

DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK

PERU

COMPREHENSIVE STORM DRAINAGE PROGRAM IN PRIORITY CITIES IN PERU

(PE-L1238)

LOAN PROPOSAL

This document was prepared by the project team consisting of: Tania Paez (WSA/CPE), Project Team Leader; Maria Julia Bocco (INE/WSA) and Jaime Fernández Baca (CSD/CCS), Alternate Project Team Leaders; Edgar Orellana (WSA/CCO), María Eugenia de la Peña, Mauro Nalesso, Keisuke Sasaki, and Liliana López (INE/WSA); Ana Rosa Cueva and Miriam Arista (WSA/CPE); Roberto Leal and Blanca Henríquez (VPS/ESG); Sisi Larrea (INE/INE); Louis Francois Chretien (LEG/SGO); Allizon Milicich (VPC/FMP); Anastasiya Yarygina (SPD/SDV); and Gabriele del Monte (VPC/FMP).

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REQUIRED LINKS	
1.	Multiyear execution plan and annual work plan
2.	Monitoring and evaluation plan
3.	Environmental and social management report
4.	Procurement plan

OPTIONAL LINKS	
1.	Socioeconomic analysis
2.	Program Operations Manual
3.	Cusco budget capacity analysis
4.	Technical annex
5.	Environmental and social management plan and analysis
6.	Problems/solutions matrix
7.	Environmental and social management framework

ABBREVIATIONS

CGR	Contraloría General de la República [Office of the Comptroller General of the Republic]
ESA	Environmental and social analysis
ESMP	Environmental and social management plan
FFF	Flexible Financing Facility
GCM	Global climate models
IRR	Internal rate of return
MEF	Ministry of Economy and Finance
MVCS	Ministry of Housing, Construction, and Sanitation
PEDP	Plan Estratégico de Drenaje Pluvial del Perú [Peru's Strategic Storm Drainage Plan]
PMU	Program management unit
PNSU	Programa Nacional de Saneamiento Urbano [National Urban Sanitation Program]
SEPA	Sistema de Ejecución de Planes de Adquisición [Procurement Plan Execution System]
SIAF	Sistema Integrado de Administración Financiera [Integrated Financial Administration System]
STA	Single Treasury Account
VCS	Office of the Deputy Minister for Construction and Sanitation

PROJECT SUMMARY
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Financial Terms and Conditions				
Borrower:			Flexible Financing Facility^(a)	
Republic of Peru			Amortization period:	12 years
Executing agency:			Disbursement period:	5 years
Ministry of Housing, Construction, and Sanitation (MVCS)			Grace period:	5.5 years ^(b)
Source	Amount (US\$)	%	Interest rate:	LIBOR-based
IDB (Ordinary Capital):	100,000,000	80.9	Credit fee:	^(c)
			Inspection and supervision fee:	^(c)
Local:	23,592,575	19.1	Weighted average life:	8.72 years ^(d)
Total:	123,592,575	100.0	Currency of approval:	United States dollars
Project at a Glance				
Project objective/description: The general objective of the program is to reduce the risk of urban flooding in priority cities in Peru, helping to improve the population's quality of life. The specific objectives are: (i) to protect the population from flooding in the areas of intervention; and (ii) to improve the sustainability of drainage systems.				
Special contractual conditions precedent to 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 program Operations Manual (optional link 2), under terms previously agreed upon with the Bank; and (ii) the creation of the program management unit and the assignment of key staff for program execution, or steps to begin hiring such staff, including a program coordinator, a technical coordinator for the program sample, an institutional management coordinator, a procurement specialist, and a financial/accounting specialist (paragraph 3.5). See other environmental and social conditions in Annex B to the environmental and social management report (required link 3).				
Special contractual conditions of execution: The executing agency will present, prior to the call for tenders for works in each priority city selected under Component I of the program, evidence of the following, to the Bank's satisfaction: (i) the entry into force of an agreement between the MVCS and the respective municipio that governs coordination between the parties, establishes the authority of the MVCS to execute the respective works, and specifies the municipio's responsibility to guarantee the annual resources needed for operation and maintenance of the works; and (ii) the right and/or authorization to use the necessary land for the respective works (paragraph 3.6). See other social and environmental conditions in Annex B to the environmental and social management report (required link 3).				
Exceptions to Bank policies: None.				
Strategic Alignment				
Challenges:^(e)	SI	☒	PI	☒
			EI	☐
Crosscutting themes:^(f)	GD	☒	CC	☒
			IC	☒

^(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, and commodity 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) The credit 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.

^(d) The weighted average life is an estimated 8.72 years assuming an estimated date of signature of the contract of 28 February 2020. The weighted average life will be adjusted based on the date of signature of the contract.

^(e) SI (Social Inclusion and Equality); PI (Productivity and Innovation); and EI (Economic Integration).

^(f) GD (Gender Equality and Diversity); CC (Climate Change and Environmental Sustainability); and IC (Institutional Capacity and Rule of Law).

I. DESCRIPTION AND RESULTS MONITORING

A. Background, problem addressed, and rationale

- 1.1 With a population of 31.2 million people,¹ Peru has been increasingly hard hit by the effects of extreme weather events. The 2017 coastal El Niño 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 others.² In addition to the serious damage, this event revealed both the lack of storm drainage infrastructure to control urban flooding and the lack of a sector policy for comprehensive storm drainage management at Peru's various levels of government.
- 1.2 Peru's 2017 Strategic Storm Drainage Plan (PEDP)³ states that most cities do not adequately meet urban storm drainage needs, setting the stage for storm flooding and exacerbating river flooding due to overflowing rivers and streams, a situation that will only become worse in the future due to the increased intensity of extreme weather events caused by climate change. 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 estimates that investment needs over the next five years to strengthen the legal and institutional framework for storm drainage management in Peru and develop management tools, as well as conduct studies for master plans and make priority storm drainage investments will total approximately US\$2.6 billion.
- 1.3 **Sector structure.** As of July 2018, by means of a legislative decree,⁴ the Ministry of Housing, Construction, and Sanitation (MVCS), acting through the Office of the Deputy Minister for Construction and Sanitation (VCS), 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 the infrastructure of storm drainage systems, 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

¹ 2017 National Census, National Statistical and Information Institute.

² World Health Organization (2017), with figures from the National Response and Recovery Information System, May 2017 report.

³ 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).

⁴ Legislative Decree No. 1356, July 2018.

cooperation, both reimbursable and nonreimbursable, and other similar arrangements, in order to obtain the necessary investments for the development of storm drainage infrastructure. Moreover, municipal governments have the authority to execute and supervise local public works,⁵ which is why they are responsible for the construction, operation, and maintenance of urban storm drainage systems.⁶ 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, this operation will contribute to the development of the management tools needed to implement the new institutional framework and fit it to the sector's purposes.

