

Democratic Socialist Republic of Sri Lanka

FY2020 Ex-Post Evaluation of Japanese ODA Loan Project

“Greater Colombo Urban Transport Development Project,  
Greater Colombo Urban Transport Development Project Phase 2 (I),  
Greater Colombo Urban Transport Development Project Phase 2 (II)”

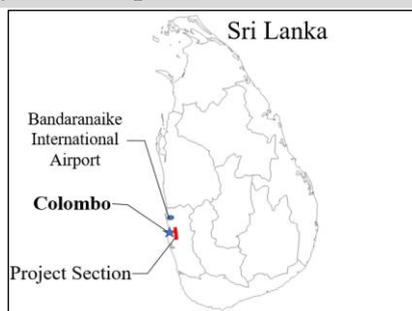
External Evaluator: Akiko Shimizu, Value Frontier Co., Ltd.

## 0. Summary

This project was carried out with the objective to improve regional connectivity by constructing an expressway that connects major national roads and the Southern Expressway in the suburbs of Colombo City. The project objective was fully consistent with Sri Lanka’s development policies, development needs, and Japan’s Official Development Assistance (ODA) policies. Therefore, relevance of the project is high. Regarding the project implementation, the project cost was within the plan, but the project period exceeded the plan, thus efficiency of the project is fair. In terms of effectiveness, the indicators achieved close to the target values, when the evaluation took into account of the effects after the completion of the expressway section, which was originally planned to be constructed under the project but was ultimately completed with the assistance of China (China-assisted section). The findings also show that traveling convenience improved when the sections constructed under the project were linked to the Southern Expressway. Regarding impacts, it has been quantitatively shown that the project has contributed to easing traffic congestion in Colombo City by improving connectivity between regions. In some confirmed cases, the project has contributed to vitalizing local industries and to promoting economic development. Therefore, effectiveness and impacts are high. In terms of the operation and maintenance of facilities constructed under the project, no particular problems have been observed in the institutional and technical aspects, despite having minor organizational and financial problems. There are also some problems in the status of operation and maintenance. Therefore, sustainability of the project is fair.

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

## 1. Project Description



Project location



View near the Kottawa interchange

## 1.1 Background

At the project appraisal, there were radial arterial roads extending from Colombo City, but no roads connecting the regions had been developed. For this reason, when traveling between regions, it was necessary to drive through Colombo City via radial arterial roads. This layout caused a large volume of traffic to flow into Colombo City, exacerbating traffic congestion in the city. Under these circumstances, the project was expected to enable efficient travel between the regions without the need to pass through Colombo City, by constructing the Outer Circular Highway (OCH) and connecting it to the Colombo–Katunayake Expressway (E03) to northern Sri Lanka as well as to the Southern Expressway (E01)<sup>1</sup> to southern Sri Lanka. The project consisted of constructing one section of Kottawa–Kaduwela (11 km) in the Greater Colombo Urban Transport Development Project (Phase 1) and a section of Kaduwela–Kadawatha (9 km) in the Greater Colombo Urban Transport Development Project Phase 2 (I) and (II) (Phase 2). Thus, both phases combined: the Kottawa–Kadawatha (20 km) (the project section) became the target.

At the project appraisal, the remaining section of Kadawatha–Kerawalapitiya (9 km) out of the total 29 km of the OCH was expected to be constructed during Phase 3 of the project. During the project implementation, however, it was confirmed that this section would be constructed with Chinese assistance. For this reason, the OCH could not be completed within the project; it was not linked to the Colombo–Katunayake Expressway (E03) leading to Bandaranaike International Airport until the China-assisted section was completed.



Source: Prepared by the evaluator based on Google Map  
Figure 1. Project section (Phase 1 and Phase 2)

## 1.2 Project Outline

The objective of the project is to improve regional connectivity by constructing an expressway in the suburbs of Colombo City to link to major national roads and the Southern Expressway, thereby contributing to mitigating traffic congestion in Colombo City, strengthening the economic foundation of Sri Lanka, and reducing the economic disparity among regions.

<sup>1</sup> The highway was constructed through a co-financing project of JICA and the Asian Development Bank (ADB). The Kottawa–Pinnaduwa (Galle) section began operations in November 2011.

Phase		Phase 1	Phase 2(I)	Phase 2(II)
Loan Approved Amount / Disbursed Amount		21,917 million yen / 21,913 million yen	5,718 million yen / 5,713 million yen	31,688 million yen / 29,980 million yen
Exchange of Notes Date / Loan Agreement Signing Date		March 2007 / March 2007	June 2008 / July 2008	March 2011 / March 2011
Terms and Conditions	Interest Rate	Main Contract: 1.5 %	Main Contract: 0.2 %	
		Consultant: 1.5 %	Consultant: 0.01 %	
	Repayment Period	30 years	40 years	
	Grace Period	10 years		
Conditions for Procurement	Main Contract: General untied	Main Contract: Tied (Special Terms for Economic Partnership (STEP))		
	Consultant: General untied	Consultant: Tied	-	
Borrower / Executing Agency		Government of the Democratic Socialist Republic of Sri Lanka / Ministry of Highway		
Project Completion		July 2015		
Target Area		The suburbs of Colombo City		
Main Contractors		China Harbour Engineering Co. Ltd. (China)	Taisei Corporation (Japan)	
Main Consultants		Joint Venture (2008 Contract): Oriental Consultants Co., Ltd. (Japan) / Resources Development Consultants Ltd. (Sri Lanka) / Engineering Consultants Ltd. (Sri Lanka) / Consulting Engineers & Architects Associated Ltd. (Sri Lanka) Joint Venture (2009 Contract): Oriental Consultants Co., Ltd. (Japan) / Greentech Consultants (PVT) Ltd. (Sri Lanka)		
Related Studies		Feasibility Study (2000), Detail Study (2006)		
Related Projects		<JICA Technical Assistance related to ODA Loan> - Expressway Administration Project (2009–2012) <Japanese ODA Loan> - Southern Highway Construction Project (I) (2001), (II) (2008) <Japanese Grant> - Project for the Development of Intelligent Transport System for Expressways (2013) <Others> - Asian Development Bank: Southern Transport Development Project (2001–2013) - Export-Import Bank of China: Outer Circular Highway Project Phase III (2016–2019)		

## 2. Outline of the Evaluation Study

### 2.1 External Evaluator

Akiko Shimizu, Value Frontier Co., Ltd.

### 2.2 Duration of Evaluation Study

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

Duration of the Study: November 2020–February 2022

Duration of the Field Study: July 20, 2021–August 18, 2021 (including a two-week

quarantine period on entering the country)

### 2.3 Constraints during the Evaluation Study

(1) According to the materials provided by JICA, two objectives of the project were set as “to mitigate traffic congestion in the Colombo metropolitan area” and “to improve connectivity between regions.” However, “to mitigate traffic congestion in the Colombo metropolitan area” is not a direct effect of the construction of the project section alone, but can be achieved through a variety of other factors. Therefore, in the ex-post evaluation, “to mitigate traffic congestion in Colombo City” is considered as a project impact.

(2) The original plan was to carry out the field study twice. However, due to the spread of the COVID-19, only one field study was carried out. Therefore, the second field study was conducted remotely, with local consultants collecting information.

## 3. Results of the Evaluation (Overall Rating: B<sup>2</sup>)

### 3.1 Relevance (Rating: ③<sup>3</sup>)

#### 3.1.1 Consistency with the Development Plan of Sri Lanka

At the project appraisal, the *Mahinda Chintana: Vision for a New Sri Lanka, A Ten-Year Horizon Development Framework 2006–2016* (2005) had clarified the need to improve the road network; constructing expressways was one of its strategies. In addition, the *National Road Master Plan 2007–2017* (2007) outlined a plan to develop a road network that included expressways, to connect the country’s growing regions.

At the ex-post evaluation, the *Updated National Physical Planning Policy and Plan–2050* (2019) was arguing that the demand for major road infrastructure could be met up to 2030 through existing expressways, including expressways under construction. In addition, *The Vistas of Prosperity and Splendour 2020–2025* (2019), as part of a new approach known as the National Spatial System, was calling for infrastructure development to reduce the disparities between urban and rural areas; one such development was a road network. The *National Road Master Plan 2018–2027* (2018) also emphasized the need to improve road networks, including expressways. The proposed revision to the master plan was finalized at the end of November 2021 and scheduled for official approval.

