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Report No: PAD3645

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED LOAN

IN THE AMOUNT OF US\$300 MILLION

TO THE

REPUBLIC OF THE PHILIPPINES

FOR A

PHILIPPINES SEISMIC RISK REDUCTION AND RESILIENCE PROJECT

May 11, 2021

Urban, Disaster Risk Management, Resilience and Land Global Practice  
East Asia And Pacific Region

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## CURRENCY EQUIVALENTS

(Exchange Rate Effective February 28, 2021)

Currency Unit = PHP

PHP48.83 = US\$1

## FISCAL YEAR

January 1 - December 31

Regional Vice President: Victoria Kwakwa

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## ABBREVIATIONS AND ACRONYMS

ASEP	Association of Structural Engineers of the Philippines
CBA	Cost-Benefit Analysis
CERC	Contingent Emergency Response Component
DEO	District Engineering Office
DepEd	Department of Education
DOH	Department of Health
DOST	Department of Science and Technology
DPWH	Department of Public Works and Highways
DRM	Disaster Risk Management
EIRR	Economic Internal Rate of Return
EO	Executive Order
EOC	Emergency Operation Center
EP&R	Emergency Preparedness and Response
ESCP	Environment and Social Commitment Plan
ESF	Environmental and Social Framework
ESS	Environment and Social Standards
FM	Financial Management
GMMA	Greater Metro Manila Area
GoP	Government of the Philippines
GRS	Grievance Redress Service
M&E	Monitoring and Evaluation
MMEIRS	Metropolitan Manila Earthquake Impact Reduction Study
MoA	Memorandum of Agreement
NCR	National Capital Region
NPV	Net Present Value
NSCP	National Structural Code of the Philippines
OMYP	Oplan Metro Yakal Plus
PDO	Project Development Objective
PHIVOLCS	Philippine Institute of Volcanology and Seismology
PIU	Project Implementation Unit
PMO-ERG	Program Management Office for the Earthquake Resilience of GMMA
POM	Project Operations Manual
PPSD	Project Procurement Strategy for Development
QRA	Quick Response Assets
QRST	Quick Response Support Teams
RVS	Rapid Visual Screening
SEP	Stakeholder Engagement Plan
STEP	Systematic Tracking of Exchanges in Procurement
SVR	Seismic Vulnerability Rating
WASH	Water, Sanitation and Hygiene
WVF	West Valley Fault

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## DATASHEET

### BASIC INFORMATION

Country(ies)	Project Name	
Philippines	Philippines Seismic Risk Reduction and Resilience Project	
Project ID	Financing Instrument	Environmental and Social Risk Classification
P171419	Investment Project Financing	Substantial

### Financing & Implementation Modalities

<input type="checkbox"/> Multiphase Programmatic Approach (MPA)	<input checked="" type="checkbox"/> Contingent Emergency Response Component (CERC)
<input type="checkbox"/> Series of Projects (SOP)	<input type="checkbox"/> Fragile State(s)
<input type="checkbox"/> Performance-Based Conditions (PBCs)	<input type="checkbox"/> Small State(s)
<input type="checkbox"/> Financial Intermediaries (FI)	<input type="checkbox"/> Fragile within a non-fragile Country
<input type="checkbox"/> Project-Based Guarantee	<input type="checkbox"/> Conflict
<input type="checkbox"/> Deferred Drawdown	<input type="checkbox"/> Responding to Natural or Man-made Disaster
<input type="checkbox"/> Alternate Procurement Arrangements (APA)	<input type="checkbox"/> Hands-on Enhanced Implementation Support (HEIS)

Expected Approval Date	Expected Closing Date
02-Jun-2021	30-Jun-2026

Bank/IFC Collaboration

No

### Proposed Development Objective(s)

The Project Development Objectives are to enhance: (i) the safety and seismic resilience of selected public buildings in Metro Manila, and (ii) the capacity of the DPWH to prepare for and respond to emergencies.



**Components**

Component Name	Cost (US\$, millions)
Improving Multi-hazard Resilience of Public Buildings and Facilities	245.00
Improving Emergency Preparedness and Response in Public Works	52.00
Project Management	3.00
Contingent Emergency Response	0.00

**Organizations**

Borrower: Republic of the Philippines  
 Implementing Agency: Department of Public Works and Highways

**PROJECT FINANCING DATA (US\$, Millions)**

**SUMMARY**

<b>Total Project Cost</b>	309.50
<b>Total Financing</b>	309.50
<b>of which IBRD/IDA</b>	300.00
<b>Financing Gap</b>	0.00

**DETAILS**

**World Bank Group Financing**

International Bank for Reconstruction and Development (IBRD)	300.00
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**Non-World Bank Group Financing**

Counterpart Funding	9.50
Borrower/Recipient	9.50

**Expected Disbursements (in US\$, Millions)**

WB Fiscal Year	2021	2022	2023	2024	2025	2026	2027



<b>Annual</b>	0.10	35.00	76.70	102.00	68.10	17.90	0.20
<b>Cumulative</b>	0.10	35.10	111.80	213.80	281.90	299.80	300.00

**INSTITUTIONAL DATA**

**Practice Area (Lead)**

Urban, Resilience and Land

**Contributing Practice Areas**

**Climate Change and Disaster Screening**

This operation has been screened for short and long-term climate change and disaster risks

**SYSTEMATIC OPERATIONS RISK-RATING TOOL (SORT)**

Risk Category	Rating
1. Political and Governance	● Substantial
2. Macroeconomic	● Moderate
3. Sector Strategies and Policies	● Low
4. Technical Design of Project or Program	● Low
5. Institutional Capacity for Implementation and Sustainability	● Low
6. Fiduciary	● Moderate
7. Environment and Social	● Substantial
8. Stakeholders	● Moderate
9. Other	● Moderate
10. Overall	● Moderate

**COMPLIANCE**

**Policy**

Does the project depart from the CPF in content or in other significant respects?

[ ] Yes [✓] No



Does the project require any waivers of Bank policies?

[ ] Yes [✓] No

**Environmental and Social Standards Relevance Given its Context at the Time of Appraisal**

E & S Standards	Relevance
Assessment and Management of Environmental and Social Risks and Impacts	Relevant
Stakeholder Engagement and Information Disclosure	Relevant
Labor and Working Conditions	Relevant
Resource Efficiency and Pollution Prevention and Management	Relevant
Community Health and Safety	Relevant
Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	Not Currently Relevant
Biodiversity Conservation and Sustainable Management of Living Natural Resources	Not Currently Relevant
Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	Not Currently Relevant
Cultural Heritage	Not Currently Relevant
Financial Intermediaries	Not Currently Relevant

**NOTE:** For further information regarding the World Bank’s due diligence assessment of the Project’s potential environmental and social risks and impacts, please refer to the Project’s Appraisal Environmental and Social Review Summary (ESRS).

**Legal Covenants**

Sections and Description

Institutional Arrangements

Loan Agreement: Schedule 2, Section I.A

Two months after the Effective Date, Recurrent, Continuous

The Borrower, through DPWH, shall, by no later than two (02) months after the Effective Date, establish the Project Implementation Unit with composition, functions, staffing and resources satisfactory to the Bank.

One month after the Effective Date, Recurrent, Continuous

The Borrower, through DPWH, shall, throughout the Project implementation period, maintain, a Project Steering





Committee, a Project Implementation Unit, and a Technical Working Group; and delegate the regional office or district engineering office; all with composition, functions, staffing and resources satisfactory to the Bank and further set out in the Project Operations Manual.

The Borrower, through DPWH, shall enter into a memorandum of agreement with each of the Partner Agencies under terms and conditions acceptable to the Bank.

Sections and Description

Project Operations Manual

Loan Agreement: Schedule 2, Section I.B

One month after the Effective Date,

The Borrower, through DPWH, shall adopt the Project Operations Manual in form and substance satisfactory to the Bank.

Recurrent, Continuous

The Borrower shall ensure that the Project is carried out in accordance with the arrangements and procedures set out in the Project Operations Manual, and not amend, waive or abrogate any provisions of the manual unless the Bank agrees otherwise in writing.

Sections and Description

Annual Work and Financial Plans

Loan Agreement: Schedule 2, Section I.C

Recurrent, Annual

The Borrower, through DPWH, shall prepare and furnish to the Bank for its no-objection no later than October 31 of each fiscal year an annual work plan and budget during the implementation of the Project containing relevant Project activities and expenditures proposed to be included in the Project in the following fiscal year, including a specification of the sources of financing.

Sections and Description

Environmental and Social Standards

Loan Agreement: Schedule 2, Section I.D

Recurrent, Continuous

The Borrower, through DPWH, shall ensure that the Project is carried out in accordance with the Environmental and Social Standards, the ESCP (including the management tools and instruments referred to therein) in a manner acceptable to the Bank, and shall not amend, repeal, suspend, or waive the ESCP or any provisions of thereof unless the Bank agrees otherwise, and report on their status of implementation as part of the project reports.

Sections and Description

Mid-term Review

Loan Agreement: Schedule 2, Section II.B

Once, 30 months after the Effective Date

Obligation of the Borrower, through DPWH, to prepare and furnish to the Bank a mid-term report in form and



substance satisfactory to the Bank.

Sections and Description

Contingent Emergency Response

Loan Agreement: Schedule 2, Section I.E

In case of an Eligible Crisis or Emergency

The Borrower shall adopt a satisfactory Contingent Emergency Response Manual and Emergency Action Plan for Part 4 of the Project and, in the event of an eligible crisis or emergency, ensure that the activities under said part are carried out in accordance with such manual, plan and all relevant safeguard requirements.

**Conditions**

Type	Financing source	Description
Disbursement		The Borrower may not withdraw the proceeds of the Loan as may be allocated to Part 4 unless an Eligible Crisis or Emergency has occurred, and the Borrower has adopted the CERC Manual and Emergency Action Plan, in form and substance acceptable to the Bank.

## I. STRATEGIC CONTEXT

### A. Country Context

- 1. The Philippines is one of the most dynamic economies in Asia, although the COVID-19 pandemic has had a significant impact on growth.** With increasing urbanization, a growing middle-income class, and a large and young population, the Philippines has nearly doubled GDP per capita over the past two decades from US\$1,669 in 2000 to US\$3,338 in 2019<sup>1</sup> (in constant 2010 US\$). Having sustained an average annual growth of 6.4 percent between 2010-2019 from an average of 4.5 percent between 2000-2009, the country is poised to cross the threshold from lower-middle income country (MIC) status to upper-MIC status within the next three years. Poverty incidence declined from 26.3 percent in 2009 to an estimated 23.3 percent in 2015 and 16.6 percent in 2018<sup>2</sup>, mainly due to improved market conditions leading to increased wages of the poor. Despite the gains, income inequality remains high, with the Gini Index above 40 due to the country's distinctively complex political economy.<sup>3</sup> The Philippines continues to face a range of development challenges including the current health risks and economic disruption brought about by the COVID-19 pandemic, and the dual risks from conflict and natural disasters.
- 2. The implementation of strict containment measures to address the COVID-19 pandemic led to an economic contraction of 9.5 percent in 2020, a reversal from the 6.0 percent growth in 2019.** GDP contracted by 8.3 percent in the fourth quarter of 2020,<sup>4</sup> compared to 6.7 percent growth in the same period in 2019.<sup>5</sup> Despite relaxation in August, the prolonged lockdown measures contributed to the contraction as private consumption continued to shrink in 2020 due to income losses, poor consumer confidence, and slow recovery of economic activities. Despite the government's efforts to mitigate the negative effects of the pandemic on poor and vulnerable households, poverty incidence was estimated to have increased by around 1.9 percentage points in 2020.
- 3. Notwithstanding the COVID-19 shock, one of the most significant development challenges the country continues to face is its exposure to adverse natural events,** placing the country near the top of global vulnerability rankings. Located at the confluence of the 'Pacific Ring of Fire' and the Pacific Cyclone Belt, at least 60% of the country's total land area is exposed to multiple hazards (frequent earthquakes, floods, tsunamis, landslides, volcanic eruptions, cyclones, and annual monsoons). Over the past 50 years, the country experienced more than 15 destructive earthquakes, and four major seismic events of magnitude greater than 6.5 occurred from November-December 2019 alone. The Philippine Institute of Volcanology and Seismology (PHIVOLCS) considers 23 volcanoes to be currently active, and in January 2020 Taal Volcano (70 km south of Manila) entered a period of unrest that then progressed into a magmatic eruption. This affected over 500,000 people and caused approximately PhP3.4 billion in direct damage to infrastructure and agriculture in Region IV-A. The country's high exposure to natural hazards is a principal threat to economic growth and inclusion: at least 74 percent of Filipinos are vulnerable to the impacts of natural hazards, which have killed 70,000 people, caused an estimated US\$23 billion in damages, and adversely affected 120 million since 1990<sup>6</sup>.

<sup>1</sup> [https://data.worldbank.org/indicator/NY.GDP.PCAP.KD?end=2019&locations=PH&name\\_desc=true&start=1960&view=chart](https://data.worldbank.org/indicator/NY.GDP.PCAP.KD?end=2019&locations=PH&name_desc=true&start=1960&view=chart)

<sup>2</sup> The latest official poverty estimate released by the Philippine Statistical Authority was for 2018. The survey is conducted every 3 years, and there was no survey conducted in 2012.

<sup>3</sup> World Bank. 2019. *Philippines - Country Partnership Framework for the Period July 2019 - December 2023*. Washington, D.C. : World Bank Group. <https://hubs.worldbank.org/docs/imagebank/pages/docprofile.aspx?nodeid=31582978>

<sup>4</sup> GDP declined by 16.9% and by 11.4% in the second and third quarters of 2020, respectively.

<sup>5</sup> <https://psa.gov.ph/national-accounts>

<sup>6</sup> GFDRR (Global Facility for Disaster Reduction and Recovery), and World Bank. 2016. "Country Profile: Philippines," World Bank, Washington DC, <https://www.gfdr.org/sites/default/files/publication/PHILIPPINES2016.pdf>

Located in one of the world's most active seismic regions, the Philippines faces high earthquake risks, especially Metro Manila, which accounts for one-third of national GDP. In the absence of mitigating measures to minimize the damage caused by earthquakes, the impact on economic growth and welfare would be massive.

4. **Climate change is exacerbating the impact of weather-related events**, while unplanned urban expansion has aggravated flood risk.<sup>7</sup> In addition to frequent earthquakes and volcanic eruptions, an average of 20 tropical cyclones (typhoons) enter the Philippine Area of Responsibility every year. The impacts of climate-related events have been increasing and, over the last decade, typhoons making landfall have increased in intensity (wind speed).<sup>8</sup> In 2013, Typhoon Yolanda (Haiyan), the strongest storm ever recorded at landfall, caused over 6,000 reported fatalities, damaged 1.1 million homes in nine Regions, and resulted in 2.3 million Filipinos falling below the poverty line. Typhoon Rolly (Goni) caused strong wind, flooding, and volcanic mudflow in the Bicol and Calabarzon regions, affecting approximately 1.6 million people and damaging 60 road sections and 7 bridges in November 2020. Of the 2,754 natural hazard events in the Philippines from 2005 to 2015, the most frequent were climate-related,<sup>9</sup> and included typhoons, floods, and droughts, with the exposure to such hydro-meteorological hazards projected to intensify under climate change.<sup>10</sup>
5. **The Government of the Philippines (GoP) takes a comprehensive, multi-hazard approach to disaster risk reduction and preparedness (including climate-related disasters and infectious diseases)**. This integrated approach is crucial as crises grow increasingly more complex, with climate-related disasters (e.g. Typhoon Ambo in May 2020) overlapping with unprecedented public health emergency like COVID-19. Presidential Proclamation No. 922 (2020) was issued on March 8, 2020, declaring a State of Public Health Emergency throughout the Philippines. In accordance with the National Disaster Response Plan, the relevant response clusters were activated as part of the Task Groups of the National Task Force (NTF) for COVID-19 (the operational arm of the Inter-Agency Task Force on Emerging Infectious Disease). As of January 30, 2021, there were 4,760 daily confirmed COVID-19 cases per million population (approximately 42% of which were in the National Capital Region), 2.0% fatality rate and 92.8% recovery rate.<sup>11</sup> Should a major natural disaster occur during the pandemic, the compounding impacts would severely undermine the country's preparedness and response measures and can overwhelm the system, which is operating at close to full capacity (including community quarantine, case management (including isolation), and sustained delivery of health services).

## B. Sectoral and Institutional Context

6. **Metro Manila (or the National Capital Region, NCR) is the seat of government and the country's population, economic, and cultural center**. Its population is approximately 12.9 million (2015 census), while Greater Metro Manila's population is estimated at 21 million (NCR, Region III, and Region IV-A). Rapid urbanization has resulted in an extremely dense agglomeration of vulnerable infrastructure, buildings, and housing. Moreover, the Greater Metro Manila Area (GMMA) risk assessment study estimated that a magnitude 7.2 earthquake on the West Valley Fault (a probable maximum scenario, so-called 'The Big One'), would result in an estimated 48,000 fatalities, US\$48 billion in economic losses, with catastrophic impact on government

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<sup>7</sup> GFDRR (Global Facility for Disaster Reduction and Recovery), and World Bank. 2016. "Country Profile: Philippines," World Bank, Washington DC, <https://www.gfdr.org/sites/default/files/publication/PHILIPPINES2016.pdf>

<sup>8</sup> [https://www.researchgate.net/publication/294138837\\_Observed\\_trends\\_and\\_impacts\\_of\\_tropical\\_cyclones\\_in\\_the\\_Philippines](https://www.researchgate.net/publication/294138837_Observed_trends_and_impacts_of_tropical_cyclones_in_the_Philippines)

<sup>9</sup> World Bank. 2019. *Philippines - Country Partnership Framework for the Period July 2019 - December 2023*. Washington, D.C.: World Bank Group. <https://hubs.worldbank.org/docs/imagebank/pages/docprofile.aspx?nodeid=31582978>

<sup>10</sup> World Bank, 2020, Climate Change Knowledge Portal Philippines.

<sup>11</sup> <http://bit.ly/3anOUim>, Department of Health data as of January 30, 2021

continuity and service provision.<sup>12</sup> Metro Manila is highly exposed to seismic and climate-related hazards, combined with the vulnerability of buildings and infrastructure, leading to very high risk of loss of life, direct damage, and economic losses.

7. **Metro Manila is transected by numerous earthquake generators, of which the West Valley Fault (WVF) poses the most significant earthquake threat.** The recurrence of large earthquakes on the WVF has previously been estimated at between 400 to 600 years, with considerable uncertainty.<sup>13</sup> The 2004 Metropolitan Manila Earthquake Impact Reduction Study (MMEIRS), implemented by PHIVOLCS and the Metropolitan Manila Development Authority (with the Japan International Cooperation Agency), shows that the West Valley Fault has moved 4 times and generated strong earthquakes within the last 1400 years. The approximate return period of these earthquakes is less than 500 years and no event along the West Valley Fault is known after the 17th century, indicating that the active phase is likely approaching. Based on analyses of historically and instrumentally recorded earthquakes, MMEIRS Model 08 scenario (WVF, Magnitude 7.2) was selected for detailed analysis due to potential to cause severe damage. A key finding of MMEIRS is that the scenario earthquake impact would result in separation of Metro Manila into four quadrants (North, South, East, West), as follows:
  - a) North-South: projected to be separated both by building collapse and bridge collapse across the Pasig River;
  - b) East: projected damage to road networks due to ground rupture/fault movement, and building collapse; and
  - c) West: projected to be isolated by fire and building collapse.
  
8. **Two important assessments have extensively identified the risks facing the Greater Metro Manila Area and the National Capital Region.** MMEIRS and *Enhancing Risk Analysis Capacities for Flood, Tropical Cyclone, Severe Wind and Earthquake for the Greater Metro Manila Area* (GMMA RAP, conducted in 2014)<sup>14</sup> estimated that the scenario impacts of 'The Big One' in Metro Manila (NCR) alone are as follows: 31,228 fatalities; approximately 510,000 injuries ranging from slight to life-threatening; approximately 261 million square meters of property damage ranging from slight to complete collapse; 500 fire incidents; and an estimated financial loss of around 2.3 trillion pesos (based on 2013 asset exposures). Considering population and economic growth in the intervening years since the GMMA RAP study, the overall risk can be expected to have increased significantly.
  
9. **To address the tremendous threat of a potentially catastrophic earthquake in GMMA, the President of the Philippines issued Executive Order No. 52 (EO 52)** on May 8, 2018, creating the Program Management Office for the Earthquake Resilience of the Greater Metro Manila Area (PMO-ERG), reporting to the President through the Chair of the Climate Change Adaptation and Management – Disaster Risk Reduction Cabinet Cluster. EO 52 defines institutional roles and responsibilities within a whole-of-government strategy to strengthen the country's resilience to earthquakes, and to ensure public safety and government continuity. Notably, Section 5 of EO 52 (*Earthquake-resistant infrastructure*) mandates government agencies to take proactive steps to 'guarantee the resilience of public infrastructure (e.g. roads, bridges, buildings, hospitals) in the GMMA'. The PMO-ERG's primary mandate is to steer the operationalization of the 'Two-pronged

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<sup>12</sup> PHIVOLCS, and Geoscience Australia. 2014. Greater Metro Manila Area Risk Assessment Program.

<sup>13</sup> Nelson, et al., 2000. Multiple large earthquakes in the past 1500 years on a fault in metropolitan Manila, the Philippines. *Bull. Seism. Soc. Am.* 90, 73–85.

<sup>14</sup> PHIVOLCS, and Geoscience Australia. 2014. Greater Metro Manila Area Risk Assessment Program.

Strategy Toward an Earthquake-Resilient GMMA<sup>15</sup>,<sup>15</sup> adopted via the Directives of the 20th Cabinet Meeting (December 2017). The PMO-ERG also has the mandate to review and monitor the earthquake resilience plans and investment programs of government agencies (see section II.E for a description of actions already underway to implement these strategies, including projects/programs funded by other development partners).

10. **While EO 52 provides a coherent national strategy for seismic risk reduction and resilience, Oplan Metro Yakal Plus (OMYP) -- the Metro Manila Earthquake Contingency Plan – identifies institutional roles, resources, and operational arrangements for emergency preparedness and response.** The OMYP is directly based on the reference scenario described by MMEIRS and GMMA RAP, and outlines the general framework, structures, and systems for the effective integration of multi-agency and multi-sectoral resources to deal with the extreme risk from a potentially catastrophic earthquake in Metro Manila. The OMYP guides the government’s response operations, as well as those of the other stakeholders within and outside Metro Manila and institutionalizes a system of earthquake preparedness and response procedures for different national agencies’ units and personnel by defining roles and providing guidelines on actions that will be carried out prior to and immediately after the occurrence of a major earthquake.
  
