japan 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: 11-24 February 2017 and 16 -22 May 2017

2.3 Constraints during the Evaluation Study and Points to be Noted

As explained in 3.1.4 Appropriateness of Project Planning and Approach and 3.2.1 Project Output, it was not possible to confirm the project components and actual condition of Ba Ria-Vung Tau Province. Therefore, the project component of Ba Ria-Vung Tau Province is evaluated only in Relevance. The project component only for Dong Nai Province is focused for the rest of the criteria in this evaluation survey to avoid duplication of judgement, since non-performance of Ba Ria-Vung Tau Province is taken into account in the judgement for Relevance.

3. Results of the Evaluation (Overall Rating: C[2])

3.1 Relevance (Rating: ②[3])

The development of water supply facilities in the Dong Nai and Ba Ria-Vung Tau Provinces was part of this project at the time of appraisal. With regard to the development policy and needs of the Ba Ria-Vung Tau Province, confirmation and review of only the project appraisal was done.

3.1.1 Consistency with the Development Plan of Vietnam

At the time of the project appraisal, the government of Vietnam formulated the *Five Year Socio-Economic Development Plan* (1996-2000). This plan pointed out the need to gradually improve water supply systems in urban centers, especially in unserviced areas. In addition, the government formulated the *Comprehensive Poverty Reduction and Growth Strategy (CPRGS)* in 2003, which aimed to ensure that 80% of the urban population and 60% of the rural population

[2] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory
[3] ③: High, ②: Fair, ①: Low

have access to clean water with an average daily supply of 50 liters per person by 2005 and that 80% of poor communes are provided with water supply infrastructure by 2005 and 100% by 2010.

At the time of ex-post evaluation, the government of Vietnam aims to achieve 100% water supply coverage rate by 2025, as stipulated in the Prime Minister's Decision of 2009: *Decision Approving Orientations for Development of Water Supply in Vietnam's Urban Centers and Industrial Parks up to 2025, and a Vision Toward 2050*. It also aims to meet the water supply requirements of all industrial parks and economic zones. In addition, the executing agency of this project, PCDN, formulated in January 2014 the *Overall Water Supply Plan for Urban and Industrial Parks in Dong Nai to 2020*, which stipulates the importance of expanding water distribution networks and water supply facilities in urban areas and industrial park in Dong Nai Province.

Based on the above, water facility development has continued to be important in Vietnam as a whole and in Dong Nai Province at the time of ex-post evaluation. Thus, this project is consistent with the national and sectoral plans during appraisal and ex-post evaluation.

3.1.2 Consistency with the Development Needs of Vietnam

Before implementation of this project, in Vietnam, many factories were constructed and the urban population grew rapidly in accordance with the fast-track economic growth in the 1990s. It was important to secure industrial water and safe household water especially in Southern Vietnam, where development of industrial parks and influx of population to urban centers were observed. In particular, there was an increasing demand for industrial and household water in Ho Chi Minh City and its surrounding areas. According to JICA internal documents, the whole capacity of water supply in Dong Nai Province was approximately 25,000 m^3/day in 2003. Meanwhile, the capacity of water supply in Ba Ria-Vung Tau Province then was approximately 50,000 m^3/day. Since both provinces were facing population increase accompanied by the progress of urbanization, the water demand was estimated at 110,000 m^3/day in Dong Nai Province and 100,000 m^3/day in Ba Ria-Vung Tau Province for the future (after 2010). Responding to the increasing drastic demand, implementing the water supply project was necessary for both provinces.

At the time of ex-post evaluation, through this project, a water treatment facility with the supply capacity of 100,000 m^3/day was developed in Dong Nai Province, which increased the province's supply capacity to about 300,000 m^3/day. The treated water is mainly distributed to

residents and industrial parks in the province's capital, Bien Hoa, Nhon Thach District and Long Thanh District. On the other hand, the water demand for this province has been increasing every year; it is expected to reach 1,100,000 m^3/day in 2020, according to PCDN. Behind this, there are reasons such as increases in the population and in companies moving to the industrial parks inside the province. Dong Nai Province is adjacent to Ho Chi Minh City and, with improved traffic accessibility after the completion of the North–South Expressway (Opened in February 2015) and other infrastructure, its location and investment environment are advantageous. There is an ample labor force with more people immigrating to this province. Thus many foreign companies continue to come and invest in this province, making it one of the most industry intensive provinces in Vietnam. As construction of a new international airport is also under discussion, the province is expected to receive more attention in the future (The source is from PCDN.). In these circumstances, a succeeding ODA loan project, the "Dong Nai Province Water Infrastructure Construction Project", and the "Thien Tan Water Supply Project" (Phase II project) financed by the Economic Development Cooperation Fund (EDCF), The Ex-port-Import Bank of Korea, are ongoing at the time of ex-post evaluation[4]. The province is taking measures so that it can respond to future water demand.

Based on the above, the project is consistent with the developmental needs brought to light by the appraisal and ex-post evaluation.

3.1.3 Consistency with Japan's ODA Policy

The *Official Development Assistance (ODA) Charter*, which was approved by the cabinet in 1992, stated that "Attention should be paid to efforts for promoting democratization, the introduction of a market-oriented economy and the situation regarding the protection of basic human rights and freedoms in the developing countries." Moreover, it mentioned that supporting the infrastructure development, an important basic condition of economic and social development must be focused on. This project offers infrastructure development assistance to Vietnam, which was striving to move to a market economy structure.

In addition, according to the Japan's ODA White Paper in 1999, it clearly stated that it would consider various cooperation that contributes to improvement of the residential (urban) environment through improvement of water and sewerage facilities based on the priorities of Vietnam.

Meanwhile, the *Country Assistance Plan for Vietnam*, was formulated in 2003 before the

[4] Loan agreement of the both projects was respectively signed in 2015.

commencement of Phase II project, by the Ministry of Foreign Affairs in Japan, stating that assistance to water supply, rural roads, electrification/rural electricity distribution network and agricultural irrigation was among its priorities. Furthermore, JICA prepared the *Strategy for Overseas Economic Cooperation Operations* and *Country Assistance Policy for Vietnam* in 2003, which highlighted development issues of and assistance policy for Vietnam. These policies identified "Assisting the development of economic and social infrastructure including water supply and sewerage sectors" and "Assisting projects contributing to improve people's living environments in urban areas".

Since this project aimed to improve the health condition of the local residents and to promote the industrial development, including foreign investment, through developing infrastructure such as water supply facilities, it can be said that the project was in line with Japan's assistance policy.

3.1.4 Appropriateness of the Project Plan and Approach

Concerning the water supply development project in Dong Nai Province, there is no significant difference between the outputs planned at the time of appraisal and the status after completion. On the other hand, regarding the water supply development project in Ba Ria-Vung Tau Province, the ODA loan was not used except for a portion of consultancy service. Behind this was the fact that the contract negotiation failed between PCBR-VT and the bidder and the contract was not finalized. Then, PCBR-VT made a decision to draw out from the ODA loan project in March 2004, immediately after the Phase II project began[5]. As water demand in the province was rapidly increasing in 2004, PCBR-VT anticipated that tendering would take a significant amount of time given the requirements specified in the loan agreement; they withdrew from this Project in order to develop the water supply more swiftly. As an alternative, PCBR-VT decided to use its own fund to implement the water supply project. The actual achievements of its project could not be confirmed through this evaluation study[6]

However, PCBR-VT did not submit an official letter informing the Ministry of Planning and Investment (hereafter referred to as "MPI"), the coordinator of ODA loans or JICA Vietnam Office about its request to cancel this component[7]. Therefore, the related parties had the view

[5] Source: JICA's internal document and interviews with JICA Vietnam Office

[6] No information was available through JICA's internal document or interviews with JICA Vietnam Office.

[7] According to interviews with JICA Vietnam Office, the cancellation and change of loan agreement regarding the project component of Ba Ria-Vung Tau Province are usually done based on submission of cancellation notice in writing from the executing agency to MPI, and then from MPI to JICA. Regarding the project components of Ba Ria-Vung Tau Province, MPI and JICA repeatedly advised PCBR-VT to write such an official letter; in fact, MPI even dispatched its staff to follow this up. However, PCBR-VT did not take any action, and loan agreement was not

that cancellation of the component nor amendment of the loan agreement's procedures concerning the project components of Ba Ria-Vung Tau Province was not possible. However, it is not clear if all the options were thoroughly examined. In principle, the terms of the loan agreement is legally binding, and it is not desirable to keep the project scope in an ambiguous state. Considering the legal framework of the loan agreement, there may have been other means to cope with the situation, such as sending the request for cancellation of the component (It is just notice by official documents.) from the JICA side[8].

Therefore, it is a fact that the necessary procedure has not actually been carried out to make the cancellation official, and the status has continued up to the ex-post evaluation. Based on this point, it is judged that there were some problems on appropriateness of project procedures and approach.

This project has been relevant to the Vietnam's development plan and development needs. In addition, it was also relevant to Japan's ODA policy at the time of appraisal. However, it cannot be judged that all means to resolve the situation were appropriately examined, and in reality no cancellation procedure about the project components of Ba Ria-Vung Tau Province were officially carried out. Based on this point, it is hard to say that there was no problem in the procedures and approach under implementation of the project. Therefore, it is judged that its relevance is fair.

Photo 1: Constructed Water Treatment Plant in Dong Nai Province

Photo 2: Constructed Water Pumping Station in Dong Nai Province

amended. The reason why PCBR-VT did not send the letter was not confirmed. Meanwhile, it can be said that MPI and JICA made efforts to convince PCBR-VT yet could not control the situation.

[8] More specifically, there may have been an option for the JICA side to offer cancellation of the project scope of Ba Ria-Vung Tau Province, by changing the loan agreement's procedure (e.g., Partial cancellation of loan agreement should have been done.) to the Vietnamese government side.

3.2 Efficiency (Rating:①)

3.2.1 Project Outputs

Table 1 shows the planned and actual outputs of this project.

Table 1: Planned and Actual Outputs of this Project

Plans at the Time of Appraisal	Actual at the Time of Ex-Post Evaluation
<Dong Nai Province> (a) Raw water intake: one place (b) Water pumping station: three places (c) Water treatment plant: one place at Nhon Trach (design capacity: 200,000 m^3/day at appraisal of phase I (March 1998), 100,000 m^3/day at appraisal of phase II (March 2004)) (d) Water transmission pipeline: approx.104km	<Dong Nai Province> (a) Implemented as planned (b) Implemented as planned (c) Implemented as planned for the planned design of phase II (Capacity: 100,000 m^3/day) (d) Implemented: approx.79km
<Ba Ria-Vung Tau Province> (a) Raw water intake: one place (b) Water transmission pipelines: approx.45km (c) Water treatment plant: one place at Ba Ria (design capacity: 100,000 m^3/day at appraisal of phase I (March 1998), 50,000 m^3/day at appraisal of phase II (March 2004))	<Ba Ria-Vung Tau Province> (a)-(c): ODA Loan was not used after 2004. (Reference) Implemented through its own fund after 2004. However details are unknown.
<Consulting Services> (a) Review of F/S, detailed design, preparation and evaluation of tender documents, assistance for tendering, supervision of construction (b) Study of topography, water quality and hydrology (c) Environmental measures including environmental monitoring	<Consulting Services> (a)-(c): Implemented as planned in Dong Nai Province (Reference) Regarding Ba Ria-Vung Tau Province, the consulting services were also partially used. However, details are unknown.

Source: Document provided by JICA (plans at the time of appraisal), answers to the questionnaires (actual at the time of ex-post evaluation).

With regard to Dong Nai Province, the outputs planned at the time of appraisal were implemented mostly as planned. Among these, the actual output related to the design capacity of "(c) Water treatment plant" was less than planned. The reason for this is that in 2000, after the project began, it was estimated that the province's water demand for water supply would slow down. Then, design capacity of this project was changed (i.e., JICA revised the design capacity from 200,000 m^3/day to 100,000 m^3/day as a result of reappraisal.) Behind this were the judgments of the Vietnamese government and the government of Dong Nai Province that demand for water supply would slow down in the province given the Asian Financial crisis in the late 1990s and the country's economic situation at that time[9]. Based on such a review of

[9] More specifically, it was assumed that the amount of foreign investment and number of enterprises to the province

design capacity, the design capacity was set at 100,000 m^3/day at the time of appraisal of the Phase II project (2004); the facility was constructed as per the design. With respect to "(d) water distribution pipe", the actual output (approx. 79km) was shorter than the initial plan. This was due to a change made to the detailed design during appraisal of the Phase II project.

With regard to Ba Ria-Vung Tau Province, the planned component was not implemented after 2004, as explained in 3.1.4 Appropriateness of the Project Plan and Approach.

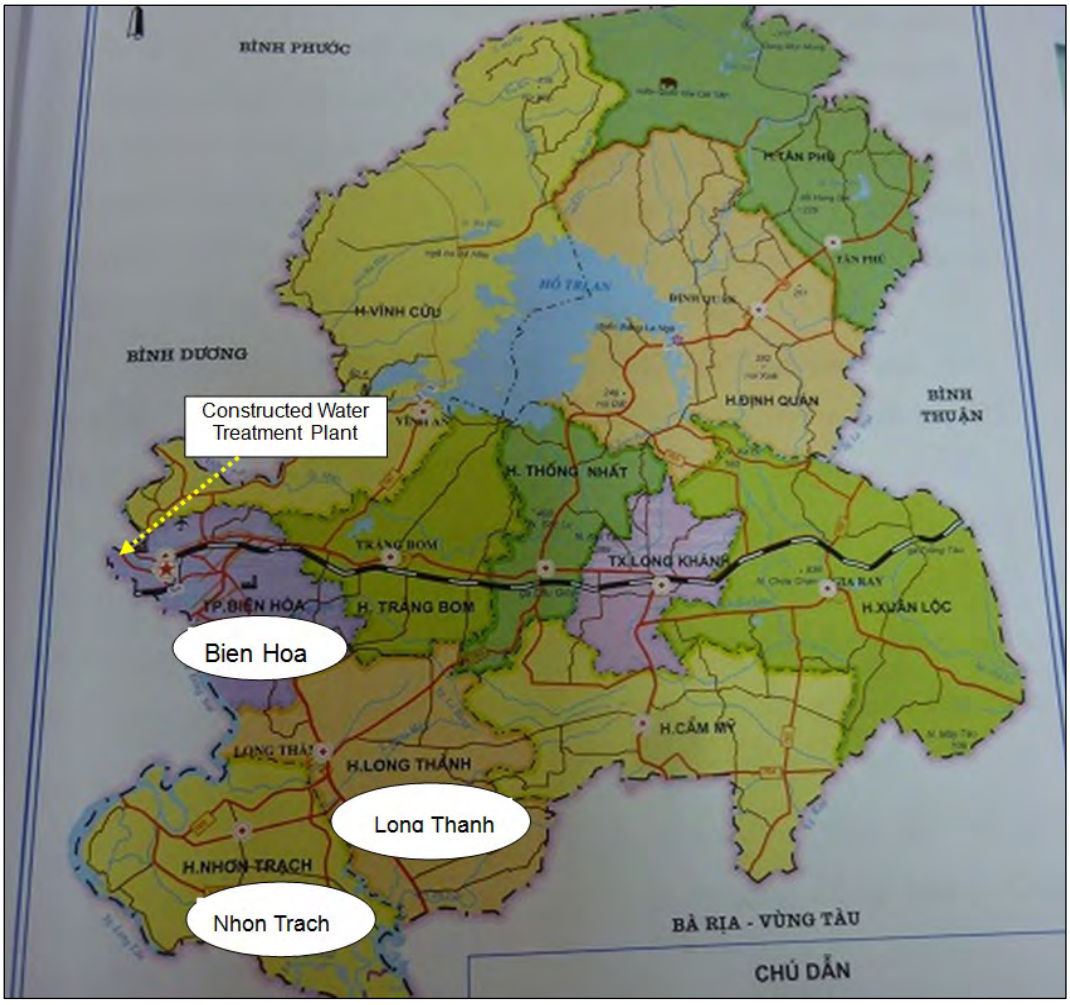


Figure 1: Locations of Project Sites (Dong Nai Province)

would not increase.

3.2.2 Project Inputs

3.2.2.1 Project Cost

Table 2 shows planned and actual costs of this project. At the time of the Phase I appraisal (1998), the project cost was planned to be 18,577 million yen for Dong Nai Province and 12,260 million yen for Ba Ria-Vung Tau Province. As mentioned earlier, it was estimated that demand for water supply would slow down in both provinces after the Phase I project began (2000); accordingly, design capacity was adjusted. As a result, the planned project cost was also reduced at the time of the Phase II appraisal (2004). This evaluation study examined the costs planned for the Phase II project after the design change to compare with the actual costs and reviewed the differences. However, as discussed in the 3.2.1 Project Outputs section under Efficiency, the project component concerning Ba Ria-Vung Tau Province was not implemented after 2004. In reality, the detailed design and tendering were conducted, and the consulting service was also provided (approx.209 million yen). Since the paid amount was relatively small, the actual cost of BR-VT was treated as reference, and analysis was done for the project cost of Dong Nai Province.

Concerning Dong Nai Province, the actual project cost was 10,769 million yen, while the amount planned for the Phase II project was 7,412 million yen (approx. 145% of the plan). The main reasons for this are as follows: (1) after Phase II began, the prices of construction materials such as oil and steel increased globally. According to JICA's internal documents and interviews with Dong Nai Water Supply Co., Ltd. (hereafter referred to as "DOWACO"), the organization regarding operation and maintenance for the project, these costs began increasing in 2004, and by 2008, when construction peaked, they had increased by about 30% in four years; (2) compensation for the land acquisition was more than was initially expected. As will be discussed in 3.4.2.2 Land Acquisition and Resettlement under Impacts, while 1,090 households were initially subject to land acquisition, the actual number increased to 1,500 households, and accordingly, the compensation also increased.

Table 2: Planned and Actual Costs of This Project

(Unit: million JPY)

	Plan (Phase I: 1998)		Plan (Phase II: 2004)		**Actual**	
	Dong Nai	BR-VT	Dong Nai	BR-VT	Dong Nai	BR-VT*** (reference)
Foreign currency	10,484	8,413	3,879	2,296	5,161	128
Local currency	8,093*	3,847*	3,533*	1,356*	5,608** (1,156,495 million VND)	81**
Total	18,577	12,260	7,412	3,652	10,769	209
(Japanese ODA loan)	5,771		3,308		8,047	

Source: JICA provided documents (Plan) and answers to the questionnaire (Actual)
*Note1: Exchange rate at the time of appraisal (Plan):
(Phase I) 1 USD=JPY120, 1 VND=JPY0.01, as of March 1998
(Phase II) 1 USD=JPY119, 1 VND=JPY 0.00768, as of Oct. 2003
**Note 2: Exchange rate at the time of ex-post evaluation (Actual): 1US dollar=JPY 93.26, 1VND=JPY 0.004849
(Note: Conversion was made by taking the average rate for the period of the construction (October 2007-December 2014) based on rates issued by the International Financial Statistics (IFS), International Monetary Fund (IMF).)
***Note 3: The actual amount of BR-VT is expenditure for only a part of consulting service. It is treated as reference, not included in the total project cost, for the rating judgement of efficiency.

3.2.2.2 Project Period

The actual project period was compared and reviewed with the initial plan (Phase I). At the time of the Phase I's appraisal, the project period was planned as 6 years and 4 months (76 months) from March 1998 to June 2004. The actual project period for the project components of Dong Nai Province was 16 years and two months (194 months) from March 1998 to April 2014[10] (197% of the plan). The main reasons for the delay are as follows: (1) owing to the increases in market prices of construction materials as discussed above, the Vietnamese side had to review the initial project costs. As a result, the process and coordination between the central government and the executing agency concerning the cost change and others took time; (2) the Vietnamese side was not accustomed to the procurement procedures of JICA for contractors and took a long time to prepare tendering documents and conduct contract negotiations; (3) the number of households subject to land acquisition was more than the initial estimate (as will be elaborated at 3.4.2.2 Land Acquisition and Resettlement under Impacts) and PCDN required time for the negotiation with landowners and acquisition processes. Consequently, construction was delayed. Accordingly, the period of the consulting services was also extended.

For reference, concerning Ba Ria-Vung Tau Province, the project scope was not implemented after 2004, as discussed at 3.2.1.1 Project Costs. Although construction was not implemented by

[10] Completion of this project was defined as the timing at which water supply treatment facilities in Dong Nai Province were completed and began operating. (i.e., April 2014)

this project, the detailed design and tendering were conducted, and the consulting service was also provided[11].

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

Economic Internal Rate of Return (EIRR)

Throughout this evaluation survey, Economic Internal Rate of Return (EIRR) was not recalculated, as the figure was not calculated at the time of project appraisal for both Phase I and II.

Financial Internal Rate of Return (FIRR)

FIRR was recalculated using the same conditions as at the time of appraisal: taking revenue from water supply as benefit and the construction cost and operation and maintenance costs of this project as costs, and assuming a project life of 40 years. The result was 6.83%, which is slightly higher than 6.4% calculated at the time of Phase II's appraisal. This is because revenue on water supply[12] including the one from industrial parks in Dong Nai Province was higher than expected at the time of appraisal, in spite of the fact that project period and costs exceeded compared with the initial plan.

Both the project cost and project period significantly exceeded the plan. Therefore, efficiency of the project is low.

3.3 Effectiveness[13] (Rating:③)

3.3.1 Quantitative Effects (Operation and Effect Indicators)

1) Operation Indicators of the Project

This project constructed water supply facilities with the capacity to supply 100,000 m^3/day. Table 3 shows operation indicators of this project regarding Dong Nai Province. At the time of ex-post evaluation, the total water supply capacity of the water treatment facilities owned by Dong Nai Province is approximately 300,000 m^3/day, of which about one-third is supplied by this project. The facilities were completed in April 2014, after which water supply service began.

[11] Nevertheless, information could not be obtained through interviews with JICA Vietnam Office. Information written in 1) Detailed Design and 2) Bidding and Consulting Services is based on JICA's internal documents; however, the statements are only for reference purposes.

[12] The water tariff rose in line with local economic growth during project implementation, according to DOWACO. However, the rate was not possible to obtain during the period.

[13] Sub-rating for effectiveness is to be put with the consideration of impact.

Table 3: Operation Indicators of the Project

Indicator	**Target***	**Actual**				
	2010 (Four years after the project completion)	From 2010 to 2013	After 2014.4 **	2015	2016	2017 ***
1) Amount (Average) of Water Supply (unit: m^3/day)	100,000	Not completed yet.	35,450	55,948	80,517	99,000
2) Population Served *** (unit: person)	98,000		68,470	69,396	72,927	77,000
3) Rate of Facility Utilization (unit: %)	100		35.4	55.9	80.5	99.0
4) Non-revenue Water Ratio (unit: %)	16		15	15	15	15

Source: JICA provided documents (Target), Answers to questionnaire (Actual)
*Note 1: At the time of ex-ante evaluation, the target was set for 2010.
**Note 2: The water supply facilities were completed in April 2014; the figure for this year represents the data for about eight months from April until December. (During the period, data regarding Amount (Average) Water Supply, Rate of Facility Utilization and Non-revenue Water ratio indicate the average value, while data regarding Population Served indicates the cumulative value.)
***Note 3: The figures are only shown for areas distributed from the water treatment facilities developed under this project. The figures for 2017 are as of March 2017.
****Note 4: Target served areas are mainly for Bien Hoa, Long Thanh, and Nhon Trach in Dong Nai Province.