#### 3.1.2 Consistency with the Development Needs of Sri Lanka

At the project appraisal, the average annual vehicle-registration growth rate in the Western Province, where the Colombo metropolitan area is located, was 13.6 % (2002–2005), while the average annual growth rate for the total road network during the same period was only 1.0 %. This showed that road-network development had not kept pace with the increased volume of

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<sup>2</sup> A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

<sup>3</sup> ③: High, ②: Fair, ①: Low

traffic. Thus, the demand for road-network development was high.

At the ex-post evaluation, the number of vehicles in Sri Lanka was continuing to increase, as shown in Table 1. In line with the increased number of vehicles, the Ministry of Highways and the Road Development Authority (RDA), under the Ministry’s jurisdiction, were developing the inter-regional road network (including expressways), as shown in Table 2.

Table 1. Number of vehicles in Sri Lanka (unit: thousands)

2007	2008	2009	2010	2011	2012	2013
3,125	3,391	3,595	3,954	4,480	4,877	5,204
2014	2015	2016	2017	2018	2019	2020
5,633	6,302	6,795	7,247	7,727	8,095	N/A

Sources: Central Bank of Sri Lanka, Ministry of Transport

Table 2. Status of expressway development

	Section	Project Period
Central Expressway (E04) <sup>4</sup>	Kadawatha–Mirigama	2020–2024
	Mirigama–Kurunegala	2017–2021
	Pothuhera–Galagedara	2021–2024
	Kurunegala–Dambulla	In planning
Ruwanpura Expressway (E06) <sup>5</sup>	Kahathuduwa–Ingiriya	2021–2023
	Ingiriya–Ruwanpura	In planning
Elevated Expressway	Athurugiriya–New Kelani Bridge	2017–2025

Source: the RDA

### 3.1.3 Consistency with Japan’s ODA Policy

In the *ODA Charter* (2003), sustainable growth is listed as one of the priority issues with the emphasis placed on developing the socio-economic infrastructure, a key factor in economic activities. The *Medium-Term Policy* (2005) likewise identifies sustainable growth as a priority issue, indicating that assistance will be provided for the development of socio-economic infrastructure, including roads and other transport infrastructure. According to the *Country Assistance Policy for Sri Lanka* (2007), at the project appraisal, the basic policy was the development of social infrastructure, including the road sector. The assistance plan included institutional reform and assistance to develop an economic foundation, in line with the medium-to-long-term vision.

In light of the above, the implementation of the project is highly consistent with the development policies and development needs of Sri Lanka at the project appraisal and ex-post evaluation, as well as Japan’s ODA policies at the project appraisal. Therefore, its relevance is high.

<sup>4</sup> An expressway connecting the northernmost IC (Kadawatha) of the project section with Kandy City.

<sup>5</sup> An expressway connecting the Southern Expressway (E01) with Ratnapura District in Sabaragamuwa Province.

### 3.2 Efficiency (Rating: ②)

#### 3.2.1 Project Outputs

The planned and actual outputs of the project are shown in Table 3.

Table 3. Planned and actual outputs

Item	Plan	Actual
1. Construction of the project section	Total: 20 km (2 lanes in each direction, 4 lanes in total) <Phase 1> Kottawa–Kaduwela: Approx. 12 km <Phase 2> Kaduwela–Kadawatha: Approx. 8 km	Total: 20 km (2 lanes in each direction, 4 lanes in total) <Phase 1> Kottawa–Kaduwela: Approx. 11 km <sup>6</sup> <Phase 2> Kaduwela–Kadawatha: Approx. 9 km
2. Interchange (IC) construction	Total: 3 locations <Phase 1> Kottawa IC, Kaduwela IC, <Phase 2> Kadawatha IC	Total: 5 locations <Phase 1> Kottawa IC, Athurugiriya IC, Kothalawala IC <Phase 2> Kaduwela IC <sup>7</sup> , Kadawatha IC
3. Bridge construction	Total: 29 bridges <Phase 1> 13 bridges <Phase 2> 16 bridges	Total: 27 bridges <Phase 1> 11 bridges <sup>8</sup> <Phase 2> 21 bridges <sup>9</sup>
4. Tollgate construction and equipment installation	<Phase 2> Tollgate offices (2 locations), toll booths (21 locations), installation of toll-system equipment	<Phase 2> As planned
5. Township development	<Phase 1> - Construction of roads and other facilities near the ICs (road widening, water-supply and power-distribution networks) (Kottawa, Kaduwela, and Kadawatha districts)	<Phase 1> - Construction of roads and other facilities near the ICs (road widening, water-supply and power-distribution networks) (Kottawa and Kaduwela districts) - Construction of the Kottawa–Makumbura Multimodal Transport Centre (MMC) <Phase 2> - Equipment procurement for the MMC (equipment for information-display systems, operation and maintenance), along with consulting services for operation and maintenance
6. Consulting services for road construction	<Scope of work> Construction supervision, monitoring environmental and social considerations, expressway-facility design, structural design changes, etc.	<Scope of work> As planned

Source: Materials provided by JICA, questionnaires to the RDA and Ministry of Transport

The main changes in the outputs are (1) and (2), as mentioned below. The output changes were made in accordance with appropriate procedures and can be considered reasonable, since

<sup>6</sup> The viaduct section, which was originally expected to be approximately 0.1 km long, was increased to 3.3 km to address soft ground and to mitigate flood damage. In addition, Kaduwela IC was originally planned to be constructed in Phase 1; when the Phase 1 re-bidding took place, the 1 km construction that included Kaduwela IC was moved to Phase 2.

<sup>7</sup> As mentioned above, during the Phase 1 re-bidding process, the construction of the Kaduwela IC was moved from Phase 1 to Phase 2.

<sup>8</sup> The type and number of bridges changed, due to construction of additional ICs.

<sup>9</sup> The type and number of bridges changed, as measures were implemented to address soft ground and other issues.

they improved traffic convenience.

(1) IC

In the section of Phase 1, Athrugiriya IC was additionally constructed to connect the project section with the national road,<sup>10</sup> anticipating development in the Athrugiriya area and increasing traffic. Likewise, Kothalawala IC was additionally constructed to connect the project section with the national road<sup>11</sup> to Colombo City, in anticipation of the development of Kothalawala and Malabe areas and traffic convenience.



Additionally constructed Athrugiriya IC



Additionally constructed Kothalawala IC

(2) Township development

The construction of the MMC was funded by both the Government of Sri Lanka and the phase 1 of this project. The MMC is a facility that functions as a transit hub for short and long distance buses as well as express buses and railways. The MMC allows passengers to transit efficiently between various modes of transportation, reducing travel time and improving connectivity between regions. In addition, consulting services for the procurement of equipment and operation and maintenance of the MMC were financed in Phase 2 in order to strengthen the operation and maintenance of the MMC. Opened in 2019, the MMC is currently undergoing further expansion while operating the facility, which is due to be completed by 2025.



Exterior view of the MMC



Equipment procured for the information-display system

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<sup>10</sup> Malabe–Godagama Road (B240)

<sup>11</sup> Malabe–Kaduwela Road (B263)

### 3.2.2 Project Inputs

For details, see the last page of the report, *Comparison of the Original and Actual Scope of the Project*.

#### 3.2.2.1 Project Cost

Although the planned cost of Phases 1 and 2 was 81,456 million yen (including 59,323 million yen from the ODA loan), the actual cost came to 63,376 million yen (including 57,606 million yen from the ODA loan). The project cost was therefore within the plan budget (78 % of the plan).

Exchange-rate fluctuations were considered as the main reason why the project cost fell so far below the estimated budget. The average exchange rate during the construction period of the project section (2007–2015) was 0.83 yen to the Sri Lankan Rupee,<sup>12</sup> compared to exchange rates of 1.12 yen to the rupee (October 2006) and 0.77 yen to the rupee (November 2010) at the project appraisal of Phases 1 and 2, respectively.

