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Report No: ICR198060

IMPLEMENTATION COMPLETION AND RESULTS REPORT

IBRD-85980, IDA-57790, TF-A3723

ON A

LOAN

IN THE AMOUNT OF US\$125 MILLION

A CREDIT

IN THE AMOUNT OF SDR 90.6 MILLION

(US\$125 MILLION EQUIVALENT)

AND A GRANT

IN THE AMOUNT OF US\$4 MILLION

TO THE

SOCIALIST REPUBLIC OF VIETNAM

FOR

CAN THO URBAN DEVELOPMENT AND RESILIENCE PROJECT

May 31, 2025

Urban, Resilience and Land
East Asia And Pacific



CURRENCY EQUIVALENTS

(Exchange Rate Effective June 30, 2024)

Currency Unit = Vietnamese Dong
(VND)

VND 1 = US\$0.000039

US\$1 = SDR 0.76

FISCAL YEAR

January 1 - December 31

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ABBREVIATIONS AND ACRONYMS

BETF	Bank-Executed Trust Fund
BRT	Bus Rapid Transit
CCDR	Country and Climate Development Report
CF	Counterpart Funding
CPC	Can Tho City People’s Committee
CPF	Country Partnership Framework
CPS	Country Partnership Strategy
CSC	Construction Supervision Consultants
DARD	Department of Agriculture and Rural Development
DOC	Department of Construction
DOIC	Department of Information and Communications
DOLISA	Department of Labor, Invalids, and Social Affairs
DONRE	Department of Natural Resources and Environment
DOT	Department of Transport
DPI	Department of Planning and Investment
EHS	Environmental, Health, and Safety
ESIRT	Environmental and Social Incident Response Toolkit
ESMP	Environmental and Social Management Plans
FM	Financial Management
FRMIS	Flood Risk Management Information System
FS	Feasibility Study
GIS	Geographic Information System
GRM	Grievances Redress Mechanisms
GRS	Grievance Redress System
IBRD	International Bank for Reconstruction and Development
IEMC	Independent Environmental Monitoring Consultant
IDA	International Development Association
IRI	Intermediate Results Indicators
IRP	Income Restoration Program
IRR	Internal Rate of Return
ISA	Integrated Social Assistance
ISR	Implementation Status and Results Report
ITS	Intelligent Transport System
M&E	Monitoring and Evaluation
MTR	Mid Term Review
LAR	Land Acquisition and Resettlement
O&M	Operations and Maintenance
PAH	Project Affected Households
PAP	Project Affected People
PCAP	Post-Closure Action Plan
PDO	Project Development Objective
PMU	Project Management Unit
POD	Pedestrian Oriented Development
RP	Resettlement Plan



RFP Resettlement Policy Framework
RSA Regional Safeguards Advisor
SECO Swiss State Secretariat for Economic Affairs
SPP Spatial Planning Platform
TOC Theory of Change
TOD Transport Oriented Development
VOC Vehicle Operating Costs
VUUP1 Vietnam Urban Upgrading Program
VUUP2 Mekong Delta Region Urban Upgrading Project



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DATA SHEET

BASIC DATA

Product Information

Operation ID P152851	Operation Name Can Tho Urban Development and Resilience Project
Product Investment Project Financing (IPF)	Operation Short Name Can Tho Urban Development and Resilience
Operation Status Closed	Approval Fiscal Year 2016
Original EA Category Full Assessment (A) (Approval package - 19 Feb 2019)	Current EA Category Full Assessment (A) (Restructuring Data Sheet - 01 Aug 2022)

CLIENTS

Borrower/Recipient The Socialist Republic of Vietnam	Implementing Agency Can Tho City People’s Committee, Can Tho ODA PMU
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DEVELOPMENT OBJECTIVE

Original Development Objective (Approved as part of Approval Package on 19-Feb-2019)

The Project Development Objective is to reduce flood risk in the urban core area, improve connectivity between the city center and the new low risk urban growth areas, and enhance the capacity of city authorities to manage disaster risk in Can Tho City.

PDO as stated in the legal agreement

The Project Development Objective is to reduce flood risk in the urban core area, improve connectivity between the city center and the new low risk urban growth areas, and enhance the capacity of city authorities to manage disaster risk in Can Tho City



FINANCING

Financing Source	Original Amount (US\$)	Revised Amount (US\$)	Actual Disbursed (US\$)
World Bank Financing	250,000,000.00	188,840,830.32	195,235,221.42
IBRD-85980	125,000,000.00	73,773,047.73	73,773,047.73
IDA-57790	125,000,000.00	115,067,782.59	121,462,173.69
World Bank Administered Financing	4,000,000.00	2,952,673.49	2,952,673.49
TF-A3723	4,000,000.00	2,952,673.49	2,952,673.49
Non-World Bank Financing	72,000,000.00	154,000,000.00	132,386,751.65
SWITZERLAND: State Secretariat for Economic Affairs (SECO)	10,000,000.00	6,000,000.00	5,732,464.74
Borrower/Recipient	62,000,000.00	148,000,000.00	126,654,286.91
Total	326,000,000.00	345,793,503.81	330,574,646.56

RESTRUCTURING AND/OR ADDITIONAL FINANCING

Date(s)	Type	Amount Disbursed (US\$M)	Key Revisions
28-Jun-2021	Portal	69.90	<ul style="list-style-type: none"> • Loan Closing Date Extension
01-Aug-2022	Portal	99.85	<ul style="list-style-type: none"> • Components • Results • Disbursement Estimates • Loan Closing Date Extension • Implementation Schedule

KEY DATES

Key Events	Planned Date	Actual Date
Concept Review	01-Jun-2015	11-Jun-2015
Decision Review	24-Nov-2015	24-Nov-2015
Authorize Negotiations	17-Feb-2016	19-Feb-2016
Approval	24-Mar-2016	24-Mar-2016
Signing		11-Jul-2016



Effectiveness	30-Nov-2016	30-Nov-2016
Restructuring Sequence.01	Not Applicable	28-Jun-2021
Restructuring Sequence.02	Not Applicable	01-Aug-2022
Mid-Term Review No. 01	11-Dec-2019	11-Dec-2019
Operation Closing/Cancellation	30-Jun-2024	30-Jun-2024
ICR/NCO	31-May-2025	--

RATINGS SUMMARY

Outcome	Bank Performance	M&E Quality
Moderately Satisfactory	Satisfactory	Modest

ISR RATINGS

No.	Date ISR Archived	DO Rating	IP Rating	Actual Disbursements (US\$M)
01	29-Jun-2016	Satisfactory	Satisfactory	0.00
02	17-Jan-2017	Satisfactory	Moderately Satisfactory	0.00
03	31-Aug-2017	Moderately Satisfactory	Moderately Satisfactory	7.00
04	09-Feb-2018	Moderately Satisfactory	Moderately Satisfactory	12.00
05	30-Jul-2018	Moderately Satisfactory	Moderately Satisfactory	22.00
06	18-Feb-2019	Moderately Satisfactory	Moderately Satisfactory	30.00
07	27-Sep-2019	Moderately Satisfactory	Moderately Unsatisfactory	30.00
08	11-Apr-2020	Moderately Unsatisfactory	Moderately Unsatisfactory	40.60
09	18-Jan-2021	Moderately Unsatisfactory	Moderately Unsatisfactory	65.15
10	13-Aug-2021	Moderately Unsatisfactory	Moderately Unsatisfactory	69.90
11	12-Apr-2022	Moderately Unsatisfactory	Moderately Unsatisfactory	87.53
12	07-Oct-2022	Moderately Satisfactory	Moderately Satisfactory	106.35



13	20-Jun-2023	Moderately Unsatisfactory	Moderately Unsatisfactory	136.44
14	20-Dec-2023	Moderately Satisfactory	Moderately Satisfactory	157.44

SECTORS AND THEMES

Sectors

Major Sector	Sector	%	Adaptation Co-benefits (%)	Mitigation Co-benefits (%)
FY17 - Public Administration	FY17 - Other Public Administration	2	100	0
FY17 - Transportation	FY17 - Other Transportation	2	100	0
	FY17 - Urban Transport	37	50	0
FY17 - Water, Sanitation and Waste Management	FY17 - Other Water Supply, Sanitation and Waste Management	11	100	0
	FY17 - Public Administration - Water, Sanitation and Waste Management	18	100	0
	FY17 - Sanitation	30	100	0

Themes

Major Theme	Theme (Level 2)	Theme (Level 3)	%
FY17 - Finance	FY17 - Finance for Development	FY17 - Disaster Risk Finance	20
FY17 - Urban and Rural Development	FY17 - Disaster Risk Management	FY17 - Disaster Preparedness	20
		FY17 - Disaster Response and Recovery	20
		FY17 - Disaster Risk Reduction	20
	FY17 - Urban Development	FY17 - Urban Infrastructure and Service Delivery	19



ADM STAFF

Role	At Approval	At ICR
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Co-Team Leader(s)	Hoa Thi Hoang	Dzung Huy Nguyen
ICR Main Contributor	John Hosung Lee	

I. PROJECT CONTEXT AND DEVELOPMENT OBJECTIVES

A. CONTEXT AT APPRAISAL

Context

- Country Context.** At the time of appraisal in 2016, Viet Nam had made significant progress in economic growth and poverty reduction, transitioning from a rural to an urban economy. Urbanization increased from 23.8 percent (18.2 million people) in 1999 to 32.95 percent (29.9 million people) in 2014, reflecting the movement of 11.7 million people to cities.
- Sectoral Context of the Region.** The Mekong Delta, an agricultural center for Viet Nam, is a complex natural system exposed to significant disaster and climate risks. Climate change and rapid urbanization, including sea level rise and land subsidence, created existential challenges, exacerbated by groundwater extraction, heavy infrastructure development, and construction of ring dikes across the Mekong Delta. This led to increased disaster risks, including more frequent and severe flooding, droughts, and storms.
- Sectoral and Institutional Context in Can Tho.** Can Tho, the fourth most populated city in Vietnam and the largest city in the Mekong Delta, had a population of approximately 1.25 million and an urban growth rate of five percent annually between 2005 and 2012. It is the economic center of the Mekong Delta and suffered significant losses due to the floods that affected large areas and populations (2,000 ha, about 69 percent of the total core urban area) and caused substantial economic damages of more than US\$300 million annually in the five years before project appraisal. Factors contributing to flooding included heavy rainfall, tidal increases, poor drainage, and land subsidence. The city's old and inadequate sewer systems, along with rapid urbanization, reduced drainage capacity, making urban flooding from rainfall events a regular occurrence. Projected climate change impacts were



expected to worsen the situation. Rapid and inadequately planned urban growth in Can Tho also made the development of urban transport a priority. The city's road-dependent transport infrastructure was vulnerable to seasonal flooding. Although transport investments were assessed based on flood risks, the link between transport and urban land-use planning was not fully considered prior to this project, leading to unplanned growth in low-lying areas. Multiple government agencies with overlapping mandates were involved in flood risk management and urban development, resulting in the absence of a consolidated approach to operations and maintenance procedures. Improved flood protection and transport infrastructure were expected to increase accessibility, connectivity, land values, and investment opportunities, creating value that the government could capture and convert into public revenue.

4. **Rationale for Bank Involvement.** The World Bank, which had more than a decade-long engagement in Can Tho through the Vietnam Urban Upgrading Project¹ (VUUP1, 2004-2014, US\$389.60 million) and its successor, the Mekong Delta Region Urban Upgrading Project² (VUUP2, 2012-2023, US\$292 million), continued its support in increasing the resilience of the Mekong Delta region through two follow-on investment projects. The first project, the Mekong Delta Integrated Climate Resilience and Sustainable Livelihoods Project³ (2016-2025, US\$ 294.13 million), supported interventions for integrated climate-resilient management and development. The second project – Can Tho Urban Development and Resilience Project (this project), aimed to make Can Tho City more climate-resilient and promote sustainable urbanization. It built on the Bank's long-term engagement in urban development, disaster risk management, and climate change in Can Tho, leveraging previous investments in VUUP1 and VUUP2, as well as several studies and technical assistance initiatives. It was aligned with the Bank's efforts to improve urban infrastructure, such as drainage systems and canal upgrades, and complemented national-level engagements to build financial resilience against disaster and climate risks.
5. **Involvement of the Swiss State Secretariat for Economic Affairs (SECO).** The project partnered with SECO from the initial project concept stage, benefiting significantly from their support. SECO's involvement was crucial, providing funds that facilitated the development of non-structural investments through targeted technical assistance activities. These activities were designed to complement the project's physical investments and were primarily focused on enhancing Can Tho city's capacity to manage urban development within a risk-informed framework. The key initiatives funded by SECO included the Spatial Planning Platform (SPP), the Flood Risk Management Information System (FRMIS), and Integrated Social Assistance (ISA).
6. **Higher-level Objectives to which the Project Contributed.** The project was consistent with the World Bank Group's Country Partnership Strategy (CPS) for Vietnam (2012–2016) (Report 85986-VN) and contributed to its pillars of Competitiveness, Sustainability, and Opportunity. It addressed the cross-cutting theme of "resilience" by enhancing Can Tho's ability to withstand natural and man-made hazards, including climate change. The project supported the following CPS outcomes: improved quality and efficiency of infrastructure services (Outcome 1.2); strengthened environmental protection and management (Outcome 2.2); enhanced resilience to natural hazards and climate change (Outcome 2.3); and improved basic infrastructure and public service delivery and access (Outcome 3.2). It was also directly aligned with the Vietnam Systematic Country Diagnostic (2016) Priority 6: Augment resilience to climate change and benefit from mitigation by increasing investments in reducing the exposure and vulnerability. In addition, it addressed elements of Priority 2: Build productive infrastructure and competitive cities, by promoting Transport Oriented Development (TOD) away from the Can Tho urban core (which has a high flood risk) to lower flood risk areas.

¹ <https://projects.worldbank.org/en/projects-operations/project-detail/P070197>

² <https://projects.worldbank.org/en/projects-operations/project-detail/P113904>

³ <https://projects.worldbank.org/en/projects-operations/project-detail/P153544>



Theory of Change (Results Chain)

7. A Theory of Change (Results Chain) for the project was not required at appraisal. Figure 1 has been developed for the purpose of this ICR based on the project appraisal document.

FIGURE 1 THEORY OF CHANGE

Activity	Output	Short-term Outcomes	Mid-term Outcomes	Long-term Outcomes
Build new and upgraded embankments	New and upgraded embankment constructed	Fluvial and tidal flooding prevented and reduced	Flood risk in the urban core area reduced	Long-term disaster resilience and sustainable growth in Can Tho
Build new tidal gates/valves	Tidal gates and valves built			
Build new and upgraded sewers/pipes	New and upgraded sewers/pipe (drainage system) installed	Pluvial flooding prevented and reduced		
Rehabilitate branch canals	Dredged canals			
Created new rainwater retention area	Rainwater retention created in the urban core area			
Build new or upgraded retention lakes	Two retention lakes built	Can Tho City's urban core flood risk management improved		
Establish Flood Risk Management Information System (FRMIS)	Operationalized integrated FRMIS with upgraded early warning information system			
Build new or upgraded non-rural roads	Non-rural roads constructed	Travel time between city center and new low risk urban growth area reduced	Connectivity between the city center and the new low risk urban growth areas improved	
Build new bridges including sidewalks connecting the urban core and Cai Rang	New bridges with sidewalk connections built			
Produce public transport feasibility and strategy studies	Public transportation studies produced	Long-term public transportation plan established		
Build Spatial Planning and Riskinfo Database	Spatial planning platform established	Inter-departmental spatial data sharing enabled for better urban planning and disaster risk management	Capacity of city authorities to manage disaster risk enhanced	
Critical Assumptions:				
1. The operation and maintenance (O&M) of the infrastructure would be ensured by sufficient funding from Can Tho.				
2. Improved institutional and staff capacities of Can Tho officials would lead to more effective management and response to flooding.				



Project Development Objectives (PDOs)

8. **The Project Development Objectives at appraisal (PAD1504 & LN 8598-VN)⁴ were** “To reduce flood risk in the urban core area, improve connectivity between the city center and the new low risk urban growth areas, and enhance the capacity of city authorities to manage disaster risk in Can Tho City.”

