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INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED CREDIT

IN THE AMOUNT OF SDR 122.8 MILLION
(US\$ 173 MILLION)

TO

BANGLADESH

FOR AN

URBAN RESILIENCE PROJECT

FEBRUARY 25, 2015

Social, Urban, Rural and Resilience Global Practice
South Asia

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CURRENCY EQUIVALENTS

(Exchange Rate Effective February 25, 2015)

Currency Unit	=	Bangladesh Taka (BDT)
US\$1.00	=	BDT 79.45
BDT1.00	=	US\$.01
US\$1.00	=	SDR .71

FISCAL YEAR
July 1 – June 30

ABBREVIATIONS AND ACRONYMS

AFD	Armed Forces Division	DL	Disbursement letter
BCIF	Bangladesh Climate Investment Fund	DNCC	Dhaka North City Corporation
BNBC	Bangladesh National Building Code	DPP	Development Project Proposal
BP	Bank Policy	DRM	Disaster Risk Management
BTCL	Bangladesh Telecommunications Company Limited	DRR	Disaster Risk Reduction
BUERP	Bangladesh Urban Earthquake Resilience Program	DSCC	Dhaka South City Corporation
BUET	Bangladesh University of Engineering and Technology	DUTP	Dhaka Urban Transport Project
C&AG	Comptroller and Auditor General	ECRRP	Emergency Cyclone Recovery and Restoration Project
CAS	Country Assistance Strategy	ECT	Emergency Management and Communications Technology
CASE	Clean Air and Sustainable Environment	eGP	electronic Government Procurement
CCDMC	City Corporation Disaster Management Committee	EMAP	Emergency Management Accreditation Program
CDMP	Comprehensive Disaster Management Programme	EMF	Environmental Management Framework
CHT	Chittagong Hill Tract	EMIDS	Emergency Management Information and Data System
CONTASA	Convertible Taka Special Account	EOC	Emergency Operations Center
COP	Common Operating Picture	ERCC	Emergency Response and Communication Center
CPTU	Central Procurement Technical Unit	ERD	Economic Relations Division
CQ	Consultants' Qualification	FAPAD	Foreign Aided Project Audit Directorate
DA	Designated Account	FBS	Fixed Budget Selection
DAP	Detailed Area Plans	FSCD	Fire Service and Civil Defense
DC	Direct Contracting	GAAP	Governance and Accountability Action Plan
DCC	Dhaka City Corporation	GDP	Gross Domestic Product
DDM	Department of Disaster Management	GEODASH	Geospatial Open Data Sharing
DFID	Department for International Development	GFDRR	Global Facility for Disaster Reduction and Recovery
DGHS	Directorate General of Health Service	GIS	Geographic Information System
		GoB	Government of Bangladesh
		GPN	General Procurement Notice

GRM	Grievance Redress Mechanism	NDRCC	National Disaster Response
HFN	Hastily Formed Network		Coordination Center
HVRA	Hazard, Vulnerability and Risk Assessment	NDRCG	National Disaster Response Coordination Group
IA	Implementing Agency	NGO	Non-Governmental Organization
IAEM	International Association of Emergency Managers	NPV	Net Present Value
ICB	International Competitive Bidding	NS	National Shopping
ICP	Incident Command Post	O&M	Operation and Maintenance
IDA	International Development Association	OP	Operational Policy
IFC	International Finance Corporation	ORAF	Operational Risk Assessment Framework
IMED	Implementation, Monitoring and Evaluation Division	OTM	Open Tendering Method
IMDMCC	Inter-Ministerial Disaster Management Coordination Committee	PAD	Project Appraisal Document
INSARAG	International Search and Rescue Advisory Group	PCMU	Project Coordination and Monitoring Unit
IRR	Internal Rate of Return	PD	Project Director
ISMEP	Istanbul Seismic Risk Mitigation and Emergency Preparedness Project	PDO	Project Development Objective
IUFR	Interim Unaudited Financial Report	PIU	Project Implementation Unit
JICA	Japan International Cooperation Agency	PPA	Public Procurement Act
LCS	Least-Cost Selection	PPR	Public Procurement Rules
LGD	Local Government Division	PRIMA	Portfolio and Risk Management
M&E	Monitoring and Evaluation	PRMP	Procurement Risk Mitigation Plan
MARM	Monthly Annual Development Program Review Meeting	PSC	Project Steering Committee
MICT	Ministry of Information and Communications Technology	QBS	Quality-Based selection
MoDMR	Ministry of Disaster Management and Relief	QCBS	Quality and Cost-Based Selection
MoHA	Ministry of Home Affairs	RAJUK	<i>Rajdhani Unnayan Kartripakkha</i> Capital Development Authority
MoHPW	Ministry of Housing and Public Works	RAP	Resettlement Action Plans
MoLGRD&C	Ministry of Local Government, Rural Development and Cooperatives	RDP	Regional Development Plan
MoP	Ministry of Planning	RSLUP	Risk Sensitive Land Use Planning
NCB	National Competitive Bidding	SCC	Sylhet City Corporation
NDMC	National Disaster Management Council	SEA	Strategic Environment Assessment
NDMCC	National Disaster Management Coordination Committee	SMF	Social Management Framework
NDMRTI	National Disaster Management Research and Training Institute	SMP	Social Management Plans
		SOD	Standing Orders on Disaster
		SoE	Statement of Expenditures
		SSS	Single Source Selection
		TA	Technical Assistance
		TED	Training, Exercises and Drills
		TPP	Technical Assistance Project Proposal
		ULB	Urban Local Body
		UNDB	United Nations Development Business
		URU	Urban Resilience Unit
		USAR	Urban Search and Rescue
		WASA	Water Supply & Sewerage Authority

Regional Vice President:	Annette Dixon
Country Director:	Johannes Zutt
Global Practice Director:	Ede Jorge Ijjasz-Vasquez
Practice Manager:	Bernice Van Bronkhorst
Task Team Leader:	Marc Forni
Co-Task Team Leader:	Swarna Kazi

PAD DATA SHEET
Bangladesh
Urban Resilience Project (P149493)
PROJECT APPRAISAL DOCUMENT
SOUTH ASIA

Report No.: PAD1023

Basic Information			
Project ID P149493	EA Category B - Partial Assessment	Team Leader Marc S. Forni/Swarna Kazi	
Lending Instrument Investment Project Financing	Fragile and/or Capacity Constraints []		
	Financial Intermediaries []		
	Series of Projects []		
Project Implementation Start Date 01-Jul-2015	Project Implementation End Date 30-Jun-2020		
Expected Effectiveness Date 1-Jul-2015	Expected Closing Date 30-Jun-2020		
Joint IFC No			
Practice Manager/Manager Bernice K. Van Bronkhorst	Senior Global Practice Director Ede Jorge Ijjasz-Vasquez	Country Director Johannes C.M. Zutt	Regional Vice President Annette Dixon
Borrower: Government of Bangladesh			
Responsible Agency: Ministry of Disaster Management and Relief			
Contact:	Mr. Mesbah ul Alam	Title:	Secretary
Telephone No.:		Email:	secretary@modmr.gov.bd
Responsible Agency: Local Government Division, Ministry of Local Government, Rural Development and Cooperatives			
Contact:	Mr. Monzur Hossain	Title:	Sr. Secretary
Telephone No.:		Email:	secretary@molgrdc.gov.bd
Responsible Agency: Planning Division, Ministry of Planning			
Contact:	Mr. Mohammad Shafiqul Azam	Title:	Secretary
Telephone No.:		Email:	
Responsible Agency: Ministry of Housing and Public Works			

Contact:	Mr. Mohammad Moinuddin Abdullah	Title:	Secretary			
Telephone No.:		Email:	secretary@mohpw.gov.bd			
Project Financing Data(in USD Million)						
<input type="checkbox"/> Loan	<input type="checkbox"/> IDA Grant	<input type="checkbox"/> Guarantee				
<input checked="" type="checkbox"/> Credit	<input type="checkbox"/> Grant	<input type="checkbox"/> Other				
Total Project Cost:	173.00	Total Bank Financing:	173.00			
Financing Gap:	0.00					
Financing Source		Amount				
BORROWER/RECIPIENT		9.00				
International Development Association (IDA)		173.00				
Total		182.00				
Expected Disbursements (in USD Million)						
Fiscal Year	2016	2017	2018	2019	2020	2021
Annual	5.00	25.00	50.00	45.00	43.00	5.00
Cumulative	5.00	30.00	80.00	125.00	168.00	173.00
Proposed Development Objective(s)						
1. The project development objective is to strengthen the capacity of Government of Bangladesh agencies to respond to emergency events and to strengthen systems to reduce the vulnerability of future building construction to disasters in Dhaka and Sylhet.						
Components						
Component Name					Cost (USD Millions)	
Component A: Reinforcing the Country's Emergency Management Response Capacity					110.00	
Component B: Vulnerability Assessment of Critical and Essential Facilities					12.00	
Component C: Improved Construction, Urban Planning, and Development					41.00	
Component D: Project Coordination, Monitoring and Evaluation					10.00	
Component E: Contingent Emergency Response					0.00	
Institutional Data						
Practice Area / Cross Cutting Solution Area						

Social, Urban, Rural and Resilience Global Practice				
Cross Cutting Areas				
<input checked="" type="checkbox"/> Climate Change <input type="checkbox"/> Fragile, Conflict & Violence <input type="checkbox"/> Gender <input type="checkbox"/> Jobs <input type="checkbox"/> Public Private Partnership				
Sectors / Climate Change				
Sector (Maximum 5 and total % must equal 100)				
Major Sector	Sector	%	Adaptation Co-benefits %	Mitigation Co-benefits %
Public Administration, Law, and Justice	General public administration sector	35	35	
Total		35		
<input type="checkbox"/> I certify that there is no Adaptation and Mitigation Climate Change Co-benefits information applicable to this project.				
Themes				
Theme (Maximum 5 and total % must equal 100)				
Major theme	Theme	%		
Social protection and risk management	Natural disaster management	70		
Urban development	Urban planning and housing policy	30		
Total		100		
Compliance				
Policy				
Does the project depart from the CAS in content or in other significant respects?			Yes []	No [X]
Does the project require any waivers of Bank policies?			Yes []	No [X]
Have these been approved by Bank management?			Yes []	No [X]
Is approval for any policy waiver sought from the Board?			Yes []	No [X]
Does the project meet the Regional criteria for readiness for implementation?			Yes [X]	No []
Safeguard Policies Triggered by the Project			Yes	No
Environmental Assessment OP/BP 4.01			X	
Natural Habitats OP/BP 4.04				X
Forests OP/BP 4.36				X
Pest Management OP 4.09				X

Physical Cultural Resources OP/BP 4.11			X
Indigenous Peoples OP/BP 4.10		X	
Involuntary Resettlement OP/BP 4.12		X	
Safety of Dams OP/BP 4.37			X
Projects on International Waterways OP/BP 7.50			X
Projects in Disputed Areas OP/BP 7.60			X
Legal Covenants			
Name:	Recurrent	Due Date	Frequency
Institutional Arrangements	Yes	One month after Effective Date	Throughout implementation
Description of Covenant			
The Recipient shall establish by no later than one month after the Effective Date and thereafter maintain, throughout the period of implementation of the Project: (a) the Apex Project Steering Committee; (b) the Project Coordination and Monitoring Unit; and (c) in each of the Implementing Agencies, a Project Implementation Unit.			
Name:	Recurrent	Due Date	Frequency
Project Operational Manual	Yes	One month after Effective Date	Throughout implementation
Description of Covenant			
The Recipient shall adopt, and thereafter maintain, the Project Operational Manual			
Name:	Recurrent	Due Date	Frequency
Safeguards Documents	Yes	N/A	Throughout implementation
Description of Covenant			
The Recipient shall ensure that the Project is carried out in accordance with the provisions of the EMF, the SMF and the relevant Safeguard Assessments and Plans			
Name:	Recurrent	Due Date	Frequency
Implementation of Safeguards	Yes	N/A	Throughout implementation
Description of Covenant			
The Recipient shall prior to the commencement of any activity, proceed to have a Safeguard Assessment and Plan: (i) prepared in accordance with the provisions of the EMF and the SMF; and; and (ii) in the case of any resettlement activity under the Project involving Affected Persons, ensure that no displacement shall occur before necessary resettlement measures consistent with the RAP			
Name:	Recurrent	Due Date	Frequency
Contingency Emergency Response	Yes	N/A	Throughout

					implementation
Description of Covenant					
The Recipient shall and ensure that the Emergency Response Part is carried out in accordance with the Contingent Emergency Response Implementation Plan					
Team Composition					
Bank Staff					
Name	Title	Specialization	Unit		
Md. Akhtaruzzaman	Consultant	Social Development	GSURR		
Jack Campbell	Disaster Risk Management Specialist	Disaster Risk Management	GCCDR		
Mohammad Reaz Uddin Chowdhury	Financial Management Specialist	Financial Management	GGODR		
Marc S. Forni	Senior Disaster Risk Management Specialist	Team Lead	GSURR		
Amani Haque	Program Assistant	Program Assistant	SACBD		
Md. Faruk Hossain	Operations Assistant Temporary	Operations	GSURR		
Tanvir Hossain	Senior Procurement Specialist	Procurement	GGODR		
Swarna Kazi	Disaster Risk Management Specialist	Disaster Risk Management	GSURR		
Steven Louis Rubinyi	Disaster Risk Management Consultant	GIS	GSURR		
Laurence Chalude	Disaster Risk Management Consultant	Disaster Risk Management	GSURR		
Nadia Sharmin	Environmental Specialist	Environmental Safeguard	GSURR		
Ignacio M. Urrutia Duarte	E T Consultant	Operations	GSURR		
Jorge Luis Alva-Luperdi	Senior Council	Lawyer	LEGES		
Satish Kumar Shivakumar	Finance Officer	Disbursement	WFALN		
Non Bank Staff					
Name	Title	City			
Fouad Bendimerad	Chairman, Earthquakes and Megacities Initiative	San Francisco			
Adam Macallister	Emergency Management Advisor	Ontario			
Locations					
Country	First Administrative Division	Location	Planned	Actual	Comments

Bangladesh	Dhaka	Dhaka Division	X	X	
Bangladesh	Sylhet	Sylhet Division	X	X	

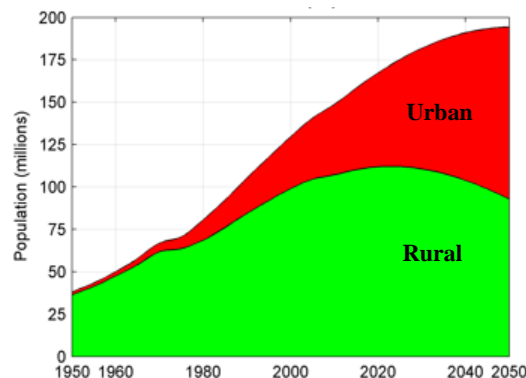
I. STRATEGIC CONTEXT

A. Country Context

1. Bangladesh has maintained an impressive track record on extreme poverty reduction and shared prosperity since the country's independence in 1971. Sustaining economic growth at around 6 percent in the past decade, the country has witnessed a profound social transformation with an influx of girls into the education system and women into the labor force. During this time, poverty has dropped by nearly a third, and there have been material increases in life expectancy, literacy, and per capita food intake. More than 16 million Bangladeshis have moved out of poverty in the last 10 years.

2. The strong economic growth prospects have fueled a significant population shift to Bangladesh's urban areas. As a result, the contribution of agriculture to Gross Domestic Product (GDP) fell from 30 percent in 1990 to 20 percent in 2010, while the contribution of the urban sector to GDP increased from 37 percent to an estimated 60 percent over the same period. The urban share of the total population of 150 million people amounted to approximately 29 percent in 2013, compared to 21 percent 20 years earlier. By 2050 the population is expected to grow to 200 million, and 52 percent are expected to live in urban areas. Not only is urbanization increasing, but the population density in major metropolitan areas is 1,900 people per sq. km. – among the highest in the world.

Figure 1: Urban and Rural Populations in Bangladesh 1950 - 2050¹



3. The sustained growth and rapid urbanization is exerting great pressure on urban development and the delivery of basic public services, and substantial efforts are needed to improve quality of life for all. Bangladesh's cities are characterized by an ever-widening infrastructure deficit, and more and more people are bound to living in sub-standard conditions. Sound planning and development are lacking, and new capital development is encroaching on already limited open space. Processes for quality control of construction and adherence to building code provisions as well as other standards are insufficient. Furthermore, the Government also lacks the capacity to tackle the threat of man-made and natural disasters, putting millions of people at risk. To sustain accelerated and inclusive growth, Bangladesh will need to manage the urbanization process more effectively.

¹UN Department of Economic and Social Affairs, Population Division (2012): World Urbanization Prospects: The 2011 Revision. New York

B. Sectoral and Institutional Context

Sectoral Context

4. Bangladesh is the most disaster prone country in the world², and is highly exposed to a variety of hazards such as floods, cyclones and earthquakes. The Government of Bangladesh (GoB) has instituted disaster risk reduction policies and invested in infrastructure along coastal areas to mitigate the risk from floods and cyclones, primarily after the catastrophic cyclones of 1970 and 1991. Over the years, the GoB has demonstrated that investments in flood management and cyclone preparedness saves lives, reduces economic losses, and protects development gains. As a result, the Government's actions are often cited in the argument for proactively investing in Disaster Risk Management (DRM) globally. Despite these tangible gains, the vulnerability of Bangladesh's urban areas is not as well understood, or addressed, in the country's policy framework. DRM solutions in an urban context also present greater challenges than in a coastal setting.

5. With seven million people living in Dhaka City, and 15 million people living in the wider metropolitan area, Dhaka is particularly at risk. Approximately 28 percent of the population is already classified as poor, and an estimated 300,000 to 400,000 poor migrants arrive in the city on a yearly basis. Land use planning regulations, and public service delivery in the urban areas of Bangladesh have failed to keep up with the pace of growth. The current regulatory environment is somewhat opaque and the enforcement mechanisms for urban development control do not address structural safety, creating an environment that lacks practical enforcement capability and accountability. In this context, physical and social vulnerabilities keep increasing and any hazards, such as floods, fires, building collapses, or earthquakes, present a formidable threat to life and prosperity.

6. Dhaka is also highly exposed to recurrent emergency events. According to the Fire Service and Civil Defense (FSCD), there are about 20,000 fires on average each year in Dhaka. The lack of local capacity to conduct search and rescue, which requires heavy lifting equipment and specialized training, often leads to slow response processes that can have dramatic repercussions in an emergency context. Fundamental deficiencies are apparent in the emergency management system, which relies more on ad-hoc decisions than a structured response operation.

7. The city of Sylhet, located outside of Dhaka, is the third largest city in Bangladesh and, like many fast growing secondary cities in the region, suffers from a responsive rather than proactive approach to urban management and development. Sylhet's own five-year development plan acknowledges that "the shortage of administrative, technical and professional capacity is exacerbated by lack of coordination, an unwieldy bureaucracy and poor organization". In this context, and the city's proximity to a fault line that crosses the country, Sylhet is also the second most highly vulnerable city to a significant earthquake after Dhaka.

8. Recent events serve as grim indicators of the extreme vulnerability of the built environment and the defective emergency system in Dhaka. In November 2012, at least 117 were confirmed dead and around 200 injured at the Tazreen Fashion factory located in the outskirts of Dhaka. The collapse of the Rana Plaza building in Savar on April 24, 2013

² Maplecroft Global Risk Analytics. <http://maplecroft.com/about/news/ccvi.html>

resulted in the death of 1,127 people and was the latest and most deadly in a series of structural failures in the city that were combined with slow emergency response. A report commissioned by the Ministry of Home Affairs (MoHA) concluded that poor site location, sub-standard building materials, and illegal construction had contributed to the collapse. A separate study by the Bangladesh University of Engineering and Technology (BUET) assessed garment factories across the city and found that 60 percent were vulnerable to similar collapse.³ The tragedy in Savar has prompted the GoB to consider how to reduce disaster risks in urban areas and simultaneously increase its capacity to respond more effectively to both recurrent and large-scale emergencies events, including disasters.

9. Dhaka is also vulnerable to seismic risk, which is driven less by the high frequency of earthquakes than by the structural deficiencies of the city infrastructure, making it very vulnerable to shaking. The nearest major fault line is believed to run less than 60 km from Dhaka and, although there is some uncertainty, research suggests that an earthquake of up to magnitude 7.5 is possible. This would have a devastating impact on the city. Moreover, the city and its inhabitants are poorly prepared to respond to a crisis of this scale within the metropolitan area. A joint research project conducted by the University of Kansas and Dhaka University found that 83 percent of Dhaka's residents do not consider themselves prepared for an earthquake.⁴

10. Finally, Dhaka has been identified as the most vulnerable city to climate change among Asian cities.⁵ This is due to the low lying nature of this delta country and the increasing pressures that sea-level rise will pose. The city experienced nine major floods in the past five decades and two major cyclones in less than a span of two years – Sidr in 2007 and Aila in 2009. These severe and extreme weather events have had the greatest impact on the poorest populations – particularly urban poor in high-risk areas – disrupting economic activities, livelihoods and national development. Long-term development gains can be safeguarded from natural hazards by increasing urban resilience.

Institutional Context

11. Government legislation, including the Standing Orders on Disaster (SOD) 2010, gives the mandate to City Corporations to lead emergency response within their jurisdictional boundaries. A City Corporation Disaster Management Committee (CCDMC) is mandated to coordinate all DRM and response activities within the city. The Mayor is the Chairperson of the CCDMC. The CCDMC covers the full spectrum of DRM responsibilities, from risk reduction to emergency management and recovery. Activities expected of the CCDMCs include risk analysis, contingency planning, rescue and relief operations, and allocation of resources for rehabilitation. The City Corporations sit under the Ministry of Local Government, Rural Development and Cooperatives (MoLGRD&C).

12. Despite progress made on the decentralization reform agenda, City Corporations, similarly to all urban local bodies (ULBs), face constraints to function as strong, responsive, and inclusive local government institutions. In particular, they have limited fiscal autonomy and decision-making powers. In recognition of these urban governance challenges, Bangladesh's Sixth Five-Year Plan lays out the GoB's priorities to address service delivery

³ <http://www.guardian.co.uk/world/2013/jun/03/bangladesh-garment-factories-vulnerable-collapse>

⁴ *Disasters*, 2010 Apr;34(2):337-59

⁵ World Wide Fund for Nature (WWF), (2009) *Mega-stress for Mega-cities: A Climate Vulnerability Ranking of Major Coastal Cities in Asia*. Switzerland: WWF International.

deficiencies; for example to provide greater clarity in the roles and responsibilities of ULBs, and improve coordination among service agencies.⁶

13. In this context, the roles and responsibilities of city authorities in disaster management services suffer limitations common to other city services; responsibilities are not well understood or executed, current structures are inappropriate, and resource allocations are insufficient. Importantly, responsibilities tend to be structured around institutions rather than functions. The resulting multitude of coordination committees is highly ineffective in the context of a sudden crisis when quick decision-making is critical.