Table 4. Planned and actual project costs (unit: million yen)

		Plan			Actual		
		Total project cost	ODA loan	Government of Sri Lanka	Total project cost	ODA loan	Government of Sri Lanka
Phase 1	OCH	29,182	21,074	8,108	N/A	N/A	3,869
	Township development	843	843	0	N/A	N/A	681
	Subtotal	30,025	21,917	8,108	26,463	21,913	4,550
Phase 2	OCH	51,431	37,406	14,025	N/A	N/A	1,130
	Township development	0	0	0	N/A	N/A	90
	Subtotal	51,431	37,406	14,025	36,913	35,693	1,220
Total		81,456	59,323	22,133	63,376	57,606	5,770

Source: Materials provided by JICA and the RDA

[Note 1] The exchange rates for each phase were as follows:

<Phase 1> The exchange rate for the planned amount was 1.12 yen to the Sri Lankan Rupee (October 2006). The exchange rate for the actual amount (in yen) is unknown, as it was not stated in the Project Completion Report (PCR).

<Phase 2>The exchange rate for the planned amount was 0.77 yen to the Sri Lankan Rupee (November 2010). The actual amount paid (in rupees) by the Government of Sri Lanka was converted into yen at an exchange rate of 0.78 yen to the Sri Lankan Rupee (the average IMF exchange rates from 2008 to 2018).

[Note 2] The total ODA loan amount of both phases refers to the total amount disbursed in ODA loans in the material provided by JICA. The actual amount spent by the Government of Sri Lanka in Phase 1 was referred to as the amount referenced in the PCR (3,869 million yen) and the amount obtained by converting the MMC construction costs of 873 million rupees into yen (681 million yen). The actual amount spent by the Government of Sri Lanka in Phase 2 was the amount (in rupees) mentioned in the PCR converted into yen (total: 1,220 million yen).

[Note 3] According to the PCR, the total ODA loan in Phase 1 came to 21,793 million yen, 120 million yen less than the total ODA loan amount (21,913 million yen) disbursed in the material provided by JICA.

#### 3.2.2.2 Project Period

The project completed its final activities in July 2018, following a change in the Phase 2 plan to

<sup>12</sup> Source: IMF exchange rates

fund the installation of equipment in the MMC. However, since the project completion was defined as “when the final facility of the project section is put into service” at the project appraisal, the planned project period was considered as the period from the signing of the L/A to the final facility of the project section being put into service.

The actual project period for Phases 1 and 2 was 101 months (March 2007 to July 2015), compared to 97 months in the plan (March 2007<sup>13</sup> to March 2015). The project period thus exceeded the plan (104 % of the plan) due to a four-month delay. Table 5 presents the project period for each phase and the reasons for the delay.

Table 5. Project period (planned/actual) and the reasons for delay in each phase

Phase 1 (Kottawa–Kaduwela)		Phase 2 (Kaduwela–Kadawatha)	
Plan	Actual	Plan	Actual
March 2007–April 2012 (62 months)	March 2007–April 2015 (98 months)	July 2008–March 2015 (81 months)	July 2008–July 2015 (85 months)
<Reasons for the 36-month delay <sup>14</sup> > 1. Bidding Bids were rejected and re-bid due to exceeding the expected price (17 months). 2. Civil construction works <ul style="list-style-type: none"> <li>• Additional construction of Athurugiriya IC and Kothalawala IC (13 months)</li> <li>• Construction delays, following the response to unexpected rock on the Marabe–Godagama road (9 months)</li> </ul>		<The reason for the 4-month delay> Additional work required due to soft ground and route changes	

Source: Materials provided by JICA

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

With regard to the economic internal rate of return (EIRR), calculated at the project appraisal, the rate was 17.4 % in Phase 1, 13.0 % in Phase 2 (I), and 9.13 % in Phase 2 (II). The last EIRR (9.13 %) calculated in Phase 2 (II) was the combined EIRR of Phases 1 and 2. Therefore, in the ex-post evaluation, the EIRR was recalculated based on the calculation method of Phase 2 (II).

During the ex-post evaluation, the actual EIRR was recalculated using actual project-section traffic-volume data; the recalculation result was 6.03 %. The EIRR was less than the value of 9.13 % at the project appraisal mainly because the China-assisted section was not completed until December 2019.<sup>15</sup> As a consequence, the traffic volume did not increase as much as expected between 2015 and 2019, when the construction of the project section was completed. It should be noted that, at the project appraisal, no decision had been made about expressway tolling, so no expressway-toll revenue was included in the EIRR calculations. The actual value of the EIRR,

<sup>13</sup> The start of the project was defined as the month when the L/A of Phase 1 was signed.

<sup>14</sup> With regard to the delay, the total period of breakdown lasted 39 months due to the overlapping periods as several civil construction works were carried out simultaneously.

<sup>15</sup> The project of China-assisted section was launched in 2016.

including expressway-toll revenues, is expected to be higher.

As the financial internal rate of return was not calculated at the project appraisal, it was not recalculated in the ex-post evaluation.

Table 6. EIRR costs and benefits

Costs	Project cost (Phase 1: excluding land costs and taxes; Phase 2: excluding taxes), cost of operation and maintenance
Benefits	Vehicle operation cost savings, travel time saving, reduction in traffic accidents
Project Life	15 years (25 years from the L/A signing)

Source: Materials provided by JICA

[Note 1] Although the project life was set at 15 years at the project appraisal, the EIRR was calculated using 25 years from the L/A signing. At the ex-post evaluation, the EIRR was therefore recalculated using 25 years from the year of the L/A signing to make the comparison targets consistent.

[Note 2] Regarding the annual project-cost data, there was no consistency between the total amount of annual data and the total Phase 1 project costs; the annual data for Phase 2 were not available. For this reason, the annual data were obtained by dividing the actual total project cost by the same ratio as the annual project cost, calculated at the project appraisal.

[Note 3] Since the tax amount for the Phase 1 project cost was unknown, a recalculation was carried out, based on the amount including tax. For the Phase 2 project cost, the recalculation excluded the tax on expenses for which the tax could be confirmed, but included the tax on other expenses, for which the tax amount was unknown.

[Note 4] The benefits from 2015 to 2020 were recalculated, based on the actual annual average daily traffic, using the ratio between the expected annual average daily traffic in the target year and the expected benefits. To eliminate the impact of COVID-19 as much as possible when analyzing traffic volume data for 2020, the 2020 benefits were recalculated using the average traffic volume data between January and March, when the impact was not significant. In calculating benefits after 2021, it was assumed that the expected benefits at the project appraisal would be achieved, due to the completion of the China-assisted section. The expected value of the post-2021 benefits at the project appraisal was therefore adopted in the recalculation.

In light of the above, although the project cost was within the plan, the project period exceeded the plan. Therefore, efficient of the project is fair.

### 3.3 Effectiveness and Impacts<sup>16</sup> (Rating: ③)

#### 3.3.1 Effectiveness

##### 3.3.1.1 Quantitative Effects (Operation and Effect Indicators)

At the project appraisal, the project aimed to connect OCH to the Colombo–Katunayake Expressway (E03) by constructing the remaining section of the OCH, Kadawatha–Kerawalapitiya, in Phase 3 of the project. In this context, at the time of the project appraisal, the target values of indicators between Kottawa and Kadawatha section was calculated with the assumption of the completion of Kadawatha–Kerawalapitiya section. Subsequently, confirmation was received during the project-implementation period that the Kadawatha–Kerawalapitiya section would be constructed with Chinese assistance, but the target values remained unchanged from the original values at the time of project appraisal, and thus the target values were kept including the effect of the completion of the China-assisted section. For this reason, the status of achievement after the completion (December 2019) of the China-assisted section was taken into account in the ex-post evaluation, when evaluating the effectiveness of the project.

<sup>16</sup> Sub-rating for Effectiveness is to be put with consideration of Impacts.