In this ex-post evaluation, indicators of quantitative effects set at the time of appraisal for phase II[14] are compared with the actual figures. Before this project began, the target year for the quantitative indicators (operation and effects indicators) was set at 2010, four years after the completion of the facilities (according to the plan of Phase II's appraisal, the completion was expected to be in 2006). However, in reality, the facilities were completed in 2014. Thus, the target year would be four years after that, which is 2018; but for this evaluation, the comparisons against the targets were made using the actual figures attainable from the most recent year, which was 2017, and these comparisons are reviewed below:

Regarding the operation indicators, after the completion of the water supply facilities, the number of residents who receive the service gradually increased, and 1) amount (average) of daily water supply and 3) rate of facility utilization mostly reached the targets. It is observed that the water supply service expanded after the completion of the water supply facilities and that they are being operated smoothly. Concerning 2) population served, according DOWACO, the connection to each house usually takes certain time, and therefore the actual population served in March 2017 is relatively lower than the target due to the timing of the evaluation (In other words, four years after the completion have not reached yet, so it is still early to make a

[14] The indicators were not set at the time of appraisal phase I.

comparison.). However, the target figure (98,000 persons) is expected to be achieved by the end of 2018, since the connection works have been increasing, almost as scheduled. In addition, concerning 4) non-revenue water, with the installation of new distribution pipes as part of this project, leakage was reduced and their maintenance status is also good, as will be discussed under Sustainability. Thus, the target (16% or less) has been achieved.

2) Effect Indicators of the Project

Table 4 shows effect indicators of this project regarding Dong Nai Province. The indicators have also mostly been achieved. The actual figures were slightly below the targets because the population in Dong Nai Province increased by more than expected[15]. In other words, the designed amount of water supply capacity, 100,000 m^3/day, needs to be shared by more residents, which makes the 1) water supply service coverage[16] and 2) water supply per capita stagnate.

Table 4: Effect Indicators of the Project

Indicator	**Target***	**Actual**				
	2010 (Four year after the project completion)	From 2010 to 2013	After 2014.4 **	2015	2016	2017***
1) Water Supply Service Coverage **** (unit: %)	96	Not yet completed	69.87	70.81	74.42	78.57
2) Water Supply Per Capita (unit: lit./day)	150		110	120	130	Around 130 *****

Source: JICA provided documents (Target), Answers to questionnaire (Actual)
*Note 1: At the time of ex-ante evaluation, the target was set for 2010.
**Note 2: The water supply facilities were completed in April 2014; the figure for this year represents the data for about eight months from April until December. (During the period, the data shown in the table indicates the average value.)
***Note 3: The figures for 2017 are as of March 2017.
****Note 4: Target served areas are mainly for Bien Hoa, Long Thanh, and Nhon Trach in Dong Nai Province.
*****Note 5: Actual data is based on interviews with DOWACO.

(Reference: Quality of water coming from the water treatment plant developed by this project)

Shown in Table 5 are recent data on the quality of water coming from the water treatment plant developed by this project. The upper row represents actual values, while the lower row

[15] Details will be explained in 3.4 Impacts (quantitative effects) later.
[16] For reference, the population of Dong Nai province is steadily increasing. Approximately 1.84 million (1995), approximately 2.05 million (2000), approximately 2.26 million (2005), approximately 2.58 million (2010), approximately 2.91 million people (2015) (Source: General Statistics Office of Vietnam)

represents the water quality standard set by the government. The water quality is within the country's standard in terms of all indicators; it can be judged that safe water is being provided.

Table 5: (Upper) Actual Data on Quality of Water Distributed by the Water Treatment Plant / (Lower) Standard Water Quality Set for Vietnam

PH	Turbidity	Hardness	Color	Residual Chlorine
6.7	1.52	30	0	0.5
6.5-8.8	<2.0	<300	<15	0.3-0.5

Source: DOWACO
Note: The upper row is data as of 21 October 2016. The lower row is the water quality standard set for Vietnam. (QCVN01:2009).

3.3.2 Qualitative Effects (Improvement of Water Supply Service)

This project has contributed to improve the water supply service for local residents around the project area in Dong Nai Province. DOWACO and PCDN commented in interviews during the field survey: "The population has been increasing rapidly, particularly in the provincial capital, Bien Hoa; and water demand is on an increasing trend. However, serviced area has definitely expanded thanks to this project. The functions of the developed water supply facilities and distribution pipes are satisfactory. There is no problem with the operation of the facilities. In addition, we can respond to the increase in water demand in the future. We think that we will be able to contribute to the future improvements in health and sanitation with the expansion of the served area."

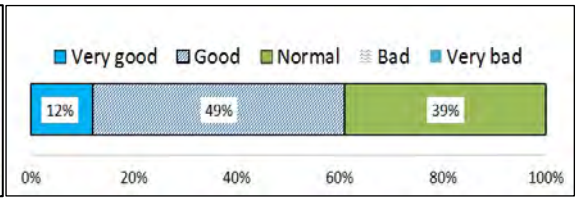
In addition, a beneficiary survey was conducted during the evaluation study, targeting the residents who received water from the water supply facilities developed as part of this project (sample size was 90)[17]. Regarding the questions about water pressure in Question 1 and water quality such as smell, taste and color in Question 2 to 4, the majority answered "good" while some said "normal." Respondents commented when interviewed: "We used to drink well water. Now, we can drink water without worrying. Water we need for living is securely distributed. When we used well water, water pressure was always a problem. Now, we are satisfied." Based on such a comment, it can be presumed that the level of satisfaction is high. Those whose answer was "normal" commented: "We do not have any negative impression about the taste, color or smell of the water. The same is true for water pressure." While these people are not

[17] The properties of the samples are: (1) those who have not moved at least for the past five years (i.e., conditions before and after the project are comparable); (2) those residing in the provincial capital of Bien Hoa or Nhon Thach, the major areas covered by this project; (3) sex ratio: 48% male and 52% female; and (4) average age of 47.94. The survey was based on interviews using a questionnaire. Concerning biases and probability of the interpretations of the results, it can be judged that the results are not statically significant given that this beneficiary survey did not follow a strict systematic sampling.

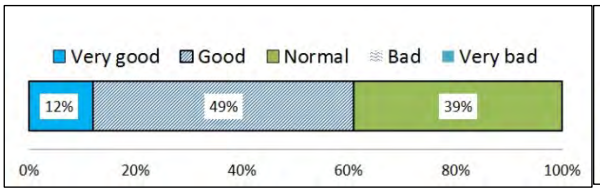
satisfied or dissatisfied, they tend to think that the current status is as per the standard expected of a water supply service. Question 5 is about reduction of physical burden and time involved in carrying water. Almost every one answered “yes”. It can be said that the residents are less burdened compared to the time when they used well water.

Based on these answers and comments, it can be judged that this project has improved the water supply service.

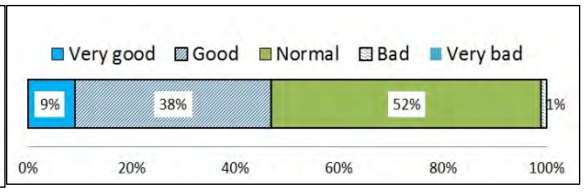
Question 1: What do you think of the current water pressure from DOWACO?
(90 valid responses, local residents)



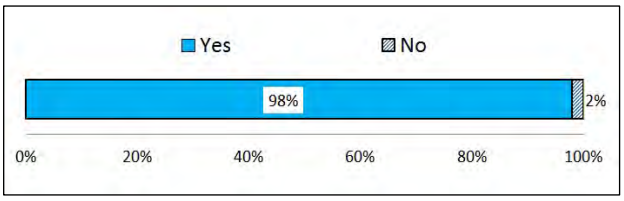
Question 2: What do you think of the current odor from supplied water from DOWACO?
(90 valid responses, local residents)



Question 3: What do you think of the current taste from supplied water from DOWACO?
(90 valid responses, local residents)



Question 4: What do you think of the current color from supplied water from DOWACO?
(90 valid responses, local residents)



Question 5: Do you think physical and time burden involved in carrying water has reduced compared with before implementation of this project?
(90 valid responses, local residents)

3.4 Impacts

3.4.1 Intended Impacts

3.4.1.1 Contribution to Promote the Industrial Development of Dong Nai Province

1） Quantitative Effects

Graph 1 shows GDP growth rates in Dong Nai Province and the whole country for the past

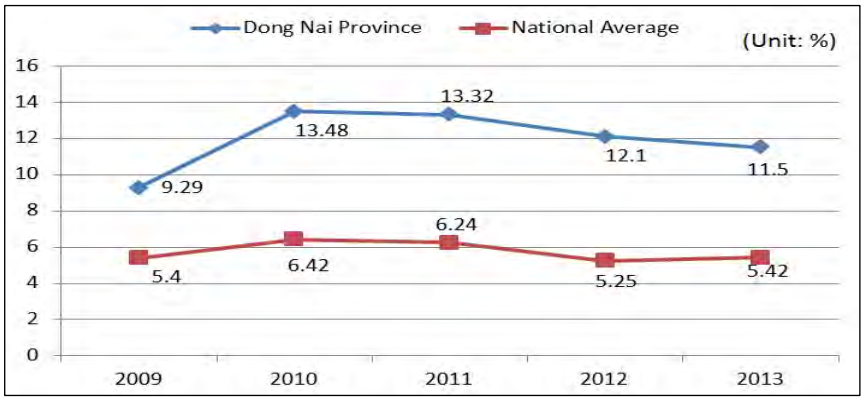
few years. Graph 2 shows amount of domestic and foreign investments to Dong Nai Province. Relatively, the GDP and domestic and foreign investment of the province has been growing at higher rates. It can be said that the socio-economy of this province has been developing rapidly. This province is closer to the largest city, Ho Chi Minh City, (one hour by car). The province has many industrial parks, which have developed infrastructure, such as roads, electricity, gas, water supply and sewage. Before this project began, there were 24 industrial parks in this province, which has increased to 31 at the time of ex-post evaluation. The total area is about 10,000 ha; almost all the industrial parks are fully occupied. About 500,000 to 600,000 people worked inside industrial parks as of the end of 2016, and the number has been rapidly increasing in recent years. Behind this is the fact that foreign companies, mainly Japanese, are expanding their businesses[18].

The management departments of the industrial parks[19] (AMATA and LOTECO Industrial Parks) that receive water supply from the water treatment plant in this project commented in interviews during the field survey: "Since some companies use a huge amount of water (e.g., textile companies that do dyeing), we need to store an enormous amount of water in the reservoirs. We have been able to secure a stable water supply from the water treatment plants day and night. For the management departments, development and maintenance of the infrastructure inside the industrial park is important, and we trust the water supply service of DOWACO."

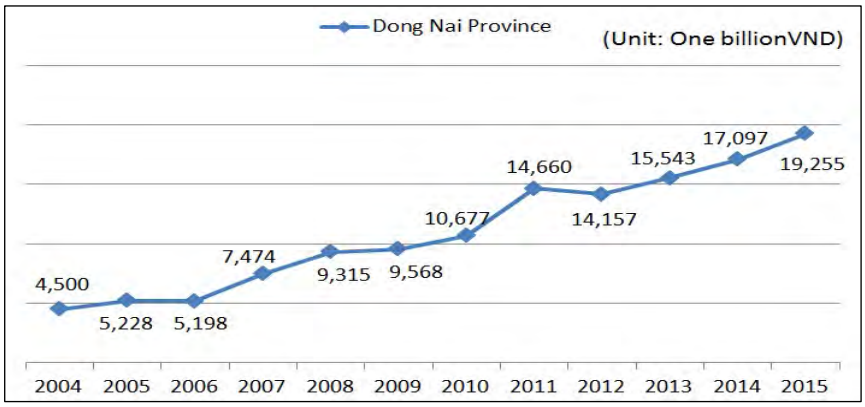
In light of the above, it is thought that the water supply service made possible through this project is playing an important role for companies operating inside the industrial parks of Dong Nai Province and that it is supporting the social and economic development of this province.

[18] About 1,000 companies from tens of countries are operating in the province, of which about 200 are Japanese companies, constituting the largest share. Companies operating in the industrial parks of Dong Nai Province are mainly in the textile industry, high-technology businesses, steel industry, electricity and paper industry.

[19] According to DOWACO and industrial parks visited during the field survey, each industrial park has infrastructure, such as roads, electricity, gas, water supply and sewage. Regarding water supply, it is equipped with reservoirs, water pumps and water distribution pipes. Water from water treatment plants is initially stored in reservoirs. Later, water is distributed to each company according to its usage. In other words, companies inside the park do not receive water directly from the water treatment plants of this project.



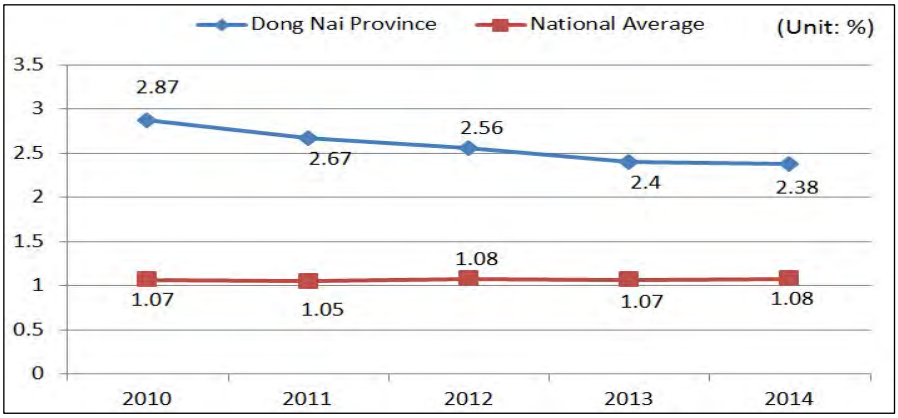
Graph 1: Trends in GDP Growth Rates of Dong Nai Province (upper row) and National GDP Growth Rates (lower row)



Graph 2: Amount of Domestic and Foreign Investments to Dong Nai Province

(Reference) Population Growth in Dong Nai Province

Graph 3 shows the population growth rates of Dong Nai Province and the whole country. The population of the province has been growing at a faster rate than the country. The population has grown by 160% (1,844→2,906 thousand) in the past 20 years. This is because the workers have immigrated from other provinces into the industrial parks (increase in population influx). According to DOWACO, the population is expected to continue to grow, increasing water demand; it can be said that the contribution of this project will be further significant in the future.

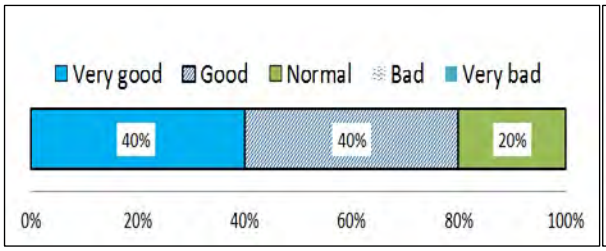


Graph 3: Population Growth Rates of Dong Nai Province (upper row) and the Whole Country (lower row)

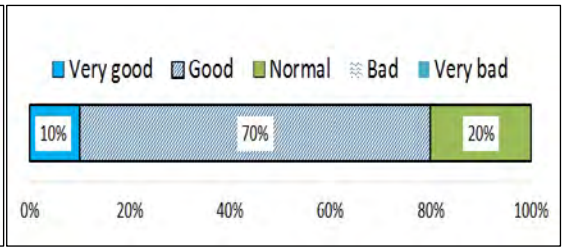
2) Qualitative Effects

A beneficiary survey was also conducted, targeting the industrial parks that receive water supply service from the facilities developed as part of this project. (sample size was ten)[20] Answers to the questions about water pressure, volume and quality from Question 1 to 3 were mostly positive. The managers of industrial parks commented in interviews: "Concerning water distributed by DOWACO, there have been no problems with water pressure, volume or quality. We have not received any complaints from companies operating inside the industrial parks. Since sufficient volume of water is secured at all times, we can distribute water around the clock." In addition, as shown in Question 4, some mentioned that water supply made possible through this project had positive impacts on the promotion of industrial development. As shown in Question 5, some think it had increased foreign and domestic investments. Some companies inside the industrial parks use a huge amount of water as discussed earlier. Thus it is presumed that this project, by securing stable water supply, is supporting the enhancement of companies' productivity, thereby creating a base for more domestic and foreign investments.

[20] The industrial parks that fit the following conditions were targeted: (1) an industrial park has been in operation at least for the past five years (i.e., situations before and after the project are comparable); and (2) it is ten industrial parks either in the provincial capital of Bien Hoa or Nhon Thach, the major areas covered by this project. The survey was based on interviews using a questionnaire. In fact, the industrial parks (the management department) receive water from DOWACO, store it in their reservoirs and distribute it to each company using their own water pumps and distribution pipes. Thus, targeting the industrial parks themselves for the beneficiary survey was judged to be appropriate.

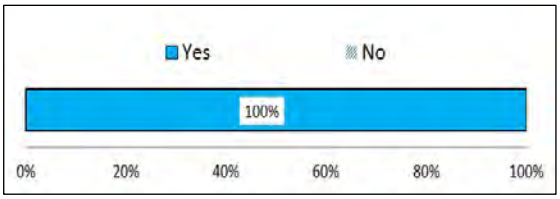


Question 1: What do you think of the current water pressure supplied from DOWACO?
(10 valid responses, Industrial parks)

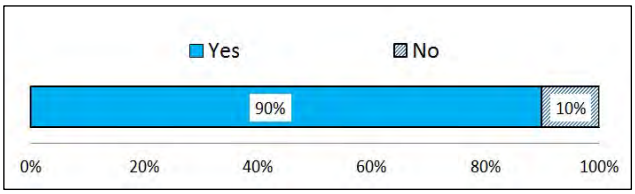


Question 2: What do you think of the current volume from supplied water of DOWACO?
(10 valid responses, Industrial parks)

Question 3: What do you think of the current quality from supplied water of DOWACO?
(10 valid responses, Industrial parks)



Question 4: Do you think water supply system constructed by this project has influenced on the promotion of the industrial development?
(10 valid responses, Industrial parks)



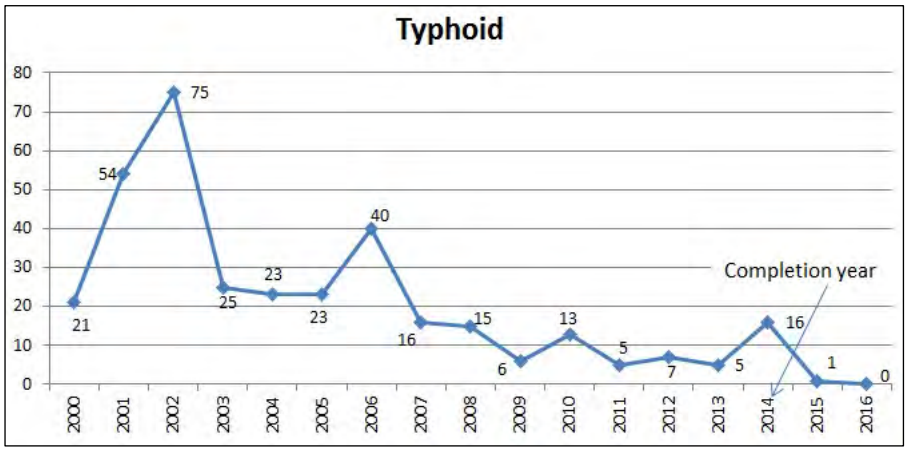
Question 5: Do you think water supply by this project has increased foreign and domestic investment at industrial park in Dong Nai Province?
(10 valid responses, Industrial parks)

3.4.1.2 Contribution to Improve Health and Sanitary Conditions of the Local Residents

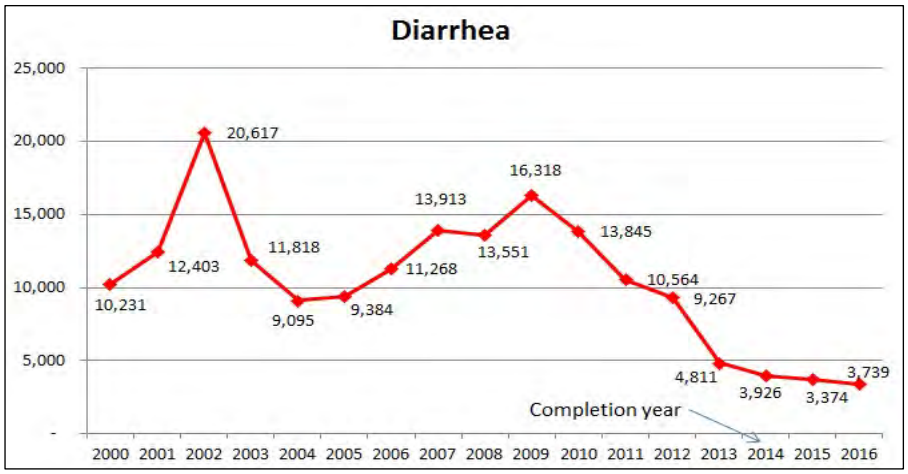
At the time of project appraisal, it was expected that this project would contribute to improve health condition of the local residents. Graph 4 and 5 show the changes in patients with typhoid[21] and diarrhea after the project began until the time of the ex-post evaluation, in Dong Nai Province. Both diseases are transmitted by mouth and most often through water intake. As both graphs show, the cases have generally been on a decreasing trend. The numbers of patients with typhoid and diarrhea have been on a decreasing trend from 2000 until the time of ex-post evaluation (2016). Meanwhile, since such changes are also affected by factors other than this project (such as improvements in living conditions and improvements due to factors other than water supply infrastructure), it is not possible to prove clearly that this project had impacts on

[21] Bacterial infections accompanied by high fever and rash.

health improvements, and therefore the result is not used as the main evidence in the judgment for sub-rating of Impact. However, it can be thought that this project is contributing to decrease the patients with typhoid and diarrhea, to some extent; thereby supporting the decrease of negative factors affecting the health of residents in Dong Nai Province[22].



Graph 4: Changes in the Number of Typhoid Patients

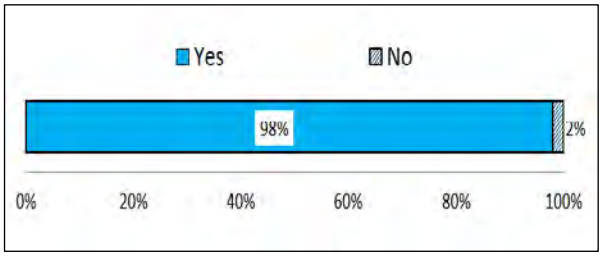


Graph 5: Changes in the Number of Diarrhea Patients

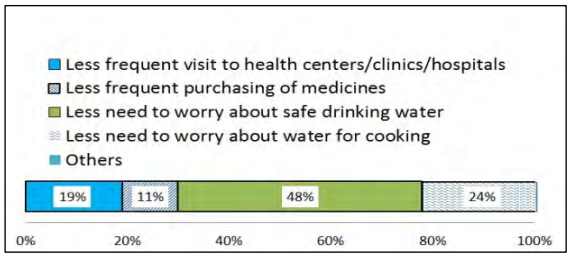
In order to know the improvements in health and sanitation of local residents, a beneficiary survey was also conducted, targeting the residents who received water from the water supply facilities developed as part of this project (sample size was 90)[23]. As shown in Question 1, 98% of the respondents answered "yes" to the question related to the improvements in health and sanitary of local residents. Many people expressed that this was because "Less need to worry

[22] PCDN is planning to ban the use of well water in residential areas of this province by 2020. Their aims are to protect the health of residents and to reduce effects on the environment. For such purposes, DOWACO is playing a role in reducing the use of well water by further increasing the population served by water pipelines.
[23] Same condition from the beneficiary survey at 3.1.2 Qualitative Effect (beneficiary survey) was applied.

about safe drinking water" as shown in Question 2. The respondents also commented in interviews: "We signed up for the water supply service as soon as it began. Compared to the time when we used well water, we can drink water without worrying. While it is difficult to tell whether the project has positive or negative impacts on our health, it is true that we do not suffer from water-borne diseases recently." Considering such comments, it can be assumed that this project is supporting to the improvements in health and sanitation to some extent.