11. **The OMYP also establishes an overall system of command and control for Metro Manila immediately after an intense ground-shaking event.** According to Section 4.1 (*Command and Control*) of the plan, the Department of Public Works and Highways’ (DPWH) mandate when the contingency plan is activated is to: (i) ensure that roads and thoroughfares are cleared of debris and assist in the restoration of other lifelines; (ii) assist in the establishment and maintenance of evacuation camps; and (iii) assist in building/establishment of temporary shelters. In addition, the OMYP also sets out sectoral plans and arrangements including Standard Operating Procedures (SOPs) and policies. For each Sector, the OMYP designates the Lead Agency, Deputy and Cooperating Agencies<sup>16</sup>. DPWH is the lead agency for the Engineering, Reconstruction, and Rehabilitation Sector with the following responsibilities, to which the project will directly contribute:
  - (a) clear debris, obstructions and restore vital access roads and bridges;
  - (b) conduct rapid damage assessment and needs analysis;
  - (c) assist in the restoration of vital lifelines (e.g. power supply, communication, and water supply);
  - (d) assist in providing the Search and Rescue Sector additional equipment for search and rescue operations;
  - and
  - (e) reconstruct/rehabilitate damaged structures and facilities.
  
12. **Relevance to climate-related disasters.** It is important to highlight that while the activities associated with EO 52 and OMYP (e.g., institutional roles, resources, general framework, structures, and operational arrangements for emergency preparedness and response) are designed to deal with the extreme risk from a major earthquake in Metro Manila, these same capacities and capabilities will also be used to prepare for and respond to climate-related disasters.

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<sup>15</sup> The ‘Two-pronged strategy’ entails: (i) Reducing risks in GMMA, and (ii) Enhancing the resiliency of GMMA. Key Result Areas to which the project directly contributes include: (i) massive retrofitting of public infrastructure, (ii) transport and mobility, and (iii) command, control, and communications.

<sup>16</sup> DPWH is a cooperating agency for the following sectors: Relief and Camp Management and Evacuation and Management of The Dead and Missing.

### C. Relevance to Higher Level Objectives

13. **The project directly aligns with the World Bank Group's Country Partnership Framework for the Republic of the Philippines (CPF) 2019-2023** [Report No. 143605-PH], which recognizes the country's susceptibility to natural disasters and the need for strengthened risk reduction and response capacity, while also considering climate change adaptation. Specifically, the project is in line with CPF Focus Area #3: Addressing Core Vulnerabilities by Building Peace and Resilience, which underscores that ending poverty in the Philippines cannot be achieved without reversing the low human development outcomes and high poverty rates in disaster-prone areas. The project will directly address the associated CPF objective to increase resilience to natural disasters and climate change by strengthening disaster risk reduction across sectors and strengthening institutional response to disasters. The priorities identified in the CPF remain relevant in addressing the challenges of the COVID pandemic, but with some adjustments (Annex 5). This proposed project was identified before the pandemic, but remains highly relevant. By reducing risk and building resilience, the project is also aligned with the World Bank Group's Twin Goals of reducing poverty and boosting shared prosperity, as it is typically the most vulnerable populations that suffer disproportionately from natural disasters.
  
14. **The Philippine Development Plan (PDP) 2017-2022 is focused on addressing the country's vulnerabilities to sustain economic growth and development.** The PDP aims to increase the resilience of institutions and the capacity of individuals to prevent, respond to, and recover from various types of risks. To deal with the risks from natural hazards, the PDP identifies risk assessment and reducing disaster vulnerability as key activities. The project directly aligns with the PDP by making public infrastructure more resilient to earthquakes, while assisting the government to build preparedness capacity for compounding disasters (please see section II.B). Furthermore, the project is in line with the following international and national policies and laws:
  - (a) Sendai Framework for Disaster Risk Reduction (2015-2030), specifically: Target 1 to reduce global disaster mortality by 2030, Target 4 to reduce disaster damage to critical infrastructure and disruption of basic services (health and educational facilities), and Priority 4 on enhancing disaster preparedness for effective response.
  - (b) Philippine Disaster Risk Reduction and Management Act of 2010, which requires the national agencies to strengthen their capacity for mitigation, preparedness, response, and recovery to reduce risks to human life and assets.
  
15. **The project's technical design and implementation methodology will contribute to establishing a framework for potentially scaling up interventions in the GMMA and nationwide.** The project will directly strengthen/upgrade a subset of at-risk public buildings, under a risk-based prioritization approach, and support appropriate, efficient, and cost-effective risk reduction interventions for vulnerable building typologies that could subsequently be applied across Greater Metro Manila (the project envelope will allow for interventions on approximately one third of the total (currently) eligible<sup>17</sup> buildings in Metro Manila). The approach could be replicated to the remaining eligible buildings in future and refined based on the lessons learned from this project. Overall, the implementation experience from the project (including data collection on building performance levels, progressive refinement of prioritization methodologies, and cost optimization of retrofit approaches) will assist the government with a stronger and more transparent technical and operational platform through which to leverage future investments. The detailed structural condition assessment and analysis to be conducted as part of the building-specific feasibility studies under the project, and the specific structural vulnerabilities of the eligible buildings (see Section IV.A) will be systematically made available to asset owner agencies. This detailed identification of the risks can inform future interventions that

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<sup>17</sup> Approximately 425 out of 1265 eligible buildings.

may be more appropriate to the public buildings that will not be intervened under this project (e.g. reconstruction of buildings above the cost threshold for retrofitting).

## II. PROJECT DESCRIPTION

### A. Project Development Objective

#### PDO Statement

16. The Project Development Objectives are to enhance: (i) the safety and seismic resilience of selected public buildings in Metro Manila, and (ii) the capacity of the DPWH to prepare for and respond to emergencies.

#### PDO Level Indicators

17. The PDO will be measured by the following outcome-level indicators:
  - (a) Targeted public buildings with reduced vulnerability to seismic and other natural hazards (including climate-related impacts) [number];
  - (b) Direct beneficiaries with increased safety from retrofitted buildings [number, disaggregated by gender];
  - (c) DPWH well equipped and organized to perform its responsibilities per the requirements of the Metro Manila Earthquake Contingency Plan (Oplan Metro Yakal Plus, OMYP) [Yes/No]; and
  - (d) DPWH staff achieve minimum standards in operational readiness for emergency preparedness and response per its mandate under the relevant multi-hazard national response plans [number].

### B. Project Components

18. The project's technical design and approaches are underpinned by the following cross-cutting areas: climate change and gender. These are described below, and further discussed in Section IV.A.

#### **Component 1. Improving Multi-hazard Resilience of Public Buildings and Facilities (US\$245 million)**

19. This component will finance seismic retrofitting and relevant strengthening/upgrades of public buildings to reduce damage from natural hazards (earthquakes and other adverse geophysical and climate-related events). Specifically, it is proposed that this component will invest in maximizing the number of beneficiaries protected from natural hazards, by implementing appropriate, cost-effective structural retrofitting (including, but not limited to, the indicative retrofitting techniques described in Annex 2) and functional improvements in selected school buildings and health centers. This will be achieved through two sub-components:

- 1.1 Retrofitting of Public Buildings; and
- 1.2 Feasibility studies and detailed design.

#### Sub-component 1.1: Retrofitting of Public Buildings

20. Approximately 425 priority buildings (based on the Seismic Vulnerability Rating (SVR) framework, described in Annex 2) are planned for seismic retrofit and other structural/functional improvements under this project (at a cost of up to 60 percent of the *in situ* reconstruction cost). Eligible buildings have been sorted



by SVR to comprise the provisional list of public buildings (schools<sup>18</sup> and health centers<sup>19</sup>) for detailed seismic evaluation, retrofit design, and eventual upgrading (please see Section IV.A for a detailed discussion of the prioritization approach). The type of occupancy is factored into the SVR framework (i.e. schools and health centers are prioritized due to their social significance, the vulnerability of the typical building types and occupants, and importance to emergency preparedness (in the case of health centers)).

21. Climate change impacts and the effects of multiple site-specific hazards will be explicitly considered in the detailed design phase, using the DOST-PHIVOLCS GeoRiskPH platform (in accordance with Presidential Directive Memorandum to Cabinet issued on July 1, 2019) to assess exposure to seismic, climatic/hydro-meteorological, volcanic, and other prevalent hazards. Where appropriate, a multi-hazard intervention approach for the facility/campus (e.g. site drainage to reduce localized flooding) will be developed. In accordance with Philippine building regulations, structural and functional upgrades will ensure overall compliance with relevant design standards currently in force (including for climate-resilient design such as strengthening roofs and windows for typhoon-related wind loads, access for persons with disabilities, COVID-related functional measures, etc.). In compliance with all current national regulations, reference standards, and statutory codes, and as appropriate to improve the service continuity of the facilities, relevant safety improvements (e.g. WASH, fastening of non-structural elements like ceilings, partitions, and equipment that can constitute falling hazards, improvement of ingress and egress, and fire safety measures) may also be included in the upgrades.
22. Structural upgrades will be in accordance with the most up-to-date seismic (and wind loading) provisions of the National Structural Code of the Philippines (NSCP, 2015). As performance-based design is not currently specified under the NSCP, compliance with the seismic provisions implicitly targets allowing building occupants to safely evacuate the building, thereby significantly reducing fatalities and severe casualties (but not guaranteeing that the building will be usable immediately after an event). In addition, compliance with the seismic provisions is expected to substantially reduce (but not entirely eliminate) the expected damage in the event of the design earthquake, which is within the range of Intensity VIII (associated with 'The Big One' scenario) on the Modified Mercalli Intensity (MMI) scale. Additional performance metrics will be considered for use on an exceptional basis, e.g. for buildings with critical emergency response functions. The major benefits of retrofitting therefore include (but are not limited to) reduction in building damage and potential casualties.
23. An ancillary benefit of the scaled-up retrofitting activities under this sub-component is the provision of higher-skilled, labor-intensive jobs in the short- to medium-term, thereby building more broad-based capacity for retrofitting in the national construction industry. It is estimated that the activities under this sub-component will have the potential to generate close to 4 million labor-days, based on the labor component of the civil works contracts for retrofitting of approximately 425 priority public buildings. This generation of labor-intensive jobs on construction sites throughout Metro Manila will contribute to the economic recovery of the construction sector, which is one of the hardest hit by wage losses during the COVID-19 pandemic.

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<sup>18</sup> Each year, natural disasters have had devastating effects on education outcomes in the Philippines. For example, Typhoon Haiyan damaged more than 2,500 schools and affected 1.4 million children in the in 2013. The impacts of disasters on children and youth include prolonged education disruption; permanent drop-out from the education system; poor-quality learning experiences and outcomes; long-term psychosocial concerns; and susceptibility to health problems.

<sup>19</sup> Based on DOH classification, these simple health centers are under Category A: Primary Care Facility, which is a first contact healthcare facility that offers basic services (including basic emergency services) to communities. These are typically low- to mid-rise reinforced concrete structures, similar to the schools.

Sub-component 1.2: Feasibility studies, detailed design and quality assurance

24. Consulting services<sup>20</sup> for detailed building-level structural condition assessments, geotechnical and other site investigations, feasibility design studies, detailed engineering designs (incorporating multi-hazard resilience measures as appropriate to site-specific exposures), and design reviews will be financed under this sub-component. Oversight of implementation of retrofit techniques and contractors' environmental and social management plans will also be financed. As a complement to the 'hard' risk reduction interventions, citizen engagement activities (including consultations and information sessions for disaster risk reduction) will be conducted at each facility to be intervened (financed under Component 3).

**Component 2: Improving Emergency Preparedness and Response in Public Works (US\$52 million)**

25. This component will finance mission-essential equipment for transport and mobility restoration, and communication. It will also finance capacity building activities for the Department of Public Works and Highways to systematically prepare for and respond to emergencies (recurrent annual events as well as low-frequency, high impact disasters), particularly in line with its mandate under the Oplan Metro Yakal Plus (as the lead agency for Engineering, Reconstruction, and Rehabilitation), as well as other national emergency response plans for multiple hazards (including those related to climate-related disasters and public health). To establish a functional EP&R system in a coherent manner, this component will take a holistic approach to strengthening DPWH's EP&R capacity by addressing gaps in the different components of the system, including equipment, communication and information management, and personnel. This will be achieved through two sub-components:

- 2.1 Emergency Response Equipment for transport & mobility restoration, and communication; and
- 2.2 Capacity building for emergency preparedness and response in public works.

26. Activities financed under this component are directly relevant for hydrometeorological/climate-related emergencies, in addition to major seismic events. For example, the investments in equipment under sub-component 2.1 will contribute to DPWH's capacity to respond to, and support the recovery from, events such as typhoons, floods, etc. The equipment for transport and mobility restoration as well as communication will enable DPWH to clear roads, restore thoroughfares, and remove debris (key emergency response activities following typhoons, floods, or precipitation-induced landslides), and to command and control its operational teams on the ground. The core capacity-building activities under sub-component 2.2 (e.g., developing plans, training exercises and drills) can also be applied to climate-related disasters through a multi-hazard approach that incorporates climate change-induced aspects in integrated emergency response and incident management structures, both strategically<sup>21</sup> and operationally<sup>22</sup>. Finally, the national multi-hazard emergency response plans that are used as the overarching framework for the investments under this component outline the same integrated systems that would be used for seismic events as well as for climate-related events.

Sub-component 2.1: Emergency Response Equipment for Transport & Mobility Restoration, and Communication

27. This sub-component will support mission-essential equipment for transport & mobility restoration (which would be staged strategically in and around Metro Manila, in relatively less hazardous locations), as well as

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<sup>20</sup> DPWH currently uses only non-corporations (firms in the name of the owner/s who are licensed to practice, prepare specifications, sign construction drawings, and supervise works in the Philippines). However, under this project, corporations will be eligible to bid under the World Bank procurement regulations, provided they include key personnel who are properly licensed. This is expected to substantially expand the pool of specialist technical resources to underpin DPWH's institutional capacity for implementation and sustainability.

<sup>21</sup> E.g., institutional arrangements, legal framework, and policy

<sup>22</sup> E.g., updating EOC operations, contingency plans, coordination and response protocols, and strengthening of DPWH's continuity of operations

critical communication and information management systems, to ensure proper execution of response operations and coordination of DPWH's emergency response teams. Operation and maintenance costs for the equipment will be covered by national government counterpart funding (US\$9.5 million over the project implementation period).

*a. Transport and Mobility Restoration*

28. DPWH's improved capacity and capability to restore transport and mobility – thereby providing access to search and rescue teams, emergency response personnel, and equipment -- will ensure communities' rapid access to critical public services (e.g. hospitals/health facilities, evacuation centers, and government facilities). Providing access for firefighting equipment will also be critical to reduce the effects of major conflagrations resulting from the earthquake, as projected by MMEIRS under 'The Big One' scenario.
29. At present, DPWH has a significant need for reliable, rapidly deployable heavy equipment to meet the operational requirements of the Oplan Metro Yakal Plus in an efficient manner. As part of its Equipment Positioning and Mobilization Contingency Plan, DPWH has established the 'Quick Response Assets' (QRA) comprising: (i) Quick Response Equipment (QRE), (ii) Quick Response Tools (QRT), and (iii) Quick Response Support Teams (QRST) composed of personnel. The QRA would be fundamental to the road restoration/clearing and rescue operations after the occurrence of 'The Big One'.
30. To address the existing gaps within the fleet and enable DPWH to meet the capacity required by the OMYP to perform road restoration/clearing and debris removal activities, this sub-component will invest in the heavy equipment needed to meet the MMEIRS projections of damaged roads, collapsed bridges across major waterways, and other critical transportation infrastructure. The investments under this sub-component will also contribute to DPWH's capacity to execute its mandate, as member agency of the Logistics Cluster under the National Disaster Response Plan, including for the government's overall COVID-19 response. This would include, among other things: (i) providing mobility services, and (ii) ensuring availability of resources, supplies, and facilities, for all concerned clusters.

*b. Emergency Response Communications and Information Management*

31. Improved incident management, response coordination, and implementation of operational plans will be critical to build DPWH's ability to execute its mandate under the different disaster response plans. To allow for rapid deployment of the QRAs and avoid interrupted communication with the different QRSTs during an emergency, appropriate and state-of-the-art communication equipment and information systems are essential. However, DPWH's current means of communication during a disaster is either the commercial cellular system, or email, which requires access to an internet data connection. Cellular or internet-based communications systems, which are unlikely to be functional during a major catastrophe such as 'The Big One', are inappropriate for use by agencies with critical disaster response/emergency management responsibilities. Any degradation of the system due to the impacts of the disaster, power system failure, and even limited cellular service during an emergency would prevent DPWH from communicating and managing their QRAs effectively. The projections of the various preparedness/response plans indicate a major reduction in cellular telephone capabilities; as such, there is a crucial need for mobile emergency communications systems (Emergency Operation Centers, or EOCs) to allow DPWH to: (i) direct and coordinate the actions of its resources on the ground, and (ii) gather information regarding the status of roads, bridges, buildings and other infrastructure, and report that information to the National EOC.
32. To address these gaps, this sub-component will invest in mobile EOCs, which would provide a platform to direct and coordinate the actions of DPWH resources in the field and gather and transfer critical information

to the National EOC. The mobile EOCs, in conjunction with DPWH's ongoing (nationally-funded) radio communications system upgrade, would provide two critical capabilities: (i) the ability to command and control operations from a mobile site, and (ii) the ability to continue uninterrupted field communications with deployed resources. Mobile EOCs are also critical due to the MMEIRS projection of regional separation of Metro Manila into four quadrants and will ensure DPWH's continued capability to direct field resources within and across the quadrants.

*Sub-component 2.2: Capacity building for Emergency Preparedness and Response in Public Works*

33. This sub-component will focus on three main activities: (i) developing, updating, and harmonizing plans, policies, and procedures based on a reference scenario (in this case, aligning with 'The Big One' scenario underpinning OMYP and other relevant national plans); (ii) organizing, training, and equipping DPWH personnel to implement the plan(s) based on the increase in capability; and (iii) exercising the plan(s) in order to further improve capability.
34. Particular areas of capacity building would include planning, training, and exercises in: (i) communications and information management, (ii) EOC operations<sup>23</sup> and contingency planning (including for health-related emergencies such as COVID-19), and (iii) Debris Management. Training for all stages of response will be included to raise awareness and appropriately prepare response teams to address the specific needs of women and girls in a post-disaster setting. A "Training of Trainers" course will be delivered, along with specialized training to key DPWH personnel who can then deliver similar trainings in the future. Finally, increased participation of female staff in the training and capacity building courses will underpin the achievement of DPWH's target to increase the percentage of women executing emergency planning and response functions (see Section IV.A).

**Component 3. Project Management (US\$3 million)**

35. This component will finance specialist technical consultants and administrative support for the Project Implementation Unit (PIU) to effectively manage key functions including planning, coordination, financial management (FM), procurement, environmental and social safeguards implementation, and monitoring throughout the project implementation period. More specifically, this component will enable the PIU to carry out: (i) contract administration, safeguards, fiduciary, training, and monitoring and evaluation, including the integration of climate-resilient standards in detailed engineering design<sup>24</sup>, (ii) citizen engagement and communications, including consultations and information sessions for disaster risk reduction at each facility to be intervened under Component 1, and (iii) incremental project operating cost.
36. Fiduciary and safeguards functions will be carried out by designated DPWH staff, through institutionalized procurement, finance, accounting, and safeguards units that perform these functions for World Bank (and other development partner) funded projects. In addition, DPWH has a robust field supervision system with well-staffed and qualified Regional/District Engineering Offices (ROs/DEOs), which will be responsible for field monitoring of retrofitting works from pre-works to completion/acceptance. These functions will be carried out as an in-kind contribution of DPWH staff time, in accordance with the established institutional structure that is utilized for large-scale civil works projects (including the 2018-2020 retrofitting program).
37. The component will also invest directly in citizen engagement and social awareness activities to ensure that the physical investments are properly communicated to the direct beneficiaries of the buildings. These

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<sup>23</sup> Including On-Site Operations Coordination and Emergency Operation Center/Incident Command System Interface

<sup>24</sup> All site investigation, detailed design, and reviews are provisioned under Component 1.

activities will focus on organizing: (i) information meetings on the long-term benefits of seismic retrofitting – including management of expectations that the interventions are intended to significantly reduce fatalities and severe casualties, but not completely prevent all damage (see paragraph 21) -- targeting building users, and administrators, and (ii) consultations with building occupants on the scheduling and programming of civil works.

#### **Component 4. Contingent Emergency Response (zero allocation)**

38. A Contingent Emergency Response Component (CERC) is an *ex ante* mechanism available to the Government to gain rapid access to financing to respond to an eligible crisis or emergency. This component will allow for rapid reallocation of uncommitted project funds towards urgent needs in the event of a disaster (geophysical, climate-related, or man-made), or public health emergency. Such events may include typhoons, floods, earthquakes, volcanic eruptions, droughts, and disease outbreaks. There is flexibility in establishing the level of evidence needed to activate this component including, but not limited to, issuances such as the declaration of a State of Calamity by the mandated national or subnational authority, or a State of Public Health Emergency. The agreed trigger would enable reallocation of uncommitted project funds to support immediate response and recovery needs from other project components. Disbursements would be made against a positive list of critical goods, civil works, and consulting services required to support the immediate response and recovery needs. The potential CERC-financed activities would: (i) be aligned with the main project activities, (ii) follow the project's implementation arrangements, and (iii) be based on DPWH's mandate under the various emergency response and contingency plans.

