Hydropower Sustainability Standard

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Assessment Report

Project Name: Ituango Hydropower Project, Colombia

Implementation

Project Sponsor: Empresas Públicas de Medellín (EPM)

Report Author: Joerg Hartmann, Margaret Trias, Miles Scott-Brown

Report Date: May 5, 2023

Cover page photo: Ituango reservoir from dam, February 2022

Published by:

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First published in September 2021.
This edition published in May 2022.

The findings in this report are based on an independent assessment conducted in compliance with the processes set out in the Hydropower Sustainability Assurance System.

A. Assessment Details

Project sponsor	Empresas Públicas de Medellín (EPM)
Assessor(s)	Joerg Hartmann (Sustainable Water & Energy LLC), Margaret Trias (M. Trias Consulting Inc.), Miles Scott-Brown (Ciera Group)
Assessment objective	• Certify compliance with the Hydropower Sustainability Standard • Improve public reputation and recognition of the project • Demonstrate alignment with Performance Standards • Engage with civil society organisations
Assessment dates	October 31 – November 11, 2022
Assessment report date	May 5, 2023 (final for public consultation)
Prepared for	Empresas Públicas de Medellín (EPM)
Limitations of the assessment	The Ituango project is a large-scale, dynamic project under construction with multiple contractors and interaction with multiple government agencies and other stakeholders. This report reflects the status quo as of December 2022, after submission of additional evidence by EPM following the on-site assessment. Developments after that date are not covered.

B. Project Details

Project name	Ituango Hydropower Project
Country	Colombia
Location	Cauca River, Department of Antioquia
Purpose	Hydropower generation
Developer / Owner	Sociedad Hidroeléctrica Ituango S.A. E.S.P., also known as Hidroituango, co-owned by the Municipality of Medellín through EPM and the department of Antioquia through the Instituto para El Desarrollo de Antioquia (IDEA), and minority owners. Hidroituango has delegated the implementation and operation of the project to EPM through a 50-year BOOMT contract.
Financer(s)	Corporate funding for EPM's general investment plan, primarily bonds, as well as corporate and project loans including USD 1 billion through IDB Invest (repaid). EPM Group's debt as of March 31, 2022 was COP 25,177 billion, 54 % bonds and 46% loans.
Installed capacity (MW)	2,400 MW
Construction start date (planned or actual)	October 16, 2009 (construction of access roads)
Commercial operations date (planned or actual)	Two first units commissioned in November 2022
Annual average generation (GWh / year)	Planned: 13,930 GWh
Associated infrastructure: road(s) (length)	77.5 km new roads, including 37.9 km access road from Puerto Valdivia; 26.3 km improvement of access road from San Andrés de Cuerquia
Transmission lines and sub-stations (names, lengths and capacities)	Principal 500 kV TL between substation Antioquia and substation Cerromatoso, 112.5 km, owned by ISA – Intercolombia
Total cost (USD m)	COP 18,319 billion (cost approved by EPM board In June 2021, equivalent to USD 6.73 billion at average exchange rate 2011-2021 (calculated from https://data.oecd.org/conversion/exchange-rates.htm), with COP 4,200 billion paid out by insurance companies after contingency
Annual operating costs (USD m)	Average estimate for 2023-2061: USD 31.9 million
Project development cost not including transmission (USD m)	Not available
Transmission costs for project development (USD m)	COP 1,386 billion (data supplied by ISA-Intercolombia), equivalent to USD 519 million at average exchange rate 2011-2021
Specific investment cost (USD m / MW)	USD 6.73 billion / 2,400 MW = USD 2.8 million/MW
Levelised energy cost (USD / kWh)	Not available
Dam type	Rockfill with clay core
Dam height (m)	237 m
Dam length at crest (m)	560 m
Units (number, type, MW)	8 x 300 MW Francis

Reservoir area at Full Supply Level (FSL) (km^2)	35 km^2
Average net head at FSL (m)	197.3 m
Average flow (m^3 / s)	1,000 m^3/s
Design flow (m^3 / s)	1,350 m^3/s (8 units with 168 m^3/s each)
Load factor	66.3 % (own calculation)
Number of physically displaced households	279
Power density (W / m^2)	68.6 (own calculation)
Emissions intensity (gCO_2e / kWh)	4.39 (see section 12)
Contacts / website	https://cu.epm.com.co/institucional/proyectos/hidroituango

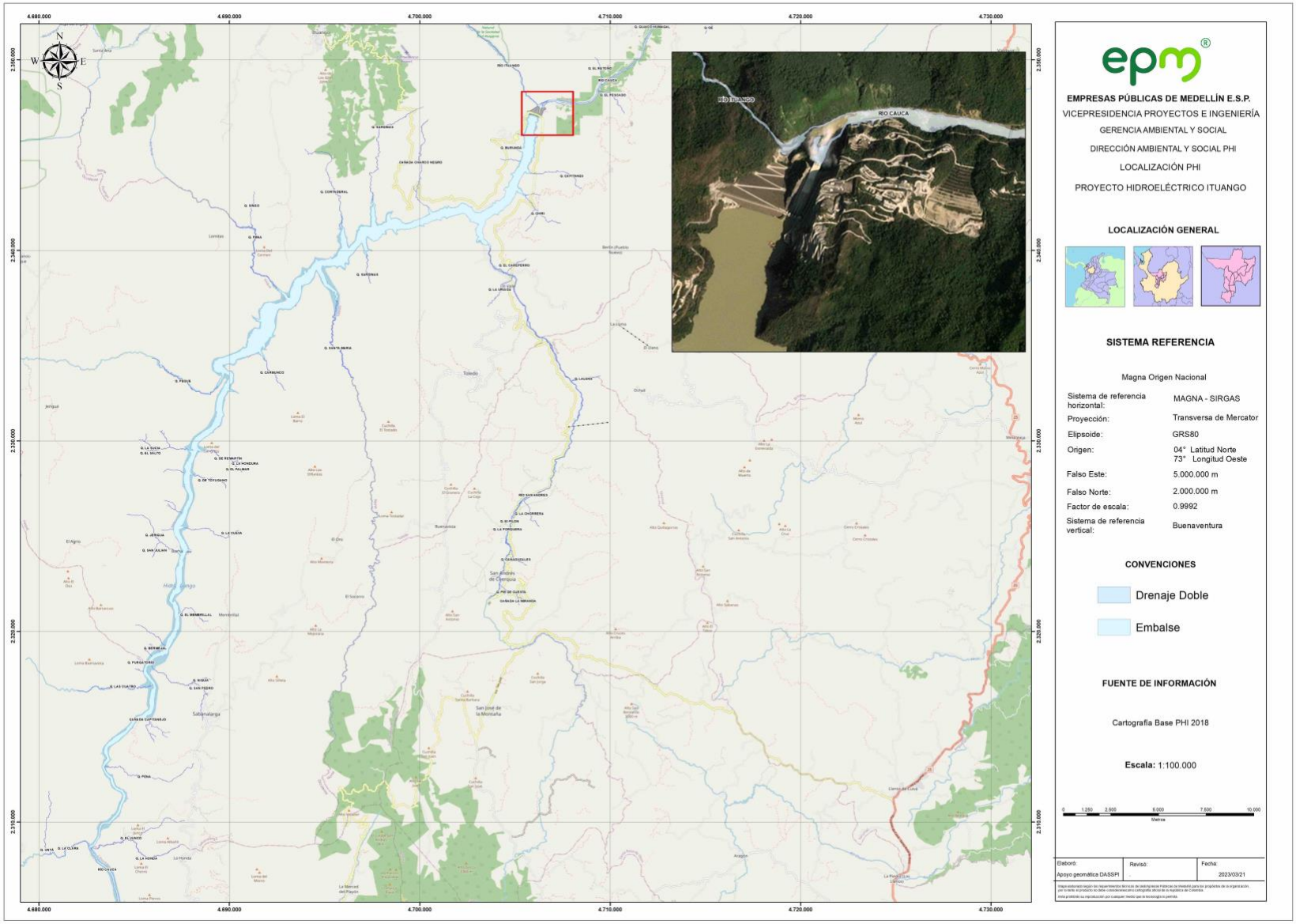
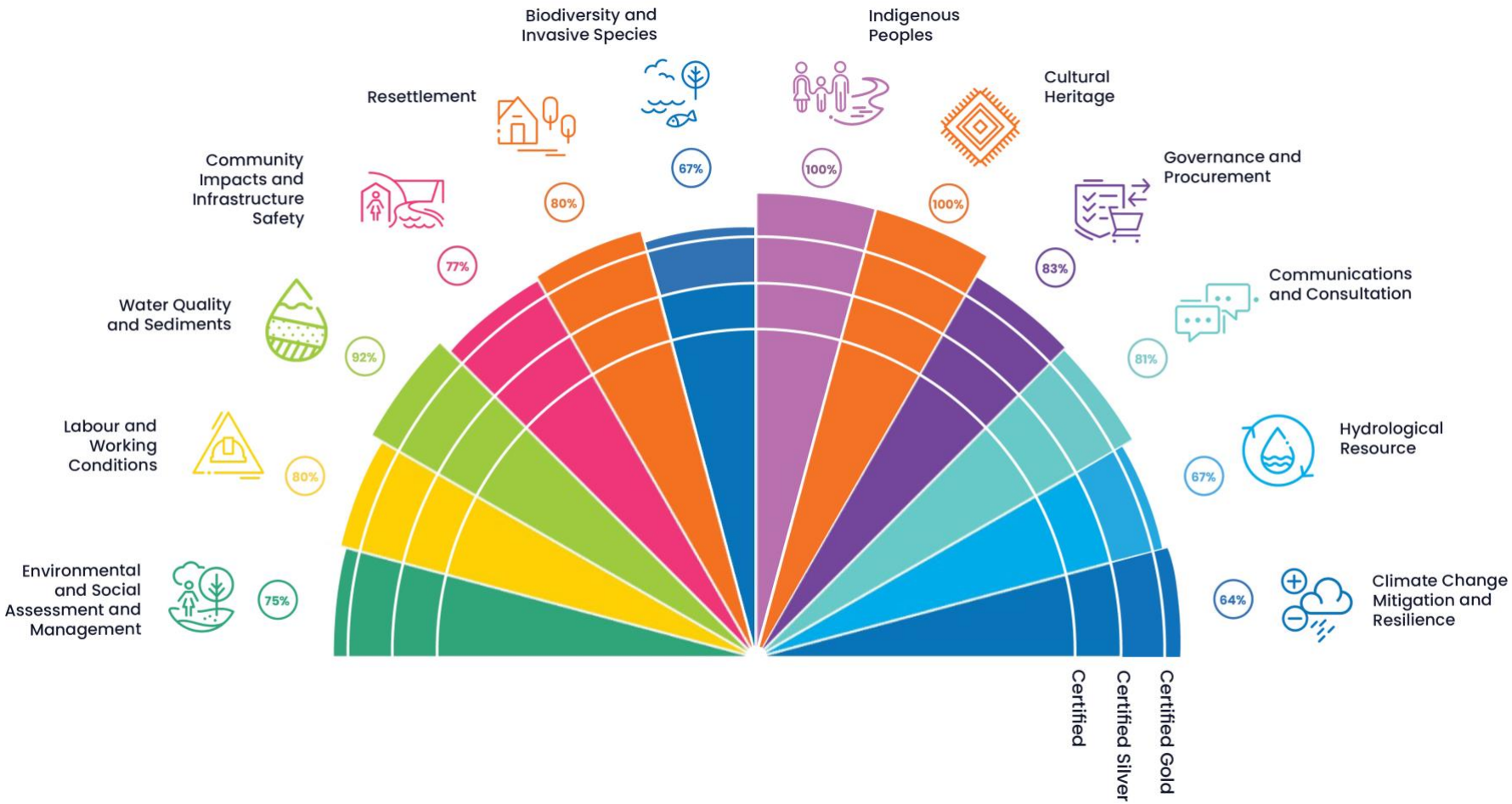


Figure 1 – Map of reservoir and aerial picture of dam site

Implementation

C. Results Diagram



D. Minimum Requirements

There are no significant gaps against the Minimum Requirements.

E. Advanced Requirements

	Topics											
	1. Environmental and Social Assessment and Management	2. Labour and Working Conditions	3. Water Quality and Sediments	4. Community Impacts and Infrastructure Safety	5. Resettlement	6. Biodiversity and Invasive Species	7. Indigenous Peoples	8. Cultural Heritage	9. Governance and Procurement	10. Communications and Consultation	11. Hydrological Resource	12. Climate Change Mitigation and Resilience
TOTAL NUMBER OF REQUIREMENTS	12	5	12	22	5	6	7	6	12	16	9	14
NUMBER OF REQUIREMENTS MET	9	4	11	17	4	4	7	6	10	13	6	9
PERCENTAGE OF REQUIREMENTS MET	75%	80%	92%	77%	80%	67%	100%	100%	83%	81%	67%	64%
PROPOSED CERTIFICATION LEVEL	Gold											

Note:

- A project must meet all Minimum Requirements on all relevant topics to achieve HS Certified label.
- To receive the HS Silver label, projects must meet a minimum of 30% of the Advanced Requirements on each relevant topic.
- To receive the HS Gold label, projects must meet a minimum of 60% of the Advanced Requirements on each relevant topic.

F. Environmental and Social Action Plan (ESAP)

(Not included)

1 Environmental and Social Assessment and Management

Scope and Principle
This section addresses the plans and processes for environmental and social issues management. The principle is that negative environmental and social impacts, including waste, noise and air quality, associated with the hydropower facility are managed; avoidance, minimisation, mitigation, compensation and enhancement measures are implemented; and environmental and social commitments are fulfilled.

Background	
Identify the main environmental and social issues during implementation	Because of the 2018 'contingency' (see section 4), the reservoir filled up prematurely (and has since been kept at a level of approximately 407 masl), and hence many of the issues normally related to reservoir filling and operations already occurred during implementation. Key impacts include typical construction disturbances (in-migration, noise, air and water quality, solid waste); change of land use in the direct footprint of project components, and the resulting displacement of people and loss of habitats; changes to downstream flows including artificial floods and low flows during the contingency, and trapping of sediments; improved infrastructure, employment, economic activity, presence of the state and public order, in the project area. The last point is of particular importance since the area had been a focus of political violence and criminal activities (often related to illegal drug cultivation and trade), with substantial impacts on communities.
Identify the main environmental and social issues during operation	Additional issues during operation will result from more active management of the reservoir, and the accumulation of impacts over time (e.g. regarding geomorphological changes). There will also be a substantial drop-off in economic activity in the area, for example with the termination of contracts for 1,800 workers from the area of influence, at the time of the on-site assessment, which needs to be well managed to avoid a return to the pre-project insecurity.
Identify the environmental regulator	The environmental licence was granted in 2009 by the Ministry of Environment, Housing and Territorial Development. Since its creation in 2011, the licence was supervised by the environmental licensing agency (*Autoridad Nacional de Licencias Ambientales,* ANLA). It has been modified 32 times. ANLA Resolution 820 in 2018 after the so-called 'contingency' restricted the project to activities required to reduce the risks associated with the contingency. The project is also subject to other permits and requirements, including from the regional environmental agencies (*Corporaciones Autónomas Regionales),* principally Corantioquia which has jurisdiction for 11 of the 12 municipalities of the project's area of influence.
Identify other regulators (e.g. on land, water use, Indigenous Peoples)	Regulators for specific issues such as Indigenous People and Cultural Heritage are listed under the respective sections.
Summarise the ESIA regulatory requirements	Licenses in Colombia are generally subject to the approval of 1) an environmental analysis of alternatives (from which the Ituango project was exempted) and 2) submission of an ESIA, following official Terms of

	Reference (ToR) and containing environmental management plans (PMA) and environmental supervision and monitoring plans (PMS). ANLA supervises the project through inspections and regular reporting, and has issued many additional requirements, principally for information. In 2018 ANLA required the project to focus on resolving the emergency. This, however, did not entail major changes as it involves finishing construction and putting the project into operation, which is the only way to safely operate the reservoir and reduce risks for downstream communities and ecosystems.
Volume of material needed for construction	The largest volume by far was required for construction of the dam (20 million m^3).
Other relevant information	The project is located on the Cauca River, the main tributary to the Magdalena River, in a dry tropical forest zone with low population density, in a remote part of the country with no roads along the river and few settlements on either side of the reservoir.

Minimum Requirements			**Advanced Requirements**		
Requirement is met: yes (✓) or no (✗)		**Findings and Observations**	**Requirement is met: yes (✓) or no (✗)**		**Findings and Observations**
Assessment					
Environmental and social issues have been identified through an assessment process:			Monitoring of environmental and social issues during project implementation takes into account inter-relationships amongst issues, and both risks and opportunities that become evident during implementation	✓	Monitoring was significantly expanded after the 2018 emergency, both spatially into the downstream areas, and thematically. Many parameters are monitored in real time and through remote sensing, particularly those related to safety. There is an exceptionally well-equipped monitoring centre at the EPM camp which is also replicated at the EPM headquarters in Medellín. The monitoring program is now very broad and thorough, so much so that some of it (e.g. the internal reporting between the supervision consultants and EPM, where monthly reports can run over 1,500 pages) and monitoring required by the environmental regulators (e.g. for water quality)
• relevant to project implementation	✓	An ESIA was submitted in 2007 and an updated version (both in terms of methodology and in terms of scope, as it included the road between the project and Puerto Valdivia) was submitted in 2011. Additional assessments of impacts were undertaken during implementation as new issues were identified, especially with regards to downstream issues which came into focus during and after the 2018 emergency.			
• relevant to project operation	✓	The 2007 and 2011 ESIAs covered both the implementation and the operation phase.			
Assessments address:					
• evaluation of associated facilities	✓	Transmission lines were not included in the Ituango project ESIAs but are			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
		under separate ownership and subject to separate ESIAs and licensing. Access and construction roads were included, also the additional 38km access road from Puerto Valdivia that has suffered from instabilities and has not been taken into full operation. Borrow areas, spoil deposit and laydown areas, camps etc. were included.			appears redundant and not cost-effective.
• scoping of cumulative impacts	✓	Cumulative impacts were first scoped in the ESIAs and later explored through a 2016 study that looked at the combination with the planned hydropower projects Cañafisto (upstream) and Espiritu Santo (downstream). In 2022, an internal study was conducted that considered downstream cumulative impacts with Espiritu Santo as well as mining, agriculture, cattle ranching and fishing activities, concluding that Ituango's contribution is moderately positive for water quality, strongly negative impact for fluvial geomorphology, and moderately negative for fish. This analysis may also become useful in engaging more closely with other sectors and shaping their plans.			
• role and capacity of third parties	✓	EPM has many years of experience with the environmental regulators (ANLA and the regional authorities). The regulators also have significant			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
		experience with hydropower and have followed the project closely since the beginning of construction.			
• impacts associated with primary suppliers	✓	Impacts associated with primary suppliers are not covered in the ESIAs. However, this gap is not considered significant since 1) almost all of the rockfill material for the dam originated directly from the excavation of caverns and spillway, 2) the borrow area for the impermeable core, located ~5km from the dam, is operated directly by the project and was included in the impact assessment and license, 3) key suppliers such as those for electro-mechanical equipment are selected and contracted with sustainability requirements (see section 9).			
Waste, noise and air quality issues have been identified through an assessment process:			Monitoring of waste, noise and air quality issues during project implementation takes into account inter-relationships amongst issues, and both risks and opportunities that become evident during implementation	✓	As described above, monitoring is done internally by contractors, by the *Interventoria* (the consulting firm contracted by EPM to supervise the contractors), by EPM directly, and periodically by the environmental authorities. The extension of the construction period also extended the time during which noise and air emissions, as well as solid waste were generated. This led to the filling of the project landfill for general waste (which had originally been designed to receive all general waste generated
• relevant to project implementation	✓	Waste, noise and air quality issues were covered in the ESIAs and have been continuously monitored. Because construction sites are not located close to communities, and much of construction is underground, noise and air pollution are largely confined to construction traffic (see section 4) and to impacts on workers (see section 2).			
• relevant to project operation	✓	The minor issues relevant for operations, were included in the ESIA.			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
The assessments utilised appropriate expertise for:					during construction and operation). The selection of a new landfill began in 2022. On a much larger scale, solutions for separating and disposing construction waste have been found; the volume of such waste expanded significantly after the 2018 emergency and will expand again during demobilisation of contractors.
• environmental and social issues	✓	The assessments were done through experienced Colombian firms with quality control through EPM, government authorities, the Inter-American Development Bank (IDB) which supported EPM through a technical cooperation program, and international experts. IDB-supported studies covered, for example, modelling of water quality and baseline for terrestrial flora and fauna. Additional expertise was brought in as needed after the original assessments, for example through contracts with universities and government research institutes.			
• waste, noise and air quality	✓	Appropriate expertise was utilised.			
Monitoring is being undertaken during the project implementation stage appropriate to the following identified issues:					
• environmental and social issues	✓	There is an extensive environmental and social monitoring program. The project submits detailed half-yearly reports (*Informe de Cumplimiento Ambiental*, ICA), compiled from contributions of contractors and own staff, to the environmental authorities. There are frequent communications with and supervision visits from ANLA. While the loan with IDB Invest was active, there was also			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
		an independent monitoring arrangement and reporting to the IDB.			
• waste, noise and air quality	✓	There is an extensive monitoring program for waste, noise and air quality issues. For example, the main general waste landfill which is now closed, is monitored for slope stability, gas emissions, runoff water quality, etc.; and waste generation, separation and transport is through licenced and closely supervised firms. Where construction traffic passes nearby communities, noise and air quality are monitored more intensely.			
Management					
Processes are in place to ensure management of identified environmental and social issues	✓	Total professional, full-time staff dedicated to E&S management at the time of the on-site assessment was 171. The project has a large and well-qualified E&S unit with approximately 100 EPM staff, as well as approximately 70 E&S staff working for the different contractors, 24 contractors (including several universities) employed on the different E&S programs, and additionally, contracts with village-level organizations (*juntas de acción comunal*). There are multiple sub-plans and programs that are required under the license (PMAs, with additional ones added since the contingency), as well as significant	Processes are in place to anticipate and respond to emerging risks and opportunities	✘	As described under Minimum Requirements, there are systematic processes for most E&S issues, starting from an assessment of potential impacts, identification of mitigation measures, monitoring of the effectiveness of these measures and any residual impacts, and adaptive management. A number of additional issues were added after the initial assessment, licensing, and E&S plans. These were in response to new concerns or insights (e.g. additional studies on the Puerto Valdivia road, cumulative impacts, or fish), requirements from lenders and regulators, and/or to new

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
		additional voluntary programs, including benefit sharing (see section 4). All contractors are also required to have site-level environmental implementation plans (PIMMAs) and their own staff. The total spending on E&S issues since the beginning of construction up to and including the 1st semester 2022 was approximately COP 1,381 billion (USD 508 million at the average exchange rate 2011-2021, see Section B), which is equivalent to approximately 7% of total project costs. About 20% of this spending was voluntary, and 9% was in response to the contingency; the rest were commitments and requirements under the originally approved management plans. There are well-defined processes for E&S management, E&S-related communications, supervision and compliance, E&S requirements for contractors, construction risk management processes that include E&S implications, periodic reviews and action plans for continuous improvement, etc.			impacts that arose because of the contingency. There is also a formal process to identify and address new E&S issues. However there are some limitations regarding the ability of the project to anticipate and address E&S issues downstream of the formal 'area of influence'. This area was defined narrowly and based on administrative boundaries of municipalities in the 2007 and 2011 ESIAs and the corresponding licenses and license modifications. Although subsequently many additional studies and E&S programs were implemented further downstream, they are not based on a comprehensive and systematic sequence of impact assessment and management. The project monitoring plan (PMS) only made a general statement, for example, that downstream geomorphological changes would be analysed and corrective actions determined. Many downstream measures were ad hoc, often responding to the immediate needs after the contingency. There are no license conditions and no formal commitments for some of these longer-term and long-distance downstream effects (e.g. those related to geomorphological changes
Processes utilised appropriate expertise (internal and external)	✓	EPM as an organization has a long experience with hydropower and a large pool of internal expertise, and together with its lenders and			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
		regulators has also made extensive use of external expertise through multiple mechanisms, such as panels of experts.			and their ecological and social implications). These limitations of the scope of E&S management are a **significant gap** against advanced requirements. It is understood that a revision of the ESIA and ESMP would have resulted in additional modifications of the license and other formal requirements; however that is not a sufficient reason to maintain an ad hoc approach to downstream management.
Processes are in place to meet environmental and social commitments relevant to project implementation stage	✓	The above-mentioned processes also apply to voluntary commitments by EPM.			
Processes are in place to ensure management of identified waste, noise and air quality, and to meet commitments, relevant to project implementation stage	✓	Waste, noise and air management processes are in place through the environmental management plans of the project and for each contractor. Noise and air pollution are not a major concern, but significantly more waste was generated than predicted, as result of the longer construction period and, more importantly, because large quantities of debris from the contingency are being separated and disposed of (98% of waste is in this 'special waste' category). Dust from construction traffic has been managed with frequent watering of roads and in the sections with the most intense traffic, with a 4.5 km sprinkler system.			
Plans are in place for the operation stage for ongoing environmental and social issues management	✓	Some of the PMA plans will extend into the operations stage. Some plans are in the process of being modified (e.g. for general waste disposal) or are under development (e.g. for reservoir management, see section 11).	Plans and processes are embedded within an internationally recognised environmental management system which is third party verified, such as ISO 14001	✘	While EPM and its main contractors have been certified against a number of ISO standards over the years and in different business areas, the only entity currently engaged in the Ituango project with an ISO 14001

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		**Findings and Observations**	**Requirement is met: yes (✓) or no (✗)**		**Findings and Observations**
The environmental and social impact assessment and key associated management plans are publicly disclosed	✓	The ESIAs, the licence and its modifications, and a significant number of additional studies, plans and reports are available through the EPM website and other sources (see also sections 9, 10).			certificate is Ingetec (*interventoria*). The lack of an externally verified ESMS is a **significant gap** against advanced requirements.
Plans are in place for the operation stage for ongoing waste management	✓	See above. A new general waste landfill is being identified, most likely an extension and improvement of the municipality of Ituango's landfill, which would benefit both the municipality and the project.			
Conformance and Compliance					
Processes and objectives to manage each of the following have been and are on track to be met:			There are no non-compliances relating to:		
• environmental and social management, with no major non-compliances	✓	The environmental authorities have issued a total of 2,965 license conditions, 170 conditions associated with other permits, and 966 conditions from the contingency resolution No. 820. Most of them refer to monitoring and reporting requirements. Additional conditions were associated with funding, in particular from IDB Invest. No major current non-compliances have been identified. A MICI (Independent Consultation and Investigation Mechanism) investigation on IDB Invest's own correct application of its E&S safeguards and operational policies in the project is ongoing.	• environmental and social management	✗	The number of conditions applied to the project is unprecedented. ANLA has notified a significant number of conditions that are not yet met and non-compliances, some of which have fines attached if they lead to substantial E&S impacts, and there is a systematic process to resolve these. Most of these are not considered non-compliances by the assessment team, because 1) many simply remain open because they refer to longer-term obligations (e.g. periodic reporting), 2) some ANLA requirements are formalities with no E&S benefits (e.g. a requirement to use a different,

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
• environmental and social management, with no major non-conformances	✓	No major current non-conformances with EPM's own corporate policies and voluntary initiatives have been identified.			equally effective foundation material for a temporary waste disposal site) or counter-productive (e.g. a requirement to transport treated drinking water over long distances, to irrigate plants in the reforestation program, instead of simply using water from the reservoir), 3) some appear to be related to confusion over what is allowed under Resolution 820, such as processing of new permits, 4) most substantial issues are being contested by EPM and have not yet been resolved through administrative or legal procedures. ANLA argues that there are processes through which EPM could have avoided these issues (e.g. apply earlier for permit to take water from reservoir). However, it would have been reasonable of EPM to assume that once a reforestation program in a dry forest zone is authorized, that includes permission to irrigate the plants, if there is an abundant water source directly next to it. EPM also argues that once the detailed watering requirements were known, they unsuccessfully tried to obtain a permit. In general, there is an impression that ANLA is trying to micro-manage the project, imposing unnecessary costs, while some

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
					important issues e.g. relating to geomorphological impacts outside the 'official' area of influence are under-attended. However, there is one area of non-compliances that still has substantial E&S repercussions and is not contested, namely the contingency that led to the unanticipated filling of the reservoir as well as the interruption of flows and later, flooding downstream, associated with evacuations and damages. There are also non-compliances with relatively minor environmental impacts, and some related to the late submission of reports to the authorities. (While these are unnecessary, they are also partially understandable given the exceptional reporting requirements.) These non-compliances are a **significant gap** against advanced requirements.
• waste, noise and air quality, with no major non-compliances	✓	No major current non-compliances have been identified.	• waste, noise and air quality	✓	No current non-compliances have been identified specific for this topic. See above for a general discussion of non-compliances being resolved with ANLA.
• waste, noise and air quality, with no major non-conformances	✓	No major current non-conformances have been identified.			
Environmental and social commitments have been or are on track to be met	✓	There are no indications otherwise.	There are no non-conformances relating to:		

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
Environmental and social funding commitments have been or are on track to be met	✓	There are no indications otherwise.	• environmental and social management	✓	No current non-conformances have been identified.
Any waste, noise and air quality-related commitments have been or are on track to be met	✓	There are no indications otherwise.	• waste, noise and air quality	✓	No current non-conformances have been identified.
Outcomes					
Negative environmental and social impacts of the project are avoided, minimised and mitigated	✓	All substantial impacts have been addressed through E&S programs.	Negative environmental and social impacts are avoided, minimised, mitigated and compensated	✓	There are a number of examples where impacts have not just been addressed but compensated, and overall positive net gains achieved. Some of these are simply a result of new infrastructure required for the project (e.g. improvement of water quality as a result of retention in reservoir; shortening of travel time for communities because of improved roads), others the result of dedicated compensation efforts (e.g. investment in dry forest protection).
The project or the corporate entity to which it belongs can pay for social and environmental plans and commitments	✓	Despite the increase in project costs by about 60% as a result of the contingency, EPM has been able to maintain and increase the E&S efforts.	Enhancements to pre-project environmental or social conditions or contributions to addressing issues beyond those impacts caused by the project are achieved or are on track to be achieved	✓	The project is investing significant amounts of funds in improvements of conditions in the affected areas (e.g. voluntary funding of COP 185 billion for roads, schools, productive projects etc.; extraction of solid waste and debris from reservoir).

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
Negative noise and air quality impacts arising from project activities are avoided, minimised and mitigated	✓	All substantial impacts have been addressed through E&S programs.	Negative noise and air quality impacts arising from project activities are avoided, minimised, mitigated and compensated	✓	Noise and air pollution have been handled responsibly, with only minor impacts on communities (e.g. by building a bypass road to avoid routing traffic through the town on San Andrés de Cuerquia).
Project wastes are managed responsibly	✓	The project is setting an example in the region regarding responsible waste separation, disposal and re-use. For a period, the closure of the main general waste landfill required additional traffic for transport to a landfill near Medellin, but this is now on track to be resolved.	The project contributes to addressing waste management issues beyond those impacts caused by the project	✓	The new general waste landfill will likely be shared with the municipality of Ituango, and will see a significant modernization compared to current conditions.

List of significant gaps against **Minimum Requirements**	Number of **Advanced Requirements** met
None	9

Summary of findings and other notable issues
The Ituango project includes one of the largest commitments ever for a hydropower project, in terms of human resources engaged and of spending on environmental and social management. In addition to a budget of USD 508 million during construction up to the time of the on-site assessment, the project will transfer 6% of its revenues over its lifetime to municipalities and environmental authorities. While the ESMS is not externally certified, most of the E&S processes and plans are well designed and implemented, and there is very close supervision by the national environmental regulator ANLA. There are some gaps related to the scope of the original ESIAs and ESMPs, and to the contingency in 2018.