Question 1: Do you think health and sanitary condition of local residents including you has improved compared with before implementation of this project?
(90 valid responses, local residents)



Question 2: If you choose "Yes" at Question 1, what kind of changes do you observe in relation to the improved health and sanitary condition? (Multiple answers allowed)
(88 valid responses, local residents)

3.4.2 Other Impacts

3.4.2.1 Impacts on the Natural Environment

It was confirmed through questionnaires and interviews with PCDN and DOWACO that there were no significant negative environmental impacts during the project implementation. In addition, no negative impacts on the natural environment (e.g., air pollution, vibration, noise and odor, etc.) occurred after the completion of the project. Based on confirmation of the results of environmental monitoring report conducted by Dong Nai Department of Natural Resources and Environment which is in charge of the environmental monitoring for this project and through sites visits and interviews during the field survey, no particular problems were observed in terms of impacts of the water treatment plants on the natural environment[24].

3.4.2.2 Land Acquisition and Resettlement

In this project, 636,104 m^2 of land was acquired for the construction of project outputs such as water treatment plants, water pumping stations and water distribution pipes. The number of

[24] In terms of environmental monitoring of this project, the Dong Nai Department of Natural Resources and Environment of PCDN is responsible. The department immediately responds in the case of any negative impacts on the natural environment occurring inside the project sites; however, there have not been any problems since the completion of this project.

households that became subject to land acquisition (land owners) was 1,500 (of which 320 households were affected and needed to resettle). The amount of compensation paid to those who were subject to land acquisition and resettlement was 342 billion VND[25]. The number of households (land owners) that were planned to be subject to land acquisition at the time of appraisal was 1,090, of which about 200 households were expected to be subject to resettlement. On the other hand, the actual numbers of households who became subject to land acquisition and resettlement were 1,500 and 320[26] respectively, approx. 38% and 60% more than the estimates. It is because the Vietnamese central government's land-related laws were revised a number of times and PCDN, a body responsible for land acquisition and resettlement, repeatedly needed to process legal issues and verify land successors, while PCDN had come to an agreement with the affected households about the amounts of compensation. Then, the actual number of households who became subject to resettlement increased from the initial plan. PCDN and DOWACO commented, "Procedures took a longer time than expected, but we repeatedly negotiated with the residents and came to agreements by offering acceptable amounts. All of these processes could not have been predicted at the time of appraisal." Also, local residents commented in interviews during the field study, "We understood the water supply projects of the province. We understood the compensation procedure and land acquisition."[27]

In light of the above, it can be judged that there were no significant negative impacts associated with the land acquisition and resettlement, even though the process and negotiation with the targeted residents required a long time.

Most operation and effect indicators came close to achieving the target at the time of ex-post evaluation. Concerning population served, it is highly thought to achieve the target in the near future. In addition, positive answers about water pressure and volume, satisfaction and reductions in labor and the time required for obtaining water were confirmed in the results of the beneficiary survey. Furthermore, it is presumed that this project, by securing stable water supply,

[25] The payment of compensation for the land acquisition and resettlement was handled as per the "Resettlement Plan" set by PCDN.

[26] For the families that needed to resettle (320 households), PCDN has allocated new residential plots in the provincial capital, Bien Hoa, and nearby. The resettled land adds up to 9 ha. PCDN has developed infrastructure such as water supply and sewage services, electricity lines and roads in the resettlement destinations for the resettled residents.

[27] Meanwhile, the report regarding the resettlement was not available from them, and it was not possible to confirm the actual implementation status.

is supporting the enhancement of productivity for manufacturing companies in Dong Nai Province, thereby creating a base for more domestic and foreign investments. Thus, this project has achieved its objectives. Therefore effectiveness and impact of the project are high.

Photo 3: Industrial Park
（AMATA Industrial Park, Dong Nai Province)

Photo 4: Residensial Area
（Bien Hoa, Dong Nai Province）

3.5 Sustainability (Rating: ③)

3.5.1 Institutional Aspects of Operation and Maintenance

The executing agency at the time of ex-post evaluation is PCDN. For actual works,, DOWACO under PCDN is the one responsible for operation and maintenance of the water supply facilities developed by this project[28]. DOWACO has about 1,000 staff (as of January 2017), of which 32 are the management and water supply department staff members, 76 are stationed at the Nhon Trach Water Supply Branch, and 33 are at the Long Thanh Water Supply Branch. These members are in charge of the operation and maintenance of this project. The number of DOWACO staff is on more of an increasing trend than before this project began. Particularly, the number has increased by about 400 in the past three to four years. This is because their operation and maintenance works have increased following the completion of this project. At the time of ex-post evaluation, the number of operation and maintenance staff at DOWACO is observed to be sufficient. It was confirmed through field inspections and interviews with DOWACO's management that the necessary number of staff was assigned to different sections.

The operation and maintenance works of DOWACO involve operating water treatment facilities and water pumping stations, developing operation and maintenance plans, cleaning and

[28] DOWACO is supervised by PCDN. Apart from supervising projects implemented by DOWACO, PCDN monitors water supply systems, such as water quality, water pressure and water supply hours. DOWACO reports its work to PCDN periodically.

inspecting water distribution pipes, collecting water tariffs and others.

In light of the above, it can be judged that there is no problem with the institutional aspects of the operation and maintenance.

3.5.2 Technical Aspects of Operation and Maintenance

DOWACO holds training mainly for operation and maintenance staff. Recently they held practical training sessions such as: "On-site training on how to operate the SCADA[29] system for clean water pumping stations" (14 participants), "On-site training on how to operate the Chloritizing Unit" (25 participants) and "On-site training on how to operate the electric valve for the sludge discharging system" (14 participants).

The main specialized areas of the staff are electrical engineers, communication engineers, technical device manufacturing engineers, water supply and drainage engineers. It is organized by experienced staff and it was confirmed through staff interviews during the field study that they are fully aware of the importance of operation and maintenance. In addition, it was confirmed that on-the-job training (OJT) is given to newly recruited staff.

DOWACO owns maintenance manuals for water supply facility operation and carries out maintenance works by referring to such manuals as needed.

In light of above, no particular problems are observed in the technical aspects of the operation and maintenance of DOWACO.

3.5.3 Financial Aspects of Operation and Maintenance

Table 6 and 7 show the operation and maintenance budgets (last three years) for the main facilities of this project (water pumping stations and Nhon Trach Water Treatment Plant). The amounts have been increasing for the past three years. Behind this are an increase in revenues from water charges and a good financial situation, shown in Table 8, 9 and 10. The operation and maintenance staff of both facilities commented in interviews, "We think that the operation and maintenance budgets of the past few years have been sufficient. There is no incidence of operation and maintenance being insufficient due to budget shortage." In addition, DOWACO's management staff commented, "The revenues from water charges are expected to increase as the population served expands in the future; we will be able to allocate operation and maintenance budgets necessary for the water supply operations."

[29] Abbreviation of Supervisory Control And Data Acquisition. SCADA is a kind of industrial control system and performs system monitoring and process control by computer.

Table 6: Operation and Maintenance Budgets for the Pumping Stations

(Unit: million VND)

	2014	2015	2016
Operation budget	8,780	10,865	10,865
Maintenance budget	40	55	70
Others	35	40	45
Total	8,855	10,960	10,980

Source: DOWACO

Table 7: Operation and Maintenance Budgets of Nhon Trach Water Treatment Plant

(Unit: million VND)

	2014	2015	2016
Operation budget	31,354	52,998	52,998
Maintenance budget	(Warranty period by contractor)	(Warranty period by contractor)	98
Others	-	-	-
Total	31,354	52,998	53,096

Source: DOWACO

Table 8 shows DOWACO's revenues from water charges. The amount has been increasing for the past few years. The growth rate became particularly high after 2014, the year in which this project was completed. According to DOWACO, the water tariff collection rate against billing is almost 100%[30]. Water supply service is stopped if the service users do not pay the charges (in the event that they are overdue).

Table 8: DOWACO's Total Revenues from Water Charges (upper row) and its Growth Rate (lower row: compared to the previous year)

(Unit: million VND)

2012	2013	2014	2015	2016
390,051	418,985	532,399	675,080	752,876
N/A	7.4%	27.0%	26.8%	11.5%

Source: DOWACO

Table 9 and 10 contain DOWACO's business results report (income statement) and balance sheets from the last three years. Concerning DOWACO's business results report (income statement), sales from water charges have increased since 2014 following the completion of this project, recording large profits after income tax. In addition, from the balance sheet, it can be seen that the total shareholders' equity has been increasing for the past three years; it can be observed that it is in a stable financial state.

[30] (Reference information) Online payment became available for water service users from January 2017. (Usually DOWACO staff collect from each house; however, online payment became possible as per the preference of the user.)

Table 9: Business Results Report of DOWACO

(Unit: million VND)

Item	2013	2014	2015
Sales and service turnover	453,715	557,871	712,527
Deductible item (from Turnover)	23	14	155
Net sales and services	453,692	557,857	712,372
Prime cost of goods	389,701	424,809	482,823
Gross profits on sales and services	**63,991**	**133,048**	**229,549**
Revenue from financial activities	69,779	173,869	56,861
Financial expenses	32,750	45,700	54,793
(In which, expenses on interest rate)	30,970	42,033	53,101
Cost of sales	51,232	54,629	63,585
Company management cost	25,828	39,515	36,330
Net profit from business	**23,960**	**167,073**	**131,702**
Other incomes	766	894	1,807
Other costs	2,020	1,004	1,665
Total net profits before tax	**22,706**	**166,963**	**131,844**
Current tax on company's income	3,342	35,482	27,365
Cost of delayed company's income tax	-	-	-
Profit after income tax	**19,364**	**131,481**	**104,479**

Source: DOWACO

Table 10: Balance Sheet (B/S) of DOWACO

(Unit: million VND)

Item	2013	2014	2015
Current assets	316,434	290,445	435,242
Fixed assets	2,124,149	2,688,723	2,738,723
Total assets	**2,440,583**	**2,979,168**	**3,173,965**
Total liabilities	1,956,459	1,853,229	1,952,091
Total shareholders' equity	484,124	1,125,939	1,221,874
Total liabilities and shareholder's equity	**2,440,583**	**2,979,168**	**3,173,965**

Source: DOWACO

In light of above, it is thought that there is no particular problem with the financial aspects of DOWACO's operation and maintenance.

3.5.4 Current Status of Operation and Maintenance

It was confirmed by interviewing maintenance staff and inspection during the field survey that there are no major problems at the time of ex-post evaluation. The status of the operation and maintenance of the water treatment plant, pumping stations, water distribution pipes and related facilities developed by this project is good. After the project was completed, there has been no breakage or trouble. Maintenance works are categorized into periodic and daily works. It was also confirmed that each facility keeps operation records of the facilities and equipment

and that its staff report to DOWACO headquarters periodically.

DOWACO formulates a maintenance implementation plan every year, based on which operation and maintenance works are carried out.

There were no particular problems with the procurement and storage of spare parts. It was confirmed that a system is in place to make speedy procurement possible.

No major problems have been observed in the institutional, technical and financial aspects of the operation and maintenance system of DOWACO. Therefore, the sustainability of the project effects is high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project was planned to meet water demand for household and industrial use and to improve the living condition of local residents, by constructing a water supply system in the province of Dong Nai and Ba Ria-Vung Tau, thereby contributing to improve the health condition of the residents and to promote the industrial development around the area, including foreign investment. However, the system was only developed for Dong Nai Province under this project. With regard to relevance, this project has been relevant to the Vietnam's national development plan and development needs both at the time of appraisal and ex-post evaluation. This project was also relevant to Japan's ODA policy at the time of appraisal. However, regarding the project components of Ba Ria-Vung Tau Province, it is hard to say that there was no problem in the procedures and approach under implementation of the project, because the necessary procedure to cancel had not actually been carried out. Therefore, it is judged that its relevance is fair. Instead, the other aspects of this ex-post evaluation will be judged based only on Dong Nai Province. As the project cost and project period significantly exceeded the plan, efficiency of the project is low. In terms of effectiveness and impact, most operation and effect indicators came close to achieving the target value. Concerning population served, it is highly thought to achieve the target in the near future. Positive answers about water pressure and volume, satisfaction and reductions in labor and the time required for obtaining water were confirmed in the results of the beneficiary survey. In addition, it is presumed that this project, by securing stable water supply, is supporting the enhancement of productivity for manufacturing companies in Dong Nai Province, thereby creating a base for more domestic and foreign investments. Therefore effectiveness and impact of the project are high. In terms of

sustainability, no major problems have been observed in institutional, technical and financial aspects of the operation and maintenance. Therefore, the sustainability of the project effects is high.

In light of the above, this project is evaluated to be partially satisfactory[31]

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

None.

4.2.2 Recommendations to JICA

None.

4.3 Lessons Learned

Appropriate Management of Project Scope (ODA Loan)

Although there was no notification regarding the project cancellation from the BR-VT Province, it is not clear whether other options such as consideration in the JICA side to promote discussion with the Vietnamese government (MPI and the Executing Agency, etc.), in order to agree on the change and clarify the project scope. In case that major changes on the project scope are necessary for similar projects in the future, it is important to agree in writing, in order to clarify the mutual understanding.

Necessity to Eliminate Project Delays

Regarding the project scope of Dong Nai Province, the project was delayed by factors such as the revision of project costs owing to the price increases of construction materials in the global markets, processes associated with procurement of contractors and land acquisition. It may have been outside factors that were not expected; nevertheless, both the executing and aiding agencies need to mutually confirm progress and hindering factors to prevent project delays, so that they are always prepared for the risk of delays and make efforts to ensure that delays do not affect the realization of the project.

[31] Nevertheless, the component for Dong Nai Province is evaluated to be satisfactory.

Comparison of the Original and Actual Scope of the Project

Item	Plan	Actual
1.Project Outputs	<Dong Nai Province> (a) Raw water intake: one place (b) Water pumping station: three places (c) Water treatment plant: one place at Nhon Trach (design capacity: 200,000 m^3/day at appraisal of phase I (March 1998), 100,000 m^3/day at appraisal of phase II (March 2004)) (d) Water transmission pipeline: approx.104km	<Dong Nai Province> (a) Implemented as planned (b) Implemented as planned (c) Implemented as planned for the planned design of phase II (Capacity: 100,000 m^3/day) (d) Implemented: approx.79km
	<Ba Ria-Vung Tau Province> (a) Raw water intake: one place (b) Water transmission pipelines: approx.45km (c) Water treatment plant: one place at Ba Ria (design capacity: 100,000 m^3/day at Phase I (March 1998), 50,000 m^3/day at Phase II (March 2004))	<Ba Ria-Vung Tau Province> (a)-(c): Not implemented after 2004
	<Consulting Services> (a) Review of F/S, detailed design, preparation and evaluation of tender documents, assistance for tendering, supervision of construction (b) Study of topography, water quality and hydrology (c) Environmental measures including environmental monitoring	<Consulting Services> (a)-(c): Implemented as planned in Dong Nai Province *Note: Through the evaluation survey, it was not possible to confirm about the consulting services of Ba Ria-Vung Tau Province.
2.Project Period	March 1998 - November 2008 (129 months)	March 1998 – April 2014 (194 months)
3.Project Cost Amount Paid in Foreign Currency	3,879 million yen	5,161 million yen
Amount Paid in Local Currency	3,533 million yen (460,026 million VND)	5,608 million yen (1,156,495 million VND)
Total	7,412 million yen[32]	10,769 million yen
ODA Loan Portion	9,079 million yen[33]	8,047 million yen
Exchange Rate	Phase I: 1USD = JPY120 1VND=JPY0.01 (March 1998) Phase II: 1USD=JPY119, 1VND=JPY 0.00768 (October 2003)	1USD = JPY93.26 1VND=JPY0.004849 (Average rate for the period of the construction (October 2007-December 2014) based on rates issued by the IMF's International Financial

[32] This amount was calculated at the time of Phase II appraisal, for the project components of Dong Nai Province.
[33] This amount was the total of the time of Phase I and II, for the project components of Dong Nai Province.

		Statistics (IFS).)
4. Final Disbursement	Phase I: July 2012	
	Phase II: August 2014	

Socialist Republic of Viet Nam

FY2016 Ex-Post Evaluation of Japanese ODA Loan Project

"Saigon East-West Highway Construction Project (I)(II)(III)(IV)(V)"

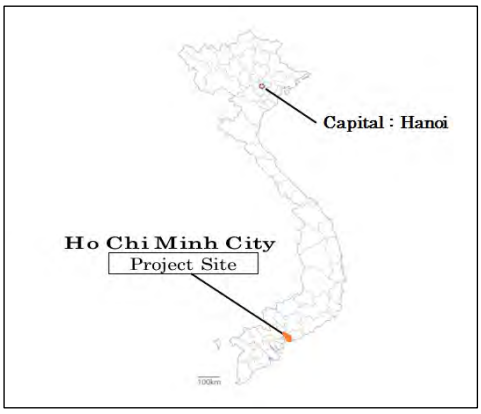
External Evaluator: Kenichi Inazawa, Octavia Japan Co., Ltd.

0. Summary

This project constructed an east-to-west arterial road including underwater tunnel traversing the Saigon River in order to increase transportation capacity and improve transportation conditions; thereby contributing to the urban development along the eastern bank of the Saigon River and to the economic development of Ho Chi Minh City, which is Vietnam's largest city and a hub of commerce and industry. Relevance of this project is high because of its confirmed consistency with economic development policies laid out in Vietnam's *Socio-economic Development Strategy 2011-2020* and *Spatial Development Direction 2010-2020*, the need for developing urban transportation infrastructure, and the assistance policy of the Japanese Government. As for efficiency, project outputs were implemented mostly as planned, but project costs exceeded the initial plan due to cost increases caused by higher land acquisition and resettlement costs as well as soil improvement work due to the discovery of soft ground. The project period was significantly longer than the initial plan due to delays in procedures, design and construction. Thus, the efficiency is low. In 2016 (five years after the project completion), actual figures of annual average daily traffic using the Saigon River Tunnel exceeded the target. The amount of time required to travel the entire distance of the Saigon East-West Highway was shortened as initially planned; thus, the initially anticipated effects have been realized. In addition, the rising price of residential land, improving living standards, and changes/improvements in living environment have been confirmed based on the results of beneficiary surveys and interviews of people living in the vicinity of the site. In light of the above, the effectiveness and impact of this project are high. No particular problems were observed at the time of the ex-post evaluation in terms of the institutional, technical or financial aspects of the Management Center of Saigon River Tunnel (hereinafter, "MCST"), which is in charge of the operation and maintenance and safety measures for the facilities developed by this project. Thus, sustainability of the effects realized through this project is high.

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

1. Project description



Project Location

Saigon East West Highway

1.1 Background

Ho Chi Minh City, which is located in Southern Vietnam, was faced with chronic traffic congestion, air pollution, noise, and an increase in traffic accidents caused by its rapid socio-economic development. Before the start of this project, the transportation corridor from outside the city to downtown from east to west[1] was narrow and had heavy traffic, making it overcrowded. There were concerns about the city's future, which was likely to include a decline in urban functions and productivity caused by worsening traffic congestion as well as a worsening living environment. To facilitate the flow of traffic, there was an urgent need for developing the east−west transportation corridor from outside the city to downtown and developing road infrastructure including the Saigon River Tunnel.

1.2 Project Outline

The objective of this project is to enhance transport capacity and mitigate traffic condition in Ho Chi Minh City, which is the biggest city and the center of commerce and industry in Vietnam, by constructing an east-west arterial highway including a tunnel crossing the Saigon River; thereby contributing to improve the living condition in the surrounding area, promote the urban development in the east side of the river, and develop the city's economy.

Loan Approved Amount/ Disbursed Amount	Phase I: 4,255 million yen / 2,047 million yen
	Phase II: 10,926 million yen / 10,733 million yen
	Phase III: 6,775 million yen / 6,717 million yen
	Phase IV: 19,071 million yen / 16,620 million yen

[1] There is Hanoi Highway, an arterial road, in the east side, and there is National Route 1 Highway in the west side. Traffic flowed into downtown Ho Chi Minh City from both interchanges.

	Phase V: 14,061 million yen / 10,299 million yen
Exchange of Notes Date/ Loan Agreement Signing Date	Phase I: March 28, 2000 / March 29, 2000
	Phase II: March 28, 2002 / March 29, 2002
	Phase III: March 31, 2003 / March 31, 2003
	Phase IV: March 31, 2005 / March 31, 2005
	Phase V: May 14, 2010 / May 27, 2010
Terms and Conditions	【Phase I and Phase II】 Construction: Interest Rate 1.8% Repayment Period : 30 years (Grace Period: 10 years) Conditions for Procurement: Complex Tied Consulting Service: Interest Rate: 0.75% Repayment Period: 40 years (Grace Period: 10 years) Conditions for Procurement: Bilateral Tied
	【Phase III, Phase IV, Phase V】 Construction: Interest Rate 1.8% (Phase III) Interest Rate 1.3% (Phase IV) Interest Rate 1.2% (Phase V) Repayment Period : 30 years (Grace Period: 10 years) Conditions for Procurement: General Untied
Borrower / Executing Agency(ies)	The Government of the Socialist Republic of Vietnam / Ho Chi Minh City People's Committee
Project Completion	November 2011
Main Contractors (Over 1 billion yen)	Obayashi Cooperation (Japan), Kawasaki Heavy Industries (Japan) /Gtech (USA) (JV), PS Mitsubishi Construction Co., Ltd. (Japan)/ Obayashi Cooperation (Japan) (JV)
Main Consultants (Over 100 million yen)	(Phase I) Pacific Consultants International (Japan)/Oriental Consultants Co., Ltd.(Japan)/Transport Engineering Design Incorporation (TEDI) (Vietnam)/Environmental Technology Company Ltd. (Vietnam) (JV) (Phase II) Oriental Consultants Co., Ltd. (Japan) (Phase II) Oriental Consultants Co., Ltd. (Japan)/Asia Pacific Engineering Consultants(Vietnam)/Transport Engineering Design Incorporation (Vietnam)/Environmental Technology Company Ltd. (Vietnam) (JV)
Feasibility Studies, etc.	F/S "Development of Saigon River Underwater Tunnel" by Manusell, Australia (December 1997) F/S "Road Widening Improvement Along Ho Chi Minh City Canal" by Transport Engineering Design Incorporation (TEDI) South, Vietnam (June 1998)

Related Projects	【ODA Loan Project】 "Ho Chi Minh City Water Environment Improvement Project" (Signing of Loan Agreement: 2010) "North-South Expressway Construction Project (Ho Chi Minh City - Dau Giay Section)" (Signing of Loan Agreement: 2008, Co-financing with ADB)

2. Outline of the Evaluation Study

2.1 External Evaluator

Kenichi Inazawa, Octavia Japan 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: 10-24 December 2016 and 10-19 May 2017

3. Results of the Evaluation (Overall Rating: B[2])

3.1 Relevance (Rating: ③[3])

3.1.1 Consistency with the Development Plan of Vietnam

Before the start of this project, the Government of Vietnam established the *Socio-economic Development Strategy 1991-2000*. One of the targets laid out in this strategy was the promotion of foreign direct investment through increased investment for infrastructure development. The Government of Vietnam formulated the *Socio-economic Development Strategy 2001-2010*, which called for collaboration in development and poverty reduction as well as maintaining highly sustained economic growth with a focus on hubs of economic development. Meanwhile, in 1998, Ho Chi Minh City formulated the *Masterplan of Socio-economic Development in Ho Chi Minh City Up to 2020*. One of the basic development concepts of this plan was to disperse the population in areas of the city already urbanized while at the same time accelerating urban and industrial development in the city's outlying areas, particularly in the south and southeast, with the goal of absorbing future increases in urban population. To realize this concept, the city emphasized the promotion of transportation infrastructure development connecting the city's existing urbanized area with these outlying areas.

[2] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory
[3] ③: High, ②: Fair, ①: Low

At the time of the ex-post evaluation, the Government of Vietnam is advocating the importance of remedying economic disparities, reducing poverty, and developing infrastructure in regional areas through the *Socio-economic Development Strategy 2011-2020*. Also, in 2010, Ho Chi Minh City People's Committee (hereinafter, "HCMCPC"), the executing agency of this project, formulated the *Spatial Development Direction 2010-2020*. This plan considers the Saigon East-West Highway, which is the section covered in this project, to be an important route traveling from the city's downtown to the city's northeast and southwest. Additionally, in 2012, the HCMCPC drew up the *Masterplan of Socio-economic Development in Ho Chi Minh City Up to 2020 Vision to 2025* in an effort to carry out socioeconomic development through infrastructure development. This plan points out the importance of urban transportation infrastructure development, including this project.