14. At the national level, the Ministry of Disaster Management and Relief (MoDMR) is the coordinating national agency for disaster risk and emergency management at a policy level. The MoDMR is mandated to coordinate with operational agencies at different levels. At the highest level, the National Disaster Management Council (NDMC), headed by the Prime Minister, formulates and reviews disaster management policies. The Inter-Ministerial Disaster Management Coordination Committee (IMDMCC), headed by the Minister MoDMR, implements disaster management policies and decisions of the NDMC. The National Disaster Management Advisory Committee assists the Committee in this effort. The MoDMR, which houses a central Department of Disaster Management (DDM), coordinates national disaster management interventions across all agencies. DDM was set up in November 2012 following the enactment of the Disaster Management Act 2012. The Department has the mandate to implement the objectives of the Disaster Management Act by reducing the overall vulnerability from different impacts of disaster, conducting humanitarian assistance programs, as well as strengthening and coordinating programs undertaken by various government and non-government organizations related to disaster risk reduction and emergency response. This newly constituted department, however, lacks the institutional foundation and staff training to effectively perform its role and functions.

15. At the city level, with regards to construction, RAJUK was established in 1987 under the Ministry of Housing and Public Works (MoHPW) to lead planning and development in Dhaka City and peripheral areas. This is done in coordination with City Corporations, *pourushavas* and union *parishads*. RAJUK's jurisdiction extends beyond the administrative boundaries of the Dhaka City Corporations (DCCs) to adjoining secondary cities. Among its responsibilities, the Building Construction Rules (2008) provide authority to RAJUK to enforce the national building code in addition to the Construction Rules themselves. Under this broad mandate, RAJUK plays an important role in steering the development of Dhaka and overseeing the implementation of construction codes and standards. The Local Government Act (2009) does not mention responsibility for enforcement of building codes, but assigns broad authority to local governments on health and safety matters. In practice, this creates ambiguity on responsibility for building safety.

16. To better understand the physical risk, as well as the institutional and legal structures in place to manage the risk, the GoB has been working with the Bank since 2012 in preparation for the proposed Project. This collaboration has been supported by the Global Facility for Disaster Reduction and Recovery (GFDRR) to address seismic risk and the structural vulnerability of urban buildings and infrastructure. GFDRR has provided US\$1.5 million of grant support for technical assistance (TA) through the Bangladesh Urban Earthquake Resilience Program (BUERP). This support convenes government officials across

⁶ The Bank is supporting this effort through the Municipal Governance and Services Project 2014-20 (\$472M)

ministries and agencies to: i) reach consensus on the level of seismic risk in Dhaka and hazards in other parts of Bangladesh; ii) increase the understanding of legal and institutional arrangements and “on-the-ground” practices related to urban DRM; iii) define parameters to make development plans and land use processes risk sensitive; and iv) establish a data sharing platform.

17. In addition to this targeted TA, the preparation for the proposed Project engaged with cross-sector stakeholders, taking into account lessons learned from the Comprehensive Disaster Management Program (CDMP) and partnering with the International Finance Corporation (IFC) and the Japan International Cooperation Agency (JICA). The result of JICA’s TA is the development of a US\$100 million Urban Building Safety Project (UBSP). This investment was taken into consideration during the URP project design to ensure that it is complementary towards improving urban resilience.

C. Higher Level Objectives to which the Project Contributes

18. The proposed Project is closely aligned with the Bank’s Country Assistance Strategy (CAS) for FY 11-15 (July 30, 2010; report 54615-BD), which underscores the need for “reducing vulnerability to disaster” as a major area of support. It aims to: i) further operationalize and institutionalize preparedness, especially at the sub-national level; ii) mobilize resources for improved local preparedness and response management; iii) mainstream disaster risk reduction and mitigation across sectors and down to lower levels of government; and iv) extend key risk mitigation infrastructure, such as shelters and coastal embankments. The Project also directly contributes to the Sixth Five-Year Plan of Bangladesh, which makes a firm commitment to pursue an environmentally sustainable development process. The plan states the need to explore and adopt effective steps in collaboration with the international community within the Sixth Plan period to mitigate the adverse consequences of climate change and natural disasters.

19. The Project supports Bangladesh’s Building Code Initiative and the DRM Framework/Law, with the objectives of improving construction standards and reducing urban vulnerability. It also aims to empower stakeholders with knowledge, create an environment for constructive dialog, and foster consensus building and problem solving. These objectives are critical to sustainable economic growth and poverty reduction by supporting the construction of resilient infrastructure while reducing the vulnerability of populations at risk.

20. The Project also directly supports the Bank’s objectives of reducing poverty and boosting shared prosperity. The major share of industrial growth and economic activity in Bangladesh is concentrated in cities, providing work opportunities and boosting the socio-economic conditions of millions. However, soaring land prices in the backdrop of a highly monetized urban economy force the majority of low-income urban workers to seek housing in physically vulnerable and environmentally hazardous areas. Consequently, the poorest urban populations in Bangladesh are highly vulnerable to climate risks and hazardous events.

II. PROJECT DEVELOPMENT OBJECTIVES

A. PDO

21. The project development objective is to strengthen the capacity of Government of Bangladesh agencies to respond to emergency events and to strengthen systems to reduce the vulnerability of future building construction to disasters in Dhaka and Sylhet.

B. Project Beneficiaries

22. The Project will indirectly benefit the 15.5 million people living under the authority of the Dhaka North City Corporation (DNCC), Dhaka South City Corporation (DSCC), and Sylhet City Corporation (SCC) due to access to improved emergency preparedness and response services. Of these, approximately 48 percent are women. Other beneficiaries include staff in municipal public organizations in Dhaka and Sylhet, in addition to members of engineering, construction and urban planning professional communities.

C. PDO Level Results Indicator

23. The key indicators for tracking progress towards the PDO can be found below. Targets have been based on experience from other countries and will be monitored for their realism during implementation, and will be revised if needed.

- (a) Share of wards with decentralized emergency response services in Dhaka (DNCC/DSCC jurisdiction)⁷
- (b) Share of wards with decentralized emergency response services in Sylhet (SCC jurisdiction)⁸
- (c) Increased capacity of officials and emergency management response personnel⁹
- (d) Systems established to reduce vulnerability of new buildings in Dhaka and Sylhet¹⁰

III. PROJECT DESCRIPTION

A. Project Components

24. The Project comprises five components briefly described below. A detailed description of the components and project costs is provided in Annex 2.

Component A: Reinforcing the Country's Emergency Management Response Capacity – US\$110 million

25. An emergency management system will be put in place that will mobilize the resources at all levels and assign roles and responsibilities more efficiently. The system will be guided by international standards and principles of emergency management and in conformity with national laws and guidelines incorporated in the Disaster Management Act

⁷ Percentage of wards where corresponding zonal offices are equipped with ECT kits and are at least partially within five kilometers radius of at least one emergency management warehouse or one equipped FSCD control room

⁸ Percentage of wards within five kilometers of at least one emergency management warehouse or equipped FSCD control room

⁹ Annual inter-agency exercise and drills program that tests and evaluates the skills and abilities of emergency personnel on an aggregate score of 1-10. The methodology for determining the baseline will be developed by the training, exercises and drills consultant prior to program commencement.

¹⁰ Systems include: Urban Resilience Unit, Electronic Construction Permitting, Professional Accreditation Program

of 2012 and SOD 2010. The overall goal is to design and operationalize an integrated emergency management system in Bangladesh that will enable the country to plan and respond to both common, everyday emergencies as well as major disasters in an organized and effective manner. The success of a more effective emergency management system will be measured based on the attainment of the EMAP certification, which is the international standard for emergency management systems.

26. For this purpose, the Project will: (1) set up emergency operations centers (EOCs) and other response facilities in line with international standards; (2) outfit them with modern interoperable emergency communication systems and response equipment; and (3) support the proposed emergency management system with a robust and sustained capacity development program that establishes and trains a cadre of emergency management professionals for Bangladesh that are on par with their international peers.

27. The following activities will be implemented under Component A:

- Renovate and outfit national-level Disaster Risk Management (DRM) facilities (Component A1)
- Build, renovate and outfit local-level City Corporation and Fire Service and Civil Defense (FSCD) DRM facilities in Dhaka and Sylhet (Component A2)
- Supply, install and integrate specialized Emergency Management and Communications Technology (ECT) equipment for DRM and emergency response within national-level and local-level agencies (Component A3)
- Supply specialized search and rescue equipment to local-level agencies involved in DRM (Component A4)
- Provide Training, Exercises and Drills (TED) to national-level and local-level agencies involved in DRM (Component A5)

Component B: Vulnerability Assessment of Critical and Essential Facilities – US\$12 million

28. The objective of this component is to develop the consensus-driven analytical foundation required for longer-term investments to reduce risk in the built environment of Dhaka, Sylhet and other cities in Bangladesh. It concentrates on two activities, the first of which is an assessment of the vulnerability of the built environment in Greater Dhaka to earthquakes and other major hazards, focusing on essential and critical facilities and infrastructure. The assessment will establish the patterns of vulnerability of the cities, understand the hotspots, and serve as a basis for a long term vulnerability reduction in Greater Dhaka. The second activity is the development of risk-sensitive land use planning as a practice in Bangladesh. This will be informed by an understanding of the hazards, vulnerability, and risk facing urban centers, and by clearly stated consensus-driven disaster risk management (DRM) objectives and policies.

29. The following activities will be implemented under Component B:

- Conduct a vulnerability assessment of critical and essential facilities and lifelines (Component B1)
- Support the development of a risk-sensitive land use planning practice in Dhaka (Component B2)

Component C: Improved Construction, Urban Planning and Development – US\$41 million

30. The objective of Component C is to put in place the institutional infrastructure and competency to reduce long-term disaster vulnerability in Dhaka. It would address both the existing built environment as well as future development. The overall scheme for component C covers four areas of investment: (1) create a unit within RAJUK to support the integration of risk information into development planning; (2) put up the infrastructure and processes to ensure an efficient and integral mechanism for land use and zoning clearance, permitting and approval of site and building plans; (3) improve competency through professional accreditation, trainings, continuous education, as well as forums; and (4) strengthen building code implementation and enforcement.

31. The following activities will be implemented under Component C:

- Create and operationalize an Urban Resilience Unit (URU) in RAJUK (Component C1)
- Establish an electronic construction permitting system (Component C2, US\$ 8.7M)
- Set up a professional accreditation program for engineers, architects and planners (Component C3)
- Improve building code enforcement within RAJUK jurisdiction (Component C4)

Component D: Project Coordination, Monitoring and Evaluation – US\$10 million

32. The URP will have an implementation structure to engage relevant ministries that will focus on DRM, emergency response, vulnerability assessment, risk-sensitive land use planning and management, and institutional strengthening. The objective of Component D is to provide necessary funding for project coordination, monitoring and evaluation. It will also ensure periodic evaluation of the investment program to highlight the outputs and outcomes in support of a longer-term investment program.

33. The Project Coordination and Monitoring Unit (PCMU) will be charged with the responsibility of developing mechanisms to track and analyze the Project's effects, including the resulting actions of key stakeholders, particularly the City Corporations. The Project will also undergo an independent mid-term review and end-of-project evaluation. In addition, activities under the Bank's Governance and Anti-Corruption Action Plan (GAAP) will be implemented under this component. This PCMU has already been established under the Emergency Cyclone Recovery and Restoration Project (ECRRP) and is fully operational.

34. Activities that will be supported under this component include: i) overall support of the activities of the Project Steering Committee (PSC) and the PCMU; ii) support of activities related to overall progress, monitoring and evaluation, compliance with the Project's safeguard and fiduciary requirements, and capacity development; iii) support of communication and promotional activities reflecting project contributions and stakeholder expectations; iv) procurement of vehicles, office furniture, and information technology equipment for the PCMU; v) operating costs of the PCMU; vi) hiring of experts and specialists to reinforce the staffing and technically support the mission of the PCMU; and vii) strategic studies.

Component E: Contingent Emergency Response – US\$ 0 million

35. Following an adverse natural or man-made event that causes a major disaster, the Government may request the Bank to re-allocate project funds to this component (which

presently carries a zero allocation) to support response and reconstruction¹¹. This component would allow the Government to request the Bank to reallocate project funds and designate them as Immediate Response Mechanism funds to be engaged to partially cover emergency response and recovery costs. This component could also be used to channel additional funds should they become available as a result of the emergency.

B. Project Cost and Financing

36. The total project cost is US\$182 million. US\$173 million of the project will be financed by an IDA Credit. Summary costs are provided below; further details on project costs are provided Annex 2. Counterpart/GoB financing will be contributed to the project in cash and kind, such as salaries, allowances, honorarium etc. of civil servants. Project-related travel, subsistence and lodging expenses, excluding salaries, allowances and honorarium of officials of the Recipient’s civil service and/or other sitting allowances and honorarium.

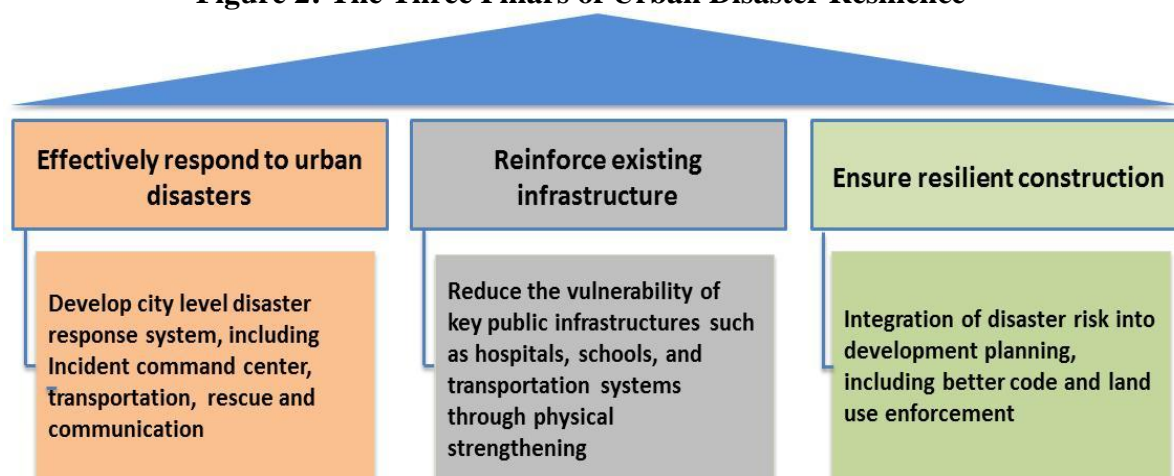
Project Components	Project cost	IDA Financing	% IDA Financing
1.Reinforcing the Country’s Emergency Management Response Capacity	114.5	110	96
2.Vulnerability Assessment of Critical and Essential Facilities	14	12	86
3. Improved Construction, Urban planning and Development	43	41	95
4.Project Implementation	10.5	10	95
5.Contingent Emergency Response Component	0	0	
GoB Costs*	9	0	0
Total Project Costs	182		
Total Financing Required	173		

* The GoB will make 9 million USD available for payment of government operating costs

C. Series of Project Objective and Phases

37. City-level actors are critical protagonists in the effort to develop resilient and livable cities in Bangladesh. This Project seeks to create an enabling environment for coordinated, locally managed DRM. There are three core pillars of disaster resilience in urban settings, as described in Figure 2 below: i) effectively respond to urban disasters; ii) reinforce existing infrastructure; and iii) ensure resilient construction.

Figure 2: The Three Pillars of Urban Disaster Resilience



¹¹ Such a reallocation would not constitute a formal Project restructuring, as permitted under the particular arrangements available for contingent emergency response components (ref. Including Contingent Emergency Response Components in Standard Investment Projects, Guidance Note to Staff, April 2009, footnote 6).

38. A comprehensive approach to increasing urban resilience would require a three phased investment program, incorporating each core pillar in each investment. The proposed Project would serve as the first of these suggested investments and will focus on improving the critical capacity and infrastructure for emergency planning and response. The proposed Project will also lay the foundations for subsequent investment projects by identifying and addressing existing risks in the built environment, and fostering a culture of risk-sensitive urban development. More details of the proposed program is included in Annex 2.

D. Lessons Learned and Reflected in the Project Design

39. The Project incorporates lessons from the Bank's global experience in building urban resilience, such as the Istanbul Seismic Risk Mitigation and Emergency Preparedness (ISMEP) Project, the Colombia Disaster Vulnerability Reduction Project, as well as national projects such as ECRRP and the Municipal Services Project. Some of the key lessons are summarized below.

40. *Cooperation among different stakeholders is crucial for ensuring the sustainability of the Project.* Different government ministries have varying and often conflicting objectives in terms of management of disasters. It is important that the interests of each stakeholder is noted and the design and operational requirements be drawn to minimize negative effects on any stakeholder or group.

41. *Data related to urban vulnerability should be readily available and easily accessible to all key stakeholders.* A centralized database system of hazards and exposures should be setup so that stakeholders can easily use it to understand the risks to their interests.

42. *Investments should be made to build the capacity of government through, for example, training of personnel on how to update input data and modify analytical tools.* Ensuring government officers are able to provide regular inputs and manipulate analytical tools will significantly increase the sustainability of the Project. Input data update and recalibration of models are very important aspect of risk modeling, as natural hazard data are often very scarce. The flood and drought models should be an open system so that it could be expanded to include additional features in the future.

IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements

43. The GoB has the overall responsibility for project management and coordination through the Planning Division, Ministry of Planning (MoP), and the following ministries: MoLGRD&C, MoHA, MoDMR, and MoHPW. A Project Steering Committee (PSC) will be established and chaired by the Secretary of the MoP and membership will include high-level representatives from concerned ministries, divisions and implementing agencies. The PSC will oversee the Project, provide overall policy guidance, and facilitate broad communication and coordination across the GoB.

44. A Project Implementation Unit (PIU) will be responsible for efficient and effective implementation and regular monitoring of activities with respect to relevant components.

Each PIU will be headed by a Project Director (PD), a mid- or senior-level official of the concerned Implementing Agencies (IAs) having at least 10 years of work experience in the relevant field/ area.

45. The three components (A, B & C) of the Project shall be implemented by three IAs, namely DNCC (for DNCC itself, DSCC and SCC within the MoLGRDC and FSCD within the MoHA); RAJUK within the MoHPW, and DDM within the MoDMR. Component D will be implemented by the PCMU of the Programming Division, Planning Commission of the MoP. All expenses are proposed to be met out of the Designated Account and no funds transfer is envisaged to other implementing agencies of the related component.

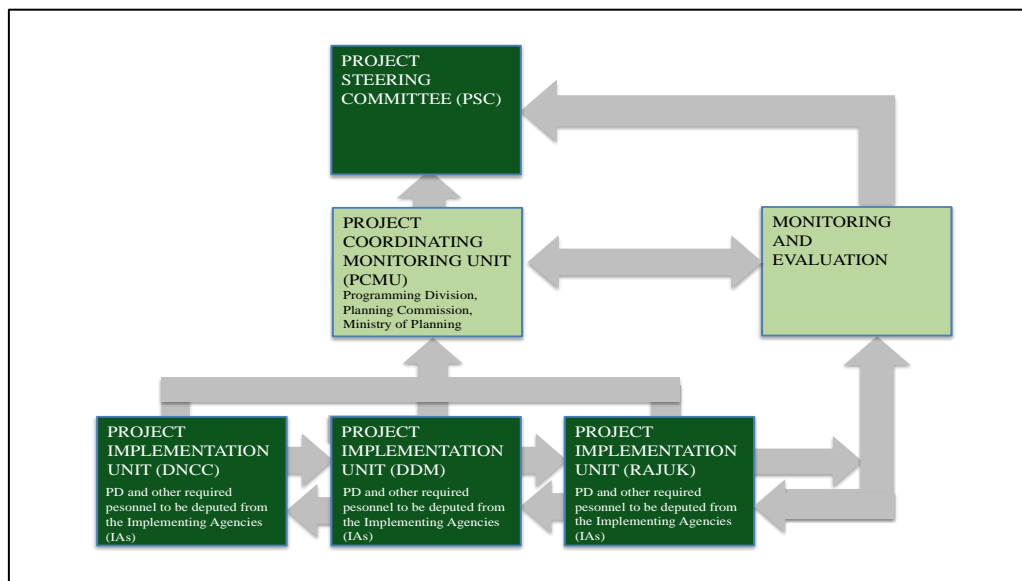
46. DDM will implement subcomponents A1 and A5, while DNCC will implement subcomponents A2, A3 and A4. Components B and C will be fully implemented by RAJUK, while Components D and E will be implemented by the PCMU.

47. The four IAs have been assessed by the Bank fiduciary specialists as having the capacity to manage projects similar to the proposed URP. Three of the four IAs are implementing ongoing Bank-financed projects, which are detailed as follows. The DCCs have implemented Bank-supported projects, including a component of the ongoing Clean Air and Sustainable Environment (CASE) Project and the closed Dhaka Urban Transport Project (DUTP). The DCCs were split into two in December 2011 and, since then, DNCC and DSCC have coordinated in implementing CASE, with the CASE PIU located within DSCC. DDM is currently implementing one of the components of the ECRRP and a component of the Safety Net Systems for the Poorest Project. Only RAJUK has not implemented a Bank-supported project and has limited experience implementing other donor-funded projects. The already established ECRRP PCMU, under the guidance of a PSC, and with oversight from the MoP, will be responsible for overall project coordination, management, monitoring, evaluation and overseeing strategic studies and training.

48. While most IAs have an understanding of Bank fiduciary processes, it will nonetheless be necessary to strengthen the IAs with a PIU housing professional, technical, procurement, financial management, social, and environment staff that would use appropriate procurement and financial management systems and procedures with adequate internal control arrangements. These would be complemented by a GAAP as described in Annex 7.

49. Though the Project's implementation structure is highly complex, the procurement process has been streamlined to ensure the smooth running of project implementation and a feasible timeline for procurement in line with project goals. To this end, procurement has been organized in a manageable number of packages for goods, works and services.

