(On-site evaluation: April 2006)

Ex-Post Monitoring for Completed ODA Loan Projects

Evaluator: Miyoko Taniguchi

Project Name: Republic of the Philippines: "Metro Manila Interchange Construction Projects (I) (II) (III)"
(L/A No. PH-P102, PH-P116, PH-P165)

Loan Outline

Loan Amount/Disbursed Amount:	Total: 6,839 million yen/5,603 million yen Phase 1: 2,304 million yen/2,276 million yen Phase 2: 1,663 million yen/1,512 million yen Phase 3: 2,872 million yen/1,815 million yen
Loan Agreement:	Phase 1 – February 1990, Phase 2 – July 1991, Phase 3 – August 1995
Loan Completion:	Phase 1 – May 1998, Phase 2 – October 1998, Phase 3 – June 2000
Ex-Post Evaluation:	FY 2001
Executing Agency:	Department of Public Works and Highways (DPWH), Republic of the Philippines

Project Objective

By converting intersections of circumferential roads and major radial roads into interchanges in the capital Manila, this project aims to attempt to handle increasing traffic volume and relieve congestion, and thereby contribute to improvements in the functioning of road traffic in the metropolitan Manila.

Consultants: Katahira & Engineers Inc., Pacific Consultants International (Japan)
Contractors: J.H. Pahara Con (Philippines) and others

Item	At time of Ex-post Evaluation	At time of Ex-post Monitoring

Effectiveness & Impact		Compared to the time of ex-post evaluation, traffic volume in the area of the Pasay-Ayala interchange is increasing. However, travel time is shorter and average travel speed has increased, so the project is contributing to relieve congestion. At other interchanges (Nagtahan-Magsaysay, Shaw-Boni) traffic volume decreased, travel time decreased, and average travel speed increased. One can say that effectiveness has been secured to a certain extent.
Effectiveness	**Phase 1, Phase 3** (1) Traffic volume trend (a) EDSA (Circumferential Road 4) – Pasay, Ayala two level interchanges As shown in Table 1 below, total volume of traffic inflow (annual average daily traffic volume (vehicles/day)) exceeded forecasts at both locations. It can be said that the project is effectively handling increasing traffic volume. Table 1: EDSA–Pasay, EDSA–Ayala Interchanges Volume of Total Traffic Inflow (Vehicles)	**Phase 1, Phase 3** (1) Traffic volume trend Since the time of the ex-post evaluation, traffic management work has been transferred from DPWH to the Metropolitan Manila Development Authority (MMDA), and MMDA also holds the traffic volume data. However, part of the data was lost when authority was transferred, so this survey was unable to obtain data on 2001-2003 traffic volume from MMDA. (a) EDSA (Circumferential Road 4) – Pasay – Ayala two level interchanges The traffic management system was changed in 2001 and unified into one traffic cycle system. Table 1 below shows total volume of traffic inflow at both interchanges (annual average daily traffic volume (vehicles/day)). Although traffic volume in 2004 exceeded volume in 2000, traffic congestion is relieved as shown below, so the project can be said to have also effectively handled increased traffic volume since 2000.

Location	2000	
EDSA–Pasay Interchange	Forecast	106,000
	Actual	135,322
EDSA–Ayala Interchange	Forecast	88,000
	Actual	130,039

Source: Forecasts from JBIC appraisal documents, actual values from DPWH data

(b) Nagtahan (Circumferential Road 2) – Magsaysay Three level interchange

Figure 1 below shows traffic volume from before project implementation until the time of ex-post evaluation (most recent data is from 1999). Traffic volume before project implementation is far exceeded post-implementation. Also, the number of registered vehicles approximately doubled through the 1990s in metropolitan Manila. The project is effectively handling dramatic growth in traffic volume at these crossing points.

Figure 1: Nagtahan – Magsaysay Interchange
Volume of Total Traffic Inflow (Vehicles/Day)

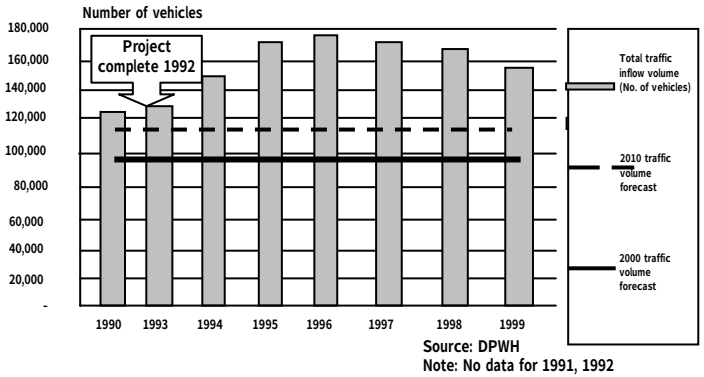
Table 1: EDSA–Pasay, EDSA–Ayala Interchanges
Total Volume of Traffic Inflow (Vehicles)

