Completion Report

Project Number: 39431-013
Loan Number: 2319
July 2015

Sri Lanka: Colombo Port Expansion Project

Asian Development Bank

CURRENCY EQUIVALENTS

Currency Unit – Sri Lanka Rupee/s (SLRe/SLRs)

		At Appraisal	At Project Completion
		1 February 2007	10 April 2012
Rs1.00	=	$0.0091	$0.00785
$1.00	=	SLRs 109.29	Rs127.27

ABBREVIATIONS

ADB	–	Asian Development Bank
BOT	–	build-operate-transfer
CCD	–	Coastal Conservation Department
CEA	–	Central Environmental Agency
CICT	–	Colombo International Container Terminals
EIA	–	environmental impact assessment
EIRR	–	economic internal rate of return
EMP	–	environmental management plan
FIRR	–	financial internal rate of return
HIW	–	harbor infrastructure works
ISC	–	Indian subcontinent
m	–	Meter
MPA	–	Ministry of Ports and Aviation
PIU	–	project implementation unit
PPP	–	public–private partnership
SCT	–	South Container Terminal
SEIA	–	summary environmental impact assessment
SLPA	–	Sri Lanka Ports Authority
TA	–	technical assistance
TEU	–	twenty-foot equivalent unit

NOTE

In this report, "$" refers to US dollars.

Vice-President	W. Zhang, Operations 1
Director General	H. Kim, South Asia Department (SARD)
Director	H. Yamaguchi, Transport and Communications Division (SATC), SARD
Team leader	A. P. Chiang, Transport Specialist, SATC K. Yangzom, Environment Specialist, SATC S. Zhao, Social Development Specialist, SATC

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BASIC DATA

A. Loan Identification

1.	Country	Sri Lanka
2.	Loan Number	2319-SRI
3.	Project Title	Colombo Port Expansion Project
4.	Borrower	Democratic Socialist Republic of Sri Lanka
5.	Executing Agency	Ministry of Ports and Aviation
6.	Amount of Loan	($300 million equivalent)
7.	Project Completion Report Number	PCR: SRI-1516

B. Loan Data

1.	Appraisal	
	– Date Started	1 November 2006
	– Date Completed	7 November 2006
2.	Loan Negotiations	
	– Date Started	16 January 2007
	– Date Completed	18 January 2007
3.	Date of Board Approval	27 February 2007
4.	Date of Loan Agreement	25 April 2007
5.	Date of Loan Effectiveness	
	– In Loan Agreement	90 days from signing (24 July 2007)
	– Actual	2 May 2008
	– Number of Extensions	4
6.	Closing Date	
	– In Loan Agreement	30 April 2011
	– Actual	19 July 2013
	– Number of Extensions	1
7.	Terms of Loan	
	– Interest Rate	London interbank offered rate plus 0.6%
	– Maturity (number of years)	25 years
	– Grace Period (number of years)	5 years
8.	Terms of Relending (if any)	None
9.	Disbursements	
	a. Dates	

Initial Disbursement	Final Disbursement	Time Interval
19 May 2008	19 July 2013	62 months
Effective Date	**Original Closing Date**	**Time Interval**
2 May 2008	30 April 2011	36 months

b. Amount (USD)

Category	Original Allocation	Last Revised Allocation	Amount Increased/ (Cancelled)	Amount Disbursed	Undisbursed Balance
Civil Works	260,300,000	289,048,099	28,748,099	289,048,099	0
Equipment	2,000,000	2,024,894	24,894	2,024,894	0
Consulting Services	12,700,000	8,927,007	(3,772,993)	8,927,007	0
Unallocated/Contingency	25,000,000				
Total	**300,000,000**	**300,000,000**	**25,000,000**	**300,000,000**	**0**

Source: ADB loan financial information.

10. Local Costs (Financed)
- Amount ($) 30.34 million
- Percent of Local Costs 20.3%
- Percent of Total Cost 7.2%

C. Project Data

1. Project Cost ($ million)

Cost	Appraisal Estimate	Actual
Foreign Exchange Cost	342.1	271.69
Local Currency Cost	137.9	149.30
Total	**480.0**	**420.99**

2. Financing Plan ($ million)

Cost	Appraisal Estimate	Actual
Public Sector Component		
Borrower Financed	180.00	120.99
ADB Financed	300.00	300.00
Subtotal	**480.00**	**420.99**
Private Sector Component	**301.00**	**500.00**[a]
Total	**781.00**	**920.99**

ADB = Asian Development Bank.
[a] Sri Lanka Ports Authority estimate.

3. Cost Breakdown by Project Component ($ million)

Component	Appraisal Estimate	Actual
A. Public Sector Component		
Civil Works	316.50	360.52
Equipment	2.00	2.02
Consulting Services	12.70	9.01
Taxes and Duties	49.70	12.38
B. Contingency	43.90	0.00
C. Financing charges during implementation	55.20	37.06
Total	**480.00**	**420.99**

4. Project Schedule

Item	Appraisal Estimate	Actual
Consulting Services		
TA Loan Consultant Support Bidding Process	Q1 2007–Q3 2007	Q1 2007–Q1 2008
Construction Supervision Consultant		
Recruitment	Q4 2006–Q2 2007	Q1 2007–Q1 2008
Implementation	Q3 2007–Q3 2010	Q1 2008–Q2 2013
Harbor Infrastructure Works		
Contract Procurement	Q1 2007–Q3 2007	Q1 2007–Q1 2008
Implementation	Q3 2007–Q3 2010	Q1 2008–Q2 2013

5. Project Performance Report Ratings

	Ratings	
Implementation Period	**Development Objectives**	**Implementation Progress**
31 March 2007–30 September 2007	Satisfactory	Satisfactory
1 October 2007–30 April 2008	Satisfactory	Unsatisfactory[a]
1 May 2008–31 October 2008	Satisfactory	Satisfactory
1 November 2008–30 April 2009	Satisfactory	Satisfactory
1 May 2009–31 October 2009	Satisfactory	Satisfactory
1 November 2009–30 April 2010	Satisfactory	Satisfactory
1 May 2010–31 October 2010	Satisfactory	Satisfactory
1 November 2010–30 April 2011	Satisfactory	Satisfactory
1 May 2011–31 October 2011	Satisfactory	Satisfactory
1 November 2011–30 April 2012	Satisfactory	Satisfactory
1 May 2012–31 October 2012	Satisfactory	Satisfactory
1 November 2012–30 April 2013	Satisfactory	Satisfactory

[a] Conditions of loan effectiveness were not met by this time and hence progress was rated unsatisfactory.

D. Data on Asian Development Bank Missions

Name of Mission	Date	No. of Persons	No. of Person-Days	Specialization of Members
Consultation 1	3–4 May 2007	3	6	b(2), e
Consultation 2	15–16 August 2007	3	6	b(2), e
Consultation 3	13–18 February 2008	4	20	a(3), b, f, e
Inception	26–28 May 2009	5	13	a, b(2), e, g
Review 1	20–23 July 2009	2	8	b, g
Special Loan Administration 1	1 September 2009	1	1	b
Special Loan Administration 2	15–16 October 2009	4	6	a, b(1), d
Review 2	9 February 2010	4	3.5	a, b(1), d
Review 3	2–9 June 2010	5	18	a, c, d, e h
Review 4	24 November–1 December 2010	4	21	a, d, e, g
Review 5	8–13 March 2012	4	15	b(1), d, e, g
Project completion review	11–15 August 2014	4	8	d, g, h(2)

a = deputy country director/country director/director/, b = transport specialist, c = social development/safeguard specialist, d = project implementation specialist, e = national officer; f = counsel, g = project analyst, h = consultant

I. PROJECT DESCRIPTION

1. At the request of the Democratic Socialist Republic of Sri Lanka, the Asian Development Bank (ADB) approved a loan of USD 300 million from ADB's ordinary capital resources to finance the public sector component of the Colombo Port Expansion Project.[1] The project was developed on a public–private partnership (PPP) basis and comprises (i) a public sector component for harbor infrastructure works, and (ii) public-private partnership development of container terminals. The loan agreement was signed on 25 April 2007 and became effective on 2 May 2008. The project aimed to assist the government to consolidate Colombo Port's position as a transshipment hub port for the South Asian region by providing sufficient container-handling capacity and sufficient depth for new-generation vessels.

2. At appraisal, the project was expected to provide dredging and breakwater construction sufficient to accommodate three terminals that were to be constructed sequentially. The project also includes establishment of a new marine operations center, relocation of a submarine oil pipeline, provision of navigational aids, and construction of shore utilities. The harbor infrastructure works (HIW) were to be implemented by the Sri Lanka Ports Authority (SLPA). Two terminals were expected to be operational in 2010 and 2015, respectively, and constructed by private operators chosen through open competitive bidding under build-operate-transfer (BOT) concession agreements.

3. At appraisal, the total cost of the project was estimated at $781 million comprising a public sector component of $480 million (about 61.5% of total cost) and private sector component of $301 million (about 38.5% of total cost). For the public sector component, a loan of $300 million from the ordinary capital resources of the ADB was to be provided under ADB's London interbank offered rate (LIBOR)-based lending facility.

4. The project was designed to promote economic growth by improving Sri Lanka's competitiveness in the port sector and facilitate economic growth by enhancing national competitiveness in international trade via lower transport costs and faster delivery times. Container-handling capacity would increase, thereby generating additional income from greater transshipment market share.

II. EVALUATION OF DESIGN AND IMPLEMENTATION

A. Relevance of Design and Formulation

5. Colombo Port is the natural transshipment hub port for the South Asian region. In 2005, container traffic volume at Jaya Container Terminal accounted for more than 90% of SLPA's revenues, making container traffic the major revenue earner for SLPA. About 70% of the containers handled in Colombo Port are transshipment containers, of which 75% are for the Indian subcontinent (ISC) market and 25% for the West African market. Between 1998 and 2002, however, Colombo Port's share in transshipment of ISC cargoes declined from 52% to 45% of the total even as the ISC transshipment market grew at an 8% annual rate. The loss in market share accounted for a stagnation of overall container traffic volume at Colombo Port during this period. This occurred mainly because the fundamentals of the market changed and Colombo Port did not adapt. Colombo Port could not offer the additional operating capacity needed to compete for the ISC transshipment market or the depth required to berth the latest

[1] ADB. 2007. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the Democratic Socialist Republic of Sri Lanka for the Colombo Port Expansion Project.* Manila.

generation of container ships. To recapture market share and remain a transshipment port, Colombo Port would need to develop additional container berths with the required depth to address these capacity and depth infrastructure constraints.

6. ADB provided a technical assistance loan (TA loan) to the Government of Sri Lanka.[2] The objective was to assist the government in developing the Colombo Port as a major, internationally competitive port in South Asia by adopting a strategic approach to enlarging the port and maximizing private sector funding. The TA loan delivered the business plan and the engineering design for the follow-on loan (Loan 2319) for the public sector component, and it also provided consulting services to prepare the procurement documents and assist the government in engaging a private sector terminal operator for the BOT concession for the South Container Terminal (SCT). The TA loan was closed on 31 December 2010.

7. During the appraisal stage for Loan 2319, ADB's strategy was to promote an efficient port system to enhance Sri Lanka's competitiveness and which would in turn attract investment. As Sri Lanka would not be able to generate sufficient domestic cargo to attract mainline vessels, creating a true transshipment hub port would allow Colombo Port to attract such vessels. As these vessels are more economical, they would allow Sri Lanka's own imports and exports to obtain lower freight charges than would otherwise be possible by avoiding the need to use feeder vessels. Enabling Colombo Port to maintain its transshipment port status would also bring additional foreign exchange to the country. A larger volume of ships calling at Colombo Port for transshipment would encourage growth in such ancillary industries as ship chandlery and bunkering, thereby increasing economic activity and generating employment opportunities generally that would not otherwise exist. Maintaining Colombo Port's transshipment hub port status will allow Sri Lanka to act as a distribution and logistics hub for the South Asian region. If realized, that will again generate economic activities and employment opportunities. ADB's strategy is also to encourage PPP in the ports sector as part of efforts to implement the landlord port model to increase efficiency.

8. At the time, the country's vision for ports sector development, which was set out in the government's *Mahinda Chintana* national policy, was to (i) develop the main ports of the country to facilitate increasing export and import trade associated with rapid economic development of the country as well as the region by taking advantage of the liberalization and globalization process; (ii) decongest Colombo Port by constructing South Port in Colombo, as well as the Galle and Hambantota ports; (iii) develop medium-scale ports in identified provinces such as South, East, and North to divert increasing volumes of domestic bulk freight transport from road to sea transport; (iv) encourage an alternative source of funding for new investment in port-related infrastructure development; (vi) operate ports as commercial entities without Exchequer support; and (vii) encourage PPP investment for new investment in the port sector.[3] While continuing the state ownership of existing ports, the government's strategy was to increase efficiency of existing ports, operate ports as commercial entities, and establish container terminals as PPP projects.

9. The project's design was therefore fully aligned with government priorities and ADB's country strategy. Despite delays and extensions in implementing the preceding TA Loan 1841, this was instrumental in ensuring a high level of project readiness for Loan 2319. The outputs

[2] ADB. 2001. *Report and Recommendation of the President to the Board of Directors: Proposed Technical Assistance Loan to the Democratic Socialist Republic of Sri Lanka for the Colombo Port Efficiency and Expansion Project*. Manila.

[3] Department of National Planning, Ministry of Finance and Planning. 2010. *Sri Lanka, The Emerging Wonder of Asia: Mahinda Chintana—Vision for the Future*. Colombo.

and outcomes of the project meet the government's development objectives and ADB's country strategy. The project's design and monitoring framework with results is in Appendix 1.

B. Project Outputs

10. The project outputs envisaged during appraisal were (i) dredging, reclamation, and breakwater construction to be completed; and (ii) south terminal construction to be completed. In November 2012, ADB revised the design and monitoring framework through a minor change in the project to update the performance targets and indicators with baselines to more accurately reflect newer framework guidelines.[4] The revised outputs were (i) improved harbor infrastructure, and (ii) South Container Terminal construction completed through PPP.

1. Output 1: Improved Harbor Infrastructure

11. The first output was the public sector component to construct the harbor infrastructure works (HIW). It was successfully completed by April 2012. The HIW included a breakwater of about 6.4 kilometers; two-way harbor access channel 9,000 meters (m) long, 570 m wide, and 20 m deep; a new navigation control tower facility of 300 square meters; marine navigation aids including 15 channel-marking light buoys, 2 breakwater obstacle lights, 1 PEL sector light, and a vessel traffic management system; and 6.4 kilometers of access roads. The HIW is designed to accommodate three new terminals, each of which would provide additional capacity of 2.4 million TEU, thereby increasing the overall container-handling capacity by 7.2 million TEU. In addition, the HIW would be able to accommodate mega vessels with overall length of 400 m, beam of 55 m, and draft of 16 m.