Relevant evidence	
Interview	2, 5, 11, 17, 20, 21, 28, 32, 41, 42, 54, 59, 68, 70
Document	1-3, 5-15, 32, 33, 35-55, 58-62, 75-77, 142, 219, 224, 242, 246, 256-257, 263, 269-271
Photo	1, 9, 18, 29, 45-48, 51, 65, 109, 111, 124

2 Labour and Working Conditions

Scope and Principle
This section addresses labour and working conditions, including employee and contractor opportunity, equity, diversity, health and safety. The principle is that workers are treated fairly and protected.

Background	
Labour requirements during implementation (full-time equivalent)	The labour peak during construction of the project was 11,204 workers in 2017, of which 2,620 were from the project zone of influence. CCC, the prime contractor for the project, had 5,600 workers at peak. As a result of the contingency event in 2018, employment first declined to 5,686 and then reached a second peak of 8,109 workers in 2021.
Labour requirements during operation (full-time equivalent)	100-200 workers (source IDB).
Applicable key human resources regulations	Labour law in Colombia is governed by the Constitution and the Labour Code (1951) (Código Sustantivo del Trabajo) which sets employment terms and conditions including hours of work, wages, holidays and rest period, overtime, working conditions and employment relationships. The Labour Code has been modified by other laws including Law 2101 of 2021, Decree 2011 of 2017, Law 1846 of 2017, Law 1822 of 2017, Decree 2943 of 2013, Decree 1406 of 1999 and Law 50 of 1990.
Applicable key occupational health and safety (OH&S) regulations	The Labour Code contains a number of occupational health and safety provisions. The key legislation is composed by the Law No. 9 of 24 January 1979 that establishes health and safety measures, followed by the Decree No. 614 of 14 March 1984 on the organization and management of occupational health/safety. Decree No. 16 of 1997 regulates the integration and functioning of a network of health and safety committees while Decree 1395 of 1994 develops standards for the prevention of worker accidents and work-related disease.
Identify the regulator for labour law and OH&S	Ministry of Labour
Other relevant information	EPM has two types of employees, those on an indefinite contract of which currently there are 1,000 employees and those on a fixed term contract of which there are currently 8,230 employees. EPM has 5 labour unions of which SINPRO (professionals, 3,500 members) and SINTRA (technicians, 3,000 members) are the largest two. EPM has made commitments to support SDGs 5 – Gender, 8-Decent Work and Economic Growth and 10 – Reduction of inequalities.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		**Findings and Observations**	**Requirement is met: yes (✓) or no (✗)**		**Findings and Observations**
Assessment					
Human resources and labour management requirements have been identified through an assessment process	✓	EPM has employment policies in place both internally (corporate) and within the area of influence of the project. Assessment of human resources in EPM is based on an ongoing assessment of workforce needs, skills, opportunities to improve the quality of the workplace, and promoting socially responsible behaviours.	The assessment takes broad considerations into account, and both risks and opportunities	✓	EPM has a number of measures to assess labour conditions, health and safety and workplace quality of life. Through the SG-SST Occupational Health Management System, workers are assessed for psychosocial risk and mental health in the workplace. In 2021, an internal audit of the Occupational Safety and Health Management System (SG-SST) obtained a score of 100% in the evaluation of the minimum standards established in Resolution 0312 of 2019 of the Ministry of Labour of Colombia. EPM also has the *"Contigo"* program, which in 2021, surveyed over 6,400 employees in 162 town-hall events on mental health, bereavement support, work life balance, family relationships and quality of life values. 96% of the participants expressed their satisfaction with the program. Through Guideline 42, EPM has established a model for managing labour and union relations relating to the right of association and collective bargaining.
The assessment included occupational health and safety issues and risks	✓	EPM has a well-developed process for implementation of an OHS management system (SG-SST) for the project and all contractors. The SG-SST is led by senior management and involves the active participation of employees to ensure the application of safe work procedures and the effective control of risks and hazards in the workplace. EPM and its contractors have significant experience with hydropower project construction and operation and understanding of related OH&S issues and risks.			
Processes are in place to identify any emerging or ongoing issues	✓	Through implementation both of comprehensive labour and employment policies and OHS management measures, EPM takes a proactive approach to managing labour and OHS risks.			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
		This is manifested through EPMs Comprehensive Risk Management (CRM) program to manage business risks and ensuring compliance with business purpose and strategies and meeting legal compliance requirements.			
Processes are in place to monitor if management measures are effective	✓	EPM conducts internal audits of their OHS management system. In 2020 the response to COVID-19 prevention, control and mitigation measures was also audited. As of June 1, 2017, all EPM suppliers and contractors must submit reporting of the percentage of implementation of their OHS Management System in their respective companies.			
Management					
Human resource and labour management policies, plans and processes are in place that address all labour management planning components	✓	EPM has a suite of human resource and labour management policies, plans and processes in place both at the corporate and project level. Examples include local recruitment, gender and inclusion, grievance mechanisms, worker code of conduct.	Processes are in place to anticipate and respond to emerging risks and opportunities	✘	EPM has a Human Talent Policy (November 2020, Directive #1698) which is based on ethics, principles, and values of the EPM Group and aims to build a diverse and inclusive work culture that respects all ideas, gender, disabilities, sexual preference, political views etc. The policy is aligned with a 2019 corporate objective – "to contribute to the harmony of life for a better world". In 2020, Guideline 2020-LINGG-59 was implemented whereby EPM is
Human resource and labour management policies, plans and processes of contractors, subcontractors and intermediaries are in place	✓	EPM requires its contractors to comply with national labour and working conditions law including contributions to social security, implementation of an OHS Management System, identification of			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
		OHS risks and periodic reporting on OHS performance in the workplace. EPM applies a code of conduct to promote corporate social responsibility, human rights, labour standards and working conditions, environmental quality, anti-corruption practices and sustainability measures to all suppliers and contractors. Contractors are required to develop and implement their own Occupational Health and Safety Management System (SG-SST) aligned with the EPM OHS (SG-SST) and in accordance with Ministry of Labour requirements.			committed to promote safe, healthy and violence-free work environments, which include measures to prevent, address, punish and eradicate labour and sexual harassment At the project level, EPM has put in place a local employment policy for labour needs within 12 municipalities in the project area of influence during construction. Employment percentages were established for each municipality based on a scoring system. In response to work challenges brought about by COVID-19, since 2020, EPM has supported teleworking with 1,232 participants in 2021 corresponding to 14.71% of the workforce. EPM is committed to improving gender equality in the workplace. In 2022 it was awarded the Equipares Labor Equity Seal, Silver level, by the Ministry of labour and UNDP in recognition of its efforts to improve gender equality. As construction of the project comes to an end, EPM has initiated a voluntary labour transition program called Minka to offer employment alternatives and to create opportunities for the reincorporation

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
					of the construction workforce. Minka incorporates a number of activities including worker communication programs regarding workforce downsizing, psychosocial support, talent development and reskilling/training, promotion of regional economic activities and capacity building and strengthening of regional community organizations. Project activities are spread over a large area which is difficult to fully supervise and which has traditionally been subject to violent conflict and criminal activities (which may increase again as employment in the project declines). Anecdotal evidence shows that some workers have been affected (e.g. a bus with workers was shot at) and that in remote areas, some workers do not behave responsibly (e.g. disabling speed monitors in vehicles, community workers not wearing PPE). The resulting risks for worker safety and security are a **significant gap** against advanced requirements; while there are some processes in place it is not clear whether they are sufficient to effectively respond to these residual risks.
Conformance and Compliance					

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		**Findings and Observations**	**Requirement is met: yes (✓) or no (✗)**		**Findings and Observations**
Processes and objectives relating to human resource and labour management have been and are on track to be met with:			There are no non-compliances	✓	No current non-compliances have been identified specific for this topic. See section 1 for a general discussion of non-compliances being resolved with ANLA.
• no major non-compliances	✓	No major non-compliances have been identified.			
• no major non-conformances	✓	No major non-conformances have been identified.	There are no non-conformances	✓	No non-conformances have been identified.
Any labour related commitments have been or are on track to be met	✓	All labour related commitments are on track to be met such as Guideline 2020-LINGG-59 committing EPM to promote a safe, healthy and violence-free work environment.			
Outcomes					
There are no identified inconsistencies of labour management policies, plans and practices with internationally recognised labour rights	✓	There are no identified inconsistencies.	Labour management policies, plans and practices are demonstrated to be consistent with internationally recognised labour rights	✓	EPM is committed to the labour practices and standards defined in the ILO conventions and complies with the labour regulations of each country where it operates. Responsibilities are assigned to specific departments to develop measures to manage labour and union relations within the EPM Group in compliance with labour legislation. Since 2012 EPM has had a Human Rights Policy to comply with the Universal Charter of Human Rights, international humanitarian law, the Colombian constitution and its associated legal framework. This was updated in Guideline 2020-LINGG-59 whereby EPM is committed to promote safe, healthy, and violence-

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
					free work environments, which include measures to prevent, address, punish and eradicate labour and sexual harassment. Living and accommodation conditions at EPM and Contractor camps are of consistent high standards in regard to provision of heating/cooling, drinking water, waste management, bathing and sanitation, kitchen, dining and food security, emergency response and first aid and recreational facilities. Workplace safety statistics have been recorded since 2011. A peak in accidents occurred in 2013 (412) and again in 2017 (498) and have declined since then. In 2022, the workplace LTI was 0.107 with a total of 153 reported accidents. At the end of 2021, over 91% of EPM employees were vaccinated against COVID-19. EPM is a recognized place of employee satisfaction. It is the seventh most attractive company to work for in Colombia. Over the last 12 years, EPM has been in the top 10 ranking for employee satisfaction and occupies first place in companies offering public utility services. Consideration and respect of human rights also extends to all EPM suppliers. EPM is preparing a guide on

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
					human rights for SMEs identified in the supply chain.

List of significant gaps against **Minimum Requirements**	Number of **Advanced Requirements** met
None	4

Summary of findings and other notable issues
The EPM Group is committed to a diverse, inclusive, health, safe and violence-free workplace both in its corporate headquarters and at their project facilities, including the Ituango project. The company has implemented a comprehensive Occupational Health and Safety Management System (SG-SST) for both its workers and contractors in accordance with the Colombian Ministry of Labour requirements. The project region presents some challenges with regards to illegal activities and a lack of a safety culture among some workers. EPM has a strong commitment towards recognition of human rights in the workplace, and this extends to its contractors and suppliers.

Relevant evidence	
Interview	1, 3, 4, 16, 26, 55, 58, 59, 73
Document	15, 16, 18, 78 – 141, 272, 292 – 294
Photo	49-58, 60-77

3 Water Quality and Sediments

Scope and Principle
This section addresses the management of water quality, erosion and sedimentation issues associated with the project. The principle is that water quality in the vicinity of the project is not adversely impacted by project activities, that erosion and sedimentation caused by the project are managed responsibly and do not present problems with respect to other social, environmental and economic objectives, and that commitments to address water quality, erosion and sedimentation issues are fulfilled.

Background	
Water Quality	
Description of water quality	The Cauca River originates in southwestern Colombia near the city of Popayán and flows northward between the Occidental and Central cordilleras of the Colombian Andes for 965 km, until joining the Magdalena River near to the municipality of Pinillos in the Bolivar Department. As Colombia's second-largest river, it traverses a total length of 1,350 km from its origin to the sea mouth crossing 9 of Colombia's 32 departments. Its catchment provides drinking water to approximately 10 million Colombians. Water quality in the Cauca River is severely degraded as a result of human activities and lack of domestic and industrial wastewater treatment.
Key water quality issues	Low levels of dissolved oxygen, and high levels of turbidity, suspended solids, heavy metals and nutrient loads.
Main influences on water quality	As a result of intensive anthropic activity upstream of the project, water quality in the Cauca River watershed is impacted significantly by inadequate treatment of domestic wastewater effluent, agricultural and livestock inputs, mining, and industrial discharges. The project improves water quality within the reservoir due to retention time and removal of pollutants such as heavy metals and nutrients by water hyacinth (*buchón*); however, for the same reasons listed above, water quality is again degraded downstream of the project throughout the lower reaches of the Cauca River to its confluence with the Magdalena River.
Sedimentology	
Key sediment issues	The project will have an impact on the sediment transport dynamics of the Cauca River, generating sediment deposition at the tail of the reservoir, and erosion and degradation of the riverbed downstream of the dam location, due to the retention of sediment in the reservoir.
Sediment load (tonnes/year)	46.1 million tonnes/year
Catchment area at the dam	37,820 km^2

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		**Findings and Observations**	**Requirement is met: yes (✓) or no (✗)**		**Findings and Observations**
Assessment					
The following issues have been identified through an assessment process:			Monitoring of water quality issues during project implementation into account inter-relationships amongst issues, and both risks and opportunities that become evident during implementation	✓	The project has undertaken and continues to undertake extensive monitoring of water quality in the reservoir area and downstream of the dam. This includes monitoring of water quality in the reservoir, tributaries, and both industrial and domestic effluents that are discharged to the reservoir. To June 2022 the water quality program has collected 9,550 water samples including surface water samples (to 3m) and those taken at numerous depth profiles, specialized sampling of phytoplankton, blue green algae, fish, macrophytes and sediment. Sampling data indicates that water quality in the reservoir, notably dissolved oxygen, is improved across the entire reservoir depth (compared to the quality of inflowing water) and that dissolved oxygen levels continue to improve following discharge over the spillway downstream to Taraza, after which water quality once again deteriorates due to lack of sanitary treatment, agricultural inputs, illegal mining activities and contribution of similarly contaminated water sources from tributaries.
• water quality issues relevant to project implementation	✓	The project environmental and social impact assessment (ESIA) identified mitigation measures for contamination of surface and groundwater sources due to the project. A requirement of the EIA was to develop a monitoring program for water quality.			
• water quality issues relevant to project operation	✓	The project ESIA identified mitigation and management of water quality issues during operations.			
• erosion and sedimentation issues relevant to project implementation	✓	The project ESIA identified impacts to erosion and sedimentation processes.			
• erosion and sedimentation issues relevant to project operation	✓	A requirement of the ESIA was to develop a monitoring program to measure downstream sediment quality. Additionally, there is monitoring of trapping of sediments in the reservoir, erosion downstream, and unstable slopes around the reservoir and along roads, particularly along the Puerto Valdivia Road.			
The above processes utilised appropriate expertise for:					
• water quality	✓	Qualified EPM staff (35 professionals) undertake water quality measurements applying techniques following best international practice.			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
		Qualified and accredited laboratories are used for analysis.			EPM has also conducted extensive studies of inflow/outflow and sediment transport mechanisms of downstream *cienaga* (wetland) complexes between Caucasia and Nechi providing new information on their current state and threats to their ecological status.
• erosion and sedimentation	✓	Qualified EPM staff undertake sediment quality measurements and techniques following best international practice. Qualified and accredited laboratories are used for analysis. Downstream bathymetry and hydro-sedimentological surveys are also ongoing.	Monitoring of erosion and sedimentation issues during project implementation takes into account inter-relationships amongst issues, and both risks and opportunities that become evident during implementation	✓	EPM conducts extensive monitoring of slope instability at 67 sites in the reservoir. Some of this monitoring is done is done in real time at the Technical Monitoring Center (*Centro de Monitoreo Técnico*, CMT at the EPM camp.
Monitoring is being undertaken during the project implementation stage appropriate to the following identified issues:					
• water quality	✓	The project monitoring and follow up plan states water quality monitoring of industrial and domestic wastewater discharges are to be monitored monthly during implementation. Monitoring of surface water quality is done at 5 points in the reservoir, 8 tributaries to the reservoir and at 7 points downstream. Monitoring is conducted in the first 15 days of each month and a report submitted to ANLA one month after.			
• erosion and sedimentation	✓	The monitoring and follow up plan states that downstream monitoring of geomorphological change is required			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
		over a 180 km distance from the dam site to Margento using satellite imagery or photogrammetry at a 1:10,00 scale during the first 10 years of operation and every 5 years after.			
Management					
Processes are in place to ensure management of identified water quality issues, and to meet commitments, relevant to the project implementation stage	✓	The Ituango project is applying standard water quality protection practices during construction such as sediment traps, oil-water separation, landfill covering, and camp wastewater treatment. As described above the water quality monitoring program is to be continued monthly until the first two years of operations and annually after that. The established water quality monitoring network is sufficient to monitor and comply with license requirements for monitoring domestic and industrial discharges and to meet water quality monitoring requirements of the PMA/PMS upstream, in the reservoir and areas downstream.	Processes are in place to anticipate and respond to emerging risks and opportunities for water quality	✓	Of note is the removal of macrophytes (*Eichhornia crassipes*) to improve water quality in the reservoir. Up to 4.9% (160.9 ha) of the reservoir has been cleaned of macrophytes (target 7.9%) which amounts to 788,000 m^3 of material removed and dried, and 171,000 m^3 buried in La Pradera sanitary landfill (noting a large percentage of the removed volume was water). The macrophytes, wood material and garbage are all buried together in the La Pradera landfill location. The project is actively monitoring water quality upstream, in the reservoir and downstream to Nechi. Monitoring results show that water quality improves in the reservoir. The macrophytes remove pollutants such as heavy metals and excessive nutrients from the water column in the reservoir and as a result biological oxygen demand decreases and dissolved oxygen levels are improved.
Plans are in place for the operation stage for ongoing water quality issues management	✓	EPM plans to continue with monitoring of water quality into operations as per the Monitoring and Follow up Plan. Treatment of industrial discharges from the powerhouse and also domestic discharges from camps and			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
		offices will continue during operations.			Active treatment measures are in place to adequately treat all project domestic and industrial discharges in compliance with regulatory requirements.
Processes are in place to ensure management of identified erosion and sedimentation issues, and to meet commitments, relevant to the project implementation stage	✓	Monitoring (visual and by satellite imagery) of erosion at unstable slopes is done at 67 sites in the reservoir every 15 days and monitoring reports are prepared every month. Continual monitoring of erosion and sedimentation conditions is completed at all active work sites and roadways. Monitoring of geomorphological conditions and sediment modelling is also undertaken downstream of the dam site to Nechi. Both these systems provide EPM with monitoring of erosion and sedimentation issues within the reservoir and downstream areas.	Processes are in place to anticipate and respond to emerging risks and opportunities for erosion and sedimentation	✘	Regarding slope instability in the reservoir, EPM has decided to monitor the extent of slope failure through visual evaluation, satellite and drone imagery and extensive geotechnical instrumentation. There are no plans currently for active intervention at most sites, as the reservoir is still operated at a constant level. When the reservoir is more actively managed and water levels start fluctuating, some slopes are expected to become more unstable and target areas for intervention can be selected, if necessary. EPM is undertaking active slope stabilization measures at km 0+900 (a short distance upstream of the dam) on a slope that is affecting transit of the road to Ituango and has some potential to lead to mass movements into the reservoir. Good slope stabilization practices were also noted at the Ticuita inert material disposal site. One issue that emerged during the contingency was the deposition of sediment and debris in the river
Plans are in place for the operation stage for ongoing erosion and sedimentation issues management	✓	EPM plans to continue with monitoring of erosion and sedimentation processes into operations as per the Monitoring and Follow up Plan. One of the objectives of the ongoing reforestation around the reservoir is slope stabilization. Initial conceptual plans are also being developed for downstream adaptive management, which may include bank stabilization.			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
					directly downstream of the tailrace tunnel outlets; this is currently being addressed through a significant effort to remove, sort, and dispose of the excavated material in the Ticuita disposal site. The reservoir will retain on average 70% of sediment transported in the Cauca River. Modelling of downstream sediment transport processes shows a potential deepening of the riverbed by 4 m in two river reaches: between 50 and 125 km downstream and from 175-200 km downstream. The implications of such potential riverbed and riverbank erosion have not yet been identified in detail. While EPM is monitoring downstream bathymetry, there are no commitments and no operational plan for adaptive management and remedy for those potentially impacted by increased erosion, only some conceptual ideas. The uncertainty regarding mitigation and compensation of long term downstream erosion impacts is a **significant gap** against advanced requirements.
Conformance and Compliance					
Processes and objectives in place to manage each of the following have been and are on track to be met:			There are no non-compliances relating to:		

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		**Findings and Observations**	**Requirement is met: yes (✓) or no (✗)**		**Findings and Observations**
• water quality, with no major non-compliances	✓	No major non-compliances have been identified.	• water quality	✓	No current non-compliances have been identified specific for this topic. See section 1 for a general discussion of non-compliances being resolved with ANLA.
• water quality, with no major non-conformances	✓	No major non-conformances have been identified.			
• erosion and sedimentation, with no major non-compliances	✓	No major non-compliances have been identified.	• erosion and sedimentation	✓	No current non-compliances have been identified specific for this topic. See section 1 for a general discussion of non-compliances being resolved with ANLA.
• erosion and sedimentation, with no major non-conformances	✓	No major non-conformances have been identified.			
Commitments relating to the following have been or are on track to be met:			There are no non-conformances relating to:		
• water quality	✓	Commitments related to water quality have been met.	• water quality	✓	There are no non-conformances.
• erosion and sedimentation	✓	Commitments related to erosion and sedimentation have been met.	• erosion and sedimentation	✓	There are no non-conformances.
Outcomes					
Negative water quality impacts arising from project implementation are avoided, minimised and mitigated	✓	Mitigation and management measures are in place to minimise and mitigate all identified potential negative water quality impacts.	Negative water quality impacts arising from project implementation are avoided, minimised, mitigated and compensated	✓	While the April 2018 contingency event caused water quality issues downstream, the project is not currently responsible for any degradation of water quality in the Cauca River.
			Enhancements to pre-project water quality conditions or contribution to addressing water quality issues beyond those impacts caused by the project are achieved or are on track to be achieved	✓	The project has a demonstrated effect in improving dissolved oxygen levels in the reservoir and downstream of the dam site to Taraza. Removal of aquatic weeds and garbage in the reservoir is also leading to improvement of water quality in the reservoir.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
					The governmental agencies receiving royalties from the project (Corantioquia and the municipalities) are also required to use a significant share to improve sanitation and catchment management, which will lead to improvements in water quality over time.
Erosion and sedimentation issues during project implementation are avoided, minimised and mitigated	✓	The erosion and sediment dynamics monitoring programme allows for issues to be identified in a timely manner, and all identified erosion issues are being addressed.	Erosion and sedimentation issues during project implementation are avoided, minimised, mitigated and compensated	✓	Short-term issues during project implementation are being addressed in a satisfactory manner.
			Enhancements to pre-project erosion and sedimentation conditions or contribution to addressing erosion and sedimentation issues beyond those impacts caused by the project are achieved or are on track to be achieved	✓	The efforts to reforest the 100 m buffer zone above the reservoir waterline, other reforestation efforts in the catchment (some of which indirectly financed through royalties flowing to Corantioquia and municipalities) and acquisition of areas of dry tropical forest in the reservoir will lead to stabilization of slopes and reduction of erosion.

List of significant gaps against **Minimum Requirements**	Number of **Advanced Requirements** met
None	11

Summary of findings and other notable issues
EPM has an exemplary program in place to monitor water quality within the reservoir and upstream and downstream river reaches. The project is improving water quality within the reservoir and immediately downstream, with regard to dissolved oxygen. The project also has an extensive monitoring program for erosion of unstable slopes in the reservoir through a variety of means (visual, instrumental and imagery) and is demonstrating best practices for slope stabilization on actively unstable slopes and inert disposal sites in the project area. Modelling shows that there could be significant deepening of the riverbed downstream of the dam site.

Summary of findings and other notable issues
Although this issue has been identified and is being actively monitored, the project has not yet developed an adaptive management response in the event that downstream users and ecosystems may be affected by erosion impacts.

Relevant evidence	
Interview	21, 22, 24, 29, 57, 64
Document	19 – 21, 142 – 148, 254, 285, 286, 295, 298
Photo	6, 7, 16-19, 30-32, 34, 46-48, 88

4 Community Impacts and Infrastructure Safety

Scope and Principle
This section addresses impacts of the project on project-affected communities, including economic displacement, impacts on livelihoods and living standards, public health impacts, impacts to rights, risks and opportunities of those affected by the project, infrastructure safety risks and additional benefits that can arise from a hydropower project. The principle is that livelihoods and living standards impacted by the project are improved relative to pre-project conditions for project-affected communities, that commitments to project-affected communities are fully delivered, and that life, property and community assets and resources are protected from the consequences of dam failure and other infrastructure safety risks. This section does not address requirements that relate to physical displacement or to Indigenous Peoples, which are addressed in Section 5 and 7. Other interested parties and groups are addressed in Section 10.

Background	
Community Impacts and Benefits	
Description of project-affected communities and how they are affected (distinguish between directly affected vs economically displaced vs other affected communities and include number of people and households)	A total of 63 towns or villages within 12 municipalities are directly affected by the project through land acquisition for project components (such as dam and reservoir footprint and surrounding areas, access roads, construction camps etc.). Within those affected communities, (i) 279 households were physically displaced and resettled (and are the subject of Section 5 of this report), and (ii) 1,020 households were economically displaced, of which 849 worked in the artisanal gold mining industry and 171 in other economic activities. In total, 1,299 households within the project's area of influence were affected by the project, and 2 river transportation companies were also affected by the project. Additionally, project-affected communities include those downstream communities that were evacuated or otherwise affected during the contingency event in 2018, and those communities affected by construction traffic and other construction-related disturbances (e.g. San Andrés de Cuerquia and Toledo).
Agencies relevant to land acquisition	National Land Agency (ANT, Agencia Nacional de Tierras), National Registry (SNR, Superintendencia de Notariado y Registro)
Agencies relevant to livelihood restoration and project benefits	Public Ministry (Ministerio Público)
Infrastructure Safety and Public Health	
Type of dam	Rockfill with clay core
Dam height (m)	237 m
Probable maximum flood (m^3 / s)	25,300 m^3/s
Design flood (expressed as estimated flood with return period)	PMF (see above)
Spillway capacity (m^3 / s)	25,300 m^3/s
Spillway height (masl)	403 masl
Headrace length (m)	Upper conveyance tunnel + pressurized conveyance section: 340m

Headrace width (m)	variable
Headrace capacity (m^3 / s)	169 m^3/s
Seismicity	Initial seismic studies were carried out for the project by Pöyry and updated regularly to include additional seismic data.
Geology	The riverbed at the dam site is composed of metamorphic rock. The bedrock consists of good quality gneisses, quartz feldspars and schists that can be highly variable in texture over short distances, from thick layers of gneiss interspersed with quartz and feldspar to layers of biotite and amphiboles.
Dam safety regulatory authorities	There are no dam safety authorities in Colombia; however dam owners are required by law to prepare disaster risk management plans (PGRD) (Law 1523 of 2012 on national policy on disaster risk management, and Decree 2157 of 2017 which regulates PGRDs).
Local presence/capacity of emergency services	The project has a professional emergency brigade that have trained local emergency services including community fire fighters and police in downstream communities in collaboration with the Colombian Red Cross. Training includes a range of emergencies including flood events, and drills are carried out regularly. During the "contingency" event in 2018, the emergency brigade and local emergency services were able to quickly respond and notify on-site personnel, contractors, and downstream community first responders to evacuate all at risk areas. EPM has cooperation agreements with the national UNGRD (Colombian Unit for Disaster Risk Management) and the regional unit DAGRAN (Administrative Department for Risk Management in Antioquia).
Potential safety risks in this context	Downstream communities in Antioquia (municipalities of Puerto Valdivia, Tarazá, Nechí, Caucasia, Cáceres, Briceño, Ituango), Bolívar, Códoba and Sucre with a total at risk population of 113,463 people (25.214 households).
Degree of risk of dam failure and in what way	The Ituango dam would be classified as a "very high" risk dam under ICOLD classification.
Population at risk of dam break (locations, numbers)	According to a study completed by Integral in 2019, the high consequence area that would be impacted in the event of a dam failure includes communities in the departments of Antioquia, Bolivar, Córdoba, and Sucre which have a total population of 113,463.
Dam safety standards followed	EPM follows ICOLD, USBR and USACE technical guidance and standards. There are no national dam safety standards in Colombia.
Agencies relevant to dam safety	There is no specific agency for dam safety in Colombia, however Colombia has established a national disaster risk management system (*Sistema Nacional de Gestión del Riesgo de Desastres – SNGRD*) coordinated by the UNGRD, and the Department of Antioquia has the DAGRAN.
Other infrastructure safety issues	Landslides, road safety and public safety around and on the reservoir.
Description of key public health issues	The main health issues in the area of influence of the project include acute respiratory infections, dengue, malaria, leishmaniasis, bites from potential transmitters of rabies, malnutrition of children under 5, food and water borne diseases, gender based and family violence and suicide.
Agencies relevant to public health	Ministry of Health, Secretariate of Health of Antioquia, Local Health Boards (DLS or *Direcciones Locales de Salud*), and State-owned hospitals (*Hospitales ESE*, *Empresas Sociales del Estado*).