(1) Operational indicator

The annual average daily traffic (AADT), set as an operational indicator, was 24,240 vehicles/day in 2017 (target year), two years after the project was completed, against a target value of 42,186 vehicles/day, resulting in an achievement rate of 57 %. The main reason the results fell short of the target value in 2017 was, as previously mentioned, because the estimated target value assumed that the China-assisted section was completed. Until the China-assisted section was actually completed, the OCH was not connected to the Colombo–Katunayake Expressway (E03); for this reason, the utility value of the project section did not increase as much as expected. After December 2019, when the China-assisted section was completed, the traffic volume in the project section increased steadily, reaching 79 % achievement rate in 2020 and 84 % in 2021, despite the COVID-19-related movement restrictions.<sup>17</sup> As Table 8 shows, the AADT reached 40,060 vehicles/day (achievement rate: 95 %) in March 2020, when the impact of COVID-19 was minimal. Furthermore, the average traffic volume from January to April 2021 increased to 45,145 vehicles/day (achievement rate: 107 %), as the number of COVID-19 cases decreased. Without the spread of COVID-19, an external factor, it is highly likely that the AADT would have achieved its target value in 2021, two years after the completion of the China-assisted section.

Table 7. AADT (unit: vehicles/day)

Baseline value	Target value	Actual value						
		2015	2016	2017	2018	2019	2020	2021
2007	2017	Project completion year	1 year after project completion	2 years after project completion	3 years after project completion	4 years after project completion	5 years after project completion	6 years after project completion
–	42,186	5,620	18,803	24,240	28,153	29,976	33,145*	35,323**
Achievement rate		–	–	57 %	67 %	71 %	79 %	84 %

Source: JICA data for baseline and target values; RDA data for actual values.

\* The average value in January–March 2020, when COVID-19 was making little impact, was 35,588 vehicles/day.

\*\* The average value of January–August 2021 data only.

Table 8. Monthly traffic volume in the project section (unit: vehicles/day)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
2020	32,547	34,157	40,060	N/A	17,114	34,653	35,844	41,099	42,408	27,069	21,527	38,110	33,145
2021	41,851	43,214	49,123	46,390	12,605	20,557	33,520	–	–	–	–	–	35,323

Source: the RDA

[Note] These data were (up to July 2021) collected during the second field study.

(2) Effect indicators

The benefits set for the EIRR were adopted as the three effect indicators “Travel time saving,”

<sup>17</sup> Various restrictions were put in place, based on the number of COVID-19 cases. For example, during the October 2020 lockdown, nonessential travel was restricted. During other periods, curfews and travel restrictions between provinces were often imposed.

“Vehicle operation cost saving,” and “Reduction in traffic accidents.” Since the benefits of the EIRR were calculated based on the AADT estimated during the project appraisal, the target values of these indicators included the effects of the completed China-assisted section, same as the operation indicator mentioned above. The target value of “Travel time saving” was 3,694 million rupees/year, while the actual value in the target year (2017) came to 2,123 1,912 million rupees/year (achievement rate: 57 %); the achievement rate increased to 84 % by 2020. Similarly, the target value of “Vehicle operation cost saving” was 3,327 million rupees/year, while the actual value in the target year (2017) was 1,912 million rupees/year (achievement rate: 57 %); the achievement rate increased to 84% by 2020. As for the “Reduction in traffic accidents,” the target value was 173 million rupees/year, while the actual value in the target year (2017) was 100 million rupees/year (achievement rate: 57 %), and the achievement rate in 2020 reached 84 %. Although none of the three effectiveness indicators achieved their target values in 2017, by 2020, after the China-assisted section was completed, they reached achievement levels close to the target values.

Table 9. Effect indicators (unit: million rupees/year)

	Baseline value	Target value	Actual value					
	2007	2017	2015	2016	2017	2018	2019	2020
		2 years after project completion	Project completion year	1 year after project completion	2 years after project completion	3 years after project completion	4 years after project completion	5 years after project completion
Travel time saving	–	3,694	492	1,647	2,123	2,466	2,626	3,116
Achievement rate			–	–	57 %	66 %	71 %	84 %
Vehicle operation cost saving	–	3,327	443	1,483	1,912	2,220	2,364	2,807
Achievement rate			–	–	57 %	66 %	71 %	84 %
Reduction in traffic accidents	–	173	23	77	99	115	123	146
Achievement rate			–	–	57 %	66 %	71 %	84 %

Source: JICA data for baseline and target values; Actual value was calculated by the evaluator based on the AADT data provided by RDA.

### 3.3.1.2 Qualitative Effects

#### (1) Improved connectivity between regions by project section

To confirm the project objective of improving connectivity between regions, interviews were conducted with five project-section users. The interviewees were asked to rate the improvement in inter-regional connectivity by the project using a five-point scale (very much improved, improved, neither improved nor not improved, not improved, and not improved at all). Three selected “very much improved” and two selected “improved.” As shown in Table 10, the interviews confirmed that user satisfaction was generally high, since connecting the project section with the Southern Expressway (E01) improved convenience.

Table 10. Five case studies obtained through an interview survey

Case 1
<p>According to a business owner living in Athurugiriya, who uses the project section every weekday to commute to work, he has been able to reduce his commuting time to his workplace by about 90 minutes each way by using the project section and the Southern Expressway (E01). He also reports enjoying various benefits, such as reduced stress while driving, fuel-cost savings, and release from congestion during the evening peak hours. In addition, it used to take him more than five hours to drive out to his family and relatives in Galle in the Southern Province of Sri Lanka. Following the connection of the project section and the Southern Expressway (E01), that trip now takes less than 90 minutes and he is able to see his family frequently on day trips, strengthening their relationship. He also said that his company has been able to hire four new employees who live in the North Western and Southern Province and other areas after the completion of the project section. Without the opening of project section and the Southern Expressway (E01), the company would have had to provide accommodation for employees forced to live away from their families. Improved regional connectivity has provided a better foundation for those people, enabling them to balance their work and family lives.</p>
Case 2
<p>According to an engineer living in Colombo City, he uses the project section approximately 12 days a month for work. Using the project section and the China-assisted section has allowed him to reduce his driving time by 60 minutes each way, arriving at work in about 45 minutes. In addition to saving time and reducing fuel consumption, avoiding the traffic congestion in the city has helped him drive with a relaxed mind, making him more productive at work. He also mentioned that before the connection of the project section and the Southern Expressway (E01), inter-provincial travel was discouraged because it took long time to get to the Southern Province. As it now takes less than two hours to travel from Colombo to the Southern Province, there are more opportunities to visit the Southern Province, not just for business, but also for leisure.</p>
Case 3
<p>According to a university lecturer who lives in a town about 20 km south of the center of Colombo, he uses the project section approximately 16 days a month for his work commute. He has been able to reduce his commuting time by about 20 minutes each way, giving him more free time in the morning. Now, with the link between the project section and Southern Expressway (E01), it has become much easier for him to travel to tourist places in the Southern Province, which used to be poor accessibility.</p>
Case 4
<p>According to a businessman living in the suburbs of Colombo, he uses the project section approximately 18 days a month to travel to the North Western Province, Southern Province, Uva Province, and other provinces for work and personal purposes. He can save 30 minutes of driving time by using the project section to travel to Belummahara in the suburbs of Colombo. From a business perspective, the improved connectivity to other regions, including the Southern Province, helps him acquire and manage customers, improving his work efficiency and business opportunities. He also said that he recently went to Beliatta in the Southern Province to buy a car; he left his house around 7:00 p.m. and came back at midnight. Without the project section and the Southern Highway (E01), he would have had to spend a whole day there.</p>
Case 5
<p>According to a civil engineer living in the suburbs of Colombo, he saves 60 minutes of commuting time each way by using the project section to drive to his workplace near the Kadawatha IC. In the past, he used to commute via congested city roads and get caught in traffic, taking a long time to reach his destination. He also said that connecting the project section with the Southern Highway (E01) has facilitated inter-regional travel, saving time and providing a stress-free ride on the expressway. In particular, he can now travel easily to the Southern Province, including Galle district, destinations he used to hesitate to travel because of the significant traveling time.</p>

Source: Interview survey conducted during the ex-post evaluation

(2) Improving connectivity between regions through the construction of the MMC

The MMC, which opened in 2019, was Sri Lanka's first transport transit center. The MMC

serves as a transit hub for short-distance buses running within the city, long-distance buses travelling between regions via expressways, and railways running to other regions. In addition, the MMC, which is located near the Kottawa IC, has a large parking lot, allowing people to park their private vehicles at the MMC and transfer to the transportation network for smooth travel to the city center or other regions. It can therefore be said that the MMC has improved the convenience of inter-regional travel.