Location	Year	Total Volume of Traffic Inflow
EDSA–Pasay–Ayala Interchanges	2000	265,361 (See the left table)
	2004	321,273

Source: 2000 actual values from DPWH, 2004 actual values from MMDA data

(b) Nagtahan (Circumferential Road 2) – Magsaysay Three level interchange

The traffic volume of 57,126 vehicles (according to MMDA data) at this location in 2005 (most recent data), was far below the approximately 150,000 or more vehicles shown in Figure 1 (page 4, left column) at the time of ex-post evaluation. According to interviews at the MMDA Planning Office, the main reason for reduced traffic volume was vehicle users changing their means of transport to Light Rail Transit (LRT), which began service in that area. LRT line 2 (which began service in 2003) runs along the Magsaysay interchange, and two facilities are located a few meters from the train stations. LRT line 2 had about 30,000 average daily users in 2004. According to interviews at the National Center for Transportation Studies of the University of the Philippines, other reasons for decreased traffic volume at that interchange included: i) introduction of traffic management schemes (one way traffic, etc., ii) development of nearby cities outside metropolitan Manila, iii) development of other major

	 Source: DPWH Note: No data for 1991, 1992 (2) Relief of congestion • Travel time: According to interviews with road users, an 80% majority of people replied that travel time had decreased. • Waiting time: There was dramatic improvement at both interchanges, with the National Research Council's indicative criteria rising from "F" (60 or more seconds/vehicle) to "B" (5.1 to 15 seconds/vehicle).	circumferential roads such as Road C-3 (some vehicles use Valenzuela Street, which was widened). (2) Relief of congestion • Travel time: A survey was done in which users of the Ayala–Pasay interchange road were interviewed (380 people) at the time of this field survey. 68% of people responded that travel time had decreased, and 18% that there had been no change. On the other hand, in an interview survey of users of the Nagtahan–Magsaysay interchange road (120 people), all respondents indicated that travel time had decreased. However, this is not only due to the project, but is also caused by an overall decrease in traffic volume. • Average travel speed: Data on waiting times which was obtained at the time of ex-post evaluation was not obtainable this time, so a travel time survey was performed for this survey. Comparing travel speed on the flyover of the Ayala-Pasay interchange before project implementation with current levels, speed increased at peak times from 10 km/hour (from feasibility study data) to 15 km/hour.

	Phase 2 (1) Traffic volume trend (a) EDSA (Circumferential Road 4)–Shaw Boulevard, and Boni Avenue interchanges **Traffic volume trend from 1994 to 1999** • EDSA–Shaw interchange (flyover): Traffic volume is decreasing on EDSA, and increasing on Shaw. Still, total volume of traffic inflow is 354,405 vehicles/day. (Confirmed 1999 data)	Average peak-time travel speed at the Nagtahan–Magsaysay interchange was also compared with that before project implementation. This had also increased from 10 km/hour (from feasibility study data) to 30 km/hour. Major congestion was not observed outside of peak times at these locations. Thus it can be said that these interchanges are contributing to relief of congestion. In this way, the project handled increased traffic volume in metropolitan Manila. It was positioned as one of the projects in an integrated traffic plan with the goal of relieving traffic congestion. It is thought to have contributed to achieving that goal. **Phase 2** (1) Traffic volume trend (a) EDSA (Circumferential Road 4)–Shaw Boulevard, and Boni Avenue interchanges • EDSA–Shaw interchange (flyover) (completed in 1998): Overall traffic volume was 354,405 vehicles/day shortly after the interchange was completed in 1999. Volume decreased to 156,014 in 2005. This is much lower than the forecast 433,318 vehicles/day (setting the 2005 forecast value midway between the forecasts for 2000 and 2010) (see table 2). This is mainly because the volume of traffic entering EDSA decreased. According to interviews at the MMDA Planning Office and at the National Center for Transportation Studies of the University of the Philippines, traffic volume decreased because MRT (Metro Rail Transit) line 3 opened along EDSA in 1999, and many vehicle users switched their means of transport. There was an average of about 380,000 daily users in 2005. Also,