In light of the above, the Central Government of Vietnam and HCMCPC, both before the start of this project and at the time of the ex-post evaluation, have placed importance in the promotion of transportation infrastructure development in regional areas and urban transportation infrastructure development in Ho Chi Minh City. Thus, it is confirmed that this project is consistent with policies and measures outlined in Vietnam's national and sector plans before the start of the project and at the time of the ex-post evaluation.

3.1.2 Consistency with the Development Needs of Vietnam

Before the start of this project, Ho Chi Minh City, which is Vietnam's largest city and a hub of commerce and industry, faced increasing transportation demand caused by the expansion of economic activities, development, and population growth. At the same time, the city's urban issues of chronic traffic congestion, air pollution, noise, and increased traffic accidents were growing worse. According to a transportation study conducted by the city in 1996, the city's population was forecasted to increase by about 1.8 times between 1996 and 2020, while daily traffic in the city was expected to increase 2.7 times and traffic during peak hours 3 times during this same span. Given this situation, the city's transportation corridor traveling from outside the city to downtown from east to west was narrow and overcrowded. Therefore, there were concerns the city's urban functions and productivity would decline due to worsening traffic congestion negatively impacting its living environment. This made it clear that the city faced the urgent task of developing transportation infrastructure including an access road and underwater tunnel crossing the Saigon River that connected the outlying areas with downtown in an east to west direction to cope with rising transportation demand.

After the completion of this project, traffic volume on the section of the Saigon East-West Highway traveling from east to west from the city's outlying area to downtown has been on the rise during both peak and off-peak[4] times[5]. Therefore, HCMCPC is planning further to develop transportation infrastructure in the vicinity to alleviate traffic congestion and reinforce urban functions. As one example of this, HCMCPC commenced a road expansion project in 2015 covering the Saigon East-West Highway from the east to south toward the Mekong Delta, with the aim of coping with increasing transportation demand and facilitating traffic flow.

Based on the above, Ho Chi Minh City's needs concerning urban transportation infrastructure development have been confirmed even at the time of the ex-post evaluation. Therefore, it can be judged that consistency is high with the development needs of the city both before the start of the project and at the time of the ex-post evaluation.

3.1.3 Consistency with Japan's ODA Policy

In June 2000, Japan's Ministry of Foreign Affairs (MoFA) formulated the *Country Assistance Plan for Vietnam* that identified the following five priority areas: [1] Human resource and legislation development (especially support for shift to market economy); [2] Power, transportation, etc., infrastructure development; [3] Agricultural and rural development; [4] Education and healthcare; and [5] The environment. Of these, with regard to [2] Power, transportation, etc., infrastructure development, the plan specified that a review be conducted on infrastructure development support in the transportation field, etc., in order to cope with future increases in physical distribution. This plan was later revised in 2004, with one of the priority areas for assistance labeled as "support related to urban transportation" (Hanoi and Ho Chi Minh City). Furthermore, this plan was revised once again in 2009, with one of the priority areas defined as "support related to the development of inter-city arterial transportation networks." This project provides assistance to Vietnam and its rapidly growing economy through the aforementioned priority areas and individual assistance policy ([2] Power, transportation, etc., infrastructure development) and for urban transportation in Ho Chi Minh City. Thus, this project is consistent with the assistance policy of the Japanese Government.

Meanwhile, the Japan International Cooperation Agency (hereinafter, "JICA") formulated the *Medium-Term Strategy for Overseas Economic Cooperation Operations* in December 1999. The priority areas cited in this strategy were: 1) Reinforcement of economic structure for

[4] The peak hours of transportation volume in Ho Chi Minh City are considered to be from 7:00am to 9:00am and from 4:00pm to 8:00pm. All other hours are considered to be off-peak.
[5] Reference: See 3.3.1 Effectiveness and Quantitative Effects (Operation and Effect Indicators)

sustained growth and overcoming factors restricting growth (appropriate macroeconomic management, reinforcement of industrial structure and economic infrastructure development); 2) Alleviating poverty and remedying disparities between regions; 3) Environmental protection and disaster risk reduction measures; and 4) Human resource development and legislation creation, among others. This project can be viewed as applicable to 1) Economic infrastructure development. Additionally, in 2009, JICA formulated the *Country Assistance Policy for Vietnam*, which identified urban development and transportation, etc., as priority development issues. Among these, the development of arterial transportation networks was cited as one of the pillars of assistance.

In light of the above, the Saigon East-West Highway developed by this project was planned to contribute to the economic growth of Ho Chi Minh City, and therefore, it can be said that it was consistent with the assistance policy of the Japanese Government.

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

3.2 Efficiency (Rating:①)

3.2.1 Project Outputs

Table 1 shows a summary of this project's construction work, equipment procurement and installation work, and infrastructure development at the site of the resettlement of residents. With regards (1) Civil works in the table, planned outputs of this project vary slightly between phases one and five; thus, the planned number at the time of the appraisal is shown. For (2) Facilities for management; (3) Development of resettlement site; and (4) Consulting services, the planned outputs at the time of the appraisal for Phase 1 are shown. In contrast, Table 2 shows the actual outputs of this project at the time of the ex-post evaluation.

Table 1: Planned Outputs of this Project

1) Civil Works:					
	Phase I's appraisal (2000)	Phase II's appraisal (2002)	Phase III's appraisal (2003)	Phase IV's appraisal (2005)	Phase V's appraisal (2010)
a) Construction of Saigon River Tunnel (New construction)	Approx. 21 km (Width: approx.36 m (canal side road),	Approx. 1.6km (Width:23. 25m, 6 lanes)	Approx. 1.09km (Width:23. 75m, 6 lanes)	Approx. 1.09km (Width:23. 75m, 6 lanes)	Approx. 1.5km (Width:23. 75m, 6 lanes)

b) Canal Side Road (Rehabilitation and widening)	Approx.31 m (tunnel section), Approx. 100m (Thu Thiem section), 6 lanes)	Approx. 9.45km (Width:27 m, 6 lanes)	Approx. 9.06km (Width:27-31m, 6 lanes)	Approx. 9.06km (Width:24-28m, 6 lanes)	Approx. 8.5km (Width:24-28m, 6 lanes)
c) Construction of Western Road (New construction)		Approx. 4.5km (Width:30 m, 6 lanes)	Approx. 4.5km (Width:33 m, 6 lanes)	Approx. 4.5km (Width:28 m, 6 lanes)	Approx. 4.9km (Width:28 m, 6 lanes)
d) Construction of Thu Thiem Road (New construction)		Approx. 6.35km (Width:29 m, 6 lanes)	Approx. 7.25km (Width:30 m, 6 lanes)	Approx. 7.25km (Width:27 m, 6 lanes)	Approx. 6.9km (Width:27 m, 6 lanes)
e) Construction of Bridges and Interchanges (New construction)	Bridge: 15, Interchange : 5	Bridge: 18, Interchange : 6	Bridge: 12, Interchange : 6	n.a.	n.a.
2) Facilities for Management:	Phase I's appraisal: Traffic information system, tunnel ventilation facility, toll gate, vehicle for maintenance				
3) Development of Relocation Site :	Phase I's appraisal: Land preparation, development of houses or residential areas (15 places in all), development of infrastructure (land preparation, on-site road, development of water supply and sewerage, electricity distribution network, kindergarten, elementary school, hospital, market, park, etc.)				
4) Consulting Services :	Phase I's appraisal: Detailed design on road construction project, bidding assistance, construction supervision, operation and maintenance training, detailed design review on infrastructure development of relocation site, monitoring for resident's relocation, etc.				

Source: JICA documents

Table 2: Actual Outputs of this Project

1) Civil Works:	Actual Outputs at the time of ex-post evaluation (breakdown)
a) Construction of Saigon River Tunnel (New construction)	1.49km (Width: 33.3m, 6 lanes)
b) Canal Side Road (Rehabilitation and widening)	Implemented almost as planned: 9.06km (Width: 42.0m, 6 lanes)
c) Construction of Western Road (New construction)	Implemented almost as planned: 4.5km(Width: 60.0m, 6 lanes)
d) Construction of Thu Thiem Road (New construction)	Implemented almost as planned: 7.25km (Width: 100.0m, 6 lanes)
e) Construction of Bridges and Interchanges (New construction)	Implemented almost as planned: Bridge: 13, Interchange: 6
2) Facilities for Management:	Implemented as planned
3) Development of Relocation	Increased from planned (Development of houses or residential

Site :	areas increased to 22 places.)
4) Consulting Services :	Implemented as planned

Sources: Answers to questionnaire

With regard to the actual outputs in Table 2, this project was implemented generally without any changes from the plan at the time of the appraisal for Phase 1 in Table 1. According to an interview held with the construction management consultant for this project, the plan at the time of the appraisal for Phase 1 presents a general design and the actual outputs were mostly unchanged from the plan. Meanwhile, there were slight differences in the planned outputs at the time of each appraisal for a) through d) in "(1) Civil works" from Table 1. The reason for this was not clearly identified. Also, there is a difference in the number of "e) Bridge and interchange construction" between the planned outputs at the time of each appraisal and the actual outputs, which is attributable to changes at the time of the detailed design and other factors. As for "(3) Development of resettlement site," the plan at the time of the appraisal stated 15 locations, but the actual output increased to 22 locations[6]. The reason for this was because efforts were made to make it possible for a larger number of eligible relocating persons to take up residence there[7].

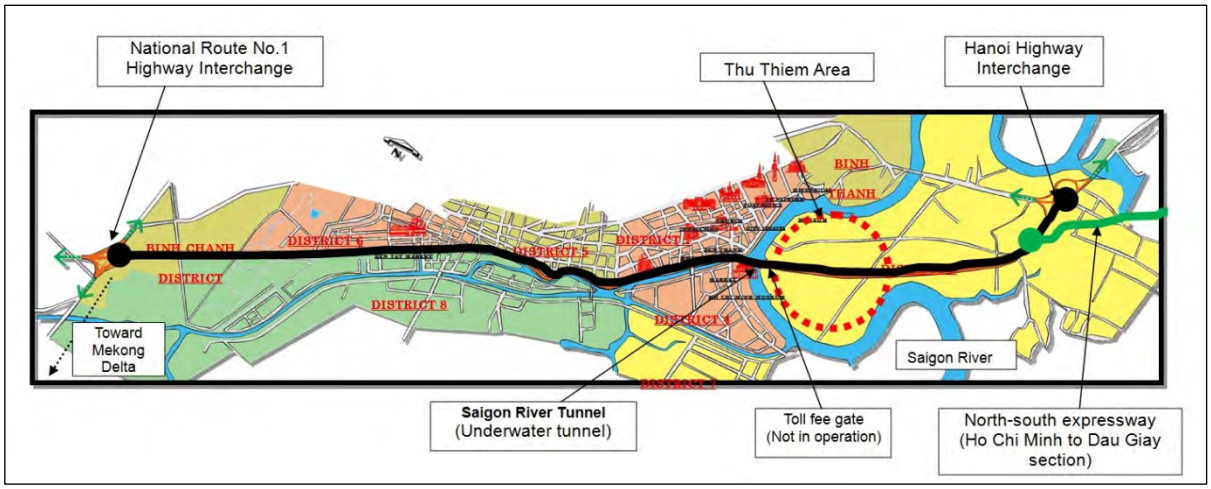


Figure 1: Locations of Project Sites
(The black line indicates the section covered in this project [total length of approx. 22km], while the green line indicates the partial section of the north-south expressway [total length of approx. 55km])

[6] The breakdown includes three locations for land development/residential land development and 19 locations for the construction of apartment buildings.
[7] Details are explained below in 3.4.2.2 Impacts "Land Acquisition and Resettlement."

3.2.2 Project Inputs

3.2.2.1 Project Cost

Table 3 shows the planned and actual costs for this project. The total project cost planned at the time of the appraisal for Phase 1 (initial plan) was 67,055 million yen. The actual costs totaled 79,209 million yen, exceeding the plan (118% compared to the plan). The reasons for this overrun included: 1) An increase in the number of land owners and residents eligible for land acquisition and resettlement[8]; 2) During the project, construction costs rose caused directly by soaring worldwide prices of construction materials that impacted construction costs; and 3) Unexpected costs requiring soil improvement work because soft ground was discovered at the project site, etc. As a result, the cost of civil engineering work and consulting services also increased[9]. Behind this, the appraisal was carried out under appropriate study and design, however these are believed to be unavoidable events (unable to be predicted) directly faced by this project. However, considering there was little change in the actual outputs as described above, it cannot be judged that it was excess of the project costs corresponding to the actual outputs.

Table 3: Planned and Actual Costs of This Project

Planned Project Costs	Actual Project Costs
Total Project Costs: 67,055 million yen (Japanese ODA loan: 47,931 million yen)	Total Project Costs: 79,209 million yen[10] (Japanese ODA loan: 46,416 million yen)

Source: JICA documents (Planned Project Costs), Answers to questionnaire (Actual Project Costs)

3.2.2.2 Project Period

At the time of the appraisal for Phase 1 (initial plan), the project period was planned for the five year five month period from March 2000 to April 2005 (62 months)[11]. In contrast, the actual project period was eleven years and nine months from March 2000 to November 2011 (start of use) (141 months), which greatly exceeded the plan (227% versus the plan). Table 4 shows the planned and actual periods for this project. The main reasons behind this delay

[8] The plan called for land acquisition to total 130ha, but the actual amount was 203ha. The plan for the number of households eligible for resettlement was approx. 5,200, but the actual number was 6,790. The land acquisition area and number of eligible households were estimated in the initial plan, but later found to actually be much higher than expected, resulting in increased land acquisition costs and compensation costs. Details are explained below in 3.4.2.2 Impacts "Land Acquisition and Resettlement."

[9] According to JICA documents, it is confirmed that cost overruns caused by soaring prices for construction materials worldwide led to a 39% increase in construction costs, a 4% increase in soft ground improvement measures at the project site, and a 33% increase caused by the need to change the design and construction work due to site conditions, each versus the initial plan.

[10] The actual cost does not include the final construction payment proceeds explained on the next page.

[11] At the time of the appraisal, the completion of this project was defined as the start of operation (April 2005).

included: 1) With regard to land acquisition and resettlement described above, the Vietnamese side faced delays in legal proceedings, including compensation, and took more time than expected to confirm the inheritor of the land, which resulted in the number of actual eligible households for resettlement increasing compared to the initial plan and adding time for procedures and administration works; 2) In terms of the bidding and contract for the construction contractor, the project covered the construction of the Saigon River Tunnel (immersed tube type), but this was first time such a method was used in Vietnam, which required more time than expected for the Vietnamese side to carry out confirmation work during the time of contract negotiation with the bidding companies; 3) With regard to civil works, underground facilities were discovered at the project site (telephone poles, telephone lines and water pipes, etc.) during the project, for which more time than expected was required for moving these facilities, and many soft grounds were discovered at the project site, requiring soil improvement work, which took more time than expected (resulting in approx. more than two and a half years of delays); and 4) Design changes occurred during the project due to changes in the Ho Chi Minh City urban plan, and as a result, design changes were made to the central portion of the road, its byroads, parking lanes and water drain off functions for the section traveling through the Thu Thiem district[12], which required more time for confirmation and approval procedures; and 5) When constructing the tunnel, part of the casting basin was damaged, which required it to shut down temporarily for repair work, the tunnel suffered cracks and water leaks, which required time to identify the causes and make repairs (resulting in approx. more than three and a half years of delays). As a result of the delays caused by 1) to 5) above, consulting service periods extended dramatically. Behind this, the appraisal was carried out under appropriate study and design, however, delays in the project period are believed to be unavoidable events (unable to be forecasted at the time of the appraisal for Phase 1) directly faced by this project. However, considering the fact that there was little change in the actual outputs, these overruns in project period cannot be judged to be appropriate in view of the actual outputs.

[12] As background information, a new urban development plan was initiated for the eastern side of the Saigon River (Thu Thiem district) in 2003. This plan involved the development and promotion of commercial and residential zones in the Thu Thiem district. This project had to maintain consistency with this new urban development plan, which affected the initial design of the section covered by this project.

Table 4: Planned and Actual Period of This Project

Planned Project Period	Actual Project Period
1) Land Acquisition and Relocation From October 2000 to August 2002	1) Land Acquisition and Relocation From October 2001 to June 2007
2) Bidding and Contract for the Construction Contractor From March 2000 to June 2000	2) Bidding and Contract for the Construction Contractor From March 2002 to November 2005
3) Civil Works From January 2002 to April 2005 (start of use)	3) Civil Works From January 2005 to November 2011 (start of use)
4) Consulting Services From July 2000 to July 2005	4) Consulting Services From August 2001 to December 2016

Source: JICA documents (Planned Project Period), Answers to questionnaire (Actual Project Period)

[Column] Ongoing discussions related to the leakage measures and subsidence of the Saigon River Tunnel (after completion of the construction work)

Construction work was completed in November 2011, but new leaks, subsidence, and cracks, etc., were found inside the tunnel around the end of the defect period in the project outputs (November 2012). The Urban Civil Works Construction Investment Management Authority (hereinafter, "UCCI"), which is responsible for overseeing project implementation and the overall project, hired a third-party engineering consultant (a Danish company) to carry out an engineering inspection in order to gain an objective assessment and advice regarding the issues occurring inside the tunnel in 2014. As a result, the consulting service period of this project was extended even further. Following this, a response plan for leakage measures and subsidence occurring inside the tunnel was presented, and discussions continue to take place toward a resolution at the time of the ex-post evaluation (December 2016)[13].

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

Economic Internal Rate of Return (EIRR)

A recalculation of the economic internal rate of return (EIRR) of this project under the same conditions at the appraisal yielded a rate of 13.99% based on the benefits of reducing traveling costs and shortening travel time on all sections of the Saigon East-West Highway, on project

[13] At the time of the ex-post evaluation, discussions continue to take place on the amendment proposal to the consulting service agreement, and talks are being held with regard to the inspections and maintenance of the Saigon River Tunnel's facilities and the final payment for construction work, among other topics. According to UCCI and the project's construction management consultant, discussions will be concluded sometime in 2017. This will be followed by the handover of the remaining project scope of the "Saigon River Tunnel" from the contractor to HCMCPC and the issuance of the completion certificate.

costs as well as operation and maintenance costs (tax excluded) as the costs, and 30 years as the project life. This is somewhat lower than the 15.8% calculated at the time of the appraisal. The main reason for this difference is that costs required for the project increased compared to the initial plan and the project period experienced delays.

As outlined above, project outputs were generally in line with the plan, while increases in land acquisition and resettlement costs and increases in costs attributable to soil improvement work carried out after the discovery of soft ground resulted in project cost overruns compared to the initial plan. The project period, too, experienced a significant overrun from the initial plan due to delays in procedures for resettlement and land acquisition, delays in procedures by the executing agency, and delays in work period, among others. Therefore, the project's efficiency is low because project costs exceeded the plan and the project period significantly exceeded the plan.

3.3 Effectiveness[14] (Rating:③)

3.3.1 Quantitative Effects (Operation and Effect Indicators)

1) Operation Indicators of the Project: Annual Average Daily Traffic

The ex-post evaluation compared the targets and actual figures of annual average daily traffic (PCUs[15]) used as the quantitative effectiveness indicator at the time of the appraisal for Phase 5 which set targets after carefully re-examining traffic predictions. As Table 5 indicates, since 2012 when road service started, PCUs traveling the Saigon River Tunnel have risen with each passing year, and in 2016, actual figures exceeded those of 2013, two years after the start of road service. The reason why the actual figures for 2013 did not achieve the target for that year was confirmed as the following factors according to interviews with UCCI and MCST: 1) While the targets of Table 5 were set at the time of the appraisal for Phase 5, afterwards Ho Chi Minh City was affected by the worldwide economic downturn. During the same appraisal period, it was anticipated that commercial, residential and office tower development in the Thu Thiem district would progress around 2013, but in actuality investments did not materialize. As a result, transportation demand for the section covered by this project fell below expectations. As reference, Table 6 shows "Foreign Investment in Ho Chi Minh City." The drop in foreign

[14] Sub-rating for effectiveness is to be evaluated with impact.
[15] An acronym for Passenger Car Unit. PCU is an indicator that converts various types of vehicle units into units of passenger cars.

investment from 2012 to 2013 is presumed to support this situation. However, investment has increased since 2014, and as a result, development of the Thu Thiem district has progressed and transportation demand has increased, affecting actual traffic causing it to increase. In addition, 2) According to interviews with UCCI and MCST, the north-south expressway (Ho Chi Minh to Dau Giay section) completed in February 2015 was connected to the eastern side of the section constructed by this project, and traffic from Dong Nai Province and Ba Ria-Vung Tau Province, both located to the east of Ho Chi Minh City, is increasing[16]. As a result, development and economic vitalization has progressed across the entire city, causing further transportation demand, which is judged as a factor for raising the actual traffic of this project. Based on the above, the initially anticipated effects of this project were realized in the fifth year after its completion (2016).

Table 5: Baseline, Target and Actual Figures Regarding Annual Average Daily Traffic

(Unit: PCU/day)

Indicator	Baseline	Target	Actual				
	2004	2013	2012	2013	2014	2015	2016
		Two years after completion	One year after completion	Two years after completion	Three years after completion	Four years after completion	Five years after completion
Annual Average Daily Traffic Volume of the Tunnel	N/A	92,650	38,551	50,685	56,176	74,050	95,000

Source: JICA documents (Baseline: Phase I's appraisal, Target: Phase V's appraisal), Answers to questionnaire (Actual)

(Reference) Table 6: Foreign Investment in Ho Chi Minh City (for the current five years)

(Unit: million USD)

2011	2012	2013	2014	2015
2,804	593	1,048	2,879	3,042

Source: HCMCPC

2) Effect Indicator: Travel Time

This project used the travel time for the entire length of the Saigon East-West Highway (approx. 22km: the time required to travel the section covered by this project from the intersection of Hanoi Highway to the intersection of National Route 1) as the effect indicator. As Table 7 indicates, at the time of the ex-post evaluation, this section could be traveled in 25 minutes as targeted initially. The road before the start of this project (former road) took around

[16] Data of traffic inflow from the north-south expressway could not be obtained. (With the facilities for management procured by this project, the traffic volume from the expressway has not been measured.)

50 minutes to travel the entire section because the road width was narrow and some places were not paved. As a result of the road, bridge and Saigon River Tunnel developed through this project, traffic flow has been facilitated, significantly shortening travel time. The project's target has been fulfilled in the fifth year after completion (2016). Thus, the effectiveness has been realized as initially planned.

Table 7: Baseline, Target and Actual Figures Regarding Travel Time

(Unit: Minute)

Target Area	Baseline	Target	Actual				
	2004	2013	2012	2013	2014	2015	2016
			One year after completion	Two years after completion	Three years after completion	Four years after completion	Five years after completion
Travel time (time required to travel from the intersection of this project and Hanoi Highway to the intersection with National Highway No.1:See Figure 1)	50	25	25	25	25	25	25

Source: JICA documents (Baseline: Phase I's appraisal, Target: Phase V's appraisal), Answers to questionnaire and measurement by vehicle running at the field survey (Data was taken several times between both ends of the section and the average value was calculated.)

