

DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK

PERU

**STORM DRAINAGE UPGRADE AND EXPANSION PROJECT IN
THE CITY OF PUERTO MALDONADO AND THE COMMUNITY OF EL TRIUNFO,
MADRE DE DIOS DEPARTMENT**

(PE-L1259)

LOAN PROPOSAL

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REQUIRED <ol style="list-style-type: none">1. Multiyear execution plan and annual work plan2. Monitoring and evaluation plan3. Environmental and social management report4. Procurement plan OPTIONAL <ol style="list-style-type: none">1. Project economic analysis2. Project technical analysis3. Program monitoring report4. Project Operations Manual5. Climate change annex6. Safeguard policy filter and safeguard screening form

ABBREVIATIONS

BCRP	Central Bank of Peru
ESA	Environmental and social analysis
ESMP	Environmental and social management plan
INEI	Instituto Nacional de Estadística e Informática [National Institute of Statistics and Information Technology]
MVCS	Ministry of Housing, Construction, and Sanitation
PEDP	Plan Estratégico de Drenaje Pluvial [Strategic Storm Drainage Plan]
PMU	Program management unit
PNSU	Programa Nacional de Saneamiento Urbano [National Urban Sanitation Program]
SENAMHI	Servicio Nacional de Meteorología e Hidrología [National Meteorological and Hydrological Service]
SMEs	Small and medium-sized enterprises

PROJECT SUMMARY

PERU STORM DRAINAGE UPGRADE AND EXPANSION PROJECT IN PUERTO MALDONADO AND EL TRIUNFO, MADRE DE DIOS DEPARTMENT (PE-L1259)

Financial Terms and Conditions				
Borrower:			Flexible Financing Facility^(a)	
Republic of Peru			Amortization period:	14.5 years
Executing agency:			Disbursement period:	5 years
Ministry of Housing, Construction, and Sanitation (MVCS), through the National Urban Sanitation Program (PNSU)			Grace period:	6.5 years ^(b)
			Interest rate:	LIBOR-based ^(c)
Source	Amount (US\$)	%	Credit fee:	(d)
IDB (Ordinary Capital):	74,000,000	71.67	Inspection and supervision fee:	(d)
Local:	29,252,317	28.33	Weighted average life:	10.70 years
Total:	103,252,317	100.00	Approval currency:	United States dollars
Project at a Glance				
<p>Project objective/description. The general objective of the project is to increase the number of people with adequate access to storm drainage services in urban areas of the districts of Las Piedras and Tambopata. The specific objectives are to: (i) protect the population from flooding in the areas of intervention; and (ii) improve the sustainability of storm drainage service in the municipality of Tambopata.</p>				
<p>Special contractual conditions precedent to the first disbursement of the loan. The executing agency will present, to the Bank's satisfaction, evidence of: (i) the approval and entry into force of the updated program Operations Manual, including environmental and social requirements and, as an annex, the project's environmental and social analysis and management plan, under terms previously agreed upon with the Bank; and (ii) the assignment of key staff for project execution—or steps to begin hiring such staff—by the PMU, including a general coordinator, a technical coordinator for Puerto Maldonado, a social specialist, an environmental specialist, a procurement specialist, and a financial/accounting specialist (see paragraph 3.3).</p>				
<p>Special contractual conditions for execution. The borrower, acting through the executing agency, will present, to the Bank's satisfaction, evidence that: (i) prior to preparation of the technical file under Component 1, a liaison has been designated to ensure effective coordination between this project and the project to improve the sewerage and wastewater treatment system in Puerto Maldonado—CUI 2234766; and (ii) prior to the first call for tenders for works under the project: (a) the financing mechanism ensuring resources to cover operation and maintenance costs has been approved; (b) an agreement ensuring the project's financial sustainability has been signed between the executing agency and the Tambopata municipal government under terms previously agreed upon with the Bank; and (c) the right and/or authorization to use the land needed for the respective works has been secured (see paragraph 3.4). See Annex B to the environmental and social management report (required link 3) for the environmental and social special contractual conditions for execution.</p>				
Exceptions to Bank policies: None.				

Strategic Alignment			
Challenges: ^(e)	SI <input checked="" type="checkbox"/>	PI <input checked="" type="checkbox"/>	EI <input type="checkbox"/>
Crosscutting themes: ^(f)	GE <input type="checkbox"/> and DI <input checked="" type="checkbox"/>	CC <input checked="" type="checkbox"/> and ES <input checked="" type="checkbox"/>	IC <input checked="" type="checkbox"/>

- ^(a) Under the terms of the Flexible Financing Facility (document FN-655-1), the borrower has the option of requesting changes to the amortization schedule, as well as currency, interest rate, commodity, and catastrophe protection conversions. The Bank will take operational and risk management considerations into account when reviewing such requests.
- ^(b) Under the flexible repayment options of the Flexible Financing Facility, changes to the grace period are permitted provided that they do not entail any extension of the original weighted average life of the loan or the last payment date as documented in the loan contract.
- ^(c) In keeping with document FN-729 (Strategy and Operational Readiness for the Execution of the LIBOR Transition for the IDB Balance Sheet) and document CF-257-1 (Base Rate Replacement for Sovereign Guaranteed LIBOR-based Loans), this loan will be subject to the SOFR-based interest rate, either upon notification to the borrower by the Bank or at the borrower's request, pursuant to the provisions of the loan contract.
- ^(d) The commitment fee and inspection and supervision fee will be established periodically by the Board of Executive Directors as part of its review of the Bank's lending charges, in accordance with the applicable policies
- ^(e) SI (Social Inclusion and Equality); PI (Productivity and Innovation); and EI (Economic Integration).
- ^(f) GD (Gender Equality) and DI (Diversity); CC (Climate Change) and ES (Environmental Sustainability); and IC (Institutional Capacity and Rule of Law).

I. DESCRIPTION AND RESULTS MONITORING

A. Background, problem addressed, and rationale

- 1.1 The 2017 coastal El Niño phenomenon caused heavy flooding in various departments in Peru, leaving more than 230,000 direct victims, 1,130,000 people affected, and 143 dead. It also led to the collapse of 25,700 homes, made another 23,300 uninhabitable, and damaged 260,000 more.¹ In addition to the serious damage, this event exposed both a lack of storm drainage infrastructure to control urban flooding and a lack of local capacity for comprehensive storm drainage management.
- 1.2 Peru's 2017 Strategic Storm Drainage Plan (PEDP)² states that most cities do not adequately meet urban storm drainage needs, exacerbating the impact of storm flooding as well as flooding due to overflowing rivers and streams. Moreover, storm drainage has not been factored into city planning and development. In effect, it has not been treated as a topic of ongoing concern; rather, it is addressed only after each extreme event with no consideration given to any type of prevention. This is compounded by the lack of management tools not only within the national government (lead agency in charge of urban storm drainage) but also within local governments (institutions responsible for planning, execution, and the operation and maintenance of storm drainage infrastructure). The PEDP prioritizes the northern coastal cities that were hit by the 2017 coastal El Niño phenomenon and will be served by the Reconstruction with Changes Authority³ and loan operation 4941/OC-PE (Comprehensive Storm Drainage Program in Priority Cities in Peru), approved on 11 December 2019 for US\$100 million. This operation will serve Cuzco, a major Andean city identified as being at high risk of flooding. The PEDP also prioritizes the main cities of the rainforest region due to their high rainfall levels and a lack of infrastructure.
- 1.3 The rainforest region covers 55% of Peru's territory and is home to 13.9% of its population (some 4.1 million people).⁴ The population has risen sharply in recent decades as migrants have been drawn by agriculture and forestry in the departments of Huánuco and San Martín, as well as by mining operations in the department of Madre de Dios, where the population is concentrated in Puerto Maldonado, the departmental capital.⁵ This population growth has led to significant urban sprawl in Puerto Maldonado, which ranks among the five fastest-growing cities in the past two decades. This region has a wet climate, with annual precipitation levels averaging over 1,000 millimeters and occasionally as

¹ World Health Organization (2017), with figures from the May 2017 report of the National Response and Recovery Information System, May 2017 report.

² Plan financed by the Bank with regional technical cooperation resources for the development of strategic plans for the storm drainage subsector (ATN/MA-15200-RG).

³ Law 30556, which approves extraordinary provisions for national government intervention in the event of disasters and provides for the creation of the Reconstruction with Changes Authority, amended by Legislative Decree 1354. The Reconstruction Plan was approved through Supreme Decree 091-2017-PCM.

⁴ National Population and Housing Census, National Institute of Statistics and Information Technology (INEI), 2017.