Figure 3. Overview of Project Implementation Arrangements and Responsibilities



B. Results Monitoring and Evaluation

50. The PCMU will prepare an annual progress report, in accordance with the format agreed with the Bank. The progress report will cover: (i) physical and financial progress achieved against agreed implementation and disbursement indicators; (ii) issues and problem areas, including comments on actions to address identified problems; and (iii) work programs and cost estimates for the coming year, including revised estimates for the former period. A mid-term review of the Project will be carried out no later than December 2017 to review overall progress and take necessary actions.

51. An independent monitoring and evaluation (M&E) consultancy, financed under Component D, will report to the DG/PD PCMU and PSC and will be responsible for overall monitoring and supervision of the implementation and impact of various components. They will also supervise implementation of the overall Environmental Management Framework (EMF) / Social Management Framework (SMF), review and monitor each sub-project's specific social and environmental management plans, as well as supervise their implementation. M&E will be carried out using the latest technology, such as satellite imagery and Geographic Information System (GIS), where necessary.

C. Sustainability

52. **Physical Sustainability:** The physical investments under the proposed Project are designed to increase the Government's ability to respond to emergency events based on best practices for system engineering, response, and communication systems in partnership with a well-known international firm with relevant expertise. Significant support for training, exercises and drills will ensure systems are used efficiently. Technical audits and experts will ensure the systems are of high quality. For sub-projects involving the financing of goods and equipment, eligibility for funding will be tied to the capacity of the receiving agency to adequately maintain the investment.

53. **Financial Sustainability:** The fiscal impacts of disasters require significant capital expenditures for repairing and reconstructing damaged public/state-owned infrastructure as well as, in particular cases, implicit liabilities to the Government. The proposed Project will build capacity within the Government to reduce their contingent disaster liability by improving the design and quality of public and private new construction that will be more resilient to adverse natural events.

54. **Institutional Sustainability:** Prior to project preparation, all relevant stakeholders were involved in the GFDRR TA, implemented over the past 18 months. Since the specific objective of the GFDRR TA was to build not just an understanding, but also consensus, of disaster risk, the program has focused on identifying a broad range of stakeholders to include in the TA. The overall project structure of the TA involves over 120 participants from more than 50 government agencies and outside organizations, including bilateral, private sector, and non-government organizations.

55. Due to the participatory approach of the GFDRR TA, the stakeholders are increasingly aware of the need to not only act on the increased understanding of disaster risk, but also to act in unison, each providing their respective strengths to the effort. As a result of this engagement, and despite the significant institutional challenges related to weak capacity as well as overlapping mandates for urban risk management, it is expected that risks related to project sustainability will be manageable.

V. KEY RISKS AND MITIGATION MEASURES

A. Risk Ratings Summary Table

Risk Category	Rating
Stakeholder Risk	M
Implementing Agency Risk	
- Capacity	S
- Governance	S
Project Risk	
- Design	S
- Social and Environmental	L
- Program and Donor	L
- Delivery Monitoring and Sustainability	M
Overall Implementation Risk	S

B. Overall Risk Rating Explanation

56. Overall implementation risk is Substantial. The main risks identified are: i) delays in procurement and other approval processes; ii) delays in completion of contracts and poor quality of works; iii) lack of accountability and oversight; and iv) political and/or other influence that may include corrupt practices in the awarding of contracts. The ORAF in Annex 4 provides details of the risks and risk management measures. In addition, there is a risk that a major disaster event will occur prior to project completion. In this case, systems being financed by the project may not yet be fully in place, which could lead to a poor

response to the event. The objectives of the project will be clearly communicated internally and externally accordingly.

VI. APPRAISAL SUMMARY

A. Economic Analysis

57. An objective approach to measuring the benefits of the Project will be to quantify losses averted due to fire in the aftermath of a major earthquake. Fire has been a recurring hazard in Dhaka due to the high concentration of industrial operations related to the garment industry, lax regulations, and susceptibility of the built environment to fire hazards. Access for fighting fires is very limited due to congestion, and the ability of fire fighters to control fires is very limited due to poor training, inadequate equipment and lack of water availability. The potential for multiple conflagrations and major fire spread in several areas of the city after a major earthquake could result in catastrophic human and economic losses.

58. While a major fire could spread across part of Dhaka in the absence of an earthquake, this analysis takes a more conservative approach that focuses on the expected fire that would materialize as a result of a major earthquake in Dhaka. The averted losses expected under the Project would be similar to those of other major cities of South Asia, including Kathmandu, Karachi or Delhi. From a historical perspective, between 1875 to 1925, cities including Boston, Chicago, San Francisco, Tokyo and Baltimore all suffered devastating fires. These fires occurred due to poor urban development, enabled by a culture of corruption. Of these, the Great San Francisco fire of 1906 and the Great Tokyo fire of 1923 were caused by a major earthquake. However, in recent years in developed nations, the impact of fires has been contained due to: i) strong building code enforcement; ii) effective land use plans; and iii) effective emergency management services.

59. The core objectives of the Project mimic the actions taken following these catastrophic events. Averted losses will be focused on the potential savings from effectively limited fire ignition and fire spread, and improving fire suppression after an earthquake. The probability of various events is estimated, as well as the expected impact of each event. A fire loss factor will be used for various scenarios of loss. This loss factor will be based on the seismic loss factor for each magnitude of event, and a fire loss factor is estimated as well. These figures will be defined during project preparation in collaboration with an international engineering firm with this expertise. In Phase 1 of the TA project, earthquake risks to Dhaka have been modeled from the earthquake scenarios. The database and analytical formulations can be extended to look at the fire risks and establish fire loss ratios. Other analytical resources can also be brought to support the fire modeling effort. Based on these figures, estimates of losses before and after the project intervention will be calculated and the averted fire losses quantified. The value of averted losses will only include affected capital and not lost lives; however, it is estimated that tens of thousands of lives would be saved in the long term as a result of an improved emergency response and preparedness system financed by the Project.

60. Economic analysis was performed to assess the rate of return of capital investments in emergency response centers and equipment. The physical investment is complemented by human capacity building in the areas of emergency response as well as fire and building code enforcement.

61. The benefit of hazard mitigation of the type proposed in the Project lies in avoiding damage and loss. Mitigation provides protection and we can calculate its benefits in the event of an actual disaster by asking the counterfactual: what would society have lost had mitigation not occurred? Broadly hazard mitigation will have the following benefits:

- Direct impacts (example: strengthening buildings will reduce the damage in an earthquake or similar events, reducing down time).
- Indirect impacts (example: less down time for production loss and reduced business disruption after an earthquake or similar events).
- Intangible impacts (example: better built structures will offer tenants a greater sense of security, just as evacuation plans and frequently checked fire extinguishers create a feeling of safety).
- Secondary impacts (these impacts could be the same as the indirect impacts, but usually work through the markets that link wholesalers with retailers and retailers with consumers).
- Human impacts (example: strengthening buildings and improved emergency response systems will reduce fatalities and injuries).

62. For the purpose of this economic analysis we do not try to measure the benefits from the additional number of lives that could be saved or the injuries that could be avoided by the Project.

63. We assume the Project will reduce the expected economic losses by at least 3 to 10 percent. The reduction of the expected economic loss will occur through the following channels: (a) direct losses to building and infrastructure will be reduced through better building code enforcement derived from capacity building and training; (b) better emergency management response will be derived from a more robust emergency management infrastructure as well as the emergency response equipment funded by the Project. This will reduce losses due to fires following an earthquake; as well as (c) economic losses due to a loss of productivity.

64. Based on the values of the assets, the state of damage (described in detail in Annex 10) and their corresponding probabilities, the expected losses were calculated for three types of losses for the various earthquake scenarios in each city: (a) expected economic losses stemming from damages to the buildings and lifeline infrastructure; (b) expected direct losses from damages to the buildings and lifeline infrastructure; and (c) expected losses due to fire following earthquakes.

65. A Monte Carlo simulation analysis was performed to account for the uncertainty in the areas of O&M, project impacts, and the future growth rates of the two cities. The simulation covers a period of 20 years using a discounting rate of 12 percent. The 20-year project life assumption is on the lower end, which leads to conservative results.

66. Overall the Project fares very well with IRR of 21.6 percent and NPV of about US\$73 million. The probability that the IRR would fall below 12 percent is zero. The possible IRR ranges of between 13.6 percent and 28.2 percent show that the rate of return on the investments is sufficiently high and satisfactory, even when values of the variables that impact benefits are at their probable lower ends.

67. ***Rationale for Public Sector Provision/Financing:*** The Project aims to make Bangladesh more resilient to recurrent and large-scale natural disasters by strengthening the

response capacity and improving construction permitting and audit processes in Dhaka and Sylhet. Public financing is crucial to strengthen the country's institutional capacities, provide the necessary equipment and resources to respond to disaster emergencies in an efficient and effective manner, and improve the enforcement of building codes and regulations.

68. ***World Bank Value Added:*** The relationship between the Bank and the GoB is strong, and the proposed Project is directly in line with the GoB's commitment to pursue an environmentally sustainable development process. At the same time the proposed operation is closely aligned with the Bank's strategic engagement with Bangladesh. The Bank's global expertise in this type of projects gives the GoB assurance that the activities being planned are comprehensive, pragmatic and will yield on-the-ground results in terms of improved disaster risk management.

B. Technical

69. A comprehensive approach to increasing urban resilience requires coordinated, long-term investment across all three pillars. The technical framework for the Project draws from the experience in urban earthquake resilience in other countries, notably the Bank's ISMEP Project. The proposed Project would serve as the first in a series (see Annex 3), which will initially focus on Pillar 1, to improve the critical capacity and infrastructure for emergency planning and response. The proposed Project will also lay the foundations for subsequent investment in Pillars 2 and 3 by identifying key risks in the built environment, and developing the practice of risk-sensitive urban development.

70. With the key elements of effective urban response in place, future attention could then shift to reversing the trend of risk accumulation, and to increasing physical resilience through broader investments in priority sectors. Under this strategy, a second project would seek to further improve construction standards for future developments and reduce the existing physical vulnerabilities in Dhaka and major cities across Bangladesh, including Sylhet. A third project could consider broader investment in priority sectors, for example water system, power system, transport, and construction of protective infrastructure.

71. There is significant consensus and demand for this investment, consolidated through the ongoing US\$1.5 million Bank / GFDRR TA program that has been ongoing for the past two years. Through this assistance, foundational outputs have been delivered, including guidebooks on elements such as hazard, vulnerability and risk assessment, legal and institutional approaches to DRM, risk-sensitive land-use planning, as well as the development of knowledge and data sharing technology and protocols. The TA program emphasizes collective problem-solving, shifting mindsets, and building consensus through multi-stakeholder thematic 'focus groups'. The Project will benefit from continued support from GFDRR-supported TA, providing just-in-time access to global expertise. Expenses relating to different donors/financing can be identified by the distinct activities under each donor/financing and separate ledgers maintained for each donor/financing.

C. Financial Management

72. The proposed financial management procedures are in line with fiduciary requirements of section 6 of OP 10.00. The PCMU, on behalf of the Planning Secretary, would be responsible for overall coordination and financial management arrangements of the Project. The PCMU is well versed in handling Bank-funded operations, including financial

management procedures. The financial management performance of ECRRP has been continuously receiving a ‘Satisfactory’ rating. A simplified financial management assessment was undertaken on the adequacy of financial management arrangements and the proposed FM arrangements were found to be acceptable. Suitable risk mitigation measures and capacity building elements have been accordingly proposed. There are no overdue audit reports or ineligible expenditures under the four IA.

73. **Financial Management Staffing:** Each PIU will hire adequate number of financial management consultants to carry out day-to-day financial management activities under the overall supervisor of the PD.

74. **Flow of Funds and Designated Account (DA):** Funds will be disbursed through four DAs to be established within each PIU for the Project in the form of Convertible Taka Special Account (CONTASA), to be opened in a branch of a commercial bank acceptable to the Bank. The bank will have adequate experience, manpower, network and authority to process transactions on a fast track basis. The approved government procedures governing the establishment of DAs shall be followed in all respects and each PIU will be responsible for their own DAs. Direct payment methods would also be allowed to process large payments to the contractors/consultants, particularly those in foreign currency to avoid exchange loss. Replenishment to DAs, and documentation of expenditures made from the DA, will be done on a monthly basis upon submission of claims along with Statement of Expenditures (SoE)/ full documentation following thresholds to be indicated in the Disbursement Letter. The ceiling on the advance to DAs will be set at four months of estimated average project expenditures.

75. **Disbursements:** Disbursements will initially be made through traditional transaction based reporting with an option to transfer to report based disbursement if the IAs can demonstrate the capacity to generate timely and accurate financial statements.

76. **Audit Arrangements:** External audits of the Project will be carried out by the Auditor General of Bangladesh. The annual audit reports will be submitted within six months of the end of the financial year and monitored in the web-based Portfolio and Risk Management (PRIMA) system. The audited financial statements will be made available for public disclosure. Internal audits of RAJUK will be carried out by its own internal audit department but other agencies will be audited by an independent audit firm on an annual basis.

D. Procurement

77. The fiduciary assessment of the Project indicates a “Substantial” risk in terms of procurement processing and procurement administration. While there are four PIUs implementing the Project, the two key agencies responsible for the bulk of implementation are DNCC and RAJUK. DNCC has limited experience in Bank-funded projects while RAJUK does not have any experience. As a result, several standard mitigation measures are being applied during both the project preparation and implementation phases. These include strengthening overall procurement capacity, enhancing measures for technical evaluations, and improving transparency in the procurement process. Detail arrangements are described in Annex 3.

78. **Procurement Plan:** The Recipient has developed the procurement plan for project implementation and has agreed with IDA on the basis of procurement methods. It will also be

available on the websites of respective PIUs and on the Bank's external website. The Procurement Plan will be updated annually, or as required, to reflect the actual project implementation needs and improvements in institutional capacity.

79. *Frequency of Procurement Supervision:* In addition to the prior review supervision to be carried out by the Bank, the capacity assessment of the PIUs has recommended semi-annual supervision missions to visit the field and carry out reviews of procurement actions.

E. Social (Including Safeguards)

80. The overall social impacts are expected to be positive. As per the project description, civil works construction under the safety and disaster management facilities and infrastructure could generate social safeguards issues. The proposed activities for assessment of vulnerability of critical and essential facilities and lifelines trigger social development issues including strategy for inclusive communication and participation. All construction is expected to be on existing or available public land without any encumbrances. However, in critical circumstances, additional private land can also be acquired and public land can be resumed from private uses causing displacement.

81. Given that the sites for physical interventions are not identified and the design will be developed during the implementation stage, the IA has developed a Social Management Framework (SMF) as a guide for social assessment, inclusive of planning and participatory management of social risks including social safeguards. The SMF has been cleared by the Bank and disclosed locally in country and at the Bank Infoshop on January 13, 2015. Bank safeguards operational policy on involuntary resettlement (OP/BP 4.12) and on indigenous peoples (OP/BP 4.10) will be complied with along with its social development considerations. The SMF will include an inclusive Grievance Redress Mechanism (GRM) to answer queries, receive suggestions and address complaints and grievances about the Project and on safeguards management issues.

82. OP/BP 4.12 Involuntary Resettlement: In the event that land acquisition or population displacement cannot be fully avoided, participatory and transparent processes would be followed in accordance with the Bank's operational policy and guidelines. However, land acquisition is not anticipated under the project. In the case that it is necessary, the National regulatory framework will be followed for documentation of transfer of government owned and donated land. Voluntary donation of land will be accepted only when the interventions are not location sensitive and the potential donor is not exposed to any threat or coercion. The SMF will be a guiding tool for social impact assessment and preparation and implementation of social management plans (SMP) or resettlement action plans (RAP), as appropriate.

83. OP/BP 4.10 Indigenous Peoples: The country's Small Ethnic Communities with indigenous language and culture are concentrated in the Chittagong Hill Tract (CHT) districts namely Rangamati, Khagrachari and Bandarban under the Chittagong Division. They are also dispersed in small proportions in the plain districts. The Small Ethnic Communities in the city of Dhaka are not living as a distinct community. However, in SCC, many of them are living in small clusters of 20 to 75 households. The project approach will be to avoid any adverse social impact on the Small Ethnic Communities but they will be covered for enhanced benefits through inclusive design, construction and operation.

F. Environment (Including Safeguards)

84. The environmental impacts are related to the infrastructure development (small scale construction/upgrading buildings to accommodate a National Coordination Center, a National Disaster Management, Research and Training Institute, Emergency Operations Centers and Control Rooms etc.) and are related to the installation of new safety equipment, handling, use and disposal of dysfunctional equipment. These impacts are likely to be short term, site-specific, non-sensitive or reversible, and in every case, mitigation measures can be designed to overcome or reduce the negative environmental impacts.

85. Considering the level of possible impact, the environment assessment (OP/BP 4.01) policy has been triggered for the proposed operation and the Project is classified as “Category B”. The Project may consider retrofitting public buildings (hospital, office, educational institution etc.) in the future. In that case environmental risk associated with the investment will be reviewed through an environmental assessment.

86. An EMF for the Project has been prepared for the current phase. The EMF highlights relevant general policies and guidelines, Environmental Code of Practice of the project design and implementation. Under Component B of the Project to support long-term building retrofitting and code, a Strategic Environment Assessment (SEA) will be developed. The SEA will give guidance on the environmental consideration of the building code.

87. PIUs will be established in each of the IAs for day-to-day execution of the project components. Each IA will appoint an environmental safeguard focal person, and the PCMU will have an Environmental Specialist with an environmental background strengthening the project execution at present and in the future. The RAJUK URU will have an Environmental Unit for the strong execution of environmental safeguard in retrofitting buildings. With the input from each PIU, the PCMU will prepare a half yearly progress report on environmental management, which it will share with the Bank for review. The EMF and SMF, documenting the mitigation measures and consultation process, have been made available for public review in English. Workshops have been organized at the local and national level to disclose the findings of the EMF. The EMF has been disclosed in the Bank Infoshop on January 15, 2015.

ANNEX 1: RESULTS FRAMEWORK AND MONITORING
Urban Resilience Project

Project Development Objective. The Project Development Objective (PDO): The objective is to strengthen the capacity of Government of Bangladesh agencies to respond to emergency events and to strengthen systems to reduce the vulnerability of future building construction to disasters in Dhaka and Sylhet										
Project Development Objective Indicators										
Indicator Name	Unit of Measure	Base line	Cumulative Target Values					Frequency	Data Source/ Methodology	Responsible for data collection
			YR1	YR2	YR3	YR4	YR 5			
Wards with decentralized emergency response services in Dhaka (DNCC/DSCC jurisdiction) ¹²	Number	0	0	0	23	45	68	Annual	DNCC, DSCC, FSCD/ Monitoring Reports	PCMU and M&E Consultants
Wards with decentralized emergency response services in Sylhet (SCC jurisdiction) ¹³	Number	0	0	0	7	14	20	Annual	SCC, FSCD/ Monitoring Reports	PCMU and M&E Consultants
Increased capacity of officials and emergency management response personnel ¹⁴	Composite Scale	N/A		Baseline	Baseline + 1	Baseline + 2	Baseline + 3	Annual	DDM/ Based on the training, exercises and drills consultant	PCMU and M&E Consultants
Systems established to reduce vulnerability of new buildings	Number	0	0	0	0	1	3	Annual	RAJUK, SCC/ Monitoring	PCMU and M&E

¹² Number of wards by 2014 jurisdiction where corresponding zonal offices are equipped with ECT kits and are at least partially within five kilometers radius of at least one emergency management warehouse or one equipped FSCD control room

¹³ Number of wards by 2014 jurisdiction within five kilometers of at least one emergency management warehouse or equipped FSCD control room

¹⁴ Annual inter-agency exercise and drills program that tests and evaluates the skills and abilities of emergency personnel on an aggregate score of 1-10. The methodology for determining the baseline will be developed by the training, exercises and drills consultant prior to program commencement.

in Dhaka and Sylhet ¹⁵									Reports	Consultants
Intermediate Results Indicators										
Indicator Name	Unit of Measure	Base line	Cumulative Target Values					Frequency	Data Source/ Methodology	Responsible for data collection
			YR 1	YR 2	YR 3	YR 4	YR 5			
Component A										
DDM facilities renovated (ERCC, NDMRTI)	Number	0	0	2	2	2	2	Annual	DDM/ Monitoring Reports	PCMU and M&E Consultants
FSCD facilities constructed and/or renovated ¹⁶	Number	0	0	10	20	29	31	Annual	FSCD/ Monitoring Reports	PCMU and M&E Consultants
DNCC/DSCC /SCC facilities constructed and/or renovated ¹⁷	Number	0	0	10	15	24	26	Annual	DNCC/ Monitoring Reports	PCMU and M&E Consultants
DDM/DNCC/ DSCC/SCC/FSCD and Satellite Control Room facilities equipped with ECT suites and/or kits ¹⁸	Number	0	0	0	25	53	57	Annual	DNCC/ Monitoring Reports	PCMU and M&E Consultants
FSCD emergency management warehouses equipped with specialized search and rescue equipment	Number	0	0	0	10	12	12	Annual	FSCD/ Monitoring Reports	PCMU and M&E Consultants

¹⁵ Systems include: Urban Resilience Unit, Electronic Construction Permitting, Professional Accreditation Program

¹⁶ Two fixed control rooms, 12 emergency management warehouses and 17 auxiliary control rooms

¹⁷ 10 emergency management warehouses, two emergency operations centers, three disaster risk management offices, 10 zonal control rooms, one urban resilience unit

¹⁸ 6 ECT suites and 51 “flyaway” communications kits

Multi-agency exercises and drills completed	Number	0	0	2	4	8	12	Annual	DDM/ Monitoring Reports	PCMU and M&E Consultants
Component B										
Identified and prioritized critical and essential facilities and lifelines for Dhaka ¹⁹	Percentage	0	0	50	100	100	100	Annual	RAJUK/ Monitoring Reports	PCMU and M&E Consultants
Vulnerability of prioritized critical and essential facilities and lifelines assessed for Dhaka	Percentage	0	0	0	25	75	100	Annual	RAJUK/ Monitoring Reports	PCMU and M&E Consultants
Component C										
E-Permits for construction issued by RAJUK ²⁰	Number	N/A	0	0	0	Baseline set	Baseline +30%	Annual	RAJUK/ Monitoring Reports	PCMU and M&E Consultants
Urban Resilience Unit facility of RAJUK constructed	Percentage	0	0	20	80	100	100	Annual	RAJUK/ Monitoring Reports	PCMU and M&E Consultants
Urban Resilience Unit facility of RAJUK equipped with laboratory and field testing equipment	Percentage	0	0	0	50	75	100	Annual	RAJUK/ Monitoring Reports	PCMU and M&E Consultants

¹⁹ Consulting firm will first identify all critical and essential facilities and lifelines for Dhaka, then prioritize a limited list to survey and assess for the following stage

²⁰ Baseline will be set one year after system is publically launched

Professional Accreditation System established	N/A	N/A	Consultation process with stakeholders completed	Research and analytical formulation completed	Accreditation board established	Platform for continued education and training to support certification established	Outreach and Educational Campaign completed	Annual	RAJUK/ Monitoring Reports	PCMU and M&E Consultants
Component D										
Monitoring Reports produced	Number	0	4	8	12	16	20	Quarterly	All IAs/ routine reporting	PCMU and M&E Consultants

ANNEX 2: DETAILED PROJECT DESCRIPTION

Urban Resilience Project

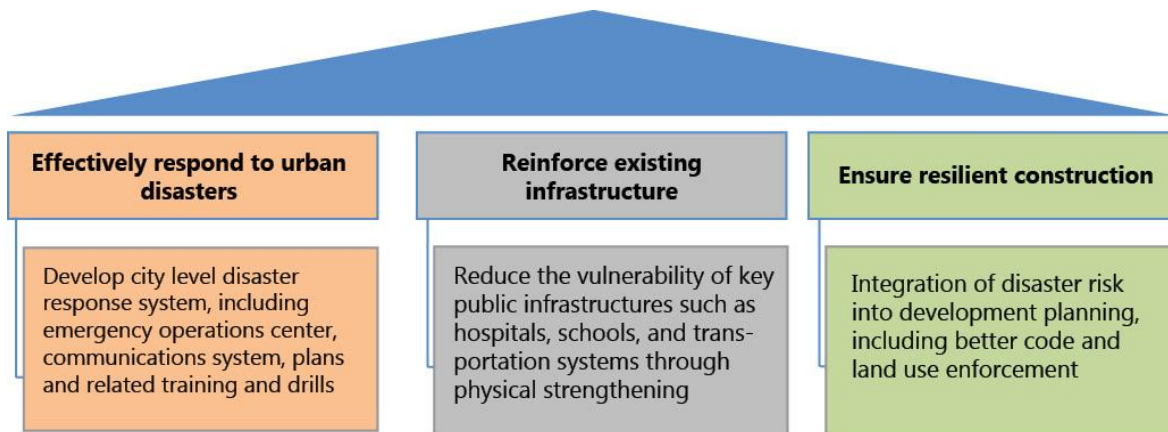
1. The Urban Resilience Project (URP) builds on a long-term Bank engagement with the Government of Bangladesh (GoB) that seeks to: (1) operationalize rules and regulations in emergency management based on the GoB's recent Standing Orders of Disaster; (2) assess the vulnerability of critical facilities and lifelines; and (3) improve the enforcement of building codes and regulations in planning and construction. Drawing on lessons from past projects in Bangladesh and the Bank's global experience in implementing complex DRM interventions, URP will serve as a new model to build capacity for emergency preparedness and response for both recurrent and large-scale events, as well as best practice in the construction industry in highly exposed, disaster-prone urban environments.