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		**Findings and Observations**	**Requirement is met: yes (✓) or no (✗)**		**Findings and Observations**
Assessment					
Community Impacts and Benefits					
Issues relating to project-affected communities have been identified through an assessment process	✓	An assessment of potential impacts on communities was carried out in the ESIAs (2007, 2011) and identified a number of issues such as resettlement, in-migration and related increase in communicable diseases and conflicts, as well as changes in socio-economic activities, land use, environmental health, regional development and cultural systems in the project's area of influence. Following the contingency event in 2018, communities downstream of Puerto Valdivia were added to the area of influence of the project. In total, 1,020 families and two river transportation companies were economically displaced/impacted by the project.	Monitoring of project-affected communities issues during project implementation takes into account inter-relationships amongst issues, and both risks and opportunities that become evident during implementation	✓	The Social Management Plan has a multifaceted approach to monitoring affected communities' issues through five different interrelated programmes: • Communication and Participation Program: establishes formal and informal communication channels with the affected communities while also creating spaces for their active participation, • Integral/comprehensive Restitution of Living Conditions Program: re-establishes the social and economic conditions of affected the families (physical and economic displacement), • Regional Integration Program: creates opportunities for development and capacity building in AOI communities by addressing employment and migration pressure issues and generally promoting participation in development in the region, • Monitoring and Reading the Surroundings Program, which detects issues that could change the peaceful conditions in the region,
This assessment utilised local knowledge	✓	The ESIAs and additional studies, assessments and monitoring activities included people with local knowledge and involved community members and incorporated regular community and stakeholder meetings within the project's area of influence.			
Monitoring of project impacts and effectiveness of management measures is being undertaken during	✓	The social monitoring plan encompasses all activities under the regional integration programme and social management plan.			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
project implementation appropriate to the identified issues					• Environmental Education Program. The project was able to quickly implement an efficient COVID prevention and screening programme to minimise community transmission by screening and testing workers before they returned home and returned to work, in collaboration with the University of Antioquia's epidemiological team that was already collaborating with the project on the epidemiological studies related to environmental health and prevalence of other diseases in the region.
Opportunities to increase the development contribution of the project through additional benefits and/or benefit sharing have been assessed	✓	In addition to the environmental license requirements embodied in the PMA and PMS, opportunities to increase the project's contribution to regional development and benefit sharing are also achieved through the following mechanisms: • 1% of project investment value that had to be invested in impacted communities (legal requirement) • voluntary additional social investments totalling USD 100 million: these are based on additional needs identified by the project and focus on institutional	The assessment of delivery of project benefits takes into consideration both risks and opportunities.	✓	The additional social investments made by the project contribute to sustainable development goals and regional development needs in a region traditionally affected by violent conflict and absence of the state. The project addresses some bottlenecks for economic development of certain areas (e.g. transportation network and connectivity, access to basic services in rural communities etc.) and takes advantage of opportunities for improving community infrastructure and services (some communities requested sports and

Minimum Requirements			Advanced Requirements		
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		capacity, human rights, governance, social inclusion, connectivity, agriculture and forestry production, public health, housing, education and municipal infrastructure/utilities (water, wastewater, gas). • 6% of generation revenues that will be transferred to municipalities and regional environmental authorities such as Corantioquia in the project catchment, during the operation stage of the project (legal requirement) • EPM and EPM Foundation also provide additional voluntary funding and sponsoring of initiatives in the region			leisure facilities, improvements to schools, health care facilities etc.).
In the case that commitments to additional benefits or benefit sharing have been made, monitoring is being undertaken on delivery of these commitments	✓	The voluntary additional social investments are monitored and progress has been reported on regularly.			
Infrastructure Safety and Public Health					
Dam and other infrastructure safety risks relevant to project implementation have been identified through an assessment process	✓	Up to date assessments (including root cause assessments related to the 2018 contingency) and risk management plans for dam safety and other infrastructure safety are in place and publicly available on the project's webpage. Several	Consideration of safety issues takes into account a broad range of scenarios and both risks and opportunities	✓	The project's Disaster Management Plan considers different scenarios including dam failure, flood and mass movements (landslides/rockslides) that would obstruct access roads. The Risk Reduction Plan includes measures to minimise a number of

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
		independent dam safety engineers and independent dam safety panels have been involved in assessing and reviewing measures put in place following the contingency. A number of measures were identified to address migratory pressure in communities; those that relate to safety include supporting road accident prevention and road signage.			risk scenarios including dam failure, failure of spillway gates or other structural failures, social protests and violence, unplugging of a diversion tunnel, landslides, road collapse, biosanitary emergencies, activities carried out by illegal armed groups or stakeholders, underground works stability issues and impacts of climate variability. Dam safety related assessments carried out following the contingency also include Failure Modes and Effects Assessment (FMEA).
Dam and other infrastructure safety risks relevant to project operation have been identified through an assessment process	✓	Current risk management plans are relevant for operations.			
Safety monitoring is being undertaken during the project implementation stage appropriate to the identified issues	✓	Safety monitoring and emergency preparedness is at the forefront of the project's construction activities since the contingency event in 2018. Monitoring includes erosion-prone areas around the reservoir and along the new road between the project site and Puerto Valdivia where a number of landslides have occurred.			
Public health issues relevant to project implementation have been identified through an assessment process	✓	Public health issues and potential impacts of the project related to public health were identified in the ESIAs. A number of measures were identified to address migratory pressure in communities; those that relate to public health include supporting local response capacity to public health issues (mental health,	Monitoring of public health issues during project implementation takes into account inter-relationships amongst issues, and both risks and opportunities for different community groups that become evident during implementation	✓	The environmental epidemiological surveillance programme has been in place to identify and assess public health issues in the AOI for about a decade, with ongoing quarterly monitoring of 57 communities within the EOI. An example of inter-relationships between issues is that the community public health studies

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
		sexual and reproductive health, prevention of the use of psychoactive substances, improvements to local hospitals and clinics, waste and wastewater management etc.). In addition, due to upstream mining and industrial areas, an assessment of mercury in reservoir fish was carried out by the project to determine if they are apt for human consumption.			were used to assess potential impacts to worker health and as input into the design of the occupational health and safety plans. Likewise, the potential effects or pressure of worker in-migration on community health and local health care systems helped design mitigation measures including improving institutional capacity of community health committees, awareness and training workshops on relevant public health issues within the AOI such as mental health, family and gender-based violence, leishmaniasis and other vector-borne diseases, HIV/AIDS and other sexually transmitted diseases, etc.
Public health issues relevant to project operation have been identified through an assessment process	✓	The environmental epidemiological surveillance programme has identified public health issues in the area of influence (AOI) that are relevant to the operations phase of the project. In addition to this, the regional integration programme and additional voluntary social investment programme has included aspects that benefit both the implementation and operation stages of the project, such as public health sector educational activities at primary health care facilities, preventive health care programmes, oral hygiene programmes, donations of ambulances, wheel chairs, crutches, public health forums, etc.			
The public health assessment processes utilised appropriate expertise	✓	Public health assessments and epidemiological surveys have been and continue to be carried out with the support of the University of Antioquia's National Faculty of Public			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
		Health (FNSP). Entomology surveys carried out as part of the epidemiological programme are carried out by qualified biologists.			
Monitoring is being undertaken during the project implementation stage appropriate to the identified public health issues	✓	The epidemiological surveillance program is aimed at monitoring environmental/public health in communities and municipalities in the AOI and includes consulting and technical assistance visits on epidemiological surveillance, outreach on public health events, follow-up for diseases and infections with an emphasis on sexually transmitted diseases and HIV, strengthening municipal and institutional epidemiological surveillance committees, training on public health issues and additional training as needs are identified in each municipality or rural area.			
Management					
Community Impacts and Benefits					
Measures are in place to address identified issues that affect project-affected communities and meet commitments made to address these issues	✓	A number of socio-economic management and monitoring/surveillance programmes (PMA and PMS) are in place to address the identified issues in the ESIAs and subsequent modifications.	Processes are in place to anticipate and respond to emerging risks and opportunities relating to project-affected communities and project benefits	✓	A number of processes and measures are in place to anticipate and respond to emerging risks and opportunities. An example of responding to emerging risks would be how the processes in place in downstream communities (community spokespersons or *voceros comunales*, training of local community first
If there are any formal agreements with project-	✓	The project's ESIAs and modifications are publicly available on EPM's website, as well as the specific action			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
affected communities these are publicly disclosed		plan related to post-contingency measures that covers the 5 municipalities affected by the event in 2018. In addition, commitments are disseminated using different media (e.g. "La Voz" newspaper and local radio shows).			responders by the Red Cross, and the project's team of professional firefighters) were able to evacuate 2,255 families from the downstream areas during the contingency in 2018. The "*contratación social*" programme also provides communities with the capacity to respond to opportunities such as requests for proposal and to contract services, which contributes to regional development and increases employment opportunities. During the recovery phase following the contingency, the project implemented a "specific action plan" that included a number of measures and activities that covered the 5 downstream affected municipalities, all located in Antioquia.
Measures are in place to deliver commitments by the project to additional benefits or benefit sharing	✓	Additional benefits corresponding to 1% of the total project investment cost and the USD 100 million voluntary contributions have been invested in community projects with the objective of improving living conditions and contributing to sustainable and competitive development in the region.			
Commitments to project benefits are publicly disclosed	✓	Commitments made in ESIAs and their modifications are available on EPM's website, which also includes a description of the programmes and measures that the project has committed to implement for each pf the 12 municipalities in the AOI under the additional voluntary investments (*Inversión Social Adicional*).			
Infrastructure Safety and Public Health					
Processes are in place to address identified dam and other infrastructure safety issues, and to meet any safety related commitments, relevant to the project implementation stage	✓	EPM has a Dam Safety Management Manual that includes aspects of their Dam Safety Program including dam classification, surveillance, dam safety review, O&M, reservoir management, emergency preparedness and data and information management, in line	Processes are in place to anticipate and respond to emerging infrastructure safety risks and opportunities	✘	The dam safety instrumentation and surveillance system is capable of detecting dam safety issues and the emergency preparedness and response plans have been widely communicated including with full-scale evacuation simulations in the

Minimum Requirements			Advanced Requirements		
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		with ICOLD technical Bulletins, it includes a description of all dams except for Ituango (dated 2018) but mentions resources allocated to Ituango. The document is currently being updated. The extensive dam instrumentation and surveillance programme that has been upscaled since the contingency uses a wide range of technologies including InSAR and total stations surveying nearby reservoir shoreline slopes and slopes above dam abutments includes continual monitoring at the project's control room (CMT) which is continually manned by engineers and specialists of the owner's engineer (*Interventoria*) and EPM. Slope stabilisation works have been initiated on the road to Puerto Valdivia (by planting indigenous grasses) and more specifically at km 0+900 upstream from the dam where erosive processes also affect the road to Ituango and have the potential to lead to mass movements into the reservoir. A programme for the prevention of road accidents and additional road signage was implemented a measure to compensate for increased road			downstream communities (November 2014). However in October 2022, the alarm systems (sirens) along the Puerto Valdivia road were not functional (they had been vandalised and the copper conductor distribution lines had been stolen). The only functional siren was located at Puerto Valdivia and was connected to a diesel generator. The lack of functional emergency warning systems (due to their state of disrepair) along the road between the dam and the town of Puerto Valdivia is a **significant gap** against advanced requirements.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
		traffic from migratory pressure in the region and construction activity.			
Processes include communication of public safety measures	✓	Throughout construction and during the contingency, communication of public safety measures was carried out by the Red Cross (related to emergency preparedness and response), and through a number of other media, including "La Voz" newspaper, radio, community workshops, environmental education events etc. In addition, the project's webpage on EPM's website includes the Disaster Management Plan and Risk Reduction measures that have been put in place for different risk or hazard scenarios.			
A formal quality control programme is in place for construction	✓	A formal quality plan includes quality assurance and management procedures implemented by INGETEC-SEDIC, the owner's engineers supervising the main contractor/construction process (interventoría) specifically for the implementation phase of the project.			
Safety management plans for the operation stage have been developed	✓	The current risk management plans and the Emergency and Contingency plan (PEC) are relevant for operations.	Public safety measures are widely communicated in a timely and accessible manner	✓	Public safety measures have been widely communicated throughout the implementation phase of the project and in preparation for the full-scale evacuation simulation exercise that was carried out in November 2022. First responders involved in the contingency evacuations of 2018
These plans have been developed in conjunction with relevant regulatory and local authorities	✓	Disaster and Risk Management Plans are reviewed and approved by ANLA. Other external entities have also had input into the emergency plans, namely the Red Cross, UNGRD,			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
		DAGRAN, and the volunteer and official first responders, firemen, police force and civil defence involved in the notification chain.			attribute the swift management of notifications and the evacuation of all community members within the flooded zones to thorough preparedness and training of project staff and local first responders.
Emergency response plans include awareness and training programmes and emergency response simulations	✓	The project entered into an agreement with the Red Cross for training and capacity building for emergency preparedness and response in communities of the AOI of the project. The Red Cross engaged with community first responders in collaboration with the project's full-time professional emergency brigade. A full-scale emergency evacuation simulation/drill was carried out on November 15, 2022 in the municipalities of Ituango, Briceño, Valdivia and Tarazá with the following entities: DAGRAN, Red Cross, local firefighters, Civil Defence, UNGRD, the National Police, the Military, and local community level organizations (*Juntas de Acción Comunal)*.			
Processes are in place to ensure management of identified public health issues, and to meet commitments, relevant to the project implementation stage	✓	Processes are in place such as the epidemiological surveillance programme, improvements to the local health care system and facilities to address identified public health issues. Commitments to improve facilities and strengthen capacity have been met and are ongoing.	Processes are in place to anticipate and respond to emerging public health risks and opportunities	✓	The epidemiological surveillance programme and committees enable the early detection of emerging public health issues, and a number of opportunities for improvement of the healthcare system and facilities have been identified and implemented in the various communities.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
Plans are in place for the operation stage for ongoing public health issues management	✓	The epidemiological surveillance programme will continue during the operation stage of the project and has strengthened municipal and institutional epidemiological surveillance committees in the municipalities within the AOI of the project, for ongoing management of public health issues.			
These plans include hand-over to local authorities as appropriate	✓	The plans include capacity building and institutional capacity strengthening within the public health system and the community institutions (including the *Juntas de Acción Comunal* for example) for seamless hand-over of programmes.			
Conformance and Compliance					
Community Impacts and Benefits					
Processes and objectives in place to manage the following have been and are on track to be met:			There are no non-compliances relating to:		
• project-affected communities' issues, with no major non-compliances	✓	No major non-compliances have been identified.	• project-affected communities	✓	No current non-compliances have been identified specific for this topic. See section 1 for a general discussion of non-compliances being resolved with ANLA.
• project-affected communities' issues, with no major non-conformances	✓	No major non-conformances have been identified.			
• project benefits, with no major non-compliances	✓	No major non-compliances have been identified.	• project benefits	✓	No current non-compliances have been identified specific for this topic. See section 1 for a general discussion of non-compliances being resolved with ANLA.
• project benefits, with no major non-conformances	✓	No major non-conformances have been identified.			
Commitments have been or are on track to be met relating to:			There are no non-conformances relating to:		

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
• project-affected communities	✓	Commitments made to project affected communities have been implemented or are on track to be met, for example the reconstruction of the bridge in Puerto Valdivia that was damaged during the contingency is underway but not completed yet, the road that was built between the project and Puerto Valdivia is not yet open to the public but a contractor has been selected to clear up landslide debris and stabilise slopes.	• project-affected communities	✓	Although there have been delays in the restoration of damages caused by the contingency, the rehabilitation of these areas is being implemented and no non-conformances have been identified.
• project benefits	✓	Commitments made to project affected communities have been implemented or are on track to be met (for example, 98% of additional social investment programmes have been completed and the remainder are on track to be completed).	• project benefits	✘	The road between the project and Puerto Valdivia will bring significant regional improvements in community connectivity, and delays in opening it to the public have negative consequences on transportation services and community expectations and is considered a non-conformance in the provision of project benefits. Similarly, the delays in achieving COD have resulted in delays in the distribution of the 6% to municipalities and environmental authorities who are counting on these funds to implement a series of projects. In some cases, these funds may represent a significant portion of annual municipal budgets. The recipients have no clarity on how much and when the 6% will start being transferred to them. This also

Minimum Requirements			Advanced Requirements		
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					represents a non-conformance in commitments made related to project benefits. The delays in the provision of benefits are a **significant gap** against advanced requirements.
Infrastructure Safety and Public Health					
Processes and objectives in place to manage the following have been and are on track to be met:			There are no non-compliances relating to:		
• dam and other infrastructure safety, with no major non-compliances	✓	No major non-compliances have been identified.	• dam and other infrastructure safety	✓	No current non-compliances have been identified specific for this topic. See section 1 for a general discussion of non-compliances being resolved with ANLA.
• dam and other infrastructure safety, with no major non-conformances	✓	No major non-conformances have been identified.			
• public health issues, with no major non-compliances	✓	No major non-compliances have been identified.	• public health	✓	No current non-compliances have been identified specific for this topic. See section 1 for a general discussion of non-compliances being resolved with ANLA.
• public health issues, with no major non-conformances	✓	No major non-conformances have been identified.			
Commitments have been or are on track to be met relating to:			There are no non-conformances relating to:		
• dam and other infrastructure safety	✓	Commitments related to dam safety and other infrastructure safety have been met or are on track to be met (for example, the monitoring and reforestation of erosion-prone slopes around the reservoir; the level of instrumentation and surveillance of the dam structure and surrounding areas using different technologies and systems including InSAR; the contract for stabilising slopes and	• dam and other infrastructure safety	✓	No non-conformances have been identified.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		**Findings and Observations**	**Requirement is met: yes (✓) or no (✗)**		**Findings and Observations**
		rehabilitation of road section on the on the road to Puerto Valdivia, etc.)			
• public health	✓	The commitments to implement measures to strengthen the public health system in the AOI of the project and the epidemiological surveillance programme have been met and are likely to be sustained over time.	• public health	✗	The public's lack of clarity regarding pollution levels and in particular, mercury levels in reservoir fish and their potential effects on human health is considered a non-conformance. The project or other entities associated with fishing and public health could be more proactive in communicating the risks associated with the consumption of fish from the reservoir. This is a **significant gap** against advanced requirements.
Outcomes					
Community Impacts and Benefits					
Livelihoods and living standards impacted by the project have been or are on track to be improved	✓	The regional integration project and additional social investments have implemented municipal infrastructure and utilities projects (such as new or improved water distribution and wastewater collection systems in 12 municipalities, 5,489 families connected to natural gas, 10,200 rural households connected to the electrical grid) and improved connectivity (1,500 km of new or improved road infrastructure), in addition to environmental education and capacity building programmes in the AOI. In addition, the monitoring of livelihoods of economically displaced	The measures put in place to improve livelihoods and living standards are on track to become self-sustaining in the long-term	✗	The social contracting programme and strengthening of local *Juntas Comunales* have built capacity in the municipalities that enables them to respond to requests for proposals, and provide services to different entities and inform community members of employment and business development opportunities, including from the operations phase of the project, contributing to long-term community resilience. In addition, similarly to the physically displaced group of people, the economically displaced families were

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
		persons indicates that livelihoods and living standards have generally improved over the 5-year monitoring period. Employment rates in the AOI of the project have increased (with a lull during the pandemic) throughout the life of the project. Over 7,000 people have been employed by the project and by additional social investment projects (25% of project workers are from the AOI).			also offered a choice between comprehensive livelihood restoration services with regular monitoring of their standard of living over a period of 5 years or direct purchase with simplified annual monitoring. 107 economically displaced families chose comprehensive livelihood restoration services, while 178 chose to implement their new 'life project' and activity on their own, and were just provided with some initial financial investment advice. This sub-group is monitored annually by the project, however, the project has lost track of a small number of households and has no means by which to assess whether their livelihoods have improved or not. Other measures such as incentives to participate in annual follow-up campaigns were not implemented. Upon request from the Independent E&S Consultant, the project carried out a survey of this direct purchase sub-group which indicated that the ICV (Living conditions index) for 42% of this population was Low, 43% was Moderate and 15% was High. While most of the heads of households were employed, 79% of them receive wages under the current minimum legal monthly salary (SMMLV). The lack of
Economic displacement is fairly compensated, preferably through provision of comparable goods, property or services	✓	EPM based compensations/ indemnifications on Law 56 of 1981 and its Regulatory Decree 20244 to determine the restitution value for affected lands and as prescribed, prepared a Manual of Unit Values that considers the value of the land, existing buildings and crops, topography, land use (actual and potential) and access to public utilities.			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
					additional measures to contribute to this sub-group's livelihoods is a **significant gap** against advanced requirements.
Communities directly affected by the development of the hydropower project have received or are on track to receive benefits	✓	The only pending commitments in terms of economic displacement, relate to a few cases which are the subject of ongoing monitoring by the project: two families are undergoing legal inheritance processes; one beneficiary is incarcerated; and one court case where the judgement was in favour of EPM, was appealed and continues as pending. Commitments for these families are on track to be met.	Benefits are significant and the project has delivered or is on track to deliver significant and sustained benefits for communities affected by the project	✓	The project benefits implemented to date that extend to community infrastructure, the public health care system, strengthening of community institutional capacity and increasing community resilience are significant within the AOI of the project. Additionally, the future 6% of generation revenue that will be distributed to municipalities and regional environmental entities such as Corantioquia during the operations phase of the project, are likely to be sustained indefinitely into the future. The project's presence has also given the population employment options and opportunities that have led to a decrease in armed illegal group activity and provided improvements in law and order in communities of the area of influence. There is however some uncertainty related to what will happen as construction activities slow down and lead to retrenchment, and it is expected that community security may suffer as a consequence of unemployment. The project is implementing a transitional employment programme (MINKA)

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
					that aims to mitigate the impacts of unemployment (including recurrence of violent conflict) as the project enters into operation.
Infrastructure Safety and Public Health					
Safety risks have been avoided, minimised and mitigated with no significant gaps	✓	Infrastructure safety risks related to downstream communities have been avoided, minimised and mitigated by a series of awareness and training campaigns and through an agreement with the Red Cross and collaboration with local first responders and other national regional and local institutions. At the moment there is limited public use of the reservoir and safety signage and safety booms are in place to warn the public of risks.	Safety risks have been avoided, minimised and mitigated with no identified gaps	✘	There are two public safety risks which have not been addressed satisfactorily: (i) there is a lack of a comprehensive programme or plan for public safety around the dam and reservoir (some signage is not clearly visible or signage is knocked down at some boat ramps, lack of clear rules and campaigns for public safety around the reservoir or for boaters). It is incumbent on the dam owner to address the risks (by himself or in coordination with other agencies) of accidents or incidents in which a member of the public encounters a hazard created by the presence or operation of the reservoir; and (ii) although the project has implemented a number of measures aimed at minimising impacts from construction traffic on communities such as the installation of 380 traffic signs, it does not have an effective road safety strategy that avoids and minimises road hazards or encourages and enforces safe driving practices. While results of vehicle speed monitoring in 2022 indicate that there were only

Minimum Requirements			Advanced Requirements		
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					0.4% of vehicles with infractions, some vehicles were observed to having disconnected their monitoring device, which demonstrates a lack of safety culture. These issues constitute a **significant gap** against advanced requirements.
			Safety issues have been addressed beyond those risks caused by the project itself	✓	A number of safety issues have been addressed that improve on pre-existing conditions. For example, the capacity of local first responders and community institutions to deal with emergencies has been exemplary and the project's roll-out of their emergency preparedness and response plans early on during implementation allowed the communities to respond appropriately to the contingency and demonstrate a high level of resilience. While the contingency itself is a significant safety issue that materialised during the implementation stage of the project, emergency management measures in place prior to the event contributed to no loss of life in spite of significant flooding and damage of infrastructure and inhabited areas. Following the event, the project put significant effort and resources into dam rehabilitation and dam safety investigations and management

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
					measures which are ongoing. The capacity built during project implementation will contribute to better responses to floods and other emergencies in the future.
Negative public health impacts arising from project activities are avoided, minimised and mitigated	✓	Negative public health impacts have been avoided, minimised and mitigated through the epidemiological surveillance programme and other implemented regional-wide health care system measures.	Negative public health impacts arising from project activities are avoided, minimised, mitigated and compensated	✓	Negative public health impacts arising from project activities have been avoided, minimised and mitigated through the ESP and region-wide.
			Enhancements to pre-project public health conditions or contributions to addressing public health issues beyond those impacts caused by the project are achieved or are on track to be achieved	✓	There are many examples of enhancements and improvements beyond impacts caused by the project, including improvements to health care facilities and capacity to deal with a wider range of public health care issues. For example, knowledge of how to identify and treat leishmaniasis was limited prior to the implementation of the ESP, and a number of measures have built awareness and prevention around other issues such as mental health, sexual and reproductive health, family and gender-based violence, improvements to facilities etc.

List of significant gaps against **Minimum Requirements**	Number of **Advanced Requirements** met
None	17

Summary of findings and other notable issues
The project has demonstrated that is has compensated negative impacts such as land acquisition, contributed to significant benefits and made improvements to pre-project conditions in its area of influence, with ongoing management measures and sharing of benefits with local municipalities during operations which are likely to be sustained in the long-term. The project has a robust emergency preparedness and response plan that was put to the test during a contingency in 2018 that cause significant flooding in downstream communities, and damage to infrastructure and residential areas. The extensive training carried out in collaboration with the Red Cross resulted in the safe evacuation of all community members during the event. The project has since implemented a number of dam safety measures to protect and reinforce structural integrity of the dam, increased instrumentation and surveillance, conducted FMEA and had independent dam safety panels review the status of the dam, and carried out a full-scale downstream evacuation simulation in November 2022 upon request from the authorities. While significant community benefits and infrastructure safety aspects are generally positive, there is room for improvement in road safety, public safety around the dam and reservoir, and delivery of some of the community benefits that have experienced delays.

Relevant evidence	
Interview	4, 6, 8, 12, 13, 17, 19, 21, 24, 25, 27, 28, 31, 34, 35, 38, 42-51, 53, 60, 69, 73, 76, 77
Document	4, 9-12, 14, 16-18, 20-24, 30, 34, 56-74, 77, 94, 95, 98, 107, 110, 130-132, 135, 137, 138, 149-172, 210-212, 216, 261, 306-312
Photo	6, 7, 10, 14, 16, 17, 25-27, 31, 32, 34, 36-42, 44, 79-88, 90-93, 99, 103, 111, 113-115, 117-120, 125, 126

5 Resettlement

Scope and Principle
This section addresses physical displacement arising from the hydropower project development. The principle is that the dignity and human rights of those physically displaced are respected; that these matters are dealt with in a fair and equitable manner; that livelihoods and standards of living for resettles and host communities are improved; and that commitments made to resettlees are fully delivered. This section does not address those that are only economically displaced, who are addressed in Section 4.

Background	
Does the project require or result in any physical displacement of people? Please state the evidence on which this determination is made.	
Yes, this section is relevant	Yes, this section is relevant. 279 families were physically displaced (from the reservoir and dam footprint, construction camps, laydown areas and access roads) and resettled by the project's resettlement programme.
No, this section is not relevant	

Description of physically displaced communities and how they are displaced (distinguish between permanently vs temporarily and include number of people and households)	420 people (279 households) were physically displaced from five communities. All displacement was permanent, no displacement was temporary. The temporary evacuation during the contingency is covered in section 4.
Name and number of settlements	Orobajo, Barbacoas, Dispersas, Valdivia and San Andrés de Cuerquia
Agencies relevant to land acquisition	Ministry of the Interior, National prosecutor's office, Government of Antioquia
Agencies relevant to livelihood restoration	ANLA, Ministry of the Interior, National prosecutor's office, Government of Antioquia, Corantioquia, Municipalities, Ombudsman

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
Assessment					
An assessment of the resettlement implications of the project has been undertaken	✓	An assessment of resettlement implications was carried out during the ESIA phase of the project (original ESIA and updated ESIA in 2009-2010).	The assessment of delivery of commitments to resettlees and host communities takes	✓	Examples of risks and opportunities include the commitment to assisting resettlees regardless of their status (e.g. an incarcerated resettlee) and

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		**Findings and Observations**	**Requirement is met: yes (✓) or no (✗)**		**Findings and Observations**
This assessment establishes the pre-project socio-economic baseline for resettlees and host communities	✓	The assessment established baseline conditions of individual households prior to resettlement, to allow for monitoring of livelihood restoration and improvement following the resettlement process.	into consideration both risks and opportunities		assisting the resettled Nutabe people from Orobajo to be formally registered with the Ministry of the Interior of Colombia as an Indigenous Community, and facilitating the FPIC process.
Monitoring is being undertaken of implementation of the resettlement plans, and to see if commitments made to resettlees and host communities have been delivered and are effective and to identify any ongoing or emerging issues	✓	Monitoring covers the implementation of the resettlement activities and follow-up over a period of 5 years (for some families, this period has concluded, for others it will soon end), to ensure livelihoods are restored and improved upon and to be able to address any emerging issue a resettled family may have during that time. After the 5-year period, families are still able to interact with the project through a variety of ongoing mechanisms (e.g. direct and indirect employment, liaison with municiplaities, grievance mechanism.)			
Management					
Measures to address resettlement are documented in a Resettlement Action Plan	✓	Measures to address resettlement are included in the Resettlement Plan and the Livelihood Restoration Programme which includes: • Housing • Restoration of livelihoods • Restoration of social and cultural networks • Economic compensation	Processes are in place to anticipate and respond to emerging risks and opportunities	✗	In addition to personalised capacity building and accompaniment during the 5-year follow-up phase, the resettlement plan also includes supporting families with respect to emotional impacts, reinforcement of cultural memory, managing expectations, and connectivity and access to services in host

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
Measures are in place to deliver commitments to resettlees and host communities	✓	The project offered two compensation alternatives to the resettlees: i) an integral or comprehensive restitution of living conditions, which provided options for nucleated resettlement and suggested lands acquired by the project; and ii) the direct purchase of the affected lands. The 158 resettlee households who chose the 'integral restitution' option were able to choose the community they wanted to resettle in and the type of economic activity they would carry out at their new location. The project developed personalised capacity building programmes to ensure positive outcomes for the resettled families. 121 households chose the direct purchase option because they arrived in the region recently and have few roots there (some because of displacement by violent conflict, or they have relatives who live in other areas and wish to live near them, or they have other properties where they can live and start businesses. A simplified monitoring process was applied to the resettlees that chose the direct purchase option. The project would contact them to inquire			communities. During the monitoring period, the project uses the following four indices to monitor social, housing and economic components twice a year: ICV: living conditions index, IAF: family adaptability Index, IDE: economic performance index, and IDAF: family environment performance index. These are monitored closely, and adaptive management actions are taken when negative trends are observed. Host communities were monitored through the project's regional Integration program which had a number of components including employment, institutional and community capacity building and strengthening, "social contracting" programme, in-migration pressure monitoring, and education program. Households who chose the direct purchase option and accepted cash compensation did not benefit from the capacity building and livelihoods restoration programs. The project has lost contact with some of them (who reportedly moved away from the region or did not want to be monitored); and emerging risks and opportunities for these families cannot be easily tracked and

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
		about the type of housing and access to and quality of public services and utilities, education level of family members, whether they were employed and what the household revenues were etc. The project has made substantial efforts to remain in contact with these resettlees.			addressed. Upon request from the Independent E&S Consultant a survey of this sub-group was undertaken in 2021 (see section 4 for results). The lack of follow-up mechanisms for this subgroup is a **significant gap** against advanced requirements, because of a risk of impoverishment. However, the risk is considered low because a) this subgroup is still well represented in the monitoring results, b) no individual cases of impoverishment have become known, c) the families choosing the direct purchase option were typically the ones with higher ability to adapt, d) the project continues to make an effort to contact these families through others from the same communities.
Measures are in place to manage any issues relating to resettlement, including provision of grievance mechanisms	✓	A grievance mechanism has been in place since 2009 and will continue to be operational, to record and attend to requests, complaints, grievances and claims.			
Formal agreements with resettlees and host communities are publicly disclosed	✓	The Resettlement Plan and the Livelihood Restoration Programme are publicly disclosed on the project's webpage on EPM's website. IDB's and ANLA's websites also disclose a number of resettlement-related documents.			
Conformance and Compliance					
Processes and objectives in the Resettlement Action Plan have been and are on track to be met with:			There are no non-compliances	✓	No current non-compliances have been identified specific for this topic. See section 1 for a general discussion of non-compliances being resolved with ANLA.
• no major non-compliances	✓	No major non-compliances have been identified.			
• no major non-conformances	✓	No major non-conformances have been identified.	There are no non-conformances	✓	There are no non-conformances.
Any resettlement related commitments have been or are on track to be met	✓	The only pending commitments relate to a few cases which are the subject of ongoing monitoring by the project: two families are undergoing legal			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		**Findings and Observations**	**Requirement is met: yes (✓) or no (✗)**		**Findings and Observations**
		inheritance processes; one beneficiary is incarcerated; and one court case where the judgement was in favour of EPM, was appealed and continues as pending. Resettlement and compensation commitments for these families are on track to be met.			
Outcomes					
Resettlement has been and is being treated in a fair and equitable manner	✓	Resettlement has been and is continuing to be treated in a fair and equitable manner. The resettlee candidate list was updated to include people who had lived less than 1.8 years in the region but that were in the 2018 census, and others who may not have been included in the original census for a number of reasons.	The measures put in place to improve livelihoods and living standards are on track to promote self-sufficiency in the long-term	✓	After 5 years of monitoring and accompaniment, data show that the resettled families have improved their livelihood conditions compared to baseline conditions. For example, under the "living conditions" index baseline data indicated that 91% had a low standard of living and 9% had a moderate standard of living. In 2022, only 11% had a low standard of living, 29% were moderate and the majority, 61% now had a high standard of living. Under the "family adaptability" index, baseline data indicates that 27% were classified as low, 52% as moderate and 21% as high. 2022 data indicates no families are currently classified as low, 32% remain classified as moderate and the majority, 68% are classified as high. With respect to the resettlees that chose the direct purchase option, statistics show similar trends in living conditions improvement (from a
Resettlees and host communities have experienced or are on track to experience a timely improvement in livelihoods and living standards relative to the pre-project baseline	✓	Continuous improvements in livelihoods, with a temporary lull for some families during the pandemic, have been demonstrated by monitoring results.			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
					baseline of 100% low standard of living to 20% low, 46% moderate and 35% high in 2022). In terms of household revenues for this population, baseline data indicated that the largest group (39%) had very low incomes and only a minority (12%) had high incomes, whereas in 2022 only 4% had very low incomes and a majority (54%) had high incomes (and the remainder had low or moderate incomes). (However, as described above under Management, not all families are included in these statistics). In addition, the families visited during the assessment expressed they have become self-sufficient and believe they will continue to be in the long term. Many families' children have since left their family homes and have also become self-sufficient.

List of significant gaps against **Minimum Requirements**	Number of **Advanced Requirements** met
None	4

Summary of findings and other notable issues
The project has implemented a number of programmes that have restored the living conditions and livelihoods and provided additional benefits to the resettled families as well as their host communities. Resettlees have been closely monitored to be able to detect and address any issues early on and contribute to positive outcomes. The outcomes for a small number of households who chose cash compensation are uncertain, as the project is no longer tracking them.

Relevant evidence	
Interview	28, 40, 42, 50
Document	167, 169, 172-179, 313
Photo	105, 106, 108

6 Biodiversity and Invasive Species

Scope and Principle
This section addresses ecosystem values, habitat and specific issues such as threatened species and fish passage in the catchment, reservoir and downstream areas, as well as potential impacts arising from pest and invasive species associated with the planned project. The principle is that there are healthy, functional and viable aquatic and terrestrial ecosystems in the project-affected area that are sustainable over the long-term, that biodiversity impacts arising from project activities are managed responsibly, and that commitments to implement biodiversity and invasive species measures are fulfilled.