- 1.4 **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.⁷ These flooding and rainfall events are becoming worse in line with climate change scenarios. Among the cities identified as priorities in the PEDP, after the northern coastal cities that were hit by the 2017 coastal El Niño and will be partially served by the Reconstruction with Changes Authority,⁸ are major Andean cities, such as Arequipa, Huancayo, and Cusco, which, owing to their geography and unplanned urban growth, are more vulnerable due to the occurrence of landslides, or *huaycos*.⁹ Cusco is one of the cities most affected by flooding as a result of its storm drainage system, which consists of the Huatanay River,¹⁰ its tributaries, various canals and pipes draining the area, and storm drains and collection structures throughout the city. Although partial interventions have been carried out to resolve specific problems, in many cases they have made the situation worse, because in the absence of an integrated system, drainpipes are connected to the sanitary sewer system, which causes significant overflows in the wastewater collection and treatment system. Furthermore, flooding in Cusco proper and the metropolitan area is one of the natural risks that most jeopardizes the economic development¹¹ of one of the country's top tourist destinations. A total of 32,582

⁵ Article 45 of Law 27783 states as follows: “Each provincial or district municipio 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.”

⁶ Article 10 of Supreme Decree No. 016, Regulation of the General Storm Drainage Law – Legislative Decree No. 1356.

⁷ [Ministerial Resolution 035-2019-Housing](#)

⁸ Law No. 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 No. 1354. The Reconstruction Plan was approved through Supreme Decree 091-2017-PCM.

⁹ *Huaycos* are climatological and geotechnical phenomena in which torrential rains loosen soil and debris on hillsides and along rivers, causing sudden washouts in gullies and ravines.

¹⁰ The Huatanay River flood plain is flat to gently sloping, whereas the banks of the river have quite a rugged relief, formed by high mountain peaks and steep slopes. Cusco Metropolitan Development Plan 2017-2037, 2017.

¹¹ Climate change disaster risk and vulnerability study for the city of Cusco. Emerging and Sustainable Cities Initiative. IDB 2016. Prepared by IDOM-IH Cantabria.

people live in flood zones lacking storm drainage infrastructure in Cusco.¹² Field visits to the districts of Zarumilla and Aguas Verdes confirmed the existence of communities exposed to danger from heavy rain due to the lack of natural runoff (flat topography) and the absence of storm drainage infrastructure (paragraph 2.4). In addition, local governments do not have urban storm drainage maintenance and management systems to guarantee the proper functioning of the infrastructure. According to the information reported by Cusco city officials, maintenance of drainage infrastructure is tied to specific events or projects, not according to a set schedule, and is therefore performed only intermittently. No specific budget is currently allocated for maintenance of this infrastructure.¹³

- 1.5 **Contributing factors.**¹⁴ While the creation of the legal and institutional framework was an important milestone, there are no national instruments for storm drainage management, including the use of green infrastructure, the incorporation of storm drainage into land-use planning processes, and land use and control in high-risk flood areas. None of the necessary storm drainage training has been provided to staff assigned to the sector, and no information and awareness campaigns have been held.¹⁵ At the local level, municipal governments do not have an area responsible for urban drainage systems. There are no maintenance plans or specific equipment for proper maintenance of infrastructure. Neither are there integrated planning and management instruments, such as master plans, zoning plans, cadastral registries, hydrological information systems, intrusion control, and residual risk management. Lastly, the public is not informed of the hydrological and storm drainage risk.¹⁶
- 1.6 **Proposed interventions.** Given the problem described above, this program will finance the design and implementation of micro and macro drainage works to prevent flooding in areas identified as priorities 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,¹⁷ including pipes and collectors, green filter trenches, and retention tanks. The intervention in the city of Cusco, which is part of the program sample, will be divided between four districts (Cusco, Wanchaq, San Sebastián, and Santiago) and comprise flow lamination structures and filter systems with green spaces and sidewalks to reduce the risk of floods with return periods of 2 to 10 years. The districts in which interventions are to be implemented have serious storm drainage problems due to the inadequacy of the existing infrastructure and the lack of microdrainage in residential areas. With respect to local management, storm drainage management units will be created and will be provided with the equipment necessary to properly maintain the systems. Management instruments will also be implemented, such as hydrometeorological variable information systems, master plans, integrated zoning

¹² Investment Project Profile. Unique Code 2459017. Invierte.pe.

¹³ Investment Project Profile. Unique Code 2459017. Invierte.pe.

¹⁴ The problems/solutions matrix ([optional link 6](#)) contains details on the contributing factors and proposed interventions.

¹⁵ Investment Project Profile. Unique Code 2459317. Invierte.pe.

¹⁶ Public Investment Project Profile. Unique Code 2459017. Invierte.pe.

¹⁷ [Water and Sanitation Sector Framework Document, Water and Sanitation Division, 2017.](#)

and management plans for flood zones, storm drainage cadasters, stormwater intrusion control plans, and residual risk management plans. These interventions will also help build the capacity of communities to adapt to the impacts of climate change. At the national level, the program will include the development and implementation of a new institutional management model for the sector. This model will include instruments for urban storm drainage management and the inclusion of green infrastructure, the incorporation of storm drainage into land use planning, training for sector officials and technical specialists, and local and national communication and dissemination systems.

- 1.7 Various case studies and other evaluations prove the effectiveness of structural interventions (physical works) and nonstructural interventions (operational measures, communications, etc.) such as those proposed.¹⁸ Studies also show a negative correlation between urban flooding and a community's income and sanitary conditions.¹⁹ 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.²⁰
- 1.8 **Effect of climate change.** The Fifth 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 disruptions 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. Climate projections were made for Peru using three global climate models (GCM) under an optimistic scenario and a pessimistic scenario involving an increase in greenhouse gases.²¹ All six projections reveal increases in average precipitation, with as much as 20% in the most pessimistic scenarios. For the city of Cusco in particular, mid-range and extreme-range projections for precipitation were made using the GCM results. These models were run under an optimistic scenario and a pessimistic scenario involving an increase

¹⁸ 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 and assessed with respect to their technical effectiveness.

¹⁹ 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.

²⁰ 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.

²¹ *El Perú y el CC: Tercera Comunicación Nacional del Perú a la Convención Marco de las Naciones Unidas sobre el CC*. MINAM, April 2016.

in greenhouse gas emissions for the periods 2020-2039 and 2040-2059. In both scenarios, the models predict higher average annual precipitation relative to the 1992-2011 reference period, with an increase of 12.5% in 2050 under the pessimistic scenario. Increases are also projected for the extreme range, but with a greater degree of uncertainty.

- 1.9 **Gender.** According to a number of studies (UNDP, CATIE,²² FLACSO,²³ IUCN,²⁴ World Bank²⁵), there is an inequality gap in the participation of women in risk management processes when events such as flooding and natural disasters occur. According to CATIE, in Nicaragua, women, owing to their traditional gender roles, are directly impacted by climate, flooding, population displacements, and lack of services, and their living conditions make them more vulnerable to losing their homes and productive resources in the case of one of the aforementioned events. It is understood that including women in consulting, planning, training, and decision-making processes ensures the sustainability of project results. However, despite being directly affected by the problem, they tend not to be considered in project management.²⁶ As the UNDP indicates,²⁷ it is important to enhance gender visibility in risk management: “[Women and men] have distinct socially prescribed roles with corresponding activities, resulting in a differentiated lived experience. In order for risk management policies and practices to be effective, these differences—as well as the varied coping and adaptation strategies—must be taken into account.” The UNDP proposes the following, as a lesson learned: “Promote gender-sensitive interventions to mitigate the impact of climate change that take account of the different risks and vulnerabilities of women and men, builds on local knowledge and skills, and gives women more power and control over their situations.” According to the World Bank,²⁸ **urban flooding** is a serious and growing challenge, in particular for the socially disadvantaged, especially **women** and children.
- 1.10 This program will help reduce the inequality gap by minimizing the adverse effect of urban flooding on families by applying a gender-lens approach in the design and execution of the **risk management plan** to ensure that the needs of both men and women are taken into consideration. This will be accomplished through the incorporation of measures for high-risk households, early warning mechanisms, emergency response plans for flood events, and training events that will ensure the active participation of women as agents of change. The risk management plan will take into account homes at risk of flooding where women, due to their traditional roles, experience greater vulnerability.
- 1.11 **Persons with disabilities.** There are 1,683 persons with disabilities²⁹ living in Cusco, which is why the infrastructure to be financed by the operation will be

²² <http://orton.catie.ac.cr/repdoc/A3028E/A3028E.PDF>.