2. Output 2: South Terminal Construction completed through PPP

12. The second output was the private sector component to develop the first container terminal on the HIW—the SCT—on a BOT basis. This was completed by April 2014. The operator was chosen through open competitive bidding. The BOT concessionaire contract was finalized with the consortium of China Merchant Holdings and Aitken Spence on 12 August 2011, and the BOT contract became effective on 1 December 2011. A special purpose company for the terminal operation, named Colombo International Container Terminal (CICT), was established jointly by the consortium and SLPA. CICT mobilized the contractor on 16 December 2011. The first phase of the SCT opened for operations in August 2013, and the SCT was fully operational by April 2014. As of August 2014, the largest vessel calling at SCT was a 14,000 teus vessel, and the total throughput at SCT in 2014 was 686,636 teus, which is good achievement for first year of operations.

13. During construction, quality control was carried out jointly by the contractors and the construction supervision consultants. The consultants inspected and assessed the works to make sure specifications were met.

[4] The project's original design and monitoring framework was prepared in February 2007, before new guidelines for preparing design and monitoring frameworks were issued in July of that year. In consultation with the government, the revised framework with clearer measurable performance targets was approved on 27 November 2012. This was to enable more meaningful evaluation of project performance during the project completion review stage. The revision did not materially alter or fundamentally affect the scope and project outcome.

C. Project Costs

14. At appraisal, the cost for the public sector component had been estimated at $480 million. It was to be financed by an ADB loan of $300 million (62.5% of total), which is exclusive of taxes and duties, and government counterpart funds of $180 million (38.5% of total). At completion, the cost for the public sector component was $420.99 million. ADB financed $300 million of that amount and the government's counterpart funds used were $120.99 million or approximately $165.22 million if the exempted tax and duties are taken into account. The ADB loan of $300 million from ADB's Ordinary Capital Resources was approved on 27 February 2007. A detailed comparison of the financing plan at appraisal and actual is in Appendix 2.

15. **Civil works.** At appraisal, the civil works were estimated to cost $316.5 million, excluding taxes and duties. The ADB portion was originally estimated at $260.30 million (82.24 % of civil works cost) and government counterpart funding at $56.2 million (17.76% of civil works cost). At completion, the costs were higher, at $360.52 million, as cost overruns led to a 14% increase in the civil works costs. This was mainly due to factors beyond the control of the project and attributed to increase of prevailing prices for key construction commodities since the contract award in 2008. At completion, $289.05 million (80.18% of civil works cost) was funded by ADB and the balance of $71.47 million (19.82% of civil works cost) by the government. ADB was able to fund the additional costs from the price and physical contingencies allocated during appraisal. The government was able to cover the additional cost mainly through savings in interest and commitment charges. The actual amount incurred for interest and commitment charges was about $37 million as compared to the $55.2 million estimated during appraisal.

16. **Equipment and consulting services.** At appraisal, costs for equipment and consulting services were estimated at $2 million and $12.7 million, respectively. At completion, the spending incurred on equipment and consulting services was $2.02 million (1% increase) and $9.01 million (29% reduction), respectively.

17. **Taxes and duties.** Although the project is exempt from taxes and duties, the total value was estimated at appraisal as $49.70 million. Since the total value of civil works, equipment, and consulting services increased by 12% from $331 million to $371 million, the amount of tax and duties exempt was estimated by increasing pro rata from $49.7 million to $55.7 million.

18. **Container terminals.** The HIW funded by ADB is expected to accommodate three container terminals, two of which are to be implemented by the private sector. The first of these, the SCT was financed by the BOT concessionaire formed by SLPA and the private sector. At appraisal, the cost was estimated as $301 million. The other two terminals, East Container Terminal and West Container Terminal, were estimated at $301 million and $324 million.

19. SLPA estimates, however, that the actual cost of implementing the SCT increased to more than $500 million. This was due to price escalation and an expedited schedule. The SCT was completed in 28 months, rather than the 60 months anticipated at appraisal. The first phase opened in August 2013 and the SCT was fully operational by April 2014. This cost increase negatively impacts the economic internal rate of return (EIRR) for the overall project, although this is offset by greater revenue streams during the same appraisal period for the economic analyses. These effects are captured in reevaluating the EIRR and the efficiency of the project.

D. Disbursements

20. All disbursements of the ADB loan proceeds were carried out in accordance with ADB's *Loan Disbursement Handbook* (as amended from time to time). The first disbursement was on 19 May 2008 and the final disbursement on 19 July 2013. Disbursement in 2009 was slower than expected due to harsh weather conditions on site. Thereafter, the contractor mobilized additional equipment to catch up on the physical progress.

21. To accommodate the slight overall delay in project implementation (para. 28), ADB approved extending the loan closing date from the original 30 April 2011 to 30 April 2013. To ensure disbursements under the loan were completed, the closing date was moved to 19 June 2013. Further, to meet requirements by the Central Bank of Sri Lanka and national budget regulations on foreign currency payments and avoid delaying project implementation, ADB approved to disburse the executing agency's share of foreign currency in addition to ADB's share, thus keeping the total loan amount the same. To cover the increase in civil works cost, ADB approved reallocation of $25 million of contingency in July 2012 to cover anticipated cost increases for civil works and equipment. In June 2013, ADB approved a final reallocation of savings from consulting services and equipment to cover shortfalls in civil works costs. The loan account was closed after the last disbursement was made. The annual projected and actual disbursements of the loan proceeds are described in Appendix 3.

E. Project Schedule

22. The comparison of the project schedule at appraisal and actual is in Appendix 4.

1. Output 1: Improved Harbor Infrastructure (Public Sector Component)

23. The HIW contract was signed on 31 March 2008 and construction commenced on 11 April 2008. Although there were initial delays in 2009 due to lack of dredging fleet and unfavorable sea conditions, the contractor overcame the delays and substantially completed the works in April 2012. The contract was extended by 6 months to complete minor building works. The implementation took about 4.5 years, which is 0.5 years more than estimated during appraisal. The defect liability period ended in April 2013.

2. Output 2: South Terminal Construction Completed through PPP (Private Sector Component)

24. To encourage major international container terminal operators to bid for the BOT concession, issuance of the request for proposals (RFP) was postponed until the ADB loan for the public sector component was approved. The RFP for the BOT concession was issued on 23 February 2007 and five bidders submitted bids by the 12 June 2007 deadline. However, following a Cabinet memorandum passed in January 2008 requiring the tender committee to consider national interest along with technical and financial aspects, the first bidding exercise had to be cancelled and the RFP revised. The revised RFP was issued on 4 June 2008, this time attracting only one bidder. Although the bid was technically sound, the financial offer was too low and the government requested extension of the deadline in the loan agreement to October 2009 so as to allow time to negotiate with the bidder for a higher financial offer.[5] But the

[5] Section 5.01(c) of the loan agreement allows ADB to suspend the loan in the event "the Borrower shall have failed to award the SCT, within 18 months after the Effective Date, to a selected private operator, following an open competitive bidding procedure in accordance with the Borrower's laws and procedures." As the effective date was 2 May 2008, the deadline was 1 November 2008.

process was further delayed by negotiations. ADB did not suspend the loan, however, as there was recognition that there was only one bidder and the process was complicated given the large scale of the BOT contract. The contract for the BOT concession was finalized and signed on 12 August 2011.

25. Construction of the terminal was completed 32 months ahead of original schedule. The first phase of 400 m of terminal commenced operations on 5 August 2013, delivering additional capacity of 0.8 million twenty-foot equivalent units (TEU) per annum. The remaining 800 m was completed and became fully operational by April 2014, adding further capacity of 1.6 million TEU per annum.

F. Implementation Arrangements

26. The project implementation unit's responsibilities were continued from the TA Loan 1841. The Ministry of Ports and Aviation (MPA) was the executing agency and SLPA the implementing agency. A project implementation unit was established with a project director and deputy project director and staffed with qualified personnel having expertise in contract management, environmental monitoring, planning, and accounting. The project director reported to the Chairman, SLPA. The project director had overall responsibility for project management and was responsible for the preparation of quarterly and annual project monitoring and progress reports. An interministerial project steering committee, chaired by the Secretary, MPA and comprising representatives from concerned government agencies, was established to oversee the project and coordinate issues related to project implementation. The Chairman, SLPA reported to the project steering committee on a regular basis. A construction supervision consultant comprising a team leader/chief resident engineer acted as engineer's representative supported by assistant resident engineers. Due to delay in selecting the terminal operator for the private sector component, the project's implementation was far behind the original schedule. Once construction commenced for the public sector component funded by ADB, however, the schedule of 48 months' time was extended only once to complete in 4.5 years. The organization chart for the institutional arrangement for the project implementation unit is in Appendix 5.

G. Conditions and Covenants

27. All loan covenants were complied with (Appendix 6). The government provided the counterpart funds required for the project and ensured its successful implementation. As described below, three key changes were processed to enable smooth implementation.

28. **Waiver of loan effectiveness condition.** The full benefits of this PPP project depend on coordinated implementation of the public and private sector components. At appraisal, a major risk was envisaged that no private sector party would be interested in the BOT concession. A loan effectiveness condition was designed to mitigate this risk by linking implementation of the HIW with progress on selecting the terminal operator and requiring the prospective terminal operator to be selected through open competitive bidding. The government nevertheless decided to rebid the BOT concession in 2008 (para. 24). Meanwhile, procurement for the HIW was in advanced stages. Any further delays in loan effectiveness would have resulted in additional costs to the government. Inasmuch as the selection of a terminal operator had been following an open competitive bidding process and timely completion of HIW was critical in this PPP project, ADB approved a waiver of the loan effectiveness condition even as a new provision allowed ADB to suspend the loan in the event that the BOT concession could not be awarded within 18 months after the loan effectiveness date. The waiver was approved on 11 April 2008, and the loan was declared effective on 2 May 2008. Although the concession could

not be awarded within the 18 months, ADB did not suspend the loan (para. 26). The BOT concession contract was finally awarded on 12 August 2011.

29. **Changes to SLPA's maximum shareholding in the SCT BOT concession.** When CICT was first incorporated, the consortium consisted of Aitken Spence, China Merchant Holdings, and SLPA. SLPA was allocated a 15% shareholding. This had also been SLPA's shareholding position in an earlier container terminal consortium (i.e., the South Asia Gateway Terminal). Subsequently, Aitken Spence decided to sell its entire 30% share. Per the Shareholder's Agreement, SLPA and the other remaining shareholders were offered to acquire part of this transferred share in accordance with their current proportional shareholdings. The government requested ADB's approval for SLPA to take over 6.43% of shares, which would bring SLPA's equity share to 21.43% and exceed the permitted shareholding limit of 15%. In ADB's assessment, increasing SLPA's shareholding limit would still maintain the consortium's operating independence. To support smooth implementation of the SCT, ADB approved a minor change in loan agreement to raise SLPA's maximum shareholding limit from 15% to 22%.[6]

30. **Changes to concessionaire clause in the loan agreement.** By 2011, the Colombo Port was operating almost at its maximum capacity. It was estimated to have handled 4.3 million TEU while its handling capacity was about 4.5 million TEU. At the time, the SCT was not expected to commence operations until mid-2014. SLPA estimated that a capacity shortfall of about 0.3 million TEU would exist by end-2012 and that this would be at least 0.8 million TEU by 2015. To mitigate the impact on Colombo's competitive position in the ISC market, SLPA proposed to develop part of the East Container Terminal as an interim measure to overcome the urgent capacity situation. The original loan agreement states, however, that the first two out of the three terminals on the new breakwaters needed to be developed by private operators selected through an open competitive bidding process. Hence the government requested ADB once again to amend the loan agreement to enable it to develop part of the East Container Terminal in advance of selecting the second private operator. To enable capacity enhancement to meet the unmet demands and mitigate further losses of the ISC market share and in turn support Sri Lanka in achieving competitiveness in the ports sector, ADB approved the government's request and the loan agreement was amended for this clause on 31 May 2012.

31. The three changes to the loan agreement cited above had no implications for costs, financing plan, implementation schedule, safeguards, or procurement arrangements.

H. Consultant Recruitment and Procurement

32. Consultant recruitment for construction supervision activities was undertaken as envisaged at appraisal in conformance with ADB's Guidelines on the Use of Consultants (as amended from time to time), using single-source selection procedures in accordance with ADB guidelines and a biodata proposal. The main service consultants from the earlier Loan 1841 were appointed as construction supervision consultants for the project and the contract was signed on 26 February 2008. This appointment was reviewed by the Maritime Structures and Port Engineering expert of the Panel of Experts and found to be the most preferred option to minimize liability risks and disclaimers of responsibility and ensure that the construction was executed in accordance with the design factors established during the detailed design phase.[7]

[6] Due to competing demands for financial resources, SLPA ultimately decided not to take over Aitken Spence's shares to increase its shareholding to 22%.

[7] A panel of experts had been engaged under TA Loan 1841 to peer review the outputs from the main service consultancy and provide technical advice to the government.

33. ADB Management approved advance action for procurement of civil works for the public sector component on 30 November 2006. The detailed design was completed by 30 November 2006. Bidding documents were approved and issued on 1 January 2007. The bid closing date was 8 May 2007. A single-stage, two-envelope procedure was used for this international competitive bidding package. Procurement for the public sector component, HIW, also was undertaken by international competitive bidding and complied with ADB's Procurement Guidelines (as amended from time to time) and the government's tender procedures acceptable to ADB. The contract for HIW was signed 31 March 2008.

I. Performance of Consultants and Contractors

34. Performance of the consultants recruited under the project is rated *satisfactory*. The consultants have provided assistance to the government whenever needed from the time of the TA loan through that of the investment loan. The supervision consultants submitted monthly progress reports, quarterly progress reports, and a final report upon completion of the construction activities. The final consultancy fee for the services was $9.01 million. The consultants intervened in a timely fashion to provide adequate guidance to the contractor to ensure completion of the project per design specifications. The supervision consultant acted as engineer and issued instructions to the contractor to clarify design and make changes in accordance with the employer requirements. Consultation for proposed changes was undertaken with the employer in a timely manner and approvals were granted prior to issuing instructions. The contractor submitted 27 claims which were resolved amicably at the site level. Engineer's determinations were issued where necessary.

35. The performance of the civil works contractor is rated *satisfactory*. The civil works contractor completed the works with good quality. Although progress was slower than expected by the engineer during monsoon period, the contractor's overall performance was reasonably good. The engineer monitored detailed progress with the contractor at weekly meetings. Overall progress was reviewed at monthly progress meetings. Through continually reviewing progress with the engineer, the contractor adjusted the work planning and program to make up for the delays as much as possible. By the project's original completion date, 7% of total works were incomplete and the project was extended for about 6 months from its original duration. The contractor overcame multiple difficulties and successfully completed the works within the time allotted for completion. Proactive contract management ensured all disputes were resolved by consultants, contractor, and the client in an amicable manner through consultation. Following completion of the HIW, the government continued to engage the same contractor to construct the first phase of the East Container Terminal, which is wholly owned and operated by SLPA.