Background	
Short description of the ecological region in the project area	There are three important biomes in the vicinity of the project, from Dry Tropical Forest at the tail end of the reservoir to Tropical Rain Forest and Premontane Rain Forest towards the northern end of the reservoir. A large floodplain wetland complex of high biodiversity is located about 180 km downstream of the project which provides habitat for some 90 fish species, is important for growth of juvenile fishes, for flood control and as a food source for local communities.
Protected areas (national parks and reserves etc) and their distance from the project	The project will not affect any protected areas or reserves. National Parks in the vicinity of the project include Las Orquideas (distance of 75 km) and Paramillo (24 km). Other protected areas include the *Reserva Natural Bajo Cauca Nechí* (20 km), the *Reserva de Recursos Naturales de la Zona Ribereña del Rio Cauca* and regional protected areas under Corantioquia. Other important reserves in the vicinity of the project include the *Distrito de Manejo Integrado del Sistema de Páramos y Bosques Altoandinos del Noroccidente Medio Antioqueño* (6 km) and the *Distrito de Manejo Integrado Bosque Seco del Occidente Antioqueño*.
Critical habitats in the project area, including important bird areas, hotspots of endemism etc.	The Dry Tropical Forest is one of the most threatened ecosystems globally and in Colombia; less than 10% of its original extent is present today. 18.5% of the fish species in the Cauca River basin are in some category of threat.
# threatened species in the directly affected area: terrestrial	Amphibians (1), Birds (6), Mammals (5) and Vascular/Non-vascular plants (5)
# threatened species: aquatic	Fish (17)
Any other species of conservation importance	Six IUCN listed species of cats have been identified in the project area of influence including (*Puma concolor* (LC)*, P. yagouaroundi* (LC)*, Leopardus pardalis* (LC)*, L. tigrinus* (VU)*, L. wiedii* NT)), and the Jaguar (*Panthera onca* (NT)) has been identified outside of the area of influence.
Migratory pathways	The Ituango dam does not include fish passage facilities. See below for a discussion of the Cauca River as a migratory pathway.
Invasive species: terrestrial	American Bullfrog (*Lithobates catesbeianus*) and Giant African Snail (*Achatina fulica*)
Invasive species: aquatic	Common Water Hyacinth (*Eichhornia crassipes*) and Nile Tilapia (*Oreochromis niloticus*)
Key threats to biodiversity	Fires, deforestation, agriculture, ranching, illegal mining, water contamination, overfishing.

Agencies involved in biodiversity conservation	Corantioquia is the regional government agency responsible for the execution of policies, plans, programs and projects on the environment and renewable natural resources, in accordance with the regulations, guidelines and directives issued by the Ministry of the Environment and Sustainable Development (MADS). The National Natural Parks agency of Colombia is a Special Administrative Unit of MADS in charge of the management of the Systems of National Natural Parks and of the coordination of the National System of Protected Areas.

Minimum Requirements			**Advanced Requirements**		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
Assessment					
Biodiversity issues relevant to project implementation have been identified through an assessment process	✓	An ESIA was submitted in 2007 and an updated version (both in terms of methodology and in terms of scope) in 2011. Additional assessments of biodiversity impacts were undertaken during implementation. Following the contingency event in 2018, additional biodiversity studies were completed downstream. IDB's technical assistance has supported two volumes describing the flora and fauna in the project area. Additionally a number of other publications have been produced including on cats, otters, birds and mammals.	Monitoring of biodiversity issues during project implementation takes into account inter-relationships amongst issues, and both risks and opportunities that become evident during implementation	✘	In 2015, as part of ANLA requirements for additional monitoring and assessment of terrestrial flora and fauna conditions, the National University of Colombia on behalf of EPM undertook extensive surveys of vegetation and fauna (amphibians, reptiles, birds and mammals) in four locations in the project area of influence. EPM had monitored aquatic resources downstream of the dam as part of license requirements, but following the 2018 contingency event and concerns over impacts on downstream fisheries, EPM expanded their aquatic monitoring programs. Monitoring of fish in the Cauca River covered a) the association of fish species located in the lower and middle Cauca basins, b) the reproductive activity of migratory species in the lower and middle Cauca basins (spawning areas and migratory
Biodiversity issues relevant to project operation have been identified through an assessment process	✓	The 2007 and 2011 ESIAs covered biodiversity issues in both the implementation and the operation phase.			
The above assessments utilised appropriate expertise	✓	Appropriate expertise in biodiversity was utilised.			
Monitoring is being undertaken during the project implementation stage	✓	Since the 2018 contingency, EPM has concluded 11 agreements for ongoing monitoring and conservation of fish			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
appropriate to the identified issues		resources and their habitats in downstream areas of the Cauca River.			routes) and c) fishing activities in the lower and middle Cauca basins. Fish studies of the University of Cordoba have shown that spawning of fish species in the Cauca River downstream of the project is not affected. The main area of fish spawning is from Puerto Valdivia (29.6 km downstream) to Achi (310.6 km downstream). The same studies show there was little fish reproductive activity above the current dam site and in downstream areas below the dam to Puerto Valdivia. Prior to construction of the project, the areas above the dam site were in a deep canyon with numerous rapids which formed a physical barrier for the migration of most fish and did not provide suitable fish spawning habitat, whereas downstream of the dam to Puerto Valdivia, the river is fast flowing and narrowly constrained, conditions also not conducive to fish reproductive activity (however migratory movement within that reach has been observed). There is likely to be some barrier effect from the dam. Including possibly from the spillway affecting access to the Ituango River which enters the Cauca River just downstream of the dam, but the implications for fish

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
					assemblages and biomass may take time to materialize. The ESIA also suggested that any reduction of flows downstream in the lower Cauca River coupled with the effect of scouring of the riverbed could lead to a loss of appropriate breeding environments for migratory species in the downstream wetlands (*ciénagas*) and, therefore, a reduction in their abundance in the basin. The project operating rules were set up to avoid any abrupt changes to flows and resultant downstream impacts. However, during implementation, additional risks for these habitats became evident during the geomorphological studies that modeled significant deepening of the riverbed (see sections 1 and 3) and consequently, a potential loss of connectivity between the river and the wetlands. These combined risks for the downstream wetlands are not yet fully understood, and it is not clear whether and how they can be managed adaptively. The lack of clarity regarding cumulative effects of the barrier and the potential long-term loss of wetlands is a **significant gap** against advanced requirements. EPM is taking an active role in engaging communities in monitoring

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
					and biodiversity conservation efforts including a) working with the *Fundacion Humedales* to engage fisher folk and improve fishing practices and b) working with and providing income to local communities to conserve and protect downstream wetlands (‘*Guardacienagas*’).
Management					
Processes are in place to ensure management of identified biodiversity issues, and to meet commitments, relevant to the project implementation stage	✓	EPM has had an active biodiversity program during implementation beginning with faunal recovery during reservoir filling and removal of aquatic weeds, acquisition of key habitats around the reservoir and ongoing baseline and monitoring surveys. Significant steps were taken to protect threatened tropical forest in the project area acquiring 17,776 ha in the Cauca River canyon (of which 17,471 ha was required by license, as offsets). These lands around the reservoir are privately held by EPM.	Processes are in place to anticipate and respond to emerging risks and opportunities	✓	Through the Plan for Specific Action (PAE) EPM is undertaking a number of ecological restoration activities in the Lower Cauca River to preserve both ecosystem health and support the fishing resource for local communities This includes evaluation of the fishing resource with the *Fundacion Humedales*; identifying spawning areas and routes of migratory fish (University of Cordoba), identifying fish genetics (University of Medellin) and through the *Guardacienagas* program, working with 120 persons in conservation efforts in 50 downstream wetland areas. Through these programs, EPM works closely with Colombia authorities including Corantiaoquia and AUNAP. It has concluded 11 agreements with universities and environmental authorities and has invested more
Plans are in place for the operation stage for ongoing biodiversity issues management	✓	EPM has an active program of biodiversity management for operations building on baseline studies done for the EIA and additional monitoring programs. It has initiated a program of restoration of the Dry Tropical Forest together with			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
		the National University. It is undertaking more monitoring of vegetation and wildlife with the University of Antioquia. It is working with 80 persons from 11 communal action committees to reforest a 100 m buffer zone around the reservoir, and also undertaking an environmental education program with local communities. EPM operates a Fauna Attention Centre at the main camp (CAV PHI) to recover wildlife affected by project operations A total of 1,238 animals have been rescued and 1,181 relocated. EPM has established a greenhouse at El Palmar to produce seedlings for replanting of vegetation. To date over 1.3 million native trees have been produced representing over 40 species. With the University of Cordoba and the Ocampo family EPM is assisting a fish farm south of Caucasia for the reproduction of three key species in the Cauca River-blanquillo, bagre y comelón.			than USD 11.6 million in these conservation efforts. EPM is also working in control programs of invasive species including capture and removal of the giant African snail (*Achatina fulica*), removal of *buchón* (water hyacinth) and Nile Tilapia (*Oreochromis niloticus*) from the reservoir.
Conformance and Compliance					
Processes and objectives in place to manage biodiversity issues have been and are on track to be met with:			There are no non-compliances	✓	No current non-compliances have been identified specific for this topic.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
• no major non-compliances	✓	No major non-compliances have been identified.			See section 1 for a general discussion of non-compliances being resolved with ANLA.
• no major non-conformances	✓	No major non-conformances have been identified.	There are no non-conformances with respect to biodiversity.	✓	No non-conformances have been identified.
Biodiversity related commitments have been or are on track to be met	✓	Biodiversity related commitments, either by regulation or voluntary, are on track to be met. This includes for example. requirements for protection of a 100 m buffer around the reservoir, reforestation commitments, and reestablishment of orchids and bromeliads.			
Outcomes					
Negative biodiversity impacts arising from project activities are avoided, minimised, mitigated and compensated with no significant gaps	✓	EPM had an active program of fish rescue and recovery following the 2018 contingency event. Over 884,000 fish were rescued with the help of 1,000 fisher folk; 80,000 fish deaths were recorded. EPM has also effectively responded to EIA license requirements including reforestation of the 100 m buffer zone from waterline at FSL, relocation of epiphytes and acquisition of biodiversity conservation areas.	Negative biodiversity impacts arising from project activities are avoided, minimised, mitigated and compensated with no identified gaps	✘	The biodiversity conservation program is comprehensive and includes fish and faunal rescue, protection of habitat through acquisition and reforestation of disturbed areas, removal of aquatic invasive species and ongoing faunal and flora monitoring programs. These efforts are likely to maintain healthy ecosystems in the project area. For example, the *Fundacion Humedales* has registered 40 fish species that are harvested in the reservoir and downstream of it. As mentioned above and in sections 1 and 3, there are some concerns about the long-term impacts on downstream wetlands due to

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
					geomorphological changes. At this stage it is impossible to confirm whether such impacts will materialize and whether they can or will be compensated. These uncertainties are a **significant gap** against advanced requirements.
			Enhancements to pre-project biodiversity conditions or contribution to addressing biodiversity issues beyond those impacts caused by the project are achieved or are on track to be achieved	✓	EPM has had an extensive aquatic biodiversity research and outreach program, contributing to scientific knowledge and management expertise. With regards to terrestrial biodiversity, EPM has acquired and is restoring over 17,778 ha of partially degraded tropical forest in the project area, an important conservation effort in the protection of threatened dry tropical forest in Colombia. With Conservation International, EPM is looking at initiating regional conservation efforts and establishment of biodiversity corridors between the Ituango HPP and the Urra HPP. While not yet established, this would be an important biodiversity conservation effort. It would also require coordination with regional and national conservation agencies.

List of significant gaps against **Minimum Requirements**	Number of **Advanced Requirements** met
None	4

Summary of findings and other notable issues
Since project initiation, EPM has had a dedicated and comprehensive response to biodiversity conservation, both in response to management plans required under the license and voluntary biodiversity conservation efforts. EPM has demonstrated minimal effects of the project on local and regional biodiversity through its ongoing terrestrial and aquatic biodiversity monitoring programs. This has also included important contributions to science improving knowledge on flora and terrestrial and aquatic fauna. However, there are uncertainties about the long-term impacts on fish and on aquatic ecosystems downstream.

Relevant evidence	
Interview	9, 10, 15, 23, 25, 33, 51, 52, 56, 61-63, 65, 74, 75
Document	180 – 193, 227, 228, 248, 259, 265, 287 – 289, 296 – 305
Photo	3, 8-14, 21-28, 55, 100-102

7 Indigenous Peoples

Scope and Principle
This section addresses the rights at risk and opportunities of Indigenous Peoples with respect to the project, recognising that as social groups with identities distinct from dominant groups in national societies, they are often the most marginalised and vulnerable segments of the population. The principle is that the project respects the dignity, human rights, aspirations, culture, lands, knowledge, practices and natural resource-based livelihoods of Indigenous Peoples in an ongoing manner throughout the project life.

Background	
Are any of the affected people Indigenous Peoples? Please state the evidence on which this determination is made.	
Yes, this section is relevant	Yes, this section is relevant. The Ituango project displaced a community of Nutabe people living in Orobajo, a riverbank village on the Cauca River in the reach now covered by the reservoir.
No, this section is not relevant	

Brief description of the peoples and their culture, lands, and representation	The people of Orobajo were artisanal miners and subsistence fishermen that lived along the shoreline of the Cauca River. At the time of the EIA and baseline studies, the people of Orobajo were not officially recognized as one of the country's 86 indigenous communities. In 2014, the Nutabe people of Orobajo began a process to become officially recognized by the Ministry of the Interior and obtain land rights. The process was supported by the Ituango project, and the Nutabe were officially registered on May 19th, 2017. The Ministry 's Resolution recognized 57 families with family units living in the communities of Orobajo, La Loma, La Aurora, and La Meseta, in the municipality of Sabanalarga; in the communities of Llanón Cañanoa, Guayabal and La Bastilla, in the municipality of Peque; and in the communities of El Tinto, La Florida, La Honda and La Hundida in the municipality of Ituango.
Directly affected communities and how they are affected	The entire Nutabe community of Orobajo was resettled by the project.
Other affected indigenous communities	No other indigenous communities are affected by the project.
# households physically displaced	37 families from Orobajo were originally identified in the resettlement program. 20 additional families were added as beneficiaries during the official registry and FPIC process.
# households economically displaced	All of Orobajo's inhabitants were resettled by the project.
Agencies relevant to Indigenous Peoples	Ministry of the Interior, Indigenous Affairs Department (Dirección Asuntos Indígenas), Government of Antioquia (Gerencia de Negritudes)

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
Assessment					
Issues that may affect Indigenous Peoples' rights in relation to the project have been identified through an assessment process	✓	Baseline studies of the communities that would be affected by the project's reservoir included Orobajo, where the majority of the Nutabe community lived and worked in the informal gold mining sector.	Monitoring during project implementation takes into account interrelationships amongst issues, and both risks and opportunities that become evident during implementation	✓	At the beginning of the resettlement process, 37 Nutabe families from Orobajo were included in the project's resettlement program but not yet identified as Indigenous People. The project supported the Nutabe people in their efforts to be recognised officially by the State (by providing the necessary human, physical and financial resources), and in response to the recognition, broadened the support and monitoring measures for the Nutabe.
This process utilised local knowledge and expertise	✓	Specialised Colombian anthropologists were retained to work with the Nutabe on the studies to support the process of official registration with the Ministry of Interior.			
Monitoring of project impacts and effectiveness of management measures is being undertaken during project implementation appropriate to the identified rights at risk	✓	The Nutabe are included in the project's resettlement monitoring program and in addition, the project monitors the progress of the agri-business and agricultural activities being carried out on the 553 ha of community land. In total, a series of 26 specific projects have been designed to support the Nutabe, some of which are underway, some have been completed (e.g. acquisition of community land) and others have yet to begin (e.g. eco-tourism project).			
Management					
Measures are in place to address the Indigenous Peoples' rights at risk in relation to the project	✓	The project assisted the Nutabe people of Orobajo to be officially recognised as Indigenous Peoples by the Ministry of the Interior of Colombia and to carry out a formal	Processes are in place to anticipate and respond to emerging risks and opportunities	✓	Monitoring of the resettled Nutabe households as well as the progress in their agri-business activities is ongoing and allows issues and opportunities to be detected early on. For example,

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
		FPIC process for the project. The project acquired 553 near the town of Ituango ha to serve as community land for the Nutabe. These measures directly address the key rights at risk, namely self-determination and access to land.			the growing of coffee on the community land led to the opportunity for the Nutabe to roast and commercialise their own coffee. The project is supporting these plans by providing roasting equipment and capacity building in addition to providing links through qualified consultants to the National Coffee Growers' Federation (Federacafé). The frequent communication and monitoring visits and capacity building activities by project staff have helped the Nutabe to adapt from their previous subsistence fishing and mining lifestyle to agricultural activities at higher altitudes in cooler climates.
Formal commitments are publicly disclosed	✓	The Ministry's resolutions are publicly available, in addition to IDB reports and project reports on EPM's website. A formal agreement between the Nutabe community and EPM was agreed to on June 7, 2019, during one of the official follow-up meetings hosted by the Ministry of the Interior in Ituango, with the participation of a number of local, regional and national institutions. The event was also filmed.			
Stakeholder Engagement					
Channels of communication with Indigenous Peoples are maintained	✓	The project maintains communication with the chief (Cacique) of the Nutabe people as well as with the other resettled families and community members, to assess whether their livelihoods have improved since the resettlement process through ongoing activities under the agreement with EPM and other activities that may be of interest to them.	Feedback on how issues raised have been taken into consideration has been thorough and timely	✓	The Nutabe have expressed that issues raised have typically been addressed promptly and to their satisfaction.
These channels are:					

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
• appropriately timed	✓	In spite of the original rejections by the Ministry of Interior (indicating that the community in question was not registered with any of the Ministry's data bases, because the activities carried out in Orobajo were not characteristic of traditional collective ethnic practices that distinguished them from other similar communities), the project, of its own initiative, worked with the Nutabe community in good faith, using a process that is comparable to prior consultation and included a long, sustained consultation with the Orobajo community.			
• culturally appropriate	✓	The process used culturally appropriate procedures and methods that included the community's representative institutions, to do outreach about the project's characteristics and analyse probable impacts as well as mitigation and compensation measures for such impacts.			
• two-way	✓	At all times, a two-way communication was maintained that allowed the community to freely participate at all levels in making decisions that would affect them.			
Ongoing processes are in place for Indigenous Peoples	✓	The ongoing regular monitoring activities allow for two-way communication and to raise issues			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
to raise issues and get feedback		and get feedback. In addition, all resettlees and other Indigenous People have access to the community grievance mechanism.			
A mutually-agreed disputes procedure is in place	✓	A monitoring committee was elected to follow up on activities and commitments included in the agreement between EPM and the Nutabe community, in addition to the mutually agreed upon grievance mechanism. This committee is present at monitoring meetings when progress and planning issues are discussed.			
Stakeholder Support					
Free, Prior and Informed Consent has been achieved with respect to the Indigenous Peoples' rights at risk following the principle of proportionality	✓	Although construction had already begun and the community members, as resettlees, consented to the resettlement process before initiating the Indigenous Community registration process with the Ministry of the Interior, the process of negotiation of the community agreement is equivalent to FPIC because of the open and transparent two-way communication and the support from the company throughout the process with government entities. Both parties contributed to the development of the agreement content. The Ministry of Interior's Prior Consultation department hosted the FPIC meetings	Free, Prior and Informed Consent of directly affected indigenous groups has been achieved for the entire project	✓	Free, Prior and Informed Consent of the directly affected indigenous community was achieved for the entire project and was formally expressed by signing the community agreement through their elected leaders.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
		with the participation of other local and regional institutions, the Nutabe and EPM. Minutes of meetings include lists of agreed upon impacts of the project on the community as well as projects and programmes to compensate for these impacts.			
Conformance and Compliance					
Processes and objectives relating to Indigenous Peoples' rights at risk have been and are on track to be met with:			There are no non-compliances	✓	No current non-compliances have been identified specific for this topic. See section 1 for a general discussion of non-compliances being resolved with ANLA.
• no major non-compliances	✓	No major non-compliances have been identified.			
• no major non-conformances	✓	No major non-conformances have been identified.	There are no non-conformances	✓	No non-conformances have been identified.
Any Indigenous Peoples related commitments have been or are on track to be met	✓	Some of the commitments in the agreement have been completed (land acquisition and title), others are in process and others have yet to begin but are on track to be met within the timelines identified in the agreement. The elected monitoring committee with members from the Nutabe council and EPM ensure commitments are being met.			
Outcomes					
Plans provide for negative impacts of the project to Indigenous Peoples' rights to be avoided, minimised, mitigated or compensated	✓	Plans and programmes in the agreement (1 compensation program and 26 mitigation projects) provide for impacts on the Nutabe's rights to be avoided, minimised, mitigated and compensated.	Opportunities for positive impacts have been thoroughly identified and maximised as far as practicable	✓	A number of positive impacts were identified throughout the process of supporting the Nutabe people to be recognised as an Indigenous Peoples community in Colombia. Some community members have chosen to

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
		As of June 2022, progress recorded in the minutes of the official monitoring meeting indicate a 100% completion of the compensation measure (e.g. procurement of 553 ha of land), and of the 26 other projects underway 2 are completed, 13 are partially completed and 7 have not yet begun.			live on the communal land while others were resettled to the communities of their choice with independent housing. The suite of programmes and projects that have been identified by the Nutabe and developed together with the project and are included in the agreement will further maximise potential for economic development on the 553 ha of communal land and through the other activities.
Plans provide some practicable opportunities for positive impacts to be achieved	✓	Plans include capacity building, education and institutional capacity building programmes to ensure positive outcomes are achieved.			

List of significant gaps against **Minimum Requirements**	Number of **Advanced Requirements** met
None	7

Summary of findings and other notable issues
The project supported the Nutabe community of Orobajo to obtain official recognition as an Indigenous Community in Colombia and gain communal land rights. Although this occurred after construction of the project had started, an FPIC-like process was then followed by the project and the Nutabe to reach an agreement to collaboratively design a programme of activities and commitments to achieve positive impacts for their community, including procurement of communal land. This programme also benefits Nutabe members who did not live in Orobajo and were not affected by resettlement and other project impacts.

Relevant evidence	
Interview	7, 8, 28, 69
Document	194-196, 314-316
Photo	122, 123

8 Cultural Heritage

Scope and Principle
This section addresses cultural heritage, with specific reference to physical cultural resources, associated with the hydropower facility. The principle is that physical cultural resources are identified, their importance is understood, and measures are in place to address those identified to be of high importance. This section does not address non-physical cultural resources, which are addressed in Section 1 and/or in Sections 5 and 7 when relevant.

Background	
Does the project affect any physical cultural resources? Please state the evidence on which this determination is made.	
Yes, this section is relevant	Yes, this section is relevant, a number of archaeological studies were undertaken for the project and the project modifications, and some historical or cultural sites/infrastructure are affected by the project.
No, this section is not relevant	

Sites of physical cultural heritage affected by or in proximity to the project-affected areas	How they are affected
The areas along the Cauca River including the footprint of the dam, reservoir and associated infrastructure (roads, substation etc.), including pedestrian suspension/hanging bridges. Impacts to one of the suspension bridges (the Puente de Occidente, located upstream from the reservoir) were avoided by adjusting dam height and reservoir footprint during the feasibility stage of the project.	135 sites within the project footprint were identified for their archaeological value, 23 were considered high archaeological value sites that would be significantly affected by the project. Two pedestrian suspension bridges of cultural and historic significance were flooded by the project.

Agencies responsible for cultural heritage	Colombian Institute of Anthropology and History (ICANH)
Other important local or regional cultural heritage values and issues	Historic buildings with potential for rehabilitation.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		**Findings and Observations**	**Requirement is met: yes (✓) or no (✗)**		**Findings and Observations**
Assessment					
Cultural heritage issues, with respect to physical cultural resources, that are relevant to project implementation	✓	A preventive archaeology programme was designed and implemented to identify and preserve the archaeological heritage in the Area of	Monitoring during project implementation takes into account interrelationships amongst issues, and both	✓	During the EIA stage historical and cultural sites that would be affected were identified. During implementation interrelationships

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
have been identified through an assessment process		Influence of the project. The programme included archaeological and cultural heritage surveys, prior to project implementation to locate physical cultural resources of archaeological, historical and cultural significance. A total of 135 archaeological sites were registered with ICANH for excavation	risks and opportunities that become evident during implementation		between the community and social management and communications included a number of presentations and discussions specifically around archaeology and cultural heritage, specifically, presentations and meetings were caried out to clarify impacts on cultural heritage sites and compensation for the loss of pedestrian suspension bridges (Puente Pescadero and Puente Buenavista) and the restoration of the historic Casa Hacienda Cuní in the community of Toledo into a community centre and museum but also served to clarify other aspects of the project or clarify community questions and concerns related to other topics.
Cultural heritage issues, with respect to physical cultural resources, that are relevant to project operation have been identified through an assessment process	✓	A number of historical sites have been identified that will be restored (as compensation measures) once normal operations resume, i.e., when the management of the contingency phase is officially closed by ANLA.			
The assessments utilised appropriate expertise	✓	Archaeological studies as well as implementation of the archaeological management plan (or recovery plan) and archaeological monitoring were, and continue to be, carried out by qualified registered archaeologists, as required per Colombian law.			
Monitoring is being undertaken during the project implementation stage appropriate to the identified issues	✓	Monitoring of the implementation of the archaeology management plan is an integral part of the preventive archaeology programme and has been carried out since the archaeological prospection stage, and is meant to recover any additional information not recovered during the previous stages (e.g. surveys, excavation)			
Management					

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
Processes are in place to ensure management of identified cultural heritage issues, and to meet commitments, relevant to the project implementation stage	✓	23 of the identified archaeological sites are significantly affected by the project (mostly within the footprint of the reservoir) and 13 of these are the subject of archaeological recovery in the archaeological heritage management program. A chance finds plan is in place for the duration of the implementation and site restoration activities, allowing the project to respond to any emerging archaeological finds during these phases. The collection of archaeological artefacts recovered during the construction stage has been transferred to the University Museum at the University of Antioquia. The consulting firm in charge of archaeological surveys (Integral S.A.) were the custodians of the collection during discussions with the University.	Processes are in place to anticipate and respond to emerging risks and opportunities	✓	Ongoing communications programmes related to archaeological and cultural heritage with the different communities in the area of influence of the project allows for open communication channels and to anticipate and respond to any requests, risks and opportunities that arise.
Plans are in place for the operation stage for ongoing cultural heritage issues management	✓	Management of impacts to bridges includes implementing compensation measures including a floating bridge on the reservoir, once the reservoir has stabilised and the reservoir management plan is finalised.			
Conformance and Compliance					
Processes and objectives in place to manage cultural heritage issues have been and are on track to be met with:			There are no non-compliances	✓	No current non-compliances have been identified specific for this topic.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		**Findings and Observations**	**Requirement is met: yes (✓) or no (✗)**		**Findings and Observations**
• no major non-compliances	✓	No major non-compliances have been identified.			See section 1 for a general discussion of non-compliances being resolved with ANLA.
• no major non-conformances	✓	No major non-conformances have been identified.	There are no non-conformances	✓	No non-conformances have been identified.
Cultural heritage related commitments have been or are on track to be met	✓	Cultural heritage commitments have been or are on track to be met, such as the restoration of Casa Cuni.			
Outcomes					
Negative cultural heritage impacts arising from project implementation are avoided, minimised, mitigated and compensated with no significant gaps	✓	Negative cultural heritage impacts have been avoided, minimised and compensated or are on track to being compensated with no significant gaps.	Negative cultural heritage impacts arising from project implementation are avoided, minimised, mitigated and compensated with no identified gaps	✓	No gaps in outcomes have been identified.
			Contributions to addressing cultural heritage issues beyond those impacts caused by the project are achieved or are on track to be achieved	✓	A number of meetings and community discussions around cultural heritage impacts and archaeological finds have provided communities and academic institutions with insight, information and documented accounts and artefacts from the surveys and studies carried out by the project. These include a number of proposed activities including traveling exhibitions to different municipalities, videos, seminars and presentations, and publications (book, flyers, etc.)

List of significant gaps against **Minimum Requirements**	Number of **Advanced Requirements** met
None	6

Summary of findings and other notable issues
A rigorous pre-construction archaeological survey and excavation program and a chance finds plan and associated training and awareness campaigns implemented during construction led to the recovery of many artefacts that are being transferred to the University Museum of the University of Antioquia. The archaeological and cultural heritage management plan includes compensation measures for the loss of two pedestrian suspension bridges and the restoration of a community building in Toledo for future community use.

Relevant evidence	
Interview	7, 28, 36
Document	1, 198-203, 317, 318
Photo	99, 116

9 Governance and Procurement

Scope and Principle
This section addresses corporate and external governance considerations for the operating hydropower facility, and all project-related procurement including works, goods and services. The principle is that the developer has sound corporate business structures, policies and practices, and that procurement processes are equitable, transparent and accountable.

Background	
Key information on political context and public sector risks	Colombia is a democracy with elected public officials including the president, members of congress, governors of departments, and mayors of municipalities. It has had a long history of internal conflict, dating back to at least 1948. Compared to other Latin American countries, Colombia ranks about average on the World Bank's Worldwide Governance Indicators, with particularly low values on Political Stability and Absence of Violence/Terrorism, lower than average values on Rule of Law, Control of Corruption, and Voice and Accountability, and higher than average values on Regulatory Quality and Government Effectiveness. Because 1) responsibility for the Ituango project is divided between the central government (as regulator and because it is the country's largest infrastructure project), the department of Antioquia (as co-owner of Hidroituango), and the municipality of Medellin (as owner of EPM), 2) these entities have different roles and are often led by politicians with opposing interests, and 3) the contingency generated a large degree of public interest, the project has been subject to much political attention and disagreements, and reviews, audits, and interventions from a variety of agencies and regulators such as ANLA (see section 1). For some processes, for example for management of the reservoir and the dry forest protected area around it, EPM relies on the cooperation of various government entities.
Key information on corporate ownership and governance	Sociedad Hidroeléctrica Ituango S.A., also known as Hidroituango, is co-owned by the Municipality of Medellín through EPM and the department of Antioquia through the Instituto para El Desarrollo de Antioquia (IDEA), and minority owners. EPM was founded in 1955 and is today a large public multi-utility with operations beyond the city of Medellin, in Antioquia, other parts of Colombia, and a number of Latin American countries. It has built a good reputation as a professionally managed and competent organization.
Details of the concession, if applicable	Hidroituango has delegated the implementation and operation of the project to EPM through a 50-year BOOMT (Build Own Operate Maintain Transfer) contract.
Key licenses or permits	See section 1. EPM has also entered obligations with regards to making firm energy available to the national grid, which could be affected by delays caused by the contingency. The first two 300 MW units did meet the deadline of commercial operations by November 30, 2022.