²³ <https://revistas.flacsoandes.edu.ec/letrasverdes/article/view/2720>.

²⁴ *Manejo de cuencas hidrográficas*, Jackie Siles, IUCN, 2003.

²⁵ See [link](#).

²⁶ <http://orton.catie.ac.cr/repdoc/A3028E/A3028E.PDF>

²⁷ See [link](#).

²⁸ *Cities and Flooding: A Guide to Integrated Urban Flood Risk Management for the 21st Century*, Abhas K. Jha, Robin Bloch, and Jessica Lamond, World Bank, 2012.

²⁹ *Statistical Yearbook of the National Registry of Persons with Disabilities*, 2018.

designed and built bearing in mind access and use by individuals of any body size, posture, or mobility.

- 1.12 **Lessons learned.** The following lessons were learned from storm drainage programs in the region³⁰ and other operations in Peru:³¹ (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 and program funds will be used to finance the preparation of technical (final designs), economic, social, and environmental studies on the project sample and the rest of the interventions to expedite implementation in the future; (ii) ensure adequate coordination between the executing agency and other institutions with a connection to the works (municipal or environmental permits) 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 with experience in project execution and supervision, for which an institutional capacity assessment was conducted and financing has been allocated under the program; (iv) raise awareness about storm drainage programs with key actors, to which end financing is provided under the program for actions to achieve sustainable management through consultations and communication plans; and (v) equip authorities with the tools they need to develop an effective monitoring and control system, which is provided for in the strengthening management component.
- 1.13 **Strategic alignment.** The operation is consistent with the IDB Group Country Strategy with Peru 2017-2021 (document GN-2889), especially with regard to environmental sustainability, climate change, and water resources as per subparagraph (iii) reinforcing the institutional capacity of and coordination among the sector authorities responsible for managing the water resources. In addition, the program is consistent with the Update to the Institutional Strategy 2010-2020 (document AB-3008) and is aligned with the development challenges of: (i) social inclusion and equality, through the implementation of inclusive structural and nonstructural measures that will reduce material damage as a result of hydrometeorological phenomena; and (ii) productivity and innovation, through measures that will improve urban planning and reduce the impact of extreme events. The program is also aligned with the following crosscutting themes: (i) institutional capacity and rule of law, as it helps to improve the management and coordination capacity of the MVCS and participating municipios; (ii) gender equality and diversity, in relation to training for women on managing the risk of flooding through the implementation of flood resilience plans (paragraph 1.9), since women are the ones who spend the most time at home and are most affected by these events, as well as making infrastructure accessible to individuals with disabilities, specifically with respect to the storm drainage canals and permeable sidewalk systems to be built; and (iii) climate change and environmental sustainability, as it helps to mitigate the impacts of climate change on cities' drainage systems in response to the growing threat of extreme events (such as floods, erosion, and landslides) through measures that reduce the risk for the population and urban infrastructure. These measures include technical solutions

³⁰ 1926/BL-BO, 2440/BL-BO, 3812/BL-BO, and 4427/OC-AR.

³¹ 2645/OC-PE, 2759/OC-PE, 4291/OC-PE, and 442/OC-PE.

to increase the adaptive capacity of the targeted urban watersheds and the strengthening of the management capacity of entities in municipal governments to reduce climate risks. All operation resources will be invested in climate change adaptation activities, according to the joint methodology of [multilateral development banks](#) for the estimation of climate finance. These resources contribute to the IDB Group's target of increasing the financing of climate change-related projects to 30% of all approvals and operations by the end of 2020. In addition, the program will contribute to the Corporate Results Framework 2016-2019 (document GN-2727-6) through the "Households protected from the risk of flooding" indicator. 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. The works to be financed have been designed taking into account IDB Sustainable Infrastructure Framework criteria,³² particularly with respect to financial and institutional sustainability, given the proposed support to strengthen capacity at the institutions involved in the program (paragraph 2.12); environmental and climate sustainability, given that the program objective is to reduce the urban population's vulnerability to extreme precipitation events, which will be exacerbated by climate change (paragraph 1.15); and social and environmental sustainability (paragraph 2.5). The program is also consistent with the Water and Sanitation Sector Framework Document (document GN-2781-8) and the Urban Development and Housing Sector Framework Document (document GN-2732-6), as its activities help improve the quality of the urban environment and strengthen urban management capacity. Lastly, the operation was included in the recent Update to Annex III of the 2019 Operational Program Report (document GN-2948-2).

- 1.14 **Innovation.** During preparation of this program, next-generation numerical models were used to verify and validate the various design options proposed for drainage solutions and their effects on the surroundings. The Hydro-BID Flood computational model was used for hydraulic verifications of the effect of the drainage works. This high-definition bidimensional hydrologic and hydraulic model, recently developed by the Bank, enables the detailed study of the dynamic effect of water currents on bodies of water and on structures located in such bodies of water or in flood zones. The model also interacts with drainage works evaluation models to analyze the effects of flows generated on such structures with receiving bodies of water in order to determine the positive or negative effect that these structures can have on the hydraulic behavior of the bodies of water. The purpose is to guarantee that the proposed works improve conditions, or at least do not exacerbate, existing flood scenarios. This type of integrated analysis is uncommon in the design of drainage works, where systems are analyzed separately. An innovative work methodology was also used with the dynamic involvement of consultants, the executing agency, and the Bank's team. It consisted of running simulations and providing all actors with access to the Hydro-BID Flood model so that solutions could be incorporated and validated jointly, optimizing the decision-making process and dialogue in the program preparation phase.

³² What is Sustainable Infrastructure? A Framework to Guide Sustainability Across the Project Cycle. IDB, 2018 ([link](#)).

B. Objectives, components, and cost

- 1.15 The general objective of the program is to reduce the risk of urban flooding in priority cities in Peru, helping to improve the population's quality of life. The specific objectives are: (i) to protect the population from flooding in the areas of intervention; and (ii) to improve the sustainability of drainage systems.
- 1.16 **Component I: Improved and expanded storm drainage and flood control systems (US\$115.4 million).** The objective of this component is to provide the population with an effective storm drainage system, through financing for: (i) the construction, rehabilitation, and expansion of storm drainage structures, such as canals and piping, flood control damping systems, microdrainage systems, green infrastructure for runoff control (e.g. permeable sidewalks and squares), and complementary urban adaptation works; and (ii) strengthening of local management of storm drainage services to guarantee the sustainability of drainage systems, the management of hydrometeorological risks, and adaptation to climate change through nonstructural actions, including actions to raise public awareness via training and campaigns that incorporate gender considerations.
- 1.17 **Component II: Improved management of sector policies for urban storm drainage (US\$2.4 million).** The objective is to support the development of the national policy for urban storm drainage by strengthening the lead agency (MVCS), through financing for instruments for managing urban drainage and utilizing green infrastructure (including the development of technical rules for zoning in green areas, guidelines for inventories of urban areas of intervention with green infrastructure, and manuals to regulate the responsibility of each owner or developer), incorporating storm drainage in land-use planning processes, and performing control of land use in flood zones characterized by risks that cannot be mitigated. Financing will also be provided for national and local training for technical professionals, as well as communication and dissemination, in order to improve knowledge about storm drainage systems and promote sustainable urban drainage solutions that are integrated into urban planning.
- 1.18 **Administration, audit, and evaluation (US\$5.8 million).** The program will finance costs associated with personnel and the procurement of goods at the program management unit (PMU), as well as program monitoring and evaluation and the corresponding external audits.