J. Performance of the Borrower and the Executing Agency

36. The performance of the borrower and the executing agency for the loan was *satisfactory*. The borrower was the Democratic Socialist Republic of Sri Lanka and the executing agency was the MPA.

1. Output 1: Improved Harbor Infrastructure (Public Sector Component)

37. During implementation, the MPA closely coordinated and regularly monitored project progress. The government provided adequate and timely counterpart funds totaling $120.99 million equivalent. SLPA was responsible for day-to-day project management and facilitated the success of subprojects implementation. SLPA monitored the works by contractors and the construction supervision consultants who prepared the required monthly and quarterly progress

reports. The project accounts and financial statements were audited under supervision of the Auditor General. The MPA and SLPA facilitated well and fully supported all ADB's review missions during implementation and at completion.

38. SLPA fulfilled its obligation to protect the environment and implemented mitigation measures that minimized adverse impacts. The project's implementation demonstrated substantial compliance with the loan covenant, the environmental management and monitoring plans, and domestic clearances and permits. No unanticipated impacts occurred during the project construction and initial operation. Although the actual scale of several impacts exceeded the anticipated levels, timely and innovative mitigation measures implemented by SLPA in coordination with the Coast Conservation Department, Central Environmental Agency, and Geological Survey of Mines Bureau brought the level of impacts back into compliance.[8]

39. A health and safety plan was implemented in accordance with international and local codes and laws. SLPA ensured that the contractor deployed a safety team to assess safety risk, undertake safety training, and monitor safety practice. Effective coordination among SLPA, the consultant, and the contractor contributed to substantial recovery in progress to catch up after initial delays and successful implementation of the project.

2. Output 2: South Terminal Construction Completed through PPP (Private Sector Component)

40. The Public Private Partnership developed 2.4 million TEU of capacity at the SCT in the Port of Colombo under a 35-year BOT agreement with SLPA. The concessionaire commenced construction works for the terminal in December 2011 and invested an estimated $500 million, including to install terminal equipment. This was one of the largest foreign direct investments in Sri Lanka.

41. The concessionaire expedited the construction by injecting more resources into the task. The construction of the SCT formally commenced on 16 December 2011. Although the planned construction period was 60 months, the concessionaire completed the works within 28 months, by April 2014, with 56% time savings and about an estimated 10% increase in cost due to expedited schedules. The first phase of the terminal was open for operations in July 2013 and was formally opened on 5 August 2013. The terminal came into full operation by April 2014.

K. Performance of the Asian Development Bank

42. Overall, the performance of ADB was *satisfactory*. The project was administered and supervised from ADB headquarters. During implementation, ADB provided substantial guidance and support to the government and SLPA in all aspects of the project's implementation and conducted 11 project review, consultation, and administration missions, including the inception mission in 2009, two special loan administration missions, and five regular reviews (see Project Data). ADB was closely involved in identifying potential problems and critical activities and in resolving issues related to the implementation, especially on the safeguard issues. The role of

[8] The borrower's innovations included i) reclaiming of all dredge materials to avoiding off-site disposal; ii) restricting rainbow operations to about 80% of the overall dredging time to minimize sediment drift; iii) a code of practice for drivers of haul trucks to avoid conflicts with other road users and traversed communities; iv) hand-in-hand on-site work by the Coast Conservation Department, construction supervision consultant, SLPA, and Sri Lanka Institute of Hydraulics to immediately address erosion at the load out point; v) a code of practice to minimize conflicts between fisherfolks and barge operation; and vi) more frequent and detailed beach erosion monitoring to establish successes and weaknesses in mitigation approach and adjust accordingly.

the ADB missions in providing timely advice on project implementation and technical issues was well recognized by the government. ADB also approved minor amendments to the loan agreement to promote the project's smooth implementation.

III. EVALUATION OF PERFORMANCE

A. Relevance

43. The project was *highly relevant* at appraisal as it was fully aligned with the government's priorities and ADB's country strategy.

44. The new terminal facilities developed using the PPP approach enable SLPA to meet its aspirations set out in Vision 2020, which include development of infrastructure in Colombo to consolidate Colombo Port's position as an important transshipment hub. The project completion review mission was also informed that private investments are expected for implementing a new ports city and an international maritime center at Colombo Port. These physical improvements, together with strategic marketing, would incentivize shipping lines to set up transshipment hubs in Colombo Port and, in turn, attract increased vessel volumes over time.

45. Supported by a high level of project readiness delivered by the preceding TA Loan 1841, the project was implemented with minimal delay and within the original cost estimates (including contingencies). Nevertheless, changes in the loan conditions were required during implementation. Arguably, these changes could not have been foreseen and hence should not be viewed as design deficiencies. The linking of the loan effectiveness condition with progress on selection of the terminal operator was necessary to engender private sector confidence in the project. However, the government's change in procurement policy could not have been anticipated. The waiver of the loan effectiveness condition was therefore necessary to enable timely contract award for the HIW and more time for selecting the terminal operator through open competitive tender. In consideration of the above, the project has been rated *relevant* upon completion rather than *highly relevant*.

B. Effectiveness in Achieving Outcome

46. The project is rated *effective* in achieving its intended outcome of improving capacity at Colombo Port. In terms of outputs, the public sector component for the HIW was completed with ADB's assistance by April 2012. This enabled construction of the SCT, which commenced the first phase (600 m) of its operations in August 2013. By April 2014, the full 1,200 m of SCT was operational. In terms of outcome, completion of the SCT in 2014 boosted the container-handling capacity at Colombo Port to 7.05 million TEU, thereby exceeding the performance target of 6.9 million TEU by 2014. Therefore, the outcome of improved capacity at Colombo Port is achieved.

C. Efficiency in Achieving Outcome and Outputs

47. The project is rated *efficient* in achieving its outcomes and outputs. Implementing the project on a PPP model has enhanced the efficiency of the outputs wherein the public sector would deliver the basic breakwater infrastructure and the private sector two of the three container terminal facilities to be accommodated on the new breakwater. This brought about significant efficiencies by increased private sector investment. The first private sector terminal went into operation on 5 August 2013, providing additional capacity of 0.8 million TEU. The SCT was completed to its full capacity of 2.4 million TEU by April 2014. The development of harbor infrastructure and three terminals will boost the port capacity by 7.2 million TEU per annum.

48. At appraisal, the EIRR calculated for the project was 17.76%. The recalculated EIRR is lower, at 13.3%. The primary differences from appraisal are due to (i) increased economic costs derived from actual costs, and (ii) a lower traffic projection for the analysis period. Nevertheless, completion of the SCT in less than half the time anticipated at appraisal has brought in greater revenue streams within the same period. Therefore, despite the higher costs of constructing container terminals, lower traffic projections, and delay in implementation, the project is still economically viable with an EIRR that remains higher than the hurdle rate of 12%.

D. Preliminary Assessment of Sustainability

49. The project is *likely* to be sustainable. The terminal operator is responsible for operating and maintaining the SCT over the concession period. The cumulative container throughput at the SCT in 2014 was 686,636 TEUs, exceeding the original target to achieve 500,000 TEUs by end-2014, which is a good achievement for initial operations

50. At an institutional level, through the preceding TA Loan 1841 and this project, SLPA significantly improved the operational efficiency of its terminals, enabling it to compete effectively with privately operated terminals. In particular, SLPA has been able to utilize this experience to manage independently the ongoing construction for the first phase of the East Container Terminal with capacity of 0.8 million TEU. Construction of the East Container Terminal commenced on 1 May 2013 and SLPA aims to commence its operations by mid-2015.

51. SLPA would conduct further market demand analyses to determine optimal implementation timescales for the remaining terminals. SLPA is also planning to enhance logistics facilities within and around the port area (para. 44). Colombo Port's strategic location has enabled it to develop its role as the primary transshipment hub for the Indian subcontinent regional container traffic. The new port will ensure the continued role of Colombo Port as a transshipment hub in the ISC region. Compared to its competitors, the improved efficiency and capacity to handle large vessels will be huge advantages to Colombo Port given its relative proximity to India's southern and east coast markets. Most ports in the ISC face congestion, and Colombo Port, with its added capacity, can continue to offer competitive shipping options and significantly benefit the regional trade. According to SLPA, Sri Lanka aims to create an Asian shipping hub by investing $3.4 billion into expanding ports with funding from China.[9] The government forecasts growing cargo traffic will enable transportation, including ports, to make up about 40% of gross domestic product by 2020, a fourfold gain from 2014. Economic growth reached a 32-year high of 8% in 2010 amid investment in roads and harbors. Over the past 2 decades, Sri Lanka's export basket has seen very limited diversification, both in terms of products and markets. The United States and European Union continue to be the major export destinations, accounting for well over 50% of total exports. Clothing exports continue to dominate with a share close to 50% of total exports. Sri Lanka's trade flows with South Asia have grown, largely due to greater linkages with India.

52. The financial internal rate of return, demonstrating the financial validity of the project for SLPA, was reevaluated at 10.2%. This is marginally lower than calculated at appraisal (11.49%) but still exceeds the 4% recalculated weighted average cost of capital (see Appendix 7).

[9] SLPA. 2011. Sri Lanka Aiming at Asian Hub Status. http://www.slpa.lk/news_events_301.asp

E. Impact

53. At completion, the project delivered *significant impact*. Transshipment traffic at the Colombo Port has grown from 2.785 million TEU in 2008 to 3.699 million TEU in 2014. Prior to project completion, the maximum-size vessel entering the Colombo Port had capacity of 8,074 TEU and draft of 14.2 m. With completion of new deep-water facilities at the SCT, Colombo Port recorded the maiden arrival in October 2013 of an ultra-large vessel with capacity 13,808 TEU, length 368 m, and draft 15.8 m. In applying historical growth trends to 2013 container traffic (4.3 million TEU) to estimate 2017 container traffic, this comes to 5.23 million TEU if the recession growth rates are used and 6.1 million TEU if the pre-recession rates are used. Thus, the capacity to handle ultra-large vessels has significantly increased overall capacity.

54. This is one of the largest PPP projects in Sri Lanka's ports sector. The public sector investment for breakwaters has enabled investment for the three large-scale container terminals upon full completion to deliver an additional 7.2 million TEU of container-handling capacity per annum. The new facilities at SCT make it the only port in the South Asia region with a deep-water terminal that can accommodate the newest breed of 18,000 TEU container ships. These are currently the world's largest container ships and the most effective to operate for mainline shippers. Higher efficiency and faster delivery times will attract larger vessels and higher volume of trade. This enhances Sri Lanka's competitiveness in international trade, and it should draw investment to the country that will improve manufacturing and distribution centers and benefit the Sri Lankan economy both directly and through the multiplier effect of increased operation at the port. SLPA has also drawn from experience in implementing the HIW funded by ADB to independently manage the current East Container Terminal construction works.

55. The success of the project has attracted more private sector investment for development of the International Maritime Center in Colombo and of the Port City Project, adjacent to the Colombo Port. The latter will consist of retail, residential, and office complexes, as well as other leisure and recreational activities that will promote further economic activity and growth.

56. Additional, unintended socioeconomic and environmental impacts are discussed below.

57. **Socioeconomic.** At appraisal, the project was anticipated to create direct and indirect employment during construction and operation. A total 1,950 jobs during construction were projected at appraisal. During the construction phase in 2011, the project employed 2,381 men and women, 307 of whom were foreign and 2,074 local. The number of people employed locally almost doubled in 2012 while the number of foreigners employed declined to 164.

58. **Land acquisition and resettlement.** There was no impact through land acquisition and resettlement. At appraisal, no land acquisition or negative resettlement impacts were associated with the project. The project had no impacts on indigenous peoples and is classified as Category C. The construction and operation activities were seaward from the south end of the Colombo Port. Therefore, no land was required by either the government or the private sector.

59. **Environmental safeguards.** The project did not result in adverse environmental impacts. Ambient air quality is within the 2004 baseline reference, while the majority of the water

quality parameters were back to baseline reference as of June 2014.[10] All impacts recorded in the impact assessment were effectively mitigated.

60. At appraisal, the project was categorized as environmental Category A in accordance with ADB's Environment Policy (2002). As required by this policy, the draft environmental impact assessment was disclosed 120 days before Board approval. For mitigating the adverse impacts, an environmental management plan was prepared and implemented. Environmental clearance was obtained on 12 December 2005. The Government of Sri Lanka through SLPA ensured compliance with ADB's Environmental Policy and requirements of National Environmental Act No. 47 of 1980 by strictly implementing the environmental management plan and conducting regular monitoring activities and coordination meetings.

61. During project implementation, nine semiannual environmental monitoring reports covering the periods from July 2008 to June 2012 were submitted by SLPA and disclosed in compliance with ADB environmental requirements for Category A projects. Seven review missions (covering all project issues, including environment safeguards) were fielded by ADB's Transport and Communications Division. One mission focused solely on reviewing environmental safeguard compliance and one was a safeguard review mission. Although the safeguard review mission concluded that implementation of the environmental management and monitoring plans and compliance with national and local laws were satisfactory, a number of inadequacies were also identified. These were immediately addressed and reflected in the succeeding July–December 2010 semiannual report. Minor unanticipated impacts, such as fishnet entanglements, were experienced during implementation. A number of challenges were encountered, such as increased suspended sediment from dredging, reclamation, and breakwater construction; increased fugitive dust during quarrying, rock crushing, and hauling of materials over unpaved roads; ground vibration from blasting; coastal erosion; and disturbance of fishing activities and barging operations. Although these impacts had been anticipated in the environmental impact assessment, differences in their scale and location rendered the mitigation measures inadequate, particularly in combating shore erosion. Issues faced and measures taken to address them are further detailed in Appendix 8. The government through SLPA effectively addressed these challenges and brought the construction activities back into environmental compliance by implementing additional mitigation and compensation measures.

IV. OVERALL ASSESSMENT AND RECOMMENDATIONS

A. Overall Assessment

62. The project is rated *successful*. It is deemed (i) *relevant* to the government's and ADB's development strategy, (ii) *effective* in achieving outcomes, (iii) *efficient* in achieving outcomes and outputs, and (iv) *likely to be sustainable*.

B. Lessons

63. **Project structuring.** A key consideration was to draw an optimal balance of public and private sector participation. The government applied a PPP landlord port model whereby the public sector would deliver the basic breakwater infrastructure and private sector deliver two of the three container terminal facilities to be accommodated by the new breakwater. This

[10] Of the 12 toxic substances monitored, only ambient water concentrations of copper and nickel were found to be higher than the lower trigger values and mercury was found to be higher than the high trigger value as of June 2014. Nevertheless, a decreasing trend in the values showed that they were returning to baseline levels.

approach has not only brought about significant efficiencies in delivery, it also resulted in tremendous financial leverage.

64. **Procurement.** The project is very large scale and complex in nature, so it was important to bring in quality consultants and contractors. Continuation of services from the main design consultants to provide construction supervision not only reduced the time for procurement but also resulted in minimizing liability risks and disclaimers of responsibility.