Key information on expected procurement strategy for this project (EPC, BOOT, etc)	EPM has concluded a large number of individual contracts for civil works, electro-mechanical works, environmental and social, and multiple other project components.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
Assessment					
Processes are in place to identify:			There are no significant opportunities for improvement in the assessment of political and public sector governance issues	✓	The issues related to the multiple and in some cases, competing political leaders at different government levels, and the agendas of sectoral agencies with different interests in the Ituango project are well understood. However, EPM as an organization has limited ability to influence these issues. While this is not considered a significant gap, there are some opportunities to improve the analysis and coordination of government agencies at different levels. One example is coherence between the plans of EPM, the municipalities around the reservoir, the Department of Antioquia, Corantioquia, and specialised government agencies such as AUNAP regarding the reservoir and land use in its catchment (see sections 6, 11).
• ongoing or emerging political and public sector governance issues	✓	EPM has a good understanding of external governance issues. A report on socio-political risks, both national and in the project zone, is prepared on a monthly basis. Political developments and new legal requirements are identified by the Legal, Corporate Audit and General Secretary units of EPM. A regulatory management team is following up on issues, often jointly with other companies in the sector, based on an annual plan that identifies priorities.			
• ongoing or emerging corporate governance requirements and issues	✓	Corporate governance issues are regularly identified by following new regulatory requirements and voluntary frameworks such as the OECD Guidelines on Corporate Governance of State-Owned	There are no significant opportunities for improvement in the assessment of corporate governance requirements and issues	✓	EPM and the Ituango project are also regularly assessed by government agencies such as the Financial Superintendency, the Superintendency for Public Services, the Auditor General, General

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
		Enterprises, through internal and external audits, and EPM's board of directors' and audit committee meetings. An annual report is produced and made publicly available through the Sustainability Report. The internal audit plan is risk-based, and special audits have been performed on issues related to the Ituango project, e.g. on the contracting strategy for a new civil works contractor.			Comptroller of Colombia, General Comptroller of the City of Medellín, and others, as well as a permanent external auditor.
• major supply needs, supply sources, relevant legislation and guidelines, supply chain risks and corruption risks	✓	The definition of supply needs is based on corporate investment plans. A market analysis and risk analysis is typically undertaken and for major contracts, procurement strategies are defined. Procurement for the Ituango project is planned and handled by the Ituango project team directly, with some support from the corporate procurement units.			
Processes are in place to monitor if corporate governance measures are effective	✓	The implementation of the Corporate Governance plans is tracked and reported on. Internal audits also provide feedback on the effectiveness of the corporate governance framework.	The assessment includes opportunities for local suppliers and local capacity development	✓	EPM has processes for the identification and preferential contracting of community organizations and local and regional providers and contractors, that include supplier development. There is a 'Supplier Diversity and Development' unit within EPM's procurement vice-presidency.
Ongoing monitoring is being undertaken to monitor effectiveness of procurement plans and processes	✓	The Optimo software platform is used to track procurement performance, and procurement processes are regularly audited. There is also a systematic process to evaluate the			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		**Findings and Observations**	**Requirement is met: yes (✓) or no (✗)**		**Findings and Observations**
		performance of contractors, which can include E&S criteria, depending on contract specifications.			
Management					
Processes are in place to manage:			Processes are in place to anticipate and respond to emerging risks and opportunities	✓	EPM's own management processes, in combination with the close supervision by regulators, owners and lenders of the Ituango project, and the high level of visibility and attention paid by the general public, ensure that risks and opportunities are comprehensively identified and addressed.
• corporate, political and public sector risks	✓	EPM has regularly updated medium-term and annual Corporate Governance plans, that address identified risks. Two board sub-committees are supervising the Ituango project, from a legal and technical perspective. There are also multiple and comprehensive corporate policies, statutes, guidelines, and manuals, to manage risks, for example supply chain risks.			
• compliance	✓	EPM maintains databases of legal and regulatory requirements, including license conditions, to keep track of the multiple conditions in particular regarding the Ituango project. More than half the entries in EPM's M-Risk database are requirements related to Ituango.	Contractors are required to meet or have consistent policies as the developer	✓	Alignment with EPM's policies is required. The Code of Conduct for contractors specifies in detail requirements related to human rights; labour standards; quality and environment; prevention of fraud, corruption, and bribery; information protection; and fair competition. Contractors have to accept these terms, which are also referenced in the contract conditions. Detailed E&S requirements are laid out in additional documents such as the PIMMA (see section 1). Compliance is
• social and environmental responsibility	✓	EPM has various related policies such as a corporate social responsibility and an environmental policy. The Environmental, Social and Sustainability unit for the Ituango project is at the same hierarchical			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
		level as the Project Development unit, and is well resourced (see section 1)			supervised by the *interventoría*. There is an annual audit by EPM and a process to deal with non-compliances and alerts from third parties, and enforcement can be done through contractual fines or cancellations. Registered suppliers are also supported through capacity development initiatives (e.g. virtual workshops on issues such as gender equity) and on occasion, collectively reminded of EPM's expectations (e.g. on respectful treatment of communities).
• procurement of goods and services	✓	Procurement is one of the so-called 'macroprocesses' among EPM's business processes, with well-defined and systematic rules.	Procurement processes include anti-corruption measures as well as sustainability and anti-corruption criteria specified in pre-qualification screening	✓	Compliance with contractual obligations, including those related to ethical business practices and sustainability, can be a reason for exclusion or a factor in the evaluation of offers. Since EPM is subject to public financial management processes, there are limitations to including sustainability criteria in the evaluation.
• grievance mechanisms	✓	There is a grievance mechanism for affected communities at the level of the Ituango project as well as one for contractors, at the level of EPM.			
• ethical business practices	✓	EPM has an internal Code of Ethics and a Code of Conduct for contractors and suppliers, and various processes to mitigate risks of conflicts of interest, fraud, corruption, money laundering etc. The management board has an ethics committee. An internal evaluation of its ethical	Sustainability and anti-corruption criteria are specified in the pre-qualification screening	✓	See above. EPM does not generally apply pre-qualification processes but has equivalent criteria built into its contractor registration and selection.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
		business practices was last conducted in 2021.			
• transparency	✓	Transparency is promoted through an open communications policy, through accountability in particular with the ultimate owners of EPM, the citizens of Medellín, and through transparent processes for hiring and contracting. The Colombian stock exchange recognized EPM in 2020 for best practices in transparency for investors.			
Policies and processes are communicated internally and externally as appropriate	✓	Policies and processes are easily accessible internally, and their understanding is promoted through trainings. External stakeholders can access many policies and processes through EPM's website.	Anti-corruption measures are strongly emphasised in procurement planning processes	✓	See above and under ethical business practices. The selection of procurement processes (between open tender, restricted tender and direct negotiation) has to be well justified.
Independent review mechanisms are utilised to address sustainability issues in cases of project capacity shortfalls, high sensitivity of particular issues, or the need for enhanced credibility	✓	A number of independent review mechanisms have been used from the beginning of the Ituango project, and more were added on later, because of the loan with IDB Invest and the contingency.			
Measures are in place to guide procurement of project goods, works and services and address identified issues or risks, and to meet procurement related commitments	✓	See above. Comprehensive procurement processes are in place.			
Conformance and Compliance					

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		**Findings and Observations**	**Requirement is met: yes (✓) or no (✗)**		**Findings and Observations**
The project has no major non-compliances relating to governance	✓	While non-compliances have been identified (see under Advanced Requirements), these are not current issues, but related to the contingency, and hence not considered 'major' by the assessment team.	There are no non-compliances	✗	Two regulators, the Comptroller General and the Superintendency for Public Services, have identified non-compliances and imposed fines related to governance: the Comptroller, against 26 persons and firms for fiscal responsibility for increased costs and delayed revenue; and the Superintendency against EPM for not meeting contractual delivery obligations, and for not complying with the framework agreement on relations between the municipality and EPM. These non-compliances constitute a **significant gap** against advanced requirements.
Processes and objectives relating to procurement have been and are on track to be met with:					
• no major non-compliances	✓	None have been identified.	There are no non-conformances	✓	None have been identified. While EPM had to modify project plans, contracts and governance arrangements as a result of the contingency, these are not considered non-conformances.
• no major non-conformances	✓	None have been identified.			
Any procurement related commitments have been or are on track to be met	✓	There are no indications otherwise.			
Outcomes					
There are no significant unresolved corporate and external governance issues identified	✓	With the entry into operation of the first two turbines before the regulatory deadline of Nov. 30 2022, the expectation is that political interferences (see under Advanced Requirements) will be reduced and will no longer cause significant issues.	There are no unresolved corporate and external governance issues identified	✗	In recent years there have been a number of interrelated governance challenges related to the high visibility of and interest in the project, including: pressure to accelerate the works, lawsuits, misinformation, requirements to change contractors, the spreading of safety concerns
Procurement of works, goods and services across major project components is:					

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
• equitable	✓	There are no indications otherwise.			among the population, evacuation simulations with unclear technical justifications, and resignations of the board of directors, leading to a downgrading of EPM's debt rating and the withdrawal of IDB as financier of the Ituango project. Some of these are still unresolved or have ongoing effects such as confusion and a lack of confidence in affected communities and the general public, distraction of the project team from resolving technical issues, and increased financing costs. Because of these lingering consequences, the political interference in the project is a **significant gap** against advanced requirements.
• efficient	✓	There are no indications otherwise.			
• transparent	✓	There are no indications otherwise. Contractors can obtain information on the evaluation of their offers. There are contact options including telephone hotlines regarding concerns about procurement and contractor performance.	Opportunities for local suppliers including initiatives for local capacity development have been delivered or are on track to be delivered	✓	See section 4 for the Ituango project. In total, in 2021, EPM had 83 contracts with *juntas de acción comunales*.
• accountable	✓	There are no indications otherwise.			
• ethical	✓	There are no indications otherwise.			
• timely	✓	Procurement processes in EPM and in the Ituango project can be time-consuming but have not yet led to significant project delays (see below).			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
Contracts are progressing or have been concluded within budget or changes on contracts are clearly justifiable	✓	Key contracts in the Ituango project have been running over schedule and budget, but this is largely explained by the contingency. The main civil works contract with CCC has not been extended again, and the contractor is now demobilizing. The entry of a new main contractor is delayed but an interim solution has been identified. The change in contractor will likely lead to some delays (although the main remaining underground works are limited by availability of space) and require some efforts to maintain continuity but is also likely to have some cost advantages.			

List of significant gaps against **Minimum Requirements**	Number of **Advanced Requirements** met
None	10

Summary of findings and other notable issues
EPM as a company has traditionally been held in high regard for its corporate governance processes and performance. The Ituango project-as a joint venture of the City of Medellín with the Department of Antioquia, as the largest infrastructure project in Colombia also under interest of the central government, and under intense public scrutiny particularly following the 2018 contingency – has presented EPM with a number of unprecedented governance as well as technical, financial and reputational challenges. Procurement and contract management have also been challenging given the budget and schedule overruns in the project. However, the project team has been able to largely overcome these challenges, maintain the project in a safe condition, and deliver the first commercial energy while generally maintaining well-established and sustainable governance processes. A number of political, administrative and judicial processes regarding responsibility for the 2018 crisis are not yet resolved but are not expected to affect the full entry into operations.

Relevant evidence	
Interview	1, 2, 6, 8, 11, 17, 20, 24, 34, 35, 43, 44, 54, 58, 59, 66, 69, 70

Document	2, 16, 31, 34, 36, 39, 48, 49, 75-76, 119, 123, 125, 127, 204-226, 256, 258, 263, 269-284
Photo	1, 35, 57, 66, 107, 110, 116

10 Communications and Consultation

Scope and Principle
This section addresses ongoing engagement with project stakeholders, both within the company as well as between the company and external stakeholders (e.g. affected communities, governments, key institutions, partners, contractors, catchment residents, etc). The principle is that stakeholders are identified and engaged in the issues of interest to them, and communication and consultation processes maintain good stakeholder relations throughout the project life. Communications and consultation requirements unique to Indigenous Peoples are found in Section 7.

Background	
Directly affected community-level stakeholders	Resettled households, Nutabe Indigenous Community, economically displaced households, municipalities in the direct area of influence (AOI) of the project, communities along access roads to the project site (e.g. San Andres de Cuerquia and Toledo) and downstream communities, particularly those affected by the contingency in 2018.
Directly affected institutional-level stakeholders	ANLA, Ministry of Interior, Government of Antioquia, Corantioquia, local municipalities, emergency first responders and disaster management agencies at different government levels, local *Juntas de Acción Comunal*, local and regional public health, biodiversity, cultural heritage and other specialised agencies and authorities, universities and other research institutions, employees and contractors.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
Assessment					
Communications and consultation requirements and approaches have been identified through an assessment process	✓	Communication and consultation needs and approaches were identified during the ESIA process and were adjusted and adapted to the circumstances throughout various stages of the project, including the revised ESIA and subsequent modifications which expanded the scope to include the road between the project and Puerto Valdivia, and further adjustments	The stakeholder mapping takes broad considerations into account	×	The stakeholder communication strategy includes three main components: informative, educational and stakeholder engagement and participation. The communication activities cover one, two or all three of these components. For example, during the pandemic, the regional newspaper “La Voz” published by the project became electronic to continue to reach local stakeholders and larger

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
		following the contingency (increasing the need to communicate with affected communities located further downstream). The pandemic also required changes to communications channels and processes.			audiences. In addition, weekly radio shows "Con Vos" and "Sobre la Mesa" were broadcasted on 8 different radio stations and shared project information on a broad range of topics with local and regional stakeholders (e.g. from what floating booms are for, to why community participation is important in risk management, to project milestones). However, stakeholder mapping does not appear to consider NGOs and project critics, and this is a **significant gap** against advanced requirements, since they have managed to gain considerable influence on public opinion.
The assessment process involved stakeholder mapping	✓	The project has identified stakeholders, assessed their level of influence and vulnerability and has developed a communication strategy that prioritizes the following audiences: internal audience (EPM staff), community (directly affected and general), opinion leaders (communication media, journalists, academia, business leaders, religious leaders, influencers), clients, investors (local and international banks, insurance companies, IDB and other DFIs/IFIs etc), government (national, regional, ANLA etc). The communication strategy for the Ituango project is adjusted annually following a series of perception surveys that map the different stakeholder groups' concerns and needs.			
The assessment process was supported by ongoing monitoring	✓	Monitoring of stakeholder perceptions is carried out by surveys which collect information on an ongoing basis and are a permanent			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
		aspect of the project's communication strategy.			
Management					
Communications and consultation plans and processes are in place to manage communications and engagement with stakeholders	✓	A Communication and Participation Programme (*Plan de comunicacion y relacionamiento*) was implemented during project implementation. A total of 12 community offices with liaison officers were put in place in the AOI to manage communications with communities. This is in addition to complementary programs such as the Regional Integration Program which has six sub-programs including one for Institutional and Community Capacity Building, one on environmental education, one for municipal development, all of which include communications aspects. At the corporate level, EPM's Communications and Corporate Relations Management department are responsible for visibility, transparency, participation and the relationship between the project and interested parties including external and government entities. For the Ituango project, EPM is supported by *MoralesCom, an* external consultant, specialized in strategic communication.	Communication and consultation plans and processes show a high level of sensitivity to communication and consultation needs and approaches for various stakeholder groups and topics	✓	As mentioned above, annual communication planning involves stakeholder groups to articulate plan objectives in accordance with their needs and concerns. The planning process also takes into account perception surveys carried out by a specialised communications company. Different mechanisms and processes are used to share information with different stakeholders and include a range of media (radio shows, documentary TV shows, newspaper, e-newsletter, webpage, social media, publicity campaigns), educational events and forums, sponsorship, and site visits organised by the corporate level communications teams for stakeholders such as deputies and congressmen, the United Nations, shareholders, ministers, international media, etc.
They include an appropriate grievance mechanism	✓	The external grievance mechanism has received and responded to over	Processes are in place to anticipate and respond to	✓	The 12 community offices, perception surveys and grievance mechanisms

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
		12,000 grievances or queries to date and has used the information received to better design stakeholder engagement activities and communication campaigns	emerging risks and opportunities		enable the detection and anticipation or emerging risks and opportunities within the directly affected communities. EPM also uses *MoralesCom*, an external consultant, specialized in more strategic communication to deal with emerging communications risks. .
They outline communication and consultation needs and approaches for various stakeholder groups and topics	✓	The Communication and Participation Programme includes a range of approaches and communications mechanisms for different stakeholder groups. It is focused on the AOI of the project and has specific mechanisms for physically and economically displaced people as well as an Employment Oversight Committee which provides information on employment opportunities.			
Stakeholder Engagement					
The project implementation stage involves engagement with directly affected stakeholders	✓	The Community Communication and Participation Programme promotes a direct channel of communication with communities and achieves active participation from community members. Different media are used to reach communities: • the newspaper "La Voz de Ituango" which became an e-newsletter during the pandemic • weekly radio programs • targeted pamphlets and billboards, publicity campaigns, sponsorships, etc.	Engagement is inclusive and we have participatory	✓	The Community Communication and Participation Programme is designed to promote inclusive participation of community stakeholders and to provide a platform for participative planning processes.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
		The most important spaces for direct community engagement participation during implementation have been: • the employment oversight committees • participatory committees to handle the impacts of migratory pressure • dialogues in towns and villages • citizen oversight • family assemblies • workshops held by the project			
Engagement is:					
• appropriately timed and scoped	✓	Communication programmes and schedules have been developed in a timely manner including during the contingency, and scoped appropriately.			
• often two-way	✓	The project's many programmes and activities provide participative fora and promote two-way discussion.	Negotiations are undertaken in good faith	✓	Examples of negotiations undertaken in good faith include negotiations with the Nutabe community from Orobajo that led to the community formally being recognised as an Indigenous community in Colombia, and the annual participative communications planning.
• undertaken in good faith	✓	Stakeholder engagement by the company and their consultants and contractors was undertaken in good faith.			
The business interacts with a range of directly affected stakeholders to understand issues of interest to them	✓	The project interacts directly with a range of stakeholders including community members within the AOI through a number of mechanisms mentioned above (participatory processes, 12 municipal offices,			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
		media etc.) as well as interaction during implementation of measures and monitoring activities, described in the project's management and monitoring plans and programmes (PMA and PMS) and other voluntary activities benefitting the AOI communities (see sections 1 and 4).			
Ongoing processes are in place for stakeholders to raise issues and get feedback:	✓	A number of channels are available for stakeholders to raise issues and receive feedback. They include the 12 municipal offices within the AOI, the project's and contractor's staff on site and in the field, the project's website, and a toll free customer service number.	Feedback on how issues raised have been taken into consideration has been thorough and timely	✓	Feedback follows grievance mechanism protocols which require a response within 2 weeks. Even when complete and thorough responses may take longer than two weeks, a reply is always submitted within two weeks stating that EPM are considering the matter.
Ongoing processes are in place for:					
• environmental and social issues	✓	A number of initiatives are in place for ongoing communications with stakeholders regarding environmental and biodiversity topics, related to the following activities: dry tropical forest restoration in the 100 m buffer zone around the reservoir, conservation of downstream wetlands in collaboration with the "*Fundación Humedales*" and wetland rangers (*guardacienagas*) as well as environmental education activities with 11 communal associations (*asocomunales*), and regarding social and other topics of interest such as:			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		**Findings and Observations**	**Requirement is met: yes (✓) or no (✗)**		**Findings and Observations**
		public health and mental health issues, migratory pressure during the implementation phase, the FPIC process with the Nutabe community, the 1% contributions of the project required by law, the status of the project and handover of infrastructure, employment opportunities, livelihood restoration and more.			
• project-affected communities	✓	A number of communications channels with project affected communities and groups (Nutabe, Resettlees and economically displaced people, local communities)	Project-affected communities have been involved in decision-making around relevant issues and options	✓	Project affected communities have the opportunity to participate in a number of decision-making activities, through the communications planning process, regional development programmes and other community based for a and activities organised by the project.
• resettlees and host communities	✓	In addition to processes available to the general public and community members, resettlees and host communities can access specific processes or channels to communicate issues and concerns directly with staff involved in monitoring their particular activities.	Resettlees and host communities have been involved in decision-making around relevant issues and options	✓	Through direct and personalised communication processes, resettlees and host communities are involved in decision-making around relevant issues. For example, resettlees may need additional capacity building to be successful in their new economic activities or may need support in adapting to their new life, and host communities may need additional facilities, road maintenance or support for events. These needs are addressed in a participatory manner.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
• employees and contractors to raise human resources and labour management issues	✓	A policy and a robust process are in place for workers to raise issues and communicate grievances. Minka, the voluntary retrenchment programme developed for the Ituango workforce, includes a communication programme (see section 2 for more details). In addition, EPM hosted 162 townhall meetings attended by 6,400 workers under the "*contigo*" program about mental health, quality of life and other issues in the workplace.	The business makes significant project reports publicly available	✓	Significant project reports are available on the project's webpage on EPM website. (Note, however that the Hidroituango company – see section 9-maintains its own website which is not up to date and does not contain most significant reports, which can lead to confusion).
• management of climate risks	✓	Annual emissions, mitigation and adaptation activities are reported in EPM's Annual Sustainability Report, for example in the 2021 edition.			
Public disclosure:					
• the business makes significant project reports publicly available	✓	Significant project reports are publicly available, for example on the Ituango project webpage on EPM's website. These include ESIAs and subsequent license modifications, and contingency related reports.	The business publicly reports on project performance in sustainability areas of high interest to its stakeholders	✓	A number of reports and extensive information are available on the project's webpage, including information on ongoing biodiversity and conservation activities, environmental education, regional development, some of the post-contingency reports and the associated Specific Action Plan for the restoration of the downstream affected communities (Bajo Cauca), some information on the full-scale emergency evacuation simulation that took place in November 2022, as well
• the business publicly reports on project performance, in some sustainability areas	✓	EPM's annual sustainability report includes sustainability performance information on the project.			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
					as environmental compliance reports for ANLA and for the IDB.
• power density calculations, estimated GHG emissions, and / or the results of a site-specific assessment have been publicly disclosed	✓	GHG emissions estimated for the project are reported on in the EPM annual Sustainability Report. In addition, a water quality modelling report includes GHG estimates for the project and is publicly available on the project's website.	The assessment of project resilience has been publicly disclosed.	✘	An assessment of project resilience to climate change has not been publicly disclosed.
Stakeholder Support					
Affected communities generally support or have no major ongoing opposition to the plans for the issues that specifically affect their community	✓	Affected communities have had input into and generally support the plans for the issues that specifically affect their communities.	Formal agreements with nearly all the directly affected communities have been reached for the mitigation, management and compensation measures relating to their communities	✓	Formal agreements (*convenios*) with the directly affected communities have been concluded and implemented for measures that mitigate, manage and compensate for impacts as well as additional benefits (see Section 4).
Resettlees and host communities generally support or have no major on-going opposition to the Resettlement Action Plan	✓	Resettlees and host communities have supported and continue to support the resettlement action plan. Resettlees reported general satisfaction with the support received.	There is consent with legally binding agreements by the resettlees and host communities for the Resettlement Action Plan	✓	The resettlees, including the Nutabe Indigenous community from Orobajo, and host communities have consented through legally binding agreements which cover provision of titled land and other individual support and capacity building activities during a 5-year monitoring period.
There is general support or no major ongoing opposition amongst directly affected stakeholder groups for the cultural heritage assessment, planning or implementation measures	✓	There is general support for the measures and plans to mitigate cultural heritage impacts such as impacts to suspension bridges.	Formal agreements with the directly affected stakeholder groups have been reached for cultural heritage management measures	✓	Formal agreements have been made for cultural management measures, including with the University of Antioquia for the hand-over of the recovered archaeological artefacts.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		**Findings and Observations**	**Requirement is met: yes (✓) or no (✗)**		**Findings and Observations**
Conformance and Compliance					
Processes and objectives relating to communications and consultation have been and are on track to be met with:			There are no non-compliances	✓	No current non-compliances have been identified specific for this topic. See section 1 for a general discussion of non-compliances being resolved with ANLA.
• no major non-compliances	✓	No major non-compliances have been identified.			
• no major non-conformances	✓	No major non-conformances have been identified.	There are no non-conformances	✗	Some non-conformances have been noted by government agencies such as ANLA regarding late reporting and likewise, EPM has noted government agencies not providing timely responses e.g. on draft plans that require government approval or cooperation. Such delays appear to be common and are a **significant gap** against advanced requirements.
Communications related commitments have been or are on track to be met	✓	Communication mechanisms related to ongoing commitments are in place for the project activities (for example, ongoing communications and meetings with the Nutabe community, the municipalities within the AOI and downstream communities related to the Specific Action Plan to address damages from the contingency.			

List of significant gaps against **Minimum Requirements**	Number of **Advanced Requirements** met
None	13

Summary of findings and other notable issues
Communications efforts at the local level have been transparent, two-way, and promoted participatory processes where directly affected stakeholders can raise issues and get feedback. The project has also benefitted from a functional grievance mechanism, engaged liaison officers and community members that contribute to the dissemination of information. There is room for improvement in communications with government agencies, the general public and NGOs.

Relevant evidence	
Interview	5, 6, 7, 20, 27, 28, 39, 43, 69
Document	6, 9, 34, 38, 39, 60, 61, 108, 125, 210-212, 256-258
Photo	1, 107, 117, 121

11 Hydrological Resource

Scope and Principle
This section addresses the management of environmental, social and economic issues within the reservoir area and downstream flow regimes during project implementation, as well as planning for reservoir management for the operating hydropower facility. The principle is that the reservoir and downstream flow regimes are planned and managed with an awareness of environmental, social and economic objectives.

Background	
Hydrology and flows	
Average flow at dam (m^3/s)	1,000
Minimum monthly average flow ($m^{3/}s$)	711
Maximum monthly average flow (m^3/s)	1,452
Lowest observed flow (m^3/s)	198
Highest observed flow (m^3/s)	4,600
Design flow (m^3 s)	1,350
Affected river reaches (start/end and how affected)	From La Pintada (133.5 km upstream from the dam site) downstream to the confluence with the Nechi River.
Proposed downstream flow regimes for environmental or social objectives	The reach for which downstream flows have been planned extends from the dam site approximately 203 km to Las Flores at the confluence with the Nechi River. Once all eight turbines are operational, the maximum flow rate (Q) for generation is 1,350 m^3/s. No peaking will occur at the Ituango HPP. The rules of operation during generation are governed by Article 10 of Resolution 1891 of October 2009 which states that no flow variations greater than 25% of Q are permitted the following day. In times when flows are half of Q (675 m^3/s) or less, there is a restriction in variation of discharge by no greater than 12.5% the following day (590 m^3/s to 760 m^3/s). A table is used to define the operating rules governing the maximum flow variation for the range of flows in the Cauca River. ANLA also requires that an intermediate discharge shall be put in place to guarantee a minimum flow of 450 m^3/s downstream in the event of a powerhouse shutdown.
Reservoir	
Reservoir length (km)	72.21
Minimum operating level MOL (masl)	390
Normal operating level (masl)	420
Full supply level FSL (masl)	432.5, which corresponds to the level reached at maximum flood
Reservoir area at FSL (km^2)	37.94 at elevation 420 masl 44.28 at elevation 432.5 masl
Reservoir area at MOL (km^2)	27.09

Volume at FSL (million m^3)	New cartography: 420 masl : 2,561-to 432.5 masl: 3,073 Old mapping (EIA): 420 masl: 2,720
Volume at MOL (million m^3)	1,596
Average retention time in days	30 days to 420 masl, at an average flow in Cauca River of 1,000 m^3/s
Number of days for filling	The filling was to be done in stages of 34, 43 and 55 days with a minimum flow of 450 m^3/s maintained. However due to the April 2018 contingency, the filling plan was not implemented.
Other relevant information	A contingency event began on April 28, 2018, with filling of the reservoir by obstruction of the diversion tunnel by a landslide. As water levels continued to rise in the reservoir and with the spillway not being finished there were concerns about a potential dam breach. To avoid this from happening, the only option was to divert water through the powerhouse which was under construction (May 11, 2018), and suffered extensive damage. By June 6, 2018, reservoir levels reached 394 masl. By January 2019, construction of the dam was completed (to elevation 435 masl) and the inlet structures were closed allowing all water to pass over the spillway and to begin reconstruction of the powerhouse. Water levels have been maintained since that time to 407.70 masl +/-20 cm.

Minimum Requirements			**Advanced Requirements**		
Requirement is met: yes (✓) or no (✗)		**Findings and Observations**	**Requirement is met: yes (✓) or no (✗)**		**Findings and Observations**
Assessment					
The following issues have been identified through an assessment process:			Monitoring of reservoir preparation and filling activities takes into account inter-relationships amongst issues both risks and opportunities that become evident during implementation	✓	A water quality modelling program of the reservoir and downstream reaches was completed from 2014-2016 (Consorcio Colombo Español IH Cantabria-Grupo Elemental – Aquática). The results indicated that the project would improve some water quality parameters (notably dissolved oxygen) in the reservoir and in areas immediately downstream of the dam site.
• the important considerations prior to and during reservoir filling	✓	The original filling plan had been developed through a total of 395 simulations, derived using flow data from 1994 – 2016, and determining. an average filling time of 90 days. Relevant considerations for prior actions had been identified early enough and activities started so that despite the unanticipated early filling of the reservoir, prior land acquisition was completed, affected individuals and families were relocated, removal of vegetative cover was completed,			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
		and a faunal rescue program was implemented.			
• the important considerations during reservoir operations	✓	A number of programs have been identified for the operations stage including macrophyte and floating debris removal, provision of fluvial transport, water quality monitoring program, monitoring of unstable slopes around the reservoir, and bathymetry measurements, and downstream monitoring of geomorphological conditions.			
• issues in relation to flow regimes downstream of project infrastructure during the project implementation stage	✓	Project construction was intended to not impact downstream flow regimes; however the 2018 contingency event caused both downstream flooding and drying up of the river downstream at certain locations.			
Monitoring is being undertaken during the project implementation stage appropriate to the following identified issues:					
• reservoir preparation and filling	✓	Reservoir preparation and filling were monitored.			
• effectiveness of flow management measures or any emerging downstream flow issues during project implementation	✓	River flows have been monitored both upstream and downstream. The prescribed flow regime of maintaining minimum flows in the Cauca River of 450 m^3/s at all times has been followed except for a brief period during the contingency. There has been only limited analysis of the choice of this minimum flow and the impacts, if any, of the temporary deviation.	Monitoring of downstream flow issues takes into account inter-relationships amongst issues, and both risks and opportunities that become evident during implementation	✓	The project has monitored upstream and downstream flows since completion of the EIA. Monitoring has been conducted across an extensive network of 12 IDEAM hydrologic stations from La Pintada, Olaya (at the tail of the reservoir) and Pescadero (near the project), to downstream, with stations to Las Flores approximately 203 km downstream of the dam. Following the contingency event, the project implemented a Technical Monitoring Center – CMT which has

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
					11 hydrologic stations, reporting on flows in real time that complement monitoring stations that were previously in place, including: La Virginia, Puente Pintada, San Andres, Hidroituango Discharge, Espiritu Santo, Apavi and Margento, as well as four weather stations at Pintada, Olaya, San Andres and dam site.
Management					
Measures are in place to address identified needs during reservoir preparation and filling	✓	Contracts and resources were in place for vegetation removal, faunal rescue and other measures required. Project affected persons were relocated in advance of filling.	Processes are in place to anticipate and respond to emerging risks and opportunities relating to reservoir preparation and filling	✓	The project had a reservoir filling plan that addressed vegetation removal, faunal rescue, community safety and other issues during filling. While the plan was not executed as intended because of the continency event in 2018, there are no indications of negative consequences from early filling. There were concerns from some sections of the community about flooding of unmarked graves of victims of the violent conflict in the area, however these were not confirmed during investigations. EPM has flow measurement stations upstream of the reservoir that allow for flow estimation at the dam site 24 hours, 12 hours and 2 hours in advance. In addition, automated modelling tools are used to perform 12-hour flow forecasts, twice a day. This information is used to operate
Plans are in place to manage the reservoir and any associated issues for the operating hydropower facility	✓	A reservoir management (POE) has been initiated but is (see under Advanced Requirements). A reservoir management plan was prepared in June 2021 following initial work by the National University of Colombia (2017) who recommended waiting four years after filling before starting more extensive use, to allow time for stabilization of the reservoir The intent of the Plan is to identify compatible and incompatible uses, identify protection and compensation zones and develop land use planning guidelines for municipal authorities. These uses include tourism, fishing, navigation and transport, environmental protection and			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		**Findings and Observations**	**Requirement is met: yes (✓) or no (✗)**		**Findings and Observations**
		ecological connectivity. The plan is not yet fully detailed and implemented. Monitoring plans for water quality and unstable slopes are ongoing (see section 3).			the spillway gates according to the generation schedule. There are also weather and flow forecasts for all EPM plants, over weekly to 12-monthly periods, as fundamental inputs for generation planning. These analyses will soon include the Ituango project.
Measures are in place to manage identified downstream flow issues	✓	Modelling of erosion and measurement of bathymetry are in place (see section 3).	Processes are in place to anticipate and respond to emerging risks and opportunities relating to downstream flow regimes	✓	EPM has undertaken modelling of possible downstream flood events and continues to monitor downstream flows and bathymetry. It is also conducting modelling of downstream geomorphology and erosional processes.
Where formal downstream flow commitments have been made, these are publicly disclosed	✓	Information on commitments is available to ANLA/Ministry of Environment and Sustainable Development, CORANTIOQUIA, municipal authorities and emergency organizations (e.g. Red Cross, DIGNAN). The EIA also publicly disclosed the commitments.			
Conformance and Compliance					
Processes and objectives in place to manage each of the following have been and are on track to be met:			There are no non-compliances relating to:		
• reservoir management, with no major non-compliances	✓	There are no indications of major non-compliances.	• reservoir management	✓	No current non-compliances have been identified specific for this topic. See section 1 for a general discussion of non-compliances being resolved with ANLA.
• reservoir management, with no major non-conformances	✓	There are no indications of major non-conformances.			
• downstream flow regimes, with no major non-compliances	✓	There are no indications of major non-compliances.	• downstream flow regimes	✗	As discussed in Topic 1, the April 2018 contingency event resulted in alteration of downstream flow regimes outside the range of planned regimes, which was deemed a non-compliance by ANLA and is a
• downstream flow regimes, with no major non-conformances	✓	There are no indications of major non-conformances.			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		**Findings and Observations**	**Requirement is met: yes (✓) or no (✗)**		**Findings and Observations**
					significant gap against advanced requirements, because it resulted in continuing constraints on the project (see section 1).
Commitments relating to the following have been or are on track to be met:			There are no non-conformances relating to:		
• reservoir management	✓	EPM has prepared a Reservoir Management Plan as required by the license.	• reservoir management	✗	The Reservoir Management Plan was prepared 4 years after initially being conceived. The document is theoretical in nature without conclusive plans and actions agreed between the parties responsible for the reservoir, its shorelines and catchment. The lack of an operational reservoir management plan several years after the reservoir has been impounded is a **significant gap** against advanced requirements.
• downstream flow regimes	✓	EPM has been releasing downstream flows within the required ranges and except for flow alterations as a result of the contingency event (see under Advanced Requirements), is on track to meet commitments.	• downstream flow regimes	✓	There are no indications of non-conformances.
Outcomes					
Downstream flow regimes take into account environmental, social and economic objectives	✓	The downstream flow regime agreed between EPM and regulators considers a wide range of values including maintaining important ecosystem services through recharge/discharge of the downstream wetlands (*cienagas*), contributing to maintenance of the	Downstream flow regimes represent an optimal fit amongst environmental, social and economic objectives within practical constraints of the present circumstances	✗	Since the contingency, EPM has markedly increased its attention to downstream issues including extensive fisheries studies, engagement with communities relying on access to sustainable fisheries, and ongoing monitoring of flows and geomorphological conditions. With a

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		**Findings and Observations**	**Requirement is met: yes (✓) or no (✗)**		**Findings and Observations**
		fisheries resource that is important to the livelihood and well-being of downstream communities.			constant reservoir level since impoundment, outflows have equalled inflows and the release rules could not be tested. EPM has also suggested a change to the downstream flows rule to increase power generation, but this has not been approved by ANLA. There is therefore some uncertainty whether the downstream flows regime represents an optimal fit, which is a **significant gap** against advanced requirements.
Where relevant, they also take into account agreed transboundary objectives	✓	Not applicable			

List of significant gaps against **Minimum Requirements**	Number of **Advanced Requirements** met
None	6

Summary of findings and other notable issues
The project has characterized flows upstream and downstream of the project as part of initial environmental licensing and has monitored flow conditions since as part of ongoing license requirements. The 2018 contingency put the project at risk from a potential dam breach and catastrophic downstream flooding and drastic responses were taken to divert flows through the unfinished powerhouse resulting in both initial flooding downstream to Puerto Valdivia and drying up of downstream reaches until flow conditions were restored through completion of the spillway. Since that time and until operations started with 2 turbines in November 2022, downstream flows were maintained through discharges of the spillway. As the remaining turbines come onstream in 2023 and through to 2025 downstream flow conditions will be normalized through generation and spillway operation as required. Due to a non-compliance with regards to the reservoir filling plan as a result of the 2018 contingency, the lack of an operational and integrated reservoir management plan, and the inability to confirm that the downstream flow regime is an 'optimal fit', gaps against advanced requirements were identified.