C. Key results indicators

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

Table I-2. Key indicators

Outcome indicator	Unit of measure	Baseline	Target
Households protected from the risk of floods with return periods of 2 to 10 years in priority cities	Number of households	2,589	17,624
Percentage of the value of the work allocated to management, operation, and maintenance	%	0	1.5
Storm drainage management unit at the local level created and operational	Unit	0	2
Municipios with comprehensive storm drainage plans developed	Municipios	0	3

- 1.20 **Beneficiaries.** This operation is expected to directly benefit some 32,582 people (around 9,100 households) living in the area of influence of the works in Cusco, who will be protected from the risk of floods with return periods of 2 to 10 years; it will indirectly benefit some 241,100 people living in the districts of Wanchaq, Santiago, Cusco, and San Sebastián (in the municipio of Cusco), owing to a reduced risk of flooding of streets and shops used by this population. The entire municipio of Cusco will also benefit from the implementation of measures to improve storm drainage management. The rest of the investments are expected to benefit 21,000 additional people, who will be protected from the risk of flooding in other cities throughout Peru. Lastly, the program will finance measures to improve the institutional framework at the national level, which will benefit municipios in Peru that are affected by storm flooding and, by extension, their populations.

II. FINANCING STRUCTURE AND MAIN RISKS

A. Financing instruments

- 2.1 **Cost and financing.** The total program cost is US\$123.6 million, of which US\$100 million will be financed from the Ordinary Capital and US\$23.6 million from the local counterpart contribution. The consolidated budget by component is shown in Table II-1.

Table II-1. Estimated program costs (US\$ millions)

Component	IDB	Local	Total	%
Component I. Improved and expanded storm drainage and flood control systems	97.3	18.1	115.4	93.37
a. Infrastructure works	90.3	16.3	106.6	
b. Improved local management	7.0	1.8	8.8	
Component II. Improved management of sector policies for urban storm drainage	2.0	0.4	2.4	1.94
Administration, audit, and evaluation	0.7	5.1	5.8	4.69
a. Administration	0	5.1	5.1	
b. Audit and evaluation	0.7	0	0.7	
Total	100.00	23.6	123.6	100.0

- 2.2 **Modality and financial structure.** The program has been designed as an investment loan under the multiple works modality given that the proposal is to perform urban drainage works, independent of one another, based on eligibility criteria (paragraph 3.4). A representative sample was analyzed as part of program preparation, which will also enable an early startup of execution. The program has a disbursement period of five years, in line with the multiyear execution plan ([required link 1](#)), and will be governed by a program Operations Manual ([optional link 2](#)). The physical start of the works will be within two years after the entry into force of the loan contract. The disbursement schedule is shown in Table II-2.

Table II-2 – Disbursement schedule (US\$ millions)

Source/year	1	2	3	4	5	Total
IDB	1.5	11.1	39.0	30.3	18.1	100.0
cumulative %	1.5	12.6	51.6	81.9	100.0	
Total	2.3	14.1	46.8	37.3	23.1	123.6
cumulative %	1.9	13.3	51.1	81.3	100.0	

2.3 Representative sample. To determine the viability of a program and expedite execution upon approval, a representative project involving the type of intervention to be carried out, accounting for 44% of the total operation amount, was analyzed. The project includes: (i) urban drainage works in four districts in the province of Cusco (paragraph 1.6), including lamination structures, storm canals and collectors, and green infrastructure (sidewalks and squares); and (ii) the implementation of actions to improve storm drainage services. The sample project meets the eligibility criteria established for the operation (paragraph 3.4).

2.4 Future basket of projects. Following the same identification process as was used for the sample, interventions were identified in the districts of Aguas Verdes and Zarumilla (paragraph 1.4), which would be subject to financing under this operation upon their preparation and verification of their feasibility (paragraphs 2.8 to 2.12) and eligibility (paragraph 3.3).

B. Environmental and social risks

2.5 Pursuant to the Bank's Environment and Safeguards Compliance Policy (Operational Policy OP-703), the program will generate risks and negative social and environmental impacts, the main ones being air pollution, noise pollution, 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. These impacts and risks are considered to be localized, and mitigation measures are available. Therefore, the program has been classified as a category "B" operation. Given that the program entails multiple works, the works in the city of Cusco have been evaluated as the representative sample. 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 project areas of the representative sample. 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. An environmental and social management framework (ESMF) was also developed and defines specific control and management measures to be considered in the planning and execution of future investments under the program. The program will not cause physical displacement of the population or affect critical natural habitats, these being exclusion criteria.

2.6 The project is deemed to pose a substantial risk, as the works are located within the urban and periurban area of Cusco and will require the temporary and partial closure of streets and avenues. Due to the nature of the project, in respect of both river regulation and rectification works 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. Works are

also planned for the historic center of Cusco, which poses a substantial risk for potential fortuitous finds. These impacts and risks will be mitigated through processes and measures included in the ESMP and through the engagement of archaeologists by contractors and the PMU in order to carry out the corresponding management plan. Implementation of that plan will be supervised very closely by the executing agency. The consultation event for the sample project was held on 28 September. Regional and municipal authorities, neighborhood organizations from the four districts, and nongovernmental organizations were all invited. The main comments that arose from the consultation pertained to: (i) the selection of districts included in the project; and (ii) concerns about potential business disruptions during the execution phase, especially in the historic center. As a result of the consultations, dissemination activities will be carried out prior to the start of works, and emphasis will be placed on the importance of correctly implementing the measures set out in the ESMP to prevent business disruptions and establishing a complaints mechanism to identify potential impacts in a timely manner.

C. Fiduciary risks

- 2.7 During design of the operation, a medium risk of higher costs and longer times for project implementation was identified inasmuch as the PMU, to be created, will not have experience and be knowledgeable about executing Bank loan operations with fiduciary policies. To reduce the risk, the following mitigation actions were identified: (i) strengthening of the fiduciary capacities of the PMU by hiring key staff; (ii) identification of fiduciary process flows in the program Operations Manual with specified functions, roles, and responsibilities; (iii) fiduciary oversight and support from the Bank with emphasis on proper planning; and (iv) fiduciary assistance and training with emphasis on proper planning and use of the Bank's management tools.

D. Other key issues and risks

- 2.8 A medium public management and governance risk was identified due to the executing agency's lack of capacity to execute the program. This risk will be mitigated through the creation of a specific management unit for execution. Development risks include: (i) inadequate operation and maintenance of works to be built under the program, which constitutes a high risk, will be mitigated through: (a) the creation of an entity that will provide municipal storm drainage services (paragraph 1.16); and (b) the use of the Single Treasury Account (STA) as a financial sustainability mechanism (paragraph 2.12); (ii) inability to achieve viability for the Zarumilla profile within one year of approval of the program, which is regarded as a medium risk, will be mitigated by hiring a consulting firm to draw up the corresponding investment project; and (iii) lack of coordination between the MVCS and the beneficiary municipios with the program during the preparation and execution phase, which is a medium risk, will be mitigated through a program participation agreement and the designation of one coordinator per municipio (paragraph 3.3).
- 2.9 **Technical viability.** The technical viability of the program is based on the review of the technical solution and the cost budget for the storm drainage works proposed for the city of Cusco, considered to be the program sample and representative of the interventions to be carried out in other cities under the program ([optional link 4](#)). These interventions are in line with the climate change disaster risk and vulnerability study for the city of Cusco conducted as part of the Emerging and Sustainable Cities Initiative and consider advanced management

principles for urban drainage, namely: (i) rainwater collection, conveyance, and transportation works; and (ii) damping (lamination and retention) works and structural and nonstructural source control measures. Hydrological and hydraulic models were developed and used as a basis for preliminary designs for the works. The proposed technical solutions have been previously employed in drainage works in the area and were structured in keeping with generally accepted engineering principles and standards. The technical viability of the rest of the projects not analyzed as part of the sample will be verified based on properly prepared feasibility and design studies, in accordance with the requirements set out in the program Operations Manual.

- 2.10 **Socioeconomic viability.** A cost-benefit analysis was carried out for the project to prevent flooding in the city of Cusco. 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 (EIRR) of 16.4%. Using a discount rate of 12%, the net present value is US\$1.5 million. The evaluation was supplemented by the corresponding sensitivity analysis showing the robustness of the results. A cost-benefit analysis will be carried out for projects that have not been evaluated, and only those with an EIRR above 12% will be eligible for financing under the program ([optional link 1](#)).
- 2.11 **Institutional viability.** The executing agency's institutional capacity was evaluated using the Institutional Capacity Assessment System methodology. The evaluation indicates that the executing agency's institutional capacity reflects a medium development level and a medium risk level. As a result of this evaluation, the implementation of a strengthening plan is recommended. Approval of the program Operations Manual and the selection of key staff will be included as contractual conditions as part of activities under this plan.
- 2.12 **Financial analysis and investment sustainability.** The historical and projected budgetary capacity of the municipio of Cusco was analyzed to determine whether the municipio has the capacity to cover the operating and maintenance costs of the works in its jurisdiction. The historical analysis shows that, according to the average of the past three years, the municipio had a balance of S/ 6 million (US\$1.8 million) available for operation and maintenance. The projections indicate that the average availability of said balance over a 20-year horizon is approximately S/ 12 million (US\$3.6 million), which could cover the estimated operating and maintenance cost of around S/ 2.7 million (US\$800,000) during the post-investment phase. The same methodology will be used for analyses of works outside the sample. Each municipio undertakes, by way of an interinstitutional agreement between the executing agency and each beneficiary municipio, to receive the transfer of works and assume the operating and maintenance costs, among other commitments. The availability of resources will be assured by means of a withholding mechanism through the STA. The entry into force of this agreement will constitute a special contractual condition of execution (paragraph 3.6) ([optional link 3](#)).

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 National Urban Sanitation Program (PNSU), or the national program that replaces it with responsibility for storm drainage during the program execution phase.
- 3.2 A PMU will be created and will report to the PNSU or the MVCS national program with responsibility for storm drainage. The PMU will be the program management body, with administrative and financial autonomy, and will be responsible for administrative processes (related in particular to budget, programming, accounting, and procurement), the coordination of technical aspects, social and environmental safeguards, and program monitoring and evaluation. Implementation details, including coordination and detailed responsibilities, will be described in the program Operations Manual ([optional link 2](#)).
- 3.3 **Program Operations Manual.** The program will be governed by a program Operations Manual establishing the project cycle, institutional coordination mechanisms and instruments, and the Bank's participation in the cycle, and will include the following: (i) project eligibility and prioritization criteria; (ii) project technical, environmental, and economic viability requirements; (iii) specifications about the project cycle and the Bank's review mechanisms; and (iv) interinstitutional agreements between the executing agency and each beneficiary municipio regarding execution, supervision, and monitoring activities, which includes responsibilities related to design, contracting processes, technical supervision, transfer of works, operation and maintenance, use of the STA, and designation of a coordinator ([optional link 2](#)).
- 3.4 **Eligibility and prioritization criteria.** The following project eligibility criteria will be incorporated into the program Operations Manual: (i) the project must be viable with respect to technical (intervention with an advanced management approach to storm drainage), economic (an IRR higher than 12%, as required by the Bank), financial (a revenue retention mechanism in place for the beneficiary municipios to ensure that they are able to cover operating and maintenance costs), and social and environmental aspects (does not fall under the exclusion criteria in the ESMF), in accordance with criteria accepted by the Bank; (ii) the project must be located in the areas identified as priorities in the country's Strategic Storm Drainage Plan (PEDP); (iii) the project must not involve involuntary resettlement; and (iv) the project's environmental and social impact must not qualify it as a category "A" operation, in accordance with the Bank's safeguards policies.
- 3.5 **As 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 program Operations Manual under terms previously agreed upon with the Bank (paragraphs 3.3 and 2.5); and (ii) the creation of the program management unit and the assignment of key staff for program execution, or steps to begin hiring such staff, including a program coordinator, a technical coordinator for the program sample, an institutional management coordinator, a procurement specialist, and a financial/accounting specialist (paragraph 3.2). These

conditions are considered essential to ensuring that the borrower will be ready to begin program execution, with a program Operations Manual ([optional link 2](#)) that provides detailed guidelines on operational and coordination aspects, as well as an execution unit that has qualified key staff in place.

- 3.6 **As special contractual conditions of execution**, the executing agency will present, prior to the call for tenders for works in each priority city selected under Component I of the program, evidence of the following, to the Bank's satisfaction: (i) the entry into force of an agreement between the MVCS and the respective municipio that governs coordination between the parties, establishes the authority of the MVCS to execute the respective works, and specifies the municipio's responsibility to guarantee the annual resources needed for operation and maintenance of the works; and (ii) the right and/or authorization to use the necessary land for the respective works. These conditions are critical for ensuring that the MVCS has the authority and rights to execute the works in the selected cities under Component I of the program, with appropriate coordination with the respective municipios.
- 3.7 **Fiduciary agreements and requirements.** The fiduciary agreements and requirements establish the financial management and planning framework as well as the framework for the supervision and execution of procurements applicable to execution of the operation. Loan proceeds may be disbursed as advances of funds, as reimbursement of expenditures, and as direct payments to suppliers. In the case of advances of funds, disbursements will be made based on projected expenditures 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. 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. To that end, the PMU undertakes to select and hire a firm of independent auditors acceptable to the Bank for the duration of the operation.
- 3.8 The procurement plan will be managed through the online Procurement Plan Execution System or a system determined by the Bank. Procurements under the operation will be carried out in compliance with the Policies for the Procurement of Goods and Works Financed by the Inter-American Development Bank (document GN-2349-9) and the Policies for the Selection and Contracting of Consultants Financed by the Inter-American Development Bank (document GN-2350-9), or their subsequent updates.³³ However, considering that partial and advanced use of Peru's country procurement system has been approved by the Bank's Board of Executive Directors (documents GN-2538-11 and GN-2538-22, of 2013 and 2017, respectively), 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.

³³ In May 2019, the Bank's Board of Executive Directors approved the IDB Policies for the Procurement of Goods and Works financed by the Inter-American Development Bank ([GN-2349-15](#)) and the Policies for the Selection and Contracting of Consultants financed by the Inter-American Development Bank ([GN-2350-15](#)), which will enter into effect in January 2020.

- 3.9 **Procurement sustainability considerations.** Procurement processes will incorporate (environmental, social, and economic) sustainability criteria in the various stages, including: planning; preparation of standard bidding document; definition of technical specifications; bidder selection and evaluation criteria; and bid evaluation and award.
- 3.10 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 façades, sidewalks, and cultural spaces. Procurement processes will also ensure that the introduction of efficient lighting systems is considered for façades, sidewalks, and public spaces, as well as permeable concrete materials for sidewalks and public squares to promote stormwater infiltration and reduce puddling and flooding. 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.
- 3.11 **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 in the framework of the respective agreement between the executing agency and the municipio.

B. Summary of arrangements for monitoring results

- 3.12 **Monitoring.** A monitoring arrangement setting out a data collection plan, the parties responsible, and the allocated budget has been agreed ([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. 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.
- 3.13 **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 proceeds have been disbursed. The before-and-after evaluation methodology is proposed. It consists in measuring the project's baseline outcome indicators and, after the interventions have been implemented, comparing the measurements to determine whether the targets were met. 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. Lastly, the program will use a

quasi-experimental difference-in-differences methodology to measure the program's impact on property values in the area of intervention ([required link 2](#)).

Development Effectiveness Matrix		
Summary		PE-L1238
I. Corporate and Country Priorities		
1. IDB Development Objectives		Yes
Development Challenges & Cross-cutting Themes	-Social Inclusion and Equality -Productivity and Innovation -Gender Equality and Diversity -Climate Change and Environmental Sustainability -Institutional Capacity and the Rule of Law	
Country Development Results Indicators	-Property value within project area of influence (% change)* -Households protected from flood risk (#)*	
2. Country Development Objectives		Yes
Country Strategy Results Matrix	GN-2889	Reinforcing the institutional capacity of and coordination among the sector authorities responsible for managing the water resources.
Country Program Results Matrix	GN-2948-2	The intervention is included in the 2019 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		10.0
3.1 Program Diagnosis		3.0
3.2 Proposed Interventions or Solutions		4.0
3.3 Results Matrix Quality		3.0
4. Ex ante Economic Analysis		10.0
4.1 Program has an ERR/NPV, or key outcomes identified for CEA		3.0
4.2 Identified and Quantified Benefits and Costs		3.0
4.3 Reasonable Assumptions		1.0
4.4 Sensitivity Analysis		2.0
4.5 Consistency with results matrix		1.0
5. Monitoring and Evaluation		10.0
5.1 Monitoring Mechanisms		2.5
5.2 Evaluation Plan		7.5
III. Risks & Mitigation Monitoring Matrix		
Overall risks rate = magnitude of risks*likelihood		Medium
Identified risks have been rated for magnitude and likelihood		Yes
Mitigation measures have been identified for major risks		Yes
Mitigation measures have indicators for tracking their implementation		Yes
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		
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 ATN/MA-15200-RG

Note: (*) Indicates contribution to the corresponding CRF's Country Development Results Indicator.

The general objective of the Program is to reduce flood risks in urban areas of the prioritized cities of Peru, contributing to improve the quality of life of the population. The specific objectives are: (i) protect the population against flooding in the intervened areas, and (ii) improve the sustainability of drainage systems.

The documentation presents a solid diagnosis, which describes the challenges of the urban storm drain subsector in terms of the lack of a comprehensive sector policy and a storm drain infrastructure gap of 98.3%. Specific problems on these issues are identified and quantified for the prioritized areas of Cusco, Zarumilla, and Aguas Verdes.

To mitigate the problems identified, the Program will implement two components: 1) Improvement of storm drainage systems; and 2) Improvement of the management of sectoral storm drainage policies. The proposed solution is clearly linked to the problems and needs identified. Evidence is presented on the effectiveness of these types of programs. The results matrix (RM) reflects the objectives of the program and shows a clear vertical logic for the two components. The baseline and target values for the main indicators are consistent with the information in the economic analysis. The lower level indicators reflect the design of the two components. The RM includes SMART indicators at the level of products, outcomes, and impacts, with their respective baseline values, targets, and means to collect information.

This operation is conceived as an investment loan under the multiple-works modality. A Cost-Benefit analysis is performed for a sample that represents 44% of the total amount. Costs and benefits are identified and quantified appropriately. The assumptions made are reasonable and are supported with administrative data and a survey applied to 500+ households in one of the intervention zones. The analysis shows an internal rate of economic return (IRER) of 16.4%, and a net present value (NPV) of US\$1.5 million. A sensitivity analysis is performed under alternative scenarios by modifying 3 main variables that can affect costs and benefits; these modifications do not present significant alterations to the NPV or IRER.

The monitoring and evaluation plan proposes an evaluation using an ex-post cost-benefit analysis, a reflexive evaluation, and an impact evaluation based on the quasi-experimental method of Difference-in-Differences.

The risks identified in the risk matrix seem reasonable and are classified as Low risk (1), Medium (4), and High (2). The risks of Medium and High classification include mitigation actions and compliance indicators.

Results Matrix										
Project objective	The general objective of the program is to reduce the risk of urban flooding in priority cities in Peru, helping to improve the population's quality of life. The specific objectives are: (i) to protect the population from flooding in the areas of intervention; and (ii) to improve the sustainability of drainage systems.									
Expected impact	Increase in property values in the areas of intervention.									
Impact Indicator	Unit of Measure	Baseline	Baseline Year	Year 1	Year 2	Year 3	Year 4	Year 5	End of Project	Comments/Mean of Verification
Property values in the area of project influence	%	0	2019					8.5	8.5 ¹	Comment: The expected impact is the percentage increase in property values in the areas treated relative to the control group, after controlling for the difference between treated and control areas in the baseline and for time trends. Means of verification: Socioeconomic evaluation baseline and endline survey Entity responsible: IDB
Expected outcomes										
Outcome 1. Households protected from hydrometeorological risk										
1.1 Households protected from the risk of floods with a return period of 2 to 10 years in priority cities	Household	2,589	2019	-	-	-	-	17,624	17,624	Comment: Baseline of 2,327 households on 111 hectares protected in Cusco; baseline of 262 households on 12 hectares protected in Zarumilla. Endline of 9,146 households on 419 hectares protected in Cusco; endline of 8,478 households on 388 hectares protected in Zarumilla. Means of verification: Final program evaluation report – Technical report by the provincial municipio Entity responsible: Project execution unit
Outcome 2: Sustainability of drainage systems improved										
2.1 Percentage of the value of the work allocated to management, operation, and maintenance	%	0	2019					1.5	1.5	Comment: Numerator = annual municipal budget executed in urban storm drainage system management and maintenance; denominator = total cost of storm drainage works at the municipal level. Means of verification: Maintenance budget execution information Entity responsible: Project execution unit

¹ The goal is to increase property values by 8.5%. This target is established based on evidence from studies that link the risk of flooding to property values. The target covers all treated homes (15,035 beneficiary households in high and moderate risk areas), as the ex ante economic analysis estimates an 18.9% increase in home valuation for 2,318 homes subject to flooding in areas at high risk of flooding in the city of Cusco only.

Impact Indicator	Unit of Measure	Baseline	Baseline Year	Year 1	Year 2	Year 3	Year 4	Year 5	End of Project	Comments/Mean of Verification	
2.2 Local storm drainage management unit created and operational	Unit	0	2019					2	2	Means of verification: Creation: municipal decree; operation: budget allocated to the management unit. Entity responsible: Project execution unit	
Outcome 3: National urban storm drainage policy strengthened											
3.1 Municipios with comprehensive storm drainage plans developed	Municipio	0	2019					3	3	Means of verification: Final program evaluation report – Technical report by the provincial municipio Entity responsible: Project execution unit Comment: Does not include the municipios of Cusco or Zarumilla.	
Output indicators											
Component I: Improved and expanded storm drainage and flood control systems											
Output	Unit of Measure	Related Results	Cost in US\$ million	Baseline	Year 1	Year 2	Year 3	Year 4	Year 5	End of Project	Comments/Mean of Verification
1.1 Work designs developed – Technical files	# of technical files	1	4.3	0	1	1	-	-	-	2	Means of verification: Technical files approved by the execution unit Entity responsible: PMU
1.2 Flooding control structures built and implemented	Works	1	102.2	0					2	2	Comment: The milestone targets are for Cusco. Means of verification: Works certificate Entity responsible: PMU
MILESTONE: Circular pipes built and implemented	Km			0	-	-	10	-	15	25	
MILESTONE: Rectangular cement collectors built and implemented	Km			0	-	-	3	-	3.5	6.5	
MILESTONE: Green filter trenches built and implemented	m²			0	-	3.000	-	10.000	10.000	23.000	
MILESTONE: Retention tanks ² built and implemented	Tanks			0	-	-	-	1	1	2	
MILESTONE: Accessibility ramps for persons with disabilities built	Ramps			0			20	20	20	60	

² Includes lamination and retention structures.

Output	Unit of Measure	Related Results	Cost in US\$ million	Baseline	Year 1	Year 2	Year 3	Year 4	Year 5	End of Project	Comments/Mean of Verification
1.3 New local urban storm drainage management model implemented	Model	1.2	8.2	0					2	2	Means of verification: Municipal report with instruments implemented Entity responsible: PMU
MILESTONE: Local storm drainage management unit equipped	Unit			0	-	1	1	-	-	2	Means of verification: Final consulting report Entity responsible: PMU
MILESTONE: Hydrometeorological variable information system implemented	System			0	-	1	1	0	-	2	Means of verification: Final consulting report Entity responsible: PMU
MILESTONE: Storm drainage cadastral system developed	System			0	-	1	-	-	-	1	Means of verification: Final consulting report Entity responsible: PMU
MILESTONE: Urban storm drainage plan and flood control master developed	Plan			0	-		1	1	-	2	Means of verification: Final consulting report Entity responsible: PMU
MILESTONE: Stormwater intrusion control plan implemented	Plan			0	-	-	-	-	1	1	Means of verification: Final consulting report Entity responsible: PMU
MILESTONE: Integrated zoning and management plan for flood areas developed	Plan			0	-	-	-	1	1	2	Means of verification: Final consulting report Entity responsible: PMU
MILESTONE: Storm drainage communication and dissemination plan implemented	Plan			0	-	-	-	-	2	2	Means of verification: Final consulting report Entity responsible: PMU
1.4 Residual risk management plan with a gender approach developed	Plan	1.2	0.8	0	-	-	-	-	2	2	Means of verification: Final consulting report Entity responsible: PMU
Component II: Improved management of sector policies for urban storm drainage											
2.1 New institutional management model for the storm drainage sector implemented		1, 2, and 3	2.5	0	-	-	-	-	1	1	Means of verification: Ministerial report with instrument implementation results Entity responsible: PMU
MILESTONE: Instruments for urban storm drainage management and inclusion of green infrastructure developed	Instrument			0	0	5	3	4	2	14	Means of verification: Final consulting report Entity responsible: PMU

Output	Unit of Measure	Related Results	Cost in US\$ million	Baseline	Year 1	Year 2	Year 3	Year 4	Year 5	End of Project	Comments/Mean of Verification
MILESTONE: Instruments for the incorporation of storm drainage in land-use planning and control processes developed	Instrument			0		1	3	1		5	Means of verification: Final consulting report Entity responsible: PMU
MILESTONE: Storm drainage training implemented	Training			0		1	1	2	1	5	Means of verification: Final consulting report Entity responsible: PMU
MILESTONE: National storm drainage communication and dissemination system implemented	System			0				1	0	1	Means of verification: Final consulting report Entity responsible: PMU

FIDUCIARY AGREEMENTS AND REQUIREMENTS

Country:	Republic of Peru
Project number:	PE-L1238
Name:	Comprehensive Storm Drainage Program in Priority Cities in Peru
Executing agency:	Ministry of Housing, Construction, and Sanitation (MVCS)
Fiduciary team:	Allizon Milicich, Gabriele del Monte, and Freddy Andara (FMP/CPE)

I. THE FIDUCIARY CONTEXT OF THE COUNTRY

- 1.1 The country's financial administration systems are adequate and reliable. With respect to the country procurement system, the electronic reverse auction and electronic framework agreement catalog subsystems are currently used under Peru's government contracting regime, approved through document GN-2538-11.

II. THE FIDUCIARY CONTEXT OF THE EXECUTING AGENCY

- 2.1 The MVCS will be the executing agency and will act through the program management unit (PMU), whose functions will be set out in the program Operations Manual. The executing agency executed GRT/WS-12127-PE and is in the process of executing 4442/OC-PE.
- 2.2 The PMU will act as the direct contact with the Bank and will be responsible for managing the program with administrative and financial autonomy. It will also have administrative responsibilities related in particular to budget, accounting, treasury, and procurement, applying IDB rules and procedures as well as national rules.
- 2.3 For fiduciary purposes, specific support (key personnel) dedicated exclusively to the operation is expected to be recruited, namely a financial/accounting specialist and a procurement specialist.
- 2.4 The Electronic Government Procurement System (SEACE) and the Procurement Plan Execution System (SEPA) will also be used in the operation to register the procurement plan and publicize procurement processes. In addition, the Integrated Financial Administration System (SIAF) will be used as the financial management operating system, whereas its project execution module will be used to generate financial reports.

III. FIDUCIARY RISK EVALUATION AND MITIGATION ACTIONS

- 3.1 During design of the operation, a medium risk of higher costs and longer times for project implementation was identified inasmuch as the PMU, to be created, will not have experience and be knowledgeable about executing Bank loan operations with fiduciary policies. To reduce the risk, the following mitigation actions were identified: (i) strengthening of the fiduciary capacities of the PMU by hiring key staff; (ii) identification of fiduciary process flows in the program Operations Manual with specified functions, roles, and responsibilities; (iii) fiduciary oversight and

support from the Bank with emphasis on proper planning; and (iv) fiduciary assistance and training with emphasis on proper planning and use of the Bank's management tools.

- 3.2 The PMU will submit audited financial statements annually and at the end of the program, with specific terms of reference acceptable to the Bank, within 120 days after the closing of each of the borrower's fiscal years during the original disbursement period or its extensions. The final audit report will be submitted within 120 days after the expiration of the original disbursement period or its extensions.
- 3.3 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 (paragraph (b)(i) of Article 4.10 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 contractor, supplier, or beneficiary.

IV. AGREEMENTS AND REQUIREMENTS FOR PROCUREMENT EXECUTION

- 4.1 **Procurement execution.** Procurements will be conducted in accordance with the Policies for the Procurement of Goods and Works financed by the Inter-American Development Bank (document GN-2349-9) and the Policies for the Selection and Contracting of Consultants financed by the Inter-American Development Bank (document GN-2350-9), or their subsequent updates.¹ The threshold for the use of international competitive bidding will be made available to the borrower, through the executing agency, at <http://www.iadb.org/procurement>. However, without prejudice to the foregoing, the procurement plan approved by the Bank will identify the method for each procurement and its amount. This will be based on the complexity of each procurement in line with the principles of economy and efficiency in program execution, including for the procurement of goods and the execution of the works involved, for the purpose of achieving the expected results, considering the context and the risk, value, nature, and complexity of the procurement and/or contract.
- 4.2 **Procurement of works, goods, and nonconsulting services.** Works, goods, and nonconsulting services² generated under the program and subject to international competitive bidding will be procured using the standard bidding documents issued by the Bank. Bidding processes subject to national competitive

¹ In May 2019, the Bank's Board of Executive Directors approved the IDB Policies for the Procurement of Goods and Works financed by the Inter-American Development Bank ([GN-2349-15](#)) and the Policies for the Selection and Contracting of Consultants financed by the Inter-American Development Bank ([GN-2350-15](#)), which will come into effect in January 2020.

² Under the Bank's procurement policies, nonconsulting services are treated as goods.

bidding will be executed using national bidding documents agreed upon with the Bank (or satisfactory to the Bank if none have yet been agreed upon). The program leader is responsible for reviewing the technical specifications.

- 4.3 **Selection and contracting of consultants.** Consulting service contracts generated under the program will be executed using the standard request for proposals issued by or agreed upon with the Bank, regardless of the contract amount (or satisfactory to the Bank if none have yet been agreed upon). The program leader is responsible for reviewing the terms of reference.
- 4.4 **Prior procurement review.** The Bank will review the selection, contracting, and procurement processes, as specified in the procurement plan. The Bank may, at any time during program execution, change the review modality for said processes, with prior notice to the borrower or executing agency. The changes approved by the Bank will be reflected in the procurement plan.
- 4.5 **Use of the country procurement system.** As the Board of Executive Directors has approved the advanced use of Peru's country public procurement system, the latter 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, subject to amendment of the procurement plan.
- 4.6 **Initial procurement plan.** See the itemized [procurement plan](#) for the first 18 months. The executing agency will publish the procurement plan in the SEPA, or a system determined by the Bank, and will update it at least every six months or as required by the Bank so that it reflects the actual program execution needs and the progress made.
- 4.7 **Procurement supervision.** Reviews will be conducted ex ante. However, the Bank may also conduct an ex post review (only on approval of the procurement plan specifying the selection modality). The Bank's ex post reviews will cover a sample of contracts based on the technical-professional criterion and will be conducted by Bank staff, consultants, or external auditors. Once use of the country procurement system has been implemented, the arrangements may be updated based on the fiduciary risks.³
- 4.8 **Records and files.** Records and files will be kept in the executing agency's offices under conditions that ensure the documentation's integrity and security.
- 4.9 **Procurement sustainability considerations.** Procurement processes will incorporate (environmental, social, and 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.
- 4.10 Environmental considerations will encourage the use of materials, ecotechnology, and design and construction practices to improve thermal comfort and energy

³ Once the reverse auction and framework agreement systems have been implemented in the operations, as part of the strategy for use of the country system, all procurements will be systemically monitored and supervised by tracking and verifying the stability of Peru's country system.

efficiency, the integration of the natural landscape into heritage infrastructure and equipment, and risk reduction in the various interventions involving façades, sidewalks, and cultural spaces. Procurement processes will also ensure that the introduction of efficient lighting systems is considered for façades, sidewalks, and public spaces, as well as permeable concrete materials for sidewalks and public squares to promote stormwater infiltration and reduce puddling and flooding. 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.

V. FINANCIAL MANAGEMENT AGREEMENTS AND REQUIREMENTS

- 5.1 **Programming and budget.** Program expenditures will have been assessed for viability within the framework of the regulations issued by the Ministry of Economy and Finance (MEF). The National Multiyear Programming and Investment Management System (Invierte.pe) is in effect to streamline the approval of investment projects and make their execution more flexible at all three levels of government. The annual programming and budget will be prepared on the basis of guidelines issued by the MEF Public Budget Division. The multiyear execution plan will be prepared and used to formulate the annual budget, taking account of the program disbursement schedule. 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 SIAF.
- 5.2 **Accounting and information systems** The SIAF project execution module, which provides transparency and specific controls in budget execution, will be used for program accounting and reporting, including disbursement requests, exchange rate control, and other Bank requirements. 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.
- 5.3 **Disbursements and cash flow.** 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, with data being recorded in the SIAF project execution module, as the expenditure is formally processed under the regulatory framework applicable to each of its stages: commitment, obligation, warrant, and payment. The PMU will maintain a specific bank account in United States dollars and another in soles (monetization) to manage the loan proceeds. The possibility of using the Single Treasury Account for loan programs is being analyzed with the MEF. This option could therefore be implemented in the short term.
- 5.4 Disbursements will be made according to the program's actual liquidity needs. The PMU will submit the disbursement request to the Bank, together with a financial plan that will initially project expenditures for up to 180 days. Disbursements will be made when at least 80% of the cumulative total balances has been substantiated using the Bank's forms. Proceeds from the Bank's loan may be disbursed as advances, as reimbursement of expenditures, and as direct payments to suppliers.

- 5.5 The records and documentation supporting the activities and transactions undertaken will be subject to ex post review by external auditors. All documents and records will be kept for at least three years from the date of the last disbursement. Expenditures that are not eligible for the Bank will be reimbursed from the local contribution.
- 5.6 **Internal control and internal audit.** The control environment, communication and information, and the monitoring of executing agency 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)).
- 5.7 **External control and reporting.** Within the role of the CGR (lead agency for the National Control System) and its regulations, external audits of projects are outsourced to firms of independent auditors acceptable to the Bank. These firms are periodically evaluated by the Bank. The CGR authorizes the 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.
- 5.8 Program financial statements include: cash flow statement, cumulative investment statement, notes to the financial statements, and statement by program management (PMU). 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 of the loan.
- 5.9 **Financial supervision plan.** This may be adjusted according to program execution and external audit reports.

Table 1. Supervision plan

Activities	Nature/Scope	Frequency
Financial	Portfolio review with executing agency and the MEF	Two per year
	Presentation of audited financial statements	Annual and final
	Review of disbursement requests and attached reports	Four per year
	PMU inspection visit	Annual

DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK

PROPOSED RESOLUTION DE-___/19

Peru. Loan ____/OC-PE to the Republic of Peru
Comprehensive Storm Drainage Program
in Priority Cities in Peru

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 Comprehensive Storm Drainage Program in Priority Cities in Peru. Such financing will be for the amount of up to US\$100,000,000 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 ____ 20__)