⁵ Espinoza A. and Fort R. (2020). Mapeo y tipología de la expansión urbana en el Perú. Lima: Grade.

high as 3,000 or even 5,000 millimeters, and the increase in 24-hour maximum precipitation for a 100-year return interval is estimated at 10% for 2070.⁶ The region's main cities are located on flood plains and experience frequent storm flooding (from rainfall) and river flooding (due to the overflow of riverbanks). The city of Puerto Maldonado (district of Tambopata) and the community of El Triunfo (district of Las Piedras), with an estimated combined 98,000 residents,⁷ are located at the confluence of the Madre de Dios and Tambopata rivers in the lower southern Amazon rainforest in southeast Peru. Due to their flat topography, drainage in the event of heavy rainfall is a major problem. Only 14% of the urban area of Puerto Maldonado has adequate drainage, while El Triunfo has no storm drainage infrastructure. The drainage system consists of open and closed channels along major thoroughfares and dirt channels along minor streets. Sustained heavy rainfall typically overwhelms the capacity of these systems in short order and causes the sanitary sewer system to overflow as well. The concentration of runoff in certain locations or in discharge lines into nearby rivers has led to the formation of gullies (ravines or deep trenches). In the provincial municipality of Tambopata, maintenance work on drainage infrastructure is performed only in response to specific events and, therefore, occurs intermittently with no set frequency.

- 1.4 With a sound macroeconomic framework, Peru's economy has been among the best-performing in Latin America and the Caribbean since 2015. However, volatile international markets, slow worldwide growth, and domestic infrastructure and productivity problems have had a weakening effect on gross domestic product (GDP), which grew 2.2% in 2019 (down from 4% in 2018). The COVID-19 pandemic took an unprecedented toll and caused an 11% drop in GDP (Central Bank of Peru, or BCRP). Peru showed remarkable financial resilience compared to other emerging economies. The buffers created in recent decades allowed the government to respond quickly with a package equivalent to more than 20% of GDP, a level on par with developed countries, including direct support for the health system, households, and businesses.⁸ The economy is projected to grow 11.9% in 2021 (BCRP), and the social and economic recovery is expected to be significant over the short and medium terms. Unemployment in the Lima metropolitan area fell to 10% in the third quarter of 2021, down from 13% in 2020. The Economic Commission for Latin America and the Caribbean is projecting Peru's poverty rate to decline from 30.1% in 2020 to 28.4% in 2021, and the BCRP expects the economy to grow 11.9% in 2021 and 3.4% in 2022. The construction sector, projected to grow 30.6%, figures to contribute heavily to growth in 2021.

⁶ Climate change projections in Latin America and the Caribbean. Review of existing regional climate models' outputs IDB, 2016.

⁷ INEI, 2017.

⁸ International Monetary Fund (2020). These policies include extensions of tax payment deadlines for small and medium-sized enterprises (SMEs) and creation of a fund for SME working capital and debt refinancing. The fiscal support package accounted for more than 7% of GDP. Meanwhile, the benchmark rate was cut and reserve requirements scaled back to inject liquidity into the financial system.

- 1.5 **Sector structure.** As of July 2018, by means of a legislative decree,⁹ the Ministry of Housing, Construction, and Sanitation (MVCS), acting through the Office of the Deputy Minister for Construction and Sanitation, as the lead agency in charge of storm drainage infrastructure, is responsible for: (i) planning and regulating all matters related to mandatory storm drainage for the three levels of government across Peru, including disaster risk management; (ii) prioritizing investment in storm drainage, in accordance with the guidelines established by the MVCS; (iii) promoting, planning, formulating, and executing storm drainage infrastructure investments; (iv) promoting the production of information on storm drainage infrastructure, at the national level, in coordination with regional and local governments; (v) providing technical assistance and building the capacities of regional and local governments to plan, formulate, and execute storm drainage investments; and (vi) proposing and coordinating arrangements with the competent authorities for access to international financial and technical cooperation, both reimbursable and nonreimbursable, and other similar arrangements, in order to secure the necessary investments for the development of storm drainage infrastructure. Moreover, municipal governments have the authority to execute and supervise local public works,¹⁰ which is why they are responsible for the construction, operation, and maintenance of urban storm drainage systems.¹¹ It should be noted that this legal and institutional framework for urban storm drainage is relatively new and still very general in scope. With that in mind, loan 4941/OC-PE will contribute to the development of the management tools needed to deliver and implement the new institutional framework.
- 1.6 **Problem.** The MVCS Multiyear Investment Programming Office has established an indicator, “percentage of urban areas without storm drainage service,” to measure gaps in storm drainage infrastructure at the national level. To date, the value of this indicator has been estimated at 98.3%, meaning that 98.3% of urban areas nationwide do not have a storm drainage system and are therefore unprepared to deal with the risk of flooding due to heavy rain.¹² These flooding and rainfall events are becoming worse in line with climate change scenarios (paragraph 1.9). Puerto Maldonado receives heavy precipitation from October to April. Due to the city’s topography and its limited drainage network (which is occasionally overrun due to a lack of maintenance), combined with the presence of impervious cover ground due to urbanization, proper rainwater runoff is constrained or limited, which results in the flooding of streets and houses.¹³ A total of 43,476 residents (21,528 households) live in flood zones lacking storm drainage infrastructure. In addition, the Tambopata municipal government has no urban storm drainage maintenance and management plans to ensure the proper functioning of the infrastructure, and no specific budget is currently allocated for maintenance of this infrastructure.

⁹ Legislative Decree 1256, July 2018.

¹⁰ Article 45 of Law 27783 states: “Each provincial or district municipality is responsible for local works of any nature, with respect to their authorization, execution, supervision, and control, which includes the obligation to restore affected roads or services.”

¹¹ Framework Law on Decentralization, Law 27783.

¹² [Ministerial Resolution 035-2019-Housing](#).

¹³ Investment Project Profile. Unique Code 2519940. Invierte.pe.

- 1.7 Due to high levels of rainfall, the intrusion of rainwater into the sewer system is a serious problem that was identified by EMAPAT, the water and sanitation service provider. The entrance of rainwater into the sewer system leads to blockages, ruptures, and erosion of the existing infrastructure, which cause occasional overflows of wastewater mixed with rainwater into the streets, as well as backups into homes and other private properties, which seriously harms residents' quality of life and poses a public health risk. What's more, in August 2019, the Bank's public-private partnerships team, with support from the Water and Sanitation Division, signed a contingent technical cooperation agreement¹⁴ with the Private Investment Promotion Agency (Proinversión) to support the completion of studies to conduct a bidding process, under the public-private partnership modality, for the construction, operation, and maintenance of a wastewater treatment plant for Puerto Maldonado and El Triunfo, as well as works for household connections and secondary networks.¹⁵ These studies identified the inadequate storm drainage system as a significant risk to the proper functioning of the wastewater treatment system to be built by the private sector.
- 1.8 **Contributing factors.** While the creation of the legal and institutional framework was an important milestone, the Tambopata municipal government has no unit responsible for urban drainage systems, and, as a result, there are no maintenance plans or specific equipment for proper maintenance of infrastructure. Nor are there integrated instruments for planning, land use, and management, such as master plans, rainwater intrusion control, hydrological information systems, and protective measures to ensure proper functioning of the storm drainage system and minimize the exposure of homes and unregulated urban developments to flood risk. Lastly, the public is not informed of the hydrological and storm drainage risk.¹⁶
- 1.9 **Effect of climate change.** The Sixth Assessment Report of the Intergovernmental Panel on Climate Change predicts that extreme precipitation events will become more frequent and intense in many parts of the world in this century. This is due to changes in the climate system as a result of an increase in human-caused greenhouse gas emissions and their consequences for the average temperature of the surface of the Earth. Recent medium- and long-term climate projections (2030 and 2050, respectively) by the National Meteorological and Hydrological Service (SENAMHI, 2020) show differentiated climate patterns throughout Peru. Some northeastern, central, and southern areas are projected to see up to a 30% decrease in total annual precipitation.¹⁷ Projections of extreme climate indices vary depending on the time horizon and variable analyzed. SENAMHI's scenarios for 2050 indicate that rainfall will likely decrease in intensity and frequency in the western sierra and in the Amazon region, based on indices of very wet days and of days with more than 10 millimeters of cumulative rain. No significant change is

¹⁴ Technical cooperation operation RG-T2998.

¹⁵ This project should be awarded by the first half of 2022.

¹⁶ Public Investment Project Profile. Unique Code 2519940. Invierte.pe.

¹⁷ Ministry of Environment, 2021. National Adaptation Plan (Ministerial Resolution 096-2021-MINAM).

projected in maximum one-day rainfall.¹⁸ Meanwhile, a Bank study projects that Peru's rainforest will see up to a 10% increase in 24-hour precipitation for 100-year return intervals in 2070.¹⁹ The highest levels of flood risk in a scenario of high emissions (representative concentration pathway 8.5) for 2030 and 2050 are concentrated in the departments of Loreto, Ucayali, and Madre de Dios, mainly due to topography (low gradient) and the activity of rivers (such as for the Ucayali, Amazon, and Marañón rivers) that change course every year (Ministry of Environment, 2021).