Relevant evidence	
Interview	4, 18, 19, 24, 31, 45, 46, 60, 71, 72
Document	21, 24, 158 – 160, 229 – 246, 264, 266, 267

Photo	3, 8-14, 21-28, 55, 100-102

12 Climate Change Mitigation and Resilience

Scope and Principle
This section addresses the estimation and management of the project's greenhouse gas (GHG) emissions, analysis and management of the risks of climate change for the project, and the project's role in climate change adaptation. The principle is that the project's GHG emissions are consistent with low carbon power generation, the project is resilient to the effects of climate change, and the project contributes to wider adaptation to climate change.

Background	
Climate Change Mitigation	
Capacity (MW) (or additional capacity in case of expansion/ rehabilitation projects)	2,400 MW
Average reservoir area (representing area of flooded land, net of pre-impoundment water body) (km^2) (or additional reservoir area if any, for expansion/rehabilitation projects)	37.94 km^2 at 420 masl
Power density (W / m^2)	63.55
Emissions intensity (gCO_2e / kWh)	4.39 gCO_2e / kWh
National and regional policies, plans and commitments relevant to mitigation	Colombia has a long history of climate change mitigation and adaptation. In 1994 Colombia joined the UNFCC and later ratified the Kyoto Protocol (2011). Law 1844 (2017) saw ratification of the Paris Agreement by Colombia. Colombia submitted its revised NDC2 in December 2020 with a more ambitious reduction target of not emitting more than 169.4 $MtCO_2eq$ by 2030, equivalent to a 51% reduction in emissions from a revised 2030 reference scenario, as compared to a 20% reduction in the first NDC. Colombia's NDC is one of the most ambitious in LAC and is further aligned with the country's objective of carbon neutrality by 2050.
Climate Change Resilience	
Hydrological data available for the project site and the basin, and observed climate trends	Data from EPM and IDEAM hydrological stations have been and are being used for hydrological monitoring and forecasting. Long-term climate and flow trends have been documented.
Regional and basin-level climate models relevant to the project location, if any	Regional climate models for temperature and precipitation were developed using 1990-2000 data and modelled for 2040 and 2090 using RCP 2.6, 4.5 and 8.5 scenarios.
Any climate change predictions for the project location, and degree of consistency	Temperatures across Colombia are projected to increase between 1.5 C and 2.5 C by 2100. A reduction or inoperability of hydropower generation (which provides 80% of Colombia's power supply) is expected as a result of a 30% reduction in the mean flows of the Colombia Andean region basins, particularly in the Cauca River basin (Source: World Bank). A study done by the National University of Colombia indicated that a reduction of 10% in precipitation levels could occur by 2050 in the project area.

	Climate modelling is also significantly impacted by ENSO conditions.
National policies, plans and commitments relevant to adaptation and resilience	The Climate Change Act (1931) of 2018 consolidated 2 decades of government action towards climate smart and low carbon development. Act 1819 (2016) instituted the national carbon tax. Decree 298 of 2016 created the National Climate Change System (SISCLIMA) to coordinate policies, programs and plans towards climate change mitigation and adaption and set up coordination at the departmental level through programs of nine Regional Nodes for Climate Change. Participants in the Antioquia node include departmental governments, municipal authorities, EPM, CORANTIOQUIA and CONARE, and civil society organizations. The National Climate Change Policy (2017) set out several strategies and plans including 1) Low Carbon Development Strategy 2) National Adaptation Plan for Climate Change 3) National Emission Reduction Strategy from Emissions due to deforestation and forest degradation (REDD+) 4) Colombian Strategy of Climate Finance (PNCC 2016) and 5) Strategy for Financial Protection from Disasters.
Other relevant information	In 2021 EPM put forward a Climate Strategy that seeks to achieve a resilient and carbon efficient business operation by 2030, to obtain carbon neutral operation by 2025, and to contribute to Colombia's commitment to the 2015 Paris Agreement. EPM commits to doing this by a) determining an annual carbon footprint for the entire Group, b) increasing energy efficiency, c) providing energy self-supply for its waste water and drinking water treatment plants and administrative buildings including the Medellin head office, d) developing non-conventional renewable energy sources such as solar, wind and small hydroelectric plants, e) securing non-conventional renewable energy auctions, f) adopt clean transportation alternatives such as natural gas and electric vehicles and g) promoting remote working alternatives. EPM has committed to actions toward achieving SDG goal 13 on Climate Action.

Minimum Requirements			**Advanced Requirements**		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
Assessment					
Climate Change Mitigation					
If power density is below 5 W/m2, net GHG emissions (gCO2e) of electricity generation have been estimated and independently verified	✓	Not applicable. Power density is not below 5 W/m^2.	If a site-specific assessment is required, it incorporates a broad range of scenarios, uncertainties and risks	✓	Although a site-specific assessment was not required, EPM has been using IPCC methods for estimating emissions from the Ituango reservoir since 2019. Total project emissions in 2021 were estimated at 61,088.3 tCO_2e/yr.
If power density is below 5 W/m2 and estimated	✓	Not applicable. Power density is not below 5 W/m^2.			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
emissions are above 100 gCO2e/kWh, a site-specific assessment of GHG emissions has been undertaken					
Climate Change Resilience					
An assessment of the project's resilience to climate change has been undertaken	✓	An assessment of project impacts on ecological restoration was done by the Universidad Nacional of Colombia to look at the potential for torrential floods/mass movement and forest fires all risks that would be compounded by climate change. The Javeriana University also conducted an analysis downstream of the dam of climate change impacts (RCP4.5 and RCP8.5) on hydrological flows and sediment deposition without and without the project from 2022 to 2070.	Assessment of resilience incorporates sensitivity analysis, and project-specific hydrological modelling using recognised climate models	✓	Updated climate scenarios 2050-2100 using the WRF (Weather Research Forecast) model, for areas of interest of EPM's Energy, Water and Sanitation divisions including an analysis of the Ituango HPP have been done by the Universidad Nacional of Colombia.
The assessment:					
• incorporates an assessment of plausible climate change at the project site	✓	The assessment by Universidad Nacional used a combination of the CCSM4 and WRF (Weather Research and Forecasting Model) and rainfall-runoff models to examine changes in hydrological response, precipitation, temperature, humidity, winds and convection for the project area under the RCP 4.5 scenario.			
• identifies a range of climatological and	✓	As above.			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
hydrological conditions at the project site					
• applies these conditions in a documented risk assessment or stress test	✓	An initial, qualitative risk assessment was the aim of the 2021 Universidad Nacional study.			
The risk assessment or stress test encompasses:			An assessment of the project's potential adaptation services has been undertaken	×	EPM is conducting climate risk analysis exercises in different companies and businesses of the EPM Group towards development of its own climate adaptation plans and required adjustments, but there are no specific adaptation plans yet. At this time, EPM also has not prepared analyses of its potential contributions to Colombia's adaptation to climate change, for example the contribution of reservoirs to the control of increased floods or the storage of water for increased droughts. This is a **significant gap** against advanced requirements.
• dam safety	✓	The dam was designed for the PMF which is an inherently conservative approach. The PMF flood peak was estimated as 25,300 m^3/s. The Failure Mode and Effects Analysis (FMEA) for the project did not incorporate potential changes to the PMF as a result of climate change. However, the increased peak floods estimated by Universidad Nacional for the 2090's of 5,311 m^3/s are well within the PMF.			
• other infrastructural resilience	✓	As above. The FMEA also included the water intake, diversion tunnels, powerhouse, reservoir, and mechanical/electrical systems.			
• environmental and social risks	✓	EPM has a basic understanding of the impacts of climate change on biodiversity. A study by the Instituto Humboldt evaluated the impact of recent trends in the project area on biodiversity, including climate trends that could be extrapolated. A study by Javeriana University study assessed impacts of the project on the downstream wetland complex from Caucasia to Pinillos. Overall, the effect			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
		of the project will be to reduce flooding and the extent of downstream wetlands; this analysis could easily be modified to include climate-induced changes to flooding.			
• power generation availability	✓	The Universidad Nacional study on Ituango did not address impacts on generation in any detail, nor are these impacts analysed in other EPM documents. However, at the national level the government's energy planning body UPME has conducted a number of technical analyses of the impacts of climate change on generation, down to the level of individual river basins and projects such as Ituango. The expected decrease in flows of the Cauca River is also expected to be reflected in decreased generation.			
Management					
Climate Change Mitigation					
If GHG emissions estimates assume design and management measures relevant to the implementation stage, these measures are in place	✓	This is not relevant for this project.	Design and management measures relevant to the implementation stage are in place to respond to risks and opportunities including offsetting emissions	✓	This is not relevant for this project. At the corporate level, EPM is undertaking a number of emission reduction and renewable generation initiatives. The San Fernando and Aguas Claras WWTPs use biogas to offset energy requirements. The company is looking to integrate solar photovoltaic, wind and small

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		**Findings and Observations**	**Requirement is met: yes (✓) or no (✗)**		**Findings and Observations**
					hydropower projects into the energy mix. It has been awarded a solar generation contract for the Tepuy project in the Caldas Department (83 MW). It is also evaluating geothermal generation at the Valle Nereidas project (PGU5 and PGU6) in Caldas Department. EPM is actively involved in promoting electric mobility and has 2,600 hybrid and electric vehicles in circulation.
			Plans are in place to monitor parameters used in GHG emissions estimates or to monitor GHG stocks	✓	EPM has committed to annually determine its carbon footprint. GHG Emissions for the project in 2021 were 61,088.3 tCO_2e of which 97% were fugitive CH_4 and CO_2 emissions from the reservoir. Estimated GHG emissions for the entire EPM Group in 2021 were 2.7 million tons of CO_2 equivalent (tCO2e), including Scope 1 and Scope 2 emissions.
Climate Change Resilience					
Measures relevant to the implementation stage are in place to avoid or reduce the identified climate risks	✓	EPM has identified a number of climate risks such as torrential floods/mass movement, forest fires, dam safety, and downstream flooding, and these risks are already largely addressed through EPM emergency preparedness and response plans. EPM is implementing actions for the ongoing conservation of its acquired	Resilience measures relevant to the implementation stage take account of a broad range of risks and inter-relationships	✗	EPM has been initiating a series of actions at the corporate level as part of their climate change strategy, but no project-specific resilience measures have been implemented to date. This is a **significant gap** against advanced requirements.
			Plans are in place to provide adaptation services if necessary	✗	As stated above, EPM has not assessed potential adaptation services, and therefore also not developed related plans. This is a

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		**Findings and Observations**	**Requirement is met: yes (✓) or no (✗)**		**Findings and Observations**
		forest lands, protected areas and ecosystems around the reservoir. This will assist in minimizing slope erosion and destabilization of the reservoir.			**significant gap** against advanced requirements.
Conformance and Compliance					
Climate Change Mitigation					
Processes and objectives relating to mitigation have been and are on track to be met with:			There are no non-compliances	✓	No current non-compliances have been identified specific for this topic. See section 1 for a general discussion of non-compliances being resolved with ANLA.
• no major non-compliances	✓	There are no indications of non-compliances.			
• no major non-conformances	✓	There are no indications of non-conformances.	There are no non-conformances	✓	No non-conformances have been identified. There are minor opportunities to reduce emissions such as a better control of idling of vehicles and machinery.
Mitigation-related commitments have been or are on track to be met	✓	This is not relevant for this assessment, as there are no specific commitments.			
Climate Change Resilience					
Processes and objectives relating to resilience have been and are on track to be met with:			There are no non-compliances	✓	No current non-compliances have been identified specific for this topic. See section 1 for a general discussion of non-compliances being resolved with ANLA.
• no major non-compliances	✓	There are no indications of major non-compliances.			
• no major non-conformances	✓	There are no indications of major non-conformances.	There are no non-conformances.	✓	There are no non-conformances.
Resilience-related commitments have been or are on track to be met	✓	EPM has a group strategy to promote climate change resilience but has not yet defined specific actions related to the project.			
Outcomes					

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
Climate Change Mitigation					
The project's GHG emissions are demonstrated to be consistent with low carbon power generation	✓	The Ituango project is consistent with low carbon generation, with an estimated emissions intensity of 4.39 g CO_2e/KWh (calculated using EPM's own data of 61,088.3 t/a and 13,930 GWh/a).	Project net emissions are minimised or project operations facilitate system emissions reductions	✓	The EPM Group is committed to reporting its GHG emissions on an annual basis and verifies emission reduction project through Green Energy Certificates (I-REC) or Certified Emission Reduction Certificates (CER) for purposes of compensation or carbon trading. The Ituango project will contribute to balancing the Colombian national grid, with increasing shares of solar and wind generation.
Climate Change Resilience					
Plans will deliver a project that is resilient to climate change under a range of scenarios	✓	EPM has committed to efforts towards climate change adaptation and resilience at the group level. As discussed above, EPM and the government of Colombia have also undertaken initial analyses that do not show major resilience concerns for the Ituango project.	The project is resilient under a broad range of scenarios	✘	Analysis of project-specific resilience under a broad range of climate change scenarios has yet to be conducted, which is a **significant gap** against advanced requirements.
			The project will contribute to climate change adaptation at local, regional or national levels	✘	An analysis of the project's climate change adaptation contributions at local, regional, and national levels has not yet been conducted which is a **significant gap** against advanced requirements.

List of significant gaps against **Minimum Requirements**	Number of **Advanced Requirements** met
None	9

Summary of findings and other notable issues
EPM has a robust Climate Strategy that seeks to achieve a resilient and carbon efficient business operation by 2030, to obtain carbon neutral operation by 2025, and to contribute to Colombia's commitment to the 2015 Paris Agreement. It commits to do this by a variety of means including measuring its carbon footprint, increasing energy efficiency, adopting other forms of renewable energy, and committing to e-mobility. At the Ituango project level, EPM has measured carbon emissions from the reservoir, has undertaken initial analyses of climax risk and no major resilience concerns have been identified. Although EPM has initiated its climate change journey regarding climate mitigation and minimizing carbon emissions, significant gaps against advanced requirements are observed as to a lack of project specific climate change resilience and adaptation plans and how the project will contribute to climate change adaptation at local, regional or national levels.

Relevant evidence	
Interview	30, 60
Document	158, 247 – 256, 259 – 268, 290 – 292
Photo	79

Appendix 1 – Interviews

Ref	Interviewee/s, Position	Organisation	Date	Location
1	William Giraldo Jiménez-Vicepresidente Proyectos Generación	EPM	31/10/2022 4/11/2022 6/11/2022	Proyecto Ituango
2	Robinson Arturo Miranda G – Director Ambiental, Social y Sostenibilidad Proyecto Ituango	EPM	31/10/2022	Edificio Inteligente-EPM
3	Carlos Mario Montoya Diaz – Director Desarrollo del Talento Humano	EPM	08/11/2022	Edificio Inteligente-EPM
4	Gabriel Lacouture-Líder Especialista en Hidrología e Hidráulica	Integral consultores	31/10/2022	Edificio Inteligente-EPM
5	Jasmin Mildrey Marín Henao-Coordinadora Ambiental	Consorcio CCC Ituango	4/11/2022	Proyecto Ituango
6	Carolina Carvajal Arroyave-Alcaldesa	Administration Municipal San Andrés de Cuerquia	4/11/2022	Municipio de San Andrés de Cuerquia
7	Dora Bibiana Molina – Alcaldesa del Cabildo	Comunidad Indigena Nutabe	5/11/2022	Municipio de Ituango
8	Sonia Marilu Calderon – Delegada Dirección Nacional de Consulta Previa	Ministerio del Interior	8/11/2022	Virtual
9	Fabio Arjona – Director Ejecutivo	Conservación Internacional-CI	12/11/2022	Virtual
10	Edwin Martin Muñoz Diaz	Autoridad Nacional de Acuicultura y Pesca-AUNAP	8/11/2022	Edificio Inteligente-EPM
11	Ana Mercedes Casas Forero – Subdirectora Seguimiento Licencias Ambientales Jhon Franklin Villamil Hernández Sandra Patricia Bejarano Rincon	Autoridad Nacional de Licencias Ambientales-ANLA	11/11/2022	ANLA-Bogotá
12	Orlando de Jesús Suárez Lopera-Operador Vivero EL Palmar	Junta de Acción Comunal Mote	3/11/2022	Vivero El Palmar
13	Martha Carvajal y Nancy Yaneth Mira Romero-Líderes comunitarios, Voceras Desmarginalizar e integrantes de Bomberos Voluntarios Valdivia	Bomberos Voluntarios Valdivia	4/11/2022	Corregimiento Puerto Valdivia – Municipio de Puerto Valdivia
14	Eugenia Gomez, William Gutierrez, Milena Flores	Rios Vivos	5/11/2022	Municipio Toledo
15	Victor Julio Atencio – Director del Centro de Investigaciones Piscícolas	Centro de Investigaciones Piscícolas	3/11/2022	Municipio Caucasia
16	Daniel Giovanni Martinez Forero – Coordinador SST	Consorcio CCC Ituango	4/11/2022	Proyecto Ituango
17	Astrid Elena Echavarria Correa – Alcaldesa	Administration Municipal Toledo	8/11/2022	Virtual
18	Emilse Guerrero – Guardiana del río Cauca	Guardianes río Cauca	4/11/2022	Municipio de Caucasia
19	Gerson Mattos – Líder Comunitario	Municipio de Caucasia-Corregimiento El Palomar	4/11/2022	Municipio de Caucasia
20	Andres Felipe Cano Torres – Compromisos Ambientales Proyecto Ituango	Profesional Ambiental y Social EPM	3/11/2022	Proyecto Ituango-Edificio Inteligente EPM
21	Paula Andrea Vélez Rodriguez – Manejo de Residuos Proyecto Ituango	Profesional Ambiental y Social EPM	3/11/2022	Proyecto Ituango-Edificio Inteligente EPM
22	Paula Lizeth Correa Velásquez – Sedimentos	Profesional Ambiental y Social EPM	31/10/2022	Edificio Inteligente EPM
23	Angela Maria Jaramillo Palacio – Biodiversidad	Profesional Ambiental y Social EPM	3/11/2022	Proyecto Ituango-Edificio Inteligente EPM

Ref	Interviewee/s, Position	Organisation	Date	Location
24	Ray Esteban Velásquez Pérez-Plan de Ordenamiento del Embalse-POE	Profesional Ambiental y Social EPM	3/11/2022	Virtual
25	William Alfonso Ramirez Vergara – Imágenes Satelitales	Profesional Ambiental y Social EPM	3/11/2022	Proyecto Ituango-Edificio Inteligente EPM
26	Jesús Enrique Llanos Hernández – Seguridad y Salud en el trabajo	Profesional Desarrollo Humano EPM	31/10/2022	Proyecto Ituango-Edificio Inteligente EPM
27	Johana Patricia Osorio Munera – Comunicaciones Proyecto	Profesional Comercial Identidad Corporativa EPM	31/10/2022	Edificio Inteligente EPM
28	Maria Cristina Henao Lopez – Gestión Socioeconómica PHI	Profesional Ambiental y Social EPM	31/10/2022 8/11/2022	Edificio Inteligente EPM
29	Jairo Alberto Sanchez Daza – Calidad del Agua PHI	Profesional Ambiental y Social EPM	31/10/2022 8/11/2022	Edificio Inteligente EPM
30	David Alejandro Agudelo Patiño – Cambio Climático	Profesional Ambiental y Social EPM	31/10/2022 8/11/2022	Edificio Inteligente EPM
31	Luis Fernando Salazar Velásquez	Profesional Operaciones Unidad de Hidrometría	31/10/2022 8/11/2022	Edificio Inteligente EPM
32	Paula Andrea Pérez Henao – Mejores prácticas PHI	Profesional Ambiental y Social EPM	31/10/2022 8/11/2022	Edificio Inteligente EPM
33	Luis José García Melo – Recurso Íctico y Pesquero PHI	Profesional Ambiental y Social EPM	31/10/2022 8/11/2022	Edificio Inteligente EPM
34	Gladys Amparo Arango Mora – Contratación Social	Profesional Ambiental y Social EPM	8/11/2022	Virtual
35	Sol Patricia Jaramillo Morales – Contratación Social	Profesional Ambiental y Social EPM	8/11/2022	Virtual
36	Sara Buitrago Arango – Patrimonio Arqueológico	Profesional Ambiental y Social EPM	31/10/2022	Edificio Inteligente EPM
37	Alejandro Giraldo Velásquez – Aspectos técnicos PHI	Profesional Gestión Proyecto	31/10/2022	Edificio Inteligente EPM
38	Sandra Milena Duarte Betancur – Sistema de Vigilancia Epidemiológica PHI	Profesional Ambiental y Social EPM	31/10/2022	Edificio Inteligente EPM
39	Maria Jannet Madrigal Morales – Profesional comunicaciones	Profesional Comunicación Corporativa EPM	31/10/2022	Edificio Inteligente EPM
40	Liney Consuelo Posada Espinosa – Gestión social aguas abajo	Profesional Ambiental y Social EPM	31/10/2022	Edificio Inteligente EPM
41	Beatriz Hernández Almanza – Coordinadora ambiental	Asesoría Integral	31/10/2022	Edificio Inteligente EPM
42	Natalia Andrea Eusse Sanchez – Gestión Social PHI	Profesional Ambiental y Social EPM	31/10/2022	Edificio Inteligente EPM
43	José Alfredo Solorzano Velandia – Sistema de Peticiones Quejas y Reclamos-PHI	Profesional Ambiental y Social EPM	31/10/2022	Edificio Inteligente EPM
44	Jose Alberto Eusse Sierra – Gestión del Riesgo PHI	Profesional Ambiental y Social EPM	31/10/2022	Edificio Inteligente EPM
45	Bladimir Suarez Agudelo-Gerente Generación Energía EPM	Jefe Unidad de Operaciones Ituango	1/11/2022	Proyecto Ituango
46	Jorge Alberto Rodriguez López-Operaciones Embalse PHI	Profesional Unidad Operaciones Ituango	1/11/2022	Proyecto Ituango
47	Andres Martinez Villa – Profesional en gestión del riesgo	Corporación Antioquia Presente	2/11/2022	Virtual
48	Blanca Eugenia Chavarría Hurtado	Vocera comunitaria, sector Chachirimí	4/11/2022	Puerto Valdivia
49	Carolina Gómez Pino	Presidenta Junta de acción comunal Toledo-El Valle	4/11/2022	Proyecto Ituango – Valle de Toledo

Ref	Interviewee/s, Position	Organisation	Date	Location
50	Carlos María Cuervo y Luz Edilia Uriberia (vereda el astillero, 8km de Pto Valdivia)	Familia Reasentada PHI	4/11/2022	Puerto Valdivia
51	Bernabé Bustamante Velásquez – Vivero El Palmar	Profesional Ambiental y Social EPM	31/10/2022	Edificio Inteligente EPM
52	Daniel Restrepo Ocampo	Centro Acuícola Piscícola	4/11/2022	Municipio Caucasia
53	Verónica Romero-Coadministradora Sistema Vigilancia Epidemiológica	Administradora Ambiental-Universidad de Antioquia	3/11/2022	Virtual
54	Gabriel Fernández Delgado	Board de Asesores Internacional para el PHI	8/11/2022	Virtual
55	Julian Andres Morales Jaramillo-Seguridad y Salud en el trabajo	Tecnólogo Unidad Gestión de Riesgos Laborales EPM	3/11/2022	Proyecto Ituango
56	Laura Cristina Chaverra Chancy – Restauración Ecológica PHI	Profesional Ambiental y Social EPM	8/11/2022	Virtual
57	Carlos Alberto Noreña Medina – Manejo de Macrófitas y Cianobacterias Embalse PHI	Profesional Ambiental y Social EPM	8/11/2022	Virtual
58	Juan Carlos Cardenas – Gerente Administrativo y Financiero Consorcio Constructor	Consorcio constructor CCCI	5/11/2022	Proyecto Ituango
59	Braulio Saraiva Junior – director general Consorcio Constructor	Consorcio constructor CCCI	5/11/2022	Proyecto Ituango
60	Andres Felipe Jaramillo Correa – CMT	Profesional Gestión Proyecto PHI	5/11/2022	Proyecto Ituango
61	Edna Marquez Fernández – Profesora Investigadora	Universidad Nacional de Colombia	8/11/2022	Virtual
62	Mauricio Valderrama	Fundación Humedales	8/11/2022	Virtual
63	Nelson Obregon Neira-(IC, MSc, PhD)-Profesor Titular II Facultad de Ingeniería	Pontificia Universidad Javeriana	8/11/2022	Virtual
64	Claudia Marcela Bustamante – Coordinadora de Proyectos	Laboratorio Chemilab	8/11/2022	Virtual
65	Úrsula Jaramillo Villa – Coordinadora Proyecto EPM	Instituto Javeriano del Agua -Facultad de Estudios Ambientales y Rurales	8/11/2022	Virtual
66	José Julián Villamizar Araque-EPM Contratación	Profesional Gestión Proyecto Ituango	4/11/2022	Edificio Inteligente EPM
67	Vincent van Oosterhout – Director Operaciones Subacuaticas PHI	DCN Diving Company	4/11/2022	Proyecto Ituango
68	Natalia Acevedo Duque-HSEQ	DCN Diving Company	4/11/2022	Proyecto Ituango
69	Edwin Mauricio Mira Sepúlveda-Alcalde	Administration Municipal Ituango	5/11/2022	Municipio Ituango
70	Juan Carlos Páez Zamora-Oficial Ambiental y Social Principal	BID Invest	8/11/2022	Virtual
71	Zorany Suley Zapata	Asesoría Integral	31/10/2022	Edificio Inteligente EPM
72	Catalina Andrea Vanegas	Asesoría Integral	31/10/2022	Edificio Inteligente EPM
73	Jairo Calle – Comandante Bomberos municipio Ituango	Bomberos Ituango	2/11/2022	Virtual
74	Álvaro Cogollo Pachecho – Biólogo Botánico	Jardín Botánico de Medellín	8/11/2022	Virtual
75	Tatiana Restrepo -Bióloga	Centro de Atención de Fauna PHI Universidad CES	5/11/2022	Proyecto Ituango
76	Jose Victor Llínas – Interventoría Social	Ingetec -Sedic (Interventoría)	8/11/2022	Virtual
77	Camilo Andres Cardona Villa	Profesional Operaciones Negocio EPM	8/11/2022	Edificio Inteligente EPM
78	Abelardo David Chancí	Guardia Mayor comunidad Nutabe	5/11/2022	Municipio Ituango

Ref	Interviewee/s, Position	Organisation	Date	Location
79	Pedro Luis Tejada	Familia reasentada municipio Santa Rosa de Osos	1/11/2022	Santa Rosa de Osos
80	Dora Bibiana Molina-alcaldesa del Cabildo	Alcaldesa Cabildo comunidad Nutabe	5/11/2022	Municipio Ituango