Key Expected Outcomes and Outcome Indicators

9. The key expected outcomes of the project were: (i) reduced flood risk in the urban core area; (ii) improved connectivity between the city center and the new low risk urban growth areas; and (iii) enhanced capacity of city authorities to manage disaster risk in Can Tho City. The outcome indicators were as follows:

(i) to reduce flood risk in the urban core area

- 1) Increase in urban core land area protected from rainfall flooding for a 10-year return period and from riverine flooding for a 100-year period (in hectares). *Target: 2,675*
- 2) Number of direct beneficiaries, defined as people living in urban core protected against 10-year return flood risk. *Target: 420,000 (of which female beneficiaries 216,000)*

(ii) to improve connectivity between the city center and the new low risk urban growth areas

- 3) Reduction in travel time between urban core and Cai Rang center from the north and from the south, specifically a) from Ninh Kieu Port to Cai Rang (NK-IC3), and b) from Nguyen Van Cu Road to Interlink Bus Station in Cai Rang (NCV-Bus). *Target: 25 percent reduction for NK-IC3, 30 percent reduction for NCV-Bus*

(iii) to enhance the capacity of city authorities to manage disaster risk in Can Tho City

- 4) Number of departments utilizing the Spatial Planning and RiskInfo Platform. *Target: 7*

Components

10. The project consisted of three components:

- (a) **Component 1: Flood Risk Management and Environmental Sanitation** (Original allocation: US\$120.9 million IDA and IBRD; SECO US\$1.5 million; Actual cost: IDA US\$69.8 million; IBRD US\$40.2 million; SECO US\$1.1 million). A "low-regret⁵" engineering solution was adopted using a polder approach⁶ with surrounding embankments, tidal gates/valves, and enhanced rainwater storage and drainage systems, including a closed ring embankment and drainage system designed to protect against river and tide floods based on government-issued rainfall and basin specifications. Sub-components included:

- *Priority Flood Control Investments in Urban Core:* A limited polder approach with a combined-use road to provide flexible and cost-effective solution for Ninh Kieu and Binh Thuy Districts including an elevated road, embankments of Can Tho and Cai Son Rivers, and tidal gates/valves forming a "ring embankment" to protect the core urban area from river and tidal flooding, designed for a 1 in 100 year flood event.

⁴ PDO is the same in the PAD and Loan Agreement.

⁵ A "low-regret" engineering solution refers to strategies and interventions in infrastructure and environmental management that are designed to be effective under a wide range of future scenarios, including those involving uncertainty such as climate change.

⁶ A polder approach is a flood risk management strategy that involves creating a controlled environment to protect specific areas from flooding. This approach typically includes the following components: ring embankment and drainage system.



- *Drainage and Wastewater Systems:* Rehabilitation and improvement of canal, drainage, and sanitation infrastructure, including dredging canals, creating rainwater retention areas in Binh Thuy District, and installing a small pumping station in Tham Tuong drainage sub-catchment.
- *Operation of the City Integrated Flood Risk Management System and Early Warning System:* Institutional support to help the city develop i) improved protocols for operating flood control and drainage systems, ii) an O&M funding framework, iii) coordination protocols with other Mekong provinces for integrated river basin management and enhanced flood early warning systems, and iv) improve the early warning information system and raise public awareness through mass media and community organizations.

(b) **Component 2: Urban Corridor Development** (Original allocation: US\$78.9 million IDA and IBRD, SECO funding: US\$1.0 million; Actual cost: IDA US\$50.9million; IBRD US\$32.4 million; SECO US\$0 million). The transport investments aim to enhance intra-city connectivity and promote compact, mixed-use, pedestrian, and public transport-oriented urban development in the less flood-prone area of Cai Rang. Sub-components included:

- *Road and Bridge Links:* Connect vertical axes of the city, facilitating connectivity between new and existing populated areas in the city center, improving connectivity between inter-regional urban areas and promoting the public transport scheme of Can Tho City.
- *Construction of the Residential Area for Resettlement:* A total of 2,140 plots with an area from 63 to 90 m² to be built at the resettlement site, including social infrastructures such as a kindergarten and a primary school. Additional infrastructures to be provided, including separate sewage and drainage systems, solid waste collection, and adequate power and road networks.
- *Effective Transport Systems Management and Equipment:* Development of feasibility studies on i) the preparation of a pilot bus rapid transit (BRT) corridor and the establishment of the Public Transport Authority; ii) identify opportunities for pedestrian oriented development (POD) iii) a corridor development analysis.

(c) **Component 3: Spatial Planning Platform and Financial and Social Protection Instruments** (Original allocation: US\$6.8 million IDA and IBRD, SECO funding: US\$6.0 million; Actual cost: SECO \$1.9 million). The objective is to build a management system that enhances spatial planning, data and information management, post-disaster budget execution, and the responsiveness of safety nets to flood events. Sub-components included:

- *Risk Informed Spatial Planning Platform:* A web-based geospatial database that serves as a single platform for spatial data and intended to be used across line departments for spatial planning and infrastructure development.
- *Disaster Responsive Social Assistance System*⁷: Adapting the City’s existing social protection system to become “disaster responsive”.

11. Counterpart Funding (CF) was allocated for i) site clearance and resettlement costs of US\$44.6 million and ii) project preparation and management costs of US\$12.9 million.

B. SIGNIFICANT CHANGES DURING IMPLEMENTATION

12. The project was restructured in June 2021 (Report No. RES45194) and in August 2022 (Report No. RES47966). The changes are summarized below.

⁷ This sub-component was implemented jointly with the Social Protection and Labor Global Practice through the Social Assistance Systems Strengthening Project – SASSP and later named Integrated Social Assistance (ISA)



Revised PDOs and Outcome Targets

The PDOs were not revised.

Revised PDO Indicators

13. The second restructuring modified the original PDO Indicator: Increase in urban core land area protected from rainfall flooding for a 10-year return period and riverine flooding for 100-year return period (End-of-project target: 2,675 ha) by splitting it into two new PDO Indicators: i) Area protected from 100-year return period river/tidal flood (End-of-project target: 1,675 ha), and ii) Area dried from 10-year return period rainstorm flooding (End-of-project target: 1,976 ha).

Revised Components

14. **Component 1.** The second restructuring resulted in the following changes: the construction of two retention lakes in Can Tho university village and Long Hoa commune, as well as the road and park along Can Tho embankment, were canceled; the width of the secondary canals was reduced from 2-21 meters to 2-18 meters and the length - from 14,500 meters to 11,647 meters⁸; existing embankments were heightened, specifically the 1.1 km city-funded section of the Can Tho embankment and the 3.1 km combined national road 91 and embankment, to complete the ring embankment system of the core urban area. Two new local rainwater pumping stations were planned in Ninh Kieu district, and the remaining works at Bun Xang Lake from VUUP2 were to be completed. There were no cost changes across components and any additional costs were to be financed through increased counterpart funding.
15. **Component 2.** In the course of the second restructuring, the output “Public transport feasibility and strategy” was replaced with “Intelligent Transport System (ITS) investment roadmap” to align Can Tho City's transport policies with the Department of Transport's new priority to focus on digital economic development and smart cities.

Other Changes

16. **Extension of the Closing Date.** The first restructuring extended the closing date of the SECO-funded Recipient Executed Trust Fund (TF0A3723) by one year, from June 30, 2021, to June 30, 2022, to align its implementation period with those of the IBRD loan and the IDA credits. The second restructuring extended the closing date of the IBRD loan, the IDA credits, and the SECO grant from June 30, 2022, to June 30, 2024.
17. **Increase in Counterpart Funding.** Counterpart funds increased from US\$62 million to US\$148 million⁹ at second restructuring to cover the higher-than-expected costs of resettlement compensation and land acquisition. (See paragraph 53 for more details).
18. **Change of the SECO grant amount.** The SECO grant for the project was reduced from US\$10 million to US\$4 million, with the remaining US\$6 million converted into a Bank-Executed Trust Fund (BETF). The majority of the technical assistance work supporting capacity building under Components 1 and 3 was delivered through this BETF.
19. The project disbursement deadline date was extended by two months from the original deadline of October 31, 2024, to December 31, 2024, to ensure that all project related expenditures could be reimbursed.

⁸ Reduction in width and length was to minimize the scale of resettlement and related land acquisition costs;

⁹ At closing, a total of VND 2,956,111,056,509 was disbursed as CF equivalent to USD 126.7 million (based on August 1, 2022 exchange rate at the time of second restructuring filing)



20. **Additional changes to the Results Framework.** The second restructuring adjusted the targets of several intermediate indicators to reflect the changes to the scope of activities under Component 1:
- The end-of-project target of the indicator “Length of new and upgraded embankment installed” was increased from 10,000 m to 14,200 m.
 - The end-of-project target of the indicator “Length of canals improved” decreased to 11,647 m from 14,500 m.
 - The output of Intermediate Results Indicator 6 changed from “Public transport feasibility and strategy” to “Intelligent Transport System (ITS) investment roadmap”.

Rationale for Changes and Their Implication on the Original Theory of Change (ToC)

21. The project has experienced significant implementation delays¹⁰ due to the complexity of land acquisition and resettlement (LAR) in a densely populated core urban area and increased compensation costs. To achieve the PDO, the World Bank task team, in collaboration with the Project Management Unit (PMU) and the Can Tho City People’s Committee (CPC), agreed on making technical adjustments to several planned investments to minimize LAR. Specifically, this resulted in the cancellation of two retention lakes, a road, a park along the embankment, and the reduction of branch canal width and length during the second restructuring. These adjustments did not materially affect the overall Theory of Change (ToC) as shown in Figure 1 since most activities were retained with a slightly modified scope or replaced with alternative technical solutions which allowed the achievement of PDO with reduced LAR footprint. For instance, retention lakes were replaced with rainwater pumping stations, and the reduced width and length of the canals were offset by increasing the depth of the canals through dredging. It was also recognized that fluvial and pluvial flooding should be measured separately due to their distinct timing and impact on the urban core. New PDO indicators were introduced to measure these two types of flooding separately, providing clearer definitions and more precise measurements of PDO results. The updated PDO targets were based on hydraulic modeling conducted in December 2020, which considered these cancellations (see paragraph 48 for more details).

II. OUTCOME

A. RELEVANCE OF PDOs

Assessment of Relevance of PDOs and Rating

Rating: High

22. The project at closing was still relevant to all higher-level objectives at appraisal (see paragraph 6). Continued relevance of the project is also demonstrated by its alignment with the priorities highlighted in the Country Partnership Framework (CPF) for Vietnam for the fiscal years 2018-2022, especially on Focus Area 3: Ensure Environmental Sustainability and Resilience. The project directly addressed Objective #10: Increase climate resilience and strengthen disaster risk management and Objective #11: Strengthen natural resource management and improve water security. It was also highly relevant to Objective #4: Improve planning, management, and delivery of infrastructure and land in cities under Focus Area 1: Enable Inclusive Growth and Private Sector Participation. The PDO also aligns with the priorities outlined in the World Bank’s Country and Climate

¹⁰ Six years into the project, only 39 percent of the committed investments had been disbursed at the time of second restructuring



Development Report (CCDR)¹¹ for Vietnam (July 2022), which highlights Vietnam's vulnerability to climate change due to its low-lying cities and river delta regions. The CCDR recommends adaptation measures to protect the country's assets, infrastructure, and people, especially in the Mekong Delta region. It also emphasizes the need for urgent public and private investments to achieve adaptation and mitigation goals through coordinated regional programs for the Mekong Delta and integrated coastal resilience investment programs for major urban centers and connecting infrastructure.

23. The project is aligned with the Central Government's February 28, 2022, Decision No. 287/QĐ-TTg, which outlines the master plan for the Mekong Delta Region (MDR) for the period 2021-2030, with a vision extending to 2050 for the sustainable and resilient development of the Mekong Delta as a whole and cities in particular. The relevance of the PDO is further supported by the Government's continued engagement with the World Bank in four follow-on projects with a similar design to improve access to infrastructure and connectivity and to reduce flood risk in the Mekong Delta and the country at-large: Dynamic City Integrated Development Project - Thai Nguyen (2018-2023, US\$100 million); Dynamic Cities Integrated Development Project (2019-2025, 194.4 million); Vinh Long City Urban Development and Enhanced Climate Resilience Project (2020-2025, US\$126.9 million); and VN-Integrated Resilient Development Project (under preparation, US\$141 million).

B. ACHIEVEMENT OF PDOs (EFFICACY)

Assessment of Achievement of Each Objective/Outcome

Rating: Substantial

Achievements related to Outcome 1: To reduce flood risk in the urban core area in Can Tho City. (Rating: Substantial)

24. **The project protected 2,467 hectares of the urban core area from a 100-year return period river/tidal flood, exceeding the target of 1,675 ha by 792 hectares (by 47 percent, see Annex 8 for details).** The project added 14,200 meters of newly built and upgraded embankments¹², including 6,140 meters of the Can Tho River Embankment, 3,900 meters of the Cai Son - Muong Khai Embankment, heightening of 1,100 meters of the existing section of the Can Tho embankment, and 3,100 meters of the combined National Road 91 and embankment. In addition, three new tidal gates and ship locks (Cai Khe, Dau Sau, and Hang Bang) and nine new flood prevention sluice gates (three along the Can Tho River Embankment, two along the Cai Son – Muong Khai Embankment, and four along the connection road from CMT8 to Provincial Road 918) were constructed.
25. A closure test of the Cai Khe tidal gate (including the ship lock), which was the remaining gap in the ring embankment system, conducted in October 2023 demonstrated a significant reduction in flood impact caused by river/tidal overflow within the core urban area. During high tide hours, many inner roads in Ninh Kieu District were no longer flooded as before, and roads such as Tran Hung Dao, Ly Tu Trong, and Huynh Cuong remained dry. Prior to the construction of the ring embankment system, the flooded areas typically remained underwater for several days.
26. **The target of 1,976 hectares of the urban core area being kept dry from a 10-year return period rainstorm¹³ missed the target by 75 hectares, i.e., by less than 3.7 percent.** According to the latest hydraulic modeling conducted in April 2024, a slight reduction in rainwater storage and drainage capacity resulted in missing the PDO

¹¹ World Bank Group. 2022. Vietnam Country Climate and Development Report. CCDR Series. © World Bank.

¹² Intermediate Result Indicator #1

¹³ This PDO indicator measures areas where water levels stay below 30 centimeters and last less than 30 minutes



#2 target by 75 hectares. The project successfully met its targets for the installation and upgrading of sewers and pipelines, with 15,300 meters of drainage installed¹⁴ in the Ninh Kieu District and additional pipelines completed along 32 upgraded roads. However, the construction of the branch canal¹⁵ fell short of its target, with only 5,373 meters built compared to the planned 11,647 meters. To mitigate rainstorm flooding, an additional rainwater and stormwater drainage pumping station has been constructed in the Tham Tuong Canal basin¹⁶.

27. **The number of direct beneficiaries, defined as people living in the urban core protected against 10-year return period flood risk, exceeded the target slightly.** It was verified that there was no significant inflow or outflow of population in the urban core area, and the target was exceeded by 5.2 percent. This increase in the number of protected people is consistent with the population increase for Can Tho.

28. The table below summarizes the expected and achieved targets of the PDO-level and intermediate results indicators. In summary, PDO #2 missed its target slightly, and the targets of all intermediate results indicators related to Outcome 1 were either met or exceeded, except for the upgrading of branch canals, as a part of the planned work was cancelled it could not be completed by the closing date.

Summary of the Achievement of PDO level and Intermediate Results Indicators related to Outcome 1

PDO Indicator	Original Targets	Targets following Restructuring	Achievement at Closing
1. Area protected from 100-year return period river/tidal flood (in hectares)	2,675 (combined #1 & #2)	1,675 (new, split from one target)	2,467
2. Area dried from 10-year return period rainstorm flooding (in hectares)		1,976 (new, split from one target)	1,901
3. Number of direct beneficiaries, defined as people living in Urban Core protected against 10-year return period flood risk (of which are female) (number)	420,000	Target unchanged	422,015
	Female: 216,000	Target unchanged	Female: 227,196

#	Intermediate Results Indicators	Original Targets	Targets following Restructuring	Results
IRI #1	Length of new and upgraded embankment installed (m)	10,000	14,200	14,200
IRI #2	Length of new and upgraded sewers/pipe installed (m)	12,000	Target unchanged	15,300
IRI #3	Length of canals improved (m)	14,500	11,647	5,373

Achievements related to Outcome 2: To improve connectivity between the city center and the new low risk urban growth areas in Can Tho City. (Rating: High)

¹⁴ Intermediate Result Indicator #2

¹⁵ Intermediate Result Indicator #3

¹⁶ Only one additional pumping station was built



- 29. **The target for the reduction in travel time between the urban core and Cai Rang center has been met.** Travel time from Ninh Kieu Port to Cai Rang (NK to IC3) has been reduced by 26 percent compared to the target of 25 percent, while travel time from Nguyen Van Cu Road to the Interlink Bus station in Cai Rang (NVC to Bus) has been reduced by 30 percent, meeting the target. The reduction in travel time was evaluated by the M&E consultants, who distinguished between the reductions experienced by cars and motorcycles. For the NK to IC3 route, motorcycles experienced an average time reduction that was 0.5 percent higher than that of cars. This reduction was attributed to the addition of two lanes through the construction of the Quang Trung Bridge. Further, the NVC to Bus route was shortened by 1,200 meters with the completion of the Tran Hoang Na Bridge, contributing to the overall reduction in travel time.
- 30. The length of road newly built or upgraded¹⁷ (non-rural) exceeded its target by 82 percent. The target of 10,440 meters of newly built or upgraded roads under Component 2 was surpassed since additional roads built along the embankments under Component 1 also contributed to the PDO Outcome 2. Two bridges¹⁸ were built as planned: the Quang Trung Bridge, which has been in operation since December 2021, and the Tran Hoang Na Bridge, which was completed in June 2024. All five tasks under the Intelligent Transport System (ITS) investment roadmap were finalized¹⁹ and support achieving the goal of Outcome 2. The tasks included can be found in Annex 1.
- 31. The beneficiary survey indicates a higher level of satisfaction for transport investments outputs related to Outcome 2 compared to the outputs of flood risk reduction investments related to Outcome 1. The table below summarizes the extent of achievement of the PDO level and Intermediate Results indicators related to Outcome 2.