3.3.2 Qualitative Effects (Other Effects: Improvement of Convenience as Access Road to the Thu Thiem District on the East Side of the Saigon River from the Center of Ho Chi Minh City (Improvement of Traffic Conditions), and Secure Traffic Safety in the Saigon River Tunnel)

1) Improvement of Convenience as Access Road (Improvement of Traffic Conditions)

This survey involved a beneficiary survey carried out targeting drivers (50 people) traveling in the vicinity of the Thu Thiem district and the Saigon River Tunnel on a regular basis[17]. With regards to the section covered by this project that travels through this district and tunnel, all drivers responded, "Travel time to my destination has been shortened" and "The new road is

[17] Sample characteristics included: 1) all respondents regularly drove in the Thu Thiem district as well as downtown Ho Chi Minh City before the completion of the Saigon River Tunnel; 2) Gender ratio: 98% male and 2 % female; 3) Number of years driving professionally: 5 to 35 years; 4) Breakdown of drivers: taxi drivers 36%, KUMHO Transportation Co., Ltd. (private sector bus company) 34%, HOA MAI Transport & Travel Services Corp (private sector bus company) 14%, and Ho Chi Minh City Public Bus (No. 9) 16%.

safer for automobiles and motorbikes[18].” Figure 2 shows a question on comfort when driving, and all respondents answered either “Very comfortable” or “Comfortable.” When the respondents were interviewed about these responses, comments were received that included, “Traffic and passengers along the section covered by the project are increasing annually. However, I am able to quickly arrive at my destination with little congestion. The route is smooth sailing even when transporting goods by truck and travel time has been shortened. The road is wide enough, so I am easily able to change lanes. There is a dedicated lane for motorbikes, which I believe helps prevent accidents. It is a very easy road to drive. The condition of the road surface is also excellent.” Based on such comments, it is presumed that this project has contributed to the improvement of travel time to destination and safety and comfort when driving.

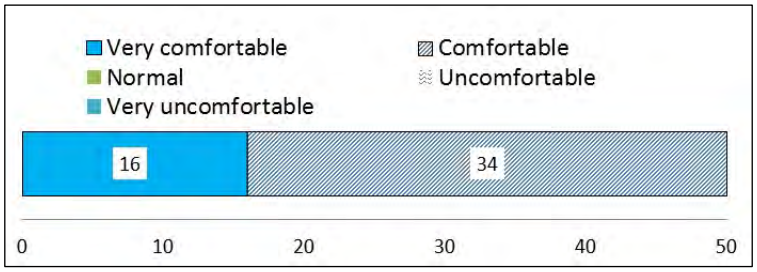


Figure 2: With regard to the comfort of this project’s road passing through Thu Thiem district and Saigon River Tunnel
(Sample total 50, target is driver)

2) Secure Traffic Safety in the Saigon River Tunnel

This project implemented traffic safety measures as part of the consulting services. Specifically, at the time of the detailed design, a dedicated motorbike lane was designed and developed for the entire length of the East-West Highway, including the Saigon River Tunnel. Through this survey, it was confirmed that this dedicated motorbike lane has improved safety inside the tunnel. In interviews conducted with senior management of a bus company operating daily services on this same section, comments were provided that included, “While I feel that traffic inside the Saigon River Tunnel is on the rise, visibility on this section and inside the tunnel is excellent, enabling the safe transport of passengers.” Additionally, in interviews with senior management of MCST, comments were provided that included, “Traffic in the Saigon River Tunnel has been increasing annually, but the dedicated motorbike lane acts as a deterrent

[18] Questions were asked without providing a clear and strict definition of “safety,” but it is presumed that respondents mainly answered assuming it meant “reduction in traffic accidents.”

against traffic accidents." As Table 5 indicates, an increase in traffic volume has been observed over the most recent several years, but per Table 8, a similar increase has not been seen in the number of traffic accidents. According to MCST, this is because of the dedicated motorbike lane, growing awareness in safe driving among drivers of ordinary vehicles using the main lanes, and gradually improving driving skills and increasing experience. Taking into consideration the above, this project helped to facilitate the smooth flow of traffic while also providing consideration to safety, which is judged to be contributing to the prevention of accidents[19].

(Reference) Table 8: Number of Traffic Accidents in the Saigon River Tunnel (for the current four years)

(Unit: Number)

2013	2014	2015	2016 *Note
76	46	37	16

Source: MCST
Note: Data as of November 2016

Photo 1: Road Developed by this Project (left side) (Photo provided by construction management consultant)

Photo 2: Two-wheeled Motorcycle Exclusive Lane

3.4 Impacts

3.4.1 Intended Impacts

3.4.1.1 Contribution to the Economic Development of Ho Chi Minh City

1) Quantitative Effect

As Figure 3 indicates, Ho Chi Minh City's GDP has been following an upward trend since 2000 before the start of this project to time of the ex-post evaluation (2015). Also, per Figure 4

[19] Whenever a traffic accident occurs in the section covered by this project, MCST employees immediately travel to the location and respond. Depending on the severity of the accident, the police or fire department are then called to handle the scene.

(which contains data only for the most recent three years), average monthly income of residents of Ho Chi Minh City is rising sharply. According to the New Urban Development Management Authority, an organization under HCMCPC responsible for commercial and urban development in the Thu Thiem district, as well as UCCI, a commercial and urban development plan has been implemented for the district since 2013 led by public organizations, financial institutions, real estate companies, and developers. Progress is being made with the construction of residences, office buildings, and commercial buildings, which is spurring on investment in the district. According to the New Urban Development Management Authority and UCCI, "The completion of this project has advanced the development plan. There are strong connections between transportation infrastructure development and urban development, which directly correlates to further invigoration of Ho Chi Minh City's economy. This has a positive effect on greater business opportunities for private sector companies and rising incomes of people." As related statistical data is being influenced by other factors outside of this project, the economic impacts of this project cannot be clearly substantiated. However, taking the above into consideration, it is presumed that this project has facilitated efficient transportation and logistics in the city, which is underpinning urban development and economic growth.

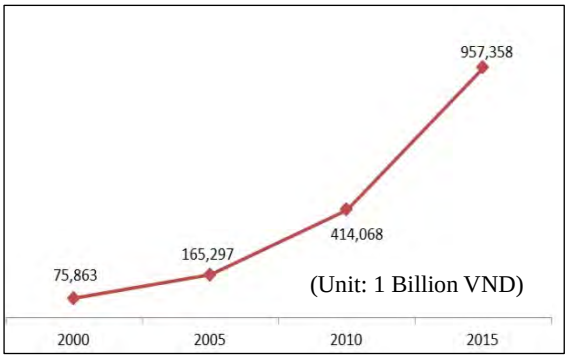


Figure 3: GDP of Ho Chi Minh City (2000, 2005, 2010, 2015)

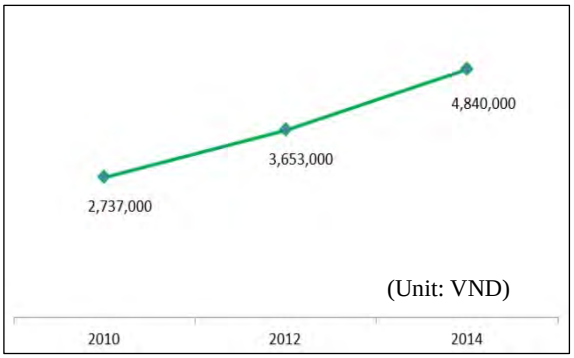


Figure 4: Average Monthly Income of Residents of Ho Chi Minh City (2010, 2012, 2014)

2) Qualitative Effect

Similar to 3.3.2 Qualitative Effects, an interview survey was conducted using a questionnaire format for local residents regarding development promotion in the Thu Thiem district through a beneficiary survey. Initially the plan called for this survey to target people living in the Thu Thiem district, but it was discovered that these residents had relocated to other districts in Ho Chi Minh City before and after completion of this project. As such, this survey was conducted in the An Phu district and Binh Trung Dong district (located to the southeast of

the Thu Thiem district), where many had relocated to[20]. Comparing before and after the project, the expansion of commercial districts, rising residential land prices, improving living standards, and local companies increasing hiring were observed in the Thu Thiem district, and it was confirmed that there is a high probability that this project contributed to each. In interviews with persons who relocated, comments were provided that included, "Since the road (from this project) opened, real estate agents are now visiting our area. I believe land prices in the Thu Thiem district are rising. The townscape has changed a great deal, as there has been an ongoing construction boom of skyscrapers for housing/commercial facilities. I feel the opening of the road is having a direct effect on this."

3.4.2 Other Positive and Negative Impacts

3.4.2.1 Impacts on the Natural Environment

During the project implementation, no major negative impacts on the natural environment arose in particular. Also, based on the results of environmental monitoring by the Department of Natural Resources and Environment (DONRE) of HCMC and through field visits in this survey and interviews with UCCI and residents, it was confirmed that even after completion, negative effects such as noise, vibrations, or air pollution have not been observed in the vicinity of the section covered by this project. A sound insulation wall was constructed along the same section as a noise solution for the surrounding community where there is a high density of residences.

3.4.2.2 Land Acquisition and Resettlement

Under this project, approximately 203ha of land acquisitions took place and 6,790 affected households were resettled as a result. Total compensation paid out to relocating families for land acquisition and resettlement was 3,173.9 billion VND. Compensatory payments and resettlement procedures were completed by the time of the project's completion. These procedures were carried out in accordance with the laws of Vietnam[21]. The land acquisition and resettlement plan was prepared by HCMCPC, while the project management unit for this project

[20] It was impossible to confirm changes before and after the project in the Thu Thiem district using a beneficiary survey because most local residents had begun living there after the completion of the project at the time of the ex-post evaluation. Characteristics of the residents of An Phu district and Binh Trung Dong district where the beneficiary survey was conducted included: 1) All had lived in the Thu Thiem district before the completion of the project, and were resettled or had their land acquired by the project; 2) Gender ratio: 68% male and 32% female; 3) Number of years living in the Thu Thiem district: 5-10 years 48%, 11 to 20 years 12%, 21 to 30 years 16%, 31 to 40 years 4% and 41 years and more 20%.

[21] Decree 22/1998/ND-CP and Decree 197/2004/ND-CP

(hereinafter, “PMU”) carried out working level matters and procedures. According to interviews of former PMU staff and UCCI senior management, comments were provided that included, “During the project implementation, the central government made revisions to the Land Act on many occasions. As a result, the land acquisition and resettlement process required time to confirm the legal procedures and land inheritors, and the number of households eligible for resettlement actually increased compared to the initial plan. This could not be foreseen at the time of the appraisal for Phase 1. However, after completion of the project, there have been no problems requiring re-negotiation or complaints.” At the time of this field survey, interviews were conducted with people mainly in the surrounding area of the district eligible for land acquisition (Tau Hu and Ben Nghe Canal district), which yielded comments including, “I understood Ho Chi Minh City’s public works project. I understood the compensation procedures and the need for land acquisitions.” However, it was not possible to check a report on resettlement monitoring conducted as a part of consulting services. Thus it cannot be judged whether there were no negative impacts in particular resulting from land acquisition or resettlement.

A lifestyle support program for relocated persons was provided between October 2004 and May 2007 with the assistance of HCMCPC. The details of this program included assistance programs for youth with no work experience and for workers with experience. The program for youth was held for between six and twelve months at HCMCPC’s vocational training school. The program for workers consisted of job search support, intermediation, and advice[22].

3.4.2.3. Other Positive and Negative Impacts

As part of the work safety measures of this project, the contractor conducted HIV/AIDS countermeasures for construction workers, with a cumulative total of approx. 6,500 people taking part[23]. During the period of construction, the contractor carried out a program for workers at least once per month in which information was provided on HIV/AIDS to educate and raise awareness. Detailed information provision and educational activities included prohibiting sex industry workers from entering the construction site or worker dormitories and giving explanations about the proper use of contraceptives[24]. Through questionnaires and

[22] However, information on the number of participants and the employment rate was not obtained.
[23] In 2003, before the start of construction work, more than 4,000 people contracted HIV and around 1,500 developed AIDS each year in Ho Chi Minh City. The background to this program is the concern that construction workers for this project who came from other regions or were there working alone had a risk of contracting HIV/AIDs.
[24] PMU was made aware of activities through monitoring reports submitted by the contractor on a monthly basis.

interviews with UCCI, it was confirmed that no workers contracted and developed HIV/AIDS during the course of this project. Taking into consideration this case study, it is believed that this project contributed to a certain degree to reducing the risk of HIV/AIDs among construction workers.

With regard to the target for annual average daily traffic in the Saigon River Tunnel, the actual figures of the second year after the completion of the project (2013) was not achieved. The main reason was investment in the development of the district used as a basis for targets did not materialize. However, this investment did emerge afterwards and the completion of the north-south expressway (Ho Chi Minh - Dau Giay section) had an effect on boosting traffic in the section covered by this project. As a result, in the fifth year after completion of the project (2016), actual figures of traffic exceeded the target and the initially anticipated effects were realized. The travel time required to drive the section covered in the project was shortened as initially planned. Convenience as an access road and improved safety inside the Saigon River Tunnel were realized per interviews with project stakeholders and based on the results of the beneficiary survey. Additionally, rising residential land prices, increasing living standards, as well as changing/improving living environment were confirmed through the results of the beneficiary survey and interviews with residents living in the vicinity of the site. Judging the above comprehensively, the implementation of this project generally brought about the planned effects, as its effectiveness and impacts are high.

3.5 Sustainability (Rating: ③)

3.5.1 Institutional Aspects of Operation and Maintenance

At the time of the ex-post evaluation, the executing agency of this project is HCMCPC. The organization in charge of overall supervision and management of the project is UCCI, which is under HCMCPC. Meanwhile, the organization having ultimate responsibility for the overall operation and maintenance of all facilities developed as part of this project and for the exclusive operation, maintenance and safety measures for the Saigon River Tunnel is MCST, under the Department of Transport (hereinafter, "DOT") [25]. MCST carries out inspection on a daily basis including cleaning and patrols of the Saigon River Tunnel and monitors the status of

Additionally, the AIDS Committee of HCMCPC conducted an audit concerning the validity of HIV/AIDS countermeasures implemented by the contractor. According to UCCI, these activities and audits were implemented smoothly and no particular problems were found.

[25] The DOT is also under HCMCPC.

traffic conditions using observation cameras installed inside the tunnel[26]. As for daily maintenance for the other section covered in this project, the Bridge and Ferry Management Company is responsible for the bridge, the Saigon Transport Works Management Company is responsible for the road, and Saigon Public Lighting Company is responsible for the traffic signals[27]. These three companies are contracted to provide operation and maintenance work by MCST. In addition to cleaning and weeding, inspections of facilities from this project are carried out using patrols. At the time of the ex-post evaluation, the number of employees at MCST is 192[28].

As stated in 3.2.1 Efficiency and Project Outputs, as of the time of the ex-post evaluation, the Saigon River Tunnel has yet to be handed over. Due to this fact, repairs, reinforcement, maintenance and regular inspections inside the tunnel had yet to take place. However, according to UCCI, the tunnel will be handed over for sure before the end of the same year. It appears that the repairs, reinforcement, maintenance and regular inspections, excluding the above cleaning and patrol-based inspections, will be steadily carried out.

Judging from the above, the roles and responsibilities for each maintenance work with regard to the operation and maintenance structure at the time of the ex-post evaluation are clearly defined, and as such, there are no major problems, in particular.

3.5.2 Technical Aspects of Operation and Maintenance

MCST has highly experienced employees. Interview surveys confirmed that these employees have expertise in operating heavy machinery and vehicles required for operation and maintenance work. Through interviews with MCST employees as part of this field survey, it was confirmed that these employees fully understand the importance of operation and maintenance work. Furthermore, many of MCST's employees have a degree (from a four-year university) in electrical machinery, IT, civil engineering, technical engineering, or transportation management.

As for actual trainings, for example, MCST held "firefighting training for road and bridge facilities" (October 2015), "safety seminar on electrical equipment" (May 2012), and "worker

[26] MCST is subject to the supervision of the DOT. MCST and the DOT hold meetings monthly to report on work, and occasionally DOT employees visit MCST to carry out regular supervision and inspections.
[27] Each company is a state-owned enterprise under the DOT.
[28] The breakdown includes 17 management personnel and 175 technical personnel. The workforce of the Bridge and Ferry Management Company, Saigon Transport Works Management Company, and Saigon Public Lighting Company fluctuates based on the day and time when maintenance work is carried out. As a result, it was not possible to confirm an accurate workforce headcount.

safety seminar" (December 2011), which were attended by many of its employees[29]. MCST also conducts on-the-job-training (OJT) on a regular basis. Whenever new employees are hired, MCST provides continuous OJT in an effort to share information about maintenance skills and techniques.

During the project implementation, the construction management consultant provided MCST with a maintenance manual concerning Saigon River Tunnel as part of its consulting services. According to MCST, it refers to and utilizes this manual when needed. As stated above, the repair, reinforcement, maintenance and regular inspections of the tunnel's structure will be carried out going forward, so it is presumed that the extent to which this manual is utilized will increase in the future.

As for the technical level of operations and maintenance carried out by the Bridge and Ferry Management Company, Saigon Transport Works Management Company, and Saigon Public Lighting Company, which are under the supervision of MCST, each has adequate background and skills for carrying out regular maintenance. Interviews with senior management of each company conducted at the time of this survey yielded comments such as, "Many of our employees are highly experienced. They will be able to carry out work based on the situation in the field even when traffic increases." Taking into account these comments, no major problems in particular are observed in terms of the technical level of the organization of these subcontractors.

Therefore, there are no major problems in particular when considering the technical level of operation and maintenance based on the conditions present at the time of the ex-post evaluation.

3.5.3 Financial Aspects of Operation and Maintenance

Table 9 provides changes in MCST's operation and maintenance costs over the most recent three-year period related to the facilities developed by this project (Saigon River Tunnel, road, bridge, traffic signals, etc.) [30].

[29] Once it completes the handover of the Saigon River Tunnel, MCST plans on improving the technical skills of employees by having them participate in field training in Vietnam required for maintenance of the Saigon River Tunnel. This survey was not able to obtain information on training implemented by the Bridge and Ferry Management Company, Saigon Transport Works Management Company, and Saigon Public Lighting Company.

[30] Including subcontracting costs incurred by MCST for the Bridge and Ferry Management Company for the bridge, Saigon Transport Works Management Company for the road, and Saigon Public Lighting Company for traffic signals.

Table 9: Operation and Maintenance Costs Related to the Project Facilities
(Actual Expenditure)

(Unit: million VND)

	2014	2015	2016
MCST's Operation and Maintenance Costs	57,068	60,645	75,786

Source: Answers to questionnaire

MCST's budget is allocated from HCMCPC through the DOT. According to an executive officer of MCST, "The budget fully covers the most recent operation and maintenance costs. We submit our budget for the next fiscal year (accounting year starting in January) to the Finance Department of HCMCPC every year in July. The Finance Department then examines the amount we applied for. The allocation amount is determined based on the budget regulations of this department. In recent years, generally the entire budget we requested has been approved." According to an executive officer of UCCI, the required budget for operation and maintenance costs is being allocated because of significantly increasing traffic along the section covered by the project over the most recent several years, in addition to HCMCPC's efforts to address the city's robust development, and not to mention increasing traffic across the entire city. In addition, the road section of the Saigon East-West Highway is a high priority for HCMCPC. Therefore, even if a major repair or restoration is needed in the future requiring a huge sum of money, HCMCPC will give it top priority by allocating a special budget or taking other measures.

As indicated in 3.2.1 Efficiency and Project Outputs, at the time of the ex-post evaluation, tolls were not being collected at the toll booth located at the entrance on the eastern side of the Saigon River Tunnel. The reason for this is because, when the project was underway, the Central Government of Vietnam established a road fund fed by revenue from a gasoline tax and automobile registration fees to secure the funds needed for the maintenance of the road and bridge, and as a result, it was decided that maintenance costs for the road and bridge will be allocated from this fund[31]. As a result, it was decided that the toll booth developed as part of this project will not collect tolls[32].

In light of the above, no particularly major problems are observed in terms of the financial aspects of this project's operation and maintenance.

[31] Following the decision of the Central Government, in 2012 HCMCPC decided not to collect tolls based on Decree 18/2012/ND-CP. It can be said that the toll booth will not be operated based on a decision made by the Vietnam side.
[32] HCMCPC decided not to collect tolls. The allocation of the road fund is 65% for the Central Government and 35% for local governments. This survey did not determine the extent to which this road fund is being allocated to MCST.

3.5.4 Current Status of Operation and Maintenance

At the time of the ex-post evaluation, no significant problems were observed in terms of the operation and maintenance situation of the Saigon River Tunnel, road, bridge and traffic signals, etc., developed as part of this project. At the time of this survey, through interviews of employees in charge of operation and maintenance and visual inspections carried out at the time of the field survey, it was confirmed that there were no major cracks or unevenness in the road surface of the section covered by the project, no evidence of a lack of cleaning, no broken traffic signals, and no deficiencies or failures found on the inside of the Saigon River Tunnel's walls or equipment.

MCST formulates an operation and maintenance plan every year and submits it to the DOT. Following this plan, MCST carries out the operation and maintenance of each facility.

With regards to spare parts such as equipment of road maintenance and traffic signal, MCST is in charge of all procurement, management and storage. The subcontractors responsible for the maintenance of project facilities excluding the Saigon River Tunnel receive parts from MCST as necessary. There has been no situation where a shortage of parts has prevented maintenance work from occurring.

No major problems have been observed in the institutional, technical and financial aspects of the operation and maintenance system. Therefore, the sustainability of the project effects is high.

Photo 3: Landscape of the Project Section and Thu Thiem District

Photo 4: MCST's Traffic Situation Monitoring Center

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project constructed an east-to-west arterial road including underwater tunnel traversing the Saigon River in order to increase transportation capacity and improve transportation conditions; thereby contributing to the urban development along the eastern bank of the Saigon River and to the economic development of Ho Chi Minh City, which is Vietnam's largest city and a hub of commerce and industry. Relevance of this project is high because of its confirmed consistency with economic development policies laid out in Vietnam's *Socio-economic Development Strategy 2011-2020* and *Spatial Development Direction 2010-2020*, the need for developing urban transportation infrastructure, and the assistance policy of the Japanese Government. As for efficiency, project outputs were implemented mostly as planned, but project costs exceeded the initial plan due to cost increases caused by higher land acquisition and resettlement costs as well as soil improvement work due to the discovery of soft ground. The project period was significantly longer than the initial plan due to delays in procedures, design and construction. Thus, the efficiency is low. In 2016 (five years after the project completion), actual figures of annual average daily traffic using the Saigon River Tunnel exceeded the target. The amount of time required to travel the entire distance of the Saigon East-West Highway was shortened as initially planned; thus, the initially anticipated effects have been realized. In addition, the rising price of residential land, improving living standards, and changes/improvements in living environment have been confirmed based on the results of beneficiary surveys and interviews of people living in the vicinity of the site. In light of the above, the effectiveness and impact of this project are high. No particular problems were observed at the time of the ex-post evaluation in terms of the institutional, technical or financial aspects of MCST, which is in charge of the operation and maintenance and safety measures for the facilities developed by this project. Thus, sustainability of the effects realized through this project is high.

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

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

As of the time of the ex-post evaluation (December 2016), the Saigon River Tunnel developed as part of this project has yet to be handed over. Talks between the contractor, construction management consultant, and HCMCPC are ongoing, but it is preferable that the

handover take place as soon as possible and the procedures for the final payment be completed.

4.3 Lessons Learned

Periodic Monitoring and Response Regarding Land Acquisition and Resettlement

During this project a long duration of time was spent until the completion of the land acquisition and resettlement. For large-scale projects like this one and in countries with robust economic growth like Vietnam, ample consideration must be given to the fact that more time than expected is needed for land acquisition and resettlement procedures (need to consider that on occasion legislation or the social situation may change). In the case of this project, although the planned duration was exceeded, work was completed without major complaints regarding the procedures and response of the Vietnamese side, such as surveys of land rights, etc. However, it took an extremely long period of more than five years to complete this process, which lowered the project's efficiency. Although land acquisition and resettlement are the responsibilities of the Vietnamese side, it is important for JICA to carefully follow up on progress by holding regular dialogue with related government ministries and agencies as well as the executing agency in an effort to encourage that there be no effects on the schedule of the overall project. In the future, for similar projects, JICA will need conduct further regular monitoring and provide assistance toward problem resolution, even for land acquisition and resettlement work, as part of its project management duties.