65. **Civil works packaging.** Since the works were interrelated, the HIW was packaged as a single contract. The large size of the contract attracted good quality and experienced contractors.

66. **Loan effectiveness.** Realization of the full project benefits was contingent upon the public and private sector components being well coordinated and implemented as planned. Implementation of the private sector component—and especially selection of the private concessionaire for the first container terminal—initially presented a major risk. This was mitigated by linking the progress of selecting a successful bidder for private concessionaire with implementation of the breakwater infrastructure (public sector component) as a condition of loan effectiveness. Although the loan effectiveness condition had to be amended to accommodate the commencement of breakwater construction and allow more time for selecting the private concessionaire, the condition ensured risk mitigation.

C. Recommendations

Project Related

67. **Future monitoring.** Regarding environment safeguards, SLPA has been advised to continue implementing and monitoring the environmental management plan—which covers operation of the SCT—and to explore the need to establish an environmental and social unit to address any future safeguard issues that may arise. To sustain the environment of healthy competition and private investor confidence, the Ministry of Ports, Shipping and Aviation has been advised to continue the functions of the Advisory Committee to redress port operators' grievances relating to unfair competition.

68. **Timing of project performance evaluation report.** It is recommended that the project performance evaluation report be prepared in 2020 or later— when all the three terminals are in full operation.

DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks	Results
Impact Improved ports sector performance	By 2017: Container traffic, including transshipment, at Colombo Port per annum increases to 6.5 million TEU (2006 baseline: 3.3 million)	Annual Report of Sri Lanka Ports Authority	**Risk** Port traffic volume is adversely affected by the global economy	**Likely to be achieved.** The performance of the project was indeed affected by the slowdown in the global economy. In 2014, the container traffic volume was 4.908 million TEU. Using a growth rate of 5% based on the historical trend affected by the global recession, estimated container traffic for 2017 is 5.68 million TEU. If the pre-recession growth rate of 9% (prior to 2009) were applied, the estimated container traffic in 2017 would be 6.36 million TEU.
Outcome Improved capacity at Colombo Port	By 2014: Container handling capacity at Colombo Port per annum increases to 6.9 million TEU (2006 baseline: 3.3 million)	Monitoring Report of Sri Lanka Ports Authority	**Assumption** Private sector component for container terminal facility is completed on time.	**Achieved**. In 2013, the container-handling capacity was 4.65 million TEU. The first phase (400 m) of the SCT opened in August 2013, delivering additional annual capacity of 0.8 million TEU. The SCT opened the rest of the terminals (800 m) by April 2014, delivering another 1.6 million TEU and raising the annual capacity at Colombo Port to 7.05 million TEU.

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks	Results
Outputs 1. Improved harbor infrastructure 2. South terminal construction completed through public–private partnership	**By 2013 (for all indicators):** Harbor breakwater of about 6.4 kilometers; two-way harbor access channel 9,000 meters long, 570 meters wide, and 20 meters deep; new navigation control tower facility of 300 square meters; marine navigation aids, including 15 channel-marking light buoys, 2 breakwater obstacle lights, 1 PEL sector light, and vessel traffic management system; and 6.4 kilometers of access roads **By 2014 (for all indicators):** new south container terminal with quay wall 1,200 meters in length, apron and yard area width of 476 meters	Monitoring Report of Sri Lanka Ports Authority	**Risk** Unexpected wave and tidal levels during construction	**Achieved** By April 2012, the public sector component for the harbor infrastructure works was fully completed. By August 2013, the first phase (400 m) of the SCT was complete and operations commenced. By April-2014, the full 1,200 meters of the SCT were operational.

Activities with Milestones at Appraisal	Inputs at Appraisal	Actual Inputs	
1A. Works contract for harbor infrastructure signed by March 2008 1B. Works for harbor infrastructure completed by April 2012 2A. Build-operate-transfer agreement under public–private partnership for SCT signed by August 2011 2B. SCT construction completed by December 2014	ADB: $300 million Government: $180 million Private sector: $301 million	ADB: $300 million Government: $120.99 million Private sector (for SCT): $500 million (estimate)	

ADB = Asian Development Bank, SCT = South Container Terminal, TEU = twenty-foot equivalent unit.
Source: ADB project completion review mission.

PROJECT COST AND FINANCING PLAN

Table A2.1: Project Costs
($ million)

Item		Appraisal							Actual						
		Foreign Currency			Local Currency			Com-bined	Foreign Currency			Local Currency			Com-bined
		ADB	Gov't	Total	ADB	Gov't	Total	**Total**	ADB	Gov't	Total	ADB	Gov't	Total	**Total**
A	**Civil works**	236.10	16.90	253.00	24.20	39.30	63.50	316.50	262.53	1.98	264.51	26.52	69.49	96.01	360.52
B	**Consulting service**	6.40		6.40	6.30		6.30	12.70	5.51	0.05	5.56	3.42	0.03	3.45	9.01
C	**Equipment**	2.00	0.00	2.00			0.00	2.00	1.62	0.00	1.62	0.40		0.40	2.02
D	**Taxes and duties**			0.00		49.70	49.70	49.70		0.00	0.00		*55.70*	*55.70*	*55.70*
	Subtotal (A–D)	**244.50**	**16.90**	**261.40**	**30.50**	**89.00**	**119.50**	**380.90**	**269.66**	**2.03**	**271.69**	**30.34**	**126.13**	**155.56**	**427.25**
E	**Contingencies**	**25.00**	**0.50**	**25.50**	**0.00**	**18.40**	**18.40**	**43.90**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
	Physical contingency	13.00	0.10	13.10	0.00	3.50	3.50	16.60		0.00	0.00			0.00	0.00
	Price contingency	12.00	0.40	12.40	0.00	14.90	14.90	27.30		0.00	0.00			0.00	0.00
F	**Interest and commitment charges**	**0.00**	**55.20**	**55.20**	**0.00**	**0.00**	**0.00**	**55.20**		0.00	0.00		37.06	37.06	37.06
	Total (A–F)	**269.50**	**72.60**	**342.10**	**30.50**	**107.40**	**137.90**	**480.00**	**269.66**	**2.03**	**271.69**	**30.34**	**163.19**	**192.62**	**464.31**

ADB = Asian Development Bank. Gov't = the government.
Sources: ADB loan financial information system, project completion review mission, Report and Recommendation of the President.

Table A2.2: Financing Plan
($ million, except % as shown)

Source	At Appraisal				Actual			
	Foreign Currency	Local Currency	Total Cost	% of Cost	Foreign Currency	Local Currency	Total Cost	% of Cost
Asian Development Bank	269.50	30.50	300.00	62.50	269.66	30.34	300.00	71.26
Government	72.60	107.40	180.00	37.50	2.03	118.96	120.99	28.74
Total	**342.10**	**137.90**	**480.00**	**100.00**	**271.69**	**149.30**	**420.99**	**100.00**

Sources: ADB loan financial information system, Report and Recommendation of the President.

DISBURSEMENT OF ADB LOAN PROCEEDS

Table A3: Annual and Cumulative Disbursement of ADB Loan Proceeds
($ million)

Year	Annual Disbursement			Cumulative Disbursement	
	Amount		% of Total	Amount	% of Total
	Planned	Actual			
2008	28.000	43.041	14.35	43.041	14.35
2009	70.000	48.685	16.23	91.726	30.58
2010	65.000	72.467	24.16	164.193	54.73
2011	72.400	76.796	25.60	240.989	80.33
2012	54.000	52.462	17.48	293.451	97.82
2013	9.408	6.549	2.18	300.000	100.00
Total	**298.808**	**300.000**	**100.00**		

Source: Asian Development Bank.

Figure A3.1. Annual Disbursement of ADB Loan Proceeds
($ million)

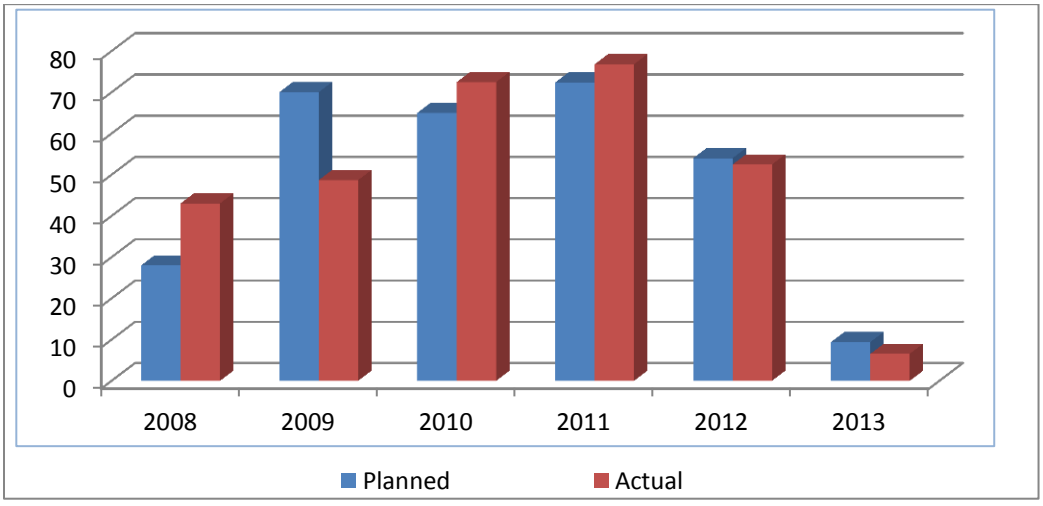
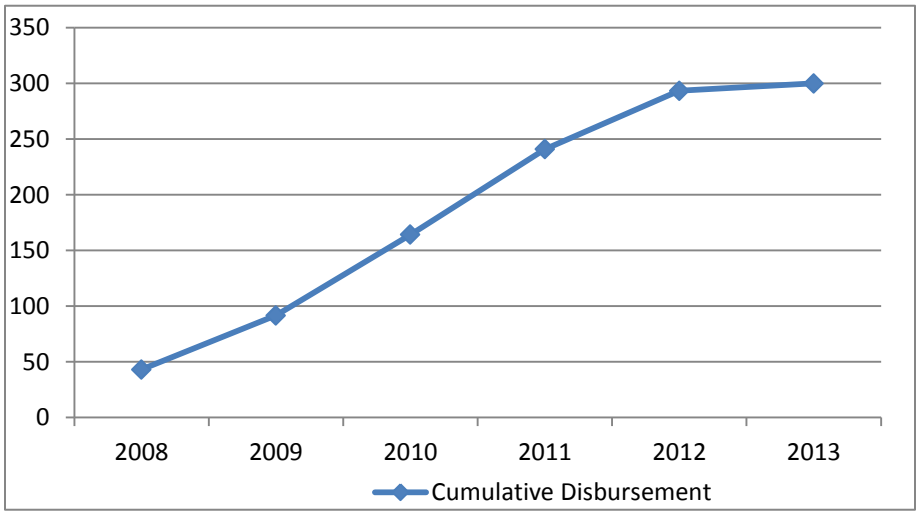
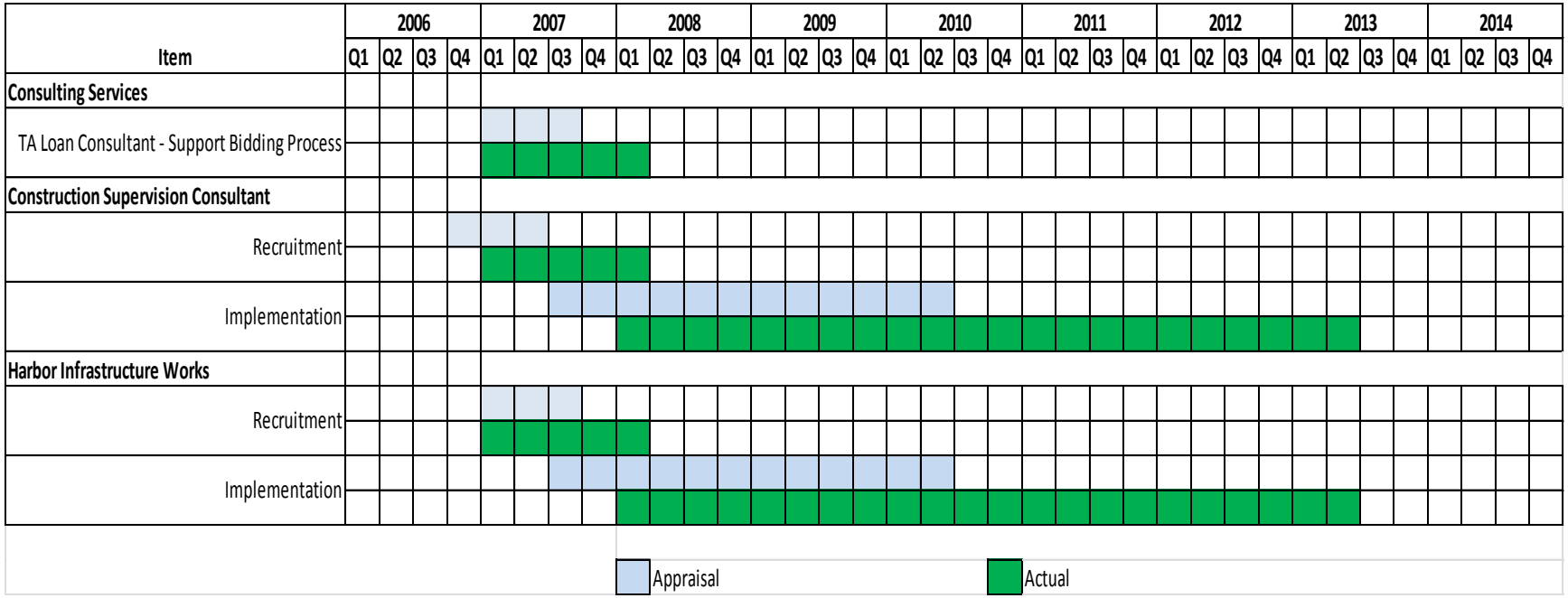


Figure A3.2. Cumulative Disbursement of ADB Loan Proceeds ($ million)