- 1.10 **Bank experience in the sector and lessons learned.** The Bank's extensive experience in storm drainage programs in the region and in Peru²⁰ has yielded the following lessons: (i) have advanced engineering designs in place in order to reduce costs and delays during execution of the works, to which end technical cooperation resources (ATN/MA-16482-PE) and program funds will be used to finance the preparation of technical, economic, social, and environmental studies to expedite implementation; (ii) ensure adequate coordination between the executing agency and other institutions with a connection to the works (municipal or environmental permits and legal possession of land) so that efforts can be made to keep the works on schedule, in which respect the program [Operations Manual](#) provides for and details the necessary institutional coordination mechanisms and instruments; (iii) strengthen the capacity of the executing agency with technical specialists who have experience in project execution and supervision, for which an institutional capacity assessment was conducted and financing has been allocated under the project; (iv) optimize the operation and maintenance of retention/lamination infrastructure (tanks) by ensuring access for machinery; (v) raise awareness about the storm drainage program with key actors, to which end financing is provided under the project for actions to achieve sustainable management through consultations and communication plans; and (vi) equip authorities with the tools they need to develop an effective monitoring and control system, which is provided for in the strengthening management component; and (vii) have basic water and sewerage services in place in the area to receive storm drainage infrastructure, verified as part of the technical studies.

¹⁸ SENAMHI, 2021. Tendencias históricas y cambios futuros de extremos de precipitación y temperatura. Presentation delivered at Reactivación climática: 8 años decisivos para fortalecer la acción frente al cambio climático, an event held on 22 September 2021.

¹⁹ Climate change projections in Latin America and the Caribbean. Review of existing regional climate models' outputs. IDB, 2016.

²⁰ These include operations in Uruguay (2647/OC-UR, City of Montevideo Drainage and Sanitation System Expansion and Improvement Project, US\$30.5 million), Bolivia (3812/BL-BO, Storm Drainage for the Cities of La Paz and El Alto III, US\$34 million), Argentina (4427/OC-AR, Drainage and Flood Control Project in the Province of Buenos Aires, US\$180 million), El Salvador (2630/OC-ES, Reduction of Vulnerability in Informal Urban Neighborhoods in the San Salvador Metropolitan Area, US\$50 million), Brazil (4960/OC-BR, Tietê River Recovery Project Upstream of Penha Dam, State of São Paulo—Renasce Tietê, US\$79.9 million; 4917/OC-BR, Environmental Sanitation, Macrodrainage, and Recovery Project for the Igarapés and the Banks of the Parauapebas River—PA, US\$70 million; and 4302/OC-BR, Environmental Sanitation and Urban Development Program in the Mané Dendê River Basin, US\$135 million), and Peru (4941/OC-PE, Comprehensive Storm Drainage Program in Priority Cities in Peru, US\$123.6 million).

- 1.11 Loan 4941/OC-PE (Comprehensive Storm Drainage Program in Priority Cities in Peru) is being executed by the PMU for that operation and consists of two components: one for storm drainage works in the cities of Cuzco and Zarumilla, and another for institutional strengthening of the storm drainage sector at all levels of government, which will complement execution of this new storm drainage operation. Execution of loan 4941/OC-PE began this year, and the bidding process is under way for completion of final studies for the works, as well as for the consulting contracts for development of the strengthening tools in Component 2. The delays after eligibility was secured in October 2020 were due to a failure to budget counterpart funds to hire PMU staff. In preparing this operation, it was ensured that the 2022 budget of the National Urban Sanitation Program (PNSU) includes resources to finance additional PMU staff for effective project execution.
- 1.12 **Strategic alignment.** The program is consistent with the second Update to the Institutional Strategy (document AB-3190-2) and is aligned with the development challenges of: (i) social inclusion and equality, through enhanced access to urban storm drainage service for the entire population (paragraph 1.23); and (ii) productivity and innovation, through measures that will improve infrastructure and urban planning and reduce the impact of extreme events, which in turn will increase people's productivity (paragraph 1.7). The program is also aligned with the following crosscutting areas: (i) institutional capacity and rule of law, as it helps to improve the service management capacity of the Tambopata municipal government, through creation of the Storm Drainage Management Unit, provision of operation and maintenance equipment and sector planning tools, and training for unit staff; (ii) diversity, through the inclusion of infrastructure accessible to persons with disabilities in the recreational green spaces to be built; and (iii) climate change and environmental sustainability, as it helps to mitigate the impacts of climate change on the city's drainage systems in response to the growing threat of extreme events through measures that reduce the risk for the population and urban infrastructure. These measures include technical solutions to increase the adaptive capacity of the targeted urban watersheds and the strengthening of the management capacity of the municipal government to reduce climate risks. The operation is consistent with the IDB Group Country Strategy with Peru 2017-2021 (document GN-2889), especially with the strategic area of fostering environmental sustainability and climate change mitigation and adaptation, as it will finance interventions for sustainable management of urban watersheds in the municipio of Tambopata.
- 1.13 According to the joint methodology of [multilateral development banks](#), the project's climate finance is estimated at 68.36% due to the adaptation of drainage works to the increase in precipitation. These resources contribute to the Bank's target for climate finance (30% of annual approvals by volume). In addition, the program will contribute to the Corporate Results Framework 2020-2023 (document GN-2727-12) through the "households protected from the risk of flooding" indicator. The operation is aligned with the Bank's Vision 2025, as it encourages recovery and provides lasting structural benefits in the most effective manner in the areas of diversity (paragraphs 1.16 and 2.8) and action against climate change. The program is also aligned with the Strategy on Sustainable Infrastructure for Competitiveness and Inclusive Growth (document GN-2710-5) in the priority area of promoting access to infrastructure services, and it is consistent with the Water and Sanitation Sector

Framework (document GN-2781-8) and the Urban Development and Housing Sector Framework (document GN-2732-11), as its activities help improve the quality of the urban environment and strengthen urban management capacity. Lastly, the operation relates to “sustainable infrastructure and cities,” the fourth thematic area of the Amazon Initiative (Establishment of the Seed/Transitory Ordinary Capital Strategic Development Program for Sustainable Development in the Amazon (AMAZON-SDP), document GN-3036-4), as it will develop sustainable infrastructure in the municipality of Tambopata.

- 1.14 **Proposed interventions.** Given the problem described above, this project will finance the design and implementation of micro- and macrodrainage works to prevent flooding in the project's areas of influence through the promotion of sustainable urban drainage systems that restore and respect the natural hydrological cycle of urban watersheds, utilizing and promoting natural retention and infiltration mechanisms to reduce peak storm flows and speeds, including pipes and collectors, green filter trenches, and retention tanks. With respect to local management, the Storm Drainage Management Unit will be created in the Tambopata municipal government and will be provided with the equipment necessary to properly maintain the system. Management instruments will also be implemented, such as the hydrometeorological variable information system, a comprehensive management plan for the main watershed (La Joya), measures for protection and accessibility of infrastructure and bodies of water that collect rainfall, a plan for communication and dissemination of topics related to urban storm drainage, the Comprehensive Storm Drainage Plan for the districts of Tambopata and Las Piedras, and a rainwater intrusion control program, which will include indoor plumbing. All interventions will include sustainable infrastructure works.
- 1.15 Various case studies and other evaluations prove the effectiveness of structural and nonstructural interventions such as those proposed.²¹ Studies also show a negative correlation between urban flooding and a community's income and sanitary conditions.²² While there are no rigorous impact assessments of comprehensive drainage interventions, there is empirical evidence of the relationship between the risk of flooding and wellbeing, measured on the basis of property values. These studies conclude that homes built in vulnerable areas have a lower market value than homes built in safe areas. These studies also find that households living in homes built in areas at risk of flooding pay insurance premiums that are 6% to 10% higher than households whose homes are built in areas not at risk.²³ As Puerto Maldonado's urban growth has been based largely

²¹ A comprehensive compendium is included in [Jha et al., 2012, World Bank](#), containing more than 50 case studies of interventions implemented in a wide range of urban contexts.

²² For example, Cancado et al. (in [Economic consequences of floods: modelling impacts in urban areas](#), 2010) conduct multisystemic modeling calibrated for Brazilian cities to capture the effects of flooding in vulnerable areas on household income, among other variables. Ahern et al. (in [Global Health Impacts of Floods: Epidemiologic Evidence, Epidemiologic Reviews](#), Johns Hopkins Bloomberg School of Public Health, Vol. 27, 2005) observe, based on data from 200 urban floods in over 20 countries, that the greatest impacts on mortality and morbidity occur where infrastructure is precarious or nonexistent and where the at-risk population has scarce economic resources.