Comparison of the Original and Actual Scope of the Project

Item	Plan	Actual
1.Project Outputs	1) Civil Works a) Construction of Saigon River Tunnel (New construction), b) Canal Side Road (Rehabilitation and widening), c) Construction of Western Road (New construction), d) Construction of Thu Thiem Road (New construction): Approx. 21 km (Width: approx.36m (canal side road), Approx.31m (tunnel section), Approx. 100m (Thu Thiem section), 6 lanes), e) Construction of Bridges and Interchanges (New construction): 15 bridges and 5 interchanges 2) Facilities for Management: Traffic information system, tunnel ventilation facility, toll gate, vehicle for maintenance 3) Development of Relocation Site: Land preparation, development of houses or residential areas (15 places in all), development of infrastructure (land preparation, on-site road, development of water supply and sewerage, electricity distribution network, kindergarten, elementary school, hospital, market, park, etc.)	1) Civil Works a) Construction of Saigon River Tunnel (New construction): 1.49km (Width: 33.3m, 6 lanes) b) Canal Side Road (Rehabilitation and widening): 9.06km (Width: 42.0m, 6 lanes) c) Construction of Western Road (New construction): 4.5km (Width: 60.0m, 6 lanes) d) Construction of Thu Thiem Road (New construction): 7.25km (Width: 100.0m, 6 lanes) e) Construction of Bridges and Interchanges (New construction): 13 bridges and 6 interchanges 2) Facilities for Management: Implemented as planned 3) Development of Relocation Site: Increased from planned (Development of houses or residential areas increased to 22 places.)

	4) Consulting Services: Detailed design on road construction project, bidding assistance, construction supervision, operation and maintenance training, detailed design review on infrastructure development of relocation site, monitoring for resident's relocation, etc. * The above is a summary of the plan at the time of phase I's appraisal	4) Consulting Services: Implemented as planned
2. Project Period	March 2000 - July 2005 （65 months）	March 2000 – November 2011 （141 months）
3.Project Cost Amount Paid in Foreign Currency	34,900 million yen	29,348 million yen
Amount Paid in Local Currency	32,155 million yen (321,550 million VND)	49,861 million yen (85,672 million VND)
Total	67,055 million yen[33]	79,209 million yen
ODA Loan Portion	47,931 million yen	46,416 million yen[34]
Exchange Rate	1 VND=JPY0.01 1USD=JPY115 (March 2000)	1VND＝JPY0.00582 1USD=JPY105.12 (Average rate for the period of the construction (August 2001-October 2016) based on rates issued by the IMF's International Financial Statistics Data

[33] The foreign currency, local currency and total amounts indicates the amount at the time of the phase one appraisal, while the Japanese ODA Loan Portion indicates the total amount of approved loans from phase one to phase five.
[34] Indicates the total executed loan amounts for phase one to phase five.

4. Final Disbursement	Phase I: July 26, 2007
	Phase II: September 1, 2014
	Phase III: July 28, 2008
	Phase IV: January 6, 2014
	Phase V: September 1, 2014

Socialist Republic of Viet Nam

FY2016 Ex-Post Evaluation of Japanese ODA Loan "Northern Vietnam National Roads Traffic Safety Improvement Project" / Technical Assistance Project related to ODA Loan "Project for Strengthening the Traffic Police Training in Various Police Colleges of Vietnam"[1]

External Evaluator: Hisae Takahashi, Ernst & Young Shin Nihon LLC.

0. Summary

"Northern Vietnam National Roads Traffic Safety Improvement Project" (the ODA Loan Project) was conducted to reduce the number of traffic accidents and fatalities caused by the same as well as reducing damage caused by accidents through installing road safety facilities, awareness activities for neighboring local residents and road users, enforcement activities of traffic regulations and strengthening traffic safety education in northern Vietnam, thereby contributing to the living environment of the surrounding area and the road-usage environment. "Project for Strengthening the Traffic Police Training in Various Police Colleges of Vietnam" (the Technical Assistance Project) was also launched to support the People's Police Academy (PPA), a training academy for traffic police to regulate traffic safety control. The purpose of two projects (the Projects) was deemed highly relevant to the development policy of Vietnam and sector strategy, which cited traffic accidents as social issues and addressed solutions; development needs to improve awareness activities and ethics and morals of traffic regulations for neighboring local residents and road users; and the Japanese assistance policy.

Both the project cost and project period of the ODA Loan Project were within the plan, therefore efficiency of the project is high. After the ODA Loan Project was completed, the number of traffic accidents, traffic accident fatalities and injuries decreased on target national highways. It was also confirmed that equivalent figures decreased in provinces and cities where the target roads were located, despite the increased number of cars registered at the time of ex-post evaluation. Moreover, the ODA Loan Project helped reduce damage incurred by road users and maintenance costs by improving the road condition, and the level of satisfaction for the road environment is high. Furthermore, it was also confirmed that the educational content and teaching methods improved in PPA and trained people played an active role in the police education institution after the Technical Assistance Project was completed. However, the data for the target national highways to analyze the effectiveness at the time of ex-post evaluation could not be

[1] "Project for Strengthening the Traffic Police Training in Various Police Colleges of Vietnam" (Technical Cooperation Project) was extended in association with the ODA Loan Project, "Northern Vietnam National Roads Traffic Safety Improvement Project", therefore, both are subject to an integrated ex-post evaluation. Refer to "1.3 Outline of the Terminal Evaluation" for details.

obtained, thus only allowed an indirect effect to be confirmed. Accordingly, the effectiveness and impact of the Projects are fair.

It was found that the equipment installed in the ODA Loan Project was maintained and kept in good condition and awareness and traffic enforcement activities also continued in each area. Despite no issues from the technical aspect of O&M, minor issues were confirmed in institutional and managing systems as well as from the financial aspect of O&M. As for the Technical Assistance Project, despite no concerns over the sustainability of educational activities in PPA, the challenge for the financial aspect on research activities was confirmed. Accordingly, the sustainability of the Projects as an integrated evaluation is fair.

In light of the above, the Projects are evaluated to be satisfactory.

1. Project Description

Project Location

The Installed Traffic Sign and Light

Exercises at People's Police Academy

1.1 Background

In Vietnam, the high number of traffic accidents had become a social problem. Among transport modes of road, inland water, maritime, railways and etc., most traffic accidents occurred on roads, occupying 96% in the number of accidents, 97% in fatalities and 98% in injuries. Number of fatalities by road traffic accidents increased about 4.6 times between 1992 and 2002, from 2,755 to 12,800 persons. Although the number had been decreased from 2002, it still exceeded 11,000 annually. In comparison with ASEAN countries, fatality rate in Vietnam ranked forth worst in 2002[2]. Although the government of Vietnam prioritized "3E" for improving traffic safety, namely facility development as "Engineering", education and awareness as "Education" and guidance and control as

[2] documents provided by JICA

"Enforcement" and initiated the development of infrastructure at accident black spots, improved the institutional framework plus laws and regulations for a security crackdown and promoted an awareness campaign, further safety measures were required due to the limited budget. Under such circumstances, the Japanese government supported the project for the development of traffic safety facilities and enforcement as well as traffic safety education and awareness -raising for neighboring local residents in four national roads, having considerable increase in traffic volume.

The training contents of educational institutions for traffic police regulating the traffic safety control have also proved inadequate in responding to the country's rapidly changing traffic situation. Accordingly, there was an urgent need to improve current-based education and training contents as well as to introduce safety measures at traffic locations. Thus, the Technical Assistance Project was implemented; aiming to improve the educational contents of PPA which nurtures police officers and retrains executives, with a plan to support both the traffic police administration and academic sides alongside the ODA Loan Project; amid expectations of achieving outputs more efficiently and effectively.

1.2 Project Outline

【ODA Loan】 "The Northern Vietnam National Roads Traffic Safety Improvement Project"

To reduce the number of fatalities from traffic accidents and mitigate the damage along four national roads (national road Nos. 3, 5 10 and 18) in northern Vietnam by developing traffic safety facilities, conducting awareness activities to local residents and road users, strengthening traffic safety enforcement and supporting the traffic safety education, thereby helping improve the living environment of local residents and the road environment for users.

Loan Approved Amount/ Disbursed Amount	6,557 million yen / 6,059 million yen
Exchange of Notes Date/ Loan Agreement Signing Date	March, 2007 / March, 2007
Terms and Conditions	Interest Rate 1.3% Repayment Period 30 years (Grace Period 10 years) Conditions for Procurement General Untied
Borrower / Executing Agencies	The Government of Socialist Republic of Viet Nam / Ministry of Public Security
Project Completion	June, 2014
Main Contractor	-
Main Consultant	Consia Consultants (Denmark) / Oriental Consultants

(Over 100 million yen)	Global Co., Ltd. (Japan) (JV)
Feasibility Studies, etc.	"Pre-Feasibility Study" November, 2006
Related Projects	・Technical Cooperation "The Project for Traffic Safety Human Resource Development in Hanoi"(2006 – 2010) ・World Bank "Road Safety Project"(2005 – 2012) ・Asian Development Bank "ASEAN Regional Road Safety Program" (2003 – 2004)

【Technical Cooperation】 "Project for Strengthening the Traffic Police Training in Various Police Colleges of Vietnam"

Overall Goal		Traffic police training in police training institutions in Vietnam is improved.
Project Purpose		Education contents of the PPA Traffic Police Faculty will be improved. PPA teacher's training ability for traffic police will be improved.
Output(s)	Output 1	Improvement of training content on the "Road traffic law and public education", "Traffic guidance and control", "Traffic enforcement" and "Collecting and analyzing of traffic accident data"
	Output 2	Improvement of training method encouraging students' initiatives
	Output 3	Establishment of Traffic Safety Research Center and implementation of research and development activities
Total cost (Japanese Side)		399 million yen
Period of Cooperation		June 2010 – December 2013 (Extended period July 2013 – December 2013)
Implementing Agency		The Government of Socialist Republic of Vietnam / The People's Police Academy (PPA)
Supporting Agency/ Organization in Japan		The National Police Agency

1.3 Policy of the Evaluation

Relevance is reviewed for both the ODA Loan Project and the Technical Assistance Project, and Efficiency is mainly reviewed for the ODA Loan Project. Effectiveness, Impact and Sustainability of the Technical Assistance Project are analyzed and evaluated based on the extent of the achievement of each output and goal confirmed at the time of ex-post evaluation as well as the contribution made in the path to the expected impact for a synergistic effect with the ODA Loan Project. This integrated evaluation for the ODA Loan Project and Technical Assistance Project considers the achievement status of the project purpose for Technical Assistance Project as a part of the project outcome for the

ODA Loan Project and confirms the contribution from the project effects of the Technical Assistance Project for making an evaluation judgment. However, the ODA Loan Project did not outline a clear relationship between both Projects on documents and neither of the executing agencies understood any relationship and association between both Projects. According to the project outline, the Technical Assistance Project supporting educational institutions for police officers is considered "traffic safety enforcement" out of the following three components of the ODA Loan Project: "development of traffic safety facilities", "traffic safety education and awareness" and "traffic safety enforcement". However, while the provision of equipment for traffic safety enforcement (ODA Loan Project) affects the effectiveness (number of accidents) and impact (surrounding and usage environment of the road) relatively within a short time span, support for educational fields at PPA (Technical Assistance Project) requires a certain period to contribute to the effectiveness and impact of the ODA Loan Project, which was considered to limit the synergistic effect and impact that could be confirmed at the time of ex-post evaluation. Therefore, the evaluation of the effectiveness of the Projects was determined based on the effectiveness/impact and a synergistic effect which were confirmed at the time of the ex-post evaluation.

2. Outline of the Evaluation Study

2.1 External Evaluator

Hisae Takahashi, Ernst & Young ShinNihon LLC.

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 22, 2016, April 12, 2017 – April 21, 2017

3. Results of the Evaluation (Overall Rating: B[3])

3.1 Relevance (Rating: ③[4])

3.1.1 Consistency with the Development Plan of Vietnam

At the time of planning the Projects, the Vietnamese government formulated a *Five-year Socio-Economic Development Plan (2006 – 2010)*, which cited traffic accidents as a serious issue; urging all individuals and the whole community to strive to

[3] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

[4] ③: High, ②: Fair, ①: Low

reduce the number of such accidents and emphasizing the provision of equipment and facilities to organizations directly resolving such issues. The drafted *National Traffic Safety Strategy (2006 – 2016)* included a plan emphasizing on national road safety with the purpose of reducing the number of traffic accidents and fatalities, raising public awareness of traffic safety and strengthening national traffic safety controls in a traffic safety area.

The Five-year Socio-Economic Development Plan (2016 – 2020) at the time of ex-post evaluation also focused on economic growth; showing prioritized items of developing sustainable culture and society and improving people's lives alongside economic growth. To secure social safety and order, it described means to reinforce control over traffic rules by continuing measures for securing traffic safety, complying with traffic rules and decreasing traffic accidents. The same *National Traffic Safety Strategy (2006 – 2016)* was effective at the time of ex-post evaluation and national road safety measures were continuously prioritized.

The Projects aimed to decrease the number and damages of traffic accidents and injuries, and as mentioned above, they are highly relevant to the country's development plan from the time of planning through to the time of ex-post evaluation.

3.1.2 Consistency with the Development Needs of Vietnam

In Vietnam, at the time of appraisal of the ODA Loan Project, the number of fatalities due to traffic accidents doubled from 5,800 in 1996 to 11,500 persons in 2005, reflecting the seriousness of traffic accidents. Among transport modes, most traffic accidents occurred on roads, 49% of which on national roads in 2001. Under such circumstances, National Traffic Security Committee (NTSC) determined that those traffic accidents were mainly due to non-compliance with traffic rules by road users, the government failing to acknowledge or impose traffic safety controls, inadequate sanctions, inconsistency and delays being effective in orders, standards, rules and regulations, a shortage of technical abilities and equipment required for traffic safety control, insufficient awareness activities and information promotion about traffic act and inadequate infrastructure[5], etc.[6].

The number of traffic accident fatalities decreased from 8,788 in 2014 to 8,385 in 2015 and 7,696 persons in 2016, respectively. The number of accidents occurring on national roads decreased from 49% at the time of planning the ODA Loan Project to 35% in 2015. However, among transport modes, road traffic accidents still occupied 96 - 98%

[5] The mixture of vehicles, bicycles and pedestrians and the shortage of traffic signs were raised in particular.
[6] Source: documents provided by JICA

of all fatalities even at the time of ex-post evaluation. NTSC indicated the need to rehabilitate national roads, implement awareness activities among road users and residents, improve the ethical and moral aspect of traffic rules and implement periodical safety traffic campaigns on a yearly and monthly basis, toward continuous traffic safety to improve the situation of road traffic accident.

The Technical Assistance Project also contributes to traffic safety, like the ODA Loan Project, by supporting academic institutions assisting traffic polices to enforce traffic safety. Both Projects aimed to improve traffic safety on the targeted national roads and were therefore relevant to the development needs of the country at the time of planning as well as ex-post evaluation.

3.1.3 Consistency with Japan's ODA Policy

At the time of planning, the Ministry of Foreign Affairs drafted a *Country Assistance Program for Vietnam (April 2004);* prioritizing three areas of: 1) Growth promotion, 2) Life and social improvement, 3) Development of the system as a basis of society and economics. 1) Growth promotion showed "a focus on support for transportation and traffic safety" including automobile traffic. JICA's *Country Assistance Strategy for Vietnam in 2006* also specified "considering assistance for facility development for traffic safety, awareness activities among residents and road users alongside the target national road and strengthening traffic safety control and education". The Projects support strengthening of facility development for traffic safety, awareness activities and traffic safety education and therefore, as indicated at the time of planning, was highly relevant to Japan's ODA policy.

3.1.4 Appropriateness of the Project Plan and Approach

As for Technical Assistance Project, a certain amount of time is required to confirm the synergistic effect with the ODA Loan Project. Conversely, the ODA Loan Project implemented the development of facilities and equipment and traffic safety awareness activities, while the Technical Assistance Project supported educational institutions with traffic police officers controlling traffic safety, both of which were consistent with the policies and the development needs as well as boosted traffic safety. This was considered an appropriate program and expected to have an efficient and effective effect by supporting traffic police administration and education.

The Projects were highly relevant to the Vietnamese development plan and development needs, as well as Japan's ODA policy. The Project plans and approaches was also appropriate. Therefore, its relevance is high.

3.2 Efficiency (Rating: ③)

3.2.1 Outputs

The ODA Loan Project conducted 1) facility development, 2) procurement of equipment and training for education and awareness, 3) procurement of equipment and training for traffic safety enforcement and 4) consulting services, as required for traffic safety, at the four national roads listed below in northern Vietnam (refer to Table 1 and Figure 1 for details). The plan and actual output are shown in Table 2- 5.

Table 1 The Section of Target National Road and Location of the ODA Loan Project

National Road	Target Section	Province/City
No. 3	Hanoi – Thai Nguyen	Hanoi city, Thai Nguyen province
No. 5	Hanoi – Hai Phong	Hanoi city, Hai Phong city, Hai Duong province, Hung Yen province
No. 10	Ninh Binh – Quang Ninh	Hai Phong city, Nam Dinh province, Thai Binh province, Quang Ninh province, Ninh Binh province
No. 18	Bac Ninh – Quang Ninh	Bac Ninh province, Hai Duong province, Quang Ninh province

Source: document provided by JICA

Figure 1 Map of the Target National Road

Source: document provided by executing agency

(1) Main changes to traffic safety facility construction

Some items that are not easily comparable have still been included due to the different indications between the plan and actual output. Meanwhile, the planned items were largely covered and implemented, despite disparity in the total number of

constructed facilities and km length covered. Considering the safety of target sections where the road width narrowed compared to the traffic volume, two lanes were also widened to four in National Road No.3 and No.8 additionally, following a suggestion from the executing agency. Under the ODA Loan Project, the records of traffic accidents were analyzed and discussion ensued based on analytical results obtained by the consultant and the suggestions and opinions of stakeholders after the contract. Improvements were then made based on the results, which was analyzed in more detail than the original. Accordingly, changes were made to provide support responding to the real situation and were hence considered appropriate, despite some differences from the plan.

Table 2 Planned and Actual Outputs (Construction of Traffic safety facilities)

Planned output	Number
Intersection (Number)	20
Signal (Number)	16
Railway at grade crossing (Number)	2
Safety measure for minor intersection (Number)	36
Push button signal system installation (Number)	10
Overpass bridge construction (Number)	-
Widening for motor cycle & bicycle lane (Number)	2
Widening section (km)	10
Center median installation (Number)	8
Safety measure such as guardrail, etc., on curve section (Number)	24
Installation section (km)	11.3
Bus bay installation (Number)	16
Widening for paved shoulder (width: 2.5m),(Length: km)	63

Actual output	Number
Intersection (Number)	64
Signal (Number)	Included above
Railway at grade crossing (Number)	
Lightening system installation (km)	7
Installation of warning signs (Number)	42
Push button signal system installation (Number)	3
Overpass bridge construction (Number)	13
Widening for motor cycle & bicycle lane (Number)	6
Center median installation (km)	32
Center median upgrade (Number)	18
Safety measure such as guardrail, etc., on curve section Installation section (km)	2
Bus bay installation (Number)	98
Widening for paved shoulder (width: 11 m),(Length: km)	6
Widening for paved shoulder (width: 19.2m),(Length: km)	6
Overlay (km)	359
Upgrade roads(2→4 lanes)(km)	19.5

Source: documents provided by JICA and executing agency

(2) Changes in procured equipment and training sessions for road safety education and awareness activities

Procuring the equipment needed for the campaign involving awareness activities and the equipment used for the same as well as the training itself were mainly supported. As for the outputs of those activities, the equipment was procured and training conducted based on suggestions and opinions made by the contracted

consultant and related institutions. Accordingly, the actual output differed from the plan. The equipment provided was selected based on the results of further examination beyond the original analysis; hence the changes can be considered appropriate.

Table 3 Planned and Actual Outputs
(Procured Equipment and Training for Traffic Safety Education and Awareness-Raising Activities)

Item	Plan	Actual
Material for campaign activities at installed traffic safety facilities	Banners, Posters	Preparation and distribution of posters, banners and leaflet, campaign cars, uniform, etc.
Material for education and campaign activities in the section of installed traffic safety facilities	Banners, Posters	Teaching kid, PCs, printers, video recorders, projectors, cameras, tape recorders, signpost models, helmets, etc.
Training material for teacher, for guard man in going and leaving to/from school and education material for traffic safety at schools and communes	N/A	Education material such as DVD, etc., installing the traffic safety corner at schools, Sets of road signs, PCs, projectors, cameras, etc.
Leader trainings	1,170 teacher for Lower and upper secondary education 1,034 parents and community residents	Holding traffic safety education trainings and workshops: 927 leaders at lower and upper secondary schools and 105,518 teachers and students and local residents participated

Source: document provided by JICA and executing agency

(3) Changes in procured equipment to strengthen traffic safety enforcement for training sessions and traffic safety campaigns

Equipment was procured and training sessions were conducted to strengthen traffic safety enforcement differed from the original plan since those changes were decided through discussion between the traffic polices and traffic safety committees of each province based on the result of further coordination beyond the scope of the plan and were hence considered appropriate and commensurate with local circumstances.

Table 4 Planned and Actual Outputs
(Equipment procured to strengthen traffic safety enforcement, for training sessions and traffic safety campaigns)

Item	Plan	Actual
Equipment for traffic safety enforcement used at installed traffic safety facilities	18 patrol cars, 35 patrol motorcycles, 17 wrecker trucks, 11 vehicle scales, 35 speed guns, 34 alcohol sensors, 34 video recorders, 34 digital cameras, 68 warning lights, 340 guideposts, 340 sticks, 340 whistles, 68 two way radios, 28 computers	13 patrol cars, 48 patrol motorcycles, 13 wrecker trucks, 13 speed guns, alcohol sensors (N/A for numbers), 32 digital cameras, guideposts/sticks/ whistles (N/A for numbers), 65 computers, 13 vehicle speed measuring machines, 31video recorders, 30 printers, etc.
Leader trainings	900 local community leaders, 22 traffic safety guardsman in each area, Traffic polices (No detail information)	380 traffic safety polices
Traffic safety campaigns	Banners, TV, Newspapers, etc.	As planned

Source: document provided by JICA and executing agency

(4) Consulting services

Consulting services in the ODA Loan Project supported efforts by the executing agency to formulate the training plan and implement training sessions for school education, local residences and traffic polices as well as supporting detailed design, tendering assistance and implementation supervision which are usually provided.

Table 5 Planned and Actual Outputs

Plan	Output
Project management support for formulating comprehensive action plan, coordination among related institutions, monitoring and evaluation, etc.	As planned
Detailed design, tendering assistance, implementation supervision	
Formulation of training plans for Project Management Unit, support of implementing training sessions	

Source: document provided by JICA and executing agency

3.2.2 Project Inputs[7]

3.2.2.1 Project Cost

The actual total ODA Loan Project cost was 7,215 million yen (6,059 million yen from Japanese ODA Loan) while the planned cost was 7,773 million yen (6,557 million yen from Japanese ODA Loan), meaning the total project cost was within the planned (93% of the original plan). The major reason why the actual cost was

[7] Though the planned and actual project cost and period of the Technical Cooperation Project are shown and compared, they are not considered in principle when judging the evaluation based on the reference for external ex-post evaluation.

lower than the plan was the fluctuating exchange rate[8].

The actual Technical Assistance Project cost was 399 million yen due to the additional input of experts along with the extension of the project period while the planned cost was 350 million yen, hence the project cost was higher than planned (Refer to "3.2.2.2 Project Period" for details of how the project period was extended and the additional input of experts).

3.2.2.2 Project Periods[9]

The scheduled ODA Loan Project period was 66 months, January 2008 through June 2013 and the actual period was 56 months, November 2009 through June 2014, within the plan. Contracting with the consultant was started after one year and 10 months delay from the plan; the project completion was also moved back. This time lag was due to the delay in coordination on the part of the Vietnamese Government, which needed to approve the consultant contract documents.