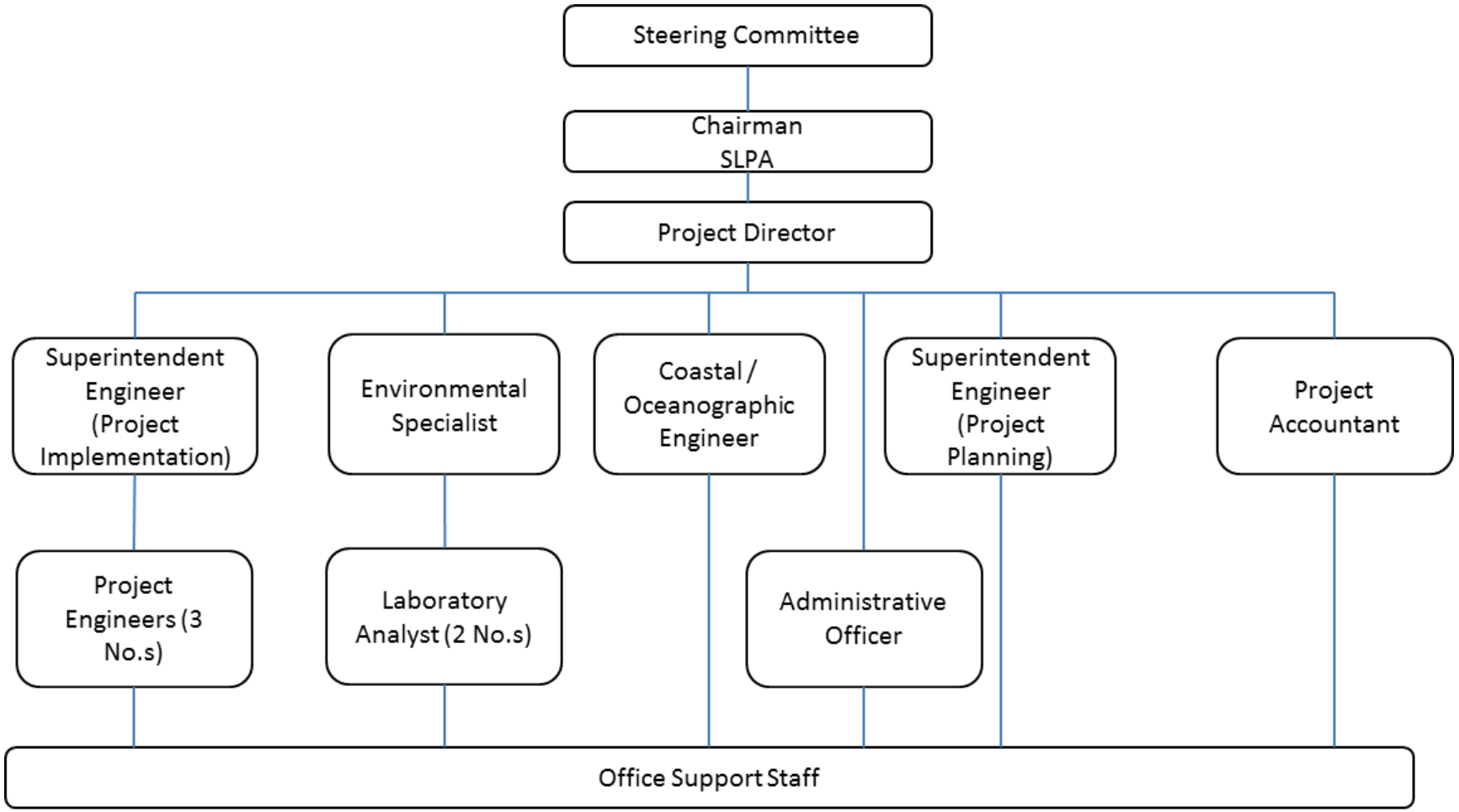


ACTUAL PROJECT IMPLEMENTATION SCHEDULES



Sources: Asian Development Bank, Sri Lanka Ports Authority.

ORGANIZATIONAL STRUCTURE FOR PROJECT IMPLEMENTATION



Source: Sri Lanka Ports Authority.

STATUS OF COMPLIANCE WITH MAIN LOAN COVENANTS

Covenant	Reference in Loan Agreement	Status of Compliance
The Borrower shall cause SLPA to carry out the Project with due diligence and efficiency and in conformity with sound administrative, financial, engineering, environmental and ports management practices	Article IV Section 4.01a	**Complied with.**
In carrying out of the Project and operation of the Project facilities, the Borrower shall perform, or cause to be performed, all obligations set forth in Schedule 5 of the loan agreement	Article IV Section 4.01b	**Complied with.**
The Borrower shall make available to SLPA, promptly as needed, the funds, facilities, services and other resources which are required, in addition to the proceeds of loan for carrying out of the Project	Article IV Section 4.02	**Complied with.**
In the carrying out of the Project, the Borrower shall cause competent consultants and contractors, acceptable to ADB, to be employed to an extent and upon terms and conditions satisfactory to the Borrower and ADB	Article IV Section 4.03a	**Complied with.**
The Borrower shall cause the Project to be carried out in accordance with plans, design standards, specifications, work schedules and construction methods acceptable to ADB. The Borrower shall cause SLPA to furnish to ADB, promptly after their preparations, such plans, design standards, specifications and work schedules, and any material modifications subsequently made therein, in such detail as ADB shall reasonably request	Article IV Section 4.03b	**Complied with.**
The Borrower shall cause SLPA to (i) Maintain separate account for the Project (ii) Have such accounts and related financial statements audited annually, in accordance with appropriate auditing standards consistently applied, by acceptable to ADB; (iii) Furnish to ADB, as soon as available but in any event not later than 6 months after the end of each related fiscal year, certified copies of such audited accounts and financial statements and the report of the auditors relating thereto (including auditors opinion on the use of the Loan proceeds and compliance with financial covenants of the loan agreement), all in English Language; and (iv) Furnish to ADB such other information concerning such accounts and financial statements and the audit thereof as ADB shall from time to time reasonably request	Article IV Section 4.04a	**Complied with.** (i) Complied. (ii) Complied. (iii) APAs for 2010, 2011 and 2012 submitted within 2 weeks after deadline. APA for 2013 was submitted on 29 December 2014. (iv) Complied.
The Borrower shall enable ADB, upon ADB's request, to discuss the Borrower's financial statements for the Project and its financial affairs related to the Project from time to time with auditors	Article IV Section 4.04b	**Complied with.**

Covenant	Reference in Loan Agreement	Status of Compliance
appointed by the Borrower pursuant to Section 4.05(a) in any such discussions requested by ADB, provided that any such discussion shall be conducted only in the presence of an authorized officer of Borrower unless the Borrower shall otherwise agree		
The Borrower shall enable ADB's representatives to inspect the Project, the Goods and Works financed out of the proceeds of the Loan, and any relevant records and documents	Article IV Section 4.05	**Complied with.**
The Borrower shall cause SLPA to ensure that the Project facilities are operated, maintained and repaired in accordance with sound, administrative, financial, engineering, environmental, ports management and maintenance and operational practices	Article IV Section 4.06	**Complied with.**
The Borrower shall take all action which shall be necessary on its part to enable SLPA to perform its obligations under the Project Agreement, and shall not take or permit any action which would interfere with the performance of such obligations	Article IV Section 4.07	**Complied with.**
The Borrower shall exercise its rights under the Subsidiary Loan Agreement in such a manner as to protect the interest of the Borrower and ADB and to accomplish the purposes of the Loan	Article IV Section 4.08a	**Complied with.**
No rights or obligations under the Subsidiary Loan Agreement shall be assigned, amended, abrogated or waived without the prior concurrence of ADB	Article IV Section 4.08b	**Complied with.**
Project Executing Agency and Implementation Agency		
1. MPA shall be the Project Executing Agency, responsible for overall Project coordination 2. SLPA shall be the Project Implementation Agency, responsible for timely and effective Implementation of the Project	Schedule 5, point 1 Schedule 5, point 2	**Complied with.** (i) Complied. (ii) MPA was restructured as MPH (Ministry of Highways, Ports and Shipping) on 23 November 2010.
Project Implementation Unit		
3. Within one month of the Effective Date, MPA shall (i) establish the PIU and (ii) select key staff for its operation including staff for the environmental monitoring as specified in procedures. The PIU shall be responsible for the day to day implementation of the Project and shall be headed by a full time Project Director. The Project Director will be supported by qualified staff having expertise in contract management, environmental monitoring, planning and accounting. The PIU shall (i) plan and schedule Project activities; (ii) supervise and monitor the work program of the Project and Project performance; (iii) administer procurement activities; (iv) be responsible for the book keeping	Schedule 5, point 3	**Complied with.**

Covenant	Reference in Loan Agreement	Status of Compliance
and the maintenance of the Project accounts; (v) prepare liquidation reports; (vi) prepare and submit to ADB various reports, including quarterly and annual Project monitoring and progress report; and (vii) coordinate field activities		
Project Steering Committee		
4. Within one month of the Effective Date, a Project Steering Committee shall be established to oversee and coordinate issues related to Project implementation. The Project Steering Committee, chaired by Secretary, MPA shall comprise representatives from concerned government agencies, including MOFP, External Resources Department and National Planning Department and shall meet whenever necessary but not less than once every six months, to provide policy guidance on the direction of the Project. SLPA shall report to the Project Steering Committee on the Project Implementation on a regular basis	Schedule 5, point 4	**Complied with.**
Project Director		
5. Within one month of the Effective Date, the Borrower shall ensure that the Project Director is appointed in accordance with the Borrower's relevant procedures. The Project Director shall report to the Chairman, SLPA. The Project Director shall have the overall responsibility for the timely and satisfactory implementation of the Project	Schedule 5, point 5	**Complied with.**
Advisory Committee		
6. Within one three months of the Effective Date, the Borrower shall establish the Advisory Committee chaired by the Secretary, MPA and including as a member, the person holding the post of the Director General of the Public Utilities Commission	Schedule 5, point 6	**Complied with.** Official appointment of the members, and establishment of a Secretariat of the Advisory Committee on Port Competition was achieved on 23 June 2008.
Counterpart Funds		
7. The Borrower shall ensure that adequate counterpart funds are made available to the Project when and in the amounts required to enable Project agencies to discharge their responsibilities under the Project and that counterpart funds shall be increased if needed to cover any shortfall of fund for the completion of the Project	Schedule 5, point 7	**Complied with.**
Concessionaire		
8. The Borrower shall ensure that Concessionaires for at least first two new terminals under the Project shall be chosen through an open competitive bidding process. This covenant has been modified as " The Borrower	Schedule 5, point 8	**Complied with** The first private sector operated terminal was awarded on 12 August 2011. During the project completion review mission, SLPA confirmed

Covenant	Reference in Loan Agreement	Status of Compliance
shall ensure that Concessionaires for at least two new terminals under the Project shall be chosen through an open competitive bidding process" vide a Memorandum dated 31 May 2012		that the second private sector terminal operator would be chosen through an open competitive bidding process. The timing is to be determined according to a market analysis and/or study to be conducted by SLPA.
Concession Agreement		
9. The Borrower shall ensure that SLPA's equity share in the terminal concession companies shall not exceed 15% of the entire issued capital of such concession company. This limit shall not apply in the case of a corporate entity registered by the SLPA and / or the Borrower under the Companies Act No. 17 of 1982 of Sri Lanka, as amended, for the purposes of carrying out the container terminal operations [Note: This clause was modified as "9. The Borrower shall ensure that SLPA's equity share in the terminal concession companies shall not exceed 22% of the entire issued capital of such concession company. This limit shall not apply in the case of a corporate entity registered by the SLPA and / or the Borrower under the Companies Act No. 17 of 1982 of Sri Lanka, as amended, for the purposes of carrying out the container terminal operations.]	Schedule 5, point 9	**Complied with.**
10. The Borrower shall cause SLPA to ensure that the Concession Agreements with all Concessionaires operating under the Project include the provision that the Concessionaire shall follow the EMP, the National Environmental Act (NEA) No. 47 of 1980 as amended, ADB's Environmental Policy (2002), ADB's Policy on Involuntary Resettlement (1995) and ADB's Policy on Indigenous People (1998) in constructing the terminals under such Concession Agreements. This provision shall be strictly monitored during project implementation.	Schedule 5, point 10	**Complied with.** Clause 67.1 of the Concessionaires Agreement compels compliance with NEA No. 47. The CCD and SLPA require concessionaire construction and operation phase EMPs based on the environmental impact assessment (EIA), and monthly monitoring reports have been submitted to ensure compliance.
Resettlement		
11. The Borrower shall ensure that the Project design and implementation are carried out in a manner so as to avoid any land acquisition or involuntary resettlement. The Borrower shall cause SLPA to ensure that in case of change in the Project scope or any unanticipated resettlement impacts (due to quarrying of rocks, widening of access roads or any other activity) during Project implementation, land acquisition and resettlement activities shall be implemented in accordance with all applicable laws and regulations of the	Schedule 5, point 11	**Complied with.** MPA confirmed through its letter dated 4 October 2004 that it did not anticipate any land acquisition and resettlement activities. During the project completion review mission, SLPA also confirmed that there was no additional impact on resettlement

Covenant	Reference in Loan Agreement	Status of Compliance
Borrower to the extent not inconsistent with ADB's policies and procedures and in accordance with ADB's Policy Involuntary Resettlement (1995) and Policy on Indigenous Peoples (1998). In case of unanticipated resettlements impacts during Project Implementation, the Borrower shall cause SLPA to submit a satisfactory Resettlement Plan to ADB for review prior to the award of Works contract. Before any affected person is dispossessed or displaced from its assets, the Borrower shall cause SLPA to ensure that they are consulted and compensated at replacement values such that their living standards are not adversely affected, in accordance with the Resettlement Plan.		during project implementation.
Environment		
12. The Borrower shall cause SLPA to ensure that the Project and all Project facilities are developed, conducted, implemented and maintained in accordance with the Borrower's National Environmental Act (NEA) No. 47 of 1980, as amended and ADB's Environment Policy (2002). In case of any discrepancies between the Borrower's laws, regulations, and / or procedures and ADB's requirements, ADB's Environmental Policy (2002) shall prevail.	Schedule 5, point 12	**Complied with.** All legal permits, clearances, and disclosure requirements have been complied with. An EIA was prepared, reviewed, and approved by the CCD, as the project approving authority, and by ADB. Air, water, noise, and erosion controls were closely monitored by the CCD while ensuring compliance of batching, crusher, and asphalt plants was supervised by the CEA. Where there are no applicable national standards (e.g., heavy metal parameters to assess water and sediment qualities), the prescribed values contained in the ADB-approved EIA were observed.
13. The Borrower shall cause SLPA to apply the environmental mitigation measures included in the EIA and the SEIA report for the implementation of the Project as necessary. The Borrower shall cause SLPA to monitor, review, and if necessary, update the EMP prior to any Works to ensure that all negative environmental impacts related to works are mitigated properly. In case of unanticipated negative environmental impacts, the Borrower shall cause SLPA (i) to report such impacts to CCD and ADB; and (ii) to provide remedial mitigation measures to affected people in consultation with CCD and EMC	Schedule 5, point 13	**Complied with.** SLPA, through the construction supervision consultant and contractors, submitted regular monitoring reports. Mitigation measures were implemented according to EMP and regulatory requirements. In cases where actual impacts exceeded predicted levels, SLPA implemented timely and innovative measures to assure levels are maintained or returned to compliance. No unanticipated impacts occurred during construction.