		other causes mentioned were the development of Circumferential Road 5 (C-5) which parallels EDSA, and increased options for routes for people moving from northern metropolitan Manila to its southern area, such as the opening of Kalayaan Avenue from C-5 towards Makati City. Furthermore, in addition to the project, traffic management also brought changes in traffic flow which can be said to have contributed to distribution of traffic, similar to in Phase 3. Table 2: EDSA–Shaw Blvd. Total Volume of Traffic Inflow Location / 2005 / Forecast / 433,318 vehicles EDSA-Shaw Blvd. / Actual / 156,014 vehicles Sources: Forecast from JBIC appraisal documents, actual from MMDA data
	• <u>EDSA–Boni Avenue crossing</u>: Traffic volume is decreasing on EDSA, and increasing on Boni Avenue by the amount passing through the Boni Avenue underpass, which was opened to traffic. Still, total volume of traffic inflow is 405,730 vehicles/day. (Confirmed 1997 data) It can be said that, "By completing the project, changes arose in traffic flow, and the volume of traffic to EDSA decreased, improving the situation."	• <u>EDSA–Boni Avenue crossing</u>: Traffic volume at the Boni interchange underpass site decreased to a count of 22,168 vehicles/day at the time of this survey, compared to 91,790 vehicles/day in 1998. The survey technique applied was a traditional traffic volume survey method (manual count method). Another reason may be that Boni interchange parallels Shaw interchange, so that traffic volume decreased for the same reason that it decreased near Shaw interchange, as noted above.
	(2) Relief of congestion (According to the "Impact Study on Transport Projects in Metro Manila") The average delay time at the EDSA-Shaw crossing (seconds/vehicle) would have been 2.0 if there had been no project. It became 0.3 with the	(2) Relief of congestion • <u>Travel time</u>: In the interview survey performed with road users who utilize the Shaw interchange, an overall majority of 67% replied that travel time had decreased, and 25% said that there had been no change. On the other

	project in place, so it can be said that traffic flow improved.	hand, in an interview survey of road users utilizing the Boni interchange, 81% of respondents replied that travel time had decreased. However, this is not only due to the project, but can be said to have been also caused by a decrease in overall traffic volume, as described above. • Average travel speed: According to the travel speed survey which was carried out, average travel speed at peak times near Shaw interchange increased to 25km/hour, rising from 10km/hour before project implementation (according to feasibility study data). On the other hand, at the Boni interchange site, the average travel speed from Mandaluyong towards Shaw Boulevard increased to 20km/hour, rising from 10km/hour before project implementation. Boni interchange is part of the circumferential road which is 1km away from the Shaw interchange (flyover), so it can be said that the function of both interchanges is connected to the relief of congestion.

Impact	(Overall impact of phases 1, 2, and 3) (1) Improvement of the functioning of city road traffic • In an interview survey (of 98 people), **about 50%** replied that traffic flow, the "congestion situation," etc., had improved. • **About 60%** replied that the overall traffic situation had improved (i.e. replied there was an orderly traffic flow when asked "whether traffic flow was becoming rectified"). • About half of all responses can be thought to relate some positive impact of the project for improvement of the traffic situation. (2) Environmental impact • According to a simulation in another survey, the "Impact Study on Transport Projects in Metro Manila," the project resulted in smoother vehicle flow, reducing the discharge rate of gas fumes (which vary with speed). This reduced the volume of exhaust fumes emitted, which would suppress the future advance of air pollution. This was in comparison to if the project had not been implemented.	(1) Improvement of the functioning of city road traffic • According to an interview survey of road users (of 380 people), 77.8% responded that there was improved traffic flow which had, for example, an "effect on travel time." • **97.1%** of all responses related to a beneficial effect of the project for improvement of the traffic situation. Those reasons (multiple responses) were: i) The project was connected to improvement of service of the traffic system (70.5%), ii) Contributed to economic development of the region (35.5%), iii) Lessened negative impacts on the environment (17.4%). • 89.2% of all responses were related to beneficial effects of the project on traffic routes or behavior. Of these, 10.3% responded that through this project, access to transport had improved, and they had changed residence due to increased employment opportunities. This trend was especially seen near Boni interchange. (2) Environmental impact • According to the Department of Environment and Natural Resources' quarterly air monitoring surveys (carried out at seven locations in metropolitan Manila since the second half of the 1980s), the air pollution situation is improving. This results from congestion relief by interchanges, a reduced volume of gasoline pollutant emissions, higher vehicle fuel efficiency, and so on. • This survey used software developed by MMUTIS (Metro Manila Urban Transportation Integration Study), to perform an environmental simulation. The results of the study showed that the project resulted in smoother vehicle