Summary of the Achievement of PDO level and Intermediate Results Indicators related to Outcome 2

PDO Indicator	Original Targets	Targets following Restructuring	Achievement at Closing
4. Reduction in travel time between urban core and Cai Rang center (in percentage change)			
4.1. From NK to IC3 (%)	25	Target unchanged	26 ²⁰
4.2. From NVC to Bus (%)	30	Target unchanged	30

#	Intermediate Results Indicators	Original Targets	Targets following Restructuring	Results
IRI #4	Roads constructed, non-rural (km)	10,440	Target unchanged	19,014
IRI #5	Number of bridges built which include sidewalks, connecting the urban core and Cai Rang (#)	2	Target unchanged	2
IRI #6	Intelligent Transport System (ITS) investment roadmap finalized (Yes/No)	Five public transport feasibility studies and strategies	Target changed to focus on ITS investment roadmap	All five tasks under ITS investment roadmap delivered.

¹⁷ Intermediate Result Indicator #4

¹⁸ Intermediate Result Indicator #5

¹⁹ Intermediate Result Indicator #6

²⁰ Used combined average travel time reduction of cars and motorcycles measured by PMU hired M&E consultants



Achievements related to Outcome 3: To enhance the capacity of city authorities to manage disaster risk in Can Tho City. (Rating: Substantial)

- 32. **The risk informed Spatial Planning Platform (SPP) was established and the number of departments utilizing the risk informed SPP has met the target of 7.** The SPP is designed to serve as a central repository for all relevant geospatial data to support spatial planning, infrastructure development, and operations and maintenance in Can Tho City. This IT platform will enhance the capacity of city authorities in Can Tho City to manage urban development and disaster risk. It will also support informed decision-making and efficient infrastructure planning. It is managed by the Department of Information and Communications (DOIC) and is used by six other departments: Department of Natural Resources and Environment (DONRE); Department of Labor, Invalids, and Social Affairs (DOLISA); Department of Construction (DOC); Department of Transport (DOT); Department of Planning and Investment (DPI); and the Department of Agriculture and Rural Development (DARD). The SPP helped to better define the roles and responsibilities of the line departments.
- 33. **Flood Risk Management Information System (FRMIS).** The FRMIS was successfully completed in May 2024 and handed over to be operated by DARD. This system is designed to provide real-time data and tools for managing flood risks and to enhance the city's ability to predict, monitor, and respond to flood events. The FRMIS is expected to significantly contribute to the efficient management of flood risk mitigation investments through the remote control of tidal/sluice gates and the dissemination of early flood warnings to the public. The FRMIS is interconnected with the SPP and shares the base geospatial information with seven different departments.
- 34. **Integrated Social Assistance (ISA).** The ISA, which was completed prior to the project closing and is operated by DOLISA, is an IT system designed to provide timely and focused monetary social assistance to vulnerable households affected by disasters, ensuring transparent and efficient delivery of support.
- 35. A total of 1,258 government and university staff²¹ were trained through multiple workshops to build their capacity on understanding and using SPP and FRMIS. There was, however, no additional result indicator designed to measure the enhanced capacity of city officials.

36. The table below summarizes the achievement of the indicator targets for Outcome 3.

Summary of the Achievement of PDO level and Intermediate Results Indicators related to Outcome 3

PDO Indicator	Original Targets	Targets following Restructuring	Achievement at Closing
5. Number of Dept. utilized Spatial Planning and RiskInfo Platform	7	Target unchanged	7

#	Intermediate Results Indicators	Original Targets	Targets following Restructuring	Results
IRI #7	Spatial Planning and RiskInfo Database established (Yes/No)	Yes	Target unchanged	Yes

²¹ Professors and researchers involved in the SPP and FRMIS design and development process



Justification of Overall Efficacy Rating

37. Based on the extent of achievement of the three Outcomes of the PDO, the Efficacy of the project is rated Substantial.

C. EFFICIENCY

Assessment of Efficiency and Rating

Rating: Modest

Economic Analysis

38. At appraisal, the economic analysis employed the Triple Dividend framework²² to evaluate the project's costs and benefits. The analysis focused on three potential benefit areas: (i) avoided losses, based on the project's capacity to reduce disaster-related damages through flood control infrastructure; (ii) increased investments as a result of enhanced economic confidence due to reduced disaster risk; and (iii) development co-benefits, related to enhanced urban mobility, reduced vehicle operating costs (VOC), time savings, and the value of multipurpose infrastructure design.

39. Economic analysis was conducted for the ICR, using the same methodology as at appraisal. The table below summarizes the internal rate of return (IRR) at completion against the IRR estimated at appraisal. The benefits from stimulated investment activities and development co-benefits, primarily driven by increased land values, increased significantly, while the return on investment for flood mitigation was lower than initially projected due to project restructuring. The overall IRR of 50.44 percent at completion is higher than the appraisal estimate of 43.67 percent. The overall NPV, while lower than projected, remains substantial at US\$648.07 million. Annex 4 provides more details of the economic analysis.

		First Dividend Benefits:		Second Dividend Benefits:		Third Dividend Benefits:		Overall Project	
		Averted losses		Investment stimulus		Co-benefits			
		IRR (%)	NPV (US\$ m)	IRR (%)	NPV (US\$ m)	IRR (%)	NPV (US\$ m)	IRR (%)	NPV (US\$ m)
Expected Value	Appraisal	48.98	4,560.93	40.37	159.00	45.40	508.46	43.67	1,494.50
	ICR	10.26	1.54	52.63	492.62	18.65	55.49	50.44	648.07

Implementation Efficiency

40. The project experienced significant delays and challenges, as detailed in the section on “Key Factors Affecting Implementation.” Only 15.2 percent of the total financing was disbursed by the MTR, i.e., 30 months into the project implementation. However, following the second restructuring, five years into the project, implementation efficiency improved dramatically, with 55.6 percent of the total financing disbursed in the final two years. This remarkable turnaround was achieved despite the initial challenges with land acquisition. Project implementation was also affected by the new regulations put in place after project approval that required prior approval for civil works packages from the Ministry of Construction which added considerable time up to six months, before the

²² Overseas Development Institute. (2015). *Unlocking the ‘Triple Dividend’ of Resilience: Why investing in disaster risk management pays off*. London: ODI.



actual implementation could commence. The PMU and the CPC demonstrated proactive and effective project management by completing most project components within the extended two-year period. Two of the 30 civil works packages which were deemed unachievable during the remaining project implementation were strategically cancelled during the second restructuring, while three remained incomplete at closing (see paragraph 56). Ultimately, Component 1 disbursed 90 percent of its funds, with the remaining 10 percent undisbursed due to incomplete civil works. In contrast, Components 2 and 3 disbursed 79 percent and 74 percent of their funds, respectively, successfully completing all civil works and IT system development. This indicates that a more effective allocation of funds could have been achieved if the potential savings had been identified earlier in the implementation process. Despite this, the successful completion of these components represents a significant accomplishment, especially considering the considerable challenges the project faced.

D. JUSTIFICATION OF OVERALL OUTCOME RATING

Rating: Moderately Satisfactory

41. Given the ratings of High for Relevance, Substantial for Efficacy and Modest for Efficiency, the overall Outcome of the project is rated Moderately Satisfactory.
42. The Split Rating approach was not applied in this assessment. While in the course of the second restructuring the technical design, PDO- and some intermediate indicators and targets were adjusted, the project achieved most of the revised targets and surpassed some of them, nearly approximating or exceeding several original targets established at appraisal.

E. OTHER OUTCOMES AND IMPACTS (IF ANY)

Gender

43. The project intended to provide community-based flood early warning training²³ to women in partnership with the women's union. This did not materialize as the FRMIS only became operational towards the end of the project leaving no time to conduct a community wide training exclusively focusing on women.

Institutional Strengthening

44. Institutional strengthening and capacity building were major priorities under the project as reflected in the PDO and were built into each component. Under component 1, institutional support was provided with the development of improved protocols for the city flood control and drainage system, O&M framework and improved early warning information system. Under component 2, feasibility study for public transport and establishing a city smart transport management center and ITS investment roadmap have been integrated into relevant plans and their implementation. Under component 3, all interventions were focused on strengthening development planning in a climate and risk-informed manner: (i) the establishment of a SPP to support future urban investment planning and budget allocation and (ii) improving the capacity of the City to provide disaster-responsive social assistance system.

Mobilizing Private Sector Financing

²³ Intermediate Results Indicator #8



45. Although the project was not explicitly designed to mobilize private sector financing, there is some evidence of an uptick in private investment activity in Can Tho during the project's duration. However, due to the absence of an indicator measuring the project's impact on private investments, it is not possible to directly attribute it to the project.

Poverty Reduction and Shared Prosperity

46. Although the project aimed to support financial and social resilience to disaster events through the disaster-responsive Integrated Social Assistance System (ISA) to channel assistance to affected vulnerable households in the aftermath of disaster, the system was commissioned shortly before the project closing date, therefore, its impact is yet to materialize. The project benefited over 400 thousand people of all income groups living in flood affected areas in Can Tho through flood protection investments, including the poor who are more vulnerable to disasters. More specifically, over 1,200 households residing in low-lying, flood-prone areas, affected by the construction work for building the ring embankment system were compensated or resettled according to Bank policies.

Other Unintended Outcomes and Impacts

47. **Appreciation of land and real estate value.** Initial findings revealed that investments aimed at controlling flooding and improving environmental sanitation have significantly increased the value of real estate in the project areas. According to a survey conducted by the M&E consultant, land prices have increased 3 to 15 times; land in the Cai Son - Muong Khai embankment area and land in the An Binh Resettlement Area have shown the steepest increases. Other notable areas include the vicinity around the Can Tho River embankment, Hoang Quoc Viet Street, and Tran Hoang Na Street.

III. KEY FACTORS THAT AFFECTED IMPLEMENTATION AND OUTCOME

A. KEY FACTORS DURING PREPARATION

48. **Hydraulic Modelling and Adoption of New Approach.** The primary focus of this project was to invest in measures to mitigate the recurring riverine/tidal floods and rainstorm floods that occurred annually before the project's inception. Hydraulic modelling played a crucial role by providing the necessary data to determine the design specifications for the ring embankment system, drainage network, canal systems, and the number of pumping stations required to achieve the desired outcomes. Backed by hydraulic modeling the project applied new technical concepts such as 'low regrets,' and 'polder approach', designing the investment activities.
49. **Resettlement Plan and Land Price.** The borrower drafted and disclosed the Resettlement Policy Framework (RPF, SFG1562) and Resettlement Plan (RP, SFG1561) that were in line with the World Bank's policies and procedure. Both documents laid out a thorough compensation plan adopting the World Bank's Involuntary Resettlement Policy (OP 4.12), including compensation of land, loss of structure, tenants, and other assets with Income Restoration Program (IRP) for those affected by the project. Despite the detailed household survey of Project Affected People (PAP), the land compensation was underestimated leading to an almost two-fold increase of required CF (see paragraph 53).
50. **Incorporating Lessons Learnt from Past Experiences.** Extensive knowledge accumulated by the World Bank through implementation of similar projects in Viet Nam and worldwide was incorporated in project design. The



project drew lessons on complementing infrastructure investments with non-structural measures such as introducing IT systems to manage flood risk (FRMIS) and guiding urban development with a spatial dimension (SPP). Additionally, it incorporated lessons learned from long-term engagement in urban upgrading projects through the Vietnam Urban Upgrading Projects 1 and 2 (VUUP1, and VUUP2) reflecting challenges associated with weak project management capacity and limited experience managing complex bidding packages as explained below.

51. **Implementation Arrangements.** Drawing from lessons learned from previous engagements with the borrower and considering the complexity of the project components, it was prudent to establish the PMU at the People's Committee level rather than within a technical department as this helped with ensuring strong ownership and coordination across different departments. The PMU had previously managed VUUP1 (closed in 2014) and was overseeing VUUP2 at the time of project appraisal, both of which were managed at satisfactory or moderately satisfactory levels. While the lack of specialized staff to manage the new investments effectively in the PMU was identified at the early preparation stage and it was agreed to recruit personnel with expertise in disaster risk management and water and sanitation engineering, the delay in hiring technical staff to prepare and evaluate bidding documents resulted in initial setbacks.

B. KEY FACTORS DURING IMPLEMENTATION

Factors Outside the Control of the World Bank and the Government

52. **COVID-19 pandemic.** The COVID-19 pandemic introduced widespread delays across World Bank-financed projects due to supply chain disruptions, lockdowns, and restrictions on travel. While this project was similarly affected, the impact was relatively contained. Nevertheless, the pandemic did contribute to delays in the overall implementation of the project, including delayed Monitoring and Evaluation (M&E) reporting.

Factors Subject to the Control of Government and Implementing Entities

53. **Land Acquisition and Compensation.** Delays in land acquisition led to delays in construction, ultimately resulting in the extension of the project and several packages²⁴ not being completed by the project closing date. At appraisal, it was estimated that land acquisition would involve approximately 135.4 hectares, affecting 4,539 households (about 17,700 persons), of which 1,814 would need to be relocated. However, the cost of land compensation was underestimated, leading to additional need for the counterpart funding of US\$86 million for land acquisition and compensation. 12 Grievance Redress Services (GRS) cases were filed concerning land acquisition and disputes over land ownership which further prolonged the land acquisition process. However, all additional counterpart funding was secured reflecting a strong government commitment which was crucial in overcoming these challenges.
54. **Lengthy Approval and Review Requirements.** The project experienced lengthy internal approval processes for procurement packages involving the CPC, PMU, and line departments, resulting in delays. The situation was exacerbated by the frequent leadership changes including the changes of the party secretary three times over eight years. Following several rounds of requests from the World Bank to enhance implementation, the CPC has delegated sufficient decision-making power to the PMU to streamline the internal approval process. However, the Ministry of Construction's new requirement to endorse the revision of the Feasibility Study (FS) and detailed technical designs of civil works before the city's approval, as per the Prime Minister's Decree 15/2021/ND-CP, prolonged the process

²⁴ Packages 1.17, 1.18, and 1.19 all relating to branch canals work



beyond the city's control. The Ministry's endorsement of the FS and technical design packages took months eventually causing more delays in the overall procurement of civil works.

- 55. **Weak Technical Capacity.** The lack of PMU's staff capacity, especially those with engineering expertise, caused delays in the early days of implementation, as technical specifications for bidding documents were not properly prepared and evaluation of technical proposals required additional support through external consultancies. This has improved over the last two years of implementation when PMU staffing reached an appropriate level.
- 56. **Incomplete Civil Works and Post-Closure Action Plan.** The Bank recommended canceling civil works packages 1.17, 1.18, and 1.19 for the secondary branch canals more than seven months before the project closure when it became evident that they won't be completed. The task team repeatedly recommended formal cancellation to avoid and mitigate a situation of project closure with incomplete civil works; however, because of constraints in decision-making due to domestic political environment, the recommendations were not followed through. Despite commitments from city leaders to cancel secondary canals before project closing, no actions were taken, leading to continued Land Acquisition and Resettlement (LAR) activities that were not completed by the project's closing date. This resulted in incomplete civil works and the need for a Post-Closure Action Plan (PCAP) to address outstanding issues post-closure.