Appendix 2 – Documents

Ref	Author	Date	Title	Notes / links
1	EPM-Integral-Solingral	2007-2011	Estudio de Impacto Ambiental	https://cu.epm.com.co/institucional/proyectos/hidroituango/gestion-ambiental
2	EPM	Julio-Diciembre, 2021	Informe de Cumplimiento Ambiental y Social – ICAS-BID	https://cu.epm.com.co/institucional/proyectos/hidroituango/gestion-ambiental
3	EPM	Julio-Diciembre, 2021	Informe de Cumplimiento Ambiental-ICA 24	https://cu.epm.com.co/institucional/proyectos/hidroituango/gestion-ambiental
4	Universidad de Antioquia-EPM	2020	Informe del Sistema de Vigilancia Epidemiológica	
5	Ministerio de Ambiente y Desarrollo Sostenible-MADS	2009-2021	Modificaciones de Licencia Ambiental	https://cu.epm.com.co/institucional/proyectos/hidroituango/gestion-ambiental
6	Integral-EPM	2011	Socialización Estudio de Impacto Ambiental 2011	
7	EPM	2021	Informe de Sostenibilidad	https://cu.epm.com.co/institucional/proyectos/hidroituango/gestion-ambiental
8	EPM	oct-22	Impactos acumulativos	
9	Codesarrollo-EPM	Mayo 5 de 2013	Caracterización red de relaciones de Orobajo y Barbacoas y comunidades de montaña marzo 5 2013	
10	HSC/EPM/Alcaldía de Medellín/Hidroeléctrica Ituango/ IDEA/Gobernación de Antioquia	2020	Diagnóstico de la problemática de genero (municipios)	
11	EPM	2012-2019	Instituciones Educativas Intervenidas por PMA	
12	EPM	2013-2021	Informes Semestrales Presión Migratoria	
13	EPM	2021	Normas de desempeño sobre Sostenibilidad Ambiental y Social-CFI-BID	
14	Codesarrollo-EPM	2022	Ajuste al diseño detallado del plan de gestión social 2012-2022	
15	EPM-Equipo gestión social	2013-2022	Bienestar laboral – Capacitaciones	
16	EPM	2022	Manual de conducta para Proveedores y contratistas	
17	EPM-Unidad de Riesgos Laborales	2022	Plan local de emergencias Obras PHI	
18	EPM-Equipo Gestión Social		Actas de comité Empleo EPM-Contratistas	,
19	IHcantabria/GrupoElemental/aquática/ Hidroeléctrica Ituango/EPM		Modelación de la calidad del agua	
20	EPM-Universidad Nacional de Colombia	2022	Informes monitoreo sitios inestables embalse-contingencia	

Ref	Author	Date	Title	Notes / links
21	EPM-Universidad Nacional de Colombia	jun-21	Análisis Hidrológico del rio Cauca y Magdalena	
22	EPM-Integral	dic-18	Informe de diseño de la presa	
23	INTEGRAL	abr-21	Informe actualizado del diseño de la presa	
24	EPM-Integral	2018-2020	Manual de operación del Vertedero (Atención Resolución, Secuencias operación, Análisis operativo)	
25	EPM-Universidad Nacional de Colombia	oct-18	Análisis Paisaje Conectividad SAG	
26	EPM	2018-2022	Estudios poblacionales flora	
27	EPM-Aqua Trading	2022	Barreras Flotantes Resumen Informe Mensual Mayo	
28	EPM-Jardín Botánico	may-12	Seguimiento fenología	
29	Hidroeléctrica Ituango/EPM	2011-2019	Contrato BOOMT y modificaciones	
30	Fundación Ideas para La Paz	2021	Convenio FIP Propuesta ruta confianza fase 2 EPM	
31	EPM	May 18, 2022	1Q2022 Report	
32	EPM	2021 y 2022	INFORMES DE SEGUIMIENTO A FRENTES DE OBRA	
33	EPM-Ingetec	2020-2022	Informes Interventoría	
34	EPM	Enero a Mayo 2022	Informes Sociopolíticos	
35	Ingetec-Sedic	2022	Planes Acción oportunidades mejora	
36	EPM	2021	Pliegos Contratación	
37	EPM	2020 -2022	Residuos	
38	Integral/EPM	2007	Socialización EIA 2007	
	Integral/EPM	2011	Socialización EIA 2011	
39	INGETEC/SEDIC/KMA	2020-2022	Verificación permisos vigentes	
40	EPM	Noviembre-2016	Análisis Complementario de Impactos Acumulativo	
41	EPM	2007	Profesionales elaboración EIA 2007	
42	EPM	2011	Profesionales elaboración EIA 2011	
43	Ministerio de Ambiente, Vivienda y Desarrollo Territorial	2007	Rad 4120-Estudio de impacto ambiental 2007	
44	EPM	2018	Actualización algunos programas de manejo	
45	BEP Advisors	05/05/2020	Propuesta Indicadores Efectividad PHI_mayo 2020	
46	ANLA	2010-2022	Actos Adm Segui y Control_AA	
47	EPM		Experiencia profesional (Contratistas-EPM-Sociedad Hidroeléctrica Ituango)	

Ref	Author	Date	Title	Notes / links
48	EPM		Matrices riesgo	
49	EPM	2020-2022	Organigramas	
50	Contratistas		PIMMAS	
51	Hidroeléctrica ITUANGO		Proceso calidad de aire y ruido	
52	Hidroeléctrica ITUANGO		Proceso residuos	
53	EPM	Mayo 2022	Flujograma de Información-mayo 2022	
54	EPM	Julio 2022	Proceso atención problemáticas ambientales y sociales	
55	EPM	Julio 2022	Proceso gestión ambiental PHI	
56	Codesarrollo/EPM	30/12/2013	Informe mapas de redes familiares	
57	SOCYA	27/12/2019	Informe adaptación cultural Orobajo Barbacoas	
58	Hidroeléctrica Pescadero Ituango/Integral	abril-2009	Contrato prestación de servicios para el ajuste de la actualización de la información socioeconómica y predial del área de influencia	
59	Hidroeléctrica Pescadero Ituango/Integral	04/04/2009	Ficha veredal de las areas de influencia puntual y local	
60	Integral/Solingral	2009	Socializaciones municipios previas PHI (Briceño, Buriticá, Ituango, Liborina, Peque, Sabanalarga, San Andres de Cuerquia)	
61		16/10/2008	Audiencia pública licencia (Audiencia, Anexos)	
62	HSC/EPM/Alacaldia de Medellin/Hidroelectrica Ituango/ IDEA/Gobernación de Antioquia	2020	Diagnóstico de la problemática de genero (municipios)	
63	Hidroeléctrica Ituango	2022	Estrategia de Contratación Social (Contratación y presentación)	
64	EPM		Presentación Mejoramiento Instituciones Educativas	
65	EPM	Agosto 2013	Monitoreo Presión Migratoria Ituango	
66	Socya/EPM	2017	Presión Migratoria - Informes más Anexos Ituango	
67	Socya/EPM	2013-2017	San Andrés de Cuerquia (Línea Base 2012, Actas de Liquidación y comités, Anexos, cierres)	
68	Socya/EPM	2012-2017	Toledo (Linea base, actas terminación, cierres, anexos,lineas salud, PM TolValle)	
69	EPM	2013-2017-2019	Valdivia (Línea base, inf técnico convenio fuc, informes, líneas salud)	
70	EPM		Base de datos consolidada	
71	EPM	2013	Instrumento monitoreo Presión Migratoria PHI	

Ref	Author	Date	Title	Notes / links
72	Codesarrollo/EPM		Metodología Presión Migratoria PHI V2 y presentación	
73	EPM	Octubre 2012	Proyectos recibidos de la administración municipal de San Andrés de Cuerquia por impactos por presión migratoria.	
74	EPM	2021	Servicios Amigables Municipios (AMB-Informes)	
75	IFC	2013	Normas de desempeño sobre Sostenibilidad Ambiental y Social	
76	EPM		Contratos EGS (Socya, Actas, convenios municipios)	
77	Codesarrollo/EPM		Ajuste al diseño detallado del plan de gestión social 2012-2022	
78	Jhon Fredy Gaviria Berrio	2020	Términos_referencia_Seguridad_y_Salud_en_el _Trabajo	
79	Juan David Alzate Arango	2018	Evaluación_de_Desempeño_de_Contratista	
80	Paula Andrea Muñoz Garzón	2021	Informe auditoria interna SGSST 2021	
81	Olga Patricia Arias Jiménez	2020	Informe 1 auditoria COVID-19 PHI	
82	Olga Patricia Arias Jiménez	2020	Informe 2 auditoria COVID-19 PHI	
83	Isabel Cristina Hernandez	2020	Capacitación Gestión de Contratos	
84	Ceneida Aliceth Durango Sánchez	2020	Accidentalidad PHI 2011-2022	
85	Administradora de Riesgos Laborales SURA	2021	Evaluación Estándares 0312 Ituango	
86	Administradora de Riesgos Laborales SURA	2022	Evaluación Estándares 0312 Bastilla	
87	Administradora de Riesgos Laborales SURA	2021	Evaluación Estándares 0312 Brugos	
88	Administradora de Riesgos Laborales SURA	2022	Evaluación Estándares 0312 Fragua	
89	Administradora de Riesgos Laborales SURA	2021	Evaluación Estándares 0312 Valle de Toledo	
90	Administradora de Riesgos Laborales SURA	2021	Evaluación Estándares 0312 Mogotes	
91	Administradora de Riesgos Laborales SURA	2022	Evaluación Estándares 0312 Sabanalarga	
92	Administradora de Riesgos Laborales SURA	2021	Evaluación Estándares 0312 Sabanalarga	
93	Administradora de Riesgos Laborales SURA	2021	Evaluación Estándares 0312 Angelina	
94	Equipo Gestión Social-Camila Salazar J.	2011-2020	Política empleo PHI V2JUL2020	
95	Ruta Inclusiva	2021	Género e inclusión social PHI	
96		2015-2022	Consolidado Accidentes graves	
97	Equipo Gestión Social-Camila Salazar J.	2011-2021	Actas Comité Empleo-EPM-Contratistas	
98	Equipo Gestión Social-Camila Salazar J.	2022	Consolidado de Empleo 2022	
99		2015-2020	Enfermedades laborales CCCI	
100	Equipo Gestión Social-Camila Salazar J.	2013 a 2021	Actas Comités Veedores Empleo	
101	Equipo Gestión Social-Camila Salazar J.	2022	Consolidado Bienes y Servicios 2022	
102	Equipo Gestión Social-Camila Salazar J.	2013 a 2022	Bienestar Laboral-Capacitaciones	

Ref	Author	Date	Title	Notes / links
103	Interventoría Ingetec-Sedic	2022	Acta Seguimiento contratista	
104	006.Seguimiento a comunicaciones	2022	Ejemplo inspección seguimiento	
105	Unidad Gestión Riesgos Laborales EPM	2022	Consolidado Acciones P,C y M	
106	Jhon Fredy Gaviria Berrio	2019	FE_Gestión_SGSST_Contratistas, Gestión_SGSST_Contratistas	
107	Consorcio CCCI	2022	Enfermedades laborales CCCI	
108	Interventoría Ingetec-Sedic	2022	Seguimiento a comunicaciones	
109	JAC Membrillal	2022	Ejemplo Entrega EPP JAC	
110	Grupo Gestión del Riesgos de Desastres EPM	2022	Convenios Bomberos	
111	JAC Ituango	2022	Ejemplo Matriz de Peligros JACItuango	
112	EPM y contratistas PHI	2021	Análisis de riesgos Reemplazo cable potencia PH	
113	EPM y contratistas PHI	2021	Análisis riesgos Llenado Descargas y Almenara	
114	EPM y contratistas PHI	2021	Análisis riesgo Maniobra Cámara Espiral	
115	EPM y contratistas PHI	2021	Análisis riesgo Prueba de carga puente grúa 2 & Tandem_PHI	
116	EPM y contratistas PHI	2021	Análisis riesgos cierre del by-pass directo GAD	
117	EPM y contratistas PHI	2021	Análisis de riesgos Despresurización del TDI	
118	EPM y contratistas PHI	2016	Análisis de amenazas	
119	Grupo EPM	2022	Manual_de_Conducta_para_Proveedores_y_Contratistas	
120	Grupo EPM	2019	Código-de-conducta-v7	
121	Aplicativo EPM		Contacto Transparente	
122	Vicepresidencia Talento Humano y Tecnología	2022	Modelo Talento Humano-gh	
123	Comfenalco Antioquia	2021	Reglamento+Comfenalco+06.2021	
124	Vicepresidencia Talento Humano y Tecnología	2018	Guía metodológica para el dimensionamiento de cargos y plazas	
125	Grupo EPM	2020	DDHH en la cadena de suministro-Informe sostenibilidad 2020	
126	Vicepresidencia Riesgos Unidad de Cumplimiento	2021	Informe-gestion-contacto-transparente	
127	Unidad de Cumplimiento	2018	Manual-conducta-empresarial-de-Grupo	
128	Geiser Astrid Gonzalez Montoya	2020	Informe Alojamientos casinos y transporte	
129	Consorcio CCCI	2020	Informe Campamento Villa Luz Gobernación	
130	Equipo COVID-19 PHI	2020-2022	Estadísticas COVID-19 Villaluz y Tacuí Cuní	
131	Equipo COVID-19 PHI	2020	Medidas iniciales COVID-19	

Ref	Author	Date	Title	Notes / links
132	Equipo COVID-19 PHI	2022	Medidas actuales COVID-19 PHI	
133	Equipo COVID-19 PHI	2020	InformeCierreBroteFinal	
134	Unidad Gestión Riesgos Laborales EPM	2022	Plan Local Campamento 2022	
135	Unidad Gestión Riesgos Laborales EPM	2022	Plan de emergencia Embalse	
136	Unidad Gestión Riesgos Laborales EPM	2022	Plan local de emergencias Bodega Tenerife V2	
137	Unidad Gestión Riesgos Laborales EPM	2022	Plan Local de emergencias Obras PHI	
138	Unidad Gestión Riesgos Laborales EPM	2022	Plan Local de emergencias Obras PHI	
139	Camila Salazar Jaramillo	2022	Capacitaciones Trabajadores	
140	Consorcio CCCI	2021	Caso enfermedad laboral	
141	EPM	22/02/2022	Orden de inicio contrato	
142	EPM	16/11/2018	Acta de inicio Monitoreo de la calidad ambiental del proyecto Ituango	
143	EPM	01/07/2022	Base Histórico RC-EMB-TR (req 1433)	
144	IHcantabria/GrupoElemental/aquática/Hidroeléctrica Ituango/EPM	21/10/2015	Modelación de la calidad del agua	
145	EPM	2022	Presentación Calidad del agua	
146	EPM	2022	Presentación Resultados aguas de infiltración	
147	Conintegral/Universidad de Medellin/EPM	04/02/2022	Res1307_Nov21_vf	
148	ConCol/ETSA/EPM	Mayo 2022	Mapa Manejo Integral Residuos Flotantes y Macrocitos	
149	INTEGRAL/EPM	Diciembre 2018	Informe de diseño de la presa	
150	HIDROELECTRICA ITUANGO/INTEGRAL /SOLINGRAL	30/03/2010	Manual de caracterización de la presa	
151	Integral	Abril-2021	Informe actualizado del diseño de la presa	
152	HATCH	17/06/2021	Reporte del informe de análisis estático y dinámico	
153	HATCH	26/05/2021	Análisis de posibles modos de falla	
154	EPM		Consolidados subcontratos (TODOS)	
155	Integral/EPM	2018-2020	Manual de operación del Vertedero (Atención Resolución, Secuencias operación, Análisis operativo)	
156	INGETEC/SEDIC/EPM	Agosto-2021	Plan de calidad PHI	
157	EPM	2021-2022	Informes de seguridad de presas	
158	HIDROELECTRICA ITUANGO/INTEGRAL /SOLINGRAL	30/03/2010	Estudio hidrológico del proyecto (Caracteristicas climaticas e hidrologicas del sitio de presa, anexos)	
159	EPM		Contratos con asesores o firmas externas - Estudio hidrológico del proyecto	

Ref	Author	Date	Title	Notes / links
160	INTEGRAL/EPM	Enero 2019	Informe de diseño del vertedero	
161	HIDROELECTRICA ITUANGO/INTEGRAL /SOLINGRAL	30/03/2010	Memorando de diseño de las conducciones	
162	HIDROELECTRICA ITUANGO/INTEGRAL /SOLINGRAL	30/03/2010	Estudios originales de amenaza sísmica	
163	HIDROELECTRICA ITUANGO/INTEGRAL /SOLINGRAL	30/03/2010	Estudio de amenaza actualizado	
164	HIDROELECTRICA ITUANGO/INTEGRAL /SOLINGRAL	30/03/2010	Documento de diseño e incorporación de red sismológica del proyecto	
165	INTEGRAL/EPM		Caracterización geológica y geotécnica (informe final presa, capitulos y anexos)	
166	EPM	2011-2015	Evidencias Manual de Valores Unitarios (Resolucion-Cartilla-Anexos)	
167	HIDROELECTRICA ITUANGO/INTEGRAL		Fichas veredales (norte-occidente)	
168	EPM		Matrices de riesgo	
169	Gobierno de Colombia		Ley 56 de 1981	
170	EPM	2015-2018	Documentos técnicos	
171	EPM		Video Censo de mineria_Ituango	
172	Proyecto Hidroeléctrico Ituango	22/02/2019	DOCUMENTO CENSO PHI DEF FEB 22 DE 2019	
173	Socya /EPM		Predios potenciales (Actas, Informe, Listado asistencia, registro fotográfico, video)	
174	Codesarrollo/EPM	2013-2014	Talleres imaginarios (Actas, idea vivienda, propuesta traslado, socialización, talleres)	
175	Codesarrolo/católica del norte/hidroeléctrica Ituango	6/10/2010	Informe de visita de reconocimiento	
176	Socya /EPM	Noviembre 2014	Propuesta traslado Orobajo	
177	Codesarrollo/EPM	Julio 2017	Proceso de compensación para familias y personas impactadas PHI	
178	Proyecto Hidroeléctrico Ituango	31/10/2019	Documento censo PHI	
179	UNAL/EPM	2014	Actualización Linea Base	
180	ISAG/EPM	Octubre-2018	Análisis Paisaje Conectividad SAG	
181	HUMBOLDT	28-jun-17	Informe_Conectividad_IAvH	
182	BID/UDNAL/EPM	2016	Guía Ilustrada PHI-Fauna	
183	BID/UDNAL/EPM	2016	Guía Ilustrada PHI-Flora	
184	UDEA/EPM	2018-2021	Estudio Aves (Especificaciones técnicas, informes)	
185	EPM	2018-2022	Estudios poblacionales flora	
186	UDEA/EPM	2015-2022	Estudios poblacionales fauna	

Ref	Author	Date	Title	Notes / links
187	Refocosta/EPM	Enero-2020	Informe semestral Subprograma de manejo de orquídeas y bromelias	
188	AUNAP	2020-2022	Ordenación Pesquera (Auto Apertura - Resolución)	
189	UNAL/EPM	17/07/2020	Ecosistema Referencia	
190	UNAL/EPM	5/04/2021	Ecosistema Restauración	
191	UNAL/EPM	18/07/2021	Plan Acción	
192	UNAL/EPM	18/07/2021	Plan Monitoreo	
193	Jardín Botánico/EPM	Mayo-2020	Seguimiento fenología (Tercer informe-Anexos)	
194	EPM	04/09/2017	Solicitud de adelanto de acciones y pronunciamientos ante las situaciones jurídicas	
195	EPM		EPM-Documento para acta en acuerdos y protocolización	
196	EPM	Diciembre-2019	Guía de relacionamiento con comunidades étnicas Grupo EPM	
197	EPM		Información CINO (Actas, seguimiento reuniones, cartilla y resoluciones)	
198	EPM		Programas Arqueología Preventiva	
199	EPM		Protocolo de hallazgos fortuito	
200	ICANH/EPM	19/04/2022	Resolución ICANH N630 del 19-04-2022- Aprueba el registro del Programa de Arqueología Preventiva PHI	
201	EPM	2012-2022	Casa Cuní	
202	EPM	2015-2022	Puente Buenavista	
203	Instituto de cultura y patrimonio de Antioquia/EPM	2017-2018	Puente Pescadero	
204	EPM	Marzo 29, 2022	Estructura Administrativa EPM 2022	
205	EPM	24/11/2015	Ficha RIC Gestión Regulación Ambiental	
206	EPM	24/01/2020	Plan de Acción RIC GRA Cierre 2019 y Apertura 2020	
207	EPM	10/02/2021	Plan de Acción RIC GRA Cierre 2020 y Apertura 2021	
208	EPM	25/05/2022	Socialización Proceso Gestión Regulatoria	
209	EPM	2022	contrato PNUD EPM	
210	FIP	Octubre 2021	Convenio FIP Propuesta ruta confianza fase 2 EPM	
211	EPM/FIP	Julio 2022	Ruta de la confianza avances	
212	EPM/PNUD	Junio 2022	Alianza EPM PNUD Bajo Cauca territorio de vida	

Ref	Author	Date	Title	Notes / links
213	EPM	07/02/2020	Código de gobierno corporativo de EPM y del grupo de EPM (ajustado Dec481)	
214	Grupo EPM	29/03/2022	Plan de Gobierno 2022-2025	
215	EPM	2022	Monitoreo entorno sociopolítico (Informes)	
216	EPM		Proveedores locales (Manual para la contratación social, guía metodológica y evaluación de desempeño)	
217	EPM	2021	Riesgos en la cadena de suministro	
218	EPM	30/06/2022	Seguimiento optimo-plan de contratación	
219	EPM	2020-2021	Link acceso Políticas Ambientales e Informes de Sostenibilidad	
220	Grupo EPM	16/11/2021	Gestión del riesgo de corrupción	
221	Grupo EPM	23/06/2022	CONSULTORÍA CONTRATACIÓN PRIORITARIA ITUANGO	
222	Grupo EPM	15/02/2022	Informe Evaluación SCI Semestre II 2021 V1	
223	Grupo EPM	23/06/2022	Plan Anticorrupción y de atención al ciudadano EPM	
224	EPM		EVALUACIÓN CONTRATOS AMBIENTALES PROYECTO	
225	Grupo EPM	07/05/2019	ESTATUTO DE AUDITORÍA INTERNA	
226	EPM	01/11/2012	Política y Lineamientos de Control Interno (Decreto 1906-2012 Gerencia General)	
227	EPM		Anexo Técnico Rescate Final	
228	EPM		PMA del medio biotico	
229	EPM	2019-2021	Convenio EPM FH Informe	
230	EPM	Octubre 2021	Seguimiento Indicadores	
231	EPM	2018-2019	Plan de Movilidad (Anexos, informes, oficio remisorio, resolución y resultados)	
232	EPM	Enero 2019	INFORME_TÉCNICO_GRUPO1_FINAL (informe, renegado y orobajo)	
233	EPM	16/01/2020	Informe final EPM-CT-2017-001538	
234	EPM		Río Cauca y Embalse PHI (Tablas de distancias)	
235	EPM	Noviembre-2021	Especificaciones Técnicas CRW127706	
236	EPM	Mayo-2022	Mapa-Manejo integral de residuos flotantes y macrófitas en el embalse del Proyecto	
237	UDEA-EPM	Febrero a Abril-2022	Trimestral Monitoreo Entomológico	
238	UDEA-EPM	27/04/2022	CARTA SVE 061-Tercer informe trimestral entomológico	

Ref	Author	Date	Title	Notes / links
239	CHEMILAB/EPM		Muestreos y análisis CHEMILAB	
240	EPM/UNAL	Julio-2021	Plan de ordenamiento del embalse	
241	EPM	Mayo-2022	Informe CT ordenamiento HI	
242	Integral/Sociedad Hidroeléctrica Ituango	Octubre-2004	Estudios de restricciones ambientales	
243	EPM		Río Cauca y Embalse PHI (Tablas de distancias)	
244	EPM	Noviembre-2021	Especificaciones Técnicas CRW127706	
245	Integral/EPM	Diciembre 2020	Delimitación de la creciente del 12 de mayo de 2018 en el rio Cauca	
246	Hidroeléctrica Ituango	Marzo 2020	Conocimiento de Riesgo	
247	EPM	2021	Documentos de consulta Resiliencia Climática	
248	EPM-HTM-IAVH	30/05/2017	Modelo de estado y tendencias de la biodiversidad	
249	EPM	2019-2022	Informacion de Modelos climáticos regionales	
250	IH Cantabria/Grupo elemental/ aquática/EPM/Hidroeléctrica Ituango	2015	Embalse Ituango Actividades	
251	IH Cantabria/Grupo elemental/ aquática/EPM/Hidroeléctrica Ituango		Emisiones Gases Efecto Invernadero	
252	IH Cantabria/Grupo elemental/ aquática/EPM/Hidroeléctrica Ituango		Metodología modelado biomasa	
253	IH Cantabria/Grupo elemental/ aquática/EPM/Hidroeléctrica Ituango		Conclusiones_generales_final	
254	IH Cantabria/Grupo elemental/ aquática/EPM/Hidroeléctrica Ituango	21/12/2015	Modelo Calidad Agua Ciénagas Aguas Abajo	
255	EPM	2022	Presentaciones Cambio Climático	
256	Grupo EPM	2021	Informe de Sostenibilidad, 2021	
257	Grupo EPM	2020	Informe de sostenibilidad, 2020	
258	Grupo EPM	2021	Nuestro grupo light compressed	
259	Grupo EPM	2021	Agua y biodiversidad	
260	Grupo EPM	2021	Hidroituango	
261	HATCH	26/05/2021	Análisis de posibles Modos de Falla	
262		13 de julio	Normatividad	
263	Hidroeléctrica Ituango	Marzo-2022	Plan de gestión del riesgo (Anexos y PGRD)	
264	UNAL/EPM	Julio-2021	Plan Ordenamiento Embalse	
265	UNAL/EPM	05/04/2021	Presentación Manejo Forestal y Coberturas (Plan de restauración Ecológica, presentaciones)	
266	EPM	2018 al 2021	Datos hidrológicos proyecto y cuenca	
267	IDEAM	1990-2021	Estaciones IDEAM	

Ref	Author	Date	Title	Notes / links
268	EPM	2016-20100	Proyección Escenarios CMIP5	
269	EPM	Dec 13, 2022	Base de Datos Requerimientos	
270	EPM	Dec 13, 2022	Base de Datos Sancionatorios	
271	EPM	Dec 13, 2022	Costos y personal Ambiental y Social PHI	
272	CONTRALORÍA GENERAL DE MEDELLÍN	Octubre 2021	INFORME AUDITORÍA DE CUMPLIMIENTO PROYECTO HIDROELÉCTRICO ITUANGO EMPRESAS PÚBLICAS DE MEDELLÍN E.S.P. Marzo 2019 - Diciembre 2020	https://www.cgm.gov.co/cgm/Paginaweb/IP/Informes%20de%20Auditora%20PGA%202021/Informe%20Definitivo%20AC%20Proyecto%20Hidroituango%20Octubre%202021.pdf
273	Contraloría General de la República	2018	INFORME AUDITORÍA DE CUMPLIMIENTO: GESTIÓN DE LAS AUTORIDADES AMBIENTALES EN EL PROCESO DE LICENCIAMIENTO PROYECTO HIDROELÉCTRICO ITUANGO MADS-ANLA —CORANTIOQUIA — CORPOURABA CON CORTE A MAYO DE 2018	https://kavilando.org/images/stories/documentos/Informe-Auditoria-ITUANGO-1.pdf
274	Ministerio de Minas y Energía - COMISIÓN DE REGULACIÓN DE ENERGÍA Y GAS	2019	Resolución 101 de 2019	https://gestornormativo.creg.gov.co/gestor/entorno/docs/resolucion_creg_0101_2019.htm
275	EPM		Comunicación interna y externa de las políticas y los procesos a proveedores y contratistas	https://cu.epm.com.co/proveedoresycontratistas/servicios-a-proveedores-y-contratistas/comunica
276	EPM	2021	Informe de Gobierno Corporativo	
277	Independent Advisory Panel to IDB Invest	July 2021	IAP Report N°6: Ituango Hydropower Project Colombia	
278	EPM	MAYO 04 DE 2021	LINEAMIENTO 2021-LINGG-70 PROCESO ATENCIÓN DE CONSEJERIA LEGAL DERECHO DE PETICIÓN Y DE LAS PETICIONES, QUEJAS Y RECURSOS -PQR´S- EN EPM	
279	EPM - DIRECCIÓN AMBIENTAL, SOCIAL Y SOSTENIBILIDAD PROYECTO ITUANGO	Febrero 2021	DOCUMENTO SOPORTE PARA AJUSTE Y CONSOLIDADO GENERAL DE PETICIONES, QUEJAS, RECLAMOS Y SOLICITUDES DEL PROYECTO HIDROLECTRICO ITUANGO	
280	Infobae	2/2/2022	Superservicios confirma sanción a EPM por demoras en la entrada en operación de Hidroituango	https://www.infobae.com/america/colombia/2022/02/02/superservicios-confirma-sancion-a-epm-por-demoras-en-la-entrada-en-operacion-de-hidroituango/
281	Infobae	6/9/2021	Fallo de la Contraloría señala a 26 personas involucradas en el caso de Hidroituango	https://www.infobae.com/america/colombia/2021/09/06/fallo-de-la-contraloria-senala-a-26-personas-involucradas-en-el-caso-de-hidroituango/
282	EPM	ENERO 04 DE 2018	LINEAMIENTO 2018-LINGG-26 Lineamientos y Reglas de Negocio del proceso de Contratación	

Ref	Author	Date	Title	Notes / links
283	EPM		Documentación políticas y procesos de contratación	Proveedores locales, modelos pliegos contractuales, riesgos en la cadena de suministros, manuales de conducto, evaluación desempeño contratistas
284	TRIBUNAL ADMINISTRATIVO DE ANTIOQUIA SALA QUINTA DE ORALIDAD MAG. PONENTE: LILIANA P. NAVARRO GIRALDO	10 de abril 2023	Sentencia No. 066 Demandante EPM Demandado ANLA	
285	Consorcio Integral/EPM	31 de agosto de 2007	Plan de manejo ambiental	
286	Hidroeléctrica Ituango	No date	Actualización del estudio de sedimentos para el proyecto hidroeléctrico Ituango en el tramo aguas abajo del sitio de presa	
287	Universidad Nacional de Colombia	2014	Actualización línea base de los componentes flora y fauna terrestre del proyecto hidroeléctrico Ituango. Informe Final`	
288	Grupo Mastozoología Instituto de Biología Universidad de Antioquia	2018	Estudio poblacional de Felinos (Carnivora: Felidae) en el área de influencia directa del Proyecto Hidroeléctrico Ituango: medidas de manejo, conservación y socialización	
289	EPM/SAG	2020	Implementación de parcelas permanentes y desarrollo de los monitoreos de cobertura vegetal y de paisaje. Capítulo 4 caracterización de fauna	
290	EPM/Universidad Nacional Javeriana	2022	Producto E. Dimensionamiento de la afectación por la construcción y puesta en marcha del Proyecto Hidroeléctrico Ituango Convenio de aportes entre Universidad Javeriana y Empresas Públicas de Medellín N° CT – 2019 – 00058	
291	Grupo EPM	2022	Informe de cuantificación de emisiones De gases de efecto invernadero Alcances 1 y 2	
292	Grupo EPM	2021	Estaciones IDEAM 1990-2021	
292	Consorcio CCC Ituango	2018	Informe mensual no. 118 De la gestión socioambiental	
293	EPM	2022	Programa Minka. Proyecto Hidroeléctrico Ituango	
294	EPM	2022	Personal Registrado Activo 16 al 22 de octubre de 2022	

Ref	Author	Date	Title	Notes / links
295	Universidad Nacional de Colombia	No date	Campañas hidrosedimentológicas realizadas por la Universidad Nacional de Colombia	
296	EPM/Universidad Nacional Javeriana	2019	Estrategia regional de restauración a largo plazo: Sistema cenagoso de la quebrada corcovada, Corregimiento Palomar, Caucasia (Antioquia)	
297	EPM/Universidad Nacional de Colombia	2020	Informe de caracterización física de la ciénaga Palomar y la cuenca del río el pesca0	
298	EPM	2022	Manejo de Embalse 09-2022	
299	EPM/Universidad de Cordoba	2022	Análisis de tendencia de la actividad reproductiva y rutas migratorias de Los peces reofílicos en la cuenca media y baja del Río Cauca	
300	Fundacion Humedales	2022	Caracterización De La Dinámica Pesquera En La Cuenca Media Y Baja Del Río Cauca Convenio Ct-2019-000564 Fundación Humedales - EPM	
301	EPM/Universidad de Antioquia	2022	Ensamblaje De Peces Cuenca Media Y Baja Río Cauca Dentro Del Área De Estudio Del Proyecto Hidroeléctrico Ituango	
302	Hidroeléctrica Ituango	2018	Programa De Monitoreo Y Conservación Del Recurso Íctico y Pesquero En Las Cuencas Baja Y Media Del Río Cauca	
303	Hidroeléctrica Ituango	2018	Consolidación Del Programa De Manejo Y Protección Del Recurso Íctico Y Pesquero En Las Cuencas Baja Y Media Del Río Cauca	
304	Consorcio Integral/EPM	2019	Protocolo De Inspección, Ahuyentamiento, Rescate, Recepción y Reubicación De Peces Del Proyecto Hidroeléctrico Ituango	
305	EPM	2022	Planes de Compensación de Biodiversidad terrestre - Acciones de restauración ecológica	
306	INTEGRAL	undated	Seguimiento a la maniobra de lanzamiento de esferas en elPT2 del TDD	
307	EPM	31 Oct. 2022	Cadena Llamadas PHI V-9	
308	EPM-Integral-Solingral	30 June 2011	Actualización Estudio Impacto Ambiental - Plan de Contingencia	
309	Independent Advisory Panel to IDB Invest	September 2018	IAP Report N°1 Ituango Hydropower Project Colombia	

Ref	Author	Date	Title	Notes / links
310	Independent Advisory Panel to IDB Invest	April 2019	IAP Report N°3 Ituango Hydropower Project Colombia	
311	Pöyry	29 Dec 2021	Informe Final	
312	EPM, Unidad Hidrometría y Calidad	20 Nov 2018	Manual de gestión seguridad de presas, Versión 00	
313	EPM, Equipo Gestión Social	30 Oct. 2022	Informe Avance Programa restitución de Condiciones de Vida	
314	Ministerio del Interior	6-7 June 2019	Acta de Consulta Previa con la Comunidad Indígena Orobajo del Pueblo Nutabe.	
315	Ministerio del Interior	3 June 2022	Acta Seguimiento consulta previa y acuerdos	
316	Ministerio del Interior	14 May 2015	Certificación Numero 657	
317	EPM-Integral-Solingral	October 2011	Informe de Rescate y Monitoreo Arqueológico	
318	ARCO arq S.A.S	29 Nov 2021	Plan especial de manejo y Protección PEMP Toledo - Casa Hacienda Cuni, Antioquia y Estudios del Proyecto de Intervención de la Casa hacienda Cuni, Toledo, Antioquia	

Appendix 3-Photographs

All photos taken during pre-assessment in February 2022 and certification assessment in November 2022.