		flow, reducing the discharge rate of exhaust fumes (which vary with speed). This reduced the volume of exhaust fumes produced, and is therefore connected to limiting air pollution. As noted above, the interview survey of road users also had responses that air pollution impact was reduced.
	(3) Technology transfer • Advanced construction technology was applied, so it can be said that there was a technology transfer effect for staff of the Philippine company in charge of construction work.	(3) Technology transfer After this project was implemented, the Department of Public Works and Highways used technology acquired in this project when interchange projects were implemented at EDSA–Quezon (flyover, underpass), C-5–Boni–Serrano (flyover, underpass), and C-5–Ortigas (flyover). Thus it is thought that there was a transfer effect.
Sustainability		Compared to the time of ex-post evaluation, no serious worsening of the maintenance situation has appeared, and the project continues to prove sustainable. On the other hand, budget allocations for maintenance of facilities are shrinking, so it could be said that sustaining the maintenance situation into the future is a remaining issue.
	(1) Technical capacity The National Capital Region (NCR) District Office participates in actual maintenance work. Also, the Regional Offices have secured several engineers and contract workers, so serious staff shortages were not especially evident. In addition, privatization of maintenance work is increasing.	(1) Technical capacity Under Executive Order 366 of October 2004, a rationalization plan associated with the promotion of privatization is in progress in all Philippine government departments. DPWH is also subject to this plan. Regarding the bureau which performs maintenance itself, five to six engineer staff and contract laborers have been secured at each Regional Office until now, so serious staff shortages are not evident (however, drastic staff reductions are

		planned through the rationalization plan which is to be implemented in 2006). The number of contract laborers participating in maintenance will decrease, but engineer staff numbers will increase. This is to strengthen the ability to supervise and inspect work contracted to private companies, and raise the quality of maintenance by decreasing the number of retained contract laborers (through privatization of maintenance), and increasing the number of staff engineers. Privatization will be promoted even more through this rationalization. The Administrative & Manpower Management Service provides periodic training for field engineers on maintenance (specifying maintenance needs, formulating plans, etc.).
	(2) Structural organization The Bureau of Maintenance (BOM) handles planning and budget related work. NCR participates in actual maintenance related work. NCR has seven Regional Offices. • Phases 1 & 3: North Metro Manila District Engineering Office (NMED) is in charge of the Nagtahan–Magsaysay crossing. The Second Metro Manila District Engineering Office (SMED) is in charge of EDSA–Pasay–Ayala. • Phase 2: First Metro Manila District Engineering Office is in charge of both the EDSA–Shaw, and the Boni Avenue crossings.	(2) Structural organization • The following organizations currently participate in maintenance work on interchanges: i) DPWH (Bureau of Maintenance, DPWH/NCR District Offices, DPWH Regional Offices), ii) MMDA (Traffic Operations Center, Traffic Engineering Center, Planning Office), iii) Road Board. • The DPWH Bureau of Maintenance rates the road situation once every six months (previously once every quarter), and sets the maintenance budget allocation for each District Office. District Offices and Regional Offices of DPWH had carried out all maintenance of road interchanges, but most maintenance and traffic management of roads (mainly national roads) in metropolitan Manila was transferred to MMDA in 2002. From that time onwards DPWH work was limited to preventative maintenance, such as small-scale repairs of road surfaces. MMDA carries out other periodic

	(3) Financial status • The following table shows the regular maintenance portion of maintenance expenses from 1996 to 2000 (time of the ex-post evaluation). Table 2: Actual Maintenance Expenses of NCR (Unit: Million pesos) • Regarding maintenance expenses, fiscal year budgets are generally being allocated as initially planned, and large delays are not seen in implementing the budgets.	maintenance work on light signals, drainage, road surface indicators, cleaning, etc. Large scale maintenance and repair is often carried out through special projects, etc. • Through the rationalization plan mentioned above, the plan was to eliminate the Bureau of Maintenance of DPWH, but part had already been transferred to Integrative Planning Service, and the 158 regular staff were to be reduced to 89 people this year (2006). The plan is to reduce by half the number of maintenance group staff in each District Office. (3) Financial status • In 2000, Republic Act Number 8794 introduced a Motor Vehicle User's Charge[1] as a source of special funds for maintenance. This tax is collected every year by the Land Transportation Office, then approved by the Road Board, and disbursed via the government's Department of Budget and Management to the DPWH for operation and maintenance expenses for national roads[2]. Initially, the maintenance budget was to be composed of this tax collection added to the General Fund. But, actually, the budget allocation was cut from the General Fund, and only funds collected by this tax are allocated for maintenance. Thus it cannot be said that the budget for maintenance expenses is sufficient. • Of the 2005 DPWH overall maintenance budget (about 5.6 billion pesos), 40% was for regular maintenance such as simple road surface repairs, and 60% was allocated to periodic maintenance, such as large budget rehabilitations.