Factors Subject to World Bank control

- 57. **Supervision and Reporting.** There were only two turnovers of TTLs, which was relatively low. The TTL at appraisal and closing remained the same, with some changes in task team members. The ISRs were candid and identified issues related to implementation, including organizational, procurement, and E&S issues. Towards the latter half of the project, the World Bank conducted multiple technical missions between ISR missions to support the PMU and CPC in resolving implementation issues.
- 58. **Technical Design Modifications.** As noted in the Implementation Efficiency section, the project experienced significant delays. Consequently, the World Bank team recommended modifications to the technical design of investments which involved canceling several activities under Outcome 1 and adjusting the corresponding targets based on the hydraulic modeling conducted in December 2020. These adjustments aimed at minimizing the impact of resettlement, which was the primary cause of delays. The borrower agreed to these changes, which were incorporated into the second restructuring, leading to improved implementation.

IV. BANK PERFORMANCE, COMPLIANCE ISSUES, AND RISK TO DEVELOPMENT OUTCOME

A. QUALITY OF MONITORING AND EVALUATION (M&E)

Rating: Modest

M&E Design

- 59. The PDO was ambitious as it aimed not only to prevent flooding in the urban core but also to improve connectivity to lower risk areas and to enhance the capacity of city authorities to better manage disaster risk through physical infrastructure and IT systems. The original PDO indicator "Increase in urban core land area protected from rainfall flooding for a 10-year return period and riverine flooding for a 100-year return period (ha)" should have been designed to separately measure the two different types of flooding, namely riverine/tidal flooding and rainfall flooding.



Additionally, there were no clear indicators to measure the outcomes of social protection, and a more explicit indicator for assessing FRMIS or SPP outcomes could have been considered.

60. M&E implementation arrangements were adequately designed and included the use of Geographic Information System (GIS) to monitor the progress of implementation. The project design included the recruitment of an M&E Consultant to support M&E implementation as it was noted that the PMU and Can Tho City departments did not have adequate capacity to implement the project M&E.

M&E Implementation

61. There were delays in recruiting the M&E consultant for the project. The PMU and the M&E consultant initially struggled to identify an approach to measure travel time reduction (PDO #4). As a result, M&E reporting was often inadequate and delayed. For instance, IRI #8 “Beneficiaries of community-based flood early warning training” was intended to measure the number of women living in the most flood-prone areas who received early warning training for floods. However, the M&E reports of the PMU instead included the number of city staff trained to operate the SPP and FRMIS. This indicator was not clearly defined in the PAD and two slightly different definitions were used, leading to misinterpretation of the target audience. This issue was not addressed during restructuring because it was anticipated that mass awareness campaign targeting women would be conducted after the FRMIS was established. In the end the FRMIS only became operational in May 2024, leaving insufficient time for this activity. Additionally, the end target for PDO Indicator #1 was exceeded by 47 percent which suggests that the target could have been set more accurately during the second restructuring.
62. Following the guidance provided by the Bank team to the PMU and M&E consultant on revising the project results framework and enhancing M&E implementation, the quality of M&E reporting improved significantly and was deemed acceptable during the latter half of the project. The COVID-19 pandemic also contributed to delays in M&E reporting.

M&E Utilization

63. M&E reports formed the basis of bi-monthly progress update meetings between the CPC, the PMU and consultants, the relevant departments, and the local authorities, particularly on the use of the monthly Environmental, Health, and Safety (EHS) reports, which consistently advised the PMU on improving the quality of EHS compliance, monitoring, and reporting. These reports were also used to monitor implementation progress and were the basis for the second restructuring when it became clear that the project will not achieve its objectives within the original implementation period. This necessitated modifications of technical design and several indicator’s targets. The PDO indicator “Increase in urban core land area protected from rainfall flooding for a 10-year return period and riverine flooding for a 100-year return period (ha)” was split into two during the second restructuring to address the shortcomings in the original compound indicator.

Justification of Overall Rating of Quality of M&E

64. Based on the above, M&E Quality is rated Modest.

B. ENVIRONMENTAL, SOCIAL, AND FIDUCIARY COMPLIANCE

Environmental and Social



65. The project complied with environmental and social safeguards, however due to incomplete civil works for canal improvements and a number of undisbursed compensations for Project Affected Households (PAH) a Post Completion Action Plan (PCAP) came into effect.
66. **Environmental safeguards are rated as Moderately Satisfactory.** The project triggered a Full Environmental Assessment (OP/BP 4.01, Category A) due to civil works impacting the environment, including the generation of dust, noise, waste, and wastewater, as well as disturbances and safety risks to traffic and communities, and occupational health and safety risks. The project also triggered Natural Habitats (OP/BP 4.04) due to dredging and waterworks being implemented on rivers and canals, which affected water quality and aquatic life. The Physical Cultural Resources policy (OP/BP 4.11) was also triggered as dredging and excavation activities could result in chance finds. In addition, the project triggered Projects on International Waterways policy (OP/BP 7.50) as it was located on a tributary of the Mekong River.
67. An Environmental and Social Impact Assessment (ESIA) Report was prepared in 2016 and disclosed before project appraisal. During the implementation phase, environmental and social requirements were incorporated in the bid documents for civil works. Construction Supervision Consultants (CSC) were assigned to carry out regular monitoring of contractors' environmental safeguard performance. Contractors prepared Environmental and Social Management Plans (ESMPs) and submitted them to the PMU for review before commencing construction. The mitigation measures implemented by the contractors were documented.
68. The task team provided guidance and support to the PMU and the project implementing agencies on safeguards implementation throughout project implementation. When compliance gaps were identified, the task team coordinated with the PMU and the Independent Environmental Monitoring Consultant (IEMC) to follow up on corrective measures. No accidents occurred during the project implementation phase. However, the impacts of canal dredging and pile driving during the construction of bridges and sluices were unavoidable. Over 200 simple houses built on weak geological soil foundations near construction sites were affected by ground subsidence and cracking. The PMU coordinated with local authorities, CSCs, contractors, and the IEMC to monitor, relocate, repair, or evaluate and compensate for the affected houses.
69. **Social Safeguards are rated as Moderately Unsatisfactory.** The project triggered the Involuntary Resettlement policy (OP/BP 4.12) due to the necessity of relocating residents. By the project's closing, there were a total of 4,627 Project Affected Households (PAHs), and the land acquired amounted to 978,448.32 square meters. The project involved significant land acquisition and resettlement in densely populated urban areas, characterized by high levels of informality, particularly near canals. Initially, the project's Resettlement Action Plan (RAP) was approved and disclosed in December 2015. An updated RAP was later approved and disclosed in June 2024 to accommodate changes in project activities and locations in anticipation of the PCAP. The EAP Regional Safeguards Advisor (RSA) retained oversight of the project, ensuring close monitoring during its implementation.
70. One year before the project's closing date, it became apparent that completing the project's activities on schedule would be challenging. Unfortunately, the Borrower was reluctant to abandon activities requiring land acquisition and resettlement. Consequently, a PCAP was developed to finalize land acquisition, resettlement, and construction works for packages 1.17, 1.18, and 1.19. The PCAP focused on: (i) compensation for the remaining houses affected by construction; (ii) canal dredging works in some sections covered by the three signed contracts that were not implemented; and (iii) pending payment for IEMC services during the project's extended period. The PCAP emphasized the necessity of completing all legal procedures for land handover and demarcation to prevent encroachment and facilitate the transfer of the site to local authorities. Additionally, for



PAHs whose compensation decisions were approved but not executed, all compensation decisions were to be revoked, and the PAHs were to be officially informed that their land was no longer being acquired, in accordance with the final direction and decision of the CPC. A fatality occurred in August 2024, i.e., after the project closed, while a group of workers were reinstating a section of the local drainage. An Environmental and Social Risk Incident Tracking (ESRIT) was initiated, and investigation is ongoing. The Bank continues the follow up as part of the PCAP²⁵.

71. **Grievance Redress Mechanism (GRM)** Given the size and complexity of the project's land acquisition and resettlement activities in a dense and highly informal urban setting, the GRM functioned remarkably well. Throughout the course of the project, the project-level GRM received, managed, and resolved over 200 complaints. Many of them were complex, requiring a number of dedicated resettlement due diligence reports to ensure compliance with the project's RAP and the Bank's OP/BP 4.12. Additionally, 12 complaints were directly submitted to the Bank's Grievance Redress Service (GRS). These complaints were primarily related to compensation prices and resettlement plots, and cracks in some houses alleged to be caused by construction works. All complaints were addressed and resolved by the closing of the project.

Financial Management

72. **Financial Management (FM) performance is rated Moderately Satisfactory.** The project's FM capacity was adequate, with the accounting software operational and most interim financial reports submitted on time. However, the first audit report and the 2021 audit report were submitted with delay, indicating a need for better coordination between the FM, procurement, and implementation planning teams. All subsequent audit reports were submitted to the Bank on time and were of acceptable quality, with unqualified (clean) audit opinions. Several issues were noted, including slow budget approval, delayed payments, untimely contract updates, and expired contracts without extensions. The PMU was advised to update the contract management system, arrange final warranty payments, implement audit recommendations, and ensure the timely provision of counterpart funds. These recommendations have been addressed by the PMU. The final Designated Account balances were returned to the Bank in January 2025, and the final project audited financial statements and the auditor's report were submitted to the Bank on April 29, 2025.

Procurement

73. **Procurement performance is rated Moderately Satisfactory.** The project encountered significant procurement challenges from the outset, including delays in internal appraisal processes, preparation of detailed designs, cost estimates, and drafting TORs and TS. These issues were caused by inadequate capacity and unclear internal responsibilities within the PMU, especially at the early stages of implementation. The PMU made efforts to recruit technical staff, hire external consultants and enhance staff capacity, which led to improved performance. However, some challenges persisted during implementation, such as delays in contract amendments, payments, and the completion/handing over completed sites and task. Several procurement-related complaints received during project implementation have been resolved satisfactorily. There was no indication of either fraud or corruption during project implementation.

Compliance with Legal Covenants

The project complied with all legal covenants.

²⁵ As of the filing of this ICR, Can Tho's ESIRT remains open



C. BANK PERFORMANCE

Rating: Satisfactory

Quality at Entry

74. The project design was aligned with the country’s and the Bank’s strategic priorities and was built on substantial experience of designing and implementing similar projects in Viet Nam and worldwide. It was technically sound and comprehensive aiming to address disaster resilience wholistically, including community involvement in early warning systems, and social protection and financial aspects of resilience. The PDO and Results Framework reflected project design, although some indicators could have been better defined (see M&E Design section). Overall, the outcomes and outputs were envisioned in a sound manner (see “Key Factors During Preparation”), including concepts that were relatively new to the project agencies. Implementation arrangements (see Paragraph 51) and M&E arrangements (see Paragraph 60) were adequate. All applicable safeguards policies were triggered, the required documents were prepared timely, risks were correctly identified, and risk mitigation measures were included in the design. (see “Environmental, Social, and Fiduciary Compliance”). However, the Resettlement Plan could have been more carefully validated, given the sharp increase in the amount of compensation that had to be paid under LAR.

Quality of Supervision

75. The World Bank team was appropriately staffed with experts in disaster risk management, urban development, flood risk management, transportation, and water and sanitation services, who provided the PMU with timely operational and technical support. Over the course of the project, the team conducted 15 implementation support missions and multiple additional technical missions. The principal focus of World Bank missions and overall supervision was to ensure timely implementation to achieve the PDO, in compliance with Bank fiduciary and safeguard policies. The Aide Memoires from the World Bank were candid in assessing progress and challenges, and in setting forth clear, time-bound action plans for the resolution of issues. To address the LAR-related issues, project design was modified through the timely restructuring to reduce the scope of LAR while allowing for the achievement of PDO. The Bank task team also ensured that all GRM and GRS cases were effectively addressed by the project closing date and a comprehensive and detailed PCAP was put in place.

Justification of Overall Rating of Bank Performance

76. The World Bank task team successfully navigated a challenging operational environment and was recognized for its significant contributions to climate adaptation and resilience, earning the Infrastructure VPU award in FY25. Despite the failure to identify the extent of LAR-related risks earlier at appraisal, the Bank took timely and adequate measures to address the issues and ensure the achievement of project objectives. Therefore, Bank performance is rated Satisfactory.

D. RISK TO DEVELOPMENT OUTCOME

77. **Operation and Maintenance (O&M) of infrastructure.** The World Bank task team consistently emphasized the importance of O&M for the built infrastructure during project preparation and implementation. Consequently, the handover process for completed project assets was conducted with a focus on ensuring sustainable O&M



practices. Can Tho City have integrated O&M costs into its budget planning process. However, due to the completion of several civil works contracts near the end of the project, there was limited time for training on the operation of some new infrastructure.

78. **Sustaining the use of infrastructure management systems FRMIS, SPP, and ISA.** The three infrastructure management systems—FRMIS, SPP, and ISA—share risk information using a unified spatial platform. Institutional arrangements are clearly defined, and the IT system developers have completed the handover to each responsible department. However, there was limited time before the project closed to test the interoperability between the three systems.
79. **GIS System Contract.** Contrary to the original intent of using open-source base maps for all infrastructure management systems, the base GIS map for the SPP was awarded to a vendor with proprietary technologies that requires annual maintenance fees. Therefore, Can Tho city faces long-term cost implications and vendor lock-in. However, the PMU has indicated the costs have been factored into the annual budget.
80. **Completing the remaining works.** The packages to improve canals that were not completed at project closure need to be completed by Can Tho City in accordance with the PCAP using its own funds. The PMU confirmed the City's commitment to complete all civil works initiated under the project by December 31, 2026. The Bank will continue to monitor the implementation of the PCAP and provide the necessary guidance and support to Can Tho City in this regard.

V. LESSONS AND RECOMMENDATIONS

81. **Enhancing Land Acquisition and Resettlement (LAR) plans from the project design stage.** The project implementation faced significant challenges due to a complex and prolonged LAR process. Unresolved issues concerning land ownership, compensation disputes, and policy discrepancies between the government and World Bank led to incomplete civil works resulting in a Post-Closure Action Plan (PCAP) at the closure. To avoid similar challenges in future projects, especially in Viet Nam, it is crucial to conduct land acquisition assessments that accurately reflect current market rates, including inflation and land value appreciation. A number of projects implemented in densely populated areas in Viet Nam have frequently encountered similar challenges, which should be addressed in future lending operations. Ensuring dedicated PMU capacity, timely availability of counterpart funds for land acquisition, and adopting flexible designs to minimize displacement are critical steps. Comprehensive LAR planning and stakeholder engagement from the outset are vital for mitigating delays and enhancing the implementation of LAR.
82. **External partnership:** The collaboration with SECO played a pivotal role in enhancing Can Tho's institutional IT capabilities. Through a grant, SECO facilitated the adoption and implementation of advanced IT systems, including SPP, FRMIS, and ISA, marking the first inter-departmental IT integration of their kind in Viet Nam. This partnership underscored the significance of international collaboration in providing grant financing for critical "soft components" that some governments may hesitate to fund through borrowing. SECO's support extended beyond the project's completion, supporting Can Tho in operationalizing and maintaining these systems. Productive external collaborations can not only complement project design and improve outcomes but also ensure long-term sustainability.



83. **Developing infrastructure management systems.** The establishment of the SPP, FRMIS, and ISA systems represents a major achievement for Can Tho City, setting a new standard in infrastructure management in Viet Nam. These systems were designed to ensure long-term sustainability and facilitate the efficient use of disaster risk data across various departments. A key lesson from this project is the importance of integrating sustainability into the design from the very beginning. This involves securing budget commitments, making strategic technology choices, such as opting for open source versus proprietary solutions for the GIS base map, and fostering a strong sense of ownership within the city government. Moreover, the project experience demonstrated that the success of these systems requires substantial investment in building capacity within the PMU and the Can Tho City government.