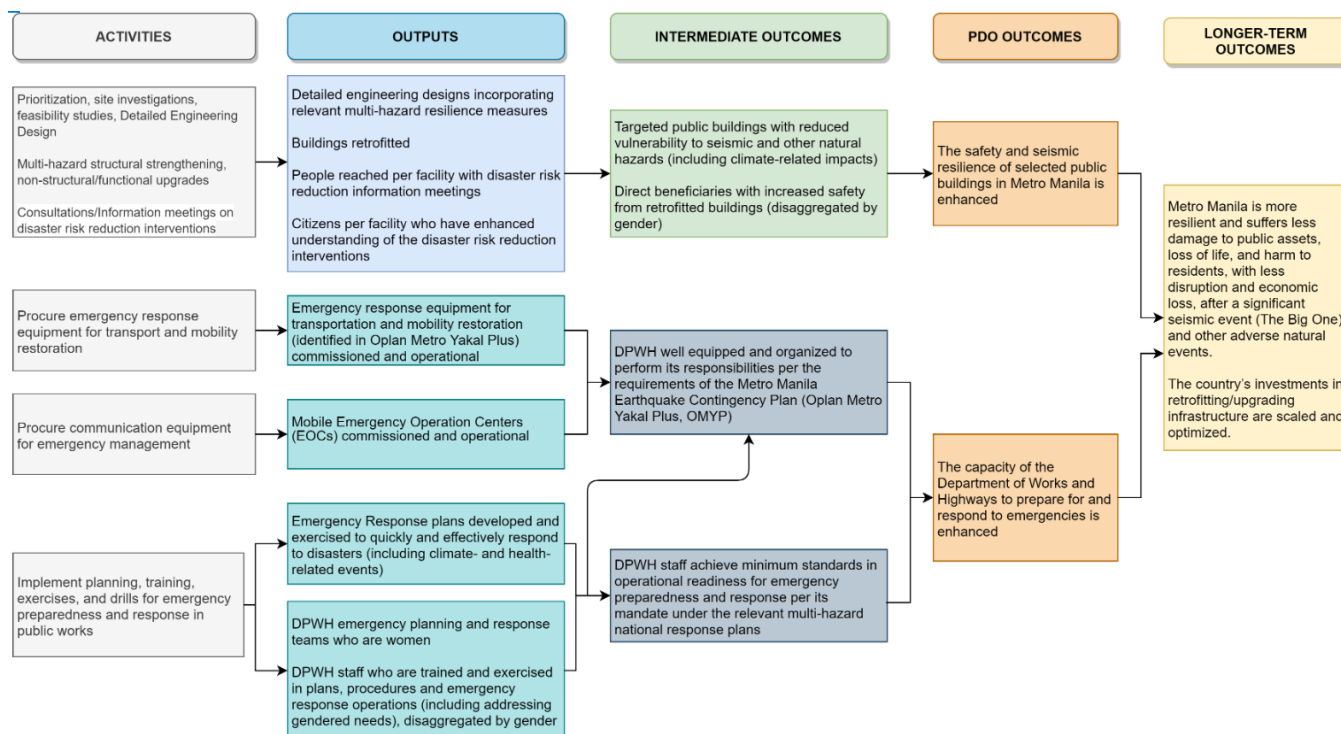
#### **C. Project Beneficiaries**

39. The estimated project beneficiaries are as follows:

- (a) Under Component 1, approximately 425 buildings will be structurally and functionally upgraded, with an estimated 290,000 occupants. This includes teachers, students, doctors, patients, staff, and other users of the buildings.
- (b) Under Component 2, the EP&R investment areas will enhance DPWH's capacity and capability to respond to, and support early recovery from, a major seismic event, addressing gaps and needs in DPWH's current capacity and capability to execute its mandate as defined under Oplan Metro Yakal Plus. The core capacities and capabilities needed to organize a response operation and coordinate resources on the ground can also be applied to any type of emergency including typhoons, floods, volcanic eruptions, and pandemics – through a multi-hazard, multi sectoral approach to integrated emergency response and incident management structures and frameworks. Building this capacity will benefit the 12.9 million residents of Metro Manila, and potentially the 21 million residents of Greater Metro Manila (NCR, Region III, and Region IV-A). Direct beneficiaries under Component 2 include approximately 600 DPWH staff who will participate in the capacity building and training activities.

## D. Results Chain

**Problem statement:** A major earthquake (such as ‘The Big One’ scenario) and other severe natural hazards will cause significant damage to public assets and loss of life or serious harm to residents in Metro Manila with commensurate disruptions and economic loss.



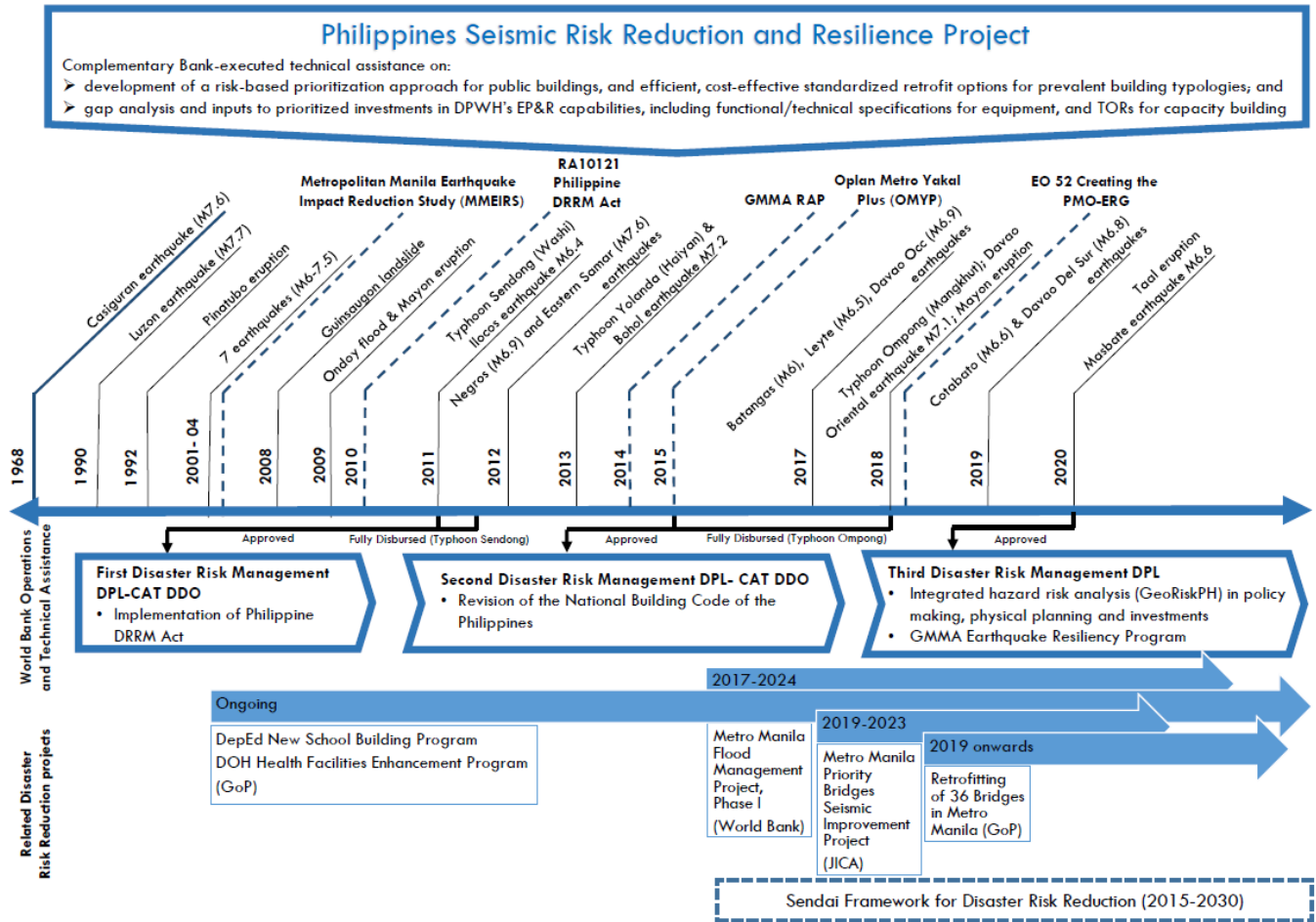
**Figure 1.** Theory of Change

Critical assumptions are:

- The NSCP is an appropriate standard for retrofitting to achieve the estimated reduction in building damage and severe casualties.
- Adequate operation and maintenance budget is allocated by the relevant Departments to maintain investments in retrofitted buildings and new equipment.
- DPWH provides ongoing support to sustain timely and adequate training for emergency preparedness and response.

## E. Rationale for Bank Involvement and Role of Partners

40. The GoP and the World Bank have had over a decade-long partnership on policy reforms and technical assistance related to disaster risk management. This engagement forms the foundation for the project, which marks the first support for implementation of crucial seismic risk reduction investments as well as EP&R system improvements. Notably, the revision of the National Building Code of the Philippines was supported through the Second Disaster Risk Management Development Policy Loan (DPL) with a Catastrophe-Deferred Drawdown Option (P155656, closed) and related Bank-executed technical assistance, in which provisions were integrated in the building regulatory framework to address the risk to existing buildings (including through retrofitting). The Program for the Earthquake Resiliency of the GMMA (established via EO 52) was assisted through the Support to the Earthquake-Resilient Greater Metro Manila (P169511, ongoing) advisory and analytical services, and the Third Disaster Risk Management DPL (P171440).



**Figure 2.** Disaster Risk Management engagement in the Philippines

41. The Bank-executed ‘Support to the Earthquake-Resilient Greater Metro Manila’ technical assistance program is providing ongoing complementary support (from project identification to preparation and through implementation) for:

(a) DPWH in the following: (i) review and enhancement of the eligibility and prioritization framework that is being used by the national government in defining intervention strategies, options for reducing the seismic vulnerability of selected public buildings, and improving their safety and functionality; (ii) analysis and standardization of retrofitting techniques for representative building types; (iii) technical inputs to inform feasibility studies and detailed design; and (iv) EP&R investment prioritization and pre-procurement activities to ensure readiness for implementation<sup>25</sup>. These technical assistance activities are planned to continue during project implementation to support DPWH to continuously refine the technical approaches and increase the efficiency of the investments.

(b) Extensive consultation with the Association of Structural Engineers of the Philippines (ASEP) during project preparation, to support ASEP’s ongoing development of relevant parameters and performance standards for retrofit designs. For the purposes of early project implementation, the Secretary of DPWH (as the National Building Official) will mandate application of a consensus-based set of standards, with a view to

<sup>25</sup> Market assessment and development of functional/technical specifications, as well as Terms of Reference for capacity building activities.

ASEP adopting, institutionalizing, and scaling up the use of the standards that are currently being developed for retrofit of low-rise and mid-rise reinforced concrete buildings throughout the country.

42. The project’s design is fundamentally underpinned by the World Bank’s global experience in financing similar investment projects (including the Istanbul Seismic Risk Mitigation and Emergency Preparedness Project, ISMEP) and preparing, designing, and implementing retrofitting prioritization and technical interventions. In addition, the project was informed by the World Bank’s Global Program for Safer Schools, which works in 12 countries to boost and facilitate informed, large-scale investments for the safety and resilience of new and existing school infrastructure at risk from natural hazards.
43. The World Bank also has global experience in financing and supporting the implementation of EP&R projects or projects with EP&R components. This includes projects such as ISMEP (P078359), the Bangladesh Urban Resilience Project (P149493), and more recent engagements such as the development of EP&R investment plans in Cabo Verde (P160628), Western Balkans (P165377), Sierra Leone (P166075), and Seychelles (P148861). Experiences from such projects suggest that an integrated approach is desirable to drive a systematic, on-going approach to EP&R. The World Bank’s comparative advantage is in building countries’ EP&R systems *ex ante*, with comprehensive financing and policy dialogues, as well as its convening power in delivering systemic value for clients.
44. The project will directly contribute to DPWH’s Disaster Risk Reduction and Climate Change Adaptation Program, which is supported by the World Bank and other development partners. Key activities include rehabilitation, retrofitting and strengthening of public buildings and bridges, and flooding management. In line with the Directives of the 20th Cabinet Meeting (December 2017), DPWH is implementing a GoP-funded 2018-2020 program of retrofitting/strengthening national government-owned public buildings (administration, schools, health facilities, etc.). Other programs implemented by DPWH related to strengthening the seismic resilience of infrastructure and reducing disaster risk in Metro Manila are shown in Table 1.

**Table 1.** Related Disaster Risk Reduction / Seismic Resilience Projects

Project Name	Objective	Implementing Agency	Funder	Project Cost	Implementation Period
Metro Manila Priority Bridges Seismic Improvement Project	To strengthen the resilience of the transport network in MM by replacing, retrofitting major bridges with improved seismic bridge design specifications.	DPWH	JICA	PhP4.29bn	2019-2023
Retrofitting of 36 Bridges in Metro Manila	To strengthen and conform with DPWH’s design and seismic guidelines to make the bridges more resilient to disasters.	DPWH	GoP	PhP1.08bn	2019 onwards
Metro Manila Flood Management Project – Phase I	45. To improve flood management in selected areas of Metro Manila.	DPWH / MMDA	World Bank	PhP2.5bn	2017-2024

46. The project is also directly complementary to the following capital investment (new construction) programs, by addressing the resilience of the existing portfolio of each agency’s assets: (i) the Department of Education’s (DepEd) New School Building Program, which has introduced upgraded calamity-resilient new school building



design and construction, and (ii) the Department of Health's (DOH) Health Facilities Enhancement Program, which provides infrastructure improvement for health facilities.

## F. Lessons Learned and Reflected in the Project Design

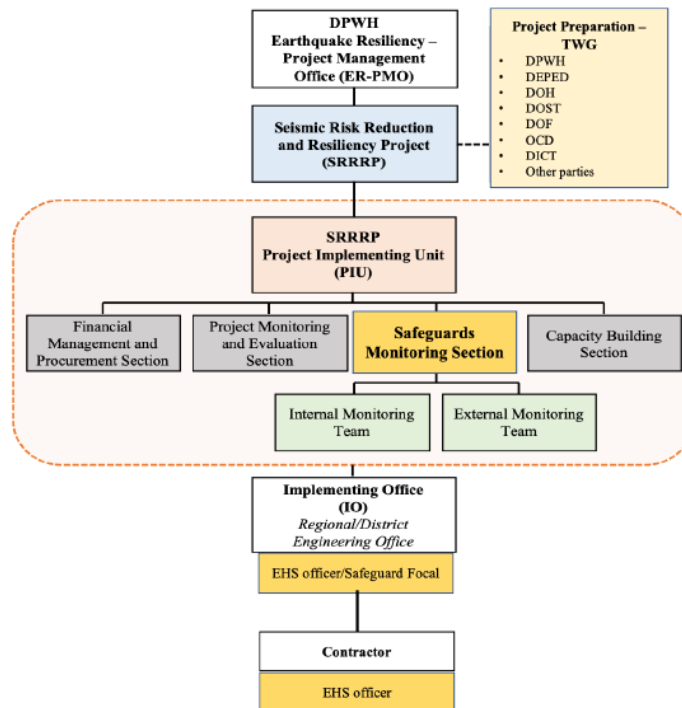
47. The project design reflects lessons from previous operations (including Implementation Completion and Results reports, IEG evaluations), analytical work, and international good practice:

- (a) *Utilizing available analytics and a progressive implementation approach.* The experience of designing and implementing retrofitting projects such as ISMEP showed that the actual cost of the interventions to increase public buildings' seismic performance remains uncertain until a detailed design and cost plan is prepared. To avoid cost overruns and maximize the benefits of the investment, the project will follow a progressive implementation process: early implementation will build on detailed designs and costs that DPWH has developed for its 2018-2020 program, which will offer experience that can refine implementation. Finally, the programs of technical agencies of the GoP (e.g. PHIVOLCS) provide extensive data and seismic hazard and risk assessment platforms that underpin the project's prioritization approach.
- (b) *Potential for scaling up investments in critical infrastructure.* Through convening other development partners, World Bank-funded resilience programs have successfully scaled up investment across infrastructure sectors. For example, the ISMEP project has scaled up from the initial World Bank investment of €400 million to crowd in financial resources from other partners and become a €2 billion program. The project's design builds on these relevant experiences and will adopt several key features to facilitate scale-up: (i) establishment of clear and evidence-based selection and prioritization criteria for public asset retrofitting in close consultation with relevant line agencies and national technical expertise; (ii) integration of multi-hazard and functional upgrades (to modern service provision standards) with seismic safety measures to increase effectiveness, sustainability, and climate co-benefits; (iii) embedding of investment projects within a larger and longer intervention and investment strategy for public assets; (iv) capacity building in relevant agencies to monitor the progress of program implementation; and (v) building national contractor capability for retrofitting and resilient construction.
- (c) *Building institutional capacity in EP&R.* The experience from many EP&R projects focusing on command and control structures suggests that while it is important to establish strong dialogue with senior officials of the implementing agencies, it is equally important to work closely with counterparts at the technical level, to ensure continuity and build institutional capacity. Deep knowledge and familiarity with government policies, processes and procedures, as well as roles and responsibilities of various departments and teams, will reduce institutional fragmentation and enable timely support and advisory services to the counterpart agencies.
- (d) *Defining the details of the CERC, as an ex ante DRM mechanism, as far as possible in advance.* Rapid activation can be achieved by preparing the CERC as fully as possible prior to effectiveness, and by maintaining readiness for activation and implementation. The CERC aims to help bridge a financing gap while other funding for longer-term reconstruction and recovery is made available. Nevertheless, the World Bank team will support the government in the strategic determination of the best value proposition for utilizing the CERC, as opposed to other available resource streams. It is also critical to assess the capacity of the government and implementing partners to prepare the component and implement potential response and early recovery projects. Capacity building activities can focus on aspects such as: (i) mechanism for activating the CERC; (ii) development of the main instruments under the CERC (e.g., Rapid Needs Assessment and Emergency Action Plan); (iii) coordination and implementation arrangements; (iv) procurement, financial management and disbursement aspects; (v) compliance with safeguard policies; and (vi) monitoring and evaluation.

### III. IMPLEMENTATION ARRANGEMENTS

#### A. Institutional and Implementation Arrangements

48. The DPWH will be responsible for overall implementation of the project, while a Project Steering Committee will provide overall policy direction and guidance for project implementation. DPWH will build on the 2018-2020 retrofitting activities and the experience implementing retrofitting programs under Memoranda of Agreement (MoA) with DepEd and DOH. Similar MoAs will be executed specifically for this project, defining the responsibilities of the asset owners (DepEd and DOH) and the implementing agency (DPWH). A Technical Working Group, chaired by DPWH and including representatives of DepEd, DOH, DOST-PHIVOLCS, OCD, DICT, and other relevant government agencies, will be responsible for coordinating among government agencies during the implementation of the project..
49. In accordance with EO 52, Department Order No. 75 (2019) was issued, creating the DPWH Earthquake Resiliency Program Management Office (DPWH ER-PMO) with the following mandates: (i) Ensuring that vulnerability and risk assessment of all critical public buildings and infrastructure are conducted; (ii) Fast-tracking the implementation of urgent interventions to ensure resilient buildings and infrastructure; (iii) Aligning the Department’s programs with Oplan Metro Yakal Plus; and (iv) Ensuring that EO 52’s Key Result Area on Transport and Mobility is implemented.
50. A dedicated PIU is being established under the strategic oversight of the DPWH ER-PMO, to perform the day-to-day implementation activities including contract management, procurement, financial management, social and environmental safeguards, training, citizen engagement and communications, and monitoring and evaluation. The PIU will be staffed mostly by DPWH civil servants but may engage external specialists, as needed. Following existing operational policies, and based on contract amount, either the DPWH NCR Regional Office or the respective District Engineering Office will be responsible for: field oversight of civil works (from pre-construction to completion and final inspection of the buildings), monitoring of construction supervision contracts, safeguards compliance and reporting implementation progress/issues to the PIU.



**Figure 3.** Project Implementing Unit Organizational Chart

### *Financial Management*

51. The DPWH will have the overall fiduciary responsibility for the project, which will be implemented using the GoP's FM system as the basis for budgeting, accounting and internal controls, and auditing. This means that the FM arrangements would be mainstreamed and, as such, would use the existing FM structure, policies and procedures of the implementing agency as supported by rules and regulations of the oversight agencies such as the Commission on Audit (COA), Department of Budget and Management (DBM), and Department of Finance's Bureau of Treasury. The FM arrangements, particularly for funds flow and financial reporting will be fully documented in the FM section of the Project Operations Manual (POM) to ensure efficient download of funds and sufficient controls on accountability for the usage of funds. The proceeds of the loan will flow to a separate bank account specifically maintained for the project.
52. The project will maintain separate books of accounts to ensure that any issues with DPWH financial statements will not affect the project accounts. The project will maximize the use of direct payment for large contracts. Resolution of issues on the project financial statements shall be required to be acted upon or resolved within 12 months from the issuance of the audit report for the project. Training on the project's FM requirements will be conducted and monitoring of compliance with FM processes will be a regular part of the review missions.
53. Interim Financial Reports (IFRs) will be submitted within 60 days after the end of each calendar semester. The audit of the project financial statements will be conducted by the COA. Annual Audited Project Financial Statements together with a copy of the Management Letter reflecting the auditor's findings and recommendations shall be submitted to the Bank six months after the end of each calendar year.

### *Procurement*

54. DPWH Central Office will be responsible for project procurement activities, through the Bureau of Maintenance and the existing Bids and Awards Committees (BAC). The existing BACs of the Central Office are now working exclusively on foreign-funded projects, hence there is no need for a special BAC for the project. Appropriate training to the members of the BAC, the Procurement Service and the various Bureaus that will be involved in procurement will be scheduled by the Bank in advance of loan effectiveness.

## **B. Results Monitoring and Evaluation Arrangements**

55. The PIU will include a Monitoring and Evaluation (M&E) section to collect on field data (on a quarterly basis) for result indicators. The M&E section will prepare a monitoring and evaluation plan that will be included in the Project Operations Manual and will contain the following: (i) baseline data for the result indicators; (ii) a description of DPWH's current system for data collection, including disaggregating data by sex and other beneficiary groups; (iii) a database system and various reporting formats for DPWH management, GoP oversight agencies, and the World Bank; (iv) project performance monitoring against achievement of targets; (v) reporting intervals and inputs expected from different agencies, and (vi) protocols for informing DPWH management and the World Bank regarding potential implementation issues, and seeking management guidance on adjustments and corrective actions.
56. The PIU will also engage an independent evaluation firm to assess the learning effectiveness of activities under sub-component 2.2 and their impact on the performance and application of training by DPWH's staff. This could be measured by:
  - (a) independent observation and assessment of the training, workshops, and exercises (the level of success could be an aggregation of the expected pass/fail threshold of different elements of the exercises), and

- (b) independent psychometric surveys for DPWH staff responsible for emergency response on their: (i) *reaction* to the learning (was the learning valuable); (ii) *learning* (what have they learned / not learned), and (iii) *behavioral change* (how well people have applied their training and their capacity to carry out assigned roles).
57. To ensure the quality of data, the PIU will review, validate, and evaluate results before reporting these to DPWH management, oversight agencies and the World Bank. If necessary, the PIU will engage external M&E specialists or staff for additional support and to ensure high-quality monitoring and reporting. The incremental costs for monitoring and evaluation arrangements including capacity building, hiring of external specialists, equipment and software may be covered under Component 3. The monitoring and evaluation reports will track implementation and outputs systematically, and measure the effectiveness of the project. DPWH management and the World Bank will be updated on the implementation progress and achievement of project outcomes, and will collectively take any necessary corrective action when changes may be needed to improve the efficacy and efficiency of interventions. This will also be essential to assist DPWH management, oversight agencies and the World Bank to acquire the knowledge and experience to underpin the design of potential future programs.