2. The Bank has been working with the GoB since 2012 in preparation for the proposed Project, which laid the foundation for a strong relationship with all the agencies involved. This collaboration has been supported by the Global Facility for Disaster Reduction and Recovery (GFDRR), which provided US\$1.5 million of grant support for Technical Assistance (ta) through the Bangladesh Urban Earthquake Resilience Program (BUERP). In order to ensure strong collaboration efforts throughout project implementation, URP will also leverage the already established and well-functioning Project Coordination and Monitoring Unit (PCMU) of the Bank-supported multi-ministerial Emergency Cyclone Recovery and Restoration Project (ECRRP).

3. This Project is part of a longer-term engagement process that includes a series of investments designed to fully equip the GoB for emergency response and construction. URP will be fundamental in providing necessary emergency management resources, decentralizing emergency response capacity, clarifying roles and responsibilities within the GoB, and building a network of trust to gradually develop a solid emergency response and safe construction system.

4. City-level actors are critical to the effort to develop resilient and livable cities in Bangladesh. This Project seeks to create an enabling environment for centrally coordinated and locally managed Disaster Risk Management (DRM). There are three core pillars of disaster resilience in urban settings, as described in Figure A2.1 below, including: i) effective emergency management; ii) improving structural resilience through reduction of existing physical vulnerability; and iii) risk-sensitive land use planning and safe construction standards and practices to ensure sustainable growth.

Figure A2.1. The Three Pillars of Urban Disaster Resilience



5. A comprehensive approach to increase urban resilience requires coordinated long-term investment across the three pillars. The Urban Resilience Project (URP) would serve as the first in a series of investments, which will initially focus on Pillar 1, to improve the critical capacity and infrastructure for emergency planning and response. The proposed Project will also lay the foundations for subsequent investments in Pillars 2 and 3 by identifying key risks in the to-be built environment and developing the practice of risk-sensitive urban development.

6. With the key elements of effective urban response in place, future attention could then shift to reversing the trend of risk accumulation, and to increasing physical resilience through broader investments in priority sectors. Under this strategy, a subsequent second project would seek to further improve construction standards for future developments and reduce the existing physical vulnerabilities in Dhaka and major cities across Bangladesh. A third project could consider broader investment in priority sectors, for example critical facilities, water systems, power systems, transport, and construction of protective infrastructure.

7. The first URP investment consists of four main components that focus on: (1) improving emergency response and preparedness capabilities; (2) establishing an understanding of risk for critical facilities and essential facilities; (3) supporting improvements in urban development and construction; and (4) providing the institutional arrangements for implementation, monitoring and evaluation to ensure efficiency, transparency, and accountability in the implementation of project activities. A common element across the four main components is the systematic collection, maintenance, updating, and sharing of critical data and information required for improving emergency management as well as the planning of urban disaster resilience programs. The project components are described in detail below.

Component A: Reinforcing the Country’s Emergency Management Response Capacity – US\$110 MILLION

8. Within the framework of DRM, Component A will increase emergency management capacity at the national and local levels in Bangladesh. This is a priority in the country, as response to past urban events has been disorganized and inefficient.

9. The overall goal is to design and operationalize an integrated emergency management system in Bangladesh that will enable the country to plan and respond to both everyday

emergencies as well as major disasters at a local or national level in an organized and effective manner based on clear, assigned roles and responsibilities. The system will be guided by international standards and principles of emergency management²¹ and in conformity with national laws and guidelines incorporated in the Disaster Management Act of 2012 and Standing Orders on Disaster (SOD) 2010. For this purpose, the Project will: (1) set up emergency operations centers (EOCs) and other response facilities to international standards; (2) outfit them with modern interoperable emergency communication systems and response equipment; and (3) support the proposed emergency management system with a robust and sustained capacity development program that establishes and trains a cadre of emergency management professionals for Bangladesh that are on par with their international peers.

10. Following an assessment of the current government capabilities for response and planning, a significant gap must be addressed for Bangladesh to reach international standards in emergency management. Bangladesh does not have local level infrastructure for emergency/disaster management. Local authorities, such as the Dhaka North City Corporation (DNCC), Dhaka South City Corporation (DSCC), Sylhet City Corporation (SCC), and other local institutions lack the basic minimum facilities, equipment, processes, competencies, and training in urban emergency management. Consequently, these institutions' significant resources and knowledge base cannot be mobilized in case of a major event. While the country has built capacity by managing coastal flooding and cyclone disasters through repeated response experience and has support systems in place through local non-profit organizations (NGOs) and government institutions under the ongoing Cyclone Preparedness Program, the current set up is not sufficient to manage catastrophic events such as earthquakes in complex urban areas like Dhaka City. Since Dhaka is the seat for the national government, urban earthquake response in Dhaka is complicated by the fact that at least three levels of political jurisdictions are physically impacted by the earthquake, making it very difficult to respond in a coordinated manner. Further, the vulnerability of the current overall infrastructure is a major concern and can potentially impede the response.

11. The current emergency response system is organized using the multiple committee approach, and the international Command and Control (or Direction and Control) system specified in the SOD is not operational. According to the SOD, there are at least 11 designated committees related to disaster management – some of these committees have been formed while others remain on paper only. For example, the Dhaka City Disaster Management Committee and the Dhaka City Disaster Response Group have not convened since the passage of the Disaster Management Act of 2012. Furthermore, there is no evidence of linkages between the designated committees and the response operations. Current government guidelines such as the SOD, national and local level contingency plans indicate the tasks and activities but do not specify how these are to be implemented. As a result, the current emergency management system does not provide a Common Operating Picture (COP) to effectively coordinate and manage a large-scale urban disaster response, such as a major earthquake that can cause widespread damage.

12. At the national level, response coordination is assumed by the National Disaster Response Coordination Center (NDRCC). The NDRCC lacks modern communication equipment, operational facilities, and other resources to be capable of coordinating large-scale disaster response. It is also not undertaking emergency management planning in accordance with international standards for a national center.

²¹ c/o FB

13. The Fire Services and Civil Defense (FSCD) organization has demonstrated capacity for emergency response and is currently the most prepared civilian agency. FSCD should be reinforced with further investments in critical infrastructure, specialized response equipment, Emergency Management and Communications Technology (ECT) and training that will help FSCD carry out its first-responder functions more effectively.

14. The identified gaps into the country's emergency management system include: a) the lack of capacity at the local level, principally at the level of the City Corporations; b) the lack of an effective system of coordination between the various levels of response agencies at the national, local, and site levels; c) the lack of uniform training, standards and reporting protocols among all those in charge of response planning and execution; d) the absence of modern facilities, in particular EOCs, control rooms, fixed and mobile command centers with appropriate ECT equipment and protocols; and e) comprehensive schedule of drills and exercises among all relevant response agencies.

15. In view of the above summarized gap analysis for emergency management practices compliant with national laws and international standards, Component A will support the following activities of the URP:

- Renovate and outfit national-level DRM facilities. This component will focus on renovating and outfitting the Emergency Response and Communication Center (ERCC) and the National Disaster Management Research and Training Institute (NDMRTI). (Component A1)
- Build, renovate and outfit local-level City Corporation and FSCD DRM facilities in Dhaka and Sylhet. FSCD will be reinforced with further investments in critical infrastructure that will help the agency carry out its first-responder functions more effectively. This will include the construction of: (1) distributed warehouses to house emergency response assets for its facilities in Dhaka and Sylhet; and (2) fixed and mobile emergency command and control rooms in Dhaka and Sylhet. This component will also help build the DRM and emergency response capability of the DCCs, North and South, including the establishment of one fully operating EOC for Dhaka City as well as Satellite Control Rooms stationed at institutions that are members of the Dhaka City Disaster Response Coordinating Group and the zone-level administrative unit of DCCs. In Sylhet, it will build the DRM and emergency response capability of the SCC with the establishment of a fully operating EOC and an Urban Resilience Unit (URU). (Component A2)
- Supply, install and integrate specialized ECT equipment for DRM and emergency response within the national-level and local-level agencies. The objective is to procure, install, test, and operationalize all the emergency communications and other related ECT equipment to establish an integrated emergency management communication system that provides interoperability between key Government of Bangladesh (GoB) response organizations, major utilities and other agencies involved in response. This ensures the ability to provide a mechanism for real-time communication and conduct command and control between all of these organizations involved in early response. (Component A3)
- Supply specialized search and rescue equipment to local-level agencies involved in DRM. Reinforce FSCD organizational structure to achieve international standards

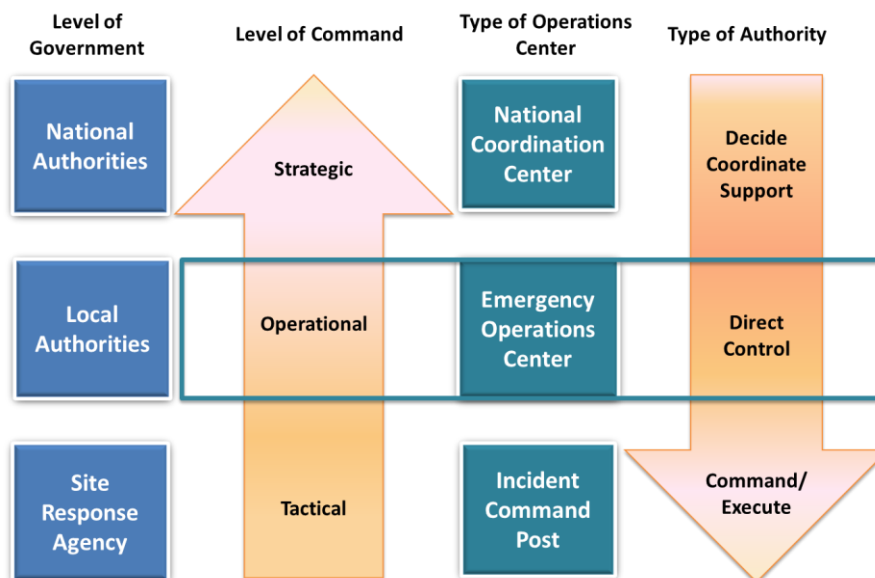
such as certification from the International Association of Emergency Managers (IAEM) and the Emergency Management Accreditation Program (EMAP). (Component A4)

- Provide Training, Exercises and Drills (TED) to national-level and local-level agencies involved in DRM. (Component A5)

16. The ERCC, EOCs, command and control centers and Satellite Control Rooms will be equipped with ECT systems capable of enabling voice and data under extreme conditions; this will enable all those involved in responding to an emergency event to keep communication up at critical times. The interoperability of the different levels of response (i.e., national-to-local-to-field/site) will enable the development of a COP during emergencies to support real-time decision making, and allow an effective mobilization and allocation of resources during the response.

17. Component A aims to achieve a national emergency operations system where role, responsibilities, resources and decision-making are optimized. This structure is represented schematically in Figure A2.2 below. It depicts horizontally, from left to right, the emergency management organizational system for levels of government, command, type of operations, and type of authority that would occur simultaneously during a major earthquake scenario for Dhaka or Sylhet. Communications capabilities are required vertically to link each level of government, achieve a vertical level of command and vertical coordination between operations centers and types of authorities to avoid confusion.

Figure A2.2. Schematic of the Proposed Integrated Emergency Management System Requiring Vertical Communications Capabilities



18. The city-level emergency response operations is represented by the horizontal, rectangular box across the middle of the diagram – local authorities perform operational commands through the EOC, which enables direct control of the emergency response. The Integrated Emergency Management System proposed for Bangladesh is comprised of management nodes at different levels of governance (column 1 from left), requiring communications links between the site response agencies at the Incident Command Posts

(ICPs) with authorities located at the City EOCs (columns 1 and 3). The City EOCs require communications to the national authorities at the ERCC (columns 1 and 3). This communications capability allows for the required vertical levels of command (column 2), from tactical at the site of the emergency and operational at the City EOC to strategic at the national level. These required vertical communications linkages also allow for an integrated response at all levels of government authority, as depicted in column 4.

19. To effectively plan and prepare for response to disaster events, emergency managers need to have access to robust and accurate data. Scenario analysis provides valuable input to emergency managers on potential impacts of various events such as number of casualties, number of displaced people, emergency shelter needs, demand on critical facilities such as healthcare, and disruptions in lifeline networks (roads, pipelines, electricity and water supply). Based on this information, narrative scenarios, as well as simulation and visualization tools can be developed to more effectively assess response, relief and recovery needs. Furthermore, sharing data and creating open systems promote transparency, accountability, and ensure that a wide range of actors are able to participate in the challenge of building resilience. The URP funding will support DDM's ERCC, FSCD, City Corporations and other associated response agencies to use and contribute to the Geospatial Open Data Sharing (GEODASH) Platform developed and maintained by the Ministry of Information and Communications Technology (MICT) under a separate Technical Assistance (TA) funding from the Bank. The URP will provide funding for capturing and updating verifiable inventories of emergency response resources and facilities, as well as accurate contingency databases (e.g. location and suitability of planned emergency shelter sites) for use by EOC personnel. The funding will also include development and training for the use of dynamic IT platforms to capture post-disaster decisions, interactions and changes over time.

Component A1: Renovate and Outfit National-Level DRM Facilities

20. Under component A1, the URP will renovate and outfit two critical national-level facilities of the country's emergency management system: a new, dedicated facility that will house both the ERCC and the NDMRTI. The ERCC will build from the NDRCC, while the NDMRTI has been recently appointed. The Project will advise on the minimum core human resources required to operationalize this national facility. The Ministry of Disaster Management and Relief (MoDMR)/Department of Disaster Management (DDM) will manage both the center and the institute, housed in one facility, once they are fully established.

21. Currently, there is a NDRCC at the level of the MoDMR. The NDRCC has limited emergency communication equipment, necessary basic data management, data display, adequate furniture or physical space and layout to be functional. In this project, the NDRCC will be upgraded to the Emergency Response and Communication Center (ERCC), which be established in DDM. This facility will be equipped with emergency management and communication technology. The country has recently established the NDMRTI, which is mandated under the Disaster Management Act 2012. Quoting section 12 of the Disaster Management Act, "Establishment of National Disaster Management Research and Training Institute. – (1) To fulfill the objectives of this Act, the Government, if necessary, may establish a 'National Disaster Management Research and Training Institute' to take relevant programs including research on the effects of disaster and climate change and increasing capability of disaster management method. (2) Functions and method of conducting including

other relevant issues of the institution established under clause (1) would be determined by the rules.”

22. Component A1 funding includes: i) renovation of the ERCC and NDMRTI; and ii) outfit of the ERCC and NDMRTI with basic office equipment. Outfit of specialized ECT equipment for both facilities will be implemented in component A3. The ERCC and NDMRTI will be located in the building currently housing DDM, to which three additional floors will be added. The actual construction of this one facility is ongoing and being financed by the MoDMR, with funds outside of this Project. Funds are available for this construction and the tender process for the construction is ongoing within DDM. The building will be analyzed for vulnerability to extreme hazard events. Any deficiencies will be corrected. The facility will also have redundant lifeline systems (water, power, wastewater, food supply, etc.) to operate independently for a period up to seven days.

23. The ERCC is conceived as a facility to assume the operational requirements of the National Disaster Management Coordination Committee (NDMCC), and the National Disaster Response Coordination Group (NDRCG) as specified into Disaster Management Act of 2012 and the SOD 2010 and in conformity with international standards. Its space and functional specifications will be prescribed to enable effective operations of both entities (i.e., NDMCC and NDRCG) during a disaster event. In addition, it should provide capabilities for its permanent staff to undertake their defined job requirements, such as event tracking, database development, and drills preparations. The ERCC operates under the premise of one emergency response operation that integrates response from the national level to the local level to site level, optimizing all national resources including the relevant sectors of civil society.

24. The role of the ERCC will be to provide national situational awareness in the event of a major disaster. The ERCC is distinguished herein from the city-level EOCs to also be a funded activity. The ERCC functions similarly to an EOC except it is the national center for coordination of resources to support subordinate EOCs make decisions and establish policies. In particular, the ERCC’s functions include the following:

- *Pre-Disaster*: Serve as the secretariat to the NDMCC, NDRCG and other similar national disaster management committees. Support the development, understanding and implementation of the regulatory framework, including national policies, rules, guidance documents, damage collection and reporting requirements for DRM and emergency management programs that will be executed before and during major disasters. Establish, execute, and monitor a pre-disaster planning process for both national and local institutions to engage in pre-disaster planning.
- *During Disaster*: Serve as a central facility for the national government to gain and maintain situational awareness of any significant disaster, including alerts and warnings, and develop a COP in order for NDRCG members to make critical decisions on the appropriate prioritization of available resources. Lead national level coordination between response agencies of the NDRCG in order to meet the resource requirements of the subordinate EOCs and Incident Commanders for any major disaster in the country that requires national-level personnel and assets. The ERCC may service multiple, on-going, simultaneous disasters within the country.
- *Post Disaster*: Serve as a facility to coordinate national-level recovery efforts as

well as conduct *after action reviews* to adapt, modify and change legal and institutional arrangements, policies, plans, Standard Operating Procedures (SOP) and processes in order to improve preparedness, DRM, and response missions.

25. The NDMRTI will serve as the support facility to the ERCC by undertaking a program for well-coordinated emergency response planning to help the country achieve international standards for emergency management. Furthermore, the institute will conduct training, educational and awareness activities. The NDRMTI assumes an important role in disaster preparedness and in guiding the country towards disaster mitigation and urban resilience.

26. Once constructed and outfitted, the NDMTRI will provide a number of key training opportunities: a) assessment and awareness of hazards and risks; b) modern DRM strategies and emergency management systems; c) DRM and emergency management specific job function and Incident Command System; and d) International Search and Rescue Advisory Group (INSARAG) entry to advanced training and certification. The INSARAG component will be operated and managed by members of FSCD.

Component A2: Build, Renovate and Outfit Local-Level City Corporation and FSCD DRM Facilities

27. Currently, the most prepared civilian agency is the FSCD. Due to its important mission as well as its limited facilities, equipment, and training, this organization overcomes tremendous challenges and obstacles on a daily basis to provide essential life-saving services. From site visits and direct consultations during field investigations, FSCD is limited in capacity and must be enhanced to provide required life rescue and fire suppression equipment and capabilities.

- a) Three key types of facilities will be built or renovated and equipped with basic operational equipment under component A2 to capitalize on the institutional success of FSCD. These are:
- Construct and equip two (2) FSCD Fixed Control Rooms, one located in Dhaka and one in Sylhet;
 - Renovate and equip seventeen (17) Auxiliary Control Rooms for priority (Alpha) fire stations;
 - Construct and equip twelve (12) new Emergency Management Warehouses within FSCD grounds, 10 located in Dhaka and two in Sylhet;

28. For FSCD, the Control Rooms are the command and control brain centers that will provide situational awareness, facilitate communication with other agencies and manage the deployment of their resources for emergency situations. The current operational fire control system is very limited in capacity, including an inadequate and vulnerable communications system. The Control Rooms will be outfitted with specialized ECT equipment that will be interoperable and resilient, provided under Component A3.

29. The operational capacity of FSCD will be further augmented in a distributed manner throughout Dhaka by renovating 17 existing Auxiliary Control Rooms located at specified Alpha fire stations within the city, which will also be outfitted with specialized ECT

equipment under Component A3. In addition, 12 FSCD Emergency Management Warehouses will be built under Component A2 to increase the effectiveness of emergency response at the local level. This intervention will focus on increasing the capacity related to FSCD Urban Search and Rescue (USAR) and HAZMAT Tenders/Trucks, as well as to augment required missing basic equipment to meet life-safety standards for rescue workers. The warehouses will house essential emergency management equipment located in close proximity to critical transportation nodes and key hotspot areas within Dhaka. The actual equipment to be housed in the warehouses will be provided under Component A4.