### 3.3.2 Impacts

#### 3.3.2.1 Intended Impacts

##### (1) Mitigating traffic congestion in Colombo City (quantitative effects)

The project was expected to contribute to relieving traffic congestion in Colombo City by allowing vehicles coming from the regions via radial arterial roads to travel to other regions—using the project section without passing through the city. During the ex-post evaluation, a measurement survey was conducted on two radial arterial roads, the A1 (connecting the northeast to the city) and the A4 (connecting the east to the city) to confirm the percentage of traffic volume moving from the northeast and east to other regions via the project section without flowing into the city. The survey found that 50.2 % of the total traffic flow from the northeast via the A1 in the direction of the city moved for a total of 12 hours (6 h/day) from region to region using the project section. Similarly, 47.2 % of the vehicles running from the east toward the city via the A4 used the project section for inter-regional travel. Considering the situation that the above-mentioned vehicles would have flowed into Colombo City without the construction of the project section, it can be said that the project has contributed to relieving traffic congestion in Colombo City.

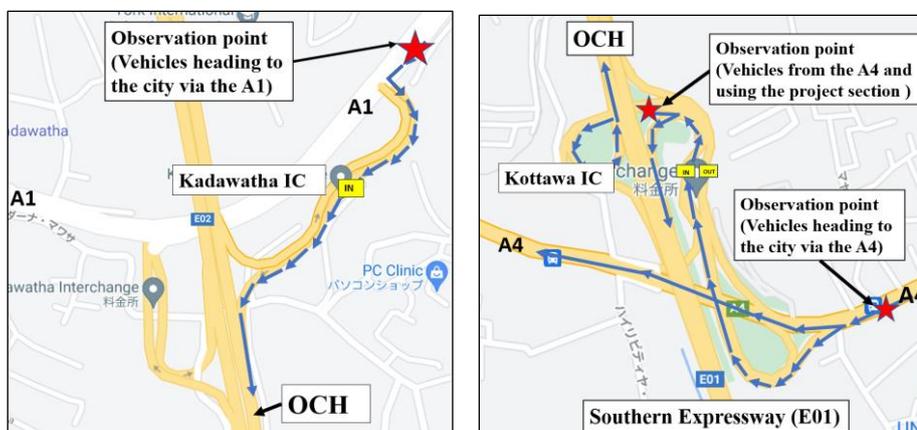
Table 11. Results of the measurement survey

			Vehicles	Subtotal (Vehicles)	Total (Vehicles)	Percentage of vehicles using the project section
① Vehicles from the northeast heading to the city via the A1	Sat	Morning	4,560	8,053	17,051	50.2 %
		Evening	3,493			
	Mon	Morning	5,621	8,998		
		Evening	3,377			
② Vehicles from the northeast, travelling via the A1 and using the project section	Sat	Morning	1,852	3,713	8,557	
		Evening	1,861			
	Mon	Morning	2,817	4,844		
		Evening	2,027			
③ Vehicles from the east heading to the city via the A4	Sat	Morning	3,315	6,219	12,438	
		Evening	2,904			
	Mon	Morning	3,718	6,729		
		Evening	3,011			
④ Vehicles from the east, travelling via the A4 and using the project section	Sat	Morning	1,552	2,555	5,870	
		Evening	1,003			
	Mon	Morning	2,098	3,315		
		Evening	1,217			

Source: Measurement survey and data provided by the RDA

Measurement locations: ① A1 before Kadawatha IC, ② data provided by the RDA, ③ A4 before Kottawa IC, ④ Kottawa IC

Measurement time: Saturday, October 2, 2021, 7:00–10:00 and 16:00–19:00 (6 hours in total), and Monday, October 4, 2021, 7:00–10:00 and 16:00–19:00 (6 hours in total)



Source: Created by the evaluator based on Google Map

Figure 2. Locations observed in the measurement survey

(2) Promoting regional economic development and vitalizing economic activities through improved regional connectivity (qualitative effects)

To confirm the project impact, interviews were conducted with six businessmen who run business near the ICs of the project section. From the interviews with three businessmen running businesses in the area since before the construction of the project section, it was found that the project-section construction had contributed to vitalizing the local economy by increasing customers and sales. In addition, interviews with two of the three entrepreneurs who launched businesses after the construction of the project section showed that the project-section construction promoted economic development such as the opening of their stores in the area.

Table 12. Results of interviews with six businessmen

Entrepreneurs who ran businesses before the construction of the project section (3 persons)	
1.	The owner of a printing store near the Athurugiriya IC said that he was gaining new customers, including some who use the Athurugiriya IC and distant customers who found his store through Internet search engines. Due to the link between the project section and the Southern Expressway (E01), he could now accept online orders from distant areas and deliver goods in the shortest time possible, using the project section and the Southern Expressway (E01). He reported that sales had increased by 10 % since the construction of the project section.
2.	The owner of a solar-panel installation business near the Kadawatha IC only had customers in the suburbs of Colombo and did not expect to attract them from other areas before the construction of the project section. Since the project section was connected to the Southern Expressway (E01), however, customers from the Southern Province (Galle and Matara districts) had increased, allowing him to expand his customer network. In the past, installation work in the Southern Province could not be completed in a day due to travel time and the need for occasional staff accommodation. As a result, there was little incentive to take orders and some inquiries from the Southern Province had to be declined. After-sales service (maintenance, etc.) for customers in distant areas was also difficult. However, after the project section was connected to the Southern

Expressway (E01), the maintenance work could be completed in a day (5–6 hours). This led to an expansion of business, increasing sales by 30 %.
3. The owner of a restaurant near the Kaduwela IC saw an increase in customers, especially during the evening rush hour, and sales increased by around 25 % since the project section was constructed. He also reported that when the project section was connected to the Southern Expressway (E01), making inter-regional travel more convenient, he was able to accept catering orders from outside Colombo, thus expanding his business and increasing employment.
<b>Entrepreneurs who launched businesses after the construction of the project section (3 persons)</b>
1. The owner of a restaurant near the Kadawatha IC said that its opening had little to do with the project-section opening. According to him, expressway users prioritized fast travel and arrived at their destinations quickly, rather than stopping to have meals.
2. The owner of a mobile phone store near the Athurugiriya IC reported that he decided to open his store near the IC because he expected the project-section opening to increase the number of customers from the suburbs of Colombo and other provinces. He found that he could actually attract customers who used the project section. In addition, he benefited from the opening of the project section and the Southern Expressway (E01) to deliver ordered products to customers.
3. The owner of a shoe store near the Kottawa IC opened his shop in the expectation that the project-section opening would attract many customers from other provinces into the Kottawa IC and Colombo City. In fact, new restaurants and supermarkets have recently opened in the area, he said.

Source: Interview survey conducted during the ex-post evaluation.

Moreover, although the above interviews did not confirm this point, it can be considered that the MMC construction has contributed to mitigating traffic congestion in Colombo City by encouraging MMC users to travel between regions, using public transportation instead of private vehicles.

### 3.3.2.2 Other Positive and Negative Impacts

#### (1) Impacts on the natural environment

The project was classified as “Category A,” based on the *JBIC environmental guidelines for ODA loans* (1999), as it was a large-scale construction project. The *Environmental Impact Assessment Report* was approved by the Central Environmental Authority in May 2001.<sup>18</sup> In both Phases 1 and 2, environmental monitoring was carried out in accordance with the *Environment Management Action Plan* and monitoring reports were submitted to the Central Environmental Authority. According to the monitoring reports, the environmental monitoring committee held regular meetings with the participation of all concerned parties; site inspections of the construction work were also conducted regularly and monitoring was carried out appropriately. In addition, planned measures were implemented to manage exhaust fumes, dust, noise, and drainage, while preventing soil erosion and disposing of soil and sand during the construction process. In case neighboring residents complained about the traffic restrictions, dust, noise, or vibrations caused by the construction, the situation was investigated and measures were taken when necessary. These measures included temporary access roads, the provision of alternative housing, and the installation of dust barriers.