Covenant	Reference in Loan Agreement	Status of Compliance
14. The Borrower shall cause SLPA to conduct regular environmental monitoring. The monitoring report should be submitted to ADB, EMC and other relevant agencies such as CCD, and CEA every 6 months	Schedule 5, point 14	**Complied with.** Eight semiannual monitoring reports were submitted to ADB from June 2008 to December 2012 summarizing the daily site inspections, weekly meetings with contractors and the construction supervision consultant, weekly environmental monitoring reports by contractors, bimonthly environmental progress meetings, and monthly site audits by the construction supervision consultant. For construction and operation of the terminal, the concessionaire is submitting monthly monitoring reports to SLPA and CCD as required in the Development Permit. Annual inspections were conducted by the CEA in line with the batching plant permit renewals.
15. The Borrower shall cause SLPA to provide the contractors and Concessionaire with the EIA and the SEIA including the EMP and ensure that contractors and Concessionaires implement the required mitigation measures as described in the EMP in a satisfactory manner. In addition, the Borrower shall cause the SLPA to ensure that the contractors and Concessionaires report on the implementation of the EMP on a regular basis, along with any deviation from the EIA report	Schedule 5, point 15	**Complied with.** SLPA discussed and provided the CICT concessionaire copies of the EIA, SEIA, and EMP. The concessionaire, as required by CCD, prepared a more detailed EMP and this is currently being enforced.
Works		
16. Prior to the commencement of the Works, the Borrower shall cause SLPA to ensure that updated environmental approval is obtained from CCD.	Schedule 5, point 16	**Complied with.** CCD clearances were secured prior to the start of construction at the project site at Colombo Port and the load out point. All batching and asphalt plants had valid environmental permits from the CEA for their installation. Underwater and quarry blasting, and quarrying operations were covered by Geological Survey of Mines Bureau clearances.
Social Development and Gender		
17. The Borrower shall cause SLPA to ensure that all works contractors comply with all applicable labor laws, do not employ child labor for construction and maintenance activities, provide appropriate facilities for women in construction campsites,	Schedule 5, point 17	**Complied with.**

Covenant	Reference in Loan Agreement	Status of Compliance
encourage employment of the poor, particularly women, and do not differentiate wages between men and women for work of equal value. The Borrower shall cause SLPA to ensure that works contracts include a requirement on the part of the contractors to conduct an information and education campaign on communicable diseases, including but not limited to sexually transmitted diseases and HIV/AIDS for construction workers as a part of health and safety program at camp sites during construction period. The Works contracts shall include specific clauses on these undertakings, and compliance shall be strictly monitored by SLPA during project implementation.		
Good Governance		
18. Consistent with the Borrower's and ADB's commitment to good governance, accountability and transparency, the Borrower shall cause SLPA to ensure that the Project funds are utilized effectively and efficiently to implement the Project and to achieve the Project objectives. The Borrower shall cause SLPA to (i) Disclose the bid awards on SLPA's website; (ii) Undertake necessary measures to create and sustain a corruption-free environment; (iii) Ensure that the Borrower's Anticorruption Law and ADB's policy on Anticorruption (1998, as amended to date), are strictly enforced and are being complied with during Project Implementation, and that relevant provisions of ADB's policy on Anticorruption, are included in all bidding documents for the Project; (iv) Facilitate ADB's exercise of its right to investigate, directly or through its agents, any alleged corrupt, fraudulent, collusive or coercive practices relating to the Project (v) Conduct periodic inspections on the Project contractor's activities related to fund withdrawals and settlements and (vi) Ensure that contracts financed by ADB in connection with the Project include provisions specifying the right of ADB to audit and examine the records and accounts of SLPA and all contractors, suppliers, consultants and other service providers as they related to the Project. The Borrower shall cooperate with any audit and investigation and other service providers as they related to the Project. The Borrower shall cooperate with any audit and investigation and extend necessary	Schedule 5, point 18	**Complied with.**

Covenant	Reference in Loan Agreement	Status of Compliance
assistance, including access to all relevant books and records, as well as engagement of independent auditors and experts that may be needed for satisfactory completion of such audits and investigations.		
Project Review		
19. In order to ensure effective Project implementation, ADB and SLPA shall jointly undertake annual reviews of the Project to assess progress, identify constraints and agree on strategies for resolving constraints. Within two years of the Effective Date, SLPA and ADB shall undertake a comprehensive mid-term review (MTR) of the Project which shall (i) Review the scope, design, and implementation arrangements of the Project appraisal (ii) Identify changes needed since the time of the Project appraisal (iii) Assess implementation performance against Project performance indicators (iv) Review and establish compliance with legal covenants and other details as requested by ADB. Project impacts will be evaluated upon the completion of the Project according to a schedule and terms of reference to be agreed upon by the SLPA and ADB and (v) Identify problems and constraints. The results of the MTR shall be discussed by SLPA and ADB and if required, appropriate corrective measures shall be formulated to ensure successful Project implementation and achievement of the Project objectives. Without limiting the generality of Section 7.04 (d) of the Loan Regulations, within three months of physical completion of the Project, the PIU shall submit to ADB a Project completion report providing detailed evaluation of the progress implementation, costs, consultant's performance, social and economic impact	Schedule 5, point 19	**Complied with.**
Project Performance Monitoring System (PPMS)		
20. Within six months of the Effective Date, the Borrower, through SLPA, shall develop a PPMS, including baseline performance monitoring and systematic Project performance monitoring. The Borrower shall cause SLPA to carryout surveys (i) At the start of the Project Implementation to establish baseline data (ii) At Project mid-term review, and (iii) At the time of Project completion and (iv) Not later than six months after Project	Schedule 5, point 19	**Complied with.**

Covenant	Reference in Loan Agreement	Status of Compliance
completion, to evaluate Project benefits. Data to be compiled for the purpose of Project performance and evaluation shall be in format developed in consultation with ADB. Key indicators shall be proposed by SLPA and developed in consultation with ADB.		
Project Agreement, Article 2		
21. SLPA shall take out and maintain with responsible insurers, or make other arrangements satisfactory to ADB for insurance to such extent and against such risks and in such amounts as shall be consistent with sound practice. 22. Without limiting the generality of the foregoing, SLPA undertakes to insure, or cause to be insured, the Goods to be imported for the Project and to be financed out of the proceeds of Loan against hazards incident to the place of use or installation, and delivery thereof to the place of use or installation, and for such insurance any indemnity shall be payable in a currency freely usable to replace or repair such goods (Article 2, Section 2.05 (a&b) of the Project agreement)	Project Agreement, Article 2, Section 2.05 (a) Section 2.056 (b)	**Complied with.**

Source: ADB review missions.

REEVALUATION OF ECONOMIC AND FINANCIAL ANALYSIS

A. General

1. The economic viability has been reevaluated using a methodology similar to that utilized during appraisal. Without the investment, Colombo Port would have lost its transshipment traffic due to capacity constraints and inability to serve the larger ships increasingly used on the trunk-line routes and would eventually have become a feeder port, served by a combination of feeder ships and mainline services with relatively long transit times. The loss of frequent, fast, direct shipping services would have increased the cost of using feeder services for export and import to importers and exporters, thus resulting in loss of transshipment market share. The project will benefit Sri Lankan exporters by enhancing their competitiveness in international markets through lower freight costs and faster delivery times for time-sensitive exports. Economic benefits were calculated by comparing the "with-project" and "without-project" cases. The economic internal rate of return (EIRR) was calculated with sensitivity testing. Overall, it was concluded that the additional capacity provided by the expansion of the port delivers significant economic benefits.

B. Traffic Forecasts

2. The public sector component for the harbor infrastructure works was completed in April 2012 and South Container Terminal (SCT) was operational from August 2013. The traffic forecast used in the analysis is based on the forecast presented in the Strategic Review Report,[1] with moderation in the growth rate considering growth trends in recent years. The forecast is based on analysis of the domestic and transshipment market, which is in turn subdivided to Indian subcontinent (ISC) transshipment, and calculates a transshipment share of ISC market and assesses Colombo's share. At appraisal, it was assessed that despite dredging programs and port building, carriers will be constrained by size at Indian ports. The project in Colombo would create deep port facilities and terminals to accommodate the ultra-large carriers. This will give Colombo Port a competitive advantage to grow its market share of transshipment within the ISC. The demand estimates for the project take into account the port expansion plans of neighboring countries such as India, as well as the opinion of the international shipping industry regarding the potential of the Colombo Port for transshipment due to the project's implementation.

3. Future growth in container traffic at Colombo is strongly correlated with the ISC regional economy, which is expected to continue to expand. Colombo's ability to service this demand, however, depends on a number of factors, including i) shipping lines' service and transshipment strategies, ii) Colombo Port's competitive position in comparison with other regional hub ports, and iii) Colombo Port's capacity and/or capability to handle the forecast demand.

4. The design capacity for each terminal at the South Harbor is 2.4 million twenty-foot equivalent units (TEU) per year. Considering the initial ramp-up period for operating a new terminal by a new operator at a new port and factoring in operational interruptions from adjacent construction activities, it is assumed that the SCT would initially have a lower capacity of around 1.0 million TEU/year in the first full year of operation (2014) and full design capacity in the third year (2016). The entire terminal is expected to be in full operation in 2016, and that full capacity for the entire terminal is assumed for 2016 and beyond.

[1] SLPA. 2011. *ADB Loan 2319-SRI Colombo Port Expansion Project, Strategic Review of Development Option*.

5. When it is fully built and operational, the SCT will provide additional capacity to the port. Nevertheless, with the rapid expansion of economies in the ISC region and growth in the global container businesses, Colombo Port will still face challenges of challenges on capacity shortfalls for deep-water berths and congestion issues if the market is to perform as projected in the short to medium terms. To this extent, it is essential for the port to develop other new terminals in a timely manner.

6. The container traffic growth trends at Colombo Port are given in Table A7.1. The average annual growth between 2003 and 2014 is 8.7% per annum and the growth in the last 3 years is about 4.8% per annum. The existing port had almost reached its capacity by 2011, and the expansion program under implementation will ensure increased capacity and continued patronage of the port by large operators.

Table A7.1: Container Traffic at Colombo Port
('000 twenty-foot equivalent units)

Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Total container traffic	1,959	2,221	2,455	3,079	3,381	3,687	3,464	4,137	4,263	4,187	4,306	4,908

Source: Sri Lanka Ports Authority.

7. The Strategic Review Report (footnote 1) had projected average growth of 6.8% per annum for transshipment traffic between 2010 and 2040. The global economic slowdown is reflected in slowing within the economic growth of the ISC region in recent years. The ISC region trade is dominated by India, which, with a share exceeding 85%, has seen its growth rate decline to 4.7% in 2012 compared to the 8–9% level prior to 2009. The economic growth outlook for India indicates that the real growth rate will improve to 6.1% by 2018.[2] Taking into account the slowing economic growth, the current analysis uses a slightly lower growth rate of 4.0% per annum for the transshipment traffic between 2014 and 2040.

8. The Strategic Review Report (footnote 1) had projected a 5.7% annual growth rate for Sri Lankan port traffic between 2010 and 2040. The Sri Lankan economy has shown sustained growth in recent years in the 6–8% range considered in the projection, and therefore a growth rate of 5.0% per annum was adopted in this analysis for the period between 2014 and 2040.

9. The current capacity and capacity addition with the completion of the SCT will be insufficient to handle projected demand, and the planned East and West container terminals are to be completed to meet the long-term demand. The trend in container shipping of using larger capacity ships will give Colombo Port a competitive advantage with the development of South Harbor terminal facilities which can handle these large ships.

C. Costs

10. **Capital construction costs.** The actual cost of construction for the basic infrastructure works and SCT are considered in this analysis (Table A7.2). The estimated costs of construction for two additional terminals that are to be constructed to meet the forecast demand of the Colombo Port Expansion Project also are considered.

[2] OECD. 2013. *Economic Outlook for Southeast Asia, China and India 2014: Beyond the Middle-Income Trap*. http://dx.doi.org/10.1787/saeo-2014-en

11. **Operating costs.** Operating costs are divided into variable costs, costs that would vary with utilization of the terminal, and fixed costs that are independent of terminal throughput. Tables A7.3 and A7.4 set out the variable and fixed costs.

Table A7.2: Project Capital Costs

Cost Category	Cost at Appraisal	Actual Cost
A. Infrastructure		
1. Civil works	290	360.52
2. Others	42	11.03
3. Taxes and duties	50	55.70
Total (A)	**381***	**427.25**[a]
B. Terminals		
1. South Container Terminal		
a. Civil works construction	154	
b. Equipment	147	
Subtotal	301	500[b]
2. East Container Terminal[b]	301	510
3. West Container Terminal[b]	324	550
Total (B)	**926**	**1987.25**

[a] Contingencies and interest not included.
[b] Estimated.
Source: Sri Lanka Ports Authority.

12. The Sri Lanka Ports Authority (SLPA) estimates costs for the East and West container terminals at $510 million and $550 million, respectively.

Table A7.3: Variable Costs and Projected Increases

Variable Costs	2008 ($ / TEU)	2008–2038 (Projected increases in real terms %)
Energy	3.04	2
Personnel	2.31	2
Repairs and maintenance (40% of total)	0.97	2
Others	3.65	1

TEU = twenty-foot equivalent unit.
Source: Consultants' estimates; Sri Lanka Ports Authority.

Table A7.4: Fixed Costs and Projected Increases

Item	2008 ($ '000)	2008–2038 (Projected increases in real terms %)
Administration	2,168.1	2
Repairs and maintenance (60% of total)	3,427.6	2
Insurance	3,974.1	1

Sources: Consultants' estimates; Sri Lanka Ports Authority.

D. Economic Evaluation

13. The economic evaluation compares the economic costs and economic benefits of the project from the viewpoint of the national economy. The economic analysis is based on the scenario that three terminals will be sequentially developed to meet forecast demands. The main consequence for the economy if the project is not built would be loss of the frequent, fast, direct shipping services used by exporters and importers. Without investment in the South Harbor, Colombo would lose its transshipment traffic; and if the port no longer were to operate as a transshipment hub port, it would soon lose its direct calls on trunk-line routes. Local traffic is not high enough to attract direct calls by trunk-line ships. Colombo would eventually become a feeder port, served by a combination of feeder ships and multiport services with relatively long transit times for the ports and with lower traffic volumes.

14. The Sri Lankan economy would experience several costs if Colombo Port were to lose its transshipment hub status. The benefits to the Sri Lankan economy are thus the avoidance of these costs. The first economic benefit of the project would be avoidance of the cost of having to use feeders. SLPA statistics indicate about one-third of imports and exports are on long-distance routes. The average cost of feeding to and from Singapore and other regional transshipment hubs were estimated at appraisal to be $250 per TEU. With the project implemented, the Colombo Port will retain its direct services and conservative estimates are that an average feeder cost of $250 per TEU would be saved by about 20% of imports and exports on long-distance routes.

15. The value to shippers of direct, fast, frequent services can be measured by willingness to pay. Longer transit times and delays are injurious to export markets, especially for textiles. Textiles accounted for 42.9% of Sri Lankan exports in 2008 and 40.8% in 2012. Exporters confirm that a substantial proportion of these exported textile products must get to retail outlets quickly. The importance of the time factor in future textile trade has also been confirmed. One study found that lead time will play a crucial role in determining international competitiveness because of tradeoffs between low wage costs and time factors.[3] The study found that closeness to a large consumer market (e.g., the United States or Western Europe) provides a competitive edge in the highly competitive, time-sensitive, and fashion-oriented clothing market and also for new exports that will emerge. The cost to the economy on the basis that 10% of the total traffic would be willing to pay $300 per TEU for fast, direct, reliable service as assessed at appraisal was used in the analysis.