Year	1995	1996	1997	1998	1999	2000
Maintenance expense	157.8	162.7	171.7	149.8	164.7	179.9

[1] Motor Vehicles Users Charge: In the 2005 budget, 83% was allocated to the Special Road Support Fund (for national roads), 5% to the Special Local Road Fund, 8% to the Special Vehicle Pollution Control Fund (to reduce air pollution), 4% to the Special Road Safety Fund (for traffic safety). Three funds were allocated to DPWH, and pollution control to the Department of Transportation and Communications.

[2] Historically, operation and maintenance expenses were provided for from the General Fund based on the General Appropriations Act, which is deliberated and renewed in Congress each year.

(4) Operation and maintenance (Situation of outputs and their operation and maintenance)

• Part is performed under contracts signed with private companies (contractor system), and part is done by NCR itself (direct management system). Private companies are in charge of 70% overall, and NCR Regional Offices are in charge of the remaining 30% of maintenance.

• Under the initiative of DPWH, the Bureau of Maintenance monitors the situation of operation and maintenance. The table below shows the maintenance situation of roads and bridges.

Table 3: Situation of Roads and Bridges Under NCR Jurisdiction

Year	1996	1997	1998	1999	2000
Good	66.1%	69.2%	48.3%	56.5%	77.0%

• The regular maintenance expenses of NCR from 2001 to 2005 are as shown below. As noted above, overall maintenance expenses show a decreasing trend because expenditures for road maintenance expenses were cut from the General Fund.

Table 3: NCR Actual Maintenance Expenses

(Unit: Million pesos)

Year	2001	2002	2003	2004	2005
Maintenance expenses	202.9	180.1	171.7	124.8	104.6

(4) Operation and maintenance (Situation of outputs and their operation and maintenance)

• Same as at the time of ex-post evaluation; the ratio of the contractor system to direct management system is 70:30. It was confirmed that the plan is to raise the contractor system to 90% in the future.

• Also the same as at the time of ex-post evaluation, regarding monitoring by the Bureau of Maintenance (BOM), the maintenance situation of roads and bridges was checked, as shown in the following table. According to this survey, the maintenance situation has been good since FY2001[3]. On the other hand, as described above, maintenance expenses are decreasing, so the “good” ratio is showing a declining trend.

Table 4: Situation of Roads and Bridges Under NCR Jurisdiction

Year	2001	2002	2003	2004	2005
Good	95.0%	95.2%	92.8%	N/A	73.9%

	Fair	26.2%	26.8%	45.4%	36.3%	16.5%	Fair	5.0%	5.0%	7.2%	N/A	24.4%
	Poor	0.8%	1.2%	3.8%	1.5%	0.4%	Poor	0.01%	0.0%	0.0%	N/A	1.7%
	Source: DPWH BOM data						Source: DPWH BOM data					
	• "Good" roads and bridges increased in 2000. Also, a roads and bridges database is being created and updated through World Bank aid, and great efforts are being made in maintenance.						• In February 2006, DPWH surveyed the situation of structures including interchanges. The survey results show damage levels[4(above)]: Magsaysay flyover was 30, EDSA Shaw flyover was 49, EDSA Boni underpass was 40, EDSA Ayala underpass was 43. Thus, serious damage was not found.					
Lessons Learned, Recommendations, Information Resources and Monitoring Methods (1) Follow up on lessons learned and recommendations made in the ex-post evaluation report or in later evaluations (2) Proposals for securing sustainability, and instructions given at time of ex-post monitoring	(1) There were no lessons learned or recommendations at the time of ex-post evaluation.						Restructuring of operation and maintenance structure, as a result of implementation of rationalization plan as indicated above, may affect the sustainability of the project in the future. Maintenance work should be done based on secure budgets, and some kind of improvement plan should be considered. (1) None in particular. (2) Proposals for securing sustainability • Regarding road maintenance: while privatization proceeds on the one hand, budget allocations for maintenance are shrinking. As was also indicated from the road user interview survey, there is insufficient road maintenance. Furthermore, the departments in charge are being reorganized in the rationalization plan, so the impact of structure changes is also a concern. To secure					

		sustainability, it is necessary to ensure a budget for regular maintenance, and that both MMDA and DPWH carry out effective maintenance.