²³ Bin, O., and Kruse, J.B. (2006). Real Estate Market Response to Coastal Flood Hazards. *Natural Hazards Review*, 7(4), 137–44; Shultz, S.D., and Fridgen, P.M. (2001). Floodplains and Housing Values: Implications for Flood Mitigation Projects. *JAWRA Journal of the American Water Resources Association*, 37(3), 595-603.

on informal settlement and illegal occupancy, the population is particularly exposed to flood risk.²⁴

- 1.16 **Inclusion.** Puerto Maldonado and El Triunfo are home to 6,774 persons with motor or visual disabilities,²⁵ whose ability to access public spaces is limited. The photogrammetric survey conducted in 2020 estimates that nearly 50% of public spaces are not adapted to persons with disabilities and more than 60% of streets lack pedestrian walkways adapted to persons with disabilities. The infrastructure to be financed by the operation, therefore, will be designed and built bearing in mind access and use by individuals of any body size, posture, or mobility.
- 1.17 **Innovation.** Storm drainage projects traditionally focus on financing public infrastructure to mitigate the risk of urban flooding. This project will also include a program for onsite separation of rainwater and wastewater. A large number of homes in Puerto Maldonado discharge their rainwater into the sanitary sewer system, resulting in overflows into the streets and the flooding of homes. This will be the first time that a storm drainage project in Peru finances this type of intervention to minimize such overflow events and the health risks they entail.

B. Objectives, components, and cost

- 1.18 The general objective of the project is to increase the number of people with adequate access to storm drainage services in urban areas of the districts of Las Piedras and Tambopata. The specific objectives are to: (i) protect the population from flooding in the areas of intervention; and (ii) improve the sustainability of storm drainage service in the municipality of Tambopata. To this end, the program has two components:
- 1.19 **Component 1. Effective and sufficient urban storm drainage infrastructure (US\$96.5 million).** The objective of this component is to provide the population with an effective storm drainage system, through financing for the construction, rehabilitation, and expansion of storm drainage structures, as well as microdrainage systems, including 77 kilometers of channels and pipe, five flood control damping systems, green infrastructure for runoff control, and complementary urban adaptation works, including infrastructure for the accessibility of persons with disabilities (paragraphs 1.16 and 2.8). Financing will also be provided for the assisted operation of the works for one year, including the building of capacity to operate and maintain the infrastructure.
- 1.20 **Component 2. Effective technical management of the storm drainage operation (US\$3.4 million).** The objective of this component is to support regional and local governments in storm drainage infrastructure management with the aim of contributing to the sustainability of drainage systems, the management of hydrometeorological risks, and adaptation to climate change through nonstructural actions. Activities for this component will relate to: (i) creating the storm drainage management unit in the Tambopata provincial municipal government and developing equipment provision and management tools; and (ii) raising public awareness via training and campaigns, inter alia.

²⁴ Espinoza and Fort (2020).

²⁵ INEI 2017.

- 1.21 **Administration, audit, and evaluation (US\$3.3 million).** The program will finance costs associated with personnel and the procurement of goods at the PMU, which reports to the PNSU, as well as program monitoring and evaluation, which includes development of a baseline, midterm and final program evaluations, and the corresponding external audits.

C. Key results indicators

- 1.22 The results matrix (Annex II) sets out the program outcomes and outputs. Table I-1 shows the main indicators.

Table I-1. Key indicators

Outcome indicator	Unit of measure	Baseline	Target
Households protected from the risk of floods in high-risk areas with a return period of 10 years	Household	0	8,747
Households with effective access to urban storm drainage service	Household	6,252	21,528
Annual budget allocated to the storm drainage management unit and executed	%	0	95

- 1.23 **Beneficiaries.** This operation is expected to directly benefit some 43,476 people (around 21,528 households) living in the area of influence of the works in Puerto Maldonado, who will be protected from the risk of flooding with return periods of 2 to 10 years. It will indirectly benefit some 40,000 people living in Puerto Maldonado and El Triunfo, outside the area of influence, owing to a reduced risk of flooding of streets and shops used by this population. The entire municipality of Tambopata will also benefit from the implementation of measures to improve storm drainage management and associated urban planning.
- 1.24 **Socioeconomic viability.** A cost-benefit analysis for the project was carried out in preparing the operation. The economic benefits were estimated based on the impact of the works on property values in the beneficiary areas (hedonic price method). The project is economically viable, with an economic internal rate of return of 24.3%. Using a discount rate of 12%, the net present value is US\$7.8 million. The evaluation was supplemented by the corresponding sensitivity analysis showing the robustness of the results ([see optional link 1](#)).

II. FINANCING STRUCTURE AND MAIN RISKS

A. Financing instruments

- 2.1 **Modality and financial structure.** The program has been designed as a specific investment loan given that the project's cost and preliminary design are set and its technical, financial, and economic viability has been estimated. The program has a disbursement period of five years, in line with the multiyear execution plan ([required link 1](#)). The disbursement schedule is shown in Table II-1.

Table II-1 – Disbursement schedule (US\$)

Source/year	1	2	3	4	5	Total
IDB (Ordinary Capital)	1,538,256	4,861,799	20,162,379	28,054,054	19,393,511	74,000,000
Local contribution	420,016	1,816,635	7,727,423	11,489,886	7,798,357	29,252,317
Total	1,958,272	6,678,434	27,889,802	39,543,939	27,181,868	103,252,317
%	2	6	27	38	26	100

- 2.2 **Cost and financing.** The total program cost is US\$103,252,317, of which US\$74 million will be financed from the Ordinary Capital and US\$29,252,317 from the local counterpart contribution. The consolidated budget by component is shown in Table II-2.

Table II-2. Estimated program costs (US\$)

Component	IDB	Local	Total	%
Component 1. Effective and sufficient urban storm drainage infrastructure	70,277,225	26,237,319	96,514,544	93.5
Technical file for storm drainage works*	1,941,781	290,822	2,232,603	
Macrodrainage and microdrainage works*	64,869,484	24,576,783	89,446,266	
On-premise plumbing*	3,446,961	1,31,369,714	4,835,675	
Component 2. Effective technical management of the storm drainage operation	2,987,775	446,449	3,434,224	3.3
Administration, audit, and evaluation	735,000	2,568,549	3,303,549	3.2
Total	74,000,000	29,252,317	103,252,317	100.0

*Amounts for the activities are indicative.

B. Environmental and social safeguard risks

- 2.3 Pursuant to the Bank's Environment and Safeguards Compliance Policy (Operational Policy OP-703) and the social and environmental evaluation of the works to be executed, this has been classified as a category "B" operation since it will generate risks and negative localized social and environmental impacts for which mitigation measures are available. The main risks and impacts include: air pollution, noise, solid and liquid waste, potential contamination of bodies of water, risk of work-related and road accidents, temporary impacts on the road network, and restricted access to locales and residences adjacent to the works due to trenching.
- 2.4 During the preparation phase, an environmental and social analysis ([ESA](#)) was conducted to identify the most relevant social and environmental characteristics, impacts, and risks of all the works and activities planned in the beneficiary areas. The ESA, which includes an environmental and social management plan (ESMP), confirmed that the proposed interventions and the potential impacts can be mitigated with standard measures and social and environmental good practices. The program will not cause physical displacement of the population or affect critical

natural habitats. Operational Policy OP-765 does not apply, because no indigenous communities have been identified in the project area. However, the presence of an indigenous population with no differentiated adverse impacts was identified.

- 2.5 The project is deemed to pose a substantial risk, as the works are located within the urban area of Puerto Maldonado and El Triunfo and will require the temporary and partial closure of streets and avenues. Due to the nature of the projects, in respect of both storm drainage regulation and storm drainage installation and improvement works, potential temporary impacts on commercial activities, transportation routes, and/or access to homes and social infrastructure have been identified. These impacts and risks will be mitigated through processes and measures included in the ESMP; it has as an annex a plan to minimize and avoid impacts to properties (the “impact plan”), which is to be updated based on the final engineering design and will be supervised very closely by the executing agency.
- 2.6 Two significant consultation events on the project were held in person, with virtual connection as well, on 28 October 2021. That same day a specific in-person session was held on the impact plan with potentially affected parties. It brought together local and regional authorities, neighborhood boards, social interest housing developments and associations, merchants, and civil society organizations from both districts. The main comments from the general sessions were related to: (i) criteria for determining what areas the project will target, since the community’s representatives requested that their specific area be included; (ii) coordination among the local government, regional government, and PNSU; (iii) preparation of the technical file and final design; and (iv) how lack of legal land tenure might affect whether or not their area was included in the project. These results highlight the importance of the consultation processes that should be held when updating the ESA/ESMP based on the final design. An updated version of the ESA/ESMP was published, along with the respective consultation report, in accordance with the deadlines set forth in operational policy OP-703.