16. Container terminals obtain additional revenue from transshipment. Without the project, transshipment traffic would almost certainly have declined rapidly, rather than being squeezed out gradually by imports and exports. For the purpose of economic analysis, however, the most conservative scenario in which existing facilities still handle the considerable transshipment traffic is applied. The tariff for transshipment is $37 per TEU, and with the project this transshipment revenue would be retained.

17. In addition to the terminal operator, SLPA itself earns revenue from handling transshipment cargo. The revenues to SLPA come from harbor-entering dues and harbor tonnage dues. They average $8 per TEU. Additional revenue to SLPA would result from providing marine services, but this would be offset by costs and are not included here. These

[3] Organization for Economic Co-operation and Development. 2004. *A New World Map in Textile and Clothing: Adjusting to Change*. Paris: Organization for Economic Co-operation and Development.

two revenues items are gains to the country, as they come from providing transshipment services to cargo originating outside Sri Lanka and also destined for places outside Sri Lanka.

18. The costs of other items (e.g., freight costs, feeder shipping costs, and terminal and port charges) are determined in the international competitive market. Thus, they are assumed to be free of distortions and so shadow pricing is not necessary for measuring their economic costs. Accordingly, the avoidance of these costs reflects true economic benefits. The values assigned to the benefits are compared with economic costs of the project investment up to 2038. The analysis used 2008 constant prices. The East Container Terminal is assumed to be constructed in two phases with capacity 0.8 million TEU to be operational in 2015 and the balance of 1.6 million TEU assumed to be operational by 2018. The West Container Terminal with capacity of 2.4 million TEU is assumed to be operational by 2023. A standard conversion factor of 0.97 estimated from trade data was used for approximating the border price equivalent of non-traded inputs and outputs. Operation and maintenance costs were also estimated for each year of the analysis period. The economic internal rate of return is estimated at 13.3% (Table A7.5).

Table A7.5: Annual Benefit and Cost Streams for the Project

($ million)

Year	Capital Cost	O&M Cost	Total Cost	Avoidance of Feeder Cost	Additional revenue from transshipment	Total Benefit	Benefit − Cost
2008	51.71		51.71			0.00	-51.71
2009	56.83		56.83			0.00	-56.83
2010	82.51		82.51			0.00	-82.51
2011	83.93		83.93			0.00	-83.93
2012	296.26		296.26			0.00	-296.26
2013	216.02	13.1	229.14	82.56	9.47	92.03	-137.11
2014	72.51	20.0	92.47	90.16	31.75	121.91	29.44
2015	87.02	23.1	110.16	95.57	41.22	136.79	26.63
2016	116.02	26.6	142.60	101.30	51.17	152.47	9.88
2017	87.02	30.3	117.31	107.38	61.68	169.06	51.75
2018		34.3	34.29	113.82	72.71	186.53	152.24
2019		38.6	38.60	120.65	84.32	204.98	166.38
2020	132.94	43.2	176.19	127.89	96.57	224.46	48.27
2021	177.26	47.0	224.28	133.65	105.75	239.39	15.12
2022	132.94	51.0	183.98	139.66	115.29	254.96	70.98
2023		55.3	55.30	145.95	125.21	271.16	215.86
2024		59.8	59.82	152.52	135.49	288.01	228.19
2025		64.6	64.61	159.38	146.15	305.53	240.92
2026		69.7	69.69	166.55	157.21	323.76	254.08
2027		75.1	75.09	174.05	168.72	342.77	267.68
2028		80.8	80.81	181.88	180.67	362.55	281.73
2029		86.9	86.87	190.06	193.03	383.09	296.22
2030		86.9	86.86	198.61	205.91	404.52	317.66
2031		93.6	93.56	207.55	219.23	426.78	333.22
2032		100.7	100.69	216.89	233.10	449.99	349.31
2033		108.2	108.22	226.65	247.46	474.11	365.89
2034		112.5	112.52	236.85	253.45	490.30	377.78
2035		114.4	114.42	247.51	253.45	500.96	386.54
2036		116.4	116.35	258.65	236.80	495.45	379.10
2037		118.3	118.32	270.29	236.80	507.09	388.77
2038		120.3	120.32	282.45	236.80	519.25	398.93
				Economic Internal Rate of Return			**13.3%**

O&M = operation and maintenance.
Source: Consultants' estimates.

19. The reevaluated EIRR (Table A7.5) is 13.3%, lower than the 17.7% calculated at appraisal. The primary reason for the reduction in the EIRR is lower expected traffic growth and increase in the estimated costs of the container terminals from the estimates at appraisal. A sensitivity analysis was conducted for the changes in traffic forecasts and ratio of switch to feeders. Table A7.6 summarizes the results of the sensitivity analysis and indicates the economic viability of the project to be robust.

Table A7.6: Results of Sensitivity Analysis

Change in	Case	EIRR (%)
Traffic forecasts	10% increase	14.6
	10% decrease	12.0
Ratio of switch to feeders	10% of domestic containers are switched to feeders of foreign ports without the project	10.4
(Base case: 20% of domestic containers are switched to feeders of foreign ports without the project)	30% of domestic containers are switched to feeders of foreign ports without the project	16.1

EIRR = economic internal rate of return.
Source: Consultants' estimates.

F. Financial Evaluation

20. The financial analysis of the project for SLPA was conducted in accordance with Asian Development Bank (ADB) guidelines.[4] The financial evaluation compares the incomes and expenditures of SLPA through project implementation. To be consistent with the methodology at the appraisal stage, this analysis is based on the scenario that three terminals will be sequentially developed by the private sector to meet forecasted demand. Incremental benefits and costs were computed on the basis of with- and without-project scenarios for each of the components. All financial benefits and costs are expressed in real terms. Taxes and duties are included, and contingencies and interest during construction are excluded. Royalties, lease cost, port entry dues, harbor tonnage dues, light dues, and handling charges are used for the incomes of SLPA. Capital investment cost and maintenance and repair cost of the basic infrastructures are used for the expenditures of SLPA.

21. The operation and maintenance costs of the breakwater could be considered negligible. To be consistent with the methodology at appraisal, however, 0.5% of the investment costs are assumed incurred from 2014 and with a 1% per annum escalation. The values assigned to the incomes are compared with the basic infrastructure expenditures for the project up to 2038. The financial internal rate of return (FIRR) is approximately 12.1% (Table A7.7).

22. The weighted average cost of capital (WACC) was calculated and compared with the FIRR to ascertain the financial viability of the project for SLPA. Nominal costs of financing are assumed at 0.84% for ADB and 9% for the government. Incorporating the other assumptions, (i.e., a long-term domestic inflation rate of 5.0% and SLPA's effective tax rate of 28%), the real cost for both ADB and SLPA funds is below 4%. Hence a minimum rate of 4% is assumed for the real cost, as per ADB guidelines, in calculating the WACC.[5] The 12.1% FIRR in exceeds the project's WACC of 4%. This demonstrates the financial viability of the project. It is also worth

[4] ADB. 2005. *Financial Management and Analysis of Projects*. Manila.
[5] ADB. 2002. *Guidelines for the Financial Governance and Management of Investment Projects Financed by the Asian Development Bank*. Manila.

noting that the FIRR was 11.49% during appraisal. Therefore, the reevaluated FIRR at completion is higher than at appraisal. The higher FIRR can also be attributed to the expedited construction schedule of the SCT and early opening of the SCT.

23. A sensitivity analysis was conducted for the changes in traffic forecasts and rates of revenue (Table A7.8). The analysis indicates that the financial sustainability of the project for SLPA is robust.

Table A7.7: Results of Sensitivity Analysis

Change in	Case	FIRR (%)
Traffic forecasts	10% increase	12.7
	10% decrease	11.4
Rates of revenues	10% increase	12.9
	10% decrease	11.2

FIRR = financial internal rate of return.
Source: Consultants' estimates.

ENVIRONMENTAL SAFEGUARDS

A. Introduction

1. Prepared by Scott Wilson Kirkpatrick and Co, Ltd. in 2005 for the Ministry of Ports and Aviation and funded by the Asian Development Bank (ADB), the environmental impact assessment (EIA) for the Colombo Port Expansion Project built on the feasibility study.[1] It further complied with the Sri Lankan EIA process and ADB's environmental assessment requirements. The Colombo Port Expansion Project is divided into two development phases: Phase I is the construction stage while Phase II is the port operation which is dependent on the container traffic. The major components of Phase I are i) dredging and reclamation, ii) breakwater construction, iii) terminals, iv) quay walls, v) road access, and vi) subsea oil pipeline. The project is classified as environmental Category A because the transport of construction materials for the breakwater construction, dredging and reclamation, and upgrading of the internal road, water supply, and drainage are likely to have significant adverse and irreversible environmental impacts.

2. The EIA identified the following significant environmental impacts: (i) increased turbidity; (ii) geotechnical stability; (iii) siltation; (iv) change in current pattern; (v) sediment transport; (vi) change in adjacent beach; (vii) wave disturbance; (viii) impacts to water, noise, and air quality; and (ix) impacts to marine ecology and fisheries. Mitigation through design was adopted during the project feasibility and engineering design stages. This included minimizing material import and reuse of dredged materials, particularly through the use of a trailing suction hopper dredger.

3. Consultations during the EIA's preparation complied with requirements from ADB and the Central Environmental Agency (CEA). From September 2003 to October 2005, extensive consultations were conducted. Multilevel consultations were organized, involving key government agencies like CEA, the Coastal Conversation Department (CCD), EIA Steering Committee, Geological Survey and Mines Bureau, and Marine Pollution Prevention Authority to define the scope and scale of assessment and identify key public concerns. Successive consultations were made with tea and garment industry representatives, local government executives of the Urban Development Authority, Colombo Municipal Council, and the Board of Investments. Industry representatives of the Ceylon Association of Ship Agents were also engaged to scope the operational issues inasmuch as construction may hamper the existing port operations. Local stakeholders comprised of small businesses along the port's periphery, fishing communities in Modera, and local drivers, among others, were briefed on the scale of the project and the objectives of the EIA. All of these were able to share their concerns and recommendations, and these were reflected in the impact assessment and mitigation measures.

B. Environmental Baseline Condition

4. **Climate.** The project area has a tropical monsoon climate with the southwest monsoon from May to September and northeast monsoon from December to February. Average annual rainfall is about 2–2.5 meters (m). During the southwest monsoon, wind speeds are usually faster by 10–20 m/second. The tidal pattern is semidiurnal, ranging from 0.2 m to 0.8 m, with 5 centimeters/second velocity.

5. **Geology and soils.** The project area is underlain by recent sediments with metamorphosed rocks and with outcrops present on the north and south of the port's seabed.

[1] ADB. 1999. *Technical Assistance to Sri Lanka for South Harbor Development in the Port of Colombo*. Manila.

6. **Hydrology and bathymetry.** The watershed where the port is located is highly urbanized. Sewage and storm water outfalls of the city are mostly located within close vicinity of the port. In terms of drift pattern, the longshore is northerly dictated by the southwest monsoon and the nearshore currents are generally weak at 10–15 m/second with peak speed of 40–50 centimeters/second recorded in November 2003. Annual average wave height is 0.9 m and maximum height of 2.7 m with more than 55% of the waves coming from the southwesterly direction. The ports depth changes from 0 to −25 m at the end of the dredge approach channel.

7. **Sediment quality.** There are no Sri Lankan statutory guidelines on sediments and so the EIA study adopted the Australian and New Zealand Environment and Conservation Council (ANZECC) values. These values allow identification of sediments containing high levels of contaminants that can cause adverse effects and facilitate decisions on potential remobilization of contaminants and protection of uncontaminated sediments. Two sets of values were adopted: a lower value that will trigger a management response such as initiating more detailed and comprehensive sampling, and a higher guide value that indicates a potential for damage or impairment of use. In 1996, Hg levels in the project site constituted the only parameter beyond the trigger value while PCBs and DDT were below detection. In 2005, more parameters were identified to be above the detection limits for Ni, Cd, and Hg but lower than the high values, and organochlorides were all below detection.

8. **Water quality.** Similar to the sediment management approach, the ANZECC guideline values were adopted for toxicants during construction and operation phases. The 2001 sampling revealed that there was no contamination, and waters were found suitable for recreational use. In 2003 and 2004, wthe ater quality sampling and analysis indicated high fecal coliform in the inner harbor basin due to the Kelani River, Mutwal sewage outfall, Wellawatta sewage outfall, other outfalls in the inner basin, and Beira Lake sea outfall.

9. **Air quality.** Air quality in the CSH was taken from the nearest air quality monitoring station at Fort Railway Station about 1 kilometer from the port boundary. NO_2 and SO_2 ambient concentrations are higher than the national standards, PM10 are higher than United States Environmental Protection Agency permissible limits, and Sri Lanka has no PM10 standard. CO ambient concentrations are well within national standards. Noise levels in the port area are elevated due to vehicular traffic but in general still meet applicable limits set by CEA for Category C or developed lands that are not considered sensitive.

10. **Vibration.** Three structures were identified in the EIA within the CSH that are sensitive to vibration: Battenberg Battery, Harbor Master's Building, and Sri Lanka Ports Authority (SLPA) Museum. Sri Lankan interim standards for Category 4 cover archeologically protected structures. Monitored vibration levels were below the 1.0 mm/s limit at 10–50 Hz.

11. **Ecological resources.** The following habitats exist in the CSH: i) rocky shore north of Galle Face and north of Kelani River mouth covered by macrophytes and brown mussel that are harvested for food; ii) sandy shore also north of Galle Face and Kelani which is poor in ecological resources and used mostly for fishing boat landings; iii) rock outcrops north of Kelani River where the exposed Kalapugala reef is located which is mostly covered by marine algae and mollusks; iv) reef habitat in Palagala about 600–800 m from Galle Face, Onagala about 2–3 kilometers north of Kelani River, Kalapugala about 300–500 from Kelani River, and Kelanigala about 3–4 kilometers west of the coast (These reefs have similar characteristics dictated by the sediments from the Kelani River. Density and colonization are very low.); v) sandy bed covered by a thin layer of silt from the Kelani River with an abundant population of benthic worms (sipunculids) and multi-segmented worms (polychaetes); and vi) open water habitat around the

CSH where sardines and herrings are abundant and in rare instances tuna, Asian sea bass, barracuda, and grouper are caught.

C. Compliance with National Environmental Requirements and Loan Covenants

12. Under the Government of Sri Lanka procedures for EIA, the project is classified as a "Prescribed Project" in accordance with the National Environmental Act, No. 47 of 1980 (as amended by Act No. 56 of 1988). The CCD, as the project approving authority, issued the permit on 8 February 2006 for the CSH Project. Separate EIA and quarrying operation permits were secured for each quarry site. Finally, an archaeological impact assessment was satisfactorily conducted and permit was issued by the Department of Archaeology.