<sup>18</sup> The period extension was approved in November 2007. In addition, a supplementary environmental impact-assessment report was prepared for the route change near the Kaduwela IC and approved in May 2005.

As for the MMC, solar panels were installed, among other measures aimed at promoting renewable energy. According to the Ministry of Transport (MOT), greenhouse-gas emissions have now been reduced.<sup>19</sup> Moreover, the MMC, which serves as a transit hub connecting rail and bus transportation networks, has promoted the mitigation of traffic congestion in Colombo City, thus contributing to the reduction of greenhouse-gas emissions.<sup>20</sup>

## (2) Resettlement and land acquisition

The *Resettlement Implementation Plan* was formulated in 2006 for Phase 1 and in 2007 for Phase 2. According to the *Study on Land Acquisition and Resettlement for the Outer Circular Highway Project*, conducted by JICA in 2010, land acquisition in Phase 1 was properly carried out, based on the *Resettlement Implementation Plan*. In addition, 109 households were resettled, 12 stores were relocated, and compensation payments<sup>21</sup> were completed in 2009. Interviews with 24 affected residents of Phase 1, conducted during the study, showed that most resettled people were able to rebuild their houses using the compensation they received. In some cases, however, house reconstructions were not completed because the households significantly outspent their compensation. When it came to the relocation of stores, there were some satisfactory cases, including owners who were able to buy a plot of land twice the size of their original plot with the compensation funding and to build a sewing workshop next to the house.<sup>22</sup> While the Phase 2 land acquisition and resettlement were in progress at the time of the study, interviews were conducted with 21 affected residents who were due to be resettled in Phase 2. The study concluded that explanations and consultations with residents were appropriately and adequately conducted. At the ex-post evaluation, interviews were conducted with four individuals who agreed to be interviewed, based on a list provided by the RDA of 10 out of 242 households<sup>23</sup> resettled in Phase 2.<sup>24</sup> Three of the four interviewees said that there was no difference between the prior explanation and the actual situation with regard to the resettlement procedures, contents of compensation, and relocation site, stating that they had received proper amounts of compensation. One felt it was a pity that the relocated house was in a residential area and did not have a large garden overlooking the river, as the previous house before the relocation had. The second said that she

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<sup>19</sup> Emission reduction of 182 t-CO<sub>2</sub> from 2020 to June 2021. (Source: the MOT)

<sup>20</sup> Emission reduction of 497 t-CO<sub>2</sub> from 2019 to June 2021. (Source: the MOT)

<sup>21</sup> Compensations were made under the *Land Acquisition Act*, the *Sri Lanka National Involuntary Resettlement Policy*, and the *Ex-Gratia Package for the People Affected by Highway Projects*.

<sup>22</sup> Some businesses reported that they had lost business opportunities in good locations and needed time to reacquire customers and recover income. However, in accordance with the *Ex-Gratia Package for the People Affected by Highway Projects*, there was a system in which the amount of earnings for a certain period of time in the past would be paid upon application as a business loss allowance.

<sup>23</sup> As for the information on the 10 households provided by the RDA, since the RDA only kept a list of affected households for all sections of the OCH, the RDA selected a number of households from the top of the list, who were considered to be the target households for Phase 2. Among the selected households, the RDA confirmed that 10 households were actually Phase 2 targets and provided contact information for the 10 households.

<sup>24</sup> One legal issue arose when the landowner received compensation but refused to vacate; however, the trial resulted in the successful resettlement.

did not feel the same sense of openness like before because she had moved to a residential area, and the third said that she was very happy living in the new house because she had a better relationship with her neighbors in the new residential area than she had in her previous village. One person who expressed dissatisfaction said that he was not satisfied with the amount of compensation he was paid because only part of the land he owned was acquired and he was not entitled to resettlement. None of the four said that their jobs or income had changed as a result of resettlement.

Table 13. Land acquisition and resettlement in the project section

	Phase 1		Phase 2	
	Plan *	Actual	Plan **	Actual
Land acquisition (ha)	94.2	N/A	81.5	N/A
Lots	926	1,201***	1,091	1,136***
No. of affected households ****	919	1,204	1,063	N/A
Resettlement	Houses	107	109	242
	Commercial buildings	12	12	81
	Others	16	N/A	N/A

Source: Materials provided by JICA and RDA

\* Planned data as of May 2006.

\*\* Planned data at the project appraisal of Phase 2 (II).

\*\*\* As there was no significant increase in the number of resettlements, it can be assumed that the number of households affected by the land acquisition increased.

\*\*\*\* Households affected by both resettlement and land acquisition.

For the construction of roads near the ICs (Township Development), a land acquisition of 12.7 hectares and the resettlement of 49 households were anticipated. Due to the cancellation of the Kadawatha component and a change to the road layout, however, only one hectare of land was acquired and four households were resettled. Compensations were paid to the four households.

### (3) Accidents occurring during the construction of the project section

In March 2014, an accident occurred in which three workers were killed and two others were injured by a girder which toppled, trapping them underneath. In response, JICA conducted an investigation on safety management for the construction work analyzing the root causes of the accident. As a result of the investigation, poor maintenance of construction equipment and inadequate safety measures at the construction site were identified as causes. However, there were subsequent accidents that caused injuries. To prevent further incidents, the number of safety-management personnel was increased and the workers were re-educated on safety-management measures.

### (4) Mitigating the negative impacts through the viaduct construction

Based on a recommendation from the Department of Irrigation, the project built a 1 km-long viaduct in the flood-prone area near the Kadawatha IC, where the Kelani River flows. According to the RDA, although statistical causality has not been verified, it is considered that the viaduct contributes to measures for risk reduction of flood damage because its structure was designed not to block the water flow.



Viaduct built near the Kelani River

(5) Improved connectivity between regions by connecting the OCH to the Colombo–Katunayake Expressway (E03), linking to Bandaranaike International Airport as a result of the completion of the China-assisted section

According to the interviews conducted with five users of the project section, mentioned above in the effectiveness section, the connection of the OCH to the Colombo–Katunayake Expressway (E03) has reduced the travel time to Bandaranaike International Airport, which used to take more than an hour, but now takes only 45 minutes. Those who said that the driving time to the airport has been reduced also said that it was worth paying the express toll to save time, especially in the evening when the roads are congested. In addition, some respondents mentioned that it became convenient to travel to Negombo, a tourist city near the airport, and Chilaw, a tourist city in the North Western Province.

(6) Promoting logistics by constructing the OCH

The total cargo handled at the Port of Colombo showed a stable upward trend, from 81,879 thousand MT in 2016 to 101,926 thousand MT in 2019. In 2020, the growth rate was negative, owing to the impact of COVID-19. Similarly, the total cargo handled at Bandaranaike International Airport showed a stable upward trend—from 253,941 MT in 2016 to 268,496 MT in 2018. In 2019, the growth rate was negative; according to a report from the Central Bank of Sri Lanka, the rate was affected by the Sri Lanka Easter bombings, which occurred in 2019. In 2020, the rate decreased further, due to the impact of COVID-19.

Despite the impacts of the Sri Lanka Easter bombings and COVID-19, the OCH is still a part of an important distribution route;<sup>25</sup> the project is believed to contribute to improving the logistics.

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<sup>25</sup> Regarding the distribution routes between the Port of Colombo and the south, there are two routes: one from the Port of Colombo to the Southern Expressway (E01) via the radial arterial road and the project section, and the other from the Port of Colombo to the Southern Expressway (E01) via another radial arterial road (without going through the project section). In addition, the distribution route connecting Bandaranaike International Airport to the south is currently the Colombo–Katunayake Expressway (E03) — OCH — Southern Expressway (E01); however, until the completion of the China-assisted section in December 2019, the Colombo–Katunayake Expressway (E03) and the OCH were not connected. Therefore, some traffic routes could pass by Colombo City and use the Southern Expressway (E01) without crossing the project section. For this reason, the role of the project section may have been limited.