		
Photo 1: EPM head office in Medellín	Photo 2: Tail end of reservoir with Santa Fé de Antioquia town in background	Photo 3: Upper part of reservoir with contained patches of water hyacinth

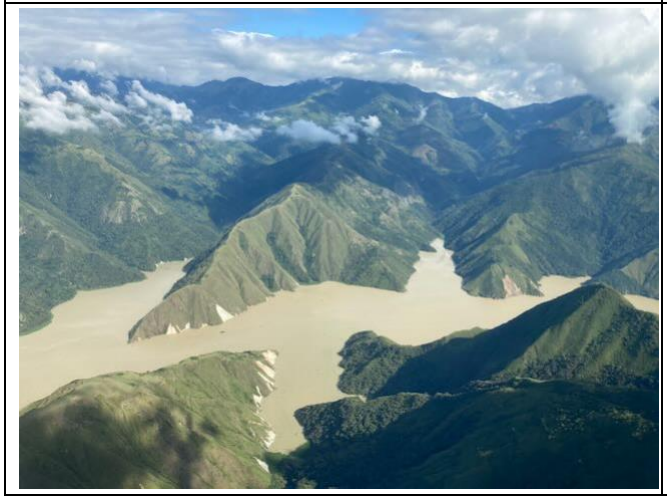



Photo 3: Central part of reservoir with mixed pastures, dry forest and unstable slopes	Photo 5: Lower part of reservoir with EMP camp in foreground and dam in background	Photo 6: Unstable slope in reservoir 1


Photo 7: Unstable slope in reservoir 2


Photo 8: Water hyacinth and woody debris floating on reservoir


Photo 9: Water hyacinth, other macrophytes and trash floating on reservoir


Photo 10: Water hyacinth and debris removal from reservoir by local community workers


Photo 11: Water hyacinth temporary storage area


Photo 12: Boca chica and cachama fish from reservoir

Photo 13: Poster with fish in reservoir

Photo 14: Unused water quality warning sign at EPM boat launch

Photo 15: Transmission lines crossing reservoir

Photo 16: Unstable areas at 0+900 (900m from dam) on left bank

Photo 17: Slope stabilization at 0+900

Photo 18: Waste management at slope stabilization site 0+900

		
Photo 19: Safety signage and ventilation at drainage tunnel to stabilize slopes at 0+900	Photo 20: Bus to Ituango town at ferry landing (former access to Pescadero bridge)	Photo 21: Epiphyte transplant and recovery
		
Photo 22: Reforestation in 100 m buffer zone around reservoir 1	Photo 23: Reforestation in 100 m buffer zone around reservoir 2	Photo 24: Revegetation area above reservoir

Photo 25: Local community worker in reforestation

Photo 26: El Palmar nursery

Photo 27: El Palmar nursery with staff buildings

Photo 28: Temporary installations at nursery, required because license modification for washrooms that are already built has not been processed.

Photo 29: Project landfill in the process of closing and covering

Photo 30: Dried mud for soil enrichment from Medellin WWTP

Photo 31: Dam and unstable areas on right bank

Photo 32: Dam from reservoir

Photo 33: Site visit at overlook above dam

Photo 34: Slope stabilization above dam on right bank

Photo 35: Military post above dam

Photo 36: Spillway in operation

Photo 37: Dam and spillway from above

Photo 38: Spillway gates

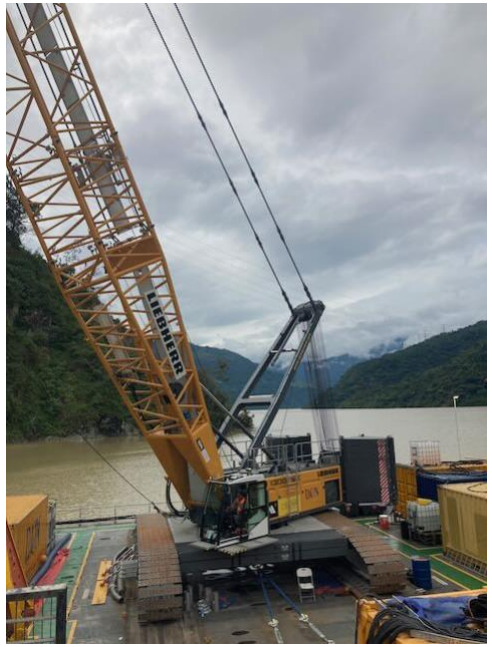


Photo 39: Crane on diving barge

Photo 40: Gas bottles for divers stored at dam

Photo 41: Workers resting on diving barge

Photo 42: Spillway from dam crest

		
Photo 43: Treatment of drainage water from dam gallery	Photo 44: Storage of ferrules to repair intake sections damaged by the contingency, on left bank	Photo 45: Sprinkler system to suppress dust on main construction roads
		
Photo 46: Ticuita inert material deposit 1	Photo 47: Ticuita inert material deposit 2	Photo 48: Disposal for liquid waste from sediment traps at Ticuita

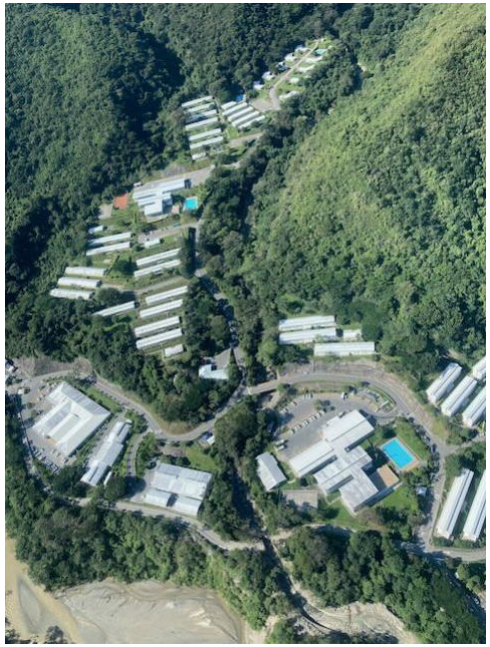


Photo 49: Aerial view of EPM camp

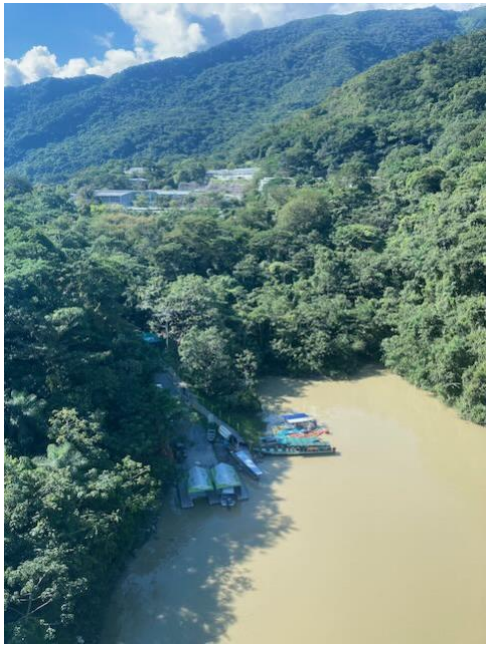


Photo 50: EPM boat landing on reservoir with camp in background

Photo 51: E&S department with 100 staff at EPM camp offices

Photo 52: Ambulance at EPM camp cafeteria

Photo 53: Concrete blocks from damaged powerhouse at EPM camp

Photo 54: EPM camp potable water storage

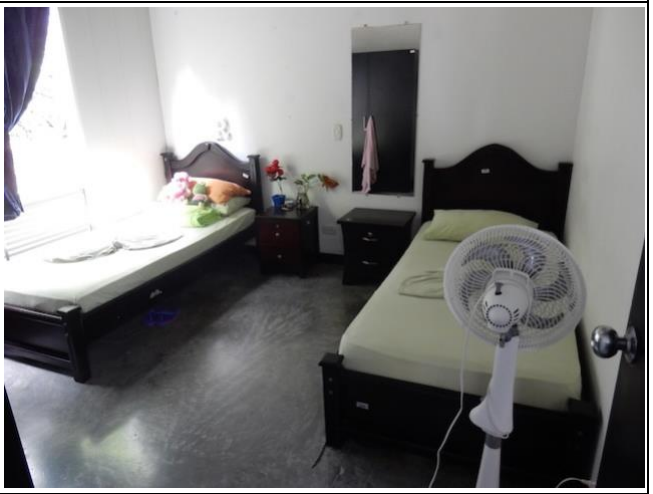
		
Photo 55: Faunal rescue centre EPM camp	Photo 56: Accommodation EPM camp	Photo 57: Main contractor CCC camp offices
		
Photo 58: Cafeteria CCC camp	Photo 59: Men's accommodation CCC camp	Photo 60: Women's accommodation CCC camp

Photo 61: Worker transport at CCC camp

Photo 62: Purchase of local produce at CCC camp

Photo 63: Wastewater treatment plant CCC camp

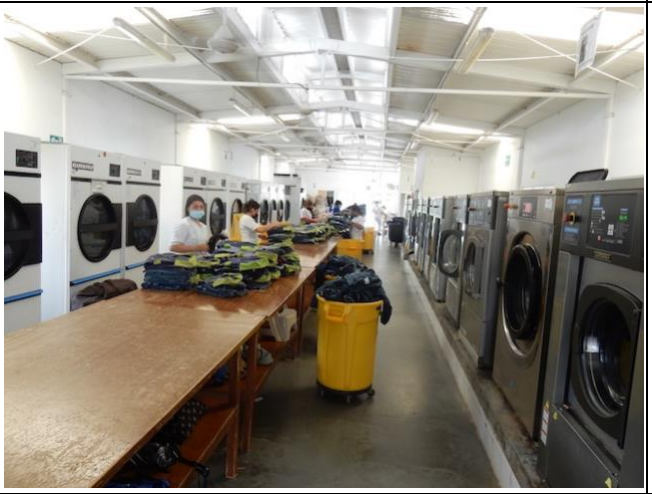


Photo 64: Laundry CCC camp

Photo 65: Composting facility at CCC camp

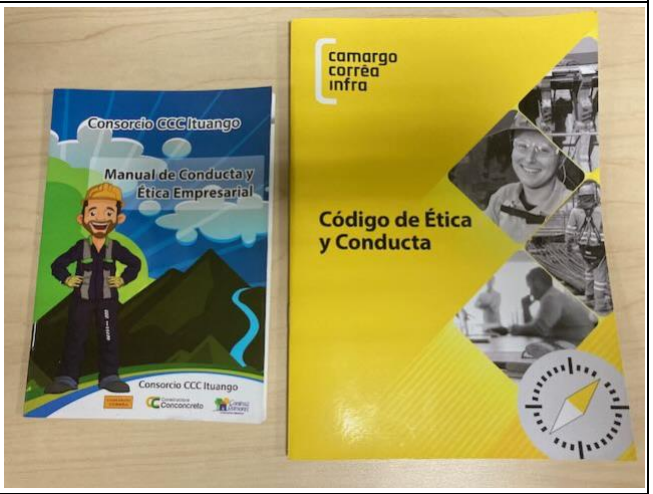


Photo 66: CCC ethics and code of conduct brochures

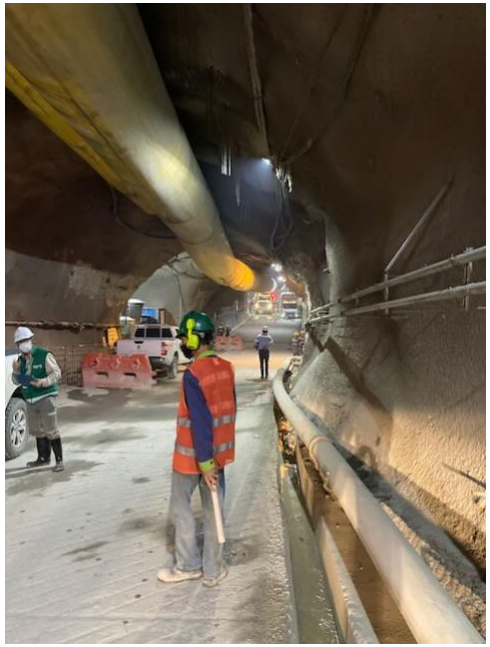


Photo 67: Access tunnel with ventilation and traffic control

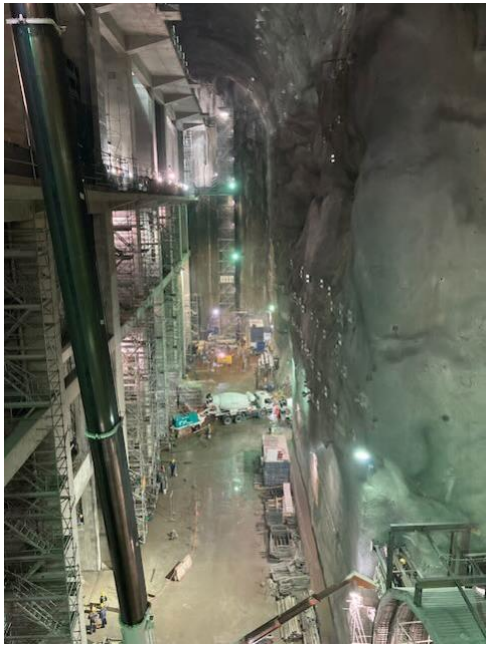


Photo 68: Tailrace cavern

Photo 69: Assembly work in transformer cavern

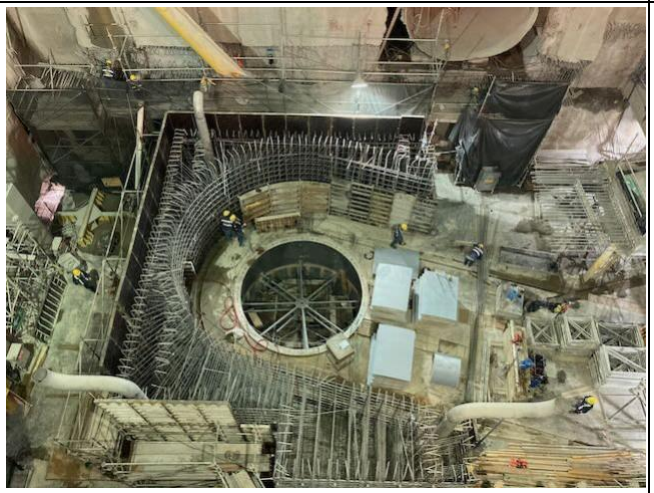


Photo 70: Concrete works in powerhouse cavern

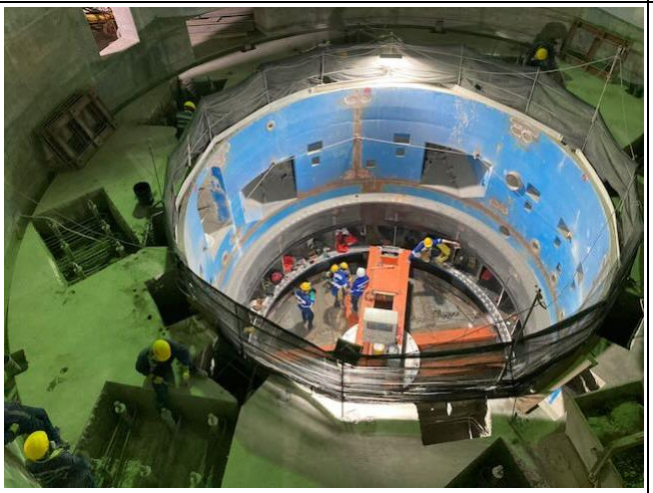


Photo 71: Assembly of generation units

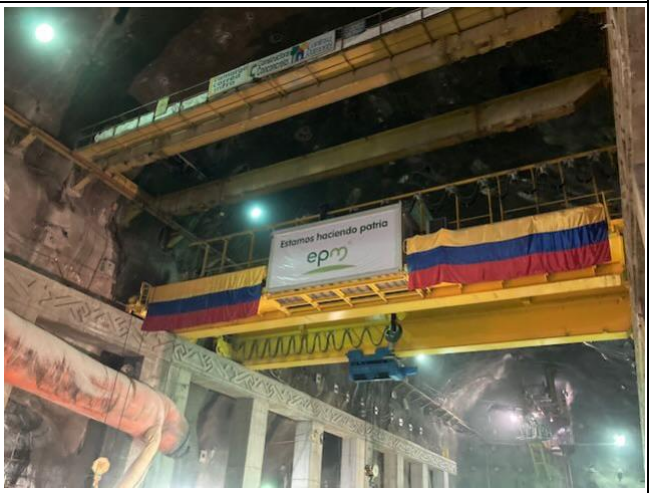


Photo 72: Powerhouse cavern roof

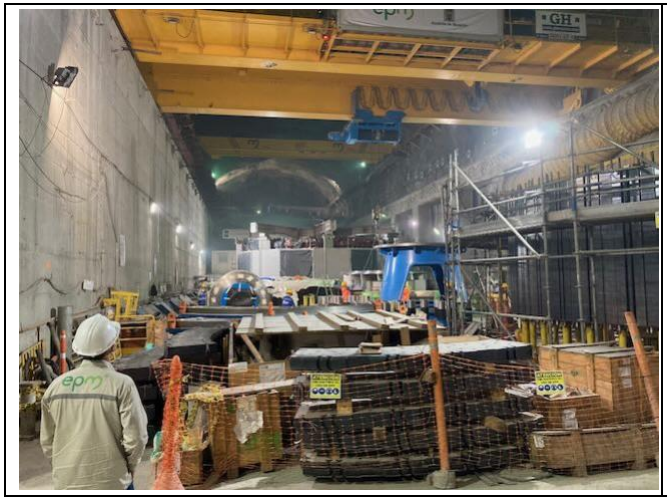


Photo 73: Space constraints in powerhouse cavern

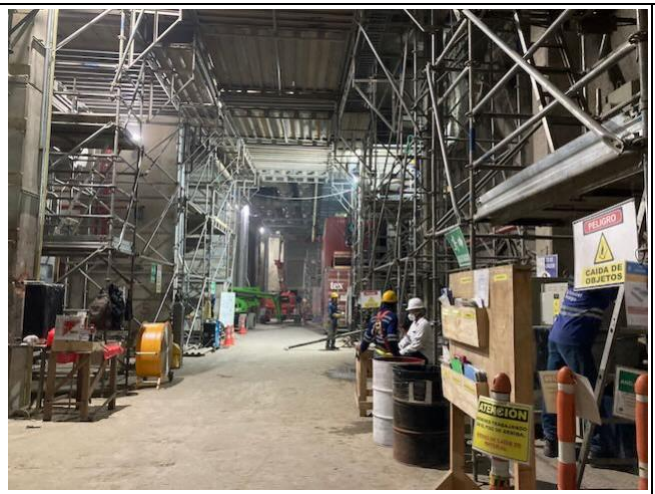


Photo 74: Transformer cavern

Photo 75: Working conditions in powerhouse

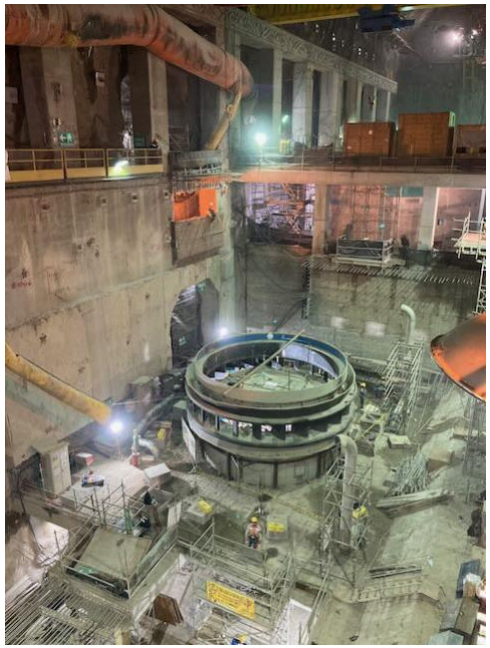


Photo 76: Assembly of generation units

Photo 77: Work at height

Photo 78: Cauca River downstream of dam, with spillway fog in distance

Photo 79: Technical monitoring center (CMT) in EPM camp

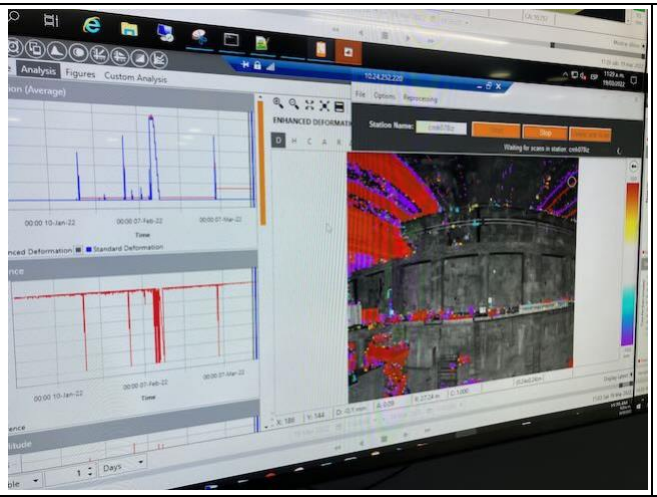


Photo 80: Example for monitoring: deformation-CMT

Photo 81: Example for monitoring: early warning system diversion tunnel-CMT

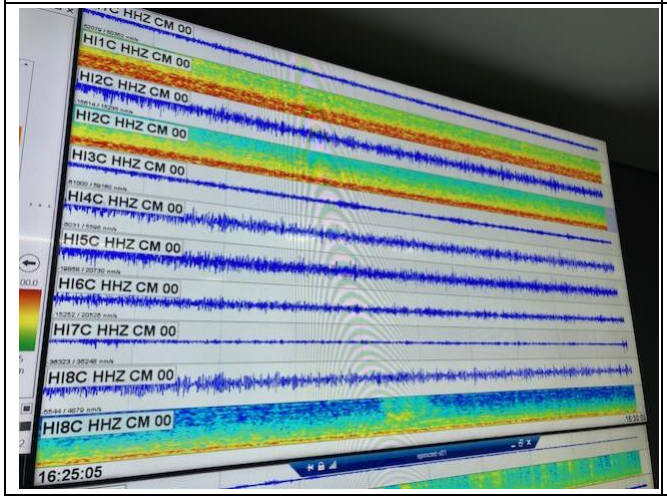


Photo 82: Example for monitoring: seismicity-CMT

Photo 83: Example for monitoring: instrumentation-CMT

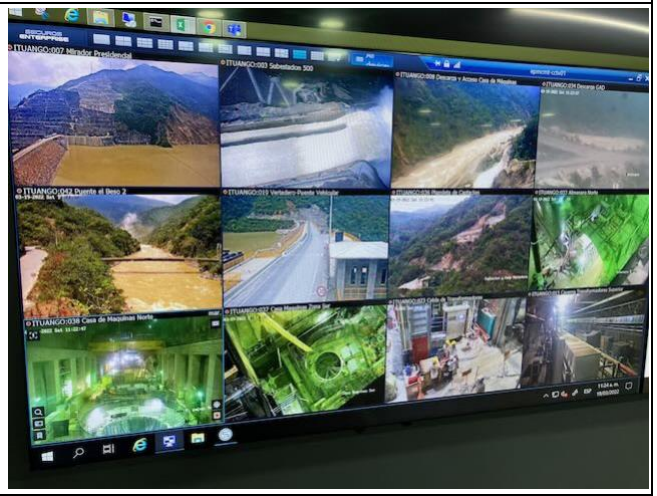


Photo 84: Example for monitoring: remote cameras-CMT

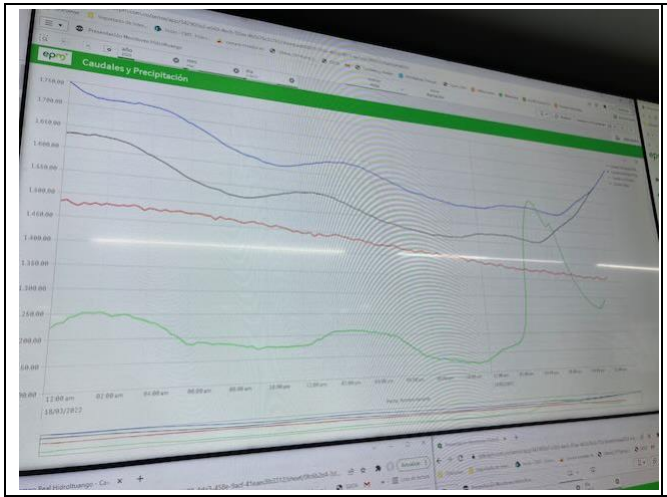


Photo 85: Example for monitoring: reservoir inflows-CMT

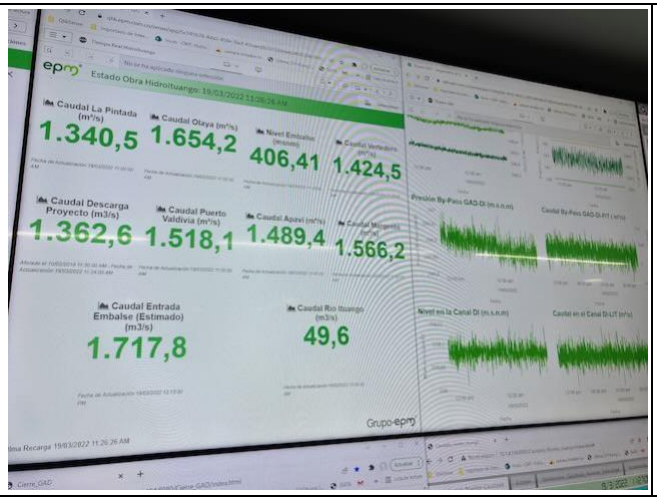


Photo 86: Example for monitoring: hydrometric stations-CMT

Photo 87: EPM community investment along road to Puerto Valdivia downstream, built by the Ituango project

Photo 88: Damages from slope failures along Puerto Valdivia road

Photo 89: Users of Puerto Valdivia road (closed for public vehicle traffic)

Photo 90: Puerto Valdivia on left bank of Cauca River

Photo 91: EPM emergency alert devices along downstream roads

Photo 92: View upstream through section of Puerto Valdivia affected by flood during contingency

Photo 93: Homes in Puerto Valdivia affected by flood during contingency

Photo 94: EPM community investment in Puerto Valdivia

Photo 95: Cauca River from Puerto Valdivia bridge

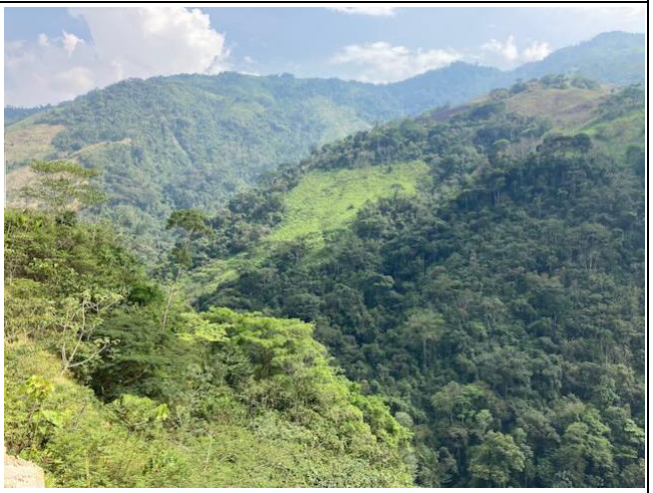


Photo 96: Coca and other cultivation on right bank downstream

Photo 97: Cauca River transition from hill country to floodplain 1

Photo 98: Cauca River transition from hill country to floodplain 2

Photo 99: Bridge over Cauca River

Photo 100: Bagre fish hatchery

Photo 101: Cienaga Palomar (floodplain lake)

Photo 102: Palomar tree nursery

		
Photo 103: Palomar community	Photo 104: EPM community investment-women's honey cooperative	Photo 105: Interview project affected people 1
		
Photo 106: Interview project affected people 2	Photo 107: Interview mayor San Andrés de Cuerquia	Photo 108: Resettlement community Jardines de San Andrés, for families affected by bypass road around San Andrés town, built to reduce traffic impacts from the main access road to project

Photo 109: Spoil deposit along access road, near San Andrés

Photo 110: Ituango town square

Photo 111: Municipal landfill in Ituango, to be improved, expanded and used by EPM

Photo 112: EPM customer office in Toledo town

Photo 113: EPM community investment-rural school in Toledo municipality

Photo 114: EPM community investment-football field in Toledo town

Photo 115: Typical landslide blockage, on road to Toledo rebuilt by EPM as community investment

Photo 116: Memorial for 2008 bombing in Ituango

Photo 117: Community information on recruitment process, in Ituango town hall

Photo 118: EPM community investment-school in San Andrés

Photo 119: EPM community investment-Toledo community centre

Photo 120: Convenience store of resettled person in Santa Rosa

Photo 121: Suggestion box in CCC cafeteria

Photo 122: Interview with resettled person from Nutabe community

Photo 123: Photo album of the FPIC process owned by resettled person from Nutabe community

Photo 124: Assessment team with EPM counterparts

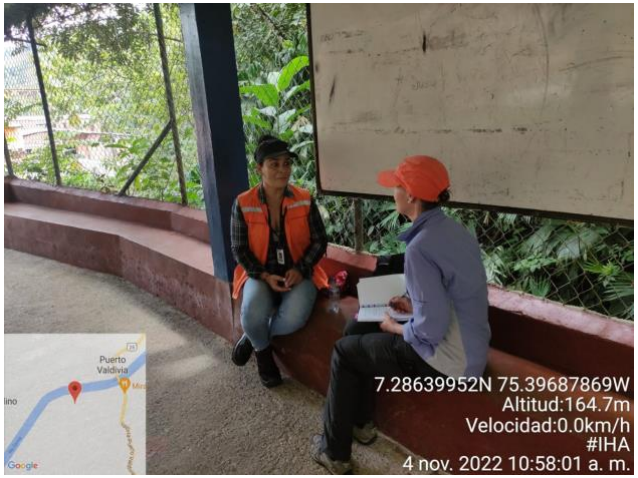


Photo 125: Interview with community leader in Puerto Valdivia

Photo 126: Panoramic view of main works at Ituango project