13. ADB, Japan Bank of International Cooperation, and the World Bank have provided loans to assist the government in implementing the project since the port modernization began in the 1980s. All three financing institutions classified the project as environmental Category A having a potential for significant adverse impacts. As such, the EIA was carried out in accordance with briefs issued by both ADB and CCD. The EIA was submitted and disclosed in 2005. It was based on extensive baseline surveys and covered the physical, biological, and socioeconomic environments.

14. Systematic environmental monitoring was implemented in the course of project construction. Eight semiannual monitoring reports from June 2008 to December 2011 were submitted as required by ADB's Environment Policy (2002).

15. The construction and operation of the terminal by the concessionaire were covered by pertinent clearances and permits administered by the CCD, CEA, and Geological Survey of Mines Bureau. A detailed environmental management plan (EMP) was prepared and is being monitored by the CCD and SLPA on a monthly basis. Further, the terminal operation will comply with environmental clauses contained in the concession agreement covering chance archeological finds, inspection and audit authorities of CCD, collection and treatment of sewage, and compliance with NEA No. 47 of 1980 and the Coast Conservation Act No. 57 of 1981.

Table A8.1: Compliance with the Environmental Provisions of the Loan Covenant

Covenant	Status of Compliance
The Borrower shall cause SLPA to ensure that the Project and all Project facilities are developed, conducted, implemented and maintained in accordance with the Borrower's National Environmental Act (NEA) No. 47 of 1980, as amended and ADB's Environment Policy (2002). In case of any discrepancies between the Borrower's laws, regulations, and / or procedures and ADB's requirements, ADB's Environmental Policy (2002) shall prevail.	**Complied with.** The project complied with all legal permits, clearances, and disclosure requirements. An environmental impact assessment was prepared, reviewed, and approved by the CCD as the project approving authority and by ADB. Air, water, noise, and erosion controls were closely monitored by the CCD while ensuring compliance of batching, crusher, and asphalt plants were supervised by the CEA. Where there are no applicable national standards (such as a heavy metal parameter) to assess water and sediment qualities, the prescribed values contained in the ADB-approved EIA were observed.

Covenant	Status of Compliance
The Borrower shall cause SLPA to apply the environmental mitigation measures included in the EIA and the SEIA report for the implementation of the Project as necessary. The Borrower shall cause SLPA to monitor, review, and if necessary, update the EMP prior to any Works to ensure that all negative environmental impacts related to works are mitigated properly. In case of unanticipated negative environmental impacts, the Borrower shall cause SLPA (i) to report such impacts to CCD and ADB; and (ii) to provide remedial mitigation measures to affected people in consultation with CCD and EMC	**Partly complied with**. Through the construction supervision consultant and contractors, SLPA submitted regular monitoring reports. Mitigation measures were implemented according to EMP and regulatory requirements. In cases where actual impacts exceeded predicted levels, SLPA implemented timely and innovative measures to assure levels are maintained or returned to compliance. Updating of mitigation measures and reporting were done through the semiannual monitoring reports. There were some minor unanticipated impacts. Upon their occurrence, these were immediately communicated to ADB and addressed on site. Other than these, it was mainly the scale of the actual impacts that was significantly greater than levels predicted in the EIA.
The Borrower shall cause SLPA to conduct regular environmental monitoring. The monitoring report should be submitted to ADB, EMC and other relevant agencies such as CCD, and Central Environmental Agency every 6 months	**Complied with.** Nine semiannual monitoring reports from June 2008 to December 2012 were submitted to ADB that summarized the daily site inspections, weekly meetings with contractors and the construction supervision consultant, weekly environmental monitoring reports by contractors, bimonthly environmental progress meetings, and monthly site audits by the construction supervision consultant. For the construction and operation of the terminal, the concessionaire is submitting monthly monitoring reports to SLPA and CCD as required in the Development Permit. Annual inspections were conducted by the CEA in line with the batching plant permit renewals.
The Borrower shall cause SLPA to provide the contractors and Concessionaire with the EIA and the SEIA including the EMP and ensure that contractors and Concessionaires implement the required mitigation measures as described in the EMP in a satisfactory manner. In addition, the Borrower shall cause the SLPA to ensure that the contractors and Concessionaires report on the implementation of the EMP on a regular basis, along with any deviation from the EIA report.	**Complied with.** SLPA discussed and provided the CICT concessionaire copies of the EIA, SEIA, and EMP. The concessionaire, as required by CCD, prepared a more detailed EMP and this is currently being enforced.

D. Significant Environmental Impacts and Mitigation Measures

16. **Dredging, reclamation, and breakwater construction.** These activities disturbed 340 hectares for reclamation and 820 hectares of the channel approach and harbor basin and resulted in increase in water turbidity, migration of sediment from the dredging area, reduction in water transparency, physical and chemical changes in the water environment, and excessive availability of nutrients. The used of a trailing suction hopper dredger ensured good quality fill materials free of fines but resulted in increase of suspended solids in the water column. Fines generated from rainbowing were controlled through the settling basins. Based on detailed modelling, dispersal of dredged materials were limited to 1–2 kilometers from the dredged site. Dredging cycles were carried out far apart to allow settlement of sediment before the next activity began and avoided cumulative impact. Sediments, as predicted, were carried by the current and resulted in blanket coverage of the seafloor during dredging and transport, but with low velocities such that sediments settled immediately into adjacent areas. Siltation of the existing harbor during construction was minimal, as predicted, due to the low rate of sediment release and low current velocities.

17. As planned, no off-site disposal of dredged materials was made in order to minimize fill materials and avoid impacts related to disposal. Rainbow operations as early as the June–December 2008 reporting period were limited to 80% of the dredging time to avoid accumulation of suspended solids.

18. **Load out point erosion.** Construction of the breakwater was completed by reporting period December 2008 and immediately nourishment north of the load out point (LoP) was implemented to address erosion. By 2009, the erosion rates had become severe, threatening residential structures and tourist beaches and disturbing fishing activities. The SLPA launched a vigorous program to control erosion which included beach nourishment, sand bagging, and geotubes to protect stabilized beach sections. In the following year, these activities were implemented aggressively and coupled with the installation of groynes and revetment to further protect the beach. By the end of 2010, large stretches were stabilized. Upon decommissioning of the groynes, and revetments by end of 2011, a final shore profile monitoring conducted by the Sri Lanka Hydraulic Institute confirmed the stability of the shoreline comparable to the 2004 baseline before the LoP was handed back to the land owner.

19. **Rerouting of subsea oil pipeline and oil spill.** Risk of oil spill due to the relocation and deepening of the CPC pipeline was anticipated. Other risks of oil spills included collision between vessels in the approach channels (including tankers) and spills at the quayside. The dredging, removal, and decontamination of the old pipeline and rerouting of the new submarine pipeline was completed in mid-2010 and handed to the Ceylon Petroleum Corporation without environmental impacts. Due to high swell, a vessel sunk during the first half of 2009 and resulted in a 16,000-liter oil spill. Dispersants were used and oil recovery was undertaken immediately in coordination with the Marine Environmental Pollution Authority.

20. **Air quality.** The EIA recommended that barges delivery, dredgers, road transport, and concrete batching activities be located far from sensitive receivers. Throughout the construction phase, water sprinkling of haul roads and quarry rock stockpiles, and protective covers around the batching plant were implemented. During the first year of construction, complaints on dust emissions were received from CSH, LoP, and haul roads. By January–June 2009, however, air quality at the LoP and batching plant had improved and no complaints were received.

21. **Noise and vibration.** Main sources of noise were delivery and placement of rock for breakwater, dredging and reclamation; piling for quay walls, site formation; and construction of buildings at the CSH. Delivery trucks at a rate of 408–550 vehicles per day constituted the single largest source. Piling during quay walls construction generated substantial noise but the large distance from the nearest sensitive receptor means there was minimal impact. At the quarry sites, blasting, handling, and vehicular transport were the main sources of noise and vibration while underwater blasting posed risk to archeological structures in the CSH.

22. Initially at the quarry site, blast overpressure and ground vibration were exceeding standards and resulted in minor damages to several residents until the blasting material was replaced from ammonia to emulsion. Levels were thereafter compliant. All damages were compensated under the supervision of the Geological Survey of Mines Bureau. By January–June 2009, noise, blast overpressure, and ground vibration near the quarry complied with standards. Within the CSH premises, ground vibration at the marine museum, harbor master building, and Battenberg Battery were below the 1 mm/s prescribed limit.

23. Noise and vibration from the haul trucks, with peak traffic reaching almost 500 trucks/day, was controlled through limiting movement along haul roads, implementing speed limits, mobilizing flagmen, covering truck beds, good driving practices, and strengthening and maintaining haul roads.

24. **Water quality.** The release of suspended solids during dredging had the potential to generate the following impacts: i) release of suspended solids into the water column and formation of off-site migration of sediment plumes, ii) release of sediment-bound pollutants to the receiving water column, iii) depletion of dissolved oxygen, and iv) smothering of marine organisms. Elutriation tests, which indicate the potential extent of toxicant release from the sediments, showed that Cu, Cr, Ni, Cd, and Pb would not be detectable. There was potential to create spots where DO is depleted, but as the sediments were expected to settle immediately and due to their low oxygen demand, these spots were localized and short-term in nature. Other wastes that could affect water quality were silt-laden run-off from the reclamation platforms and sewage from the camp.

25. Starting in 2009, water quality at nine monitoring sites showed signs of deterioration. During that period, TSS and NH3-N levels exceeded the 2004 baseline values in all stations while heavy metals and pesticides were still below the trigger and baseline values. By the following year, NH3-N and TSS continued to increase and heavy metals, including Cu, Cr, Ni, and Pb, started to increase in the inner harbor and Kelani River mouth but were still below the lower trigger values. By the end of 2011, however, Pb and Hg had breached the lower limit and by mid-2012 levels were higher than the higher limits. The SLPA advised the terminal operators and contractors against contact with water in spite of the area's being secured and no contact recreation or fishing was allowed. Post-construction monitoring conducted in June 2014 revealed the levels of heavy metals in the water column to be returning to baseline levels.

Table A8.2: Comparison of 2014 Post-Construction and 2004 Baseline Water Quality

Water Quality Parameter	Unit	Monitoring Stations and Period								Remarks
		June 2014			June 2014					
		WQ1	WQ4	WQ17	WQ1	WQ4	WQ17	Low	High	
Cu	ug/l	0.05	0.05	0.05	<0.03	<0.03	<0.03	1.3	8	Returning to baseline < LTV
Cr	ug/l	0.01	0.01	0,01	<0.08	<0.08	<0.08	4.4	85	Back to baseline
Ni	ug/l	0.14	0.14	0.14	<0.05	<0.05	<0.05	70	560	Returning to baseline < LTV
Pb	ug/l	0.15	0.12	0.18	0.25	0.309	0.107	4.4	12	Back to baseline
Cd	ug/l	0.01	0,01	0,01	<0.01	<0.01	<0.01	5.5	36	Back to baseline
Sn	ug/l	0.05	0.05	0.05	<1	<1	<1	ID	ID	Back to baseline
Hg	ug/l	<1	<1.3	<1	<0.001	<0.001	<0.001	0.4	1.4	Returning to baseline < HTV
As	ug/l	0.001	0.001	0.001	0.001	0.001	0.001	ID	ID	Back to baseline
Mn	ug/l	<0.01	<0.01	<0.01	ND	ND	ND	None	None	Cannot compare
Al	ug/l	0.1	0.1	0.1	<1	<1	<1	ID	ID	Back to baseline
Aldrin	ug/l	<0.08	<0.08	<0.08	<0.02	<0.02	<0.02	ID	ID	Back to baseline
Dieldrin	ug/l	<0.08	<0.08	<0.08	<0.02	<0.02	<0.02	ID	ID	Back to baseline

Note: (i) ID – insufficient data
(ii) LTV – low trigger value, HTV – high trigger value

26. **Waste disposal.** Although the generation of additional solid and liquid wastes had been recognized in the EIA, there were no clear actions to be taken in their management. Minimization of waste generation was practiced by reducing damage to valuable and salvageable materials during demolition. Solid wastes were segregated into hazardous and nonhazardous or recyclable materials and were disposed of in coordination with the Colombo Municipal Council. Non-recyclables were collected and processed at the Kollonnawa Waste Disposal Facility. During the demolition of existing structures, asbestos-laden materials were encountered and with close supervision of the CEA these were properly collected, transported, and disposed of off-site through landfilling. A total of 1,690 m^3 of garbage were collected, 1,900 tons of recyclables were segregated and processed, 1,760 container drums were reused, and 40 m^3 of waste oil were recovered and treated. During the disruption of sewage disposal through the marine outfall, sewage and domestic waste were collected by road tankers and disposed to the marine outfalls through the city's main sewer line.

27. Wastewater treatment have been installed and operated by SLPA to treat all waste coming from the terminals, including ship wastes. All solid wastes are collected and disposed of in compliance with Colombo Municipal Council's requirements.

28. **Ecological and fisheries resources.** Permanent loss of benthic habitat under the reclaimed area and temporary loss of soft habitat along the dredged channel, as well as the impacts from increase in turbidity during the project construction are considered insignificant due to the limited benthic habitat.

E. Unanticipated Impacts and Mitigation

29. No unanticipated impacts were encountered during implementation of the project. However, the actual scale of impacts exceeded what was predicted in the EIA. The increase in heavy metals in the water column and sediment resuspension due to dredging and reclamation were not anticipated to increase beyond the higher levels. However, during the final year of construction higher level limits for Pb and Hg were exceeded and advisories were immediately issued. A resampling was conducted in 2014 after completion of the terminal construction. The demolition of buildings to construct the access roads generated asbestos-contaminated wastes.

30. The erosion north of the LoP was also anticipated but with limited information available during the preparation of the EIA, no quantification on scale and location was made. As it turned out, serious coastal erosion brought by the change in hydrographic pattern brought by the construction of the temporary breakwater challenged SLPA to minimize the impacts on nearby coastal community through aggressive nourishment, establishment of revetment, groynes, sand bags, and geotubes to protect nourished section. The close cooperation between SLPA, Contractor, the construction supervision consultant and pertinent government agencies like CCD, CEA, and Geological Survey of Mines Bureau allowed the expedient and efficient resolution of these impacts.

F. Conclusion

31. During construction, SLPA fulfilled their obligation to protect the environment and implemented mitigation measures that minimized adverse impacts. No sensitive ecosystem or habitat were affected and the general environmental quality of project impacts areas like the LoP, quarry, and haul roads, and CSH has returned to baseline condition. The initial operation of the terminal had insignificant impacts on the ambient environment with the implementation of the environmental provisions of the concessionaires agreement, environmental plan, and compliance with domestic environmental laws being supervised by SLPA.