### C. Sustainability

58. In line with the Directives of the 20th Cabinet Meeting (2017), DPWH commenced a program for retrofitting/strengthening public buildings in Metro Manila (focusing on national government administration buildings, schools, and health facilities), starting with a rapid vulnerability assessment (completed for Metro Manila, and being rolled out to GMMA and the rest of the country). Based on the vulnerability assessment, DPWH is implementing a 2018-2020 program of retrofitting/strengthening national government schools, health facilities, and other public buildings (2018 - 37 buildings completed; 2019 - 23 buildings, including the DPWH Central Office). Retrofitting for thirty-four buildings is ongoing in 2020, while the program is planned to transition to World Bank funding under the project in calendar year 2021. Building on the implementation experience from 2018-2020, the project will apply an enhanced prioritization approach and systematic technical interventions for increased efficiencies in retrofitting.
59. The project's use of a transparent, risk-informed decision-making process for Component 1 will promote scalability and sustainability. Instead of a case-by-case approach, this portfolio approach ensures that the safety and resilience of beneficiaries are maximized for Metro Manila, within available resources. By using seismic risk analyses at portfolio level, retrofitting interventions can be optimized to identify cost-efficient solutions. Furthermore, Component 1 will contribute to establishing a framework that could be adapted for future retrofitting interventions nationwide, while at the same time addressing seismic risk in Metro Manila at the portfolio level. Overall, the outcomes of the project will assist the government with a stronger and more transparent technical and operational platform through which to leverage further investments.
60. Long-term sustainability of project interventions will require: (i) ensuring infrastructure maintenance by the asset owners (supported through Memoranda of Agreement between DPWH, DepEd, and DOH under Component 1), (ii) adequate planning and budget for continuous capacity building programs (including training of trainers) related to disaster management, EOC management, incident management and coordination among government agencies (supported through Component 2), (iii) reviewing multi-agency ICS and communication protocols, building capacity through updated and harmonized plans and regular training and drills, and (iv) sufficient funding for operation and maintenance of equipment (for which local funding will be allocated during and following the conclusion of the project).

## IV. PROJECT APPRAISAL SUMMARY

### A. Technical and Economic Analysis

#### Component 1. Improving Multi-hazard Resilience of Public Buildings and Facilities

61. Approximately 425 seismically vulnerable school buildings and health centers are planned for seismic retrofit under the project. The primary benefits associated with retrofitting (which would apply to the entire portfolio of intervened buildings) are summarized as follows:

(a) *Reduction in damage ratio.*<sup>26</sup> For a scenario M7.2 earthquake at the West Valley Fault it is estimated that (for example at intensity IX) a typical low-rise (1-2 storey) reinforced concrete moment-resisting frame building (i.e. FEMA 154 structural type C1-L) would result in damage ratio reduction ranging from 20% to 60%.

(b) *Reduction in severe casualty rate.*<sup>27</sup> In broad terms it is estimated that for structural types C1-L and C1-M (typical mid-rise reinforced concrete moment-resisting frame building, as per FEMA 154 classification) severe casualty rates would, on average, decrease by approximately 70% after retrofitting according to NSCP 2015.

62. Since 2017, a total of 5,956 public buildings in Metro Manila were inspected by DPWH to assess the potential need for seismic upgrade or retrofit. From those assessed buildings, a refined list of 2,662 Candidate Buildings has been developed by removing: (i) recently constructed or retrofitted buildings (2015 or more recent); (ii) buildings programmed for demolition; and (iii) buildings for which retrofitting works are already contracted or proposed for funding from other sources. From among the Candidate Buildings, 1,265 buildings are deemed Eligible for selection for funding under the project based on Rapid Visual Screening (RVS) score of 2.1<sup>28</sup> or lower (using the United States Federal Emergency Management Agency (FEMA) 154 procedure, version 2002<sup>29</sup>), as shown in Figure 4.

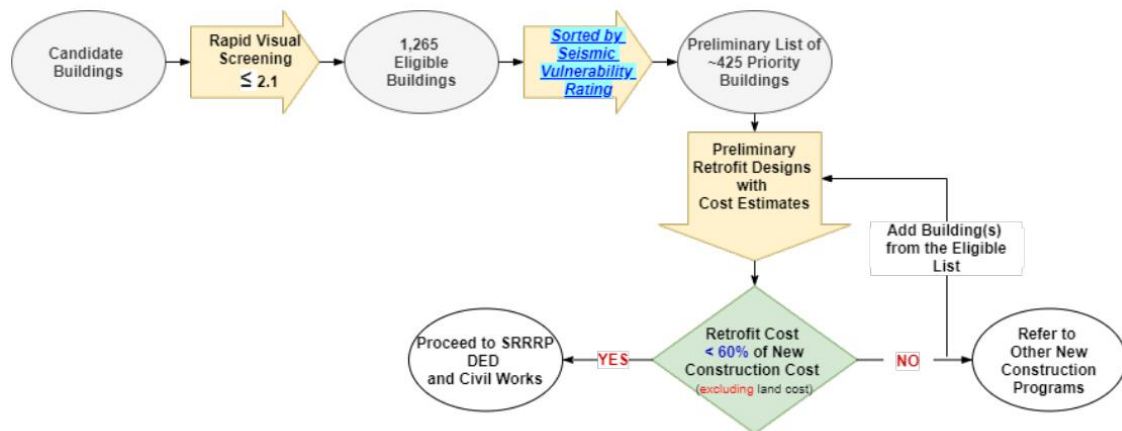


Figure 4. Eligibility and Prioritization of Buildings

<sup>26</sup> The damage ratio of a building for a given intensity (in MMI) is defined as [Damage Ratio] = [Repair Cost] / [Building value].

<sup>27</sup> The combined number of severely injured persons and fatalities will be estimated for each building before and after retrofit using the associated fragility curves and the indoor casualty rates for the building.

<sup>28</sup> Based on current seismic design criteria in use in the Philippines. A building with a score above the specified cut-off may be considered to have adequate seismic resistance to prevent collapse during a design-level earthquake.

<sup>29</sup> FEMA 154 is a Rapid Visual Screening procedure to assess the potential seismic hazard to buildings, generally in use in the Philippines, pending the development of local assessment procedures.

63. To optimize the project investment in a subset of the Eligible buildings, a multi-factorial prioritization framework (further described in Annex 2) has been developed to identify the risk factors deemed significant in the decision process by key stakeholders. The factors have been identified from an extensive technical review of the criteria used by DPWH in its 2018-2020 program and enhanced through a series of consultations with the asset-owner agencies. These factors are integrated into a Seismic Vulnerability Rating, which has been calculated for the 1,265 Eligible buildings, forming the framework for prioritizing public buildings for detailed seismic evaluation (including structural condition assessment) and retrofit design. The proposed retrofit cost (based on the detailed design, including multi-hazard and safety/functional upgrades) would be compared against a threshold of 60% of the reconstruction cost as per current government practice; should this threshold be exceeded, retrofitting would not be deemed the optimal action, and the building would be proposed for reconstruction under alternate projects/funding sources (e.g. asset-owner agencies' new construction programs).
64. The Feasibility Study conducted during project preparation analyzed 5 representative buildings (of differing vintages, building types, and number of storeys) retrofitted under DPWH's 2018-2020 program, to illustrate the rationale for the selected technical approach/retrofitting methods that may be deployed under this project (depending on the building type and specific seismic/structural vulnerability). It is worth noting that other retrofitting schemes that may be more effective and efficient for specific selected buildings may be utilized under the project.

## **Component 2: Improving Emergency Preparedness and Response in Public Works**

65. The Feasibility Study conducted during project preparation identified needs and gaps that will be directly addressed by the proposed investments/activities under this component, and are necessary to bring DPWH up to a level of capacity commensurate with the agency's roles and responsibilities under OMYP and other national and agency-specific emergency response plans. The study enabled prioritization of mission-essential equipment for transport & mobility restoration, which would be staged strategically in and around Metro Manila, as well as critical communication and information management systems to ensure proper execution of response operations. In conjunction with the new equipment and systems, DPWH will develop the associated plans, and conduct relevant training and capacity building (including regular drills and multi-agency exercises).
66. *Transport and Mobility Restoration.* As identified throughout several of the national and internal response plans, policies, and procedures, one of the foremost mission-essential functions of the DPWH is the ability to clear debris from/restore roadways and thoroughfares. The criticality of this capability cannot be emphasized enough, as transport and mobility restoration will provide access and egress to search and rescue teams, emergency response personnel, and equipment so that lifesaving interventions can be provided at the earliest possible time. Multiple studies around the world show definitively that reducing the response times for emergency medical services personnel (emergency medical technicians and paramedics, for example) improves the chances for survival among the sick and injured. According to the Journal of Emergency Medical Services (JEMS),<sup>30</sup> a one-minute decrease in the response time of ambulances saves more than 10,000 lives annually in the United States. Recognizing the need to provide rapid access to critical services for the public, such as hospitals and evacuation centers, Oplan Metro Yakal Plus prioritizes specific roadways which must be cleared as quickly as possible. Providing access for firefighting equipment will also be critical for reducing the effects of the MMEIRS projection of 500 fires, resulting from disrupted gas systems, electrical surges, and fuels in collapsed buildings.

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<sup>30</sup> Jay Fitch, *Response Times: Myths, Measurement and Management* (Journal of Emergency Medical Services, 2005)

67. The Feasibility Study conducted during project preparation found that DPWH lacks sufficient capacity to rapidly initiate road clearing and debris removal under 'The Big One' scenario. For example, the OMYP identifies the need for 16 DPWH road clearing teams to be immediately available to initiate road clearing operations in the prioritized roadways; however, much of the equipment currently does not exist within DPWH's fleet. It should be noted that the gaps identified in the OMYP do not reflect the full recommendations for investment under this project, as further investments were identified to ensure more holistic improvements with additional mission-essential equipment. The equipment (including, but not limited to, those shown in Annex 2, Detailed Project Description) that will be supported under this sub-component were validated by DPWH Bureau of Equipment's institutional strengthening assessment and Equipment Demand Analysis. These have been aligned with projected utilization of QREs under OMYP, DPWH's Equipment Positioning and Mobilization Contingency Plan and the Harmonized National Contingency Plan for Magnitude 7.2 Earthquake, as well as current QRE fleet and status.
68. In the catastrophic 'Big One' scenario, and as indicated in the OMYP, the mobilization of QRAs from the various DPWH Regions would be time-consuming and unlikely to meet the operational needs due to the following challenges: (i) equipment loading (availability), (ii) travel time due to damaged roads, bridges, and other critical transportation infrastructure (such as ports and airports) not only within Metro Manila but throughout the country, and (iii) delays due to traffic congestion. These factors would all limit the ability to rapidly initiate road/bridge restoration/clearing operations essential for saving lives and opening vital transportation routes.
69. Detailed analysis was conducted to determine the direct exposure of the Metro Manila road network to earthquake hazards, and assess the extent of the need for transport and mobility restoration under the 'Big One' scenario. This analysis suggests that over 7,000 km of roads could be affected by liquefaction, while 5,321 road segments could be directly damaged through ground deformation along the Valley Fault System. While these direct physical damages to the road network are substantial, as roads become impassable these disruptions will affect the ability of people to access critical public services in the aftermath of a catastrophic earthquake, unless critical transport and mobility restoration can be carried out in an effective and timely manner by DPWH.
70. *Emergency Response Communications and Information Management.* DPWH currently lacks a deployable communications system that can be utilized during a major disaster. As previously described, the assumptions of the various preparedness plans indicate a major reduction in cellular telephone capabilities. Since the only method currently in use for communicating within DPWH is cellular telephones, there is a crucial need for mobile emergency communications systems (such as mobile EOCs) to allow DPWH to deploy resources and develop situational awareness from the field. Additionally, considering the projections that: (i) the Metro Manila area will be separated into quadrants due to earthquake damage, and (ii) the communications infrastructure will be severely damaged, mobile EOCs would provide a platform for coordinating operations and communications that would be complementary to the ongoing upgrade of DPWH's radio communication equipment (described in Annex 2).
71. *Capacity building for emergency preparedness and response in public works.* The Feasibility Study conducted during project preparation focused on the need to build capacities in emergency management (in general), as well as specifically related to public works in emergencies. The identified needs and gaps in these areas directly relate to the proposed investments/activities required to bring DPWH up to a level of capacity commensurate with its roles and responsibilities under OMYP and other national and agency-specific contingency and disaster response plans for multiple hazards.

## Economic Analysis

72. The quantitative economic analysis focused on the seismic retrofitting component of the project (Component 1: Improving Multi-hazard Resilience of Public Buildings and Facilities), which comprises 82 percent of total project cost. The economic case for a disaster risk reduction intervention is typically based on the need for the reduction of direct and indirect potential losses, rather than generating a continual flow of positive benefits.<sup>31</sup> The *Triple Dividend of Resilience*<sup>32</sup> framework was the basis for analyzing the project benefits, since existing methods of appraising DRM investments undervalue the benefits associated with resilience. Benefits associated with the first dividend – saving lives and avoiding losses -- were calculated, reflecting the basic rationale for investing in resilience (please see Annex 3).
73. Based on the investment cost of US\$245 million, approximately 425 school buildings and health centers are planned to be retrofitted over the five-year implementation period. A full cost-benefit analysis (CBA) was conducted on the provisional list of public buildings proposed for seismic retrofitting (prioritized based on the Seismic Vulnerability Rating). The estimated benefits included avoided losses after retrofitting interventions in the event of the scenario M7.2 earthquake, namely: (i) avoided direct damage to the buildings, and (ii) avoided severe casualties.
74. The 425 school buildings and health centers correspond to approximately 703,705 m<sup>2</sup> of floor area, providing life safety to approximately 300,000 direct building occupants. The Feasibility Study shows that for the scenario M7.2 earthquake (Intensity VIII – IX), the retrofit interventions are projected to reduce the damage ratios by 60 percent and 49 percent for C1-L and C1-M building types, respectively. The avoided fatalities were based on the reduction in severe indoor casualty rates resulting from the retrofit intervention, at 0.825 percent and 0.440 percent, respectively for C1-L and C1-M building types. The total benefits of the project for the 25-year design life (as per the NSCP 2015) were estimated US\$987 million, applying a 2 percent annual probability of occurrence of the scenario earthquake and scaling to include the avoided losses from less extreme events.
75. The CBA shows that over a 25-year period, the Net Present Value is positive at US\$139 million, the EIRR is 21.1 percent, and the benefit/cost ratio is 4.7. These results show that the project is economically viable and will benefit society by saving lives and reducing economic losses associated with the damage to the portfolio of facilities being intervened.

**Table 2.** Summary of Cost-Benefit Analysis Results

Component 1: Improving Multi-Hazard Resilience of Public Buildings and Facilities		
Benefits Considered in the Analysis	Avoided Fatalities	Avoided Damages
Economic Internal Rate of Return (EIRR)		21.1%
Net Present Value (NPV), US\$ million		139
Benefit/Cost Ratio (BCR)		4.7

76. A sensitivity analysis was applied to the base case model to determine the impact of: (i) increasing investment cost by 10 percent and 20 percent; (ii) decreasing benefits by 10 percent and 20 percent, and (iii) combining the two cases. All cases were also economically viable.

<sup>31</sup> 2007. ProVention Consortium. Tools for Mainstreaming Disaster Risk Reduction: Economic Analysis, Guidance Note.

<sup>32</sup> Tanner, T.M. Surminski, S. Wilkinson, E. Reid, R., Rentschler, J.E., and Rajput, S. (2015) The Triple Dividend of Resilience: Realising development goals through the multiple benefits of disaster risk management. Global Facility for Disaster Risk Reduction at the World Bank and Overseas Development Institute (ODI). London. [www.odi.org/tripledividend](http://www.odi.org/tripledividend)



**Table 3. Sensitivity Analysis**

Case	EIRR	NPV (US\$ million)	BCR
Base Case	21.1%	139	4.7
Case IA: increase projected cost by 10%	19.1%	123	4.3
Case IB: Increase projected cost by 20%	17.3%	108	3.9
Case IIA: Decrease benefits by 10%	18.9%	110	4.2
Case IIB: Decrease benefits by 20%	16.6%	80	3.8
Case IIIA: Increase projected cost by 10% and decrease benefits by 10%	17.0%	94	3.9
Case IIIB: Increase projected cost by 20% and decrease benefits by 20%	10.1%	1.2	2.5

**77. Other unquantified economic benefits.** There are several other project benefits that have not been quantified in this economic analysis due to the limitations in Philippines-specific data, including but not limited to the following:

- (a) For Component 1: (i) avoided disruptions to the provision of education and learning services, (ii) avoided outdoor casualties resulting from falling debris and building collapse, and (iii) generation of labor-intensive jobs on construction sites throughout Metro Manila, thereby contributing to the economic recovery of one of the sectors hardest hit by wage losses during the COVID-19 pandemic.
- (b) For Component 2 a series of comprehensive studies, completed by the United Nations World Food Programme (WFP) and UNICEF, provides a clear demonstration of the benefits of investing in EP&R capacities. The major finding of the UNICEF/WFP Return on Investment for Emergency Preparedness Study – Final Report<sup>33</sup>, assessed forty-nine emergency preparedness investments globally for their impact on response time and cost savings. Both measures provide important insight into the value of such investments. Cost savings highlight the financial impacts to the jurisdiction that were avoided due to the investment. Time savings highlight the efficiency of response operations with the understanding that during emergencies, response speed is one of the most significant drivers of survival rates and loss avoidance. Of the forty-nine investments considered in the study, the investments had an average benefit-cost ratio of 2.1. However, certain investments, such as those that focused on personnel development, produced a much higher benefit-cost ratio of 18.7. Perhaps more importantly, 93 percent of preparedness investments saved time for emergency response operations and no investment slowed operations down. These investments reduced response time by two to fifty days, or more than a week on average. Section IV.A (Technical Analysis) section details the contributions of the Component 2 investments to the ability of people to access critical public services in the aftermath of a catastrophic earthquake, particularly the avoided increase in access time to health facilities resulting from immediate transport and mobility restoration.

**78. Climate Change.** The project will directly support climate change adaptation through the following activities:

- (a) *Component 1:* Structural and functional upgrading of schools and health centers to reduce vulnerability to climate-related events, per multi-hazard resilient design standards;
- (b) *Component 2:* (i) Development and operationalization of multi-hazard emergency response systems; and (ii) Increased capacity of DPWH to carry out its emergency management responsibilities, including for climate-related events;
- (c) *Component 3:* Monitoring by the PIU’s M&E section of the integration of climate-resilient standards in detailed engineering designs; and

<sup>33</sup> Meerkatt, H., Kolo, P., and Renson, Q. (2015). UNICEF/WFP Return on investment for emergency preparedness study – final report. The Boston Consulting Group; UNICEF, WFP. Funded by DFID-UKaid.

(d) *Component 4*: Establishment of a CERC, the readiness of which will be maintained to provide access to financial resources in case of an eligible crisis or emergency (including climate-related events).

79. **Gender Aspects.** The project will reduce existing gaps between women and men by supporting an increase in the percentage of women that execute DPWH’s emergency planning and response functions.

(a) *Gender gap analysis.* Women are under-represented in the Department’s Quick Response Support Teams. Response activities are male-dominated (currently only 9.6 percent of QRSTs are women (DPWH, 2020)), as they are limited to physically demanding functions such as operating heavy equipment and clearing debris. Based on global and national evidence, women’s participation can broaden and strengthen response processes (e.g., development of emergency response plans, training and drills), and is expected to enhance women’s empowerment in disaster response operations (this includes Emergency Operation Center and incident workers).<sup>34</sup> Research suggests it is important to mandate minimum representation (proportional to the target demographic profile) and assign appropriate and clear responsibilities and tasks in all disaster risk management systems.<sup>35</sup> In the context of emergency planning, preparedness and response, this would enhance the empowerment of women to articulate their interests and concerns, emphasizing certain issues that may not have otherwise been prioritized.<sup>36</sup> Increased participation of women in these functions can help increase the equity, effectiveness and sustainability of EP&R planning and operations, while also leveraging women’s voice and capabilities.<sup>37</sup>

(b) *Gender action.* The project will enable DPWH to establish new roles (see Table 4), to meet the need for the agency to formalize emergency planning and response functions and activities. This will expand the positions that are accessible to women, as the activities are no longer limited to the physically demanding functions on the QRSTs. The project will support courses that will provide DPWH staff with the qualifications and certification needed to perform these expanded emergency planning and response roles. The courses will be tailored to improve gender-informed response to meet the differentiated needs of women, men and children in emergency preparedness and response (please see detailed Gender analysis in Annex 4). Under the project, the courses will be targeted to the DPWH Bureau of Maintenance (Central Office) and corresponding units in the DPWH Regional Offices (with x% female staff). The resulting qualifications will enable the female staff of the units to achieve the required certification and be assigned to the new positions on the emergency planning and response teams. DPWH will set a target of 15% of DPWH emergency planning and response teams who are women.

**Table 4.** Matrix of Gender Gap, Actions and Expected Results

Gender Gap	Actions	Expected Results and Indicators
<p><b>Gap:</b> Women are under-represented in DPWH emergency planning and response teams</p> <p><b>Objective:</b> More women</p>	<p>- Under Sub-component 2.2 (<i>Capacity building for emergency preparedness and response in public works</i>), the project will support the following courses: (i) Communications Plan and Debris Management Plan Development; (ii)</p>	<p>DPWH emergency planning and response team members who</p>

<sup>34</sup> GFDRR, 2018, Op.cit; UN Women, 2015, Op.cit.; UNDP, 2019, Op.cit.

<sup>35</sup> IFRC, 2018, Minimum standards for protection, gender and inclusion in emergencies, International Federation of Red Cross and red Crescent Societies, Geneva; IFRC, 2017, Nepal Country Case Study: Effective law and policy on gender equality and protection from sexual and gender-based violence in disasters, International Federation of Red Cross and Red Crescent Societies, Geneva

<sup>36</sup> UNDP, 2019, Op.cit.