ANNEX 1. RESULTS FRAMEWORK AND KEY OUTPUTS

A. RESULTS FRAMEWORK

PDO Indicators by Outcomes

To reduce flood risk in the urban core area in Can Tho City								
Indicator Name	Baseline		Closing Period (Original)		Closing Period (Current)		Actual Achieved at Completion	
	Result	Month/Year	Result	Month/Year	Result	Month/Year	Result	Month/Year
Number of direct beneficiaries, defined as people living in Urban Core protected against 10-year return period flood risk (of which are female (#)) (Number)	0.00	Jun/2016	420,000.00	Jun/2024	420,000.00	Jun/2024	442,015.00	Mar/2024
	Comments on achieving targets		Information source: PMU reports, discussion with PMU and M&E consultant.					
Number of direct beneficiaries, of which # are female (Number)	0.00	Jun/2016	216,000.00	Jun/2024	216,000.00	Jun/2024	227,196	Mar/2024
Area protected from 100-year return period river/tidal flood (Hectare(Ha))	0.00	Jun/2016	1,675.00	Jun/2024	1,675.00	Jun/2024	2,467	Jun/2024
	Comments on achieving targets		Information source: PMU reports, discussion with PMU and M&E consultant.					
Area dried from 10-year return period rainstorm flooding (Hectare(Ha))	0.00	Jun/2016	1,976.00	Jun/2024	1,976.00	Jun/2024	1,901	Jun/2024
	Comments on achieving targets		Information source: PMU reports, discussion with PMU and M&E consultant.					
To improve connectivity between the city center and the new low risk urban growth areas in Can Tho City								
Indicator Name	Baseline		Closing Period (Original)		Closing Period (Current)		Actual Achieved at Completion	
	Result	Month/Year	Result	Month/Year	Result	Month/Year	Result	Month/Year
Reduction in travel time between urban core and Cai Rang center (percentage change) (Percentage)	0.00	Jun/2016	15.00	Jun/2024	0	Jun/2024	0	Jun/2024
	Comments on achieving targets		Information source: PMU reports, discussion with PMU and M&E consultant.					
From NK to IC3 (% change) (Percentage)	0.00	Jun/2016	25.00	Jun/2024	25.00	Jun/2024	26.00	Jun/2024
	Comments on achieving targets		NK-IC3: travel time from Ninh Kieu Port to Cai Rang					
	0.00	Jun/2016	30.00	Jun/2024	30.00	Jun/2024	30.00	Jun/2024



From NVC-Bus (percent change) (Percentage)	Comments on achieving targets	NCV-Bus: travel time from Nguyen Van Cu road to Interlink Bus station in Cai Rang						
To enhance the capacity of city authorities to manage disaster risk in Can Tho City								
Indicator Name	Baseline		Closing Period (Original)		Closing Period (Current)		Actual Achieved at Completion	
	Result	Month/Year	Result	Month/Year	Result	Month/Year	Result	Month/Year
Number of Dept. utilized Spatial Planning and RiskInfo Platform (Number)	0.00	Jun/2016	7.00	Jun/2024	7.00	Jun/2024	7	Jun/2024
	Comments on achieving targets		SPP, FRMIS and ISA have been fully developed and used by DONRE, DOLISA, DOC, DOT, DOIC, DPI, DOF and DARD. Information source: PMU reports, discussion with PMU and M&E consultant.					

Intermediate Indicators by Components

Flood risk management, and environmental sanitation								
Indicator Name	Baseline		Closing Period (Original)		Closing Period (Current)		Actual Achieved at Completion	
	Result	Month/Year	Result	Month/Year	Result	Month/Year	Result	Month/Year
Length of new and upgraded embankment installed (Meter(m))	0.00	Jun/2016	14,200.00	Jun/2024	14,200.00	Jun/2024	14,200	Jun/2024
	Comments on achieving targets		Target Achieved: All packages for construction of embankment (1.1, 1.2, 1.3,1.15, 1.16) have been completed in combination with completion of connection road (functional embankment) for the ring dike of the protected polder.					
Length of new and upgraded sewers/pipe installed (Meter(m))	0.00	Jun/2016	12,000.00	Jun/2024	12,000.00	Jun/2024	15,300	Jun/2024
	Comments on achieving targets		Target Exceeded: This indicator measures the total length of new and upgraded sewers in the city core installed under the project.					
Length of canals improved (Meter(m))	0.00	Jun/2016	11,647.00	Jun/2024	11,647.00	Jun/2024	5,373	Jun/2024
	Comments on achieving targets		Target Missed. This indicator is measured as total length of upgraded canals; Due to dropping off some canals in 1.17, 1.18 and 1.19 the target was not met.					
Urban corridor development								
Indicator Name	Baseline		Closing Period (Original)		Closing Period (Current)		Actual Achieved at Completion	
	Result	Month/Year	Result	Month/Year	Result	Month/Year	Result	Month/Year
Roads constructed, non-rural (Kilometers)	0.00	Jun/2016	10.44	Jun/2024	10.44	Jun/2024	19.01	Jun/2024
	Comments on achieving targets		Target Exceeded. This indicator was designed to measure the total length of urban roads under component 2. All packages 2.2, 2.3, 2.5 and 2.6 were completed. In addition to component 2, there were additional urban roads in Hoang Quoc Viet road (1.10, 1.13) upgrading and behind the embankment road in packages 1.2, 1.16 increasing the total non-rural road constructed.					



Number of bridges built which include sidewalks, connecting the urban core and Cai Rang (Number)	0.00	Jun/2016	2.00	Jun/2024	2.00	Jun/2024	2.00	Jun/2024
	Comments on achieving targets		Target Met: Quang Trung Bridge has been completed and put into operation since December 2021. Tran Hoang Na Bridge opened to traffic on 30/12/2023.					
Intelligent Transport System (ITS) investment roadmap finalized (Text)	0	Jun/2016	Completed ITS Roadmap and implementation plan	Jun/2024	Completed ITS Roadmap and implementation plan	Jun/2024	Completed ITS Roadmap and implementation plan	Jun/2024
	Comments on achieving targets		Target Met: All five tasks have been completed and handed over in July 2023. - 6.1. Review, all available plans and policies and connect to the spatial planning platform (SPP) - 6.2 Research on solutions to enhance and improve VE services and identify prioritized pilot GTCC improvement projects; - 6.3. Develop a Traffic and Traffic Management Strategy for Can Tho City Center - 6.4. Building capacity for Can Tho City Public Transport Management and Operation Center, enhancing the application of intelligent transport (ITS) - 6.5. Develop a task outline for an ITS equipment procurement package					
Spatial planning platform and financial and social protection instruments								
Indicator Name	Baseline		Closing Period (Original)		Closing Period (Current)		Actual Achieved at Completion	
	Result	Month/Year	Result	Month/Year	Result	Month/Year	Result	Month/Year
Spatial Planning and Riskinfo Database Established (Yes/No)	No	Jun/2016	Yes	Jun/2024	Yes	Jun/2024	YES	Jun/2024
	Comments on achieving targets		Target Met: SPP and FRMIS including SCADA was completed					
Corporate Indicators								
Indicator Name	Baseline		Closing Period (Original)		Closing Period (Current)		Actual Achieved at Completion	
	Result	Month/Year	Result	Month/Year	Result	Month/Year	Result	Month/Year
Beneficiaries of community based flood early warning training, of which, female (Number)	50,000	Jun/2016			50,000	Jun/2024	0	Jun/2024
	Comments on achieving targets		The target was missed, and the activities did not occur because the FRMIS system became operational only shortly before the project closed, leaving insufficient time to conduct these activities.					
Participants in consultation activities during project implementation (Number)	2,500	Jun/2016			2,500	Jun/2024	4,126	Jun/2024
	Comments on achieving targets		Target Exceeded					
Participants in consultation activities during project implementation - female (Number)	1,250	Jun/2016			1,250	Jun/2024	1,945	Jun/2024
	Comments on achieving targets		Target Exceeded					



B. KEY OUTPUTS



To reduce flood risk in the urban core area	
PDO Indicators	<ol style="list-style-type: none"> 1. Area protected from 100-year return period river/tidal flood 2. Area dried from 10-year return period rainstorm flooding 3. Number of direct beneficiaries, defined as people living in Urban Core protected against 10-year return period flood risk (of which are female (#))
Key Outputs (linked to the achievement of the PDO Outcome)	<ol style="list-style-type: none"> 1. 14,200 meters of newly built and upgraded embankments were added, including 6,140 meters of the Can Tho River Embankment, 3,900 meters of the Cai Son - Muong Khai Embankment, 1,100 meters of heightening of the existing section of the Can Tho embankment built by the city, and 3,100 meters of combined National Road 91 and embankment. Additionally, three new tidal gates and ship locks (Cai Khe, Dau Sau, and Hang Bang) and nine new flood prevention sluice gates (three along the Can Tho River Embankment, two along the Cai Son – Muong Khai Embankment, and four along the connection road from CMT8 to Provincial Road 918) were constructed. 2. 15,300 meters of drainage in Ninh Kieu District and additional pipelines completed along upgraded 32 roads. 5,373 meters of branch canals built. An additional stormwater drainage pumping station in Tham Tuong Canal basin has been newly built.
To improve connectivity between the city center and the new low risk urban growth areas	
PDO Indicators	4. Reduction in travel time between urban core and Cai Rang center (percentage change)
Key Outputs (linked to the achievement of the PDO Outcome)	4. 10,440 meters of urban roads built & Two bridges built: Quang Trung Bridge and Tran Hoang Na Bridge
To enhance the capacity of city authorities to manage disaster risk in Can Tho City	
PDO Indicators	5. Number of Dept. utilized Spatial Planning and RiskInfo Platform
Key Outputs (linked to the achievement of the PDO Outcome)	5. SPP and FMRIS established and used by seven departments: Department of Information and Communications (DOIC), Department of Natural Resources and Environment (DONRE), Department of Labor, Invalids, and Social Affairs



(DOLISA), Department of Construction (DOC), Department of Transport (DOT), Department of Planning and Investment (DPI), and Department of Agriculture and Rural Development (DARD).



Spatial planning platform and financial and social protection instruments	
Intermediate Results Indicators	7. Spatial Planning and Riskinfo Database Established
Key Outputs (linked to the achievement of the Component)	7. SPP, FMRIS established
Urban corridor development	
Intermediate Results Indicators	4. Roads constructed, non-rural 5. Number of bridges built which include sidewalks, connecting the urban core and Cai Rang 6. Intelligent Transport System (ITS) investment roadmap finalized
Key Outputs (linked to the achievement of the Component)	4. 10,440 meters of road for component 2, and the additional 857 meters of roads built as a byproduct of outcome 1 5. two bridges built: Quang Trung Bridge and Tran Hoang Na Bridge 6. All five delivered <ul style="list-style-type: none"> - 6.1. Review, all available plans and policies and connect to the spatial planning platform (SPP) - 6.2 Research on solutions to enhance and improve VE services and identify prioritized pilot GTCC improvement projects; - 6.3. Develop a Traffic and Traffic Management Strategy for Can Tho City Center - 6.4. Building capacity for Can Tho City Public Transport Management and Operation Center, enhancing the application of intelligent transport (ITS) - 6.5. Develop a task outline for an ITS equipment procurement package
Flood risk management, and environmental sanitation	
Intermediate Results Indicators	1. Length of new and upgraded embankment installed 2. Length of new and upgraded sewers/pipe installed 3. Length of canals improved
Key Outputs (linked to the achievement of the Component)	1. 14,200 meters of new and upgraded embankment installed 2. 15,300 meters of new and upgraded sewers/pipe installed 3. 5,373 meters of canals improved

**ANNEX 2. BANK LENDING AND IMPLEMENTATION SUPPORT/SUPERVISION****A. TASK TEAM MEMBERS**

Name	Role
Marc S. Forni	Task Team Leader
Dzung Huy Nguyen	Co-Task Team Leader
Hoa Thi Hoang	Task Team Leader
Zhiyu Jerry Chen	Task Team Leader
Vinh Quang Nguyen	Co-Task Team Leader
Ha Thuy Tran	Financial Management Specialist
Thang Toan Le	Procurement Specialist
Ly Thi Dieu Vu	Environmental Specialist
Son Van Nguyen	Environmental Specialist
David Baringo	Social Specialist
Thang Duy Nguyen	Social Specialist
Thong Trung Le	Social Specialist
Nga Thuy Thi Nguyen	Procurement Team
Rahmoune Essalhi	Procurement Team
Floris Dalemans	Team Member
Van Anh Thi Tran	Team Member
Martin Henry Lenihan	Team Member
John Hosung Lee	ICR Author
Steven Louis Rubinyi	Team Member
Nga Thi Nguyen	Team Member
Kevin Bain	Team Member
Nga Nguyen	Team Member
Hai Yen Tran	Team Member
Pierre Arnoux	Team Member- consultant
Trinh Cong Van	Team Member- consultant
Thai Quoc Ngo	Team Member- consultant

B. STAFF TIME & COST



Stage of Project Cycle	Staff Time & Cost	
	No. of Staff Weeks	US\$ (including travel and consultant costs)
Preparation		
FY15	26.427	124,359.72
FY16	47.629	222,809.61
FY17	0.000	9,930.58
FY23	0.000	6,050.52
Total	74.06	363,150.43
Supervision/ICR		
FY16	0.400	8,688.62
FY17	67.021	667,888.01
FY18	77.129	700,607.96
FY19	76.344	593,868.52
FY20	73.452	716,955.01
FY21	93.642	779,018.35
FY22	40.297	253,161.11
FY23	101.794	840,984.75
FY24	195.243	2,198,407.40
FY25	37.702	223,428.95
Total	763.02	6,983,008.68

ANNEX 3. PROJECT COST BY COMPONENT



Component	Amount at Approval (US\$M)	Actual at Project Closing (US\$M)
Flood risk management, and environmental sanitation	120.9	111.0
Urban corridor development	78.9	83.4
Spatial planning platform and financial and social protection instruments	6.8	1.9



ANNEX 4. EFFICIENCY ANALYSIS

METHODOLOGY

At the time of project completion, a Cost–Benefit Analysis (CBA) was conducted to assess the economic performance of the capital investments made under the project. The analysis evaluated the post-completion benefits derived from flood protection and urban corridor development, as well as the additional benefits generated by the establishment of a spatial planning platform and the implementation of financial and social protection instruments, in comparison to the associated investment costs.

Consistent with the Triple Dividend of Resilience approach adopted in the PAD, the economic analysis in this ICR also incorporates three categories of benefits, as follows:

1. 1st Dividend of Resilience Benefits: averted losses
2. 2nd Dividend of Resilience Benefits: stimulating economic activity
3. 3rd Dividend of Resilience Benefits: development co-benefits (It should be noted that Dividend 3 includes the construction costs for the two-road links connecting CMTT8 and Provincial Road 918. However, due to the absence of actual traffic count data provided by the City of Can Tho, the economic analysis was unable to quantify the vehicle operating cost (VOC) and travel time (VOT) savings for these two road segments).

In addition, the ICR will also assess the project’s economic performance based on two project-level scenarios, consistent with the approach used in the PAD, as follows:

1. Dividend level: a component level CBA is undertaken for each of the three dividends.
2. Project level: costs and benefits are aggregated for all three dividends and analyzes them. Two scenarios are considered, one that evaluates avoided loss savings and codevelopment gains but excludes land appreciation, while the second analyzes land benefits only.

At the time of the Implementation Completion Review (ICR), the economic analysis applied a **10% discount rate**, replacing the 12% rate used at the time of PAD preparation, to better reflect the opportunity cost of capital under Vietnam’s prevailing economic conditions.

In the sensitivity analysis, two types of variations were applied to determine the Minimum and Maximum values. Specifically, since the investment costs and Operation and Maintenance (O&M) costs were determined based on the actual disbursement of project funds at the time of project completion, the **O&M costs** were assumed to vary within a range of **±10%** to reflect potential minor fluctuations during operation, such as changes in labor costs, materials, and routine maintenance expenses. For **economic benefits**, a variation of **±20%** was assumed to assess the potential impacts of changes in infrastructure utilization or service efficiency. This approach enables an independent evaluation of the robustness of key economic indicators (IRR and NPV) against variations in benefits and O&M costs compared to the base case.

Updated Economic Costs

The total investment cost of the project was updated based on actual disbursement data provided by Can Tho City from 2017 up to the time of evaluation. These figures accurately reflect the implementation progress of activities under each project component and serve as a reliable basis for adjusting and finalizing the project’s cost–benefit analysis.

Table 1: Economic Investment Costs (US\$ million, in constant 2025 prices)

	2017	2018	2019	2020	2021	2022	2023	2024
Component 1		1.461	0.102	13.548	13.407	22.169	23.819	17.272
Component 2	3.113	9.320	4.884	12.669	18.103	19.289	44.225	70.033



	2017	2018	2019	2020	2021	2022	2023	2024
Component 1								
Component 3		0.631	1.262	1.893	2.524	3.785	1.893	0.631

Update O&M Costs

At the time of evaluation, Operation and Maintenance (O&M) costs were estimated as a percentage of infrastructure investment, with approximately 1% allocated for flood protection systems and 5% for road infrastructure. Additionally, major rehabilitation works for both systems were assumed to take place every five years, with an estimated cost of around 5% of the infrastructure value. For road infrastructure, a full overhaul was assumed to occur every 20 years, with a cost estimated at 10% of the total road investment value. However, since detailed O&M cost data was not available from Can Tho City at the time of this evaluation, O&M costs in this ICR continue to be estimated using the percentage-based approach outlined in the PAD. This method ensures consistency across all stages of analysis while still providing a reasonable approximation of the operational costs required to maintain system performance over the project's lifecycle.

1ST DIVIDEND OF RESILIENCE BENEFITS: AVERTED LOSSES

Consistent with the benefit analysis approach used at the time of project evaluation, investments were prioritized for critical infrastructure components aimed at enhancing the city's resilience to natural disasters, particularly flooding and tidal surges - risks that have significant impacts on economic activity, livelihoods, and the overall quality of life in Can Tho City.

Key interventions such as canal rehabilitation, construction of tidal gates, installation of pumping stations, and development of a comprehensive drainage system have contributed to a substantial reduction in flood risk. As a result, the project has helped reduce asset losses, minimize production disruptions, and mitigate adverse impacts on daily life in flood-prone areas of the city.

Methodology

This report focuses on the analysis of Resilience Dividend 1 - Avoided Losses, with the primary objective of comparing Average Annual Losses (AAL) before and after project implementation. This approach helps quantify the actual reduction in disaster risk achieved through the project and serves as a basis for assessing the overall economic effectiveness of urban infrastructure and flood risk management interventions.

Updated Economic Benefits

At the time of evaluation, the Average Annual Loss (AAL) prior to project implementation was estimated to range between USD 10.2 million and USD 13 million, with an average value of USD 11.6 million. In contrast, the actual reported damage in 2024 - following the completion of key project components - was approximately USD 811,575. According to the 2024 socio-economic report of Can Tho City, during that year, the city experienced 22 heavy rain events, 23 whirlwinds, 1 hailstorm, 27 cases of riverbank erosion, and 3 tidal surge incidents with the total damage estimated at VND 20,683 million, equivalent to USD 811,575. Based on these figures, the annual avoided flood-related losses attributed to the project are calculated as follows:

$$\text{Avoided Losses} = \text{AAL}_{\text{without}} - \text{AAL}_{\text{with}} = 11.600.000 - 811.575 = 10.788.425 \text{ USD per year}$$

Input of AAL estimates into CBA

The economic benefit from avoided flood-related damage is estimated at approximately USD 10,788,425 per year. This figure represents the average annual losses that the city can avoid because of the coordinated implementation of flood prevention measures under the project. In the Cost-Benefit Analysis (CBA) model, this amount is treated as a growing stream of benefits and projected over the 20-year lifespan of the project.

To achieve this level of benefit, the project made significant infrastructure investments under Component 1, including canal rehabilitation, construction of tidal control gates, pumping stations, and drainage systems. In parallel,



operation, routine maintenance, system monitoring, and technical management costs - primarily under Component 3 - were also considered to ensure long-term system performance.

Thus, the avoided loss benefit stream is derived not only from the initial capital investments but also from the ongoing operation and effective management of the flood control infrastructure throughout the project's operational phase.

Updated Economic Analysis Result

Table 2 presents the updated economic analysis results at ICR, focusing on the first resilience dividend – avoided flood-related losses. This benefit group is the primary outcome of investments under Component 1 and part of Component 3, with the objective of minimizing property damage, production disruption, and negative social impacts caused by flooding and tidal surges.

The analysis shows that the Internal Rate of Return (IRR) at the time of ICR reached 10.26%, significantly lower than the PAD estimate of 48.98%. The Net Present Value (NPV) also declined sharply, from USD 4,560.93 million to only USD 1.54 million. Under reasonable variations of assumptions, the IRR fluctuated between 10.08% and 11.58%, while the NPV ranged from USD 0.46 million to USD 9.69 million. This substantial decline is mainly attributed to project restructuring, which led to the cancellation of several major flood mitigation subprojects, including the riverside park, the service road behind the embankment, and the retention lakes in Long Hoa and the University Village, as well as the reduction in the scale of canal upgrading works, thereby limiting the actual area and number of beneficiaries compared to the initial expectations.

Table 2: Results of Economic Analysis

	PAD		ICR	
	EIRR (%)	ENPV (US\$ m)	EIRR (%)	ENPV (US\$ m)
Expected Value	48.98	4,560.93	10.26	1.54
Minimum	44.97	3,700.93	10.08	0.46
Maximum	48.98	4,560.93	11.58	9.69

2ND DIVIDEND OF RESILIENCE BENEFITS: STIMULATING ECONOMIC ACTIVITY

Beyond its core function of disaster risk reduction, the project also created favorable conditions for urban development by improving the investment environment, technical infrastructure, and land use value. The completion of strategic roadways such as Tran Hoang Na Street and the second span of Quang Trung Bridge has enhanced regional connectivity, facilitated the planning of new urban areas, and helped reduce pressure on flood-prone central districts.

Investments in flood mitigation have not only strengthened resilience to natural hazards but also generated additional economic benefits by stimulating growth. By reducing baseline disaster risks, the project has increased investor confidence, encouraging greater engagement from individuals, businesses, and local authorities who now perceive a stronger level of protection against future losses.

Methodology

In line with the original approach outlined in the PAD, the project’s infrastructure investments not only delivered direct technical outcomes but also generated indirect positive impacts by increasing land utility and value - a factor widely recognized as an investment stimulus for urban development.

Specifically, Component 1 helped reduce key risk factors such as flooding, environmental pollution, and public health threats. As a result, land values in the project areas have improved significantly, reflecting growing confidence from both residents and investors in a safer and more sanitary living environment.

Meanwhile, Component 2 played a pivotal role in expanding the urban transport network and facilitating the development of new urban areas. By investing in strategic road infrastructure, the project helped redirect urban growth



away from frequently flooded central areas like Ninh Kieu toward newer, less vulnerable districts such as Cai Rang. This shift not only supports a more sustainable redistribution of the urban population but also contributes to increased land values in areas where infrastructure development is better integrated and more resilient.

Land appreciation from Component 1

Investments under Component 1 directly contributed to reducing disaster risks from flooding, improving sanitation and environmental conditions, and enhancing the overall quality of life for residents in the project area. As a result, real estate values in affected areas have increased significantly, driven by improved flood protection, better access to infrastructure, and a more stable and livable environment.

The total area impacted by the project is estimated at approximately 26,750,000 m², of which around 85% is in Ninh Kieu District and 15% in Binh Thuy District. Based on technical assessments, about 80% of this area is expected to directly benefit from interventions under Component 1, including drainage systems, tidal control gates, canal dredging, and other technical infrastructure. Within this benefited area, 68% lie within Ninh Kieu and 12% within Binh Thuy.

To calculate land value appreciation in the economic analysis, official land prices provided by Can Tho City for the year 2025 were used as the reference.

Table 3: Project Area Land Value Appreciation Analysis

Land appreciation analysis: project area		
	Units	Value
Land in project area		
Total	m ²	26,750,000
Ninh Kieu	m ² (85% of total land)	22,737,500
Binh Thuy	m ² (15% of total land)	4,012,500
Land in directly benefiting from project		
Ninh Kieu	m ² (68% of total land)	18,190,000
Binh Thuy	m ² (12% of total land)	3,210,000
Appreciation		
Ninh Kieu		
<i>Land price</i>		
<i>Before project</i>	<i>(USD/m²)</i>	<i>\$316</i>
<i>After project</i>	<i>(USD/m²)</i>	<i>\$387.89</i>
<i>Marginal prices increase due to project</i>	<i>(USD/m²) add %</i>	<i>\$71.89</i>
<i>Total prices increase due to project</i>	<i>(USD, rounded)</i>	<i>1.307.665.075</i>
Binh Thuy		
<i>Land price</i>		
<i>Before project</i>	<i>(USD/m²)</i>	<i>\$257</i>
<i>After project</i>	<i>(USD/m²)</i>	<i>\$258.98</i>
<i>Marginal prices increase due to project</i>	<i>(USD/m²) add %</i>	<i>\$1.98</i>
<i>Total prices increase due to project</i>	<i>(USD, rounded)</i>	<i>6.342.537</i>
Total land value increases due to project	(USD)	1.314.007.612

New urban area: land value appreciation from component 2

The project has contributed to enhancing flood resilience and guiding urban development toward areas with safer terrain conditions, through targeted transport infrastructure investments under Component 2. This component consists of two key elements: the rehabilitation of 1.6 km of existing roadway, connecting the eastern part of the city with the urban



core, and the construction of a new 1.6 km road segment to extend Tran Hoang Na Street as a strategic transport corridor leading to a newly planned urban zone in Cai Rang District.

These investments not only improve traffic circulation but also help shape a new urban growth corridor, supporting the redistribution of population and investment away from the high-density, flood-prone areas of Ninh Kieu District toward lower-risk zones in the southern part of the city.

Land values along the upgraded and newly constructed road segments are expected to increase significantly, driven by improved accessibility, better infrastructure, and enhanced flood safety. The land appreciation analysis is based on official land price data issued by Can Tho for the year 2025, in accordance with government regulations.

Table 4: Land value appreciation analysis of road connectivity networks for new urban area

	Unit	Tran Hoang Na (improving existing section)	Tran Hoang Na (add new section)
Land area			
(0-20m roadside)	m ²	64,000	64,000
(21-100m roadside)	m ²	256,000	256,000
Price before project			
(0-20m roadside)	USD/ m ²	\$108	\$36
(21-100m roadside)	USD/ m ²	\$108	\$36
Price after project			
(0-20m roadside)	USD/ m ²	\$785	\$785
(21-100m roadside)	USD/ m ²	\$530	\$530
Marginal price increase			
(0-20m roadside)	USD/ m ²	\$677	\$749
	%	627%	2080%
(21-100m roadside)	USD/ m ²	\$422	\$494
	%	391%	1372%
Land value increase after project			
(0-20m roadside)	USD/m ² , rounded	43.328.000	47.936.000
(21-100m roadside)	USD/m ² , rounded	108.032.000	126.464.000
Total Land Value Increase	USD/m ² , rounded	151.360.000	174.400.000

Updated Economic Analysis Result

Table 5 presents the updated economic analysis results after expanding the scope of benefits to include the second resilience dividend - Investment Stimulus, in addition to avoiding flood-related losses. This group of benefits captures the indirect value added by the project, such as increased land values in protected and better-connected areas, stimulated private investment, and urban expansion made possible by reduced disaster risk and improved living and environmental conditions - ultimately contributing to an enhanced quality of life.

The updated analysis shows that the Economic Internal Rate of Return (EIRR) 52.63%, higher than the PAD estimate of 40.37%, while the NPV increased from USD 159.00 million to USD 492.62 million. Under the projected fluctuation of



input assumptions, the IRR varied between 47.15% and 57.20%, and the NPV ranged from USD 373.29 million to USD 611.96 million. These outcomes reflect the significant spillover effects of strategic infrastructure investments, particularly along corridors such as Tran Hoang Na Street and Quang Trung Bridge, which have improved access to new urban areas while relieving pressure on flood-prone central districts.

This strong improvement is largely attributable to the fact that actual land values in 2025 have been much higher than originally projected in the PAD.

Table 5: Results of Economic Analysis

	PAD		PAD	
	EIRR (%)	ENPV (US\$ m)	EIRR (%)	ENPV (US\$ m)
Expected Value	40.37	159.00	52.63	492.62
Minimum	35.37	122.25	47.15	373.29
Maximum	40.37	159.00	57.20	611.96

3RD DIVIDEND OF RESILIENCE BENEFITS: DEVELOPMENT CO-BENEFITS

During project implementation, transport infrastructure investments continued to play a critical role in shaping urban spatial development and driving local economic growth. Specifically, the completion of Tran Hoang Na Road upgrades and the construction of Quang Trung Bridge significantly improved regional connectivity and enhanced access to the city center, thereby stimulating land development and economic activity in the southern part of the city.

The urban development corridor along the CMTT8 embankment road, connecting to Provincial Road 918, also generated positive socio-economic spillover effects. These impacts are categorized as development co-benefits - additional value generated beyond the core function of disaster risk reduction. Notable co-benefits include:

- Increased land values along upgraded and newly constructed corridors.
- Savings in vehicle operating costs (VOC) and travel time (VOT) due to shorter distances, reduced congestion, and improved road conditions.
- Cost-efficiency in infrastructure design by multi-functional solutions (e.g., roads that also serve as flood protection), replacing more costly single-use structures.

These co-benefits represent value-added outcomes beyond flood risk mitigation, contributing to the overall effectiveness of the project in promoting sustainable urban development.

Land value appreciation from corridor development

The Cach Mang Thang Tam (CMTT8) Road is a multi-functional infrastructure component, serving both as a key urban transport corridor and as a protective embankment shielding the city center from flood risks. The tidal control gate systems constructed along various sections of the CMTT8 corridor fall under Component 1 of the project. In the cost-benefit analysis, the flood control functions, and their associated costs were accounted for separately under Component 1, ensuring accuracy in quantifying benefits based on each specific function.

The benefits from land value appreciation along the CMTT8 corridor were analyzed for two zones:

- The area within 0–20 meters from the road edge.
- The area within 21–100 meters from the road edge.

A land value increase analysis was conducted using official land price data issued by Can Tho City for the year 2025, in accordance with national regulations.

Table 6: Land value appreciation for CMTT8 urban corridor development

Unit	CTM8 - Nat'l Road 91B (improving existing section)	CTM8 - Nat'l Road 91B (add new section)
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Land area			
(0-20m roadside)	m ²	118,400	97,600
(21-100m roadside)	m ²	473,600	390,400
Price before project			
(0-20m roadside)	USD/ m ²	\$108	\$36
(21-100m roadside)	USD/ m ²	\$108	\$36
Price after project			
(0-20m roadside)	USD/ m ²	\$785	\$746
(21-100m roadside)	USD/ m ²	\$487	\$65
Marginal price increase			
(0-20m roadside)	USD/ m ²	\$677	\$710
	%	627%	1972%
(21-100m roadside)	USD/ m ²	\$379	\$29
	%	351%	81%
Land value increase after project			
(0-20m roadside)	USD/m², rounded	80.156.800	69.296.000
(21-100m roadside)	USD/m², rounded	179.494.400	11.321.600
Total Land Value Increase	USD/m², rounded	259.651.200	80.617.600

Vehicle operating costs and time (VOC & VOT)

The transport infrastructure investments under the project have significantly improved urban connectivity, generating clear economic benefits that were quantified through savings in Vehicle Operating Costs (VOC) and reduced travel time (VOT). These benefits not only enhance transport efficiency but also positively impact on labor productivity and the overall economic performance of the area.

VOC savings were calculated based on shorter travel distances and improved road surface conditions, while VOT savings were derived from higher travel speeds and reduced travel times. The analysis covered three major transport components: Quang Trung Bridge and Tran Hoang Na Road.

The analysis included all common vehicle types, such as motorcycles, private cars, trucks, buses. The total VOC and VOT benefits were projected over a 20-year period, using traffic forecasts that combine volumes across all three key routes.

Table 7: VOC and VOT cost savings for Quang

Vehicle	Trung Bridge, Tran Hoang Na Road				
	2025	2030	2035	2040	2042
Quang Trung Bridge					
VOC w/project					
Motorcycle	4.551	6.383	8.542	11.431	3.269
Car	1.501	2.105	3.165	4.759	2.253
Bus	0.340	0.459	0.614	0.822	0.169



Truck	0.937	1.266	1.578	1.966	0.398
Subtotal	7.328	10.213	13.898	18.978	6.089
VOC w/out project					
Motorcycle	8.527	11.960	16.005	21.418	3.970
Car	2.589	3.632	5.461	8.211	2.823
Bus	0.625	0.844	1.130	1.512	0.205
Truck	2.675	3.614	4.503	5.612	0.750
Subtotal	14.417	20.050	27.099	36.754	7.749
VOT w/project					
Motorcycle	0.276	0.535	0.962	1.689	1.231
Car	0.085	0.165	0.333	0.655	0.630
Bus	0.086	0.161	0.289	0.508	0.304
Truck	0.014	0.026	0.043	0.070	0.041
Subtotal	0.461	0.886	1.626	2.922	2.206
VOT w/out project					
Motorcycle	0.675	1.307	2.351	4.128	2.937
Car	0.203	0.393	0.792	1.561	1.501
Bus	0.203	0.380	0.684	1.202	0.719
Truck	0.046	0.087	0.145	0.238	0.140
Subtotal	1.128	2.167	3.972	7.129	5.296
Benefits calculation (USD/year)					
VOC saving	7.088	9.837	13.201	17.776	1.660
VOT saving	0.667	1.281	2.346	4.207	3.090
Total benefits	7.755	11.118	15.547	21.983	4.749

Project design cost savings

As analyzed in the PAD, prioritizing the use of multi-functional infrastructure solutions, particularly the Cach Mang Thang Tam (CMTT8) embankment road, in place of the originally proposed single-purpose flood control structures, resulted in significant financial efficiency. Specifically, this integrated design approach saved approximately USD 45 million in investment costs by avoiding the need to construct separate facilities for transportation and flood protection.

This cost saving is considered a key economic benefit and was realized in the project's inception year, categorized as part of the “design-related co-benefits”, which reflect the additional value gained through smart, multi-functional infrastructure planning).

Updated Economic Analysis Result

Table 8 presents the updated results of the economic analysis, based on a comprehensive benefit scenario that incorporates not only disaster risk reduction gains, but also co-benefits such as land value appreciation and savings in vehicle operating costs and travel time (VOC & VOT).

The IRR at the time of ICR was recorded at 18.65%, lower than the PAD estimate of 45.40%, while the NPV decreased from USD 508.46 million to USD 55.49 million. Considering variations in input assumptions, the IRR fluctuated between 13.39% and 23.03%, and the NPV ranged from USD 19.50 million to USD 91.48 million. This discrepancy is primarily due to the updated scope of monetized benefits. Specifically, although the investment costs for the two-road links between CMT8 and PR918 were included in the total project cost, the City of Can Tho did not provide actual traffic count data for these segments, preventing the analysis model from incorporating vehicle operating cost (VOC) and travel time (VOT) savings for the CMTT8 corridor.



Nevertheless, the IRR remained significantly high, primarily due to the substantial actual increase in land values along the CMTT8 corridor, which far exceeded the initial assumptions made in the PAD - thereby further reinforcing the project's economic justification and investment efficiency.

Table 8: Results of Economic Analysis

	PAD		ICR	
	EIRR (%)	ENPV (US\$ m)	EIRR (%)	ENPV (US\$ m)
Expected Value	45.40	508.46	18.65	55.49
Minimum	36.02	413.46	13.39	19.50
Maximum	45.40	508.46	23.03	91.48

RESULTS

The analysis provides results for two project-level scenarios:

1. Dividend level: a component level CBA is undertaken for each of the three dividends.
2. Project level: costs and benefits are aggregated for all three dividends and analyzes them. Two scenarios are considered, one that evaluates avoided loss savings and codevelopment gains but excludes land appreciation, while the second analyzes land benefits only.

Dividend analysis

Table 9 provides a summary of the economic performance analysis at the project level, disaggregated by the three core benefit streams defined under the Triple Dividend of Resilience framework. Each dividend represents a distinct channel through which the project generates economic value, and the analysis presents the internal rate of return (IRR) and net present value (NPV) for each at the time of ICR:

- **Dividend 1: Averted Losses** captures the project’s ability to reduce disaster-related damages, primarily through flood control infrastructure under Component 1. At ICR, the IRR achieved was 10.26% and the NPV recorded was USD 1.54 million. Under sensitivity analysis, the IRR varies between 10.08% and 11.58%, while the NPV ranges from USD 0.46 million to USD 9.69 million. These results confirm the project's contribution to protecting assets and maintaining livelihoods despite actual benefits being lower than originally anticipated.
- **Dividend 2: Investment Stimulus** reflects the added land value and stimulated economic activity resulting from improved infrastructure and reduced disaster exposure. This benefit stream achieved the strongest performance, with an IRR of 52.63% and an NPV of USD 492.62 million. The IRR fluctuated between 47.15% and 57.20%, and the NPV ranged from USD 373.29 million to USD 611.96 million, highlighting the substantial economic impacts generated by strategic urban infrastructure investments.
- **Dividend 3: Co-benefits** represent the benefits from enhanced urban mobility, reduced vehicle operating costs (VOC), time savings (VOT), and the value of multipurpose infrastructure design. The IRR achieved for this stream was 18.65%, with an NPV of USD 55.49 million. The IRR varied between 13.39% and 23.03%, while the NPV ranged between USD 52.58 million and USD 91.48 million, emphasizing the economic efficiency of the project’s transport infrastructure improvements.
- **Overall Project:** The IRR at ICR reached 50.44%, significantly higher than the PAD estimate of 43.67%, while the NPV decreased from USD 1,494.50 million to USD 648.07 million. Within the expected range based on reasonable variation of assumptions, the IRR fluctuated between 39.79% and 55.68%, and the NPV ranged from USD 480.61 million to USD 815.53 million. These results confirm that the project’s investment efficiency was optimized, focusing resources on components with clearer economic returns after scope adjustment, and further reinforce the project’s strong economic viability and sustainability, particularly considering its broad spillover effects and contribution to sustainable urban development.

Table 9: Analysis summary of overall project



		1 st Dividend Benefits:		2 nd Dividend Benefits:		3 rd Dividend Benefits:		Overall Project	
		Averted losses		Investment stimulus		Co-benefits			
		IRR	NPV	IRR	NPV	IRR	NPV	IRR	NPV
		(%)	(US\$ m)	(%)	(US\$ m)	(%)	(US\$ m)	(%)	(US\$ m)
Expected Value	PAD	48.98	4,560.93	40.37	159.00	45.40	508.46	43.67	1,494.50
	ICR	10.26	1.54	52.63	492.62	18.65	55.49	50.44	648.07
Minimum	PAD	44.97	3,700.93	35.37	122.25	36.02	413.46	39.79	1,210.45
	ICR	10.08	0.46	47.15	373.29	13.39	19.50	44.15	480.61
Maximum	PAD	48.98	4,560.93	40.37	159.00	45.40	508.46	43.67	1,494.50
	ICR	11.58	9.69	57.20	611.96	23.03	91.48	55.68	815.53

Project Level analysis

In line with the approach adopted in the PAD, the economic effectiveness of the project at completion was assessed at the aggregate level using two hypothetical base scenarios, designed to reflect differences in the scope of benefits considered:

- **Project Level 1** includes the benefits from reduced disaster-related losses (1st Resilience Dividend) along with development co-benefits such as savings in vehicle operating costs (VOC), travel time (VOT), and design efficiency gains. However, this scenario does not account for land value appreciation. These benefits are compared against the total investment cost to assess the direct economic return from disaster risk reduction and transport improvements.
- **Project Level 2** focuses solely on the benefits from land value appreciation, corresponding to the 2nd and 3rd Resilience Dividends, capturing the project's contribution to spatial development. These benefits are directly compared with the total investment cost to assess the standalone economic return from real estate-related impacts.

The analysis results are as follows:

For **Project Level 1**, at the time of project completion, the Internal Rate of Return (IRR) was recorded at 6.47%, and the Net Present Value (NPV) was negative USD 40.41 million. Considering reasonable variations in input assumptions, the IRR ranged from 4.34% to 8.79%, while the NPV varied from negative USD 64.81 million to negative USD 16.00 million. These results are largely due to the exclusion of benefits that could not be quantified, such as savings in vehicle operating costs (VOC) and travel time (VOT) on road links without traffic data (e.g., the two connections between CMT8 and Provincial Road 918), as well as the adjustment or cancellation of several components, which reduced the scope and scale of the project's economic impact. Nevertheless, it is important to note that this scenario reflects a limited benefit case. When the scope of analysis is broadened to include indirect value additions, such as land value appreciation and spillover effects from broader urban development - other scenarios demonstrate significantly higher IRR and NPV values, reaffirming the project's overall economic viability and effectiveness.

For **Project Level 2**, which focuses on land value appreciation benefits, the project's economic performance was significantly stronger. The IRR reached 48.27%, while the ENPV stood at USD 532.36 million. Under projected fluctuations in input assumptions, the EIRR varied from 41.98% to 53.48%, and the NPV ranged from USD 388.04 million to USD 676.68 million. These results reflect the project's substantial impact on promoting urban development and increasing land values, particularly along key corridors such as Tran Hoang Na Street and newly developed urban areas, highlighting the project's strong spillover effects on spatial development and urban real estate. This significant difference is mainly attributed to actual land values in 2025 being much higher than originally projected in the PAD. Overall, Base Case 2 reinforces the role of infrastructure investment not only in disaster risk reduction but also in promoting urban growth and delivering long-term, sustainable economic returns.

Overall, the updated analysis confirms that the project achieved sustainable and substantial economic returns, particularly when broader urban development impacts are considered beyond direct disaster risk reduction benefits.

Table 10: Analysis summary of the project level



	Project-Level 1		Project-Level 2	
	IRR (%)	NPV (US\$ m)	IRR (%)	NPV (US\$ m)
Expected Value	6.47	(40.41)	48.27	532.36
Minimum	4.34	(64.81)	41.98	388.04
Maximum	8.79	(16.00)	53.48	676.68



ANNEX 5. BORROWER, CO-FINANCIER AND OTHER PARTNER/STAKEHOLDER COMMENTS

Borrower's comments

Dear Mr. Marc S. Forni (TTL) and Mr. Nguyễn Huy Dzũng (Co-TTL),

In response to your suggestion for comments on the ICR Report under the CTUDRP, we have some comments as follows:

In overall, this is a suitable report reflecting the results of project implementation in Can Tho. We agree with the project assessments. The effectiveness of the project has been and continues to be recognized by the government and people of Can Tho city. The city has commitment to operate the project investment infrastructures as well as soft component with FRMIS and SPP to maximize investment efficiency and looks forward to continuing to cooperate with the World Bank for future projects.

We would like to enclose herewith the document that agrees with your ICR report from the Department of Construction of Can Tho city.

We are very grateful to all of you for your support and joint implementation of projects funded by the World Bank in recent years, and we are looking forward to accompanying you to implement other projects in the future. Once again, many thanks for your cooperation.

Kind regards,

Bùi Thái Thượng

Director

Can Tho City ODA Project Management Unit

Can Tho Urban Development and Resilience Project

120 - Trần Phú - Ninh Kiều - Cần Thơ



UBND THÀNH PHỐ CẦN THƠ
SỞ XÂY DỰNG

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập - Tự do - Hạnh phúc

Số: 1690/SXD-QLXD&CLCT
V/v nghiên cứu góp ý Báo cáo kết quả
và hoàn thành thực hiện (ICR).

Cần Thơ, ngày 27 tháng 5 năm 2025

Kính gửi: Ban Quản lý dự án đầu tư xây dựng sử dụng nguồn vốn hỗ trợ phát triển chính thức thành phố Cần Thơ (Ban Quản lý dự án ODA).

Thực hiện ý kiến chỉ đạo tại Công văn số 2345/VPUB-XDĐT ngày 26 tháng 5 năm 2025 của Văn phòng Ủy ban nhân dân thành phố về việc nghiên cứu góp ý Báo cáo kết quả và hoàn thành thực hiện (ICR).

Qua nghiên cứu Thư của Ngân hàng Thế giới ngày 19 tháng 5 năm 2025, Báo cáo Kết quả và Hoàn thành thực hiện đính kèm theo Công văn số 448/BQL-KHĐT ngày 22 tháng 5 năm 2025 của Ban Quản lý dự án ODA, Sở Xây dựng có ý như sau:

Thông nhất vào các mức đánh giá: Mức độ phù hợp cao (High) đối với Mục tiêu Phát triển Dự án (PDO), Hiệu quả đạt được ở mức đáng kể (Substantial) và Hiệu suất thực hiện ở mức khiêm tốn (Modest), Kết quả tổng thể của Dự án được đánh giá là **Khá hài lòng**.

Sở Xây dựng chuyển nội dung trên đến Ban Quản lý dự án ODA./.

Nơi nhận:

- Như trên;
- UBND TP (để b/c);
- Giám đốc SXD (để b/c);
- Lưu: VT, QLXD&CLCT.

KT. GIÁM ĐỐC
PHÓ GIÁM ĐỐC



Nguyễn Hoàng Tùng

Co-Financier SECO's Comments

Dear John, dear Yoonhee and World Bank colleagues,

Thank you for sharing the Implementation Completion and Results Report (ICR) for the Can Tho Urban Development and Resilience Project as well as letting us participate in the QER meeting. In the meantime, we have also formally reviewed the document and would like to share our key comments, focusing on three areas: (i) **donor attribution and funding figures**; (ii) **lessons learned**, and (iii) **sustainability**. For us, it is in particular important that the technical assistance (TA) components are reflected correctly. Please see the same comments attached and below.

1. SECO Financing – Attribution and Consistency

We respectfully request the following corrections in the final version of the ICR:



- The ICR **misattributes SECO’s funding to “SDC”** (Swiss Agency for Development and Cooperation) in several instances, including the financing summary table. This should be corrected to **SECO (State Secretariat for Economic Affairs)**, the sole Swiss donor to the project.
- Disbursement figures appear **inconsistent**. While the **recipient-executed portion** is stated as **USD 2.95 million**, and the **bank-executed amount** as **USD 5.19 million**, the financing table lists only **USD 5.9 million** without clarification. We recommend harmonizing these figures for accuracy and transparency.

2. Lessons Learned – Role and Timing of Institutional Systems

We value the lessons captured in the ICR, particularly those on the need for technical readiness and institutional capacity for IT systems. However, we would like to comment on **paragraph 87**, which recommends delaying complex institutional components—such as FRMIS and SPP—until late project stages or adding them through additional financing.

We respectfully note that:

- These components were **not optional additions**, but **core to achieving Outcome 3**, which was co-financed by SECO from the outset.
- Their **early design and integration** enabled vital institutional learning—both for Can Tho City and for the World Bank team.
- Postponing them could have compromised the project's intent to **develop capacity concurrently** with infrastructure investments.

Instead of deferral, we recommend that future projects consider **phased implementation** of such systems with strong technical support, while ensuring **early investment when donor resources are available**. SECO’s contribution was designed precisely to enable this forward-looking approach.

3. Sustainability

We would welcome continued collaboration to support Can Tho City in operationalizing and maintaining these systems beyond project closure and integrating them into the city's urban management and risk governance structures to support the institutionalization and continued capacity development.

SECO remains committed to working with the World Bank and the Government of Vietnam to advance inclusive and climate-resilient urban development. We highly value the collaboration throughout the Can Tho UDRP and look forward to continued engagement in future efforts.

Best regards,

Sibylle

Sibylle Bachmann

Head of Cooperation

Embassy of Switzerland in Vietnam

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ANNEX 6. SUPPORTING DOCUMENTS (IF ANY)

World Bank Project Documents

- Project Appraisal Document (Report No. PAD1504)
- Financing Agreement (Cr-5779-VN)
- Implementation Status & Results Reports (1-15)
- Implementation Support Mission Aide Memoires and Management Letters
- Integrated Safeguards Datasheet at appraisal (Report No. ISDSA15513)
- Restructuring Papers (Report No. RES45194 and RES47966)

World Bank and Government of Viet Nam Policy Documents

- Decision No.445/QĐ-TTg: The Adjustment of the Master Plan for Urban Development in Vietnam to 2025 and Vision to 2050. Government of Vietnam, 2009
- Decision No. 417/QĐ-TTg,
- Resolution No. 120/NQ-CP,
- Decision No. 287/QĐ-TTg
- World Bank Group Country Partnership Strategy for the Socialist Republic of Vietnam for the Period FY12–FY16
- World Bank Group Country Partnership Framework for the Socialist Republic of Vietnam for the Period FY18–FY22
- Vietnam Country Climate and Development Report. World Bank
- Statistical Yearbook of Viet Nam 2016
- Statistical Yearbook of Viet Nam 2023

Client Documents

- Interim Unaudited Financial Reports
- Procurement Plans
- Environmental Management Plans
- Ethnic Minority Management Framework
- Resettlement Action Plans
- Safeguards instruments
- Progress reports
- Mid-term report
- Project Complement Report
- Surveys
- Environment and social safeguards reports
- Project Operations Manual



ANNEX 7. SELECTED PHOTOS OF KEY INVESTMENTS

Before and after photo comparisons of the same selected areas during high tide seasons contributing the PDO Outcome 1 to reduce flood risk in urban core area (riverine/tidal flooding)

Ninh Kieu Wharf

Ninh Kieu District, Can Tho



Ninh Kieu Wharf

Ninh Kieu District, Can Tho





Ninh Kieu Wharf

📍 Ninh Kieu District, Can Tho



Nguyen Van Cu Extended Street

📍 Ninh Kieu District, Can Tho



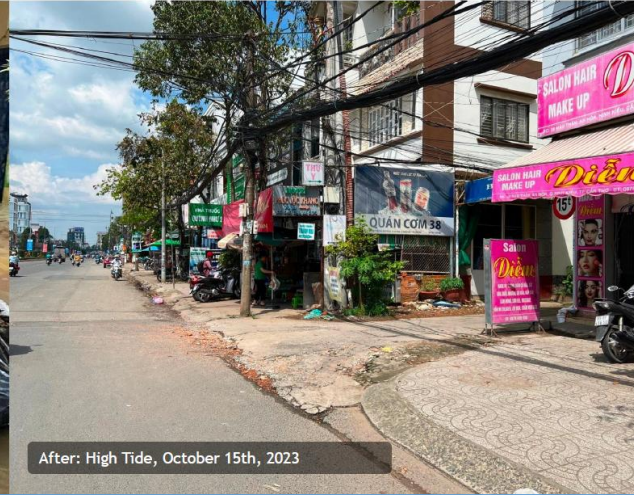


Tran Hung Dao Street

Ninh Kieu District, Can Tho



Before: High Tide, October 13th 2022



After: High Tide, October 15th, 2023

Tran Hung Dao Street

Ninh Kieu District, Can Tho



Before: High Tide, October 2022



After: High Tide, October 2023



Cardiovascular Hospital

204 Tran Hung Dao, An Nghiep Ward

Ninh Kieu District, Can Tho



Cach Mang Thang Tam Street

Ninh Kieu District, Can Tho





Ly Tu Trong Street

Ninh Kieu District, Can Tho



A café

Ly Tu Trong Street

Ninh Kieu District, Can Tho

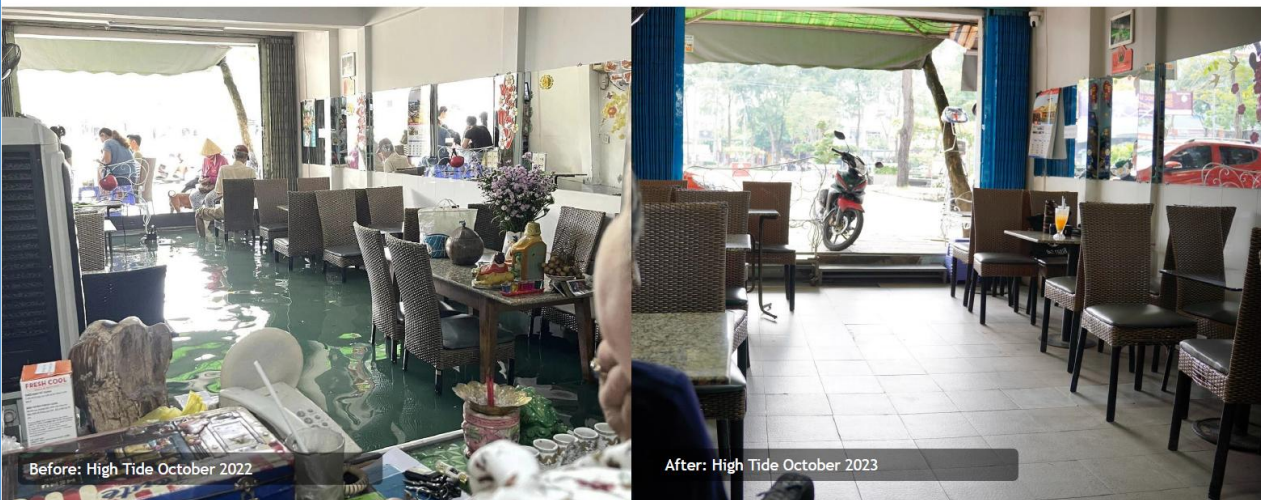
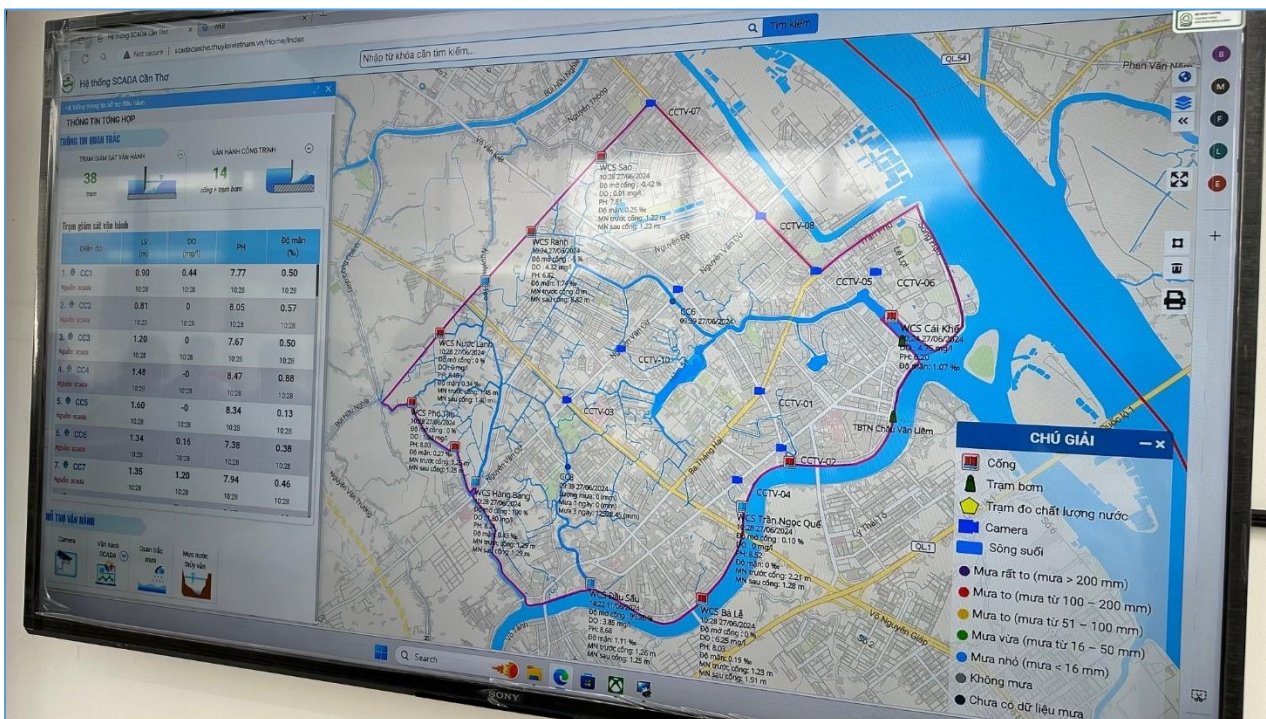
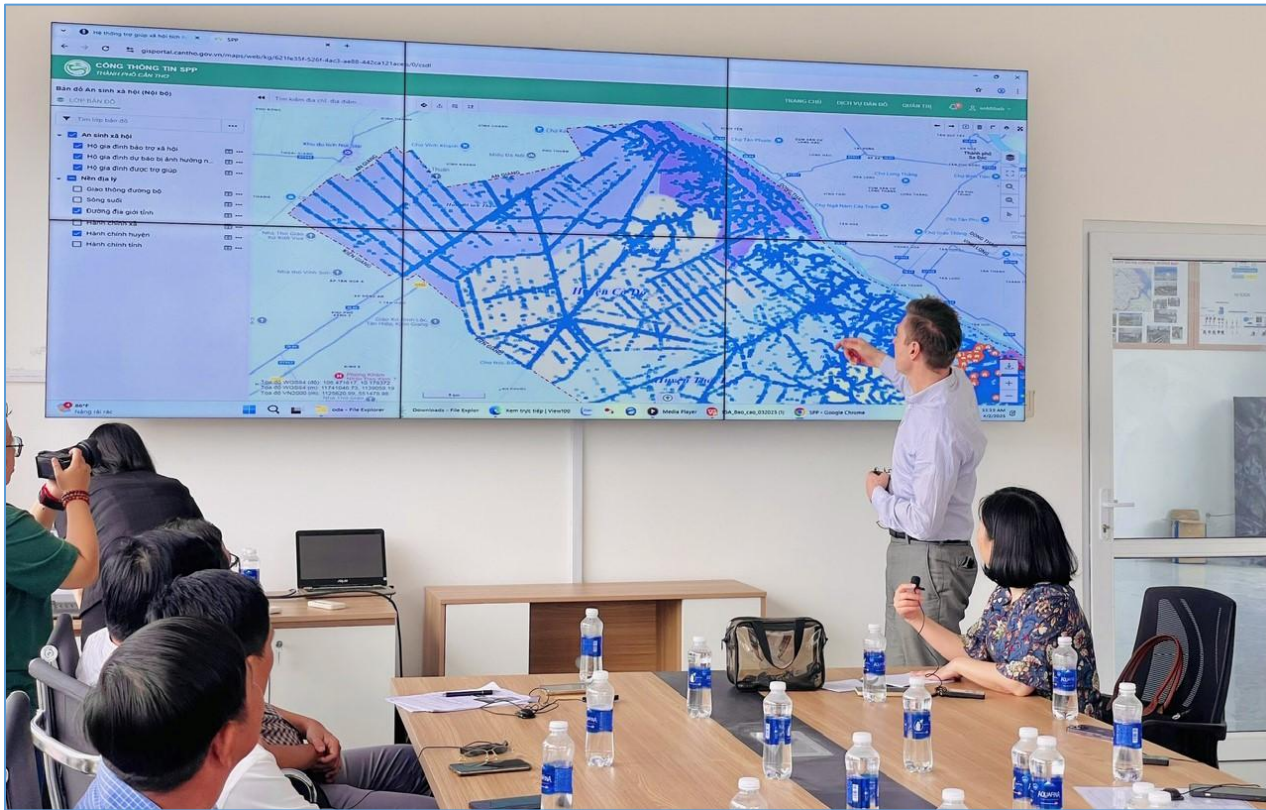




Image of SPP and FRMIS system related to PDO Outcome 3 to enhance the capacity of city authorities to manage disaster risk in Can Tho City.





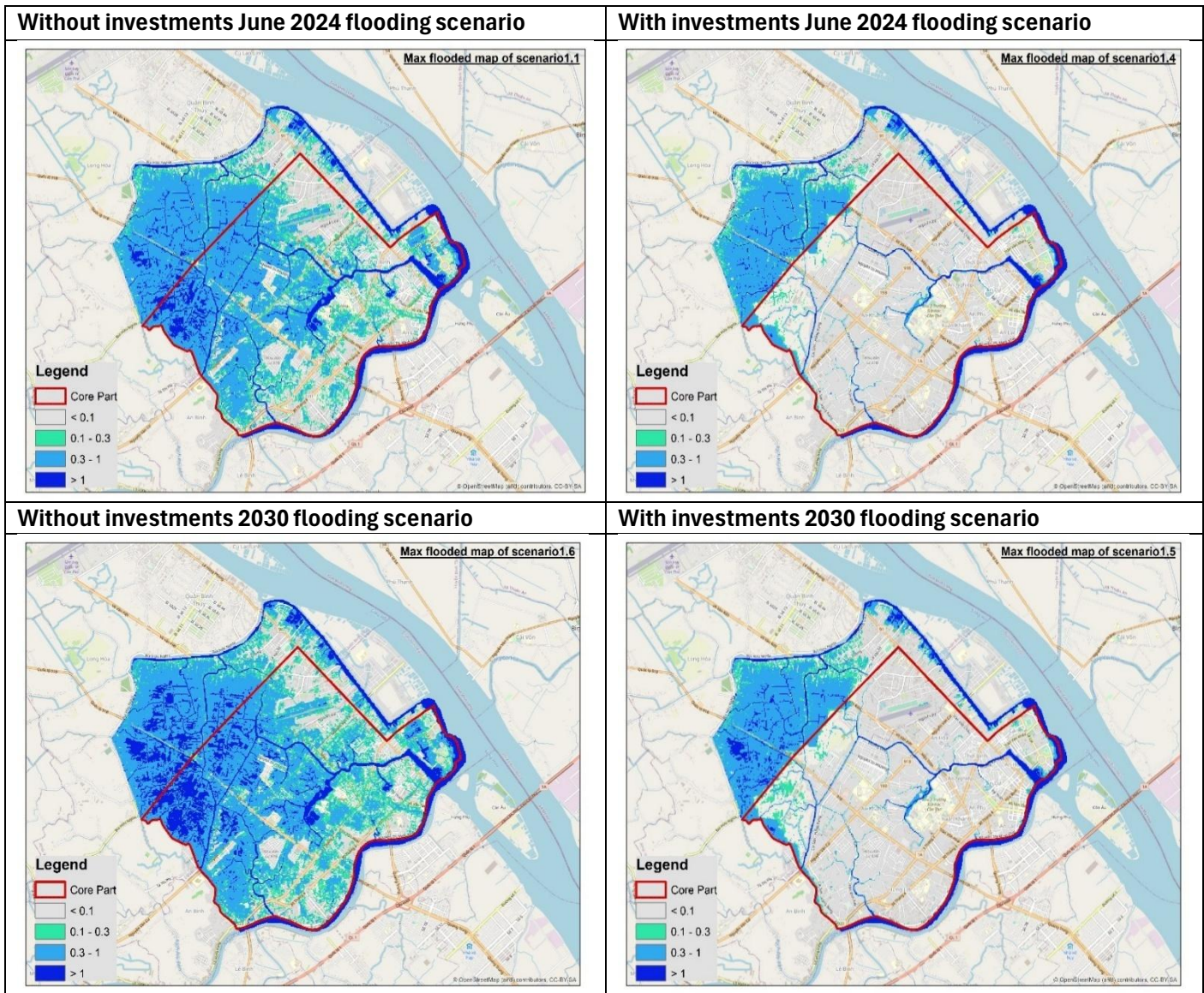
ANNEX 8. DETAILED HYDRAULIC MODELING RESULT

This analysis was conducted in December of 2020 by consultants hired by the Task Team to update and verify the project’s projected impact on the urban core area of Can Tho City. This was verified once more during the last mission in April of 2024. Below is a summary of the detailed hydraulic modeling results.

1. The urban core area protected from a 100-year return period river/tidal flood

The hydraulic modeling scenario conducted in December 2020, which set the project targets, demonstrated a significant impact on the urban core of Can Tho City. At project closing, it is estimated that 100 percent of the urban core is protected from riverine or tidal flooding, representing a 61 percent increase in protection. The projected impact is even more substantial when comparing the situation in 2030: without the project, 73 percent of the urban core would be flooded, whereas with the project investments, only 2 percent is estimated to be affected. The area protected from flooding is projected to be 10 percent larger in 2030 compared to June 2024, considering the anticipated higher water and tidal levels on the Hau River. Even the flooded areas in both June 2024 and 2030 scenarios are mostly agriculture land which has minimal impact to residents. The detailed analysis results are presented in below table, followed by a visual comparison of flooding scenarios on the accompanying maps.

Scenario #	Description	Flooding (0.1m->0.3 m) [ha]	Flooding (>0.3 m) [ha]	Total Flooded area [ha]	Percentage of Urban Core [%]	Estimated affected people
Scenario 1.1	Without investments June 2024 flooding scenario	452	1,177	1,629	61%	108,726
Scenario 1.4	With investments June 2024 flooding scenario	53	156	208* (0)	8% (0%)	13,787 (0)
	Difference in June 2024 estimates	399	1,021	1,421 (1,213)	53% (61%)	94,939 (108,726)
Scenario 1.6	Without investments 2030 flooding scenario	499	1,442	1,940	73%	140,412
Scenario 1.5	With investments 2030 flooding scenario	77	177	254 (46)	10% (2%)	15,122 (1,335)
	Difference in 2030 estimates	422	1,265	1,686 (1,478)	63% (71%)	125,290 (139,077)



2. The urban core area keeping dried from a 10-year return period rainstorm flooding

Again, the hydraulic modeling scenario conducted in December 2020, shows the impact of investment in reducing 10-year return period rainstorm flooding. At project closing, it is estimated that 74 percent of the urban core is protected from rainstorm flooding, representing a 39 percent increase in protected area. The projected impact is greater when comparing the situation in 2030: without the project, 74 percent of the urban core would be flooded due to rainstorms, whereas with the project investments, a smaller area of 30 percent will be affected. The area protected from rainstorm flooding is projected to be 5 percent larger in 2030 compared to June 2024. The detailed analysis results are presented in the table below, followed by a visual comparison of rainstorm flooding scenarios on the accompanying maps.



Scenario #	Description	Flooding (0.1m->0.3 m) [ha]	Flooding (>0.3 m) [ha]	Total Flooded area [ha]	Percentage of Urban Core [%]	Estimated affected people
Scenario 2.1	Without investments June 2024 rainwater flooding scenario	425	1,317	1,742	65%	126,118
Scenario 2.5city3	With investments June 2024 rainwater flooding scenario	248	451	699	26%	30,347
	Difference in June 2024 estimates	177	866	1,043	39%	95,771
Scenario 2.7	Without investments 2030 rainwater flooding scenario	430	1,556	1,985	74%	162,641
Scenario 2.6city3	With investments 2030 rainwater flooding scenario	291	519	809	30%	36,214
	Difference in 2030 estimates	139	1037	1176	44%	126,427