C. Fiduciary risks

- 2.7 In preparing the program, two medium-high fiduciary risks were identified: (i) internal processes: since the PMU is under the PNSU, key budgeting and treasury processes may be delayed, which in turn could delay (annual) financial planning for the operation. To mitigate this risk, twice-monthly coordination meetings will be held, and the administrative area will be strengthened; and (ii) goods and services: if the fiduciary procurement team is not strengthened in the first six months of execution, processes might not be managed effectively or appropriately, which could cause delays in the operation’s physical and financial timetable. A similar situation exists regarding formation of the PMU. To mitigate this risk, the workload of the procurement team will be analyzed, and the number of team members will be increased to maintain an appropriate level of knowledge and professionalism. Additional personnel will be hired to strengthen the PMU as well.

D. Other key issues and risks

- 2.8 **Technical viability.** The project evaluated for the storm drainage works has been developed by a specialized consulting firm at the pre-investment stage. The proposed works are technically viable, and they reflect appropriate alternatives to

address identified needs and the required levels of capacity and quality. The detailed project will be finalized by consulting firms and specialized consultants prior to the corresponding works, pursuant to applicable national and international standards and the guidelines stipulated in the program Operations Manual ([optional link 4](#)). The project includes works that will ensure accessibility for persons with disabilities. These works include sunken public spaces (in relation to street or sidewalk level), to be built in accordance with current laws and regulations.²⁶ All new drainage-related engineering works combined (about 66% of the loan) will help better evacuate excess precipitation to a large watershed and therefore will help increase the system's resilience to climate change.

- 2.9 **Institutional viability.** The Institutional Capacity Assessment Platform was used to assess the executing agency's institutional capacity. This assessment identified a need to strengthen the PMU with additional personnel, including a technical coordinator for this project and professionals in the following areas: hydrology, fiduciary (procurement and financial management), monitoring and evaluation, communications, environmental, and social.
- 2.10 **Sustainability of investments.** In the operation phrase, the Tambopata provincial municipal government will be responsible for operation and maintenance. Pursuant to the newly created legal framework, the responsible local government will have a unit tasked with storm drainage management, and Component 2 will support the creation of this unit. Assisted operation will be provided for one year, and the works contractor will be responsible for maintaining the works until the aforementioned unit is formed and consolidated. The contractor will also train Tambopata provincial municipal government staff for optimal operation and maintenance. Under the newly created legal framework, no specific financing mechanism has been identified for operation and maintenance of the storm drainage infrastructure (paragraph 1.5). Therefore, this operation (loan 4941/OC-PE) includes a study to help the sector create financial mechanisms. Timely completion of this study is critical, as is subsequent approval of the financing mechanism by the MVCS, and a contractual condition has been included to this effect (paragraph 3.4).
- 2.11 The project's high or medium-high risks are described below:

Table II-3 – High and medium-high risks and mitigation actions

Risk	Type of risk	Mitigation action	Level of risk
If beneficiaries do not allow work to separate rainwater from wastewater within their property, the works may not be completed as the project was designed, which would hinder the effort to minimize the intrusion of rainwater in the sewer system.	Technical design	Implement the connections program pilot at the start of the project, to raise public awareness and design on-premise solutions with beneficiaries in order to avoid delays in starting the works.	High

²⁶ [Law 29973: Law on Persons with Disabilities and its regulations](#) and [Standard A.120, "Universal Accessibility in Buildings," of the National Building Code.](#)

Table II-3 – High and medium-high risks and mitigation actions

Risk	Type of risk	Mitigation action	Level of risk
If land regularization is not achieved before the date on which the works are scheduled to begin, the works for 2023 cannot commence, delaying the project completion date.	Legal environment	Coordinate with the municipal government for land regularization in keeping with its budgetary and technical resources. Coordinate with the Peruvian Institute of Sport for the intervention at the stadium during preparation of the technical file for the works.	Medium-high
If the financing mechanism for the resources needed to cover operation and maintenance costs is not in place on time, the works for Component 1 cannot commence, causing delays in project execution.	Planning and sustainability	Complete the study for financing alternatives under loan 4941/OC-PE and secure subsequent MVCS approval of the legal mechanism.	Medium-high

III. IMPLEMENTATION AND MANAGEMENT PLAN

A. Summary of implementation arrangements

- 3.1 **Borrower and executing agency.** The borrower will be the Republic of Peru, and the executing agency will be the MVCS, acting through the PNSU. The PMU, which reports to the PNSU, will be responsible for technical, administrative, social and environmental, fiduciary, and operational execution of the program, including general coordination and resource management. The PMU will include the following key personnel: (i) PMU coordinator; (ii) technical coordinator; (iii) environmental specialist and social specialist; (iv) financial/accounting specialist; and (v) procurement specialist. The profiles for these key personnel and detailed information on the execution mechanism will be included in the program Operations Manual ([optional link 4](#)). Key personnel will be hired and/or assigned with the Bank's prior no objection. The PMU's duties will include: (i) preparing and periodically updating the multiyear execution plan, annual work plan, and procurement plan; (ii) conducting selection processes for works, goods, and consulting services; (iii) carrying out activities for works supervision, monitoring of execution and evaluation, and social and environmental management; (iv) performing financial management within the framework of Bank policies; and (v) preparing and updating semiannual program reports—including reports on social and environmental compliance—and risk matrices.
- 3.2 **Program Operations Manual.** The project will be governed by the PMU's current program [Operations Manual](#) as updated to reflect this project's needs and specific features. The update will include the project cycle, the necessary institutional coordination mechanisms and instruments, and specifications related to engineering, environmental and social matters, fiduciary considerations, etc. ([optional link 4](#)).
- 3.3 **As special contractual conditions precedent to the first disbursement of the loan, the executing agency will present, to the Bank's satisfaction, evidence of: (i) the approval and entry into force of the updated program [Operations Manual](#), including environmental and social requirements and, as an annex, the environmental and social analysis and management plan, under terms**

- previously agreed upon with the Bank; and (ii) the assignment of key staff for project execution—or steps to begin hiring such staff—by the PMU, including a general coordinator, a technical coordinator for Puerto Maldonado, a social specialist, an environmental specialist, a procurement specialist, and a financial/accounting specialist. These conditions are critical to ensuring that the borrower is prepared to begin executing the project, with a program [Operations Manual](#) describing operational and coordination guidelines, as well as a PMU reinforced with essential qualified staff.
- 3.4 As special contractual conditions for execution, the borrower, acting through the executing agency, will present, to the Bank's satisfaction, evidence that: (i) prior to beginning preparation of the technical file under Component 1, a liaison has been designated to ensure effective coordination between this project and the project to improve the sewerage and wastewater treatment system in Puerto Maldonado—CUI 2234766; and (ii) prior to the first call for tenders for works under the project: (a) the financing mechanism ensuring resources to cover operation and maintenance costs has been approved; (b) an agreement ensuring the project's financial sustainability has been signed between the executing agency and the Tambopata provincial municipal government under terms previously agreed upon with the Bank; and (c) the right and/or authorization to use the land needed for the respective works has been secured. Condition (i) is justified since the two projects are technically related and the final design work and construction of the works will be carried out at the same time by different executing agencies (paragraph 1.7). Condition (ii) is required for timely determination of the financing mechanism and to ensure that the rights to execute the works are in place.
- 3.5 **Fiduciary agreements and requirements.** The fiduciary agreements and requirements (Annex III) establish the fiduciary framework of the operation. Loan proceeds may be disbursed as advances of funds, as reimbursement of expenditures, and as direct payments to suppliers. For advances, disbursements will be made based on a financial plan covering the project's actual liquidity needs for up to 180 days. Disbursements will be made when at least 80% of the cumulative total balances have been substantiated using the Bank's forms. To manage resources, the PMU will use the Treasury Single Account and the local treasury framework applicable to operations financed by foreign debt. The PMU will submit audited financial statements annually and at the end of the operation, within the terms and timeframes established by the Bank in its policies. The PMU will select and hire a Bank-eligible firm of independent auditors for the duration of the operation.
- 3.6 Procurements financed in full or in part with loan proceeds will be made in compliance with the Bank policies established in document GN-2349-15 (Policies for the Procurement of Goods and Works Financed by the Inter-American Development Bank) and document GN-2350-15 (Policies for the Selection and Contracting of Consultants Financed by the Inter-American Development Bank). However, considering that the advanced use of Peru's country procurement system has been approved by the Bank's Board of Executive Directors (document GN-2538-22 of 2017), the system may be used after completion of the implementation and monitoring actions set out in the approved report for acceptance of the use of the country procurement system of Peru, subject to amendment of the procurement plan. The electronic reverse auction and electronic framework agreement catalog

subsystems can be used once recommendations regarding their use have been implemented.

- 3.7 In view of the findings of the PMU capacity assessment, ex post reviews will be conducted of Bank-financed procurement processes except when ex ante supervision is justified, as noted in the procurement plan. Whenever the country system is used for procurement, supervision will also be conducted through the country system. The procurement plan will be managed through the Procurement Plan Execution System or a system determined by the Bank.
- 3.8 Procurement processes may incorporate (environmental, social, or economic) sustainability criteria in the various stages, including planning, preparation of standard bidding documents, definition of technical specifications, bidder selection and evaluation criteria, and bid evaluation and award.
- 3.9 Environmental considerations will encourage the use of materials, ecotechnology, and design and construction practices to improve thermal comfort and energy efficiency, the integration of the natural landscape into heritage infrastructure and equipment, and risk reduction in the various interventions involving front elevations, sidewalks, and cultural spaces. Procurement processes may also introduce efficient lighting systems for front elevations, sidewalks, and public spaces. The guide entitled [Green Procurement: How to Encourage Green Procurement Practices in IDB Funded Projects?](#) provides guidance on aspects that can be considered in the design of green procurement.
- 3.10 **Operation and maintenance.** The borrower will adopt, through the executing agency or the beneficiary municipio, as applicable, the necessary measures to ensure that the works and goods under the project are properly maintained, in accordance with generally accepted technical standards. The borrower will submit, through the executing agency, during the disbursement period and as part of semiannual progress reports, a report on the status of each work and good. If the Bank's inspections, or the reports it receives, reveal that maintenance is not up to the agreed standards, the borrower will, through the executing agency or the beneficiary municipio, as applicable, take the necessary measures to fully correct the deficiencies.

B. Summary of arrangements for monitoring results

- 3.11 **Monitoring.** A monitoring arrangement setting out a data collection plan, the parties responsible, and the allocated budget has been agreed on ([required link 2](#)). The executing agency will be responsible for monitoring and evaluating projects to be financed by the program, for which it may retain independent consulting services. The Bank's supervision instruments, such as the procurement plan, multiyear execution plan, annual work plan, results matrix, and progress monitoring report, will be used for monitoring ([optional link 3](#)). The executing agency will send semiannual reports specifying the progress made, the results obtained, and an action plan for the next six months within 60 days after the end of each six-month period.
- 3.12 **Evaluation.** Program evaluation will include a midterm evaluation within 90 days after the date on which 50% of the loan proceeds have been disbursed and a final evaluation once 90% of the loan proceeds have been disbursed. The before-and-after (reflexive) evaluation methodology is proposed. It consists in measuring the project's outcome indicators at baseline and again after the

interventions have been implemented. An ex post economic evaluation will also be conducted, following the ex ante evaluation methodology, comparing the costs of the investments implemented and the project operating and maintenance costs and benefits, estimated as detailed in the monitoring and evaluation plan ([required link 2](#)).

Development Effectiveness Matrix		
Summary		PE-L1259
I. Corporate and Country Priorities		
Section 1. IDB Group Strategic Priorities and CRF Indicators		
Development Challenges & Cross-cutting Issues	-Social Inclusion and Equality -Productivity and Innovation -Gender Equality and Diversity -Climate Change -Institutional Capacity and the Rule of Law	
CRF Level 2 Indicators: IDB Group Contributions to Development Results	-Beneficiaries of enhanced disaster and climate change resilience (#)	
2. Country Development Objectives		
Country Strategy Results Matrix	GN-2889	Foster environmental sustainability and climate change mitigation and adaptation
Country Program Results Matrix		The intervention is not included in the 2021 Operational Program.
Relevance of this project to country development challenges (If not aligned to country strategy or country program)		
II. Development Outcomes - Evaluability		Evaluable
3. Evidence-based Assessment & Solution		8.1
3.1 Program Diagnosis		2.5
3.2 Proposed Interventions or Solutions		1.6
3.3 Results Matrix Quality		4.0
4. Ex ante Economic Analysis		10.0
4.1 Program has an ERR/NPV, or key outcomes identified for CEA		1.5
4.2 Identified and Quantified Benefits and Costs		3.0
4.3 Reasonable Assumptions		2.5
4.4 Sensitivity Analysis		2.0
4.5 Consistency with results matrix		1.0
5. Monitoring and Evaluation		8.4
5.1 Monitoring Mechanisms		2.8
5.2 Evaluation Plan		5.5
III. Risks & Mitigation Monitoring Matrix		
Overall risks rate = magnitude of risks*likelihood		Medium High
Environmental & social risk classification		B
IV. IDB's Role - Additionality		
The project relies on the use of country systems		
Fiduciary (VPC/FMP Criteria)	Yes	Financial Management: Budget, Treasury, Accounting and Reporting, External Control. Procurement: Information System, Price Comparison, Contracting Individual Consultant, National Public Bidding.
Non-Fiduciary	Yes	Strategic Planning National System.
The IDB's involvement promotes additional improvements of the intended beneficiaries and/or public sector entity in the following dimensions:		
Additional (to project preparation) technical assistance was provided to the public sector entity prior to approval to increase the likelihood of success of the project	Yes	TC PE-T1342

Evaluability Assessment Note. The general objective of the project is to increase the population with adequate access to storm drainage services in the urban area of Las Piedras and Tambopata districts. The specific objectives are: (i) to protect the population against floods in the intervened areas; and (ii) improve the sustainability of the storm drainage service of the Municipality of Tambopata.

The operation presents a solid diagnosis: substantial gaps are identified in the coverage of storm drainage service at the national level (98.3%) and the negative impacts caused by the floods is documented both at the national level and for the Municipality of Tambopata (MdT); the lack of an area in charge of the drainage systems in the MdT is identified, as well as the lack of budget allocation and maintenance and management plans for storm drainage; and the lack of instruments for planning, land use and comprehensive management is also identified.

To mitigate these challenges, the program will implement two components: 1) Adequate and sufficient urban stormwater drainage infrastructure; and 2) Adequate technical management of the storm drainage operation. The results matrix (RM) reflects the Specific Objectives of the program and shows a solid vertical logic. The RM includes output and result indicators with their respective baseline values, targets, and means to collect the information. The output and outcome indicators meet the criteria for being SMART.

It is a specific investment loan for which a cost-benefit analysis is carried out. The main costs and benefits are appropriately identified and quantified. The benefits derive from the impact of the works on the value of the properties in the beneficiary areas using a hedonic pricing model. The assumptions made are reasonable and are supported by economic theory and by information collected from 540 surveys in the Puerto Maldonado area. The results show that the operation is viable with an Internal Economic Rate of Return (IERR) of 24.3%. Sensitivity analyzes are performed by modifying variables that can affect costs and benefits. These modifications do not present significant alterations in the IERR.

The monitoring and evaluation plan proposes a reflexive evaluation, which is complemented by an ex-post cost-benefit analysis.

The risks identified in the risk matrix seem reasonable and are classified as Low (1), Medium-Low (2), Medium-High (5), and High (1) risks. All risks classified as Medium-High or High include a risk management strategy, activity, responsible party, and date or trigger.

RESULTS MATRIX

Project objective:	The specific objectives of this operation are to: (i) protect the population from flooding in the areas of intervention; and (ii) improve the sustainability of storm drainage service in the municipality of Tambopata. Fulfillment of these objectives will contribute to the general objective of increasing the number of people with adequate access to storm drainage services in urban areas of the districts of Las Piedras and Tambopata.
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SPECIFIC DEVELOPMENT OBJECTIVES

Indicator	Unit of measure	Baseline value	Baseline year	Year 1	Year 2	Year 3	Year 4	Year 5	End of project	Means of verification / Comments
Specific development objective 1: To protect the population from flooding in the areas of intervention										
1. Households protected from the risk of floods in high-risk areas with a return period of 10 years	Household	0	2021					8,747	8,747	High-risk areas are defined by the flood areas identified in the predesign stage of the works. Means of verification: Tambopata municipal government technical report.
2. Households with effective access to urban storm drainage service	Household	6,252	2021					21,528	21,528	This refers to people living in the 1,380 hectares included in the study area. Means of verification: Tambopata municipal government technical report.
Specific development objective 2: To improve the sustainability of storm drainage service in the municipality of Tambopata										
3. Annual budget allocated to the storm drainage management unit executed	%	0	2021					95	95	Means of verification: Municipal government report. Budget in year 5 allocated to the storm drainage management unit executed / budget allocated to the storm drainage management unit for year 5.

Indicator	Unit of measure	Baseline value	Baseline year	Year 1	Year 2	Year 3	Year 4	Year 5	End of project	Means of verification / Comments
4. Municipal ordinance establishing regulations for the Tambopata municipal government's storm drainage service, published	Ordinance	0	2021					1	1	Means of verification: Publication of the ordinance in the official gazette.

Output	Unit of measure	Related outcomes	Cost (US\$)	Base-line	Year 1	Year 2	Year 3	Year 4	Year 5	Final	Comments / Means of verification
Component I. Effective and sufficient urban storm drainage infrastructure											
Technical file for storm drainage works approved	File	1	2,232,603	-	-	1	-	-	-	1	Means of verification: Technical file approved by the PMU. Responsible party: PMU of the Comprehensive Storm Drainage Program in Priority Cities in Peru (PMU-PIDP).
Macrodrainage and microdrainage works built	Works	1	87,766,471	-	-	-	-	-	1	1	Means of verification: Works certificates validated by the PMU. Responsible party: PMU-PIDP.
-Milestone: (Closed ¹ and open ²) channels built	Km		74,872,363	-	-	-	33	89.5	72.24	194.74	
-Milestone: Rainwater collector ³ built	Km		2,135,771	-	-	-	0.9	2.21	2.03	5.14	
-Milestone: Outfall ⁴ built	Km		226,371	-	-	-	-	0.28	0.15	0.43	

¹ Microwatershed 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, El Triunfo.

² Microwatershed 6, 7, 8, 9, 10, 11, 17, El Triunfo.

³ Microwatershed 6, 7, 8, 9, 10, 11, 15, 17.

⁴ Microwatershed 10, 11, 12, 13, 14, 18.

Output	Unit of measure	Related outcomes	Cost (US\$)	Base-line	Year 1	Year 2	Year 3	Year 4	Year 5	Final	Comments / Means of verification
-Milestone: Pump station ⁵ built	Station		1,024,990	-	-	-	-	-	1	1	
-Milestone: Retention/lamination built ⁶	Structure		8,620,688	-	-	-	-	-	3	3	
-Milestone: Green trenches/sunken gardens ⁷ built	Meter		10,879	-	-	-	-	10	50	60	
-Milestone: Discharge structures ⁸ built	Structure		875,409	-	-	-	-	1	5	6	
Recreational spaces for retention/lamination with accessibility for persons with disabilities built ⁹	Space	1	805,996	-	-	-	-	-	2	2	Means of verification: Works certificates validated by the PMU. Responsible party: PMU-PIDP.
Contract for assisted operation and maintenance executed	Contract	1, 2, 3, and 4	640,345		-	-	-		1	1	Means of verification: Municipal government report with contract executed. Responsible party: PMU-PIDP.
On-premise plumbing ¹⁰ built	Connection	1, 2	5,069,129		-	-	900	1,050	1,050	3,000	Means of verification: Works certificates validated by the PMU. Responsible party: PMU-PIDP.

⁵ Microwatershed 10, 11.

⁶ Microwatershed 6 (León Velarde damping system), 10, 11, 17 (concrete tank underneath loop roadway).

⁷ Microwatershed 6.

⁸ Microwatershed 7, 8, 9, 10, 11, 12, 13, 14, 18.

⁹ Microwatershed 7 (stadium lamination) and 10 (Miraflores).

¹⁰ Microwatershed 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, El Triunfo.

Output	Unit of measure	Related outcomes	Cost (US\$)	Base-line	Year 1	Year 2	Year 3	Year 4	Year 5	Final	Comments / Means of verification
Component II: Effective technical management of the storm drainage operation											
Storm drainage management unit created	Unit	3 and 4	311,061	-	-	-	0	1	-	1	Means of verification: Municipal government report on creation of the unit validated by the PMU. Responsible party: PMU-PIDP.
Equipment package for operation of the storm drainage management unit installed	Equipment package	3 and 4	678,610	-	-	-	0	1	-	1	Means of verification: Municipal government report on receipt of equipment validated by the PMU. Responsible party: PMU-PIDP.
Hydrometeorological variable information system installed	System	3 and 4	147,882	-	-	-	-	1	-	1	Means of verification: Municipal government report on system installation validated by the PMU. Responsible party: PMU-PIDP.
Comprehensive management plan for the La Joya watershed prepared	Plan	3 and 4	676,480	-	-	-	1	-	-	1	Means of verification: Consultant's report validated by the PMU. Responsible party: PMU-PIDP.
Comprehensive storm drainage plan for Puerto Maldonado and El Triunfo prepared	Plan	3 and 4	436,411	-	-	-	-	-	1	1	Means of verification: Consultant's report validated by the PMU. Responsible party: PMU-PIDP.
Communication and dissemination plan on matters related to storm drainage prepared and implemented	Plan	3 and 4	358,560	-	-	-	-	-	1	1	Means of verification: Municipal government report on plan implementation validated by the PMU. Responsible party: PMU-PIDP.
Rainwater intrusion control program implemented	Program	3 and 4	825,220	-	-	-	-	-	1	1	Means of verification: Municipal government report on plan implementation validated by the PMU. Responsible party: PMU-PIDP.

Country: Peru

Division: WSA

Project No.: PE-L1259

Year: 2021

FIDUCIARY AGREEMENTS AND REQUIREMENTS

Executing agency: Ministry of Housing, Construction, and Sanitation, through the National Urban Sanitation Program (PNSU)

Project name: Storm Drainage Upgrade and Expansion Project in the City of Puerto Maldonado and the Community of El Triunfo, Madre de Dios Department

I. THE EXECUTING AGENCY'S FIDUCIARY CONTEXT

1. Use of country systems in the operation¹

<input checked="" type="checkbox"/> Budget	<input checked="" type="checkbox"/> Reports	<input checked="" type="checkbox"/> Information system	<input checked="" type="checkbox"/> National competitive bidding (NCB)
<input checked="" type="checkbox"/> Treasury	<input type="checkbox"/> Internal audit	<input checked="" type="checkbox"/> Shopping	
<input checked="" type="checkbox"/> Accounting	<input checked="" type="checkbox"/> External control	<input checked="" type="checkbox"/> Individual consultants	

2. Fiduciary execution mechanism

<input checked="" type="checkbox"/> Particular features of fiduciary execution	The PMU will be responsible for fiduciary management related to fulfillment of project targets. The PMU's experience in executing Bank-financed operations is still at an incipient stage (loan 4941/OC-PE).
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3. Fiduciary capacity

The executing agency's fiduciary capacity	The Institutional Capacity Assessment Platform was used to assess the PMU's fiduciary capacity. This assessment identified weaknesses, opportunities for improvement, and measures consistent with the operation's risk matrix.
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¹ Any system or subsystem approved subsequently can be applied to this operation, in accordance with the Bank's terms of validation.

4. Fiduciary risks and risk response

Type of risk	Risk	Risk level	Risk response
Internal processes	Since the PMU is under the National Urban Sanitation Program (PNSU), key budgeting and treasury processes may be delayed, which in turn could delay (annual) financial planning for the operation.	Medium-high	Twice-monthly meetings, depending on workload, will be held between the PMU and the PNSU. An administrative coordinator will be hired, and support for the planning and budget specialists will be secured.
Goods and services	If the fiduciary procurement team is not strengthened in the first six months of execution, processes might not be managed effectively or appropriately, which could cause delays in the operation's physical and financial timetable. A similar situation exists with regard to formation of the PMU.	Medium-high	The procurement team's workload will be analyzed, and the number of team members will be increased to maintain an appropriate level of knowledge and professionalism. Additional personnel will be hired to strengthen the PMU as well.

5. Policies and guidelines applicable to the operation: Financial Management Guidelines for IDB-financed Projects (document OP-273-12), Instructions for Disbursements, Instructions for Audited Financial Reports and External Audit Management. Policies for the Procurement of Goods and Works Financed by the Inter-American Development Bank (document GN-2349-15) and Policies for the Selection and Contracting of Consultants Financed by the Inter-American Development Bank (document GN-2350-15).
6. Exceptions to policies and guidelines: None.

II. CONSIDERATIONS FOR THE SPECIAL PROVISIONS OF THE LOAN CONTRACT

Exchange rate. To determine the equivalence in the currency of approval or disbursement of an eligible expenditure incurred in the local currency of the borrower's country, for the purposes of reporting and substantiation of expenditures, the exchange rate in effect on the date of conversion of the currency of approval or disbursement to the local currency of the borrower's country (Article 4.10(b)(i) of the General Conditions of the loan contract) will be used. For the purpose of determining the equivalence of expenditures incurred in local currency, recognized against the local contribution, or the reimbursement of expenses, recognized against the loan proceeds, the exchange rate agreed upon will be the exchange rate in effect on the date on which the borrower, the executing agency, or any other natural or legal person to whom spending authority has been delegated makes the respective payments in favor of the beneficiary.