Conversely, the planned Technical Assistance Project period was three years, June 2010 through June 2013 and the actual period was extended from July to December 2013, longer than the planned. This delay was due to the changes in legal status for the Traffic Safety Research Center to secure the budget and personnel when commencing the research activities of the center as originally planned. Due to this change, a six-month extension was decided when conducting the terminal evaluation to summarize requests for new research and to assess current needs on site and advise on the legal framework, budget measures, personal allocation plan and formulating a plan for future activity, to obtain approval for setting up the formal institution[10].

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

Economic Internal Rate of Return (EIRR) of the ODA Loan Project was estimated as 20% at the time of appraisal[11]. Although recalculation based on assumption at the time of appraisal has to be attempted, details of the assumption and data on each national

[8] Source: questionnaires to the Japanese experts. According to them, the exchange rate of 1 yen=180 Vietnamese Don (VND) at the time of planning became 1 yen = 265 VND during the implementation and 1 yen =200 VND in June 2014, making it difficult to predict the fluctuation. Accordingly, the project progressed by adjusting to take account of the fluctuation in yen and VND, which comprised 92% of the planned cost.

[9] The project period defined from the time of the contract with the consultant to the completion of consulting services as an agreement which defined the project start as the time of concluding a contract with a consultant, was confirmed by the documents as of the plan.

[10] Source: interviews with Japanese experts and responses to PPA questionnaire.

[11] Cost: project cost except taxes, operation and maintenance cost, Benefit: Medical cost for casualties and families and social costs, Project life: ten years

road could not be obtained from the executing agency[12], which meant the EIRR at the time of ex-post evaluation could not be recalculated.

Conversely, the project consultants showed the EIRRs of the ODA Loan Project targeted at the time of starting the project and that when the project was completed. Based on this information, although no precondition could be confirmed, it was confirmed that EIRR as of the project completion met the assumptions, except for No.5. The fact that EIRR of only No.5 was lower than other national roads was attributable to high project costs for No.5, because the number of constructed pedestrian bridges with a high unit cost was greater than other national roads[13].

Table 6 Comparison of EIRR at the Time of Project Completion

Assumption as of the commencement	Project completion (2013)			
Assumption	No. 3	No. 5	No. 10	No. 18
12% - 24%	21.2%	11.4%	23.9%	14.7%
【Benefit】 Accident cost reduction, Travel time cost reduction and fuel saving cost 【Cost】 Project cost, Operation and maintenance cost				

Source: document provided by executing agency

Based on the above, both the project cost and project period were within the plan. Therefore, efficiency of the ODA Loan Project is high.

3.3 Effectiveness[14] (Rating:② (ODA Loan Project:②/ Technical Assistance Project:③)

In this ODA Loan Project, support for road traffic safety was implemented by developing traffic safety facilities and conducting awareness activities and campaigns. Meanwhile, the Technical Assistance Project mainly targeted the educational field which focused on trainings of trainees to be traffic police, meaning a certain period will be required until the outputs reach the stage of contributing toward roadside safety through trained human resources. Accordingly, it was difficult to treat the effectiveness and impact of both projects in parallel during the ex-post evaluation. With this in mind, this evaluation shows the effectiveness and impact of the ODA loan and Technical Assistance Project respectively, then assigning a sub-rating to each. Evaluating the effectiveness of the Projects was finalized based on effectiveness and impact which could be confirmed and the synergetic effect at the time of ex-post evaluation, as explained in "1.3 Policy of

[12] When assuming benefits, details of the number of traffic accidents and casualties on the target national roads are required. As explained later in "3.3 Effectiveness", since such data on individual national roads cannot be obtained in Vietnam, it was difficult to calculate with the same assumption as the appraisal time.
[13] Overpass bridges were installed five in No. 5, none in No.3 and No.10 and three in No.18.
[14] Sub-rating for Effectiveness is to be evaluated with Impact.

Evaluation".

3.3.1 Quantitative Effects (Operation and Effect Indicators)

(1) Number of traffic accidents, injuries and fatalities caused by traffic accidents in the target sections

Table 7 shows changes in the number of traffic accidents, injuries and fatal traffic accidents. At the time of appraisal and project completion, the project employed consultants, who collected data on each of the target national roads. As shown in Figure 1, while each target road in this project was allocated across multiple provinces, data, including the number of traffic accidents, was collected by each province at the time of ex-post evaluation, meaning the executing agency and related institutions lacked data on the individual national roads. Accordingly, the effect of this project at the time of ex-post evaluation could not be accurately confirmed. For this reason, the information was quoted from the project evaluation report[15] prepared at the time of project completion as an available source in this evaluation. The actual data can be said to show the direct effects of the project as it reflects the time right after the equipment installation. Since the baseline data of 2006 shown as of the appraisal and that in the project evaluation reports prepared as of the project completion do not match, the targets cannot be simply compared. The number of traffic accidents per km per year, however, improved by a considerable 80% or for more than 80% of the target data except for No.18[16], meaning the target was largely achieved at the time of project completion. In addition, Figure 2 shows the actual data from 2006 to 2013 of Table 7, showing that the number of traffic accidents, injuries and fatal traffic accidents have declined since the equipment was installed in 2011.

This ODA Loan Project prioritized traffic accident black spots for installing the facilities. For example, improving sharp curve sections has helped prevent accidents by widening the field of vision of drivers. Installing an overpass for pedestrians, bicycles and motorcycle lanes and the center median in busy national roads all directly helped secure safety for road users. As such, the effects of this project at the time of completion were confirmed.

[15] Source: documents provided by JICA and executing agency

[16] Regarding an explanation for the difference between No.18 and other national roads, no clear reasons were obtained when confirming with the executing agency.

Table 7 Number of Traffic Accidents, Injuries and Fatalities in the Target National Roads

Indicators	National road No.	Baseline (Appraisal)	Target (3 years after project completion)	Before installing equipment					During or after installing equipment		
		2006	2016	2006	2007	2008	2009	2010	2011	2012	2013 Completion year
Traffic accidents (Number/ year)	3	119	84	75	61	143	198	236	98	52	22
	5	449	319	158	153	134	152	179	75	66	74
	10	170	121	47	48	39	48	92	35	36	41
	18	42	30	210	219	157	130	134	87	55	105
Traffic accidents (Number/ km/year)	3	1.8	1.3	1.2	0.9	2.2	3.1	3.7	1.5	0.8	0.3
	5	4.2	3.0	1.7	1.7	1.4	1.6	1.9	0.8	0.7	0.8
	10	1.2	0.9	0.6	0.6	0.5	0.6	1.1	0.4	0.4	0.5
	18	0.9	0.6	1.3	1.4	1.0	0.8	0.9	0.6	0.4	0.7
Injures by traffic accidents (person /year)	3	156	111	89	58	178	223	288	99	48	6
	5	65	46	147	110	103	99	72	35	27	37
	10	199	141	37	25	21	19	69	21	14	31
	18	47	33	163	155	142	113	87	82	68	85
Injures by traffic accidents (person /km/ year)	3	2.5	1.8	1.4	0.9	2.8	3.5	4.5	1.5	0.7	0.1
	5	0.6	0.4	1.6	1.2	1.1	1.1	0.8	0.4	0.3	0.4
	10	1.4	1.0	0.4	0.3	0.3	0.2	0.8	0.3	0.2	0.4
	18	0.3	0.2	1.0	1.0	0.9	0.7	0.6	0.5	0.4	0.5
Fatalities by traffic accident (person / year)	3	58	41	61	49	71	97	72	44	31	25
	5	11	8	115	138	92	121	76	74	66	63
	10	36	26	43	46	42	49	52	30	31	31
	18	30	21	163	155	142	113	87	82	68	85
Fatalities by traffic accident (person /km/year)	3	0.9	0.6	0.9	0.8	1.1	1.5	1.1	0.7	0.5	0.4
	5	0.1	0.1	1.2	1.5	1.0	1.3	0.8	0.8	0.7	0.7
	10	0.3	0.2	0.5	0.5	0.5	0.6	0.6	0.4	0.4	0.4
	18	0.7	0.5	1.0	1.0	0.9	0.7	0.6	0.5	0.4	0.5

Source: documents provided by JICA and executing agency

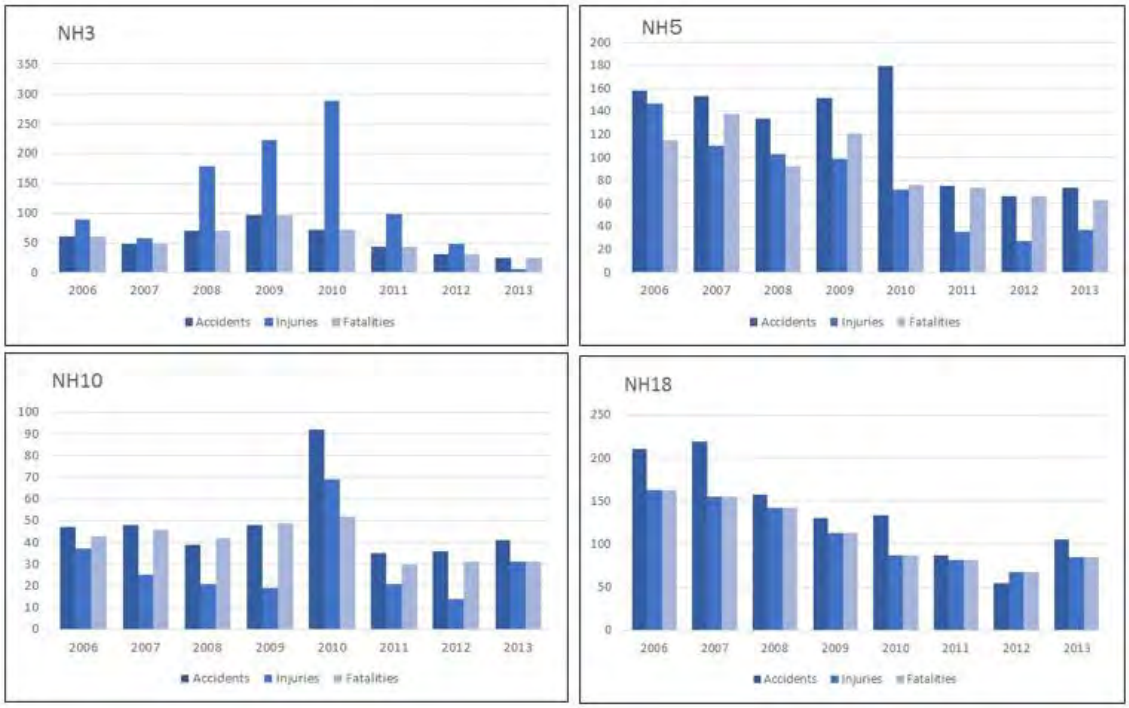


Figure 2 Changes in the Number of Traffic Accidents, Injuries and Fatalities in the Target Sections
(Before Project, After Installing the Facilities and Equipment, till Project Completion)

Source: prepared based on the documents provided by executing agency

In addition, the numbers of traffic accidents, fatalities and injuries by traffic accidents in cities and provinces where the target national roads were located at the time of ex-post evaluation divided by that before implementing the project (data after/before the project) are shown in Figure 3. If the number is below one, it indicates that the number of accidents, etc. as of the ex-post evaluation was lower than the pre-project figure. Since the numbers of accidents and so on are proportional to the increase in traffic volume and registered car numbers, the number of cars registered with each city and province as of the ex-post evaluation compared to figures before the project was also shown as a reference (Table 8). According to JICA documents at the time of appraisal, traffic accidents doubled from 1996 to 2005. Conversely, Figure 3 shows that the number of fatalities except for Thai Binh province as of ex-post evaluation decreased compared to before the project, despite a large increase in the number of registered cars in all cities and provinces as shown in Table 8. This data includes accident information which happened in other roads located in each city and province and thus can be taken as only reference information, however, it is thought to include information showing improvement in traffic safety conditions in areas where target national roads of the ODA Loan Project are located.

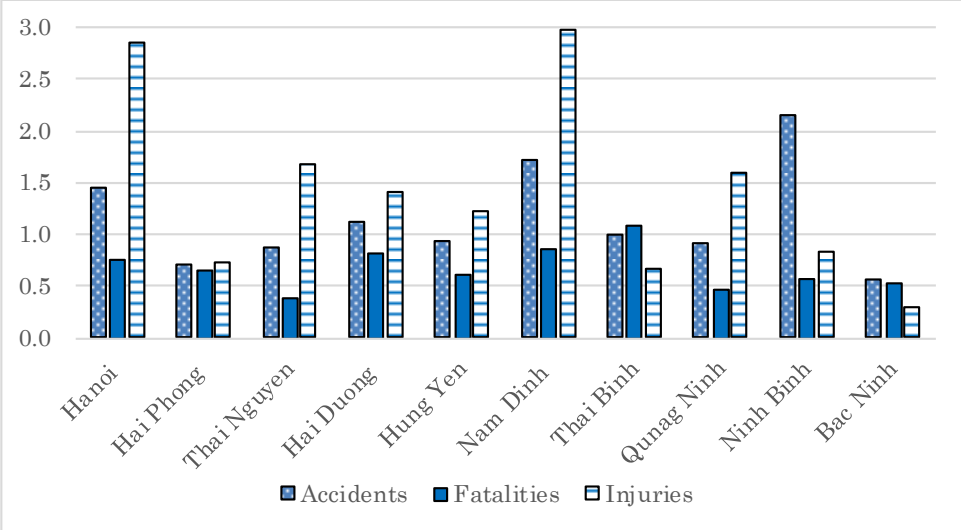


Figure 3 Numbers of Accidents, Fatalities and Injuries Before and After Project (After project in 2016/ Before project in 2010)

Source: documents provided NTSC and each city/province Traffic Safety Committee

Table 8 Changes of the Number of Registered Car

NH	City/Province	Changes of car registers (Times)
③	Hanoi city	9.7
⑤⑩	Hai Phong city	11.0
③	Thai Nguyen	10.1
⑤⑱	Hai Duong	13.5
⑤	Hung Yen province	9.3
⑩	Nam Dinh province	11.6
⑩	Thai Binh province	11.3
⑩⑱	Qunag Ninh province	10.0
⑩	Ninh Binh province	9.5
⑱	Bac Ninh province	11.8

Source: documents provided each city/province Traffic Safety Committee

Note: Data shows a comparison on the number of registered cars between 2008 and 2016

3.3.2 Qualitative Effects (Other Effects)

The qualitative effects were confirmed as follows through the beneficiary survey[17] though such effects were unspecified as of appraisal in this project.

(1) Improvement in traffic safety conditions at target sections

More than 90% of respondents answered that traffic safety conditions at the target national roads had improved. Both road users (mainly drivers) and neighboring local residents responded that the traffic safety facilities installed had helped improve traffic safety condition in the target section (See Figure 4), confirming the project contribution. For more details, opinions are raised as follows; installing the intersection and signals made road crossings safer, installing bus bays stopped people from running out into the road while awaiting buses which increased safety, installing a center median helped drivers drive more safely and not into opposite lanes.

Table 9 Improvement of Traffic Safety

	Largely improved	Improved	No change	Worsen	Much worsen
Road users	46%	54%	0%	0%	0%
Neighboring local residents	40%	52%	8%	0%	0%

Source: beneficiary survey

[17] In the four National Roads targeted under the project (No. 3, 5, 10 and 18), interview surveys with a total of 200 ①100 road users (drivers) and ②100 neighboring local residents (numbers of responses, ①100 male, 39 male and 61 female) were selected on a non-random basis and conducted by local survey assistants (25 persons each from Thai Nguyen in No.3, Hai Duong in No.5, Thai Binh in No.10 and Bac Ninh in No.18 respectively). Road users were selected on a non-random basis at rest areas alongside target national roads and facilities installed, industrial parks and bus bays. Since most of the drivers were male, it was difficult to get the result with the consideration of the gender balance. Neighboring local residents were selected on a non-random basis alongside the target road of each province. In the list of local resident in the cities and provinces where the target roads are located, both areas alongside and not alongside the target roads are mixed, meaning that the beneficiary cannot be correctly selected from the list. Moreover, despite the need for approval from the People's Committee to obtain a list of residents, it was difficult to obtain approval from all People's Committees due to time constraints. Therefore, the respondents were selected on a non-random basis alongside the road where the facilities were installed. Basically, respondents were selected based on responses to preliminary questions (whether they were aware of the situation before and after the project, whether they were involved in the awareness activities, whether they had heard about activities, etc.) for every few other houses. Since the households were alongside the target roads, the answers reflected the opinions of residents throughout the area but mainly limited to those alongside residents.

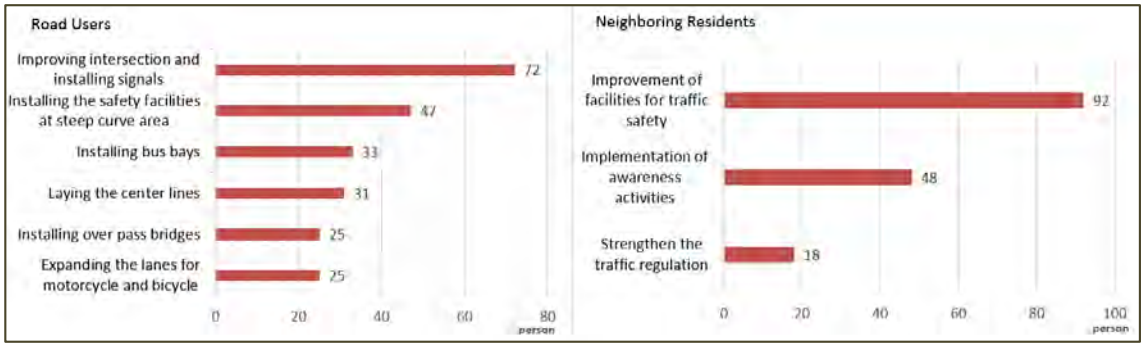


Figure 4 Reasons for Improving Traffic Safety (Multiple Answers)

Source: beneficiary survey

Road Condition Before Installing Overpasses by the Project (left) and After the Project (right)

Note: The photo (left) was provided by executing agency

(2) Reduction in damage caused by traffic accidents

All the road user respondents and 88% of local residents responding answered that the damage caused by road accidents had decreased. The reasons cited by respondents included the fact that they used to see accidents frequently while driving and respondents also experienced being involved in accidents before implementing the project, but that the frequency of such cases declined significantly after the project. While not all the answers are based on their own experiences of reducing damage, they all relied on cases which were actually confirmed by respondents, meaning a decline in damage from accidents at the target national roads was seen as a whole.

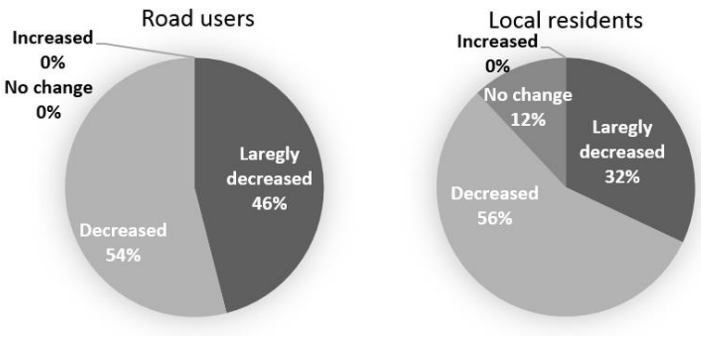


Figure 5 Reductions in Damage Caused by Traffic Accidents

Source: beneficiary survey

(3) Improved understanding of traffic regulations and rules

80% of the respondents among neighboring residents answered that understanding of traffic regulations and rules had increased after the ODA Loan Project, meaning the awareness education held at primary and lower secondary schools nearby as well as traffic safety campaigns among residents living near to the target roads conducted by the project was thought to have helped promote their understanding. According to interviews with beneficiaries, it was explained that awareness activities and so on had even been conducted before the project, while those conducted during this project introduced material including photos and videos which had not been used previously, facilitating understanding of activities compared to those originally. Conversely, the lack of awareness activities and so on involving road users (drivers) meant they did not fully understand the installed signposts and rules and efforts to promote understanding were said to have limited success. Though a single project cannot cover all road users, measures to promote road users' understanding will be required in future.

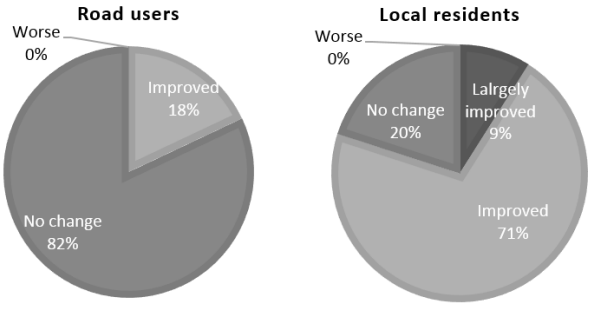


Figure 6 Improvements in Traffic Regulations and Rules

Source: beneficiary survey

(4) Changes in traffic manners

The project conducted awareness activities and a campaign for neighboring local residents. Consequently, approximately 87% of the responding neighboring local residents answered that their traffic manners had improved. Some respondents were unable to distinguish between the activities/campaign conducted under this project and the other implementing entities, which means although not all the improvements can necessarily be attributed to this project, it is still considered to have helped improve traffic manners among neighboring local residents through awareness activities and a campaign of the ODA Loan Project. Meanwhile, 42% and more than half of the road user said no changes in their traffic manner.

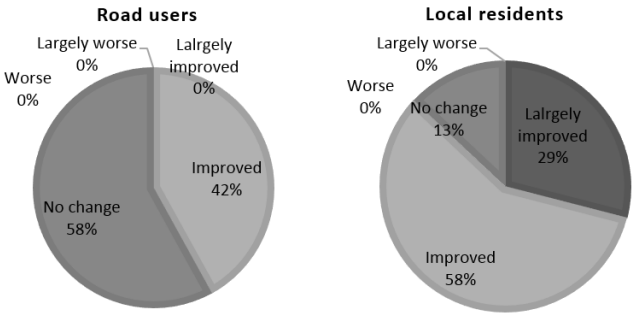


Figure 7 Personal Perceptions of Changes in Traffic Manners

Source: beneficiary survey

3.4 Impacts

3.4.1 Intended Impacts

Intended impacts generated by implementing the ODA Loan Project included "Improvement in the living environment for neighboring local residents to target national roads" and "Improvement in the road-usage environment for road users". The impact generated and confirmed via the beneficiary survey was as follows:

(1) Improvement in the living environment in surrounding target national roads and the usage environment for road users

In the beneficiary survey, 62% of responding local residents answered that the living environment around the road had improved. Major reasons cited included opinions such as "dust around the road has decreased", "the living environment is getting safer", "doing business alongside the road is getting easier" thanks to widened paved shoulders, overlays and road improvements. Moreover, all felt that the road-usage environment had improved after the project. When confirming with road users, it was explained that installing center median, safety measures on steep curved sections and installing lights and so on had significantly improved the usage environment in terms of safety during

driving. In addition, 51% of respondents replied that the maintenance cost for vehicles has declined alongside the improvement in the road-usage environment. They explained the reasons as follows: the cost of fixing worn tires and damaged parts had reduced due to less reckless driving and so on, on steep curved section amid the improvement in the road-usage environment.

Table 10 Improvement of Living Environment in the Surrounding Target National Roads and Usage Environment for Road Users

	Largely improved	Improved	No change	Worsen	Much worsen
Improvement of living environment in the surrounding target national roads	0%	62%	38%	0%	0%
Improvement of usage environment for road users	44%	56%	0%	0%	0%

Source: beneficiary survey

Table 11 Reduction of Maintenance Cost for Vehicles of Road Users

	Largely reduced	Reduced	No change	Increased	Largely increased
Reduction of maintenance cost for vehicles	2%	49%	49%	0%	0%

Source: beneficiary survey

(2) Satisfaction level of local residents living near the target national highway and road users

All respondents answered they were satisfied with the road traffic safety environment after the project. Facilities boosted road traffic safety in a manner directly connected to driving and pedestrian activities. For instance, installed intersections, bus bays, overpasses and so on reduce the risks of pedestrians getting caught up in car accidents, while establishing motorcycle and bicycle lanes helped cars, bicycles and motorcycles drive more safely. Installing center lines and medians prevented cars from driving in the opposite lanes and made safe driving possible in areas where two lanes expanded to four. In addition, dust no longer flies off the paved road, meaning the positive impact from an environment perspective was also confirmed.