30. Local authorities, such as DNCC, DSCC and SCC play a critical role in such a decentralized system as they provide the link between decision making and coordination at the national level, and the tactical operations of the response agencies on-site. They have significant resources and knowledge that must be mobilized for effective DRM and emergency response. The DRM Offices of Dhaka and Sylhet will thus serve as the Secretariats for their respective City Disaster Management Committees and City Disaster Response Coordination Groups. They will prepare annual plans and budgets to support DRM activities and coordination with other agencies and relevant stakeholders.

31. The local authorities will also help promote the mainstreaming of DRM within the city's mandate and governance system. They will undertake the necessary risk assessment studies, maintain databases of human resources, equipment, directories, and location of critical infrastructures and support advocacy, policy, and the adoption of legal instruments (e.g. local ordinances) aimed at DRM. In addition, local authorities will execute the core function of training and capacity building, vulnerability reduction, information-education-communication as part of these preparedness activities, and coordinate all the city's activities related to DRM. To assess progress achieved, they will also undertake monitoring and evaluation (M&E) activities to measure and report on progress made by their respective city in their preparedness and mitigation activities. Some of the main activities of the DRM Offices can be summarized as follows:

- *Pre-Disaster*: Utilize agency personnel to develop city-level DRM strategies, emergency operations plans and policies that will help operationalize local city response as described in the current law. Compile, update, maintain and share systematic databases on hazard, vulnerability and risk assessment (HVRA) used for emergency response planning and DRM on the GEODASH platform developed and maintained by the MICT. Educate local-city level agencies and the community on emergency management policies and best practices. Undertake emergency management planning and training.
- *During Disaster*: Gain and maintain situational awareness of the disaster, and develop a local city level COP in order for the mayor to: (1) make critical decisions on the appropriate prioritization of resources; (2) handle coordination between response agencies; and (3) meet the resource requirements of the Incident Commander in the field managing an emergency response operation.
- *Post Disaster*: Lead city-level recovery efforts as well as conduct *after action reviews* to adapt, modify and change legal and institutional arrangements, policies, plans, SOP and processes in order to improve preparedness, DRM, and response missions.

32. Five key types of facilities will be built or renovated and equipped with basic

operational equipment under Component A2 to capitalize on the institutional success of DNCC, DSCC and SCC. These are:

- Separate DRM Offices for DNCC, DSCC, and SCC;
- Build two (2) fully operational EOC, one for DSCC and one for SCC;
- Build individual Satellite Control Rooms for twelve (12) DCC agencies, namely DCCs, RAJUK, Deputy Commissioner, Police Commissioner, Ansar & VDP, Dhaka Water Supply & Sewerage Authority (WASA), Bangladesh Telecommunications Company Limited (BTCL), Directorate General of Health Service (DGHS), TITAS GAS, Anjuman E Mafidul Islam, Red Crescent Society, DESCO;
- Outfit ten (10) Zonal Control Rooms, one for each of the DCCs zonal offices;
- Establish one (1) URU for SCC.

33. The DRM Offices should have the appropriate staffing and budget to undertake the above activities. Typically it will include the head of the DRM Office, and Deputy and Division heads for Planning and Research, Administration and Finance, Training, and Operations.

34. Incorporated into the facilities for the DSCC and SCC DRM Offices is the appropriate space to accommodate a state-of-the-art EOC as the foundation for establishing successful emergency management systems for Dhaka and Sylhet. International standards have expanded EOCs' roles from simple call and dispatch centers to central locations for key decision makers to analyze disaster information, develop a COP, and determine resource allocation during an emergency. The EOC provides a central location from which the Government at any level can conduct interagency coordination and executive decision making in support of the incident response. The EOC provides the primary emergency management node for disaster response.

35. International standards acknowledge that disaster responders must mobilize resources at all levels of government. It is recognized that local level responders are more familiar with their jurisdiction and have existing institutional relationships. In addition, in a countrywide disaster, the national level response apparatus may be physically and systemically incapable of handling every decision and directive at the local level. The decision making must be decentralized and ordered. Interoperable communications is the key to this decision making process and city-level EOCs facilitate this important procedure.

36. Initially, DNCC and DSCC will share a single EOC located in DSCC. The reason is that DNCC is currently located in a small house with no space or land available to accommodate an EOC. From discussion with government authorities, the acquisition of land and construction of facilities could be a long-term endeavor and is not expected under this project. DSCC has an open space in its existing building that can be used immediately. Further, both DNCC and DSCC have no emergency management training or personnel at the moment. Thus, time will be needed to build capacity and operationalize an emergency management practice within these institutions.

37. Within Dhaka, two additional groups of responders will be outfitted with small but important disaster control centers. First, up to 12 DCC agencies engaged in the Dhaka City Disaster Management Response Group will be outfitted with Satellite Disaster Control Rooms. The agencies are DCCs, RAJUK, Deputy Commissioner, Police Commissioner, Ansar & VDP, Dhaka WASA, BTCL, DGHS., TITAS GAS, Anjuman E Mafidul Islam, Red Crescent Society, and DESCO. These city agencies/department Control Rooms will enhance

the emergency support function capabilities and responsibilities of the city departments and resources. Second, since DCC has decentralized some of its functions into 10 zones, these zones will also be outfitted with Control Rooms. The purpose of this strategy is to further extend the emergency management system into the community in order to mainstream the system throughout Dhaka.

38. Finally, SCC does not have a Planning Department. At the same time, the city is expanding rapidly and significant urban renovation activity is expected to modernize the city to adapt it to the expected growth. It is thus critical that development planning and urban renovation be risk-sensitive. Thus, an URU will be established within SCC, which will undertake urban development functions fully integrated with HVRA, risk-sensitive land use planning, building code and other development control enforcement provisions, as well as work with the DRM Office and other relevant institutions and stakeholders to plan, develop, and implement risk reduction programs within SCC. The URU will also be in charge of the training of construction professionals to improve the overall construction standards and construction monitoring within Sylhet.

Component A3: Supply, Install and Integrate Specialized ECT Equipment for DRM and Emergency Response within the National-Level and Local-Level Agencies

39. The objective of Component A3 is to procure, install, test, operationalize all the emergency communications and other related ECT equipment to establish an integrated emergency management communication system that provides interoperability between key GoB response organizations, including FSCD, DDM, MoDMR, Office of the Deputy Commissioner, National Police, DNCC, DSCC, SCC, major utilities and other agencies involved in response. This ensures the ability to provide a mechanism for real-time communication and conduct command and control between all of these organizations involved in early response.

40. Of note is that although we will strive to provide interoperable communications with police and armed forces organizations, this Project will not provide funding for any equipment, personnel, training or exercises for them. The intent of this Project is only to fund ECT for FSCD, DNCC, DSCC, SCC, ERCC and NDMRTI.

41. The ECT equipment will include the following:

- Five (5) full ECT Suites will be installed, tested, and operationalized at the ERCC facility, FSCD Control Room Dhaka, FSCD Control Room Sylhet, DSCC EOC and SCC EOC;
- One (1) Training Mini-ECT Suite will be installed, tested and operationalized at the NDMRTI facility;
- “Flyaway” Communication kits:
 - Seventeen (17) “Flyaway” Communication kits will be installed, tested and operationalized at the Alpha fire stations in Dhaka
 - Twelve (12) “Flyaway” Communication kits will be installed, tested and operationalized at the thirteen agencies members of the Dhaka Disaster Management Coordination Committee
 - Ten (10) “Flyaway” Communication kits will be installed, tested and operationalized at the ten zonal offices under the DCC agencies
 - Twelve (12) "Flyaway" Communications Suites for Sylhet Disaster

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- Supply and operationalize Mobile Command and Control Centers for ERCC, FSCD Dhaka, FSCD Sylhet, and DSCC
- Six (6) Emergency Management Information and Data System (EMIDS) will be installed, tested and operationalized at the ERCC, NDMRTI, FSCD Control Room Dhaka, FSCD Control Room Sylhet, DSCC EOC, and SCC EOC;
- Geographical Information System (GIS) consisting of software and hardware will be installed, tested and operationalized at the NDMRTI, FSCD Control Room Dhaka, FSCD Control Room Sylhet, DNCC DRM Office, DSCC DRM Office, and SCC DRM Office.

42. Firstly, the proposed ECT equipment should enable effective operations of all entities (i.e.: NDMCC, NDRG, FSCD, Dhaka and Sylhet Disaster Management Coordination Committee, and all satellite agencies as well as field command centers and posts) during a disaster event. The Mini-ECT at the NDMRTI will be primarily used for training but could also augment the national capabilities in case of a major disaster.

43. The second ECT requirement is to address the very real likelihood that the normal telecommunications infrastructure is rendered completely inoperable due to a disaster event (e. g.: no land lines, cellular service, push-to-talk radio systems, wired or wireless broadband Internet). In such a case, the Project requires the deployment of Hastily Formed Networks (HFNs) in the form of mobile/portable facilities and communication capabilities. This includes the purchase of ten (10) large SUV integrated Command Vehicles and a defined quantity of medium and small hardened suitcases or man-pack based Flyaway kits consisting of ECT equipment and capabilities that are strategically placed around the region. These mobile/portable resources would be used to quickly and temporarily set up and deploy resources at disaster ICPs in an environment where the normal ECT infrastructure is completely destroyed. The ICPs will be able to fully integrate with local early responders as well as with the above fixed EOC and Control Room ECT infrastructure.

44. The required ECT equipment components that will be acquired include High Frequency (HF)/Ultra High Frequency (UHF)/Very High Frequency (VHF) radios, robust cell phone, satellite phone and smart phone devices (for voice communications); VSAT and Broadband Global Area Network (BGAN) devices (for satellite broadband Internet access) at the EOC, Control Rooms and in the mobile/portable expeditionary configuration levels; Meshed WiFi (to create broadband “clouds” of Internet access); WiMAX point-to-multipoint-wireless-bridging technologies; and the required grid, generator or alternate energy solutions to power all of the ECT infrastructure outlined above. Some of these technologies require monthly/annual service to operate (the cell phones, satellite phones, VSAT and BGAN broadband satellite capabilities).

45. The EMIDS system will have the capability to integrate and display hazards, damage, traffic, and GIS data. EMIDS is an interactive database with the capability to monitor and display real-time, information feeds from external data providers for use in situation assessment and analysis. It can also serve as a log for the Incident Command System to keep detailed information about reports from the field and whereabouts of particular individuals or equipment.

46. The GIS technology (software and hardware) will enable database development, database management and spatial mapping. This is critical in disaster management. It will

also have the capability for connecting with spatial mapping applications on the Internet, such as Google Earth and OpenStreet, and will be used to operate GEODASH.

47. Finally, the human resources necessary to secure, track, operate, and maintain this entire ECT infrastructure will be required. These resources include the hiring, training and field exercising of the personnel who will acquire, operate and maintain these ECT resources, including permanently assigned ECT fixed and mobile/portable infrastructure managers and operators. Full-time permanent personnel will be responsible for operating and maintaining the HFN Flyaway kit suites, the mobile command vehicles as well as the mobile/portable equipment.

48. These full time permanent personnel will also be required to provide ongoing training and certification for these systems. Operationalizing all the above equipment shall be achieved through three levels of training: 1) Regular User, 2) Advanced User, and 3) Administrator. Training should include basic trouble-shooting and repairs. Services will include licensing, maintenance and upgrades of specialized ECT equipment.

Component A4: Supply Specialized Search and Rescue Equipment to Local-Level Agencies Involved in DRM

49. Component A4 will focus on supplying and operationalizing firefighting, hazardous materials handling, and search and rescue equipment within FSCD, DNCC and DSCC. The construction of warehouses, as well as the procurement of critical rescue and fire-fighting equipment will increase DRM and emergency response capacity at the local level. This particular component will focus on increasing the capacity related to FSCD USAR and HAZMAT tenders/trucks, and augment required missing basic equipment to meet life-safety standards for rescue workers. By housing essential emergency management equipment in close proximity to critical transportation nodes and key hotspot areas, these warehouses and inventories of equipment and supplies will further provide Dhaka with a distributed response system.

50. The package of goods and associated services related to the maintenance of these goods to be purchased will consist of twelve (12) sets of firefighting, hazardous materials handling, rescue and other specialized equipment, which will be stored in the distributed Emergency Management Warehouses. These warehouses will be constructed within the grounds of selected FSCD Alpha Fire Stations.

51. The search and rescue equipment should be based on two fully equipped USAR teams. A USAR response consists of highly trained, multi-agency specialists responsible for their own safety. They operate within a defined structure as a specialized resource working under normal city or province emergency management arrangements. An effective USAR response requires personnel from different disciplines to train and work together for maximum efficiency. An integrated response system is also required. This involves highly specialized equipment, effective communications, logistical support and an established internal command and control system.

Component A5: Provide Training, Exercises and Drills (TED) to National-Level and Local-level Agencies Involved in DRM

52. The tasks under this assignment require the development, evaluation, implementation, review and improvement of a comprehensive multi-agency program of TED to improve emergency response capabilities, preparedness and readiness of government institutions and other key stakeholders involved in disaster and emergency management response (utilities, service providers, media, private sector and civil society organizations). This is an in-depth, long-term and fundamental educational competency, capacity building and awareness program, which in the long run will provide Bangladesh with a confidence and pertinence in managing disaster risk and building urban resilience. The lead agency for the program is FSCD. However, the program is to be coordinated and implemented collaboratively with the NDMTRI, DNCC, DSCC, and SCC. Certain components will be specific to particular agencies as specified below. The program will be designed and implemented over five years with the last year devoted to evaluation, improvement and formulation of a final set of TED activities to be carried out for a decade or longer by the related agencies.

53. Component A5 will also utilize funding for staff development, curriculum development, and curriculum delivery of the NDRMTI. The Disaster Management Act of 2012 and the Revised SOD 2010 require the development of a series of identified guideline documents on disaster management. It must be noted that the country has developed a large-scale volunteer training program. By following international standards to develop response guidelines, the country can develop a corps of certified emergency managers under the certification program supported by IAEM, the international non-profit organization of emergency management professionals.

54. National institutions can also be accredited under EMAP standards. EMAP is an independent non-profit organization that fosters excellence and accountability in emergency management. To achieve this mission, EMAP establishes credible disaster and emergency management standards that are then applied in a peer reviewed voluntary accreditation process. The American National Standard Institute recognizes EMAP as a Standard Developing Organization.

55. Recognized for being rigorous, robust and scalable, the standard created by EMAP is known as the Emergency Management Standard. The Standard is flexible in design so that programs of differing sizes, populations, risks, and resources can use it as a blueprint for improvement and attain compliance. It was collaboratively developed in a series of working groups of emergency management stakeholders from government, business and other sectors, and continues to evolve to represent the best in disaster and emergency management. EMAP's Emergency Management Standard is the only disaster and emergency management standard endorsed by the IAEM.

56. Accreditation of a jurisdiction's emergency management program is undertaken by way of a five-step, quantitative approach completed by EMAP certified assessors. The approach is both objective and cooperative, ensuring that the process is completed with the jurisdiction rather than for the jurisdiction.

The scope of work consists of the following tasks:

- 1) Undertake an in-depth capacity needs assessment, strengths-weaknesses-opportunities-challenges analysis and situational analysis of the TED requirements to improve urban emergency/disaster preparedness, planning, awareness and management using various scenarios such as a major earthquake in Dhaka or Sylhet,

and a major flood in Dhaka. Complete the situational analysis for each of the five institutions concerned by this contract, putting the findings and recommendations in the context of the country as a whole.

- 2) In view of the above study, define the particular TED requirements as well as a collaborative program for each of the five institutions. In general the assessment should include specific targets to reach particular international standards on emergency management as indicated above. In addition to the guidance and criteria of the international standards, the particular conditions are as follows:
 - i. Assess the requirements relative to the mandate of the NDMTRI as indicated in the Disaster Management Act of 2012, the SOD 2010 and direct consultations with government officials from the MoDMR and DDM.
 - ii. Assess the requirements relative to the mandate of FSCD to acquire qualifications for INSARAG.
 - iii. Assess the requirements relative to the mandate of DNCC, DSCC, and SCC for building competency of the DRM Offices and EOCs.
- 3) Based on Task 1 and Task 2 findings, design a comprehensive TED Program with the minimum requirements:
 - i. Use the NDMTRI to build the capacity of national institutions in DRM and emergency management. Training on Emergency Communication Technology, Incident Command System and Fundamentals of Emergency Management are considered mandatory in the curriculum.
 - ii. Acquire FSCD INSARAG qualifications, reach optimum use of Communication Equipment, and obtain special firefighting skills.
 - iii. Trainings on the EOC, Emergency Support Functions, and ECT for personnel in charge of response planning and operations at the DCCs and SCC.
 - iv. Capacity building for the DRM Offices of DNCC, DSCC and SCC, and the Sylhet URU, including training on HVRA. Rapid assessment of the seismic vulnerability of buildings.
 - v. Multi-institutional exercises and drills, including simulations, table top exercises for at least three major event scenarios (earthquake, flood and pandemic), and at least one large scale Dhaka-level drill based on the occurrence of a major earthquake on the Madhapur Fault where all agencies, the NDMCC and the Dhaka Disaster Management Coordination Committee are involved at the Dhaka level. This last drill is expected to take place on year 4 of the program.
 - vi. Training related to search and rescue equipment, including technical training on: (1) contingency planning, (2) firefighting, (3) search and rescue; (4) hazardous materials handling; (5) emergency communications; (6) disaster assistance and rescue; (7) international certification standards; (8) HVRA; and (9) DRM thematic areas.
- 4) All training courses and methods should be independently peer reviewed and tested under a rigorous quality control program that is developed as part of this contract. A coordination process between the concerned agencies should be designed to ensure the sharing of data and knowledge and effective use of the program.
- 5) The development of the training program should be completed at the end of year 2. Years 3 and 4 should be fully dedicated to capacity building program and the

preparation of the exercises and drills. Each of the training modules should be given at least once. The curriculum can be based on other existing courses that are available either on a partnership or on a sub-contract basis.

- 6) An M&E team with an objective monitoring approach should be set up as part of the program. Each delivery should be evaluated and the results assessed to improve all aspects of the course, including delivery methods, pedagogy, content, knowledge checks, tests and reports. The findings will serve to improve the whole TED program.
- 7) Year 5 of the program will be devoted to review and update the entire TED program including its curriculum, delivery method, pedagogy, content and schedule. At the end of Year 5, it is expected that the TED program will be in place, operationalized, fully equipped and sustainable with a targeted timeline of a decade. A schedule of upgrade and review should be part of the program.

Component B: Vulnerability Assessment of Critical and Essential Facilities and Lifelines – US\$12 MILLION

57. The objective of Component B is to develop the consensus-driven analytical foundation required for longer-term investments to reduce risk in the built environment of Dhaka, Sylhet and other cities in Bangladesh. It would concentrate on two activities: i) an assessment of the vulnerability of the built environment in Greater Dhaka to earthquakes and other major hazards, focusing on essential and critical facilities and infrastructure. The assessment will establish the patterns of vulnerability of the cities, understand the hotspots, and serve as a basis for a long-term vulnerability reduction in Greater Dhaka; and ii) the development of risk-sensitive land use planning as a practice in Bangladesh informed by an understanding of the hazards, vulnerability and risk facing urban centers, and by clearly stated consensus disaster risk reduction objectives and policies.

58. RAJUK's jurisdiction extends beyond the administrative boundaries of the DCCs to adjoining city corporations and municipalities. Among its responsibilities, the Building Construction Rules (2008) provide authority to RAJUK to enforce the national building code in addition to the Construction Rules themselves. Under this broad mandate, RAJUK plays an important role in steering the development of Greater Dhaka and impacting its urban resilience outcome either positively or negatively. In particular RAJUK has jurisdiction over legal development enforcement instruments such as zoning ordinances, development control provisions, and building codes and construction rules implementation.

59. Currently, RAJUK and other relevant national institutions have not developed a comprehensive understanding of the vulnerability of critical and essential facilities such as hospitals, emergency operation centers, public safety facilities, key public buildings, food distribution centers, amongst others, to natural hazards such as earthquakes. This is also true for the general public. The knowledge of risk present in critical and essential facilities resides only in the hands of a few experts and is incomplete. Yet, these facilities are relied upon immediately after an event to render core services to the population, house displaced populations and enable a fast recovery. It is thus critical to identify, map and assess the vulnerability of these facilities in order to build urban resilience in Greater Dhaka.

60. Previous HVRA studies for Dhaka undertaken by the Comprehensive Disaster

Management Programme (CDMP) and by the Bangladesh Urban Earthquake Resilience Project (BUERP) were limited to the geo-administrative boundary of DNCC, DSCC and SCC. The understanding of hazards, vulnerability and risk of Greater Dhaka with technologies that enable spatial visualization and data sharing will empower RAJUK as well as stakeholders with the knowledge to create an environment for promoting higher standards and ethics for construction and development. These objectives are critical to sustainable economic growth and poverty reduction achieved by making development plans risk-sensitive and supporting the construction of resilient infrastructure while reducing the vulnerability of at risk populations.

61. The Dhaka Structure Plan (2016-2035) had focused on finding new satellite areas for urban expansion; however, i) core areas with high density building structures (Old Dhaka) or ii) urbanizing areas (near Old Dhaka and periphery) are highly vulnerable (or highly at risk) to earthquake hazards and flood hazards. The older and dense part of Dhaka has a large – but unknown – number of dilapidated buildings and frequently experience collapses. While the vulnerability of the built environment is recognized, a mapping and characterization of these vulnerabilities has not been done.

62. To address those inherent weaknesses, the following activities will be implemented under Component B:

- Conduct a vulnerability assessment of critical and essential facilities and lifelines (Component B1)
- Support the development of a risk-sensitive land use planning practice in Dhaka (Component B2)

Component B1: Conduct a Vulnerability Assessment of Critical and Essential Facilities and Lifelines

63. This component aims to identify at-risk public infrastructure, including critical and essential facilities and lifelines, assess their vulnerability to earthquakes and other hazards and develop city-wide vulnerability reduction program including priorities and budgets for physical strengthening, retrofitting or replacement.

64. This project component shall integrate several levels of surveys and structural engineering techniques (i.e. rapid visual surveys, advanced engineering analysis, and building material testing) to collect critical construction data on the identified facilities in Greater Dhaka and establish their level of vulnerability and safety.²² This data will be used to set up the strengthening and retrofitting recommendations.

65. The water transmission and distribution system for Greater Dhaka currently administered by DWASA is one of the lifelines that will be evaluated. Potential breaks in the piping system due to various levels of earthquake shaking, as well as structural and functional failures of water treatment plants, reservoirs, and pumping stations will be assessed. Down time for restoration of the water system for each ward will also be estimated. The dependency of water and power distribution systems will be investigated to understand the potential impact of power failure on the water distribution system. The assessment will be used to

²² *Essential and Critical facilities* are facilities needed for emergency response such as hospitals, fire stations, emergency centers, police stations, certain public buildings that house functions needed by the public, data centers, and power plant.

develop a program for reducing down time and improving reliability of the water system.

66. Similarly, the earthquake vulnerability assessment of the gas transmission and distribution system currently administered by TITAS Gas will also be investigated. Potential breaks in the piping system should be established according to the severity of ground shaking and potential for soil failure, such as liquefaction. Potential for fire ignitions will also be assessed. A program for reducing the vulnerability of the gas distribution system and potential for fire should be developed.

67. The output of the vulnerability assessment is to develop a long-term risk reduction program combining various building and lifeline vulnerability reduction strategies. This includes techniques such as building retrofit, building abatement and replacement to reduce the number of unsafe, substandard and dangerous buildings, pipelines and facilities strengthening to ensure that infrastructures are resilient to extreme environment stresses. The lifeline strategies include developing redundant distribution systems and improve their reliability through system analysis. The focus is primarily to address them in areas highly susceptible to earthquake and flood hazards. This will be done in coordination with DCCs, organizations and ministries owning properties or operating within RAJUK's jurisdiction, such as the Ministry of Primary and Mass Education, the Ministry of Health and Family Welfare, and the Ministry of Home Affairs (MoHA), among many others.

68. The following tasks are envisioned:

Database of Critical and Essential Facilities:

- a) Develop a framework and methodology for building vulnerability assessment particularly suited for structural typologies existing in Bangladesh. This could follow a procedure similar to ASCE-31 of the United States or similar standards, including a procedure for Quality Control (e.g.: peer review).
- b) Develop a framework and process for the vulnerability assessment of water and gas systems, similar to procedures/guidelines suggested by the American Lifelines Alliance, FEMA, ASCE, or the US National Institute of Building Sciences. A system reliability analysis will be undertaken for lifelines.
- c) Train structural engineering assessors on the methodology, including field testing and validation, inventory and reporting systems.
- d) Prepare databases of critical and essential buildings and infrastructures within RAJUK jurisdiction. Incorporate all key information as required by the methodology developed in a) and b).

Survey for a Structural Vulnerability Assessment:

- e) Collect and review previous vulnerability assessment studies undertaken by CDMP, BUERP-1 and others. Catalogue information and findings from these studies to serve as references.
- f) Coordinate vulnerability assessment activities with utility providers (DCCs, TITAS Gas, WASA, and other facilities owners).
- g) Prepare a long-term schedule for seismic evaluations according to the available resources. The schedule should start with areas of higher risk as determined by the study.
- h) Carry out an HVRA study for Greater Dhaka.

- i) Conduct initial surveys for structural vulnerability assessment on selected samples to assess the validity and further refine the methodology; identify vulnerability features of buildings and infrastructure.

Analysis of Output Development for a Vulnerability Reduction Strategy and Program:

- j) Complete vulnerability assessments and a system vulnerability analysis according to the formulated schedule.
- k) Develop an overall program for risk reduction and a methodology for prioritization for retrofit and vulnerability reduction. Produce an initial implementation plan with priority clusters and budget estimates.

Consultations, Education and Awareness Campaign:

- l) Develop an awareness and educational campaign to inform building vulnerability and raise societal involvement in improving construction standards.
- m) Prepare a consultation and reporting process with concerned building owners and other relevant stakeholders. Develop an online reporting and tracking system.
- n) Prepare guidelines and standards for the rehabilitation and retrofitting of critical facilities.

69. Table A2.6 presents a summary of the budget allocation for B1.

Component B2: Support the Development of a Risk-Sensitive Land Use Planning Practice in Dhaka

70. There is a real opportunity to fundamentally influence future development, reduce risk and build resilience in the development of the detailed area plans (DAP). The plan development is scheduled for 2015. The objective is to make the DAP risk-sensitive and support the integration and mainstreaming of HVRA (to include earthquake and flood hazard risks for Greater Dhaka) in the planning process.

71. So far, BUERP has evaluated the existing planning policies, systems and plans under RAJUK. It has provided input and detailed guidance on how future plans can be made “risk-sensitive” and how mainstreaming can be incorporated in the land use management approaches and various sectors of development embedded in the plan. The findings and guidelines were summarized in the Guidebook for Risk-Sensitive Land Use Planning of Dhaka (RSLUP)²³ produced as an output of BUERP. An introductory training on risk-sensitive land use planning was developed and completed for about 35 planners and engineers.

72. At the same time, significant HVRA data and output have been produced by the CDMP and the BUERP. A Dhaka City Profile and Earthquake Risk Atlas publication was produced by BUERP Phase 1 and has been widely distributed in Dhaka. GEODASH is also being developed under a separate contract to facilitate knowledge and data sharing and provide better information and tools to support DRM planning and decision making. RAJUK is expected to be an active participant in the development and sharing of data within GEODASH. Additional GIS resources are also provided to enable RAJUK to play a key role in this initiative.

²³ Refer to RSLUP Guidebook: <http://nmd.sk/ENcMSuPf>

73. RAJUK is completing the Dhaka Structure Plan 2016-2035 and the Dhaka Regional Development Plan (RDP). These plans provide the policy, strategies and pattern of development for Metropolitan Dhaka for the next 20 years. Risk sensitivity in the plans is only integrated in terms of hazards, such as geological and meteorological attributes. Suitability, land and infrastructure qualities criteria are also included. The geological input was provided by the Geological Survey of Bangladesh during the planning process. This input, however, is limited to hazards and does not include a full integration of the earthquake risk considerations as well as DRM objectives. Policies and mechanism for mainstreaming risk reduction and disaster management objectives are not explicitly derived and integrated in the plans. Hence, the opportunity to mainstream DRM at the strategic level may not be fully realized.

74. Component B2 will support the conduct of risk-sensitive planning exercises for Metropolitan Dhaka in coordination with the findings and outputs of Component B1. In particular it will have the following objectives:

Assessment of Plans and Planning Systems:

- Review, assess and re-design RAJUK's current participatory planning process to assume more ownership for consultation, learning and consensus building within both RAJUK offices (e.g.: the Engineering or Town Planning Division) and external stakeholders such as urban managers of Dhaka (DCCs, DWASA, TITAS GAS) with a focus on institutional capacity building and risk-sensitive planning. A structured participatory process for all relevant stakeholders under the leadership of RAJUK will enable a better understanding of the risks and their implications, thus reaching a superior outcome for urban resilience. The focus on methodology will be institution-based planning rather than consultant-driven planning.
- Review, assess and re-design the existing process of strategic planning (Metro-wide), local land use planning (DAP), zoning and site planning (local areas) towards risk-sensitive planning, investment programming and implementation.

75. The project component will have the following activities managed by the Town Planning Division of RAJUK and supported by the URU (See component C):

Develop the Internal Guidelines and Processes for RSLUP:

- Provide support to RAJUK to develop the tools, procedures, and examples for mainstreaming Disaster Risk Reduction (DRR) into spatial and development planning, utilizing outputs from other components of the URP.
- Develop a framework and methodology for risk-sensitive planning particularly suited to Dhaka. It should utilize the existing RAJUK and external institutional arrangements as well as planning processes as take-off points for DRR mainstreaming.
- Identify and develop the entry points for DRR mainstreaming into land use planning, sector planning and zoning, using the Structure Plan 2016-2035 of Dhaka and DAP as case studies.
- Identify and develop the entry points for DRR mainstreaming into investment programming, project development cycle, building enforcement and related RAJUK operations and processes.
- Develop the internal guidelines and processes for RSLUP, including mainstreaming plan formulation, collecting and integrating data, and supporting the development of detailed DAPs.

Training and Capacity Building:

- Develop curriculum and training methodology for capacity building; conduct various trainings as well as their assessments.

Database Management and Outreach:

- Develop data management and dissemination strategy to share and promote collected data on GEODASH using the established technology, protocols and standards in order to use the spatial data on critical infrastructure and essential buildings in an efficient and flexible way among beneficiary institutions.
- Introduce spatial analysis and decision-making tools to enhance current plans.
- Develop a common digital platform for the sharing of planning and HVRA information within RAJUK and other institutions.

76. Table A2.7 presents a summary of the budget allocation for B2.

Component C: Improved Construction, Urban Planning and Development – US\$41 MILLION

77. The objective of Component C is to put in place the institutional infrastructure and competency to reduce long-term disaster vulnerability in Dhaka. It would address both the existing built environment and future development. The overall scheme for component C covers four areas of investment: (1) create a unit within RAJUK to support the integration of risk information into development planning; (2) put up the infrastructure and processes to ensure an efficient and integral mechanism for land use and zoning clearance, permitting and approval of site and building plans; (3) improve competency through professional accreditation, trainings, continuous education, as well as forums; and (4) strengthen building code implementation and enforcement.

78. The investments when completed will be seen as a big leap in the country's urban governance to build urban resilience in accordance with existing Bangladesh Acts, building codes, construction standards, enforcement laws and institutional arrangements. They will align Bangladesh with international standards for construction and development.

79. Core to the success and implementation of this component is institutional strengthening by the creation of a new URU in RAJUK to encompass the development of competencies related to urban resilience such as risk assessment, earthquake engineering, construction standards, and risk-sensitive land use planning. RAJUK's management has granted internal approval to create the URU and its director has been appointed. This Project will support the setup, structuring, training and provision of necessary facilities, resources, and equipment of the URU. It will also support its core activities to ensure its sustainability. The URU will also serve as RAJUK's Project Implementation Unit (PIU) for Components B and C, which will be implemented by RAJUK.

80. The implementation of the Project will require several years and significant level of high-end expertise and TA for RAJUK and the GoB. However, strategically, this is key to reversing the trend of vulnerability and developing a coherent and effective urban investment roadmap for the country.

81. The following specific activities will be implemented under Component C:
- Create and operationalize a URU in RAJUK (Component C1)
 - Establish an electronic construction permitting system (Component C2)
 - Set up a professional accreditation program for engineers, architects and planners (Component C3)
 - Improve building code enforcement within RAJUK jurisdiction (Component C4)

Component C1: Create the Urban Resilience Unit (URU) to Support DRR Mainstreaming and Improve Dhaka Urban Resilience

82. This component will fund activities related to setting up an URU within RAJUK to develop human and capital resources (both in number and capacity) to undertake urban resilience activities. In particular, it will oversee the implementation of the Bangladesh National Building Code (BNBC), accreditation and code enforcement provisions, and implementation of building construction standards. During the project period, the URU will coordinate all the URP activities under Component B and Component C.

83. The URU will help RAJUK mainstream DRR into its operations, functions, planning, policy and decision making. Within the Project's lifetime, the organization will coordinate and set up the electronic construction permitting infrastructure and process, provide the required trainings for the enforcement of BNBC and related development permitting processes, and undertake the testing of construction materials to improve construction quality and assess structural vulnerability. Eventually, the URU will become the main arm for the construction permitting and building code enforcement process within Dhaka, in accordance with BNBC accreditation and code enforcement provisions.

84. The structuring and development of a sustainable URU within RAJUK will require close collaboration amongst RAJUK's leadership to ensure the unit will have the authority to exercise its responsibilities as indicated in its mandate. Part of the funding will be dedicated to establishing the legal, administrative and organizational structure of the URU and the detailed definition of its mandate and activities within RAJUK's own institutional mandate. Through the implementation of these components, RAJUK will ramp-up its structure, competence and capacities. The Project will support this process administratively, technically and materially.

85. In addition to technical and scientific competencies, the URU will have the laboratory and field equipment to undertake the testing of structures, including non-destructive testing, to enable it to establish material properties and characteristics of existing buildings and of construction material and aggregates. This will provide essential data for tracking building quality and establishing norms and standards to improve construction.

86. The URU will conduct and/or sponsor research, trainings, forums, community outreach, campaigns and workshops on risk-sensitive development to support the operationalization of major thrusts, such as building permitting, construction supervision, land use, zoning, and specific planning aspects of urban resilience. The outputs shall be taken to develop improved standards of construction in the country and promote urban resilience. For this purpose, the URU will be equipped with a state-of-the-art training facility that will oversee and manage all training activities.

Component C2: Establish an Electronic Construction Permitting System

87. This component will fund the design, development and implementation of an electronic permitting and monitoring system (e-permit) for construction applications. The funding will include a feasibility study, the design, development, testing, training, as well as deployment of the system, and related infrastructure (software and hardware necessary for institutionalization). The e-system is intended to improve transparency and governance, but also to advance compliance with building codes and development control regulations, thus contributing to urban resilience.

88. Planning permitting processes for building construction have been described as lengthy, opaque and complicated for building applicants. Illegal broker fees are known to be paid in order for applicants to shortcut the process²⁴. This reduces Dhaka's quality of life, creates frustrations, erodes public confidence in its institutions, and opens the door to violations, thereby increasing vulnerability to disasters.

89. Being the legitimate approving authority for any building construction, RAJUK has in the past been unable to cope with the demands of rapid building construction. This is primarily due to a lack of manpower, resources, and effective internal mechanisms to enforce the building construction provisions. Several problems and conflicts need to be addressed in the building permitting process:

- Non-respect of deadlines and timelines for delivering permits and void interventions and deals;
- Delays and negligence in duties in inspection, enforcement and reporting;
- Lack of accountability and monitoring;
- Complexity and opacity for getting clearances and non-objections (RAJUK demands clearance certificates from the following organizations: DoE, DESA, WASA, TITAS Gas, DMP Traffic, DCC, and the Civil Aviation Authority Bangladesh prior to considering the issuance of building permits).

90. The e-permit will create incentives for the Government, developers and owners to observe development control regulations and provisions by providing increased efficiency, cost savings, speed in processing, transparent verification, and feedback mechanisms.

91. The activities will start by undertaking a feasibility study of the e-permit system that includes:

- Consulting with key stakeholders, such as relevant ministries responsible for planning, infrastructure, housing, public works, utilities, amongst others;
- Studying the institutional arrangements and assessing the IT infrastructure;
- Designing and specifying the process for instituting an electronic permitting and monitoring system for building construction and development;
- Establishing rules for conflict resolution between agencies;
- Establishing a schedule for reviews, applicant tracking mechanism, regulatory checks and mechanisms of enforcement;
- Identifying critical path in the business permitting process and re-engineering the process to improve the overall turnaround in plan approval;

²⁴ Mahmud, A. (2007). *Corruption in Plan Permission Process in RAJUK: A Study of Violations and Proposals*. Transparency International Bangladesh.

- Developing a conceptual system architecture and specifications of key functionalities related to various users (e.g., builders, inspectors, plan reviewers, and supervisors);
- Estimating cost of development, set-up, and deployment.

92. The design of the e-permit system will include the regulatory and licensing schemes, the legislative instruments, as well as the institutional and administrative arrangements of the permitting process under the principles of transparency and effectiveness. It shall incorporate requirements for RAJUK and satellite agencies that regulate and enforce building safety, fire safety, traffic management, waste management and environment protection. RAJUK shall provide the coordination and integration of these requirements from within and from various regulatory agencies. It will also act as gatekeeper for the system and as an e-permit process enabler.

93. A multi-stakeholder and multi-agency collaboration steering committee will be created to support and oversee the development of the e-permit system. This will contribute to: i) reaching consensus among the stakeholders on the core parameters that would facilitate an integrated seamless and transparent process for the application of construction permits through a common e-permit platform; and ii) defining the parameters of success in the design, development and implementation of the reformed system.

94. The steering committee will conduct a series of workshops and consultations to seek stakeholders' input on the changes in building permitting processes to ensure that new system's functionality corrects existing issues and streamlines the process. The consultations and workshops shall be designed to promote awareness among all relevant stakeholders, including the concerned RAJUK business units, developers, designers, contractors, practitioners, regulators, experts and advocates for the e-permit system.

Component C3: Set Up a Professional Accreditation Program for Engineers, Architects and Planners

95. Bangladesh currently has a professional licensure process through which an engineer or architect becomes authorized to provide professional services to the public. However, the current process is not based on rigorous competency criteria and is not recognized as adding value to the profession or society as a whole.

96. Component C3 will serve to improve the professional competency and ethical standards of practice of professional engineers, architects, planners and other construction professionals according to Bangladesh building code and international standards of practice. The objective is to develop a new program aimed at delivering a recognized professional accreditation based on international best practices. This will pave the way for improving the competency and qualifications of front line construction and urban development professionals and to elevate their professional status and market competition.

97. A major effort will go into developing the curriculum, requirements for skills and experience, and certification documentation agreed upon and accepted by the professional engineering community. For Dhaka, the Authorized Officers of RAJUK will act as deputized building officials for building code enforcement, according to the BNBC and the Construction Act 1952.

98. The professional accreditation will apply to a broad range of professionals involved in land development, design, construction and real-estate industries, including: building officials, engineers, architects, planners, designers, contractors, constructors and developers. However, at the start of the program, the professional accreditation will focus on civil engineers because of the relevance of their function in the design, development and supervision of building construction.

99. The funding for this program will be supported for the duration of the project. However, in the long term, the incentive-based program should become financially self-sustainable and market-driven, as certified professionals will emerge as leaders in their field, and recognized by their peers, the Government and the industry for their added skills and observance of exceptional codes of ethics and professionalism.

100. Due to the nature of its mandate for Metropolitan Dhaka, RAJUK will play a key role in the development and implementation of the program. RAJUK engineers could serve as the first set of engineers to be accredited.

101. The funding will translate the requirements embedded in the Professional Accreditation Program into institutional and operating arrangements, setting geographic jurisdictions, continuing professional education, building and planning field curriculum reviews to enable RAJUK to implement the activities of this component.

102. Component C3 will first oversee a consultation process with stakeholders to establish a working relationship with RAJUK and the Ministry of Housing and Public Works (MoHPW). The Professional Accreditation Program should be promoted and the demand and requirements should be defined through a participatory process. In consultation with the professional associations, academia, building design and construction industries, an Accreditation Advisory Panel should be convened to help build consensus around the parameters and conditions for the accreditation program and establish standards. The administrative and technical provisions of the accreditation program will also be developed and discussed with the Advisory Panel. The technical provisions should include qualifications in terms of knowledge and experience. An M&E mechanism should also be developed.

103. Secondly, research and analytical studies will be developed to provide an enhanced understanding of BNBC's enforcement mechanism, as well as its agenda and procedures for deputized inspectors and accreditation. Other models of professional accreditation in both developed and developing countries should be researched and documented and opportunities of adaptation of most relevant provisions should be identified.

104. A training platform and capacity building program should be developed to support engineers in the preparation of the Accreditation tests and exams and in developing the capacity of relevant institutions. The capacity program should extend beyond the targeted engineers to reach developers, contractors, planners and architects. It should conduct a series of forums, trainings, symposia, and study tours to educate, build support and further develop the infrastructure and accreditation requirements.

105. The initial experiment of the accreditation program with RAJUK will create the parameters to establish a permanent national accreditation system and its governance structure.

Component C4: Improve Building Code Enforcement within RAJUK Jurisdiction

106. Building code enforcement in Dhaka has been described as “largely problematic”. The capacity and numbers of personnel from RAJUK to meet the demands of building construction and carry out building permitting based on BNBC requirements are lacking. The shortage of building inspectors, weaknesses in competency, and lack of understanding of building code enforcement to protect human lives and properties have resulted in a negligent code enforcement process.

107. The current code enforcement process is limited to checking setbacks and ignoring the structural provisions. The noted development and code violations include the following:

- No maintenance of the required distance between buildings from adjacent roads;
- No maintenance of the agreed height of the building as per the plan;
- No maintenance of the setback rules of the building;
- Change in the land use of the building;
- Systemic dismissal of the structural provisions (including earthquake provisions) of the building code;
- Violation of fire code provisions;
- Low or inexistent field construction quality control and inspections.

108. The funding will build the capacities and administrative structure for RAJUK to implement and enforce the BNBC, the provisions of the Structure Plans and DAP, and building field inspection and controls. This funding is confined to RAJUK’s jurisdictional responsibilities and mandate. It will include the following:

- Conduct an initial assessment to identify strengths, weaknesses, opportunities and challenges for strategic and successful BNBC implementation, the necessary capacity building needs for RAJUK infrastructure, and current legal and administrative procedures for building code enforcement.
- Based on the findings of the assessment, develop the parameters (legal, administrative, technical, and logistical) for transparent and rigorous building code implementation and enforcement. Develop the processes, reporting and recourse mechanism for improved code enforcement. Validate the proposed interventions with the relevant stakeholders, including RAJUK.
- Develop a training and capacity building program for government officials, construction engineers, architects, planners and other construction professionals on building code requirements and implementation procedures. The training and capacity building program should extend into a continuing education program to raise the technical capacity of building officials, engineers, contractors and other professionals involved in the construction industry.
- Link the proposed capacity programs to the ones undertaken in Component B and Component C3. It will include the development of step-by-step guidebooks and illustrative examples.
- Develop an extensive awareness and educational campaign to reinforce the critical importance of the implementation of the building code, the development controls to protect life and property and the development of a globally competitive design and construction industry in Bangladesh.
- Develop indicators for M&E progress in achieving code compliance.

Component D: Project Implementation, Monitoring, and Evaluation – US\$10 MILLION

109. The URP will have an implementation structure to engage relevant ministries that will focus on DRM, emergency response, vulnerability assessment, risk-sensitive land use planning and management, and institutional strengthening. The objective of Component D is to provide necessary funding for project coordination, monitoring and evaluation. It will also ensure periodic evaluation of the investment program to highlight the outputs and outcomes in support of a longer-term investment program. The implementation arrangements for the Project are not included as each implementing agency (IA) will be responsible for its own implementation and procurement.

110. Component D will be implemented by the Project Coordination and Monitoring Unit (PCMU) of the Programming Division, Planning Commission, MoP. The PCMU of the Programming Division has been successfully implementing a similar Bank-funded multi-sectoral and multi-ministerial project, i.e.: Emergency Cyclone Recovery and Restoration Project (ECRRP). It would also provide funding for the activities of the Project Steering Committee (PSC).

111. Activities that will be supported under this component include: i) overall support of the activities of the PSC and the PCMU; ii) support of activities related to overall progress, monitoring and evaluation, compliance with the Project's safeguard and fiduciary requirements, and capacity development; iii) support of communication and promotional activities reflecting project contributions and stakeholder expectations; iv) procurement of vehicles, office furniture, and information technology equipment for the PCMU; v) operating costs of the PCMU; vi) hiring of experts and specialists to reinforce the staffing and technically support the mission of the PCMU; and vii) strategic long-term studies.

112. The already established PCMU of the Programming Division, Planning Commission will provide overall coordination, macro-management and resource (technical/HR) support for efficient implementation of this multi-ministerial Project. The PCMU will provide secretariat services in the form of technical and administrative resources to the PSC. Second, it will collect progress/monitoring/financial reports from each of the three Project PIUs and prepare consolidated progress/monitoring/financial reports for onward transmission to the Ministries/Division concerned, the Implementation, Monitoring and Evaluation Division (IMED) under the MoP, the Economic Relations Division (ERD) under the Ministry of Finance, the Planning Commission as well as the Bank. Third, it will render supervision /technical services to the PIUs on an ongoing and "as-needed" basis.

113. The PCMU will consist of:

- One (1) Project Director (PD) for planning and management who will be the PD for both URP and ECRRP;
- One (1) Deputy/ Assistant Project Director (DPD/APD) for administration and safeguards;
- One (1) DPD/APD for financial management, budgeting and accounts;
- One (1) DPD/APD for procurement and contract management;
- Any other DPD/APD depending on the activities to be undertaken by the PCMU.

114. An international firm (jointly supported by a national firm) shall be hired specifically for M&E, and shall be supervised by the PD of the PCMU. The international firm should also

provide the adequate technical knowledge to assist in the definition of the request for proposals, evaluation of the bids, and development of the M&E criteria and analysis.

115. The three (3) Components A, B & C of the Project shall be implemented by three (3) IAs, namely: a) DNCC (for DNCC itself, DSCC, SCC and FSCD) within the Local Government Division (LGD) of the Ministry of Local Government Rural Development & Cooperatives (MoLGRDC); b) RAJUK within the MoHPW; and c) DDM within the MoDMR.

116. Each of the IAs (DNCC, RAJUK and DDM) will have its own PIU. Each PIU may consist of:

- One (1) PD for planning and management;
- One (1) DPD/APD for administration and social safeguard;
- One (1) DPD/APD for financial management, budgeting and accounts;
- One (1) DPD/APD for procurement and contract management;
- One (1) DPD/APD for M&E;
- One (1) DPD/APD for environmental safeguard, and
- Any other DPD/APD depending on the activities to be undertaken by the respective PIU.

117. The Logical Planning Framework in Annex 4 will be used to monitor and evaluate the progress towards accomplishing the PDO and the expected outcomes. Project monitoring will be undertaken with a periodic function, and shall include: accounting and financial audits, reporting of outputs, review of processes and maintenance of records. As reflected in Annex 4, the project outputs will be measured against the collected baseline information using identified performance indicators under each component.

118. M&E will be undertaken in parallel by the PSC and PIUs, as well as the project IAs for the project components for which they are responsible. The PCMU will be responsible for the overall M&E. With technical support from the international and local M&E experts, the PCMU will develop tools and techniques (i.e. determining baselines, setting bi-annual/annual targets, setting appropriate indicators to measure performance, collecting required information/data, among others) for monitoring progress in achieving Project Development Objectives and Intermediate Results. These results/outcomes may be monitored initially annually and then subsequently bi-annually (depending on the required timeline to generate results/outcomes). The PCMU will also need to devise an M&E system, including report templates for the PIUs, to make use of in measuring their respective components' results and impacts.

119. The PIU of each IA will likewise undertake M&E by preparing Monitoring Reports in the prescribed format of the IMED and the PCMU. The PIU-level monitoring will be confined to inputs, processes, and outputs. In each of the PIUs, the APD for M&E will assign the responsibility of routine implementation monitoring of the particular Project. The APD will continuously monitor the Project's physical and financial progress, including processes involved. The APD will then need to prepare Monthly/Quarterly/Bi-annual/Annual Progress Monitoring Reports, which s/he will eventually process for endorsement and signature of the PD. The endorsed reports will be forwarded to the IMED, which in turn will submit it to PSC for acceptance. The PSC will examine, endorse and/or accept/ approve monitoring reports prepared by the PIUs.

120. The Monthly Annual Development Program Review Meeting (MARM) at the Ministry/Division chaired by either the Minister or the Secretary will similarly discuss progress on their respective components and other related issues on the project performance.

121. The mid-term review will be conducted halfway of the Project jointly by the GoB and Bank under an agreed terms of reference.

122. The end-of-project evaluation will be conducted separately by both the GoB and Bank after the completion of the Project. It may be noted here that the IMED of the GoB has to conduct terminal evaluation of all projects mandatorily within six months of their completion but these evaluation mainly look into the performances with respect to outputs rather than performances made with respect to intermediate/final outcomes or results. Under this Project a result framework will be developed with appropriate indicators to measure at least intermediate outcomes or results. Hence, an end-of-project evaluation may be designed at a later stage under that perspective.

Component E: Contingent Emergency Response – US\$0 MILLION

123. Following an adverse natural or man-made event that causes a major disaster, the GoB may request the Bank to re-allocate project funds to this component (which presently carries a zero allocation) to support response and reconstruction²⁵. This component would allow the Government to request the Bank to reallocate project funds and designate them as Immediate Response Mechanism funds to be engaged to partially cover emergency response and recovery costs. This component could also be used to channel additional funds should they become available as a result of the emergency.

²⁵ Such a reallocation would not constitute a formal Project restructuring, as permitted under the particular arrangements available for contingent emergency response components (ref. Including Contingent Emergency Response Components in Standard Investment Projects, Guidance Note to Staff, April 2009, footnote 6).

ANNEX 3: IMPLEMENTATION ARRANGEMENTS

Urban Resilience Project

A. Project Institutional and Implementation Arrangements

1. The Government of Bangladesh (GoB) has overall responsibility for implementing this multi-sectoral and multi-ministerial Project. The GoB shall ensure proper planning, management, and coordination of the Project through five of its Ministries i.e. Ministry of Planning (MoP), Ministry of Local Government, Rural Development and Co-operatives (MoLGRDC), Ministry of Home Affairs (MoHA), Ministry of Disaster Management and Relief (MoDMR), and Ministry of Housing and Public Works (MoHPW). On behalf of the GoB, these Ministries shall oversee that the key components of the Project are being implemented efficiently.
2. The MoP will be responsible for overall coordination and monitoring of the Project. On behalf of the Secretary of the MoP, the Division Chief (Programming) of the Planning Commission will oversee Component D, which is the PCMU, as Project Director (PD). The Emergency Cyclone Recovery and Restoration Project (ECRRP) PCMU, which is headed by a full-time PD, will take on the additional responsibilities required for the proposed Project. The PCMU PD will be assisted by a small group of full-time core professionals.
3. A Project Implementation Unit (PIU) will oversee efficient and effective implementation and the regular monitoring of activities with respect to relevant components. Each PIU will be under the supervision of a PD, a mid- or senior-level official of the concerned Implementing Agencies (IAs) having at least 10 years of work experience in the relevant field/area. Each PIU shall consist of: 1 (one) PD for planning and management; 1 (one) Deputy/Assistant Project Director (DPD/APD) for administration and governance; 1 (one) DPD/APD for financial management, budgeting and accounts; 1 (one) DPD/APD for procurement and contract management; and 1 (one) DPD/APD for monitoring and evaluation (M&E). Personnel to be required for PIUs will be identified from respective IAs as soon as possible and provided with necessary training.
4. The three components (A, B & C) of the Project shall be implemented by three IAs, namely DNCC (for DNCC itself, DSCC and SCC within the MoLGRDC and FSCD within the MoHA); RAJUK within the MoHPW and DDM within the MoDMR. Component D will be implemented by the PCMU of the Programming Division, Planning Commission of the MoP.
5. The already established ECRRP PCMU of the Programming Division, Planning Commission will provide overall coordination, macro-management and resource (technical/HR) support for the efficient implementation of the Project. The PCMU will provide secretariat services in the form of technical and administrative resources (preparing consolidated working paper for the Project Steering Committee (PSC) meetings, writing meeting minutes, finalize thereof for distribution, etc.) to the PSC. Secondly, it will collect progress/monitoring/financial reports from each of the three PIUs and prepare consolidated progress/monitoring/financial reports for onward transmission to the concerned Ministries, the Implementation Monitoring and Evaluation Division (IMED), the Economic Relations Division (ERD) and the Bank. Thirdly, it will render top supervision/technical services to the PIUs on an as and when required basis.

6. A PSC shall be constituted to provide an apex platform/forum for overall guidance, policy advice/decision, and coordination of project activities addressing inter-agency issues that may arise during implementation. The PSC shall be chaired by the Secretary, Planning Division of the MoP, with appropriate representatives from the MoLGRD&C, MoDMR, MoHPW, MoHA, Prime Minister's Office, Planning Commission, Finance Division, ERD, IMED, Ministry of Health and Family Welfare, Ministry of Defense, Ministry of Primary and Mass Education, Armed Forces Division (AFD), Metropolitan Police (Dhaka and Sylhet), DNCC, DSCC, SCC, FSCD, DDM, and RAJUK, and any other appropriate representatives.

7. It will be necessary to strengthen the IAs with a PIU housing professional, technical, procurement, financial management, social, and environment staff that would use appropriate procurement and financial management systems and procedures with adequate internal control arrangements. These would be complemented by a specially designed GAAP as described in Annex 4.

8. The four IAs have been assessed by the Bank fiduciary specialists as having the capacity to manage projects similar to the proposed URP.

B. Fiduciary (Procurement, Financial Management and Disbursement)

Fiduciary Capacity

9. General Fiduciary Environment: Bangladesh has a nodal procurement policy agency and a Public Procurement Act (PPA) 2006 with associated Public Procurement Rules (PPR) 2008 and bidding documents. It created a critical mass of about 39 procurement professionals and, as of now, provided training to over 5,700 staff of about 350 organizations. To sustain the reform, with Bank assistance, the Government has been implementing a second procurement reform project since late 2007 and subsequently another additional financing starting from 2013, focusing largely on the implementation and monitoring of PPA, including the introduction of electronic-Government Procurement (e-GP) at key sector agencies. Notwithstanding the above progress over the past years, the new Government recently made a number of amendments to the PPA, part of which were found not consistent with the Bank's Guidelines, and as such the Bank allowed local procurement using the PPA/PPR with those exceptions.

10. The Project will be implemented by four IAs: DNCC within the MoLGRD&C, RAJUK within the MoHPW, DDM within the MoDMR, and the PCMU within the MoP. Three of the four IAs are implementing ongoing Bank-financed projects, which are detailed as follows. The DCCs have implemented Bank-supported projects, including a component of the ongoing Clean Air and Sustainable Environment (CASE) Project and the closed Dhaka Urban Transport Project (DUTP). The DCCs were split into two in December 2011 and since then DNCC and DSCC have coordinated in implementing CASE, with the CASE PIU located within DSCC. DDM is currently implementing one of the components of the ECRRP and a component of the Safety Net Systems for the Poorest Project. RAJUK has not implemented a Bank-supported project and does not have experience implementing other donor-funded projects. The already established ECRRP PCMU, under the guidance of a PSC, and with oversight from the MoP, will be responsible for overall project coordination, management, monitoring, evaluation and overseeing strategic studies and training.

11. A procurement capacity assessment of all IAs has been conducted. The procurement risk rating is “**substantial**”. Summary of the assessment is given below:

12. *DNCC*: DNCC has about 20 staff trained on the national three-week course on public procurement. However, procurement is not the sole responsibility of such staff. The trained staffs conduct procurement as part of their overall project management or project support function, and there is no systematic capacity development approach towards sustainability and knowledge transfer. DNCC generally procures certain goods, as well as civil works and services. However, even the trained staff lacks experience in the procurement of disaster recovery/management equipment and goods, so DNCC needs the support of a full-time procurement consultant. The individual agency risk is “*substantial*”.

13. *RAJUK*: RAJUK has not implemented a Bank project, though it has done so for other development partners. They have about 10 staff trained on public procurement, and do not have a structured use of such resources. There are no particular ‘terms of reference’ and project staff take the training in order to do procurement according to the Government’s PPA/PPR. The agency generally is a policy unit; however it also develops lowlands or uninhabitable areas for residential use. Governance, accountability and transparency are an issue in RAJUK, and significant risk mitigation measures will be required for it to be involved in this Project. RAJUK would need procurement consultant support for the specialized goods under this Project, as well as to safeguard procurement processes. The agency level risk is “*high*”.

14. *DDM*: DDM has been implementing different components of two Bank-funded projects. It has only about five people trained in procurement, but in other projects, DDM has been taking the support of a procurement consultant. In this Project, the number of procurements is not significant, but it requires adequate technical skills on equipment and consultancy procurement. The associated agency level risk is “*substantial*”.

15. A financial management capacity assessment was carried out to evaluate the overall financial management environment prevailing in the country and within the elected IAs. More specifically, the Association assessed the financial management risks within all the IAs underlying the proposed Project, the capacity of the implementing entities and the financial management systems. The assessment has also identified the financial management arrangements under the proposed Project that would need to be in place to meet the Association’s fiduciary requirements in accordance with its OP/BP 10.00. The overall financial management risk is assessed to be “*substantial*”. The Association has identified the necessary measures on financial management staffing and systems to mitigate the fiduciary risks arising from the weaknesses of the internal control environment and financial management capacities through project financial management arrangements.

16. Considering all the factors, the overall fiduciary (procurement and financial management) level of risk is “**substantial**” for this Project.

Planning and Budgeting

17. *Planning*: A procurement plan covering all major procurement has been prepared for the entire duration of the Project in close consultation with the Bank. The procurement plan will be updated by PIUs, at least annually, to reflect actual implementation needs in consultation with the Bank.

18. *Budgeting:* A budget will be maintained for the entire term of the Project, and detailed budgets for each fiscal year will also be produced to provide a framework for financial management purposes. The annual budget will be prepared on the basis of the procurement plan and any other relevant annual work plans. These budgets will be monitored periodically to ensure actual expenditures are in line with the budgets, and to provide input for necessary revisions.

Internal Control

19. *Filing and Record-Keeping:* The PIUs will preserve all procurement records and documents in accordance with the provisions of the PPA 2006. These records must be made readily available on request for audit/investigation/review by the Government and the Bank. All project-related documents must be filed separately to facilitate internal and external audits, as well as reviews by the Bank.

20. *Financial Management Manual:* A financial management manual will need to be prepared by the Project, which will have all the ready references to financial rules and regulations of the Government along with the project requirements.

21. *Financial Management System:* The IAs do not have a common computerized system of accounting and book keeping. The PCMU will thus not have an integrated financial management system to produce a single set of Interim Unaudited Financial Reports (IUFs) from one source of financial information. Therefore, there is a requirement to procure an off the shelf accounting software at each IA level to provide timely and accurate financial information to the PIU in order to prepare the IUFs on a timely manner.

22. *Internal Audit:* The capacity assessment indicates that RAJUK has an internal audit department with a reasonable number of staff and a Director who heads this department. The other three agencies do not have their own internal audit capacity in order to carry out the internal audit function of the Project. It was agreed that the internal audit of the RAJUK component of the Project will be carried out by its own internal audit department at least once a year and the report will be submitted to the Chief Executive for action with a copy to the Bank. An audit firm will be hired by the PCMU to carry out the annual internal audit of the other agencies. The reports will be submitted to the respective heads of agencies with a copy to the Bank.

23. Going beyond the financial aspects, the internal audit would look into the effectiveness and efficient use of project resources and an independent appraisal of the workings of the PIUs, the PCMU, and other partners in the implementing arrangements. Such activities will be independent of the control of those who are responsible for carrying out the financial and accounting operations as well as those engaged in the execution of services rendered. The key internal audit function will be: (a) ascertaining whether the system of internal checks and controls operating within the organization for preventing errors, fraud and corruption is effective in design as well as in operation; (b) making certain reliability of accounting and other records as well as seeing that accounting methods provide the information necessary for preparation of correct financial statements; (c) determining the extent to which the project entity's assets are safeguarded from any unauthorized use or losses; (d) undertaking physical verification of assets/goods on a sample basis to opine on the asset management systems and (e) establishing whether administrative and financial regulations of

the Government and instructions issued by the Treasury as well as donors' legal requirements are followed.

Governance and Oversight Arrangements

24. *External Audit:* External audits of the Project including all IAs will be carried out by the Foreign Aided Project Audit Directorate (FAPAD) of C&AG. The annual audit reports will be submitted within six months of the end of the financial year and monitored in PRIMA. The audited financial statements will be made available for public disclosure. The PDs will be responsible for follow up and taking remedial actions with the assistance from the Financial Management Specialist and the program implementing sections relevant to the audit objections. The PIU, with the help of respective ministries, will arrange tripartite meetings to resolve outstanding audit objections within three months from the receipt of audit reports and improve the internal control arrangements to prevent recurrence of issues that would trigger audit objections.

25. *Audit Committee:* An audit committee will need to be established at the PCMU level in order to follow up audit issues on a regular and systematic manner. The audit committee will be comprised of all PDs of IAs as members along with a government officer equivalent to an Additional Secretary/Joint Secretary from the MoP as Chairman. The PD at the PCMU will act as the member secretary of the committee. This committee will have at least two meetings per financial year to review the audit reports and follow up on audit recommendations.

26. *Outstanding Audit Issue Resolved:* There are no overdue audit reports or ineligible expenditures under the existing IAs. There was a long outstanding audit observation on the DNCC part relating to the DUTP, which was resolved during the Appraisal Mission in January 2015. DNCC submitted a copy of the letter to the Bank on September 2014, which was originally issued to the auditors to resolve this audit observation. The audit observation relates to some auditable documents that were not shown to the auditors. Clarifications on why these documents were not shown to the auditors have been provided by DNCC. Based on the satisfactory clarification, the observation has been dropped from the Bank's system.

27. *Procurement Complaints:* All IAs must establish a system to manage complaints, including a database for recording, monitoring, and following up on all procurement activities. The Bank must be notified of any complaints to ensure transparency in the resolution process.

Procurement Considerations in the Fiduciary Assessment

28. Total procurement of goods, works and consultant services under the Project will be around US\$170 million. The overall responsibility of project implementation would be with the four IAs, namely DNCC, RAJUK, DDM and the PCMU. Agency wise procurement summary are as follows: DNCC total procurement US\$84.68 million, out of which goods of US\$77.08 million, works US\$5.12 million and consulting services of individuals and firms of about US\$1.48 million. RAJUK total procurement US\$50.33 million, out of which goods of US\$12.27 million, works US\$3.00 million and consulting services of individuals and firms of about US\$35.06 million. DDM total procurement US\$3.68 million, out of which goods of US\$1.03 million, works US\$1.67 million and consulting services of individuals and firms of about US\$1.48 million. The PCMU total procurement US\$8.5 million, out of which goods of

US\$1 million, works US\$0.5 million and consulting services of individuals and firms of about US\$7 million. Procurement would be carried out in accordance with the Bank's "Guidelines: Procurement of Goods, Works, and Non-Consulting Services under IBRD Loans and IDA Credits & Grants" dated January 2011 revised July 2014 (Procurement Guidelines) and "Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits & Grants by Bank Borrowers" dated January 2011 revised July 2014 (Consultant Guidelines), as well as the specific provisions stipulated in the Financing Agreement. A General Procurement Notice (GPN) for all major procurement to be financed by the proposed Project will be published on the Bank's external website and United Nations Development Business (UNDB).

29. *Procurement of Goods and Works:* Except as otherwise agreed in the procurement plan, the procurement of goods and works would follow International Competitive Bidding (ICB) procedures. The procurement of goods and works having an estimated value less than the ceiling stipulated in the procurement plan may follow National Competitive Bidding (NCB) and National Shopping (NS) procedures. Direct Contracting (DC) may be allowed under special circumstances with prior approval of the Bank. NCB contracting would be carried out under the Bank's Procurement Guidelines, following procedures for the Open Tendering Method (OTM) of the PPA 2006 (including first amendment to the PPA 2009) and the Public Procurement Rules, 2008 (as amended in 2009), using standard bidding documents satisfactory to the Bank. For the purpose of NCB contracting, the following shall apply: (a) post-bidding negotiations shall not be allowed with the lowest evaluated or any other bidder; (b) bids should be submitted and opened in public in one location immediately after the deadline for submission; (c) lottery in the award of contracts shall not be allowed; (d) bidders' qualification/experience requirements shall be mandatory; (e) bids shall not be invited on the basis of percentage above or below the estimated cost, and contract awards shall be based on the lowest evaluated bid price of compliant bid from eligible and qualified bidder; and (f) single-stage two-envelope procurement shall not be allowed.

30. *Procurement of Non-Consulting Services:* Except as otherwise agreed in the procurement plan, procurement of non-consulting services would follow ICB procedures. Procurement of non-consulting services having an estimated value less than the ceiling stipulated in the procurement plan may follow NCB procedures.

31. *Selection and Employment of Consultants:* The following methods will apply for selection of consultants: Quality and Cost-Based Selection (QCBS), Quality-Based selection (QBS), Fixed Budget Selection (FBS), Consultants' Qualification (CQ), Least-Cost Selection (LCS), and Single-Source Selection (SSS). SSS consultants may be allowed under special circumstances with prior approval of the Bank. Shortlists of consultants for services estimated to cost less than US\$500,000 equivalent per contract may be composed entirely of national consultants. The procurement plan will specify the circumstances and threshold under which specific methods will be applicable.

32. *Staffing:* Each IA shall nominate a procurement focal point for this Project. The appointed focal point will take necessary training, both on PPR 2008 and Bank Procurement Guidelines. The focal points will help the respective agencies in day-to-day procurement follow up and preparation of periodic procurement reporting. In addition, DNCC, RAJUK and DDM will hire a Procurement Specialist to assist the respective units. The PCMU will hire an experienced international Procurement Specialist on a part-time basis to help all four agencies for high-value, complex ICB procurement. The national Procurement Specialist

must be a qualified professional with adequate knowledge of government and Bank systems, and will be a mandatory member of all evaluation committees for procurement under the Project for their respective agencies. The consultant selection process must be prioritized so that the position is filled for project effectiveness.

33. *Independent Evaluation by the Bank:* The major contracts would be reviewed by the Bank thoroughly and independent consultants would be recruited as needed to review such contracts at various stages of evaluation and award to evaluate proposed changes in the contract.

34. *Procurement Transparency:* A functional webpage for IAs with procurement-related information will be made accessible to the public. Information pertaining to bidding and procurement above the specified thresholds, as per PPR, will be published on the Central Procurement Technical Unit's (CPTU) website. In addition, all IAs will publish procurement information on their own website. This information will include: invitation to bid, bid documents and RFPs (wherever applicable); latest information on procurement plan/contracts; contract award information; and information covering the poor performance of contractors, suppliers and consultants, including a list of debarred firms. The website would be accessible to all bidders and interested persons equally and free of charge.

35. *Procurement Risk Mitigation Plan (PRMP):* All IAs, through reports submitted to IDA on a periodic (semi-annual) basis, will develop a PRMP with a set of features as agreed by the Bank.

36. *Electronic government procurement (e-GP):* All NCB procurement under the Project will be allowed to be done through e-GP as a phased approach. e-GP was rolled out in June 2011 under the Government's Procurement Reform. The Bank has approved the system for NCB contracts under Bank-financed projects in Bangladesh. The following steps will be implemented by DNCC, RAJUK and DDM in order to implement e-GP:

- a. Submit a list of available IT equipment, software and connectivity to IDA.
- b. Prepare a roadmap for e-GP implementation, including plan to train own officials and bidders of different IAs.
- c. All procurement officers involved in URP will have completed national/international training on e-GP (by the end December 2015).

37. *Complex high value ICB procurement:* Under the Project, there are a few complex high-value packages. For these procurements, the evaluation committee shall be comprised of five members, out of which one international procurement consultant and one international technical consultant will be included. The formation and terms of reference of the evaluation committee shall be acceptable to the Bank.

38. *Review by IDA of Procurement Decisions:* The review by IDA of procurement decisions and selection of consultants will be governed by Appendix 1 of the Bank's Guidelines. For each contract to be financed by credit, the threshold for prior review requirements and post review contracts will be identified in the Procurement Plan. During the first 18 months of the Project, IDA will carry out prior reviews of the following contracts. This prior review threshold will be updated annually based on the performance of each IA: a) all contracts for goods, works and non-consulting services following ICB and DC procedures irrespective of estimated cost; (b) all contracts for goods and non-consulting services following NCB procedures estimated to cost US\$1,000,000 or above; (c) all contracts for

consultant services following SSS procedures irrespective of estimated cost; (d) all contracts for firms estimated to cost US\$500,000 or above; and (e) all contracts for individuals estimated to cost US\$200,000 or above. In addition, all terms of reference for consultants will be subject to the Bank's review, irrespective of the prior review status of the contract.

39. *Post Review:* For compliance with the Bank's procurement procedures, the Bank will carry out sample post review of contracts that are below the prior review threshold. Such review (ex-post and procurement audit) of contracts below the threshold will constitute a sample of about 15 percent (fifteen percent) of the post-review contracts in the Project. Procurement post reviews will be done on an annual basis depending on the number of post-review contracts. Post review will also include an assessment of the performance of the project's procurement staff and consultants, including adequacy of due diligence exercised by the agencies, regularity of procurement-related reporting and record-keeping.

Financial Management Considerations in the Fiduciary Assessment

40. *Staffing:* A DPD at the PCMU will be responsible for the overall financial management of the Project and will also provide the overall direction and guidance on a day-to-day basis. However, each IA will hire Financial Management Consultants (FMC) for project accounting and reporting purposes. All IAs will depute at least one Accountant to help FMCs in the day-to-day operation of financial affairs. Otherwise these positions will be recruited from the market at prevailing market rates. The FMC at the PCMU will coordinate with the other three FMCs and consolidate the financial reports for onward submission to the Bank and Government. The terms of reference of FMCs will be prepared and shared with the Bank for its concurrence and the hiring process of FMCs shall start soon after the negotiation phase so that the candidate can be identified without any delay.

41. *Basis of Disbursements:* It was agreed that the Project would start with transaction based disbursements and may convert to IUFR based disbursement when the Project demonstrate capacity to prepare reliable and timely financial reports during implementation.

42. *Flow of Funds and Designated Account (DA):* Funds will be disbursed through four DAs to be established within each PIU for the Project in the form of CONTASA, to be opened in a branch of a commercial bank acceptable to the Bank. The bank will have adequate experience, manpower, network and authority to process transactions on a fast-track basis. The approved government procedures governing the establishment of DAs shall be followed in all respects and each PIU will be responsible for their own DA. Direct payment methods would also be allowed to process large payments to the contractors/consultants, particularly those in foreign currency to avoid exchange loss. Replenishment to DAs, and documentation of expenditures made from the DAs, will be done on a monthly basis upon submission of claims along with SoE/full documentation following thresholds to be indicated in the Disbursement Letter. The ceiling on the advance to DAs will be set at four months of estimated average project expenditures.

43. *Accounting & Reporting:* Quarterly IUFRs will be submitted by the Project within 45 days from the end of each quarter. A format of such reports will be agreed with the Bank during the negotiation phase of the Project. IUFRs will be directly produced from the computerized project accounting system by all IAs and will then be forwarded to the PCMU for its consolidation. The consolidated IUFR format would include a statement comparing actual expenses and allocation as per PAD, PIU-wise. This would be verified during the

quarterly review of IDA to ensure that disbursement by each PIU is within the allocated amount.

DNCC Organogram: There is no formal organogram of DNCC, which results in a lack of clarity on who does what, especially on the financial management side. Therefore an organogram shall be decided before negotiation of the Project in order to have proper clarity on financial matters. However, project accounting recording and authorization and documentation will be carried out within the PIU, unless there is any extra ordinary events.

44. *Financial Management Training:* RAJUK does not have adequate training on operating a Bank-funded project. Financial management training will have to be organized for all the implementing partners who do not have adequate knowledge on-Bank funded projects.

45. *Supervision Plan:* Considering the overall risk of the Project, a supervision mission will be conducted at least every six months. The supervision mission will ensure that adequate financial management arrangements are maintained for the Project, both at the PIU and IA levels.

C. Environmental and Social (Including safeguards)

Environment

46. The Project overall is environmentally and socially beneficial, since the objective is to strengthen the capacity of GoB agencies to plan for and respond to emergency events, and to reduce the vulnerability of future building construction to disasters in Dhaka and Sylhet. The project activities which may trigger environmental safeguard issues are upgrading or construction of emergency management infrastructure and purchase of new safety and disaster equipment to strengthen the resources of FSCD and EOCs for DCCs and SCC.

47. The environmental impacts due to the infrastructure development (small-scale construction/upgrading buildings to accommodate a National Coordination Center, a National Disaster Management, Research and Training Institute, Emergency Operations Centers and Control Rooms) and due to the installation of new safety equipment for FSCD, handling, use and disposal of dysfunctional equipment are likely to be short term, site-specific, non-sensitive or reversible, and in every case, mitigation measures can be designed to overcome or reduce the negative environmental impacts. Considering the level of possible impact, the environment assessment (OP/BP 4.01) policy has been triggered for the proposed operation and the Project is classified as “Category B”. The Project may consider the retrofitting of public buildings (hospital, office, educational institution etc.) in the future. In that case environmental risk associated with the investment will be reviewed through an environmental assessment.

48. An Environmental Management Framework (EMF) for the Project has been prepared. The EMF highlights relevant general policies and provides guidance on: (i) environmental concerns and benefits obtained from the construction of warehouses for storing emergency evacuation equipment; (ii) environmental concerns and mitigation outlines for retrofitting buildings to reduce earthquake vulnerability; and (iii) terms of reference for preparing the Strategic Environmental Assessment (SEA) for integrating environmental concerns into development planning. Under Component B of the Project to support long-term

building retrofitting and code, an SEA will be developed. The SEA will give guidance on the environmental consideration of the building code. The EMF has been disclosed as per the Bank Policy on Disclosure of Information.

49. PIUs will be established in each of the IAs for day-to-day execution of the project components. These PIUs will include social and environmental safeguards compliance management. Each IA will appoint an environmental safeguard focal person, and the PCMU will have an Environmental Specialist with an environmental background to strengthen the project execution at present and in the future. The Environmental Specialist will be responsible for providing support for environmental compliance in the project activities and coordination of the multi-agency setup. S/He will share biannual reports with the project coordination committee. S/He will ensure contractors provide due diligence in following the environmental safeguard concerns. A Social Development Officer with a social science background will be engaged to strengthen the social management capacity of the PIUs.

50. RAJUK will additionally receive the support of a Senior Environment Specialist for the finalization of the SEA. The RAJUK PIU may hire a consulting firm for conducting the SEA in close collaboration with the multiple departments. The URU will have an Environmental Unit for the strong execution of environmental safeguard in retrofitting buildings. Environmental safeguard will be given due diligence during independent mid-term review and project completion.

51. The PCMU, with the input from each PIU, will prepare a half yearly progress report on environmental management and will share the report with the Bank for review. In addition, the effectiveness of screening, monitoring and implementing the EMP will be carried out by an independent M&E Consultant hired as a third-party monitor. The Annual Environmental Audit Report prepared by the third-party monitoring firm will be shared with the safeguards secretariat.

52. Public consultations for the EMF and SMF have already been conducted. The EMF and SMF, documenting the mitigation measures and consultation process, will be made available for public review in both English and Bengali. Workshops have been organized at the local and national levels to disclose the findings of the EMF. The EMF has been disclosed in the Bank Infoshop by Appraisal.

Social

53. As per the project description, investment activities include construction and/or upgrading buildings for technical and institutional support services enhancing urban resilience to disasters. All these constructions will expectedly be on existing or available lands. However, in critical circumstances, additional private lands can also be acquired and public land can be resumed from private uses. There is a small concentration of Small Ethnic Communities (indigenous by language and culture) in the city areas of DCCs and SCC. Given that the urban areas are densely populated; displacement of people may not be avoided fully. In unavoidable displacement events, participatory and transparent processes would be followed in accordance with the Bank's operational policy guidelines for resettlement and rehabilitation of affected persons. The national regulatory framework will be followed for any land acquisition and documentation of transfer of government-owned and donated land. A strategy of inclusive communication and participation will be followed for the activities

proposed for assessment of vulnerability of critical and essential facilities and lifelines in the City Corporations.

54. The IAs have been developing the SMF that includes guidelines for attending involuntary land acquisition and displacement issues in compliance with the Bank's safeguard operational policies and applicable national regulatory framework on land acquisition. The IAs will ensure that sound methodologies are followed and no displacement is unattended to check impoverishment rather than improvement of livelihoods. They will ensure that none of the tribal people is affected by any project intervention rather than benefitted. Voluntary donations of land will be accepted only when the interventions are not location sensitive and the potential donor is not exposed to any threat or coercion.

55. The SMF will include a Grievance Redress Mechanism (GRM) for the Project to answer queries, receive suggestions and address complaints and grievances about any irregularities in application of the guidelines adopted in the SMF for inclusive project design, and assessment and mitigation of social and environmental impacts. Based on consensus, the procedure will help resolve issues/conflicts amicably and quickly, saving the aggrieved persons from having to resort to expensive, time-consuming legal action. The procedure will however not pre-empt a person's right to go to the courts of law.

D. Institutional Setup for Safeguards

56. PIUs will be established in each of the IAs for day-to-day execution of the project components, including social and environmental safeguards compliance management. Each IA will appoint its own safeguard focal persons, including an Environmental Specialist with an environmental background to strengthen the project execution at present and in the future. The Environmental Officer will be responsible for providing support for environmental compliance in the project activities and coordination of the multi-agency setup. S/He will share biannual reports with the project coordination committee. S/He will ensure contractor provide due diligence in following the environmental safeguard concern. A Social Development Specialist with a social science background will be engaged to strengthen the social management capacity of the PIUs.

57. RAJUK will additionally receive the support of a Senior Environment Specialist and an Occupational Health and Safety Specialist for the finalization of the SEA. The RAJUK PIU will hire a consulting firm for conducting the SEA in close collaboration of the multiple departments. Environmental safeguard will be given due diligence during independent mid-term review and project completion.

ANNEX 4: OPERATIONAL RISK ASSESSMENT FRAMEWORK (ORAF)
Urban Resilience Project
Appraisal Stage

1. Project Stakeholder Risks		Rating	Moderate
Description: Through the ongoing Bank / GFDRR TA BUERP, the various stakeholders across government and civil society have been consulted in the preparation of the Project.	Risk Management: The ongoing TA will continue to engage all stakeholders from 40+ government agencies and civil society organizations through the project preparation and implementation process. Local focus groups, stakeholder meetings, and dialogue with all relevant individuals will inform all aspects of the Project.		
2. Implementing Agency Risks (including fiduciary)			
3.1. Capacity		Rating:	Substantial
Description: RAJUK and DDM have limited experience with Bank procurement and financial management procedures and lack adequate staffing for procurement and financial management.	Risk Management: RAJUK has not implemented an IDA project and substantial support will be required. DDM has been implementing the IDA-supported <i>ECRRP Component D1</i> since 2009. This has built some capacity within DDM in implementing similar projects. The following measures will be put in place: <ul style="list-style-type: none"> (i) Procurement Specialist to assist in the preparation of procurement documents. (ii) Financial Management Specialist to assist in ensuring smooth flow of project funds, preparation of IUFs, preparation of annual financial statements, coordination of project audit, among other relevant tasks. (iii) A functional webpage with procurement-related information accessible to the public. A system for handling complaints and a database for recording, monitoring and following up all project procurement activities. (iv) Procurement guidelines will be issued to ensure clarity on procedures and training will be provided to IA staff. 		
3.2. Governance		Rating:	Substantial
Description: While there is broad ownership for the Project across IAs, there may be risks associated with delayed decision making due to bureaucratic processes in place or potential lack of agreement on proposed measures. This could affect project implementation.	Risk Management: The process of decision making would be assisted through continuous discussion and engagement with the PIU and line departments on project activities and overall program reforms. The PIU will coordinate with the various departments to ensure streamlined project implementation. To support rapid decision making, the Chairperson of the PIU will have the convening power to align the objectives of the departments associated with the Project.		
4. Project Risks			
4.1. Design		Rating:	Substantial
Description:	Risk Management:		

<p>The Project is multi-sectoral and complex by nature. It involves a wide variety of departments, including DNCC, DSCC, SCC, FSCD, DDM, and RAJUK. These departments are not used to working together cohesively. This may create confusion and slow project implementation.</p>	<p>According to a recent Independent Evaluation Group Report, in most cases, multi-sector lending has proved most effective for getting funding to the right areas at the state level. Multi-sector lending has proved an indispensable component for drawing the line ministries into a dialogue on development priorities. The PIU will serve as the point agency for all line ministries and will streamline the communication between these agencies and the Bank. In addition, the PIU will have the organizational power to implement and monitor projects, and institute standard operating procedures for all project components (e.g. bidding documents and procurement). It will also ensure compliance with all Bank rules, including financial management and disbursement of funds and compliance with safeguards standards. Throughout project implementation, the PIU will monitor and evaluate the progress of the various components and keep the Bank informed of the situation on the ground. It is also critical that the focus of the Project is at the city level – and with City Corporations – in order to ensure institutional complexity can be managed at a local level.</p>
<p>4.2. Social & Environmental</p>	
<p>Description: The Project is expected to have positive social and environmental consequences for residents who will benefit from improved emergency response systems. But there is a likelihood of limited adverse social and environmental impacts. Those need to be handled in compliance with Bank policy on environmental and social safeguards. Given the performance and previous experience of the multiple IAs, identification and management of social and environmental safeguard compliance issues will be a challenge.</p>	<p>Risk Management: The PIU and consultants will provide guidance to the IAs to prepare acceptable EMF and SMF for sub-projects (as appropriate) and monitor implementation. Independent validations will also be provided for the social and environmental aspects of the Project. Bank missions will review and clear sub-project specific safeguard documents and monitor their implementation through site visits, discussions with government parties and consultants, and by executing thorough reviews of reports produced by the IAs. The Bank will provide guidance in ensuring compliance with safeguard documents as necessary.</p>
<p>4.3. Program & Donor</p>	
<p>Description: Several donors have been active in Bangladesh’s DRM activities. There is a risk of overlapping activities and lack of coordination.</p>	<p>Risk Management: To mitigate this risk, the Bank and the PIU will: (i) make project documents available as per the Bank policy on Access to Information and GoB’s Right of Information Act; (ii) closely coordinate with the UNDP team regarding the CDMP; and (iii) continue to regularly inform all associated donors about project progress through ongoing dialogue and formal updates.</p>
<p>4.4. Implementation & Sustainability</p>	
<p>Description: The GoB typically faces issues with the continued adequate budget allocations for O&M of critical infrastructure, and various government agencies have faced continued funding maintenance problems because of budget shortfalls.</p>	<p>Risk Management: Adequate funding for O&M will be available under the Project. In addition, the Project will establish EOCs within the major line ministries, which will undertake minor maintenance and overall coordination over time.</p>
<p>Non disclosable Information for Management Attention (Optional)</p>	
<p>Comments:</p>	
<p>5. Project Team Proposed Rating Before Review</p>	
<p>Moderate</p>	

ANNEX 5: GOVERNANCE AND ACCOUNTABILITY ACTION PLAN (GAAP)
Urban Resilience Project
Stage: Appraisal

Risk Factors	Mitigating Measures	Timeline	Responsibility
<p>1. Institutional Environment</p> <p>There exists a lack of coordination among agencies which may hamper implementation of this complex project.</p>	<ul style="list-style-type: none"> • Creating awareness and understanding across government ministries and agencies involved in urban disaster preparedness and response to ensure long-term commitment and sustainability. • Formal establishment of a PSC comprising representation from Planning Division, MoP, ERD., MoLGRD&C, MoHPW, MoDMR, MoHA, DNCC, DSCC, SCC, RAJUK, DDM, AFD, and FSCD. • Appointment of PDs and the development of a clear organogram. 	<ul style="list-style-type: none"> • By Negotiation • Within 1 month after Effectiveness • Within 1 month after Effectiveness 	PCMU DNCC RAJUK DDM
<p>2. Program Design and Oversight</p> <p>A large number of stakeholders and coordination is necessary for successful project implementation.</p>	<ul style="list-style-type: none"> • Clear assignment of roles and responsibilities, at both policy and program delivery levels, including defining accountability relationships, monitoring responsibilities, and remedial actions, among others, in program specific policy documents. • Development of separate policy documents to include clear definitions of rules, assignment of roles and responsibilities, and formulation of control and accountability measures. • Public Information and Awareness Campaign. 	<ul style="list-style-type: none"> • By Negotiation • By Negotiation • Ongoing 	PCMU DNCC RAJUK DDM
<p>3. Management Supervision and Capacity</p> <p>Human resource constraints continuously prove to be the biggest challenge to conducting business. There is also insufficient technical capacity for specific administrative functions, which hampers programs at the service delivery level.</p> <p>There is an acute lack of adequate staffing and resources for proper supervision. The lack of internet connectivity and computer equipment also provides large challenges to the data flow upstream.</p>	<ul style="list-style-type: none"> • Appointment of Work Assistants as per government sanction. • Appointment of technical specialists to complement government officials at the national level. • Provision of financial and technical resources (i.e. computers and other equipment, internet connectivity). 	<ul style="list-style-type: none"> • End of first year of implementation • End of first year of implementation • End of first year of implementation / Ongoing 	PCMU DNCC RAJUK DDM
<p>4. Monitoring and Evaluation</p> <p>Functions of dedicated cells or units for M&E.</p>	<ul style="list-style-type: none"> • Establishment of M&E cell staffed with mix of government officials and full-time technical specialists to review program information and provide analyses for policy decision support. • Use of electronic tools to capture real-time information from program locations and transmission to M&E cell for review and analysis. 	<ul style="list-style-type: none"> • Three months into implementation (terms of reference) completed • End of first year of implementation 	PCMU
<p>5. Access to Information & Transparency</p> <p>Detailed information on program rules, roles of implementers,</p>	<ul style="list-style-type: none"> • Assignment of information focal points in IAs. 	<ul style="list-style-type: none"> • By Effectiveness 	PCMU DNCC RAJUK

Risk Factors	Mitigating Measures	Timeline	Responsibility
and responsibilities, is not readily available and the access to information is limited.	<ul style="list-style-type: none"> • Conducting a comprehensive communication campaign. • Making available any pertinent project or program documents requested by any member of the public, other than those protected under relevant legal provisions (i.e. personnel information), as per the Government’s Rights To Information (RTI) Act and the Bank’s Access to Information Policy, and submitting a report of queries made and responses provided, including time taken, for Bank review. • Detailed project information to be available to the public. 	<ul style="list-style-type: none"> • Annually • As and when needed • Annually 	DDM

ANNEX 6: RISK AND VULNERABILITY ASSESSMENT

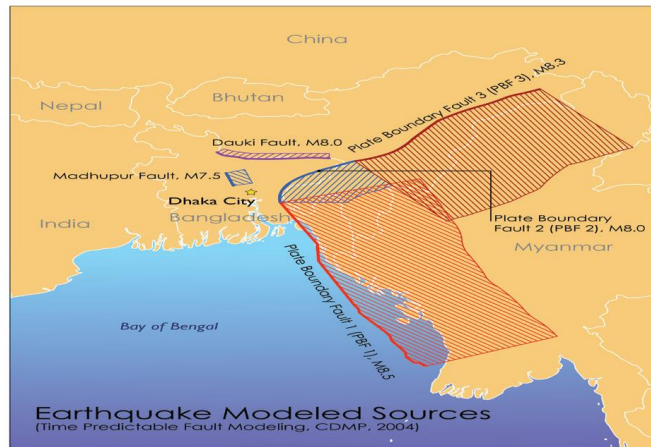
Urban Resilience Project

1. With respect to natural hazards, the risk of flood is well understood and managed through generations of adaptation. However, the threat of a major seismic event in Bangladesh is less evident. Bangladesh lies on the seismically active Indian plate. Studies by the Geological Survey of Bangladesh divide the country into three seismic zones. Earthquake risk increases towards the north and east of the country, and no area is immune from seismic threat. The five fault lines passing underneath Bangladesh are presented below.

Table A6.1: Fault Line Sources and Estimated Maximum Magnitude

Source	Estimated Maximum Magnitude
Madhupur Fault	7.5
Dauki Fault	8.0
Plate Boundary Fault 1	8.5
Plate Boundary Fault 2	8.0
Plate Boundary Fault 3	8.3

Figure A6.1: Earthquake Modeled Sources



2. The building stock in Dhaka, the capital of Bangladesh, is susceptible to collapse – by ground shaking or simply due to gravity – due to poor enforcement of building code regulations and the absence of robust construction standards. Vulnerability is exacerbated by rapid urbanization and increasing pressure on land (Dhaka is the most densely populated city in the world).

3. Dhaka has been identified as one of the 20 most vulnerable cities to seismic risk in the world²⁶. The nearest major fault line is believed to run less than 60 km from Dhaka, and although there is some uncertainty, research suggests that an earthquake of up to magnitude 7.5 is possible.

²⁶ Earthquake Disaster Risk Index, Blume Earthquake Engineering Center, Stanford University (1997)