Audit. The following external financial audit reports have been identified as necessary for supervision of project financial management: (i) annual audited financial statements, which will be submitted to the Bank within 120 days after the closing of each fiscal year of the executing agency during the original disbursement period or any extensions; and (ii) the final audited financial statements for the project, which will be submitted within 120 days after the expiration of the original disbursement period or any extensions.

III. AGREEMENTS AND REQUIREMENTS FOR PROCUREMENT EXECUTION

☒	Bidding documents	<p>Procurement processes for works, goods, and nonconsulting services that are conducted in accordance with the procurement policies (document GN-2349-15) and subject to international competitive bidding will use the standard bidding documents issued by the Bank or the bidding documents agreed upon between the executing agency and the Bank for the procurement item in question. Consulting services will be selected and contracted in accordance with the Policies for the Selection and Contracting of Consultants Financed by the Inter-American Development Bank (document GN-2350-15), using the standard request for proposals issued by the Bank or agreed upon between the executing agency and the Bank for the selection process in question. For NCB processes, a procurement document will be agreed upon between the competent authority in Peru and the Bank. The project's sector specialist will review the technical specifications and the terms of reference for procurement items in the course of preparing selection processes. This technical review may be performed on an ex ante basis regardless of the method used to review the procurement process.</p>						
☒	Use of country systems	<p>Country procurement systems (advanced validation—2017) may be used with the approval of the Bank's Board of Executive Directors (documents GN-2538-11 and GN-2538-22). The procurement plan will list the procurement items for which the country system will be used within the approved scope. If the scope of the Board of Executive Directors' approval for use of the country system is expanded, it will be applicable to this operation.</p>						
☒	Procurement supervision	<p>Ex post supervision will be used, except where ex ante supervision is justified. Procurement processes executed using the country system will be supervised through the country system for supervision. The supervision method—(i) ex ante, (ii) ex post, or (iii) country system—will be determined for each selection process. Ex post reviews will be conducted in accordance with the project supervision plan, but this is subject to change during program execution. Ex post reviews will include at least one visit. (The inspection will verify the existence of the procurement items; verification of quality and compliance with specifications will be left to the sector specialist.) The thresholds for ex post review are as follows:</p> <table border="1"> <thead> <tr> <th data-bbox="560 1482 810 1545">Works</th><th data-bbox="810 1482 1060 1545">Goods/services</th><th data-bbox="1060 1482 1385 1545">Consulting services</th></tr> </thead> <tbody> <tr> <td data-bbox="560 1545 810 1640">US\$3,000,000.00</td><td data-bbox="810 1545 1060 1640">US\$250,000.00</td><td data-bbox="1060 1545 1385 1640">US\$200,000.00 firms US\$50,000.00 individuals</td></tr> </tbody> </table>	Works	Goods/services	Consulting services	US\$3,000,000.00	US\$250,000.00	US\$200,000.00 firms US\$50,000.00 individuals
Works	Goods/services	Consulting services						
US\$3,000,000.00	US\$250,000.00	US\$200,000.00 firms US\$50,000.00 individuals						

Main procurement items

Description	Selection method	New procedures/tools	Estimated date	Estimated amount (US\$)
Goods				
Procurement of equipment for the PMU of the Tambopata municipal government	ICB		2022	680,000
Works				
Works contract for microwatersheds 12, 13, 14, 15, 18, El Triunfo (including works, environmental monitoring and mitigation, and safety and accessibility measures)	ICB		2023	26,500,000
Works contract for microwatersheds 6, 7, 9, 10, 11 (including works, environmental monitoring and mitigation, and safety and accessibility measures)	ICB		2023	29,600,000
Works contract for microwatersheds 8 and 17 (including works, environmental monitoring and mitigation, and safety and accessibility measures)	ICB		2023	28,904,575
Works contract for on-premise connections (including works, environmental monitoring and mitigation, and safety and accessibility measures)	ICB		2023	4,900,000
Nonconsulting services				
Service contract for assisted operation and maintenance	ICB		2022	520,000
Firms				
Consulting service for preparation of the technical file	QCBS		2023	440,000
Consulting service for supervision of works in microwatersheds 12, 13, 14, 15, 18, El Triunfo	QCBS		2023	1,075,000
Consulting service for supervision of works in microwatersheds 6, 7, 9, 10, 11	QCBS		2023	1,200,000
Consulting service for supervision of works in microwatersheds 8 and 17	QCBS		2023	1,170,000
Individuals				

The 18-month procurement plan may be found here: [procurement plan](#).

IV. FINANCIAL MANAGEMENT AGREEMENTS AND REQUIREMENTS

☒	Programming and budget	The annual programming and budget for both sources of financing will be prepared in accordance with the guidelines issued by the Public Budget Division of the Ministry of Economy and Finance (MEF). The multiyear execution plan will be prepared and used to formulate the annual budget and annual work plan, taking account of the project execution outlook. The budget allocated to the program will be approved by the MEF and the Congress of the Republic and reported annually to the Bank. The budget will be administered through the Integrated Financial Administration System (SIAF) and constitutes the maximum budget for disbursement of resources by the Bank.
☒	Treasury and disbursement management	The country's treasury system will be used in accordance with the directives issued by the National Debt and Treasury Directorate. Expenditure is subject to the budget and financial execution process, and the PMU will record it in the SIAF project execution module under the regulatory framework applicable to each of its stages: commitment, obligation, warrant, and payment. Loan proceeds may be disbursed as advances of funds, as reimbursement of expenditures, and as direct payments to suppliers. Disbursements will be made manually, and the operation will be managed in United States dollars. The PMU will use the Treasury Single Account to receive the funds disbursed by the Bank, and it may also maintain a specific bank account in U.S. dollars to pay eligible expenses in that currency. Payment of eligible expenses in local currency will be in accordance with laws and regulations applicable to the Treasury Single Account. Based on the program's annual financial planning exercise, the PMU will request that the Bank make a disbursement in the form of an advance of funds, based on a financial plan covering the project's actual liquidity needs for up to 180 days. Disbursements will be made when at least 80% of the cumulative total balances have been substantiated using the Bank's forms.
☒	Accounting, information systems, and reporting	The PMU will use the SIAF project execution module. The systems provide transparency and specific controls in accounting and reporting. Accounting will be done on a cash basis and will meet international accounting standards, while also adhering to the directives of the National Public Accounting Directorate. All documents and records will be kept for a minimum of three years after the date of the last disbursement. Expenses that are not Bank-eligible will be repaid as a local contribution. The program Operations Manual, which documents workflows and internal controls, will be used to complement the policies and guidelines applicable to the operation.
☒	Internal control and internal audit	The control environment, communication and information, and the monitoring of PMU activities are governed by the loan contract, the program Operations Manual, and the country's rules (Law governing the National Control System and the Regulations of the Office of the Comptroller General of the Republic (CGR)).

<input checked="" type="checkbox"/>	<p>External control and financial reports</p>	<p>The external auditors will conduct the ex post review of the records and supporting documentation of activities and transactions. Within the role of the CGR (lead agency for the National Control System) and its regulations, external audits of projects are outsourced to Bank-eligible firms of independent auditors. These firms are periodically evaluated by the Bank. The CGR authorizes the PMU's firm selection and hiring process, pursuant to Bank policies, for the entire program execution period, including any extensions of the final disbursement period. Selection of an eligible or eligible-plus firm of independent auditors will be required. Program financial statements include: cash flow statement, cumulative investment statement, and notes to the financial statements. The audit report will include an assessment of the internal control system. External audits will be covered using loan proceeds, estimated at US\$375,000 for the five years planned for execution.</p>
<input checked="" type="checkbox"/>	<p>Financial supervision</p>	<p>This may be adjusted according to project execution and external audit reports. Planned activities include a portfolio review with the executing agency twice per year, a review of disbursement requests four times per year, and an annual financial supervision visit.</p>

DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK

PROPOSED RESOLUTION DE-___/22

Peru. Loan ____/OC-PE to the Republic of Peru. Storm Drainage Upgrade and Expansion
Project in the City of Puerto Maldonado and the Community of El Triunfo,
Madre de Dios Department

The Board of Executive Directors

RESOLVES:

That the President of the Bank, or such representative as he shall designate, is authorized, in the name and on behalf of the Bank, to enter into such contract or contracts as may be necessary with the Republic of Peru, as borrower, for the purpose of granting it a financing to cooperate in the execution of the Storm Drainage Upgrade and Expansion Project in the City of Puerto Maldonado and the Community of El Triunfo, Madre de Dios Department. Such financing will be for the amount of up to US\$74,000,000 from the resources of the Bank's Ordinary Capital and will be subject to the Financial Terms and Conditions and the Special Contractual Conditions of the Project Summary of the Loan Proposal.

(Adopted on ____ 2022)