Table 12 Level of Satisfaction with the Road Traffic Safety Environment

	Highly satisfied	Satisfied	Neither	Not satisfied	Not satisfied at all
Neighboring local residents	0%	62%	38%	0%	0%
Road users	40%	60%	0%	0%	0%

Source: Beneficiary survey

3.4.2 Other Positive and Negative Impacts

(1) Impacts on the Natural Environment

According to a document related to planning, an environment impact assessment report was prepared for the ODA Loan Project in accordance with *the law on Environment Protection of Vietnam, 2005.* During the construction, air and noise were monitored including the expanded sites added to the original output by the construction company. In addition, following an interview with the executing agency and after confirming the monitoring report and site survey, no complaints regarding noise and so on were confirmed in the course of implementing the project.

(2) Land Acquisition and Resettlement

The ODA Loan Project was conducted in an area of existing public road, meaning no land acquisition and resettlement were planned. However, 23 households were resettled in No.3 of Thai Nguyen province and 2.1 hectares of land was acquired by improving the road from two lanes to four. According to interview surveys with the executing agency, the consultants and neighboring local residents, both resettlement and land acquisition were conducted in line with the rule of local government and no special issues were confirmed.

By installing traffic safety facilities and having traffic safety awareness activities for primary and secondary schools and neighboring local residents and so on, it was confirmed that the numbers of fatalities, traffic accidents and injuries in traffic accidents at the time of the project completion had declined compared to before the project. Moreover, the living environment of neighboring and local residents, traffic safety conditions of road users and the level of satisfaction with traffic safety had improved while damage caused by traffic accidents had decreased. Conversely, information at the time of ex-post evaluation could not be obtained from executing agency since the data related to traffic accidents on target national roads was not collected after the project completion. Accordingly, sufficient proof of facts to judge the effectiveness and impact after project completion till the ex-post evaluation could not be attained. Therefore effectiveness and impact of the ODA Loan Project are fair.

3.4.3 Intended Effectiveness and Impact of the Technical Assistance Project

3.4.3.1 Effectiveness of the Technical Assistance Project

The project purposes of the Technical Assistance Project included “Improvement of the educational contents” and “Improving teacher’s training ability” at the Traffic Police Faculty of the PPA. Targeted indicators and achievement status were as follows:

Indicator 1: Syllabus/Teaching Materials are authorized by PPA.

Indicator 2: Lecture/exercise using project output is commenced.

Indicator 3: Research result including policy proposals is reported to Ministry of Public Securities and others.

Through implementation of the Technical Assistance Project, textbooks for four subjects[18], supplemental materials[19] and syllabus were approved at PPA (Indicator 1). While the previous materials did not reflect the updated traffic conditions, new materials were prepared to reflect the current Vietnamese situations and featured improved and more realistic contents. Furthermore, the lesson style was also significantly changed. Although lectures were mainly used before the project, sufficient time for practical lessons was secured in the new curriculum.

Before the project, teachers used to mainly conduct lecture-type lessons on a unilateral basis based on their own experiences. Teachers prepared lesson scenarios for classes and conducted the lectures and practical lessons using textbooks and supplemental materials prepared during the Technical Assistance Project (Indicator 2). Moreover, lessons were conducted whereby teachers would often pose questions to students and proceed with classes while checking the level of understanding of their students. Pilot lessons with contents that were student oriented to promote their proactive participation were repeatedly conducted. In the process, the teaching ability of teachers was evaluated and feedback, which helped them improve their teaching ability. Even during interview surveys, students of the Traffic Police Faculty and some graduates explained that their understanding of lessons had improved following participation, hence the improvement in the teacher's teaching ability was also confirmed.

At PPA, a research theme related to traffic police activities was designed and a system to conduct research activities was internally organized. It was approved as a research center attached to the PPA by the Ministry of Public Securities and the number of personnel was also increased at the time of Technical Assistance Project's completion. It is expected to strengthen the function to analyze data on national traffic accidents and make effective policy recommendations in future. The center has already issued a White Paper on Traffic Safety while implementing the project, which has been recognized as useful principle information for discussion on policy suggestions (Indicator 3).

[18] "Road Traffic Law and Public Education" "Traffic Guidance and Control" "Traffic Enforcement" "Collecting and Analyzing of Traffic Accident Data"

[19] Exercise books, video clips, PowerPoint materials and so on

In light of the above, the three indicators were achieved and it can be said that the project purposes, namely "Improving educational content" and "Improving teacher's training ability" at the Traffic Police Faculty of the PPA, had been achieved.

3.4.3.2 Intended Impact of the Technical Assistance Project

"Traffic police training in police training institutions is improved" was an expected impact of the Technical Assistance Project. The achievement status of two targeted indicators was as follows:

Indicator 1: University/Colleges begin to utilize teaching materials made by PPA.

Indicator 2: Lecturers of university/Colleges trained in PPA begins to train students.

Teaching materials prepared and approved by the PPA were introduced not only to the PPA but also to the People's Police University in Ho Chi Minh and People's Police Colleges in Hanoi and Quang Nam provinces after the Technical Assistance Project's completion. Subsequently, they were also introduced to training institutions in Ho Chi Minh and Can Tho, whereupon all parties utilized the new materials at the time of ex-post evaluation (Indicator 1). It was confirmed that the Technical Assistance Project had helped enrich the educational content of education institutions for training traffic police in the field, including the People's Police University and training institutions as well as PPA, which mainly trains official police using such educational materials. In addition, according to the PPA, education and training sessions for teachers in training institutions were regularly conducted at the PPA or PPA teachers were dispatched to institutions even after project completion. Accordingly, graduates from each institution are expected to be assigned as active traffic police and will help strengthen traffic safety enforcement in the field in future.

Thanks to the implementation of the Technical Assistance Project, the educational content and teaching method at the PPA have improved, and trained persons with newly developed education materials at the PPA are actively deployed at the People's Police University and training institution; confirming that the project purpose and overall goals have been achieved. Accordingly, the effectiveness and impact of the Technical Assistance Project are high.

In light of the above, the decrease in fatalities from traffic accidents and number of traffic accidents, the reduced damage and the improved living environment for neighboring local residents and the road use environment by the time of ODA Loan Project completion, were confirmed when assessing the effectiveness and impact. Conversely, sufficient

information to prove the effect of the ODA Loan Project as of the ex-post evaluation could not be obtained. Meanwhile, a Technical Assistance Project was conducted to improve the educational content and the teacher's teaching ability at PPA and effectiveness and impact for the project alone can be considered high. However, it is too early to confirm the conceivable impact[20] of the Technical Assistance Project on synergistic effects with the ODA Loan Project. As mentioned above, with the implementation of the two projects, the ODA Loan Project and the Technical Assistance Project, since a certain level of effects were confirmed, the effectiveness and impact of the integrated evaluation of the Projects are fair.

3.5 Sustainability (Rating:② (ODA Loan Project:②/ Technical Assistance Project:②))

3.5.1 Sustainability of the ODA Loan Project

3.5.1.1 Institutional Aspects of Operation and Maintenance

The Operation and Maintenance (O&M) system of the facilities and equipment installed in this ODA Loan Project remained unchanged since the time of appraisal and is shown in the table below. However, Thai Binh, Bac Ninh, Hai Duong, Quan Ninh and Nam Dinh provinces, which mainly oversee signal maintenance, explained that the handover certificate of facilities had not yet been officially issued to the provinces. Therefore, since the facilities were not recognized as the property of provinces, this led to issues such as inability to secure maintenance budget, despite no facilities being unused due to malfunction at the time of ex-post evaluation. The Vietnam Road Administration (VRA), overseeing maintenance for other facilities, including expanded roads, manages O&M while outsourcing daily maintenance to private companies. The roles of the responsible institution in conducting awareness activities, enforcing traffic safety guidance, traffic safety education and so on are also clear as shown in Table 13. Though responses on the situation for assigning appropriate staff for kinds of activities as well as O&M had not been collected from all provinces, the responding provinces (six out of 10) reported no issues.

[20] For example, the impact was assumed to be activities that contribute to road traffic safety such as future graduates being engaged in traffic enforcement activities in each area.

Table 13 O&M System of Facilities and Equipment

Facilities, Equipment, Activities	Responsible institutions for O&M
Signals	Province/City ; traffic polices
Other facilities, road	VRA
Equipment/Material for school education	Province/City; Department of education and training
Equipment/Material for education and awareness in communities	Province/City; Traffic Safety Committees
Equipment for enforcement	Province/City ; traffic polices
Traffic safety education activities at schools	Province/City; Department of education and training
Traffic safety education activities in communities	Province/City; Traffic Safety Committees
Enforcement activities	Province/City ; traffic polices

Source: document provided by JICA and interview to executing agency

3.5.1.2 Technical Aspects of Operation and Maintenance

VRA, overseeing the O&M of facilities except signals and roads, is a subsidiary of the Ministry of Transport and has sufficient experience of O&M of road infrastructure, meaning there are no special issues in terms of technical capacity. The Province and City Traffic Police, which have jurisdiction over signals, also have no concerns[21] on a technical level for appropriate O&M. When actually negotiating target national roads, it was confirmed that facilities such as signals, lights, overpasses, bus bays and so on were properly utilized. As for materials provided to conduct awareness activities, since posters and banners are short-lived and considered consumables, only audio education material and campaign cars need O&M. After confirming the current conditions via executing agencies and a site survey, it was confirmed that they were properly operated and maintained and fully utilized. Accordingly, there are no concerns in terms of the technical aspect of O&M.

3.5.1.3 Financial Aspects of Operation and Maintenance

The budget will be allocated by the organizations overseeing O&M as listed above.

The Department of Road Management in VRA, overseeing O&M of major facilities such as expanded road and center median, etc., are allocated a budget through the Ministry of Transport. According to VRA staff, the minimum necessary O&M can be conducted with this budget, although the allocation of an appropriate O&M budget was not guaranteed (See Table 14 for the amount). Considering that each road was largely in good condition when negotiating the target national highway during the site surveys,

[21] interview surveys to executing agencies and Provincial traffic polices

no serious concerns were raised regarding the financial aspect of O&M.

Table 14 O&M cost of VRA by each National Highway

(Unit: million VND)

National Road No.	2013	2014	2015	2016
3	16,224	6,146	8,104	7,399
5	8,205	7,473	8,533	0
10	7,930	15,925	16,585	12,510
18	3,916	1,650	616	401

Source: document provided by VRA

Note: Regarding why no O&M budget was allocated to No.5 in 2016, no clear reasons were obtained when confirming with the VRA, but they explained that the amount allocated was decided based on the proposed amount.

Since responsibility for City and Provincial traffic polices overseeing O&M of signal facilities remains unclear, as written in "3.5.1.1 Institutional Aspects of Operation and Maintenance", most traffic police face an inability to secure the O&M budget. Accordingly, it can be said that concerns are raised over the financial aspects for sustainability. Despite the lack of any reported problems caused by damage or a lack of maintenance through responses to the questionnaires from executing agencies and each province and site surveys, the first priority is to clarify the responsible O&M organization by issuing a handover certificate to secure the future O&M budget.

3.5.1.4 Current Status of Operation and Maintenance

【Facilities, Equipment, Material】

When the maintenance conditions of facilities and equipment supported in this ODA Loan Project were confirmed during the site survey, the installed signals, motorcycle and bicycle lanes, center median and safety measures for steep curve sections and bus bays, etc. were deemed to be fully utilized, despite the low usage rate of some pedestrian overpasses (pedestrians were crossing the road without using them). Among the material procured in the ODA Loan Project, posters and so on were discarded after being used a couple of times for awareness and education activities and severely dilapidated, but equipment for traffic safety campaigns, including campaign cars, patrol cars, patrol motorcycles and pick-up cars, was fully utilized even at the time of ex-post evaluation, hence there is no concern over the current O&M status.

【Education・Awareness・Traffic enforcement activities】

According to interview surveys with a provincial Traffic Safety Committee and the primary schools visited, it was confirmed that awareness activities, strengthened traffic enforcement and a traffic safety education campaign had been incorporated in school

education and that traffic safety campaigns and contests had also been regularly conducted. In Hai Duong province for example, traffic safety seminars were conducted for 348 primary and secondary schools in 2013; traffic safety training for 600 commune leaders and safety guardsman in 2014; and sessions for 265 communes and wards as well as for staff engaged in traffic safety were sponsored by the provincial Traffic Safety Committee in 2015. The contribution of those activities is significant since education material and campaign cars supported by the Technical Assistance Project have been effectively utilized for continuing the activities.

Conversely, it was often reported in the interview survey during the site visits that the road users (drivers) did not properly understand signposts, hence there is high need to conduct and continue awareness activities as required on signposts for road users and traffic safety for pedestrians.

In light of the above, the facilities and equipment installed in the ODA Loan Project were deemed fully utilized and awareness activities and campaign for traffic rule enforcement have continued in each area. It was confirmed that there was no particular concern over the technical capacity required for O&M. However, in some provinces (six out of nine confirmed in the current status), since the handover certificates were not officially informed, no budget for O&M was secured due to the lack of clarity over responsibilities for O&M facilities. As such, some problems were observed in terms of sustainability from institutional and financial perspectives. Accordingly, sustainability of the ODA Loan Project effects is fair.

3.5.2 Sustainability of the Technical Assistance Project

3.5.2.1 Institutional Aspects of Operation and Maintenance

Usually, there is no turnover in the PPA, thus the numbers of teachers and staff assigned are appropriate and a system to provide the required education has been developed. The number of staff at the Traffic Safety Research Center was also increased from seven to 13 following approval by the Ministry of Public Security in 2013. At the time of ex-post evaluation, a total of 25 personnel had been secured. Accordingly, the required number of teachers and staff were assigned to provide education as needed and no sustainability issues were confirmed in terms of the organizational institutional aspect.

3.5.2.2 Technical Aspect of Operation and Maintenance

Since there are almost no cases of turnover except retirement in PPA, the teaching capacity of teachers has been sustained. Even after the Technical Assistance Project

was completed, when the traffic safety rules were changed and new rules introduced, the educational content was updated by modifying the corresponding parts, eliminating concerns over the technical capacity. Conversely, efforts by the Traffic Safety Research Center to improve the capacity of junior staff through timely training have proved a challenge, given the numerous junior level staff as talent recruited for research activities in the traffic safety field, including Ph.D., master's degree and bachelor's degree holders.

3.5.2.3 Financial Aspect of Operation and Maintenance

Since all PPA training programs are conducted based on the approval of the Traffic Police, the necessary budget for O&M is allocated by the Ministry of Public Securities. According to PPA staff, the budget to conduct the approved training programs was allocated every year without issues, though no information on the budget amount was provided by the Ministry of Public Securities. The fact the planned training programs were actually conducted each year, it was confirmed that there were no issues as regards providing the appropriate education from a financial perspective. Meanwhile, the staff of the Traffic Safety Research Center raised the issue of limitations on research activities due to budget shortages. The budget allocated for research activities was 200 million VND in 2014, 300 million VND in 2015 and 700 million VND in 2016, but they only covered issuing a booklet for traffic safety and approximately 1,500 million VND would be needed to conduct analysis and research for contributing to traffic safety which is expected as the Center's role.

3.5.2.4 Current Status of Operation and Maintenance

In PPA, sustainability to provide improved education can be expected as educational contents being enhanced based on actual traffic rules, even after the Technical Assistance Project was completed. In addition, curriculums and materials for the Technical Assistance Project which have supported preparation for major subjects have been provided to other educational institutions for traffic police by the time of ex-post evaluation and actually utilized. Accordingly, they are not only fully utilized but also disseminated to other institutions, meaning that sustainability is secured and also expected in future. However, the project was completed in December 2013 and the number of graduates is still limited to a certain number even at the time of ex-post evaluation. Accordingly, it can be said that a few years of time will be needed to widely confirm the actual result where the graduates actually play their roles in the traffic field.

Education contents, curriculums and materials, etc. improved by the Technical Assistance Project were revised as needed by PPA and continuously utilized and then also spread to other educational institutions for traffic police. No technical concerns were confirmed and its sustainability is fully expected. However, the Traffic Safety Research Center lacked financial resources and concerns over financial aspects were confirmed given limitations on some research activities. Thus sustainability of the Technical Assistance Project effects is fair.

In light of the above, the integrated evaluation for sustainability of the project effects generated from ODA Loan Project and Technical Assistance Project is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The ODA Loan Project was conducted to reduce the number of traffic accidents and fatalities caused by the same as well as reducing damage caused by accidents by installing road safety facilities, awareness activities for neighboring local residents and road users in northern Vietnam, enforcement activities of traffic regulations and strengthening traffic safety education, thereby contributing to the living environment of the surrounding area and the road -usage environment. The Technical Assistance Project was also launched to support the PPA, a training academy for traffic police to regulate traffic safety. The purpose of the Projects was deemed highly relevant to the development policy of Vietnam and sector strategy, which cited traffic accidents as social issues and addressed national solutions and development needs to improve awareness activities and ethics and morals of traffic regulations for neighboring local residents and road users and the Japanese assistance policy. Both the project cost and project period of the ODA Loan Project were within the plan, therefore efficiency of the project is high. After the ODA Loan Project was completed, the number of traffic accidents, traffic accident fatalities and injuries decreased on target national highways. It was also confirmed that equivalent figures decreased in provinces and cities where the target roads were located, despite the increased number of cars registered at the time of ex-post evaluation. Moreover, the ODA Loan Project helped reduce damage incurred by road users and maintenance costs by improving the road condition, and the level of satisfaction at the road environment is high. Furthermore, it was also confirmed that the educational content and teaching methods had improved and trained people played an active role in the police education institution after the Technical Assistance Project was completed. However, the data for the target national highways to analyze the effectiveness at the time of ex-post evaluation only allowed an indirect effect to be confirmed. Accordingly, the effectiveness

and impact of the project are fair. The equipment installed in the project is maintained and kept in good condition and awareness and traffic enforcement activities also continued in each area. Despite no issues from the technical aspect of O&M, minor issues were confirmed in institutional and managing systems as well as from the financial aspect of O&M. As for the Technical Assistance Project, despite no concerns over the sustainability of education activities, the challenge for the financial aspect on research activities was confirmed. Accordingly, the project sustainability in an integrated manner 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

- At Provincial Traffic Safety Committees, the budget for damages could not be proposed beforehand due to the lack of official handover processes for facilities and equipment installed under the ODA Loan Project, despite acknowledging the need for maintenance. The executing agency is required to conduct the official handover in writing and set up a system for Provincial government to secure the O&M budget required promptly.

- There are many cases seen where road users not understanding road signs correctly and pedestrians crossing national roads without using overpasses even after the ODA Loan Project was completed. Traffic Safety Committees and Traffic Polices of provinces/cities must impose measures on road users and neighboring local residents to enhance their understanding of road traffic rules and so on. On such occasions, as well as continuing their awareness activities, for example, it is also considered effective to devise means of displaying posters to explain such road signs in prominent places for drivers such as rest areas and distribute leaflets to explain when issuing and renewing driver's licenses.

4.2.2 Recommendations to JICA

None

4.3 Lessons Learned

- <u>Clarification of the O&M structure and prior consensus on procedure among concerned institutions</u>

Provincial Traffic Safety Committees explained that facilities and equipment have not been officially handed over to them after the ODA Loan Project completed. Under such circumstances, Provinces understand the needs of O&M, however, the budget

when damages and so on occur have not been secured at the time of ex-post evaluation. The reason is explained as the inability to share the necessary procedures among related institutions while the plan was to move responsibility of O&M for the procured facilities and equipment from the executing agency to traffic safety committees and traffic polices of the target 10 provinces/cities. In case the executing agency differs from the maintenance institutions or there are many institutions involved, the executing agency and maintenance institutions clarify their responsibilities and roles after project completion and must obtain consensus for the required procedure at the planning stage.

・Setting indicators in the perspective of the executing agency's monitoring

When evaluating this Project, it was confirmed that the specified operating and effect indicators could not be obtained from the existing data collected by the executing agency. Preparing the monitoring system as of planning is critical for the executing agency to implement the project for managing progress and capturing its effect. Accordingly, it is preferable for the executing agency to confirm whether a monitoring system utilizing the data they usually collect has been prepared at the time of the project planning, or set the indicators that are possible to be monitored and prepare a system for it.

Comparison of the Original and Actual Scope of the ODA Loan Project

Item	Plan		Actual	
1. Project Outputs	Items	No.	Items	No.
Construction of traffic safety Facilities	Intersection	20	Intersection (number)	64
	Signal	16	Signals	Included above
	Railway at grade crossing	2	Railway at grade crossing	
	Safety measure for minor intersection	36	Lightening system (km)	7
			Warning signs	42
	Push button signal system	10	Push button signal system	3
	Overpass bridge construction	-	Overpass bridge construction	13
	Widening for motorcycle & bicycle	2	Widening for motorcycle & bicycle	6
	Center median installation	8	Center median installation	32
	Safety measures on curve section	24	Safety measures on curve	2
			Bus bay installation	98
	Installation section (km)	11.3	Widening for paved shoulder (km)	6
	Bus bay installation	16		
	Widening for paved shoulder (km)	63	Overlay	359
Procured Equipment and training for traffic safety and awareness raising	a) Materials for campaign activities at installed traffic safety facilities: Banners, Posters, Media use b) Material for education and campaign activities in the section of installed traffic safety facilities: Banners, Posters, Media use c) Training material for teacher, for guard man in going and leaving to/from school and education material at schools and communes d) Leader training: 1,170 teacher for primary and lower secondary education, 1,034 parents and community residents (local residents)		a) Banners, Posters, preparation and distribution of leaflet, campaign cars, uniform, etc. b) Teaching kit, PCs, printers, video recorders, projectors, cameras, tape recorders, signpost models, helmets, etc. c) DVD, installing the traffic safety corner at schools, Sets of road signs, PC, projectors, camera, etc. d) Trainings and workshops for traffic safety education: 927 leaders at primary and lower secondary schools and 105,518 teachers and students and local residents participated	
Procured Equipment and training for strengthen traffic safety enforcement and traffic safety campaigns	a) Equipment for traffic safety enforcement used at installed traffic safety facilities :18 patrol cars, 35 patrol motorcycles, 17 wrecker trucks, 11 vehicle scales, 35 speed guns, 34 alcohol sensors, 34 video recorders, 34 digital cameras, 68 warning lights, 340 guideposts, 340 sticks, 340 whistles, 68 two way radios, 28 computers b)Leader trainings: 900 local guardsman in each area, Traffic polices (No detail information) c) Traffic safety campaigns :Banners, TV, Newspapers, etc.		a)13 patrol cars, 48 patrol motorcycles, 13 wrecker trucks, 13 speed guns, alcohol sensors (N/A for numbers), 32 digital cameras, guideposts/sticks/ whistles (N/A for numbers), 65 computers, 13 vehicle speed measuring machines, 31video recorders, 30 printers, etc. b)Leader trainings: 380 traffic safety polices c) As planned	
Consulting service	a) Project management support b)Detailed design, tendering assistance, implementation supervision c) Formulation of training plans for Project Management Unit, support of implementing training sessions		As planned	

2. Project Period	January 2008 – June 2013 (66 months)	November 2009 – June 2014 (56 months)
3. Project Cost		
Amount Paid in Foreign Currency	2,860 million yen	N/A
Amount Paid in Local Currency	4,913 million yen (674,863 million VND)	N/A N/A
Total	7,773 million yen	7,215 million yen
ODA Loan Portion	6,557 million yen	6,059 million yen
Exchange Rate	1VND = 0.00728 yen (November 2006)	1VND = 0.00442 yen (Average between November 2009 and June 2014)
4. Final Disbursement	July 2014	