<sup>37</sup> See: UNDP, 2019, *UNDP Gender and Recovery Toolkit*, United National Development Programme, New York; GFDRR, 2018, *Gender Equality and Women’s Empowerment in Disaster Recovery*, Disaster Recovery Guidance Series August 20, 2018, GFDRR, IRP, The World Bank, UN Women, EU, Washington DC

Gender Gap	Actions	Expected Results and Indicators
<p>perform emergency planning and response functions/activities</p> <p><b>Data:</b> Baseline: 9.6% women in DPWH response teams (2020)</p> <p>Other References: Findings from <i>2018 IFRC report</i> based on a series of focus group discussions in Aklan and Leyte and key informant interviews.</p> <p>Findings from <i>2015 IFRC global study</i> on GBV in disasters and good practice response measures</p> <p>Findings from <i>UNDP's 2019 Gender and Recovery Toolkit</i> which looks at proven approaches for gender-equitable disaster resilience programming.</p>	<p>Communications for Emergency Response Personnel - Radio Operations; (iii) Incident Command System for Public Works Response Personnel; (iv) EOC Operations and Management; (v) Resource &amp; Situation Unit Leader Position-Specific Course; (vi) Basic Critical Incident Stress Management; (vii) DPWH Training and Exercise Planning, and Standard Operating Procedure Development; (viii) DPWH Plans, Policies, Procedures; (ix) Exercise Design and Evaluation; and (x) Functional Train-the-Trainer Course.</p> <ul style="list-style-type: none"> <li>- The resulting qualifications will enable the female staff of the relevant units to achieve the required certification and be assigned to emergency planning and response teams</li> <li>- The project will enable DPWH to create new roles which are no longer limited to the physically demanding functions on the QRSTs (e.g., operating heavy equipment), and so expanding the positions that are accessible to women</li> <li>- The project will enable DPWH to set a target of 15% of DPWH emergency planning and response teams who are women</li> </ul>	<p>are women (%)</p>

80. **Citizen Engagement.** The project will support citizen engagement and social awareness activities to ensure that the physical investments and their benefits are effectively communicated to the direct beneficiaries of the buildings to be retrofitted, as well as to other stakeholders. These activities will include the following: (i) information meetings on the long-term benefits of seismic retrofitting – including management of expectations that the interventions are intended to significantly reduce fatalities and severe casualties, but not completely prevent all damage; and (ii) consultations with building occupants on the scheduling and programming of civil works. Disaster risk reduction communication materials will also be prepared to support these activities to broaden information reach in the community. Consultations under the Stakeholder Engagement Plan (SEP) will focus on explaining the project, its impacts and mitigating measures, and the Grievance Redress Mechanism (GRM). The inclusion of citizen engagement activities in the planned stakeholder consultations will result in better-informed and empowered stakeholders. The consultations will pose opportunities for stakeholders to raise issues and complaints during project implementation, including through the GRM. All meetings and stakeholder consultations will be documented, evaluating stakeholder feedback and actions to be monitored throughout project implementation. Two indicators have been included in the Results Framework to measure the effectiveness of citizen feedback: (i) the number of people reached per facility with disaster risk reduction information meetings (disaggregated by gender), and (ii) the number of citizens per facility who have enhanced understanding of the disaster risk reduction interventions (disaggregated by gender). Surveys will be conducted before and after the

information meetings to assess the beneficiaries'/communities' level of understanding of the risk reduction interventions. Feedback received during these consultations will be reviewed by the project team and aid in project planning and delivery, in particular on the scheduling and programming of civil works. Similarly, the GRM will be monitored frequently throughout project implementation and feedback will be addressed.

## **B. Fiduciary**

### **(i) Financial Management**

81. Based on the financial management assessment of the project carried out in accordance with the "Financial Management Practices in World Bank-Financed Investment Operations", the FM system at the DPWH meets the Bank's requirements, provided the recommended mitigating measures described below and in Annex 1 are incorporated in the design and implementation of the project. There is sufficient basis to rely on the country systems for all financial management aspects of this project.
82. The DPWH has been implementing World Bank-assisted projects and as such, is familiar with Bank requirements on the maintenance of acceptable FM arrangements. The FM risk of the Project before mitigating measures is assessed as Substantial but can be reduced to Moderate after the following proposed mitigating measures described below are implemented and have shown effective impact.
83. The mitigating measures to reduce risks associated with the current Financial Management system are to: (i) maintain separate books of accounts for the project; (ii) finalize and adopt a Project Operations Manual that includes an FM Section to formalize control processes specific to the project; (iii) hire an FM staff complement for the PIU, to support day-to-day operations; (iv) maximize the use of direct payments for large contracts; (v) address findings of the COA on the annual audited project financial statements within 12 months from the issuance of the audit report for the project; and (vi) provide relevant fiduciary training/capacity building for PIU staff.

### **(ii) Procurement**

84. *Applicable Procurement Framework.* All procurement of goods, works, non-consulting services and consulting services under the project financed by the loan shall be carried out in accordance with the World Bank's Procurement Regulations for IPF Borrowers (dated November 2020) and the provisions of the Loan Agreement and Procurement Plan. The project will be subject to the World Bank's Anticorruption Guidelines, dated October 15, 2006, revised in January 2011, and as of July 1, 2016. The project will use the Systematic Tracking of Exchanges in Procurement (STEP) to plan, record and track procurement transactions.
85. *Summary of Project Procurement Strategy for Development (PPSD) and Procurement Plan (PP).* The PPSD is being finalized by DPWH, and it identifies the appropriate procurement approaches under the project. Based on the PPSD findings, the DPWH has prepared a PP for the first 18 months of project implementation. The PP will be updated at least annually or as required during project implementation to reflect any substantial changes in procurement approaches and methods to meet the actual implementation needs, market fluctuations, and improvements in institutional capacity. The updated PP along with the revised PPSD will be subject to the Bank's prior review and approval. The PPSD includes detailed assessments of the markets for goods, works, and services required for project implementation, procurement approaches, and procurement risks analysis along with corresponding proposed risk mitigation measures.
86. *Use of National Procurement Procedures.* All contracts for goods, works and services to be procured in line with the national market approach shall follow the Philippines' national procurement procedures (NPP) set

out in the Philippines’ Government Procurement Reform Act (GPRA) (Republic Act 9184), which were assessed and found to be broadly consistent with the requirement of the World Bank Procurement Regulations, Section V – Para 5.4, National Procurement Procedures (subject to a few conditions specified in the PPSD and in the project text section of the PP that was agreed at negotiations).

87. The DPWH Central Office will procure all the contracts under the project. The procurement capacity assessment by the World Bank and the PPSD prepared by DPWH identified the key risks that may impact procurement under the project along with the recommended mitigation measures, which are listed under the Fiduciary Risk section. Further details of the procurement arrangements are provided in Annex 1.

### C. Legal Operational Policies

	Triggered?
Projects on International Waterways OP 7.50	No
Projects in Disputed Areas OP 7.60	No

### D. Environmental and Social

88. The number and typology of buildings to be intervened under the project will be based on the selection criteria and prioritization framework, of which the criticality of various locations and types of facilities, number of occupants, occupancy type, vulnerabilities of existing buildings, additional functional upgrades, environmental, social, community health and safety risks and impacts at the work site, inside and around the building envelope are to be considered. The preliminary estimates of beneficiaries are estimated based on the number of buildings that can be financed using current DPWH cost estimates (approximately 425). DPWH will design, construct, and decommission the structural elements of the buildings in accordance with national legal requirements, Environment, Social, Health, Safety (ESHS) Guidelines and other Good International Industry Practice (GIIP). The highly qualified University of the Philippines – Institute of Civil Engineering, with relevant and recognized experience and track record in earthquake and multi-hazard risk reduction, was engaged during project development to review the project design and menu of retrofit interventions for the eligible buildings. Grievance Redress Mechanisms for: (i) workers, and (ii) other project stakeholders will be set up as stipulated in the ESMF.
89. The World Bank’s Environmental and Social Framework (ESF) will apply to this project. The relevant environment and social standards (ESS) are: (i) ESS1 on Assessment and Management of Environmental and Social Risks and Impacts, (ii) ESS2 on Labor and Working Conditions, (iii) ESS3 on Resource Efficiency and Pollution Prevention and Management, and (iv) ESS4 on Community Health and Safety. To minimize environment and social risks, the eligibility criteria for building selection include: (i) avoidance of acquisition of private land, (ii) avoidance of construction impacts that will harm the workers, building occupants and surrounding communities, (iii) avoidance of impacts that will harm the structural integrity of the existing building/s, adjacent structures and on houses and other assets in dense urban locations, and (iv) avoidance of creating new access roads, digging borrow pits, and cutting of trees as construction materials in natural habitats. Indigenous Peoples as defined in the ESF will not be involved. Labor influx issues are not anticipated as only small number of workers (10-20 per worksite per 8-hour shift) are expected to be present on any one site.
90. An Environment and Social Management Framework (ESMF) has been prepared to identify and address the project’s remaining environment and social risks. It includes safeguards considerations for project

implementation during the COVID-19 pandemic (e.g. for consultations, civil works, and contingency planning for an outbreak). A standardized Environment Code of Practice (ECOP) or site-specific Environment and Social Management Plans (ESMPs) will be prepared based on Environmental and Social Safeguards screening criteria. Environmental and social screening, which is part of the ESMF process, will be conducted to determine the nature, scale and range of risks and impacts so that using the mitigation hierarchy, the development and implementation of the ESMPs should materially satisfy the ESS. Screening will also inform the prioritization, selection, design and implementation of the buildings/structures for retrofitting.

91. DPWH has experience and capacity to manage and exclude site-specific risks and impacts, backed by examples of existing practice. To date, DPWH has retrofitted approximately 37 buildings. In addition, as a result of implementing previous World Bank projects, DPWH has created the Environment and Social Safeguards Department (ESSD) in charge of assisting in the implementation, review and reporting the compliance of projects with safeguards requirements. It also follows a Social and Environment Management System (SEMS) which provides solid background for understanding safeguards principles and implementing the ESMF. The PIU will include a dedicated Safeguards Monitoring section to oversee the implementation of the ESMF and put in place institutional arrangements at the subproject level to manage social and environmental risks encountered in the subproject sites. The Environment and Social Commitment Plan (ESCP) and SEP have been prepared, which summarize key actions to be taken, and the consultation process to manage risks during project implementation. The ESMF and ESCP contain capacity-building measures for safeguards implementers under the project. The ESCP, SEP, and ESMF were disclosed on the World Bank's website on April 19, 2021, February 17, 2021, and November 17, 2020, respectively.

## V. GRIEVANCE REDRESS SERVICES

92. Communities and individuals who believe that they are adversely affected by a World Bank (WB) supported project may submit complaints to existing project-level grievance redress mechanisms or the WB's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the WB's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of WB non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's corporate Grievance Redress Service (GRS), please visit <http://www.worldbank.org/en/projects-operations/products-and-services/grievance-redress-service>. For information on how to submit complaints to the World Bank Inspection Panel, please visit [www.inspectionpanel.org](http://www.inspectionpanel.org).

## VI. KEY RISKS

93. **The overall risk is assessed as Moderate**, considering: (i) the critical residual risks in each sub-category (all rated Moderate or Low, with the exception of Political and Governance, Environmental and Social risks which are rated Substantial), (ii) the interactions among these risks (e.g. residual risks associated with technical design of the project, as well as environmental and social risks, are expected to be reduced by the mitigating actions for institutional capacity for implementation and sustainability, and vice versa), and (iii) the overall level of residual risk compared with other operations in the country.

94. **Political and Governance risks are rated Substantial.** Political risk in 2021 is expected to increase as elected officials prepare for the national elections in 2022. Some challenges could be experienced in the continuity of programs with the political transition. The World Bank team will continue to foster collaborative working relationships with technical counterparts in the implementing and beneficiary agencies, and will be prepared to actively engage newly appointed officials in a technical dialogue to build understanding of and support for the objectives and design of the project.
95. **Social risk is rated Substantial.** All 425 buildings targeted under the project have social significance, and therefore the potential for disruption of classes and health services is the main social risk. The project will utilize the mitigation measures deployed for buildings previously retrofitted under DPWH's 2018-2020 program, including phasing of construction of buildings in a given site, civil works to be carried out during school vacations to the extent possible, temporary relocation of classes within the same school compound, and rescheduling classes to alternative shifts, as appropriate. Worker and community safety especially related to the COVID-19 pandemic is also critical, and the ESMF includes provisions for reducing the spread of infectious disease and preparing for an outbreak.



VII. RESULTS FRAMEWORK AND MONITORING

Results Framework

COUNTRY: Philippines

Philippines Seismic Risk Reduction and Resilience Project

Project Development Objectives(s)

The Project Development Objectives are to enhance: (i) the safety and seismic resilience of selected public buildings in Metro Manila, and (ii) the capacity of the DPWH to prepare for and respond to emergencies.

Project Development Objective Indicators

Indicator Name	PBC	Baseline	Intermediate Targets			End Target
			1	2	3	
<b>Enhance the safety and seismic resilience of selected public buildings in Metro Manila</b>						
Targeted public buildings with reduced vulnerability to seismic and other natural hazards (including climate-related impacts) (Number)		0.00	24.00	102.00	306.00	425.00
Direct beneficiaries with increased safety from retrofitted buildings (disaggregated by gender) (Number)		0.00	16,000.00	69,000.00	208,000.00	290,000.00
<b>Enhance the capacity of the DPWH to prepare for and respond to emergencies</b>						
DPWH well equipped and organized to perform its responsibilities per the requirements of the Metro Manila Earthquake Contingency Plan		No	Yes			Yes





Indicator Name	PBC	Baseline	Intermediate Targets			End Target
			1	2	3	
(Oplan Metro Yakal Plus, OMYP) (Yes/No)						
DPWH staff achieve minimum standards in operational readiness for emergency preparedness and response per its mandate under the relevant multi-hazard national response plans (Number)		0.00				600.00

**Intermediate Results Indicators by Components**

Indicator Name	PBC	Baseline	Intermediate Targets			End Target
			1	2	3	
<b>Component 1. Improving Multi-hazard Resilience of Public Buildings and Facilities</b>						
Detailed engineering designs incorporating relevant multi-hazard resilience measures (Number)		0.00	102.00	282.00		425.00
Buildings retrofitted (Number)		0.00	24.00	102.00	306.00	425.00
People reached per facility with disaster risk reduction information meetings (disaggregated by gender) (Percentage)		0.00				70.00
Citizens per facility who have enhanced understanding of the disaster risk reduction interventions as reflected in the survey assessment (disaggregated by gender) (Percentage)		0.00				60.00



Indicator Name	PBC	Baseline	Intermediate Targets			End Target
			1	2	3	
<b>Component 2: Improving Emergency Preparedness and Response in Public Works</b>						
Emergency response plans developed and exercised to quickly and effectively respond to disasters (including climate- and health-related events) (Number)		0.00	2.00			4.00
Emergency response equipment for transportation and mobility restoration (identified in Oplan Metro Yakal Plus) commissioned and operational (Number)		0.00	14.00	47.00	55.00	70.00
Mobile Emergency Operation Centers commissioned and operational (Number)		0.00				5.00
DPWH staff are trained and exercised in plans, procedures and emergency response operations (including addressing gendered needs), disaggregated by gender (Number)		0.00				600.00
DPWH emergency planning and response team members who are women (Percentage)		9.60				15.00
<b>Component 3. Project Management</b>						
Consultations/Information meetings on disaster risk reduction interventions organized at facility level (Number)		0.00				425.00
<b>Component 4. Contingent Emergency Response</b>						
CERC established and ready to provide access to financial resources in case of an eligible		No	Yes			Yes



Indicator Name	PBC	Baseline	Intermediate Targets			End Target
			1	2	3	
crisis or emergency (including climate- and health-related events) (Yes/No)						

**Monitoring & Evaluation Plan: PDO Indicators**

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Targeted public buildings with reduced vulnerability to seismic and other natural hazards (including climate-related impacts)	Public school buildings and health centers that have been structurally retrofitted in compliance with the seismic provisions of the National Structural Code of the Philippines (NSCP 2015), and structurally/non-structurally upgraded in accordance with applicable design standards (including for climate-resilient design) and reference codes, including for wind loading and other relevant hazards.	Semi-annual	DPWH NCR Regional or District Engineering Office, with certificate of acceptance from the building owners (DepEd or DOH)	Progress Reports prepared by PIU	PIU M&E section
Direct beneficiaries with increased safety from retrofitted buildings (disaggregated by gender)	Number of occupants/users of the school buildings and health centers that have	Semi-annual	Enrollment/patient/user records and	Progress Reports prepared by PIU	PIU M&E Section



	been retrofitted		staff roster provided by school/health facility administration		
DPWH well equipped and organized to perform its responsibilities per the requirements of the Metro Manila Earthquake Contingency Plan (Oplan Metro Yakal Plus, OMYP)	<p>Transport and mobility restoration equipment and fully-equipped teams. Will be measured against the equipment requirements of the Oplan Metro Yakal Plus, and exercises and drills' success rate and after-action review.</p> <p>Intermediate Target 1: It is expected that by June 2024, DPWH will be equipped in accordance with the requirements of the Oplan Metro Yakal Plus.</p> <p>End Target: DPWH has an incident management system in place to analyze emergency situations and provide for clear and effective response and recovery.</p>	Semi-annual	DPWH Bureau of Equipment Quick Response Assets database	Progress Reports prepared by the PIU	PIU M&E Section



<p>DPWH staff achieve minimum standards in operational readiness for emergency preparedness and response per its mandate under the relevant multi-hazard national response plans</p>	<p>Prior to the implementation of capacity building activities under sub-component 2.2, DPWH will determine and adopt standards for operational readiness (based on international good practice) to execute its role under the OMYP and other relevant emergency response plans. An independent evaluation firm will assess the learning effectiveness of activities under sub-component 2.2 and their impact on the performance of DPWH's staff and how well people apply their training.</p> <p>Standards for Operational Readiness:  1. Operational plans and procedures  DPWH has operational plans and procedures that are developed, coordinated, and implemented among all relevant stakeholders. The plans and procedures describe the emergency response, continuity of</p>	<p>Semi-annual</p>	<p>Independent evaluation to assess the learning effectiveness of training and capacity building activities</p>	<p>a. independent observation and assessment of the training, workshops, and exercises (the level of success could be an aggregation of the expected pass/fail threshold of different elements of the exercises), and  a. independent psychometric surveys for DPWH staff responsible for emergency response on their: (i) reaction to the learning (was the learning valuable); (ii) learning (what have they learned / not learned), and (iii) behavioral</p>	<p>PIU Capacity Building Section</p>
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	<p>operations, and recovery from emergencies/disasters.</p> <p>2. Training DPWH has a training program that includes the assessment, development, and implementation of training for DPWH emergency management response personnel.</p> <p>3. Exercises and Drills DPWH has an exercise, evaluation, and corrective action process that regularly tests the knowledge, skills and abilities, and experience of emergency personnel as well as the plans, policies, procedures, equipment, and facilities.</p>			<p>change (how well people have applied their training and their capacity to carry out assigned roles).</p>	
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**Monitoring & Evaluation Plan: Intermediate Results Indicators**

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Detailed engineering designs incorporating relevant multi-hazard resilience measures	Detailed engineering designs are compliant with design codes and standards for relevant hazards to	Semi-annual	DPWH Bureau of Design	Progress report prepared by the PIU	PIU M&E Section



	which each building site is exposed. This may also include, as appropriate, ancillary improvements (e.g. WASH to improve public health, fastening of equipment, improvement of ingress and egress, fire safety).				
Buildings retrofitted	Public school buildings and health centers that have been structurally retrofitted, and certificate of completion issued	Semi-annual	DPWH NCR Regional or District Engineering Office	Progress reports prepared by PIU	PIU M&E Section
People reached per facility with disaster risk reduction information meetings (disaggregated by gender)	Participants in citizen engagement and social awareness activities to ensure that the physical investments are properly communicated to the direct beneficiaries of the buildings. These activities will focus on organizing: (i) information meetings on the long-term benefits of seismic retrofitting -- targeting building users, and administrators, and (ii) consultations with building occupants on the scheduling and programming of civil	Semi-annual	Surveys	Progress reports prepared by PIU	PIU M&E Section



	works.				
Citizens per facility who have enhanced understanding of the disaster risk reduction interventions as reflected in the survey assessment (disaggregated by gender)	Citizen engagement indicator associated with People reached with disaster risk reduction awareness raising sessions, resulting in enhanced understanding of the information received (as reflected in a survey assessment). Feedback received during these sessions will be reviewed by the project team and aid in project planning and delivery, in particular on the scheduling and programming of civil works. Similarly, the GRM will be monitored frequently throughout project implementation and feedback will be addressed.	Semi-annual	PIU	Surveys	PIU M&E Section
Emergency response plans developed and exercised to quickly and effectively respond to disasters (including climate- and health-related events)	DPWH Communication Plan, EOC Manual, Debris Management Plan and Equipment Positioning and Mobilization Contingency Plan. One exercise completed per year, followed by after-activity	Annual	After-activity reports	Training evaluation	PIU M&E Section





	reporting				
Emergency response equipment for transportation and mobility restoration (identified in Oplan Metro Yakal Plus) commissioned and operational	Procured emergency response equipment inspected, commissioned and tested. This is based on the Oplan Metro Yakal Plus (OMYP) gap analysis that specifies minimum equipment requirements to execute DPWH’s roles under the plan.	Semi-annual (operational testing)	DPWH Bureau of Equipment Quick Response Asset database	Progress reports prepared by Bureau of Equipment	PIU M&E Section
Mobile Emergency Operation Centers commissioned and operational	Procured mobile EOCs will be inspected based on required functional specifications, commissioned and tested. Relevant staff will also be trained to operate the mobile EOCs.	Semi-annual (for operational testing)	DPWH Bureau of Maintenance - Safety and Disaster Management Office	Progress reports prepared by the PIU	PIU M&E Section
DPWH staff are trained and exercised in plans, procedures and emergency response operations (including addressing gendered needs), disaggregated by gender	Trained and exercised personnel (disaggregated by gender) on DPWH Plans, Policies, Procedures, and Emergency management for public works	Semi-annual	After-activity reports	Training evaluation	PIU Capacity Building Section
DPWH emergency planning and response team members who are women	The project will reduce existing gaps between women and men by supporting an increase in the percentage of women that participate in DPWH’s	Semi-annual	DPWH Bureau of Maintenance - Safety and Disaster Management	Progress reports prepared by the PIU	PIU M&E Section



	disaster preparedness and emergency response planning and operations teams. This includes (but is not limited to) Quick Response Support Teams, of which currently only 9.6% are women. This increase will be underpinned by a corresponding increase in women’s participation in the EP&R capacity building and training activities.		Office personnel records; Quick Response Asset database		
Consultations/Information meetings on disaster risk reduction interventions organized at facility level	One per facility	Semi-annual	PIU	Progress Report prepared by PIU	PIU M&E Section
CERC established and ready to provide access to financial resources in case of an eligible crisis or emergency (including climate- and health-related events)	The Intermediate Target will measure readiness for CERC activation, which will include developing the following in the CERC Operations Manual: (i) mechanism for activating the CERC; (ii) main instruments under the CERC (e.g. template for Rapid Needs Assessment, draft Emergency Action Plan) ; (ii) coordination and implementation arrangements; (iii) procurement, financial	Annual	PIU	Progress reports prepared by the PIU	PIU M&E Section