Table 14. Change in the total cargo handled at the Port of Colombo

	2014	2015	2016	2017	2018	2019	2020
Total cargo handled (1000 MT)	70,794	73,718	81,879	89,035	100,152	101,926	97,681
Year-on-year growth rate	11.5 %	4.1 %	11.1 %	8.7 %	12.5 %	1.8 %	-4.2 %

Source: Central Bank of Sri Lanka

Table 15. Change in the total cargo handled at Bandaranaike International Airport

	2014	2015	2016	2017	2018	2019	2020
Total cargo handled (MT)	192,371	215,031	253,941	265,786	268,496	246,406	136,043
Year-on-year growth rate	4.1 %	11.8 %	18.1 %	4.7 %	0.8 %	-8.2 %	-44.8 %

Source: Central Bank of Sri Lanka

In light of the above, it can be concluded when the achievement after the completion of the China-assisted section is taken into account that the four quantitative indicators set in the effectiveness could have been achieved at a level close to the target values if the COVID-19 pandemic, an external factor, had not occurred. Moreover, the interviews with project-section users confirmed that connecting the Southern Expressway (E01) to the project section improved connectivity between the regions. In terms of impacts, the results of the measurement survey showed that constructing the project section contributed to mitigating traffic congestion in Colombo City. In addition, the interviews with entrepreneurs running businesses near ICs confirmed that the project-section opening contributed to vitalizing local industries and promoting economic development. Therefore, the effectiveness and impacts of the project are high.

### 3.4 Sustainability (Rating: ②)

#### 3.4.1 Institutional/Organizational Aspects of Operation and Maintenance

##### (1) Institutional aspect

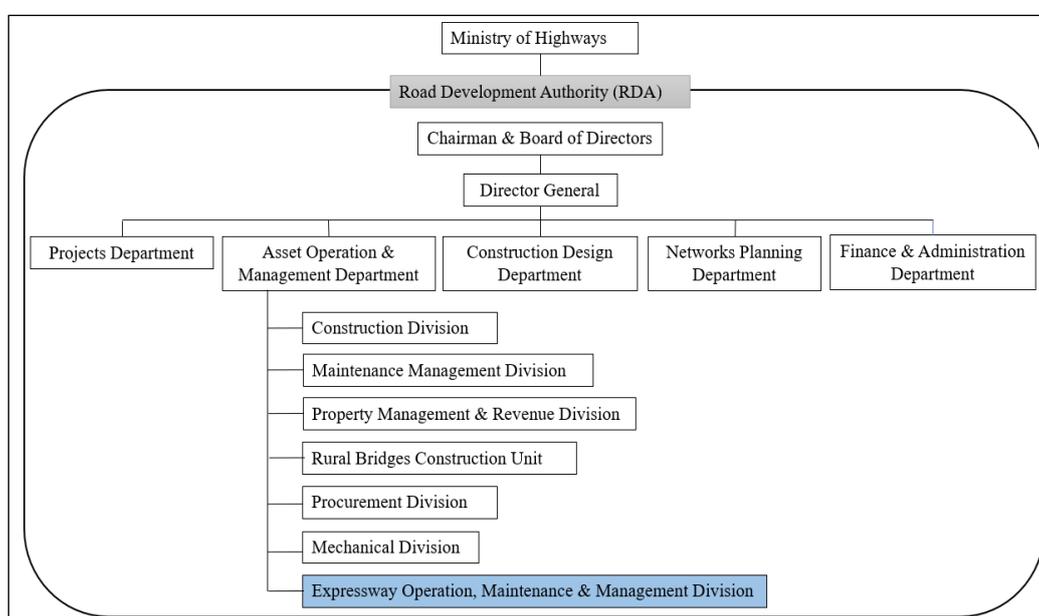
The Ministry of Highways is responsible for formulating highway policies and projects, as well as supervising organizations under the Ministry, including the RDA. The RDA, established under the *RDA Act No. 73* of 1981, is responsible for the development, operation, and maintenance of the expressway network<sup>26</sup> under the *National Thoroughfares Act, No. 40* (2008).

The MOT is responsible for operation and maintenance of the MMC. Since the MMC is the first facility of its kind in the country, involving various organizations, including the Sri Lanka Railways Department and National Transport Commission, existing institutions and legislation cannot fully address the issue of MMC operation and maintenance. For this reason, the MOT was developing an institutional mechanism and legal framework to operate and maintain the MMC at the time of the ex-post evaluation. Now that its conception paper has been finalized, the new system is expected to be officially established, with Parliamentary approval, by the end of FY 2021 or 2022.

<sup>26</sup> The legal and institutional procedures for the establishment of the Expressway Authority, planned at the project appraisal, has not proceeded, due to the change of government and the reorganization of ministries. At the ex-post evaluation, no concrete plan (with a timeline of its establishment and the expected role) had been established.

(2) Organizational aspect

The operation and maintenance of OCH is performed by the Expressway Operation Maintenance and Management Division (EOMM), under the Asset Operation and Management Department. In addition to operating and maintaining expressways, the EOMM is responsible for collecting tolls, conducting patrols to ensure the safety of road users, addressing malfunctions, and responding to accidents 24 hours a day and 7 days a week. According to the RDA, the number of personnel assigned to the EOMM is fewer than required, as shown in Table 16. Although there is a plan to increase the number of personnel, the Ministry of Highways must first obtain approval from the Ministry of Finance, a process that will take some time.



Source: Created by the evaluator, based on materials provided by the RDA

Figure 3. RDA organizational chart

Table 16. Allocation of EOMM personnel (as of April 2021)

Section	No. of Personnel	No. of personnel required	Shortfall
User Fee Collection	1,062	1,587	525
Traffic Control	155	268	113
Maintenance	157*	175*	18*
Mechanical	343	408	65
Electrical & Electronic	29	80	51
IT/Computer	12	47	35
Administration	47	115	68
Accounts	33	63	30
Procurement	12	22	10
Construction & Procurement	8	10	2
<b>Total</b>	<b>1,858</b>	<b>2,775</b>	<b>917</b>

Source: the RDA

\* Excluding laborers.

In terms of the operation and maintenance of the MMC, the Township Development Project under the MOT played a role at the ex-post evaluation as the expansion project was ongoing. Once the institutional mechanisms and legal framework for operating and maintaining the MMC are in place, the task will be transferred to a new department to be established within the MOT.

There are thus no problems associated with the institutional and organizational aspects of operation and maintenance. However, concerns remain regarding the lack of EOMM personnel.

### 3.4.2 Technical Aspects of Operation and Maintenance

Regarding the technical capability for the daily operation and maintenance of OCH, one-off training is conducted as needed, but no regular training is provided. The EOMM has conducted daily inspections and repairs without encountering any problems, using manuals such as the *Toll Collection Manual*, the *Inspection and Maintenance Manual*, and the *Traffic Management Manual*, which were formulated under the JICA Technical Assistance related to ODA Loan. The EOMM is considered to have sufficient technical capabilities to carry out daily operation and maintenance.

For the large-scale maintenance of the OCH, an overlay<sup>27</sup> of the road surface is generally performed every 10 years.<sup>28</sup> The first overlay of the project section is likely to be carried out four or five years after the ex-post evaluation. Similar large-scale maintenance, including overlays, has been carried out without any problems in other sections operated by the RDA, so no particular technical concerns have been observed.

With regard to the technical capacity of operation and maintenance for the MMC, the Township Development Project under the MOT has been working to build staff capacity by conducting operation and maintenance training; no particular problems have been observed.

There are thus no particular concerns about the technical capacity for operation and maintenance.

### 3.4.3 Financial Aspects of Operation and Maintenance

According to the RDA, the cost of daily inspections and repairs of the OCH is fully covered by revenue from tolls and other sources, raising no particular financial concerns. In addition, the RDA, with support from the Asian Development Bank (ADB), has been developing a system of communication, monitoring, and manuals. Once the system is developed, it is expected to centralize monitoring information, improve efficiency, and reduce the cost of operation and maintenance. The RDA is considering expanding the system for the entire expressway network, including the OCH.

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<sup>27</sup> Repairing cracks and worn, thin road surfaces.

<sup>28</sup> It depends on the condition of the road and the EIRR of the section.

At the same time, no specific budget item for large-scale periodic maintenance, including road-surface overlays and major future repairs, has been established. Although it is reported that these costs can be covered on a case-by-case basis as needed, it would be desirable to establish the budget item and systematically secure the budget for large-scale periodic maintenance and major repairs expected in the future.