	<p>management and disbursement aspects; (v) compliance with safeguard policies; and (vi) monitoring and evaluation. Readiness will be maintained throughout project implementation by regular capacity building activities and updating of the CERC Operations Manual, as appropriate.</p>				
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## ANNEX 1: Implementation Arrangements and Support Plan

### A. Implementation Arrangements

1. The agency responsible for overall implementation of the project will be the Department of Public Works and Highways, while a Project Steering Committee will provide overall policy direction and guidance for project implementation. DPWH, as the implementing agency, will build on the 2018-2020 retrofitting activities and the experience implementing new construction/retrofitting programs under Memoranda of Agreement (MoA) with DepEd and DOH. Similar MoAs will be executed specifically for this project, defining the responsibilities of the asset owners (DepEd and DOH) and the implementing agency (DPWH) of the retrofitting activities. A Technical Working Group, chaired by DPWH and including representatives of DepEd, DOH, DOST-PHIVOLCS, OCD, DICT, and other relevant government agencies, will be responsible for coordinating among government agencies during the implementation of the project..
2. In accordance with EO 52, the Secretary of Public Works issued Department Order No. 75 (s. 2019), creating the DPWH Earthquake Resiliency Program Management Office (DPWH ER-PMO) with the following mandates: (i) Ensuring that vulnerability and risk assessment of all critical public buildings and infrastructure are conducted; (ii) Fast-tracking the implementation of urgent interventions to ensure resilient buildings and infrastructure; (iii) Aligning the Department's programs with Oplan Metro Yakal Plus; and (iv) Ensuring that EO 52's Key Result Area on Transport and Mobility is implemented.
3. A dedicated PIU is being established under the strategic oversight of the DPWH ER-PMO, to perform the day-to-day implementation activities including contract management, procurement, financial management, social and environmental safeguards, training, citizen engagement and communications, and monitoring and evaluation. The PIU will be staffed mostly by DPWH civil servants but may engage external specialists, as needed. Following existing operational policies, and based on contract amount, either the DPWH NCR Regional Office or the respective District Engineering Office (DEO) will be responsible for field oversight of civil works and construction supervision contracts, and reporting implementation progress and other implementation issues to the PIU.
4. The PIU will implement the project in accordance with a Project Operations Manual (POM), which will be prepared in consultation with the World Bank and will set forth the guidelines and specific procedures for carrying out the project. The POM will include, among other things: (i) the detailed description of all project activities supported under the Loan Agreement, (ii) the sequencing of activities, and a planned timetable for the activities, (iii) the prioritization framework, (iv) the Environmental and Social Management Framework, (v) the procurement and financial management arrangements for the Project, (vi) coordination arrangements governing the day-to-day execution of the project, and (vii) M&E data collection and reporting arrangements.

#### Procurement

5. The DPWH Central Office will be responsible for project procurement activities, through the Bureau of Maintenance and the existing Bids and Awards Committees (BAC). The existing BACs of the Central Office are now working exclusively on foreign-funded projects, hence there is no need for a special BAC for the project. Appropriate training to the members of the BAC, the Procurement Service and the various Bureaus that will be involved in procurement will be scheduled by the Bank in advance of loan effectiveness.
6. All procurement of goods, works, non-consulting services and consulting services under the project shall be carried out in accordance with and governed by the World Bank Procurement Regulations for IPF Borrowers (dated November 2020) and the provisions stipulated on the Loan Agreement and in the Procurement Plan. The Project



will be subject to the World Bank's Anticorruption Guidelines, dated October 15, 2006, revised in January 2011, and as of July 1, 2016. The Project will use the Systematic Tracking of Exchanges in Procurement (STEP) to plan, record and track procurement transactions. The general description of various items under different expenditure categories, as assessed in the PPSD, and to be financed by the Bank are described below.

- (a) *Works*. Seismic retrofitting and other structural/functional improvements of approximately 425 priority public buildings, and ancillary improvements (e.g., WASH to improve public health, fastening of equipment, improvement of ingress and egress, fire safety) to buildings, as appropriate.
  - (b) *Goods*. Emergency response equipment for transport and mobility restoration, and communications equipment, including heavy equipment, mobile emergency operation centers (EOCs), etc.
  - (c) *Consulting Services*. Consulting firms may be required for various capacity building activities (i.e., emergency preparedness and response in public works; communications and information management; EOC operations, training of trainers); conduct of feasibility studies, geotechnical investigations, and detailed engineering designs; construction supervision and quality oversight; and monitoring and evaluation support. Individual consultants will also be hired as technical experts to support the Project Implementing Unit.
  - (d) *Non-consulting Services*. Outreach programs, citizens engagement and social awareness activities may be needed to support project implementation.
7. The applicable method of procurement for each specific contract and the Bank's review requirements (prior or post review) will depend on the nature, value, and risk of each contract and are specified in the Procurement Plan approved by the Bank. For open national competitive procurement, the Philippines' national procurement procedures (NPP) were assessed and found to be broadly consistent with the requirement of World Bank Procurement Regulations Section V – Para 5.4 National Procurement Procedures (subject to a few conditions specified in PPSD and in the project text section of the procurement plan).
8. *Procurement Manual*. The procurement arrangements and procedures will be detailed and fully documented in the Procurement Section of the POM, based on the provisions of the Loan Agreement and as agreed between DPWH and the World Bank. The manual will also detail the processing timelines, and the hierarchy of approval within the DPWH.
9. *Procurement Plan*. Contracts eligible for financing shall be procured in accordance with the Procurement Plan, which defines the applicable procurement methods, estimated costs, prior review requirements and time frame. A draft Procurement Plan for the first 18 months of the project has been prepared by DPWH, was agreed at loan negotiations, and will be published through the STEP system. The Procurement Plan will be updated annually, or as may be required, to reflect project implementation needs and improvements in institutional capacity and procurement risk.
10. *Project Implementation Support Staff*. Individuals to be contracted for positions to support DPWH in carrying out its project management functions (as assessed in the PPSD), as distinct from individual consulting positions identified in the Procurement Plan, may be selected according to DPWH/Government's personnel hiring procedures, as reviewed and found acceptable by the Bank. This means that such project implementation support staff are not deemed Consultants as defined in the Bank's Procurement Regulations and their selection and contracts are not governed by the consultant selection procedures under the Bank's Procurement Regulations, but by the DPWH/Government's own rules. Such personnel should not be included in the Procurement Plan in STEP but identified in the project implementation/staffing plan. They are eligible expenses under the project under the IOC category.



### Financial Management

11. The Financial Management assessment for the project was carried out in accordance with the “Financial Management Practices in World Bank-Financed Investment Operations” issued by the Financial Management Sector Board on November 3, 2005 and as further rationalized in the “Principles Based Financial Management Practice Manual” issued by the Board on March 1, 2010. Under the Bank’s OP/BP 10.0 with respect to projects financed by the Bank, the borrower and the project implementing agency are required to maintain financial management systems — including budgeting, internal control, accounting, financial reporting, and auditing systems — adequate to provide the Bank with assurance that funds will be used in an efficient and economical way to enable project development objectives to be met. The conclusion of the assessment is that the financial management systems at the DPWH meet the Bank’s requirements.
12. The DPWH has been implementing World Bank-assisted projects and, as such, is familiar with Bank requirements on the maintenance of acceptable FM arrangements. The FM risk of the project before mitigating measures is assessed as Substantial but can be reduced to Moderate after the following proposed mitigating measures are implemented within the current FM system: (i) maintain separate books of accounts for the project; (ii) finalize and adopt a POM that includes an FM Section to formalize control processes specific to the project; (iii) hire an FM staff complement for the PIU to support day-to-day operations; (iv) maximize use of direct payments for large contracts; (v) DPWH to address findings of the Commission on Audit (COA) on the annual audited project financial statements within 12 months from the issuance of the audit report for the project; and (vi) relevant fiduciary training/capacity building for PIU staff.
13. *FM implementation arrangements.* The existing financial management system of DPWH will be used for the implementation of the project. It includes acceptable budgeting, accounting, reporting, internal controls including internal audit and staffing. DPWH will have a robust information system that will regularly report the progress of project implementation. The Director of the Finance Service at DPWH shall be designated as the FM focal person who will: (a) facilitate the financial management processes within DPWH; and (b) coordinate the financial management requirements of the Project with the PIU.
14. *Budgeting arrangements.* Budget proposals are prepared annually by DPWH and submitted to DBM, which after review are incorporated into the General Appropriations Act each year. The project shall prepare an Annual Work and Financial Plan together with disbursement projection to be submitted to the Bank before the start of each fiscal year.
15. *Accounting arrangements.* The accounting records of the project shall be maintained by DPWH using the eNGAS financial management system. The chart of accounts complies with the eNGAS chart of accounts prescribed by the COA. The DPWH Accounting Division under the Finance Service shall maintain the accounting records in accordance with the country accounting procedures and policies. Processing and accounting of project transactions shall be mainstreamed. Hence, adequate staff resources at the PIU and the Accounting Division shall be made available to ensure timely completion of the financial reports, monitoring of the Designated Accounts (DA), and preparation of withdrawal applications. Separate books of account will be maintained for the project. There shall also be separate bank accounts (DA) for the project. FM staff complement shall be hired for the PIU to support day-to-day operations.
16. *Internal control and internal auditing.* The DPWH Finance Service has adequate segregation of duties with no staff handling incompatible functions. The Budget and Accounting Division is under the supervision of the Director of the Finance Service. The project shall follow the internal controls and policies found in eNGAS, Government Audit and Accounting Manual, COA and DBM memoranda and circulars, and other laws and regulations. DPWH has an



Internal Audit office which maintains a robust program. As mitigating controls, the following requirements shall be implemented for the project: (i) Subsidiary records shall be maintained for the DA and the related project peso account; (ii) Quarterly bank reconciliation statements shall be required to be prepared and submitted to DPWH Accounting Division every 20th day after end of each quarter together with the trial balance; and (iii) Annual physical inventory count of fixed assets shall be conducted, and results reconciled with the accounting and property records.

17. *Fund flow arrangements.* The funds from the loan proceeds will flow from the World Bank to the Treasury Single Account (TSA) of the Bureau of Treasury (BTr) at the *Bangko Sentral ng Pilipinas* (Central Bank of the Philippines or BSP). DBM shall issue the Notice of Cash Allocation (NCA) which shall be the peso equivalent of the USD amount received using the BSP reference exchange rate at the date of receipt of funds as certified by the BTr. DPWH will open and maintain Modified Disbursement System (MDS) peso project account at Land Bank of the Philippines.
18. *Financial reporting arrangements.* DPWH will prepare and submit Unaudited Interim Financial Reports (IFRs) within 60 days after the end of each calendar quarter consisting of the financial reports on the project's: (i) statement of financial position; (ii) statement of sources and uses of funds, which should include the current and cumulative data compared with plan & by fund source; and (iii) bank reconciliation statements, both dollar and all peso project bank accounts. The IFR should also be accompanied by a narrative explanation of the progress of the project and the significant variances between actual against planned and financial against physical accomplishments. The format of the IFR will be agreed before negotiation and shall be included in the Project Operations Manual.
19. *External audit arrangements.* The audit of the Project Financial Statements (consisting of the statement of financial position, statement of financial performance, a statement of changes in net assets/equity, and a cash flow statement) will be conducted by COA (the auditor for all government agencies in the Philippines). COA has extensive experience in the auditing government agencies and World Bank funded projects and is an auditor acceptable to the Bank. The audit will be conducted in accordance with International Standards on Auditing and the report will be submitted to the Bank within six months after the end of the financial year. Based on prior experience there is a substantial risk that the audit may not be received within the period prescribed in the Loan Agreement. Finance staff will be advised to work closely with COA to minimize the risk of late receipt of the audit report.

#### *Disbursements*

20. The proceeds of the loan will be disbursed against eligible expenditures in accordance with the financial plan of the project. The disbursement methods allowed under the Project are: (i) advance, (ii) direct payments, (iii) reimbursements, and (iv) special commitment. The project will maximize the use of direct payments for large contracts. The proposed minimum value of application for direct payments and reimbursements is US\$6,000,000.
21. Under the advance method, BTr shall open and maintain a DA in US Dollars at the BSP. An MDS project Peso account shall also be opened and maintained by DPWH at Land Bank of the Philippines to pay for peso-based/local currency expenditures. The maximum ceiling for the DA shall be initially set at US\$30 million. The DA ceiling shall be reviewed by DPWH in consultation with the Bank's Task Team from time to time to assess its reasonableness and adequacy. BTr shall periodically furnish a copy of record of the DA balance deposited at BSP to DPWH. DPWH shall withdraw funds from the Bank through the submission of duly signed Withdrawal Application and Statement of Expenditures (SOEs). Disbursements under the project shall comply with the Bank policies and procedures on disbursements and financial management as reflected in the Bank's Disbursements Handbook and Financial Monitoring Report Guidelines. All replenishments to the DA shall only be for eligible expenditures based on the



agreed eligibility/financing percentage in the Loan Agreement and shall have adequate supporting documents. The frequency for reporting eligible expenditures paid from the DA will be quarterly or as need arises.

- 22. To allow the submission of Withdrawal Applications and supporting documentation, for expenditures incurred on or before the Closing Date, the project will be granted a four-month grace period to report these eligible expenditures.
- 23. FM implementation support missions will be conducted twice a year focusing on the adequacy of the FM system to ensure that funds are used for the intended purposes with due regard to economy and efficiency. Based on the level of FM risks at time of FM supervision, the reviews may include any or all of the following: (i) review and verification of specific transactions, (ii) review of bank reconciliations, (iii) analysis of the financial statements in relation to the funds disbursed by the Bank, and (iv) physical verification of structures as to existence. Desk reviews will also be conducted on a regular basis and upon submission of the annual external audit of the project and the IFR. Issues arising from these reports will be used to review and adjust the scope of the planned FM implementation support.
- 24. The loan shall be disbursed over a period of five years based on the following categories of expenditures. Disbursements for the first two years is expected not to exceed 60% of the loan.

Category	Amount of the Loan Allocated (expressed in USD)	Percentage of Expenditures to be financed (inclusive of Taxes)
(1) Goods, works, non-consulting services, consulting services, Operating Costs, and Training for the Project	300,000,000	100%
(2) Emergency Expenditures	0	100%
<b>TOTAL AMOUNT</b>	<b>300,000,000</b>	

Safeguards

- 25. The implementation of the ESMF will be consistent and aligned with the project implementation arrangements to ensure that identification and mitigation of risks are incorporated efficiently during subproject implementation. This includes programming the safeguards screening and assessments according to contract packages. A dedicated Safeguards Monitoring Section (SMS) will be established in the PIU to ensure the strict and proper implementation of the ESMF throughout the project cycle. The SMS will be staffed by designated DPWH safeguards specialists as internal evaluators and specialists from partner agencies (DepEd and DOH) as external evaluators.

**B. Implementation Support Plan**

- 26. *Overall approach to Implementation Support.* Implementation support will be provided by the World Bank Task Team (TT), consisting of staff with relevant competencies in project operations, procurement, finance, monitoring and evaluation, safeguards, disaster risk management, seismic risk reduction, and EP&R. The TT will conduct implementation support missions every six months (at a minimum) throughout the project’s implementation period. Implementation support missions will include field visits to verify physical implementation and compliance with the processes as stated in the Project Operations Manual. Additional support will include frequent coordination with the PIU for updates on implementation performance and progress. The TT will monitor progress of the following: (i) achievement of results indicators; (ii) overall and component specific project implementation





progress; (iii) proper fiduciary management of all activities carried out by the PIU; (iv) safeguards compliance; (v) reconciliation of payments with contracts; and (vi) monitoring of key legal covenants. The TT will also mobilize staff and consultants that will directly support project implementation with specialized technical assistance, as needed.

27. The TT will work closely with the PIU to ensure the project's compliance with the Bank's fiduciary and safeguards policies, and to monitor progress in achieving project outcomes. The PIU will prepare and transmit to the Bank progress reports, workplans, and financial reports, as well as reports on implementation issues, among others.

#### Financial Management

28. The World Bank's FM specialist will provide timely and effective support to the PIU. The project will be monitored through: (i) desk reviews of audit reports, interim financial reports, and status of action plans agreed with the counterparts following visits or audit findings, if any; and (ii) on-site reviews of the continuous adequacy of the project FM arrangements. These will include monitoring and reviewing the status of implementation of any agreed actions and issues identified by the auditors, including other issues related to project accounting, reporting, budgeting, internal controls, and flow of funds. A review of a sample of transactions will be also conducted during supervision missions or on-site monitoring reviews.

#### Procurement

29. Support for procurement management will focus on effective implementation of the various project components in line with the World Bank Procurement Regulations. The following activities will be carried out by World Bank procurement staff: (i) training as needed (i.e. application of the Procurement Regulations, use of STEP, etc.) for staff of the PIU prior to loan effectiveness and during project implementation; (ii) review of procurement documents prepared by the DPWH; and (iii) monitoring of progress against the Procurement Plan. In addition to the prior review of procurement transactions, the World Bank's procurement specialist will join the two implementation support missions scheduled per year to assess the progress of the procurement activities under the project. Procurement post reviews will be conducted during these missions. The post review sample size will not be less than 20 percent of the contracts that were not subject to the Bank's prior review. Additional support will include clarification and advice on procurement related matters as requested by the client.

#### Environment and Social Safeguards

30. The World Bank's social and environmental safeguards specialists will provide technical support and oversight throughout project implementation, including guidance in the preparation of required safeguards instruments (ESMF, ESMPs, ECoPs). Semi-annual assessments on safeguards compliance from the environmental and social specialists will be conducted through the implementation support missions and field visits. In case environmental and social safeguards policies are triggered, the PIU will receive support from the Bank to prepare relevant environmental and social documents and instruments, conduct due diligence processes, and monitor the timely preparation of environmental and social assessments and management instruments, which must be completed before any physical activity can commence. During project implementation the Bank will monitor the project's safeguards performance, provide timely advice and work closely with the PIU on areas for improvement on a continuing basis. The Bank will also provide capacity building support to the PIU, recipient institutions and partner agencies. The PIU will ensure that a functioning grievance redress mechanism is in place.



Mid-Term Review

31. A Mid-Term Review (MTR) will be carried out halfway through project implementation to review the Results Framework and achievement of targets, SORT ratings, Financial Management Reports, procurement activities, safeguards compliance, disbursement status, and other relevant items. In preparation for the MTR, an independent review of implementation progress will be carried out, including beneficiary assessments, as appropriate. The MTR will provide recommendations as to any potential changes or restructuring necessary to improve the project’s relevance, efficacy, or efficiency.

Implementation Completion and Results (ICR) Report.

32. To evaluate project outcomes, an ICR will be drafted by the World Bank and the Borrower within six months of project completion. Impact evaluations and beneficiary assessments may be conducted as part of the ICR process. ICRs are tailored to enhance development effectiveness through a continuous process of self-evaluation, lesson learning and application, knowledge sharing, and accountability for results. The lessons learned from ICRs improve the quality and effectiveness of World Bank operations, while Borrower/stakeholder participation in the ICR process informs the design, preparation, and implementation of potential follow-on projects.

*Implementation Support Plan (ISP) and Resource Requirements*

33. The following ISP is based on the preliminary estimates of the skill requirements, timing, and resource requirements throughout the project implementation period. As the needs of the PIU evolve over time, the ISP will be reviewed annually to ensure that it provides the required support. The tables below indicate the level of inputs that will be needed from the World Bank to provide implementation support for the project.

Time	Focus	Skills Needed	Partner Role
First 12 months	Provide support for start-up activities <ul style="list-style-type: none"> <li>• set-up PIU office by assigning staff to specific units and hire consultant specialists/analysts as needed</li> <li>• Procurement and Financial Management Systems are in place</li> <li>• Environmental and Social Safeguards monitoring system are in place</li> <li>• Establish the Monitoring and Evaluation system</li> <li>• Procurement of Design Consultants for Component 1</li> <li>• Preparation of Capacity Building Activities for Component 2</li> <li>• Preparation of Communications/Public Awareness Campaign Plan</li> </ul>	<ul style="list-style-type: none"> <li>• Task Team Leader</li> <li>• DRM Specialist</li> <li>• Technical Specialist</li> <li>• Procurement Specialist</li> <li>• FM Specialist</li> <li>• Environmental Specialist</li> <li>• Social Safeguards Specialist</li> <li>• Monitoring &amp; Evaluation Specialist</li> <li>• Training Consultant</li> <li>• Communications Consultant</li> </ul>	<ul style="list-style-type: none"> <li>• Task Team to provide support to ensure smooth commencement of project activities</li> </ul>
12-48 months	<ul style="list-style-type: none"> <li>• Continued implementation support to all aspects of project activities</li> <li>• Implementation support missions and field visits to monitor progress of activities and achievement of PDOs</li> <li>• Mid-term Review of project</li> <li>• Preparation of ICR</li> </ul>	All skills (same as above)	<ul style="list-style-type: none"> <li>• Task Team to provide support to PIU including technical assistance in Procurement, FM, Safeguards and M&amp;E</li> <li>• Ensure safeguards are on track</li> <li>• Ensure compliance with Bank fiduciary requirements</li> </ul>



Skills Mix Required

<b>Skills Needed</b>	<b>Number of Staff Weeks</b>	<b>Number of Trips</b>	<b>Comments</b>
Task Team Leader	50	14	
Co-Task Team Leader	50	14	
Technical Specialist or Consultant	35	12	
Procurement Specialist	15	N/A	Field Based Staff
Financial Management Specialist	15	N/A	Field Based Staff
Environmental Specialist	15	N/A	Field based Staff
Social Safeguards Specialist	15	N/A	Field Based Staff
DRM Consultant	35	N/A	National Consultant
M&E Specialist/Consultant	50	6	
Training Specialist/Consultant	50	8	
Communications Consultant	35	6	

\*Field based staff and national consultants do not need to travel since all sub-projects are in Metro Manila.



## ANNEX 2: Detailed Project Description

### A. Detailed Component Description

#### Component 1. Improving Multi-hazard Resilience of Public Buildings and Facilities (US\$245 million)

1. This component will finance seismic retrofitting and relevant strengthening/upgrades of public buildings to reduce damage from natural hazards (earthquakes and other adverse geophysical and climate-related events). Specifically, this component will invest in maximizing the number of beneficiaries protected from natural hazards, by implementing appropriate, cost-effective structural retrofitting (including, but not limited to, the indicative retrofitting techniques described below) and functional improvements in selected school buildings and health centers. This will be achieved through two sub-components:
  - 1.1 Retrofitting of Public Buildings; and
  - 1.2 Feasibility studies and detailed design.

##### *Sub-component 1.1: Retrofitting of Public Buildings*

2. Approximately 425 priority buildings (based on the Seismic Vulnerability Rating (SVR) framework, described below) are planned for seismic retrofit and other structural/functional improvements under this project (at a cost of up to 60 percent of the *in situ* reconstruction cost). Eligible buildings have been sorted by SVR to comprise the provisional list of public buildings (schools<sup>38</sup> and health centers<sup>39</sup>) for detailed seismic evaluation, retrofit design, and eventual upgrading. The type of occupancy is factored into the SVR framework (i.e. schools and health centers are prioritized due to their social significance, the vulnerability of the typical building types and occupants, and importance to emergency preparedness (in the case of health centers)).
3. Climate change impacts and the effects of multiple site-specific hazards will be explicitly considered in the detailed design phase, using the DOST-PHIVOLCS GeoRiskPH platform to assess exposure to seismic, climatic/hydro-meteorological, volcanic, and other prevalent hazards. Where appropriate, a multi-hazard intervention approach for the facility/campus (e.g. site drainage to reduce localized flooding) will be developed. In accordance with Philippine building regulations, structural and functional upgrades will ensure overall compliance with relevant design standards currently in force (including for climate-resilient design such as strengthening roofs and windows for typhoon-related wind loads, access for persons with disabilities, COVID-related functional measures, etc.). In compliance with all current national regulations, reference standards, and statutory codes, and as appropriate to improve the service continuity of the facilities, relevant safety improvements (e.g. WASH, fastening of non-structural elements like ceilings, partitions, and equipment that can constitute falling hazards, improvement of ingress and egress, and fire safety measures) may also be included in the upgrades.
4. To optimize the project investment in a subset of the Eligible buildings, a multi-factorial prioritization framework has been developed to identify the risk factors based on a review of the criteria used by DPWH in its 2018-2020 program and enhanced through a series of consultations with the asset-owner agencies. These factors are

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<sup>38</sup> Each year, natural disasters have had devastating effects on education outcomes in the Philippines. For example, Typhoon Haiyan damaged more than 2,500 schools and affected 1.4 million children in the in 2013. The impacts of disasters on children and youth include prolonged education disruption; permanent drop-out from the education system; poor-quality learning experiences and outcomes; long-term psychosocial concerns; and susceptibility to health problems.

<sup>39</sup> Based on DOH classification, these simple health centers are under Category A: Primary Care Facility, which is a first contact healthcare facility that offers basic services (including basic emergency services) to communities. These are typically low- to mid-rise reinforced concrete structures, similar to the schools.



integrated into a Seismic Vulnerability Rating, which has been calculated for the 1,265 Eligible buildings, forming the basis of prioritizing public buildings. The SVR is derived by taking the weighted sum of the factors:

	Remarks
1. <b>Rapid Visual Screening (FEMA 154 version 2002) Score</b>	Among the factors considered in the <b>RVS version 2002</b> are: 1.1 <b>Seismicity of Site</b> (high seismicity for Metro Manila) 1.2 <b>Structural Type</b> (e.g. reinforced concrete, moment-resisting frame: C1) 1.3 <b>Structural Height</b> (e.g. medium-rise: C1-M) 1.4 <b>Geometric Non-Regularity</b> (vertical and/or horizontal (plan) non-regularity in the building shape) 1.5 <b>Vintage of Construction</b> (e.g. pre-code -- earlier than 1972, or post-benchmark -- later than 1992) 1.6 <b>Soil Type</b> (except that the rapid tool cannot effectively screen buildings on liquefiable soil; see below)  <b>A weight of 35% is applied</b> to the building’s RVS score.
2. <b>Proximity to a Known Fault Line</b>	The closer a building is to an identified active fault line, the higher the hazard. The range of values for this factor is based on the application of the near-source factors prescribed in the NSCP 2015. <b>A weight of 15%</b> is applied to this factor.
3. <b>Liquefaction Potential</b>	The potential of soil liquefaction also poses an added hazard on the building, even if arguably non-life threatening (see Soil Type above). Areas in Metro Manila may be classified into four levels of liquefaction potential: high, moderate, low, and safe; data may be derived from the HazardHunterPH platform by GeoRiskPH. <b>A weight of 10%</b> is applied to this factor.
4. <b>Year of Construction</b>	After benchmark-year 1992 (see Vintage of Construction above), further changes have been introduced in the seismic provisions of the NSCP, geared towards improving the seismic design of structures. Hence, buildings constructed after these significant improvements in the code may be construed as less vulnerable. Later benchmark years are 2001 and 2010. <b>A weight of 10%</b> is applied to this factor.
5. <b>Type of Occupancy</b>	Higher vulnerability value is given to schools, and health centers, due to the vulnerability of their occupants; and to emergency evacuation centers. <b>A weight of 10%</b> is applied to this factor.
6. <b>Number of Occupants</b>	The number of occupants relates to risk of life losses and severe casualties. The higher the number of occupants in the building, the more are exposed, and potentially vulnerable, to the hazard at hand. <b>A weight of 20%</b> is applied to this factor.

Selection Factor	Weight %
1. Rapid Visual Screening (FEMA 154 version 2002) Score	35
2. Proximity to a Known Fault Line	15
3. Liquefaction Potential	10
4. Year of Construction	10
5. Type of Occupancy	10
6. Number of Occupants	20
<b>Total</b>	<b>100</b>



Sub-component 1.2: Feasibility studies, detailed design and quality assurance

5. Consulting services<sup>40</sup> for detailed building-level structural condition assessments, geotechnical and other site investigations, feasibility design studies, detailed engineering designs (incorporating multi-hazard resilience measures as appropriate to site-specific exposures), and design reviews will be financed under this sub-component. Oversight of implementation of retrofit techniques and contractors' environmental and social management plans will also be financed. As a complement to the 'hard' risk reduction interventions, citizen engagement activities (including consultations and information sessions for disaster risk reduction) will be conducted at each facility to be intervened (financed under Component 3).

**Component 2: Improving Emergency Preparedness and Response in Public Works (US\$52 million)**

6. This component will finance mission-essential equipment for transport and mobility restoration, and communication. It will also finance capacity building activities for the Department of Public Works and Highways to systematically prepare for and respond to emergencies (recurrent annual events as well as low-frequency, high impact disasters), particularly in line with its mandate under the Oplan Metro Yakal Plus (as the lead agency for Engineering, Reconstruction, and Rehabilitation), as well as other national emergency response plans for multiple hazards (including those related to climate and public health, such as COVID-19). To establish a functional EP&R system in a coherent manner, this component will take a holistic approach to strengthening DPWH's EP&R capacity by addressing gaps in the different components of the system, including equipment, communication and information management, and personnel. This will be achieved through two sub-components:

- 2.1 Emergency Response Equipment for transport & mobility restoration, and communication; and
- 2.2 Capacity building for emergency preparedness and response in public works.

Sub-component 2.1: Emergency Response Equipment for Transport & Mobility Restoration, and Communication

7. This sub-component will support mission-essential equipment for transport & mobility restoration (which would be staged strategically in and around Metro Manila, in relatively less hazardous locations), as well as critical communication and information management systems, to ensure proper execution of response operations and coordination of DPWH's emergency response teams. Operation and maintenance costs for the equipment will be covered by national government counterpart funding (US\$9.5 million over the project implementation period).

*a. Transport and Mobility Restoration*

8. The mobilization of Quick Response Assets is based on a 'wave system', to prioritize road restoration/clearing operations. Under DPWH's disaster response wave system, the first wave of QRAs, composed of highly important QRE, QRT, and QRST immediately clear the road for easy passing and to enable first responders/rescuers to reach affected areas. After the deployment of the first wave, an assessment will be carried out to evaluate the severity of the incident and to estimate and set the quantity of QRAs to be subsequently deployed. Depending on the said assessment, second and/or additional waves may be deployed subject to the identified needs.
9. DPWH has a significant need for rapidly deployable heavy equipment to meet the minimum capability requirements of Oplan Metro Yakal Plus in an efficient manner. As indicated in the OMYP, DPWH may be able to

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<sup>40</sup> DPWH currently uses only non-corporations (firms in the name of the owner/s who are licensed to practice, prepare specifications, sign construction drawings, and supervise works in the Philippines). However, under this project, corporations will be eligible to bid under the World Bank procurement regulations, provided they include key personnel who are properly licensed. This is expected to substantially expand the pool of specialist technical resources to underpin DPWH's institutional capacity for implementation and sustainability.



meet these gaps through requesting QRAs from the various DPWH Regions; however, the mobilization of heavy equipment from other regions would be time consuming and constrained by the condition of roadways and thoroughfares, not only within Metro Manila but throughout the country.

10. The equipment that will be supported under this sub-component were validated by DPWH Bureau of Equipment's institutional strengthening assessment and Equipment Demand Analysis. These have been aligned with projected utilization of QREs under OMYP, DPWH's Equipment Positioning and Mobilization Contingency Plan and the Harmonized National Contingency Plan for Magnitude 7.2 Earthquake, as well as current QRE fleet and status.

*b. Emergency Response Communications and Information Management*

11. This sub-component will invest in mobile EOCs, which would provide a platform for coordinating operations and communications. The mobile EOCs, in conjunction with DPWH's ongoing communications system upgrade (described below), would provide two critical capabilities: (i) the ability to command and manage operations from a mobile site, and (ii) the ability to continue uninterrupted field communications with deployed resources (including the transport and mobility restoration equipment to be supported under this project). Mobile EOCs are also critical due to the MMEIRS projection of regional separation of Metro Manila into four quadrants and will ensure DPWH's continued capability to direct field resources within and across the quadrants.
12. An internally funded radio communication equipment investment (also assessed as part of the Feasibility Study conducted during project preparation), is currently being procured by DPWH (separately from the project). Together with the proposed investment in the mobile EOCs, this would address DPWH's lack of a dedicated, reliable, interoperable, and redundant communications system. Currently, DPWH's primary means of communication during a disaster is either the commercial cellular system, or email (which requires access to an internet data connection), both of which are vulnerable to the impacts of major disasters on communications systems. The primary impacts occur when part – or all – of the communications infrastructure is physically damaged or destroyed. Secondary impacts occur when the systems become overloaded due to an excessive number of users accessing the systems at the same time. These primary and secondary impacts make cellular or internet-based communications systems inappropriate for use by agencies with critical disaster response/emergency management responsibilities.
13. In light of the MMEIRS projection that as much as 70% of Metro Manila's infrastructure would be damaged during a 7.2 magnitude earthquake, loss of commercial communication capacity can be expected, thus preventing DPWH from communicating with the Quick Response Teams and requesting assistance from other Regions. The proposed investments under this project will provide DPWH with a capability that allows the agency to have reliable, redundant communication systems. The DPWH Information Management Service has coordinated on requirements for a system that would be compatible with those currently in place within the Office of Civil Defense and other organizations with response roles during an earthquake such as the Department of Information and Communications Technology. This interoperability allows all response agencies to communicate with each other; a critical feature of effective emergency response operations.
14. Finally, the Feasibility Study conducted during project preparation recommended that DPWH develop a Communications Plan that clearly outlines the intended use of the communication equipment, how equipment will be operated and maintained, and locations of equipment. This recommendation is addressed under sub-component 2.2.



*Sub-component 2.2: Capacity building for Emergency Preparedness and Response in Public Works*

15. This sub-component will focus on three main activities: (i) developing, updating, and harmonizing plans, policies, and procedures based on a reference scenario (in this case, aligning with ‘The Big One’ scenario underpinning OMYP and other relevant national plans); (ii) organizing, training, and equipping DPWH personnel to implement the plan(s) based on the increase in capability; and (iii) exercising the plan(s) in order to further improve capability.
16. DPWH’s capacity in emergency management in general, as well as specifically related to public works in emergencies, is critical to enable its personnel to execute their roles under the different emergency response plans for various hazards. In order to improve DPWH’s capacity in this area, this sub-component will focus on three main activities: (i) developing, updating, and harmonizing plans, policies, and procedures based on a reference scenario (in this case, aligning with ‘The Big One’ scenario underpinning Oplan Metro Yakal Plus and other relevant national plans); (ii) organizing, training, and equipping DPWH personnel to implement the plan(s) based on the increase in capability; and (iii) exercising the plan(s) in order to further improve capability.
17. Planning, training, and exercises will be conducted over the life of the project to ensure continuity of capacities and capabilities within DPWH. These activities will include Training of Trainers programs as well as building capacity for designing, implementing, and evaluating drills and exercises to ensure that DPWH will be able to maintain this function within the agency. Finally, planning, training, and exercises will be designed to support the operation of the equipment for transport and mobility restoration procured under sub-component 2.1.

**Component 3. Project Management (US\$3 million)**

18. This component will finance specialist technical consultants and administrative support for the Project Implementation Unit to effectively manage key functions including planning, coordination, financial management (FM), procurement, environmental and social safeguards implementation, and monitoring throughout the project implementation period. More specifically, this component will enable the PIU to carry out: (i) contract administration, safeguards, fiduciary, training, and monitoring and evaluation<sup>41</sup>, (ii) citizen engagement and communications, including consultations and information sessions for disaster risk reduction at each facility to be intervened under Component 1, and (iii) incremental project operating cost.
19. Fiduciary and safeguards functions will be carried out by designated DPWH staff, through institutionalized procurement, finance, accounting, and safeguards units that perform these functions for World Bank (and other development partner) funded projects. In addition, DPWH has a robust field supervision system with well-staffed and qualified Regional/District Engineering Offices (ROs/DEOs), which will be responsible for field monitoring of retrofitting works from pre-works to completion/acceptance. These functions will be carried out as an in-kind contribution of DPWH staff time, in accordance with the established institutional structure that is utilized for large-scale civil works projects (including the 2018-2020 retrofitting program).
20. The component will also invest directly in citizen engagement and social awareness activities to ensure that the physical investments are properly communicated to the direct beneficiaries of the buildings. These activities will focus on organizing: (i) information meetings on the long-term benefits of seismic retrofitting – including management of expectations that the interventions are intended to significantly reduce fatalities and severe casualties, but not completely prevent all damage -- targeting building users, and administrators, and (ii) consultations with building occupants on the scheduling and programming of civil works.

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<sup>41</sup> All site investigation, detailed design, and reviews are provisioned under Component 1.





**Component 4. Contingent Emergency Response (zero allocation)**

21. A Contingent Emergency Response Component (CERC) is an ex ante mechanism available to the Government to gain rapid access to financing to respond to an eligible crisis or emergency. This component will allow for rapid reallocation of uncommitted project funds towards urgent needs in the event of a natural or man-made disaster, crisis, or public health emergency. Such events may include typhoons, floods, earthquakes, volcanic eruptions, droughts, and disease outbreaks. There is flexibility in establishing the level of evidence needed to activate this component including, but not limited to issuances such as the declaration of a State of Calamity by the mandated national or subnational authority, or a State of Public Health Emergency. The agreed trigger would enable reallocation of uncommitted project funds to support immediate response and recovery needs from other project components. Disbursements would be made against a positive list of critical goods or the procurement of works, and consulting services required to support the immediate response and recovery needs.

**B. Proposed Implementation Schedule**

22. **Component 1.** Detailed engineering design consultancies are ongoing (under current DPWH contracts) and will enable the initial construction packages to be procured immediately after project effectiveness. Design, as well as construction, is planned to be undertaken initially in groups of 24 buildings, later increasing to 32, with civil works contracts typically having 13 months duration<sup>42</sup>. As project implementation progresses, design and civil works contract packages can, in principle, be bundled into fewer contracts (with more buildings) if firms demonstrate capacity to absorb the workload.

**Schools (# of buildings and packages commenced per calendar year)**

Activity	2021	2022	2023	2024	2025	2026	Total
Design	78	187	100				365
Construction	24	78	187	100			389

**Health centers (# buildings and packages commenced per calendar year)**

Activity	2021	2022	2023	2024	2025	2026	Total
Design		17	19				36
Construction			17	19			36

23. **Component 2.** All planning, training, and exercises will be conducted over the life of the project (5 years) to ensure maintenance of capacities and capabilities within DPWH.

<sup>42</sup> Schools will not reopen for face-to-face learning for academic year 2020-2021. DPWH’s priority infrastructure projects are proceeding, with strict protocols in place for implementation during the COVID-19 pandemic (e.g. for consultations, civil works, and contingency planning for an outbreak).



### ANNEX 3: Economic Analysis

1. The economic analysis focused on Component 1: Improving Multi-hazard Resilience of Public Buildings, using the Triple Dividend of Resilience<sup>43</sup> Framework. The framework aims to provide a more comprehensive approach to analyzing the benefits of disaster risk management (DRM) projects, since existing methods of appraising DRM investments undervalue the benefits associated with resilience.
2. *Triple Dividend of Resilience Framework (TDRF)*. The TDRF identifies three types of benefits from risk reduction and disaster mitigation projects: (i) avoided losses; (ii) unlocked development potential arising from stimulated innovation and bolstered economic activity in a context of reduced disaster-related background risk for investment; and (iii) enhanced synergies of the social, environment and economic co-benefits of disaster risk management investments, even if a disaster does not take place for many years.
3. *Approach and Methodology*. In the analysis conducted, only the benefits of the First Dividend of Resilience – saving lives and avoiding losses -- were calculated, which is the fundamental rationale for investing in resilience. The Second Dividend of Resilience is not directly applicable since school buildings and health facilities are not generally considered centers of economic activity. The benefits of the Third Dividend of Resilience, such as upgrades of water, sanitation and hygiene (WASH) facilities, improved energy efficiency, and avoidance of disruption in the education sector or health sector are important but difficult to quantify due to scarcity of Philippines-specific data.
4. The two key aspects considered in the analysis are the costs of the risk reduction intervention (Component 1, representing 82% of the total project cost) and the safety benefits (avoided losses) that will be achieved with the project. The benefits are determined by the difference between with- and without-intervention losses under a M7.2 scenario earthquake at the West Valley Fault causing Intensity VIII-IX (MMI) shaking ('The Big One') with annual exceedance probability of 2 percent, scaled to also include the losses that would result from less severe earthquakes.
5. *Estimation of Costs*. To estimate the investment cost prior to the start of project implementation, a number of steps were taken, as follows: (i) from the list of assessed buildings by the DPWH, the number of buildings that are eligible for retrofitting and prioritized based on the Seismic Vulnerability Rating was determined; (ii) the average retrofitting cost per square meter -- based on completed and ongoing projects implemented by DPWH -- was applied to the list of eligible buildings to compute the total investment cost of US\$245 million; and (iii) adjustments were made to the total investment cost to arrive at the economic cost. Percentages of the economic cost were allocated based on the disbursement schedule across the 5-year project period and these will be treated as the cash outflows of the project. Total economic cost for retrofitting was estimated at US\$209.2 million to enhance the seismic resilience of 425 buildings (approximately 389 school buildings and 36 health centers).
6. *Estimation of Benefits*. The calculations of avoided losses were based on the following: (i) avoided direct damage to the buildings, and (ii) avoided fatalities or lives saved. The 425 school buildings and health centers correspond to 703,705 m<sup>2</sup> of floor area, providing life safety to approximately 300,000 direct building occupants. The total benefits of the project for the 25-year design life (as per the NSCP 2015) were estimated US\$987 million, applying a 2 percent annual probability of occurrence of the scenario earthquake and scaling to include the avoided losses from less extreme events.

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<sup>43</sup> Tanner, T.M. Surminski, S. Wilkinson, E. Reid, R., Rentschler, J.E., and Rajput, S. (2015) The Triple Dividend of Resilience: Realising development goals through the multiple benefits of disaster risk management. Global Facility for Disaster Risk Reduction at the World Bank and Overseas Development Institute (ODI). London.[www.odi.org/tripledividend](http://www.odi.org/tripledividend)



i. *Avoided fatalities.* The concept of the Value of Statistical Life (VSL) is used to account for the intrinsic value of human life and assign a value to the avoided life losses due to the retrofit interventions under this project. Country-specific VSL is typically derived from a survey of willingness-to-pay to prevent the loss of life. In the absence of in-country surveys, there are studies that estimate and publish data on the VSL.<sup>44</sup> For the purpose of this analysis, published VSL estimates for the Philippines were used. To calculate for avoided fatalities, the number of occupants was estimated at 311,013 for the 425 buildings. Public schools in the Philippines average about 40-50 students per classroom and have two shifts of classes per day. The analysis used an occupancy factor of 1.2 for both the school buildings and health centers to account for increased occupancy per square meter of floor area. The avoided fatalities were based on the reduction in severe indoor casualty rates resulting from the retrofit intervention, at 0.825 percent and 0.440 percent, respectively for C1-L and C1-M building types. The avoided life losses were then calculated by multiplying the estimated number of casualties by the VSL. The avoided life losses also included a scaling factor of 1.5, to include a wider range of (less severe/more probable and more severe/less probable) events than the M7.2 scenario earthquake.

Structural Type	Severe Casualty Rate	
	Before retrofit	After retrofit
C1-L	0.852%	0.027%
C1-M	0.449%	0.009%

ii. *Avoided damages.* The direct damage to buildings is the total cost of repairing the building damaged by the scenario M7.2 earthquake at the West Valley Fault causing Intensity IX (MMI) shaking with annual exceedance probability of 2 percent. The avoided damage is a comparison of direct damages before and after the retrofitting. The feasibility study shows that the retrofit interventions are projected to reduce the damage ratios by 60 percent and 49 percent for C1-L and C1-M building types, respectively. Avoided direct damages were calculated by multiplying the unit cost (per square meter) of new construction by the reduction in damage ratio and the total floor area of the 425 buildings. The estimated avoided damages also included a scaling factor of 1.5 to measure the full cost of a wider range of (less severe) events than the M7.2 scenario earthquake.

7. *Cost-Benefit Analysis (CBA).* A full CBA was conducted for the 425 buildings identified for seismic retrofitting. Based on the Feasibility Study, the following assumptions were applied to the analysis (Table 1). The results of the analysis are summarized in Table 2.

**Table 1.** Key Data and Assumptions

(1) Number of eligible buildings	425
(2) Scenario:	M7.2 earthquake at the West Valley Fault causing Intensity IX (MMI) shaking
(3) Annual Exceedance Probability	2%
(4) Avoided effects	Severity 3 and 4
(5) Value of statistical life	US\$611,000
(6) Estimated number of occupants	311,691
(5) Occupancy factor	1.2
(6) Estimated Number of lives saved	1,687
(7) Total economic cost (Component 1)	US\$209.2 million
(8) Time Period (design life)	25 years

<sup>44</sup> [https://law.vanderbilt.edu/phd/faculty/w-kip-viscusi/355\\_Income\\_Elasticities\\_and\\_Global\\_VSL.pdf](https://law.vanderbilt.edu/phd/faculty/w-kip-viscusi/355_Income_Elasticities_and_Global_VSL.pdf)



**Table 2.** Summary of CBA Results

Component 1: improving Multi-Hazard Resilience of Public Buildings and Facilities		
Benefits Considered in the Analysis	Avoided Fatalities	Avoided Damages
Economic Internal Rate of Return (EIRR)		21.1
Net Present Value (NPV) US\$ million		139
Benefit/Cost Ratio		4.7

8. The cost-benefit analysis (CBA) shows that over a 25-year period, the Net Present Value is positive at US\$139 million and the EIRR is 21.1 percent, which is well above the 10 percent threshold rate of the National Economic and Development Authority. The benefit/cost ratio is 4.7, with benefits being nearly five times the economic cost. These results show that the project is economically viable and will benefit society by saving lives and reducing economic losses associated with the damage to the portfolio of facilities being intervened.
9. A sensitivity analysis was also applied to the model to determine the impact of: (1) increasing investment cost by 10 percent and 20 percent; (2) decreasing benefits by 10 percent and 20 percent and (3) combining the two cases. All cases were economically viable.

**Table 3.** Sensitivity Analysis on CBA

Case	EIRR	NPV (US\$ million)	BCR
Base Case	21.1%	139	4.7
Case IA: increase projected cost by 10%	19.1%	123	4.3
Case IB: Increase projected cost by 20%	17.3%	108	3.9
Case IIA: Decrease benefits by 10%	18.9%	110	4.2
Case IIB: Decrease benefits by 20%	16.6%	80	3.8
Case IIIA: Increase projected cost by 10% and decrease benefits by 10%	17.0%	74	3.9
Case IIIB: Increase projected cost by 20% and decrease benefits by 20%	10.1%	1.2	2.5



ANNEX 4: Gender Analysis

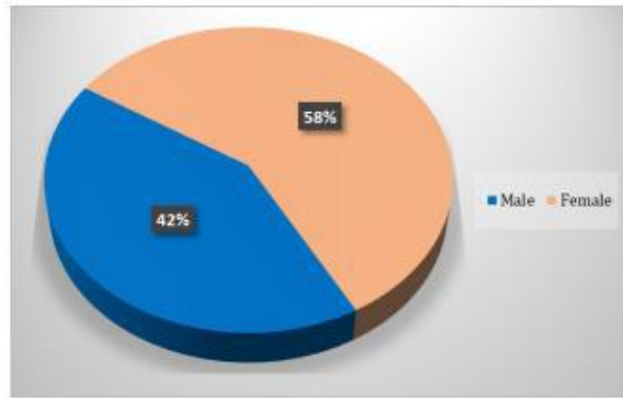
i) Gender gap analysis

- 1. The project identified that there is a gap in the participation of women in DPWH’s emergency planning and response functions. For example, DPWH’s current database (2020) shows that a total of 433 women or 9.6 percent out of 4,509 personnel are part of the Quick Response Support Teams (QRST). The breakdown is shown below:

Medical Team:

Medical Team	Female	Male	Total
CAR	32	39	71
NCR	21	21	42
DPWH REGION I	19	17	36
DPWH REGION II	11	24	35
DPWH REGION III	7	1	8
DPWH REGION IV-A	7	1	8
DPWH REGION IV-B	3	1	4
DPWH REGION IX	1	3	4
DPWH REGION V	18	28	46
DPWH REGION VI	22	29	51
DPWH REGION VII	27	16	43
DPWH REGION VIII	20	60	80
DPWH REGION X	29	39	68
DPWH REGION XI	4	16	20
DPWH REGION XII	7	20	27
DPWH REGION XIII	3	3	6
<b>Grand Total</b>	<b>231</b>	<b>318</b>	<b>549</b>

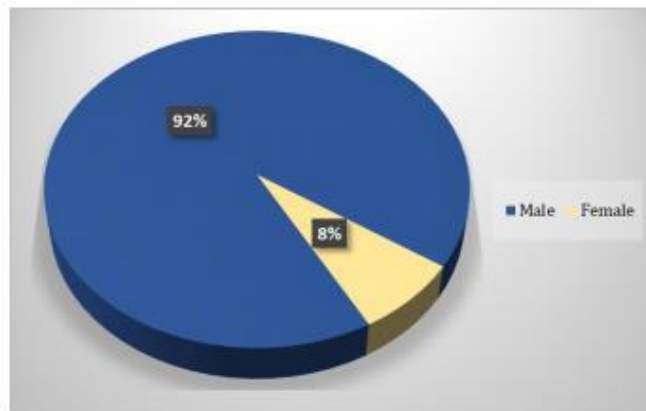
Percentage by Gender



Support Team:

Support Team	Female	Male	Total
CAR	23	150	173
NCR	18	158	176
DPWH REGION I	17	102	119
DPWH REGION II	4	85	89
DPWH REGION III	18	170	188
DPWH REGION IV-A		50	50
DPWH REGION IV-B		60	60
DPWH REGION IX		49	49
DPWH REGION V	20	283	303
DPWH REGION VI	31	186	217
DPWH REGION VII	24	222	246
DPWH REGION VIII	28	315	343
DPWH REGION X	1	208	209
DPWH REGION XI	17	334	351
DPWH REGION XII	1	80	81
DPWH REGION XIII		10	10
<b>Grand Total</b>	<b>202</b>	<b>2462</b>	<b>2664</b>

Percentage by Gender



- 2. Women are under-represented in the Department’s Quick Response Support Teams. Response activities are male-dominated, as they are limited to physically demanding functions such as operating heavy equipment and clearing debris. Based on global and national evidence, women’s participation can broaden and strengthen response processes (e.g., development of emergency response plans, training and drills), and is



expected to enhance women’s empowerment in disaster response operations (this includes Emergency Operation Center and incident workers).<sup>45</sup>

3. There is international recognition of the role of women in disaster preparedness, relief and response. Women are powerful agents of change during and after disasters and good recovery initiatives require the skills, knowledge and contributions of both women and men. Women’s participation can broaden and strengthen recovery processes and growing evidence encourages women’s participation in recovery efforts through affirmative action strategies to ensure women are adequately represented, particularly in non-traditional areas of disaster response and management. For example, research suggests it is important to mandate minimum representation (proportional to the target demographic profile) and assign appropriate and clear responsibilities and tasks in all disaster risk management systems.<sup>46</sup> In the context of emergency planning, preparedness and response, this would enhance the empowerment of women to articulate their interests and concerns, emphasizing certain issues that may not have otherwise been prioritized.<sup>47</sup> Increased participation of women in these functions can help increase the equity, effectiveness and sustainability of EP&R planning and operations, while also leveraging women’s voice and capabilities.<sup>48</sup>

**ii) Gender action**

4. The project will enable DPWH to establish new roles (see Table 1), to meet the need for the agency to formalize emergency planning and response functions and activities. This will expand the positions that are accessible to women, as the activities are no longer limited to the physically demanding functions on the QRSTs. The project will support courses that will provide DPWH staff with the qualifications and certification needed to perform these expanded emergency planning and response roles, and. The courses will be tailored to improve gender-informed response to meet the differentiated needs of women, men and children in emergency preparedness and response. Under the project, the courses will be targeted to the DPWH Bureau of Maintenance (Central Office) and corresponding units in the DPWH Regional Offices (with x% female staff). The resulting qualifications will enable the female staff of the units to achieve the required certification and be assigned to the new positions on the emergency planning and response teams. DPWH will set a target of 15% of DPWH emergency planning and response teams who are women.

**Table 1.** Matrix of Gender Gap, Actions and Expected Results

Gender Gap	Actions	Expected Results and Indicators
<p><b>Gap:</b> Women are under-represented in DPWH emergency planning and response teams</p> <p><b>Objective:</b> More women perform emergency planning and response functions/activities</p>	<p>- Under Sub-component 2.2 (<i>Capacity building for emergency preparedness and response in public works</i>), the project will support the following courses: (i) Communications Plan and Debris Management Development Course; (ii) Communications for Emergency Response Personnel Radio Operations; (iii) Incident Command System for Public Works Response Personnel;</p>	<p>DPWH emergency planning and response team members who are</p>

<sup>45</sup> GFDRR, 2018, Op.cit; UN Women, 2015, Op.cit.; UNDP, 2019, Op.cit.

<sup>46</sup> IFRC, 2018, Minimum standards for protection, gender and inclusion in emergencies, International Federation of Red Cross and red Crescent Societies, Geneva; IFRC, 2017, Nepal Country Case Study: Effective law and policy on gender equality and protection from sexual and gender-based violence in disasters, International Federation of Red Cross and Red Crescent Societies, Geneva

<sup>47</sup> UNDP, 2019, Op.cit.

<sup>48</sup> See: UNDP, 2019, *UNDP Gender and Recovery Toolkit*, United National Development Programme, New York; GFDRR, 2018, *Gender Equality and Women’s Empowerment in Disaster Recovery*, Disaster Recovery Guidance Series August 20, 2018, GFDRR, IRP, The World Bank, UN Women, EU, Washington DC



Gender Gap	Actions	Expected Results and Indicators
<p><b>Data:</b></p> <p>Baseline: 9.6% women in DPWH response teams (2020)</p> <p>Other References: Findings from <i>2018 IFRC report</i> based on a series of focus group discussions in Aklan and Leyte and key informant interviews.</p> <p>Findings from <i>2015 IFRC global study</i> on GBV in disasters and good practice response measures</p> <p>Findings from <i>UNDP's 2019 Gender and Recovery Toolkit</i> which looks at proven approaches for gender-equitable disaster resilience programming.</p>	<p>(iv) EOC Operations and Management; (v) Resource &amp; Situation Unit Leader Position-Specific Course; (vi) Basic Critical Incident Stress Management; (vii) DPWH Training and Exercise Planning, and Standard Operating Procedure Development; (viii) DPWH Plans, Policies, Procedures; (ix) Exercise Design and Evaluation; and (x) Functional Train-the-Trainer Course.</p> <ul style="list-style-type: none"> <li>- The resulting qualifications will enable the female staff of the relevant units to achieve the required certification and be assigned to emergency planning and response teams</li> <li>- The project will enable DPWH to create new roles which are no longer limited to the physically demanding functions on the QRSTs (e.g., operating heavy equipment), and so expending the positions that are accessible to women</li> <li>- The project will enable DPWH to set a target of 15% of DPWH emergency planning and response teams who are women</li> </ul>	<p>women (%)</p>

**iii) Additional actions**

5. Furthermore, holistic and robust EP&R requires adequate capacity building to understand the specific needs of disaster-affected women and men. Institutional mandates should support gender trainings to raise awareness and appropriately prepare response teams to address gender issues.<sup>49</sup> Aspects of the courses under Subcomponent 2.2 will enable greater familiarity with potential gender-related issues and considerations from the planning stage to actual response operations. DPWH will coordinate with relevant government counterparts and partners in emergency preparedness and response to ensure women’s needs and priorities are well understood.<sup>50</sup>
6. The project will support the development of targeted capacity building (mainstreamed in various EP&R courses) to better understand the needs of women, men and children in emergencies, based on four guiding principles (1) Safety; (2) Confidentiality, (3) Respect and (4) Non-discrimination.<sup>51</sup> The courses would include communication and information management and emergency procedures that are gender- and socially-inclusive.<sup>52</sup> Specific actions include: (i) supporting DPWH to increase women’s participation in EP&R courses; and (ii) supporting courses for DPWH on the specific needs of women, men and children during emergency preparedness and response activities – sections in the capacity building courses will be designed and institutionalized to strengthen DPWH’s capacity to provide targeted response services to all genders.

<sup>49</sup> GFDRR, Gender Equality and Women’s Empowerment in Disaster Recovery

<sup>50</sup> UNDP Gender and Recovery Toolkit 2019

<sup>51</sup> <https://www.ifrc.org/PageFiles/96532/A%20Guide%20for%20Gender-sensitive%20approach%20to%20DM.pdf>

<sup>52</sup> [https://media.ifrc.org/ifrc/wp-content/uploads/sites/5/2017/10/Gender-SGBV-Report\\_-Nepal.pdf](https://media.ifrc.org/ifrc/wp-content/uploads/sites/5/2017/10/Gender-SGBV-Report_-Nepal.pdf)



## ANNEX 5: Philippines: Country Program Adjustment Responding to COVID-19

Like many other countries, the Philippines has been hard hit by the COVID-19 crisis. Thanks to strong macroeconomic fundamentals, favorable external conditions, and the cumulative effects of structural reforms, the Philippines grew by an average 6.3 percent per year in 2010-2019, contributing to a 10 percentage points decline in poverty to 16.6 percent in 2018. However, the COVID-19 shock has abruptly pushed the economy into a severe recession. In response, the Government has taken significant measures to support the health sector, poor and vulnerable households and firms, especially small and medium enterprises. The consequent rise in public spending, combined with a significant shortfall in revenues has significantly raised government financing needs. The World Bank responded early, already in FY20, with an immediate relief support to save lives and mitigate the impacts on vulnerable households and firms. This was followed by ongoing support and adjustments to the FY21 pipeline. The priorities identified in the CPF remain relevant, but with some adjustments.

### I. Impact of the COVID-19 Pandemic on the Philippines and Government Response

**1. The COVID-19 pandemic continues to inflict severe health, economic and social impacts on the Philippines.** Despite significant government efforts, the Philippines is facing sustained COVID-19 infections, posing significant challenges for the health system. Economic activities underwent a steep contraction in 2020 driven by the severity of the COVID-19 pandemic and associated containment measures, both in-country and globally. The economy contracted by 10.0 percent year-on-year in the first three quarters of 2020, the worst performance in over three decades. Unemployment rose to 17.7 percent in April before falling to 8.7 percent in October 2020. Remittances inflows contracted by 0.9 percent in the first eleven months of 2020. Private consumption contracted by 8.2 percent year-on-year in the first three quarters of 2020, from 5.9 percent last year. As expected, the demand for non-essential goods and services such as from the hospitality and tourism sectors were impacted the most, contracting by double digits, while movement restrictions caused sharp contractions in transportation spending. Growth in the consumption of essential items such as food<sup>53</sup>, housing and utilities, and communications also slowed. In this context, the pillars<sup>54</sup> and objectives of the WBG's Country Partnership Framework (CPF), discussed at the Board on December 17<sup>th</sup>, 2020, remain valid but adjustments were made to support the Government in its relief and recovery efforts.

**2. The Government of the Philippines (GoP) has undertaken significant measures to respond to the ongoing health and economic crisis.** So-called community quarantine measures, implemented since the beginning of the crisis and varying over time and by region, have kept the pandemic at overall manageable levels for the health system. Bangko Sentral ng Pilipinas (BSP) aggressively reduced key policy rates and reserve requirements, signed a reverse repurchase agreement with the Bureau of the Treasury (BTr) worth PHP 300 billion. On March 24, 2020, the Congress passed the Bayanihan "To Heal As One Act" (Republic Act No. 11469) which declared a national emergency due to COVID-19, and allowed President Duterte to access PHP 352 billion (around 1.9 percent of GDP) from realigned budget, existing budget, and special purpose funds to respond to the health and economic crisis. Arguably the most important provision of the law is the distribution of PHP 5,000 to PHP 8,000 in emergency cash aid to 18 million low-income families, depending on the prevailing minimum wage in the region. The cost of the cash transfer program is PHP 200 billion. Bayanihan 2, a second and much smaller stimulus plan (0.9 percent of

<sup>53</sup> Self-reported hunger data from the Social Weather Station Surveys indicate an increase from 8.8% of Filipino families reporting hunger due to lack of food to eat in December 2019 to 20.2% in July 2020.

<sup>54</sup> The CPF outlines three focus areas for engagement: (i) Investing in Filipinos; (ii) Competitiveness and Economic Opportunity for Job Creation; and (iii) Promoting Peace and Building Resilience. The CPF incorporates cross-cutting themes of *strengthening governance* and *digital transformation*.





H1 2020 GDP) was ratified on August 24<sup>th</sup> and remains valid until end of 2021. Among others, it aims to accelerate the recovery of businesses hit hard by the pandemic by providing three government financial institutions with additional resources to provide soft loans and guarantees to firms, cover compensation for medical frontline workers and funding for medical supplies to better equip the health sector in its testing, contact tracing, and treatment efforts.

**3. The Government's response and economic recovery packages combined with a significant shortfall in revenues have significantly raised government financing needs.** The fiscal deficit climbed to an estimated 8.7 percent in 2020 against 3.2 percent expected pre-COVID. The debt-to-GDP ratio expected to have surpassed 55 percent by the end of 2020, up from 39 percent last year. For 2021, the government approved a PHP 4.5 trillion (US\$90 billion) budget that focuses on containing the spread and mitigating the effects of the virus while stimulating the economy to help the nation reset, rebound, and recover from the crisis.

## II. WBG Support for Responding to the Crisis

**4. The priorities identified in the CPF remain relevant in addressing the challenges of the COVID pandemic, but with adjustments.** From the outset of the pandemic, the Bank and Government officials engaged in an intense dialogue on how to respond to the pandemic. Analytical and advisory services have been adjusted in response to the crisis. This includes immediate and still continuing policy advice as the crisis is unfolding, including high frequency monitoring of the social and economic impacts of the crisis, and adjustments to the more longer-term analytical and advisory tasks. On the lending side, the overall demand for IBRD support has further increased. The CPF estimated an annual lending envelope of about US\$1.5 billion, with demand at about US\$4.2 – 4.4 billion during FY20-22. New commitments in FY20 amounted to US\$1.87 billion and the total FY20-22 lending volume is estimated to be about US\$5.5-6.0 billion. Two new operations were added to the FY20 pipeline in response to the pandemic: i) a COVID-19 health emergency response project (US\$100m), aligned with Pillar 1 of the Approach Paper, in response to the health-related challenges (approved April 22, 2020); and ii) an Emergency COVID-19 Response DPL (US\$500m), aligned with Pillar 2 of the Approach Paper, to mitigate the impact of COVID-19 on the poor and vulnerable households and provide financial relief to affected small and medium enterprises (SMEs) (approved May 28, 2020).

**5. The FY21 pipeline has also been adjusted to incorporate COVID-related activities into previously identified pipeline projects.** This is closely aligned with the Government's COVID recovery plan, as well as with the 4 Pillars of the WBG COVID Crisis Response Framework, while supporting the CPF and maintaining a focus on the corporate commitments of gender and climate change. Two new operations have been added to the FY21 lending program in response to the crisis: A new Beneficiaries FIRST Social Protection project (US\$600m) to mitigate the impacts of COVID-19 on the welfare of low income households and strengthen the social protection delivery systems to be adaptive and efficient (Pillar 2 of the Approach Paper); and a proposed Additional Financing for the health emergency response project (US\$500m) for financing the COVID-19 vaccination efforts. The remaining pipeline for FY21 had been agreed prior to the COVID-19 crisis, but a number of projects are adjusted to align with the Pillars of the Approach paper. Specifically, i) the National Community Driven Development Project (NCDDP) AF (US\$300m) supports Pillar 2 (approved December 16, 2020); and ii) the Philippines Rural Development Project (PRDP) AF (US\$280m) will support Pillars 2 and 4. Moreover, other FY21 projects are COVID informed, i.e. iii) the Second Promoting Competitiveness and Improving Resilience DPL (US\$600m) is supporting Pillar 4 (approved December 16, 2020); and iv) the First Financial Sector Reform DPL (US\$400m) will support Pillars 3 and 4.



### III. SELECTIVITY, COMPLEMENTARITY, PARTNERSHIPS

**6. The Philippines, like many other countries, requests significant support from development partners during this crisis, and available support needs to be well targeted to have maximum impact.** Of critical importance is the knowledge the World Bank Group and others can provide, i.e. analytics and advice for the Government of the Philippines but also the private sector and other stakeholders to make the right decisions. International experience, in particular, is critical for domestic decision-makers because the pandemic is affecting all countries, and because experience of how other countries are dealing with the crisis provide valuable lessons for the Philippines. The WBG's support in this area has combined international knowledge with strong client engagement and understanding of the country circumstances. Financing is also critical. The World Bank and other development banks also provide important sources of foreign financing, generally a mix of budget support and investment projects that are prioritized or adjusted to respond to the ongoing crisis. The World Bank Group is closely coordinating with other Development Partners, in particular the IMF, other IFIs, the UN and selected bilaterals, including from Australia, the EU, and Japan.

**7. Financing Needs and Sources of Financing.** The estimated government financing need for 2020 was about US\$27.81 billion (7.6 percent of GDP), about 74 percent of which to be sourced domestically and about 26 percent from international financial markets and development partners. As of end-December 2020, US\$6.43 billion in global bonds were issued. A first global bond worth Euro 1.2 billion was issued in January 2020, a second in May over US\$2.35 billion, and a third in December amounting to US\$2.75 billion fetched the Philippines' lowest ever cost of financing. According to the Department of Finance, as of December 2020, about US\$9 billion were raised from the World Bank and other multilateral organizations as well as bilateral development partners. This included budget or quasi-budget support from the ADB of about US\$3.8 billion, the Asian Infrastructure Investment Bank (AIIB) (US\$750 million); the Japan International Cooperation Agency (JICA) (US\$936.78 million), the Agence Francaise de Developpement (US\$285.22 million); and the Export-Import Bank of Korea (US\$100 million). Total IBRD commitments (DPFs and IPFs) in calendar year 2020 amounted to US\$2,758 million (US\$1,470 million in the last semester of FY20 and US\$1,288 million in the first semester of FY21).



COUNTRY MAP