Table 17. Operation and maintenance costs of the OCH (unit: million rupees)

	2017	2018	2019	2020
Maintenance cost, including equipment-purchase costs	91.8	168.6	161.1	182.5
Operation costs, including staffing costs	165.9	237.8	279.3	266.9
Total	257.7	406.4	440.4	449.4

Source: the RDA

\* Data for 2017 covers April to December.

Table 18. OCH revenue (unit: million rupees)

	2017	2018	2019	2020
Toll fee	1,715	2,010	2,256	2,072
Towing charge	2	2	2	2
Charge for accident response	1	5	4	3
Total	1728	2017	2262	2077

Source: the RDA

The MMC receives tenant-fee income from banks, restaurants, and other organizations, as well as from electricity sales of installed solar panels. It aims to become financially independent by 2025.

Table 19. MMC revenue (unit: million rupees)

Revenue up to December 2020	20
Revenue from January to April 2021	6
Outstanding receivables	5

Source: the MOT

Although no particular financial problems were observed at the ex-post evaluation, more stable operation and maintenance can be ensured by accumulating a budget for large-scale periodic maintenance and major repairs expected in the future.

#### 3.4.4 Status of Operation and Maintenance

##### (1) Undulation and bumps on the road surface

Undulations and bumps were observed on the road surface of viaducts near the Kaduwela and Kothalawala ICs, causing discomfort while driving. Although these problems occurred during the defect liability period, the root causes were not identified. Subsequently, the EOMM

investigated the causes, discovering that the issue was caused by the asphalt material and surface thickness; part of the road surface was repaired on a trial basis. The EOMM will monitor the condition of the road surface after the repair. If this trial repair method is successful, it will be applied to other locations. According to the interviews conducted with five project-section users discussed in the section on effectiveness, four out of five users also pointed out that the road surface, especially on the viaduct, had deteriorated, with undulations and bumps appearing.

### (2) Deterioration of the expansion joints

Some of the expansion joints in the project section have deteriorated (settling, lifting, cracking) in several locations. The RDA recognizes the situation as a serious issue because it causes accidents of vehicle damage. The EOMM has repaired the expansion joints as an urgent measure whenever they become damaged, but this is a temporary fix that does not solve the fundamental problems. The specifications of the expansion joints used in the project differed from those used in the Southern Expressway and other sections operated by the RDA. In other sections, where the gap between the expansion joints could be reduced compared to the project section, specifications that were structurally simpler and more durable were selected. The problems that occurred in the project section have not occurred in other sections. At the same time, it was reported that the specifications in the project section were selected to ensure smooth driving and less vibration, even though the road structure had a larger expansion gap. It should be noted that the reason for the deterioration of expansion joints occurring faster than expected may be due to a combination of factors, including not only the type of specifications but also the quality of the product itself and the installation work.



Expansion joint in the project section



Expansion joint in other sections

### (3) Others

According to the interviews with the project-section users, some of them commented that they expected improved expressway lighting because the visibility became very poor, especially at night on rainy days. The lighting was not good enough for an expressway with a speed limit of 100 km/h. Others said that steps needed to be taken to prevent animals from entering the expressway. According to the RDA, although there is no concrete plan or budget allocation yet,

increasing lighting as well as fences to prevent animals from entering the expressway is under consideration.

In light of the above, no particular concerns have been observed in relation to the institutional and technical aspects of operation and maintenance. However, there are minor issues in relation to organizational and financial aspects and partial problems involving the status of operation and maintenance. Therefore, sustainability of the project effects is fair.

## **4. Conclusion, Lessons Learned and Recommendations**

### 4.1 Conclusion

The project was carried out with the objective to improve regional connectivity by constructing an expressway that connects major national roads and the Southern Expressway in the suburbs of Colombo City. The project objective was fully consistent with Sri Lanka's development policies, development needs, and Japan's ODA policies. Therefore, relevance of the project is high. Regarding the project implementation, the project cost was within the plan, but the project period exceeded the plan, thus efficiency of the project is fair. In terms of effectiveness, the indicators achieved close to the target values, when the evaluation took into account of the effects after the completion of the China-assisted section, which was originally planned to be constructed under the project but was ultimately completed with Chinese assistance. The findings also show that traveling convenience improved when the sections constructed under the project were linked to the Southern Expressway. Regarding impacts, it has been quantitatively shown that the project has contributed to easing traffic congestion in Colombo City by improving connectivity between regions. In some confirmed cases, the project has contributed to vitalizing local industries and to promoting economic development. Therefore, effectiveness and impacts are high. In terms of the operation and maintenance of facilities constructed under the project, no particular problems have been observed, in the institutional and technical aspects, despite having minor organizational and financial problems. There are also some problems in the status of operation and maintenance. Therefore, sustainability of the project is fair.

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

### 4.2 Recommendations

#### 4.2.1 Recommendations to the Executing Agency

##### (1) Consideration to identify a method of repairing or replacing expansion joints

The EOMM has temporarily repaired the expansion joints, but this has not led to a fundamental solution. With the cooperation of the Research and Development Section of the Construction Design Department, the EOMM needs to find a lasting way to repair expansion joints. If no fundamental method can be found, it is recommended that the EOMM estimates the

cost of replacing the expansion joints entirely.

(2) Establishing a budget item for large-scale periodic maintenance and major repairs

It has been reported that the cost of large-scale periodic maintenance and major future repairs will be covered on an ad-hoc basis, and no financial problems have arisen at this time. However, to carry out stable operation and maintenance, it is desirable to establish a budget system that will gradually and systematically accumulate funds. Therefore, it is recommended that the EOMM establishes a budget item and accumulate long-term funding for large-scale periodic maintenance and major repairs.

4.2.2 Recommendations to JICA

None

4.3 Lessons Learned

The importance to consider the unification with existing specifications as one of the possible options when choosing equipment specifications

There have been problems with the expansion joints installed in the project and the executing agency is finding it difficult to identify a solution. Although the expansion-joint specifications were appropriately selected to ensure driving comfort based on the road structure, they differed from those used in other sections of expressway, which were simple in structure and easy to manage. This made it difficult to identify a long-lasting method of repair. From the operation and maintenance perspective, operating facilities with unified specifications enable more efficient operation and maintenance, making it easier to take countermeasures when problems occur. For similar future projects, if the executing agency operates existing facilities, “unification with existing specifications” can be one of the important factors to consider when choosing equipment specifications.

End

Comparison of the Original and Actual Scope of the Project

Item	Plan	Actual
① Project outputs		
1. Construction of the project section	Total: 20 km	Total: 20 km
2. IC construction	3 locations	5 locations
3. Bridge construction	29 bridges	27 bridges
4. Construction of tollgates and the installation of equipment	Tollgate offices (2 locations), toll booths (21 locations), installation of toll-system equipment	As planned
5. Township development	- Construction of roads and other facilities near the ICs (Kottawa, Kaduwela, Kadawatha districts)	- Construction of roads and other facilities near the ICs (Kottawa and Kaduwela districts) - Construction of the MMC - Procurement of equipment for the MMC, and consulting services for operation and maintenance
6. Consulting services for road construction	<Scope of work> Construction supervision, monitoring environmental and social considerations design of expressway facilities, structural design changes, etc. <Volume of work> International consultants: 385 MM Local consultants: 3,537 MM	<Scope of work> As planned  <Volume of work> International consultants: 462 MM Local consultants: 5,853 MM
② Project Period	March 2007–March 2015 (97 months)	March 2007–July 2015 (101 months)
③ Project Cost		
Amount Paid in Foreign Currency	18,824 million yen	Unknown
Amount Paid in Local Currency	62,632 million yen (70,968 million rupees)	Unknown
Total	81,456 million yen	63,376 million yen
ODA Loan Portion	59,323 million yen	57,606 million yen
Exchange Rate	Phase 1: 1 rupee = 1.12 yen (As of October 2006) Phase 2: 1 rupee = 0.77 yen (As of November 2010)	Phase 1: 1 rupee = 0.83 yen (Average for 2007–2015) Phase 2: 1 rupee = 0.78 yen (Average for 2008–2018)
④ Final disbursement	Phase 1: June 2015 Phase 2 (I): October 2012 Phase 2 (II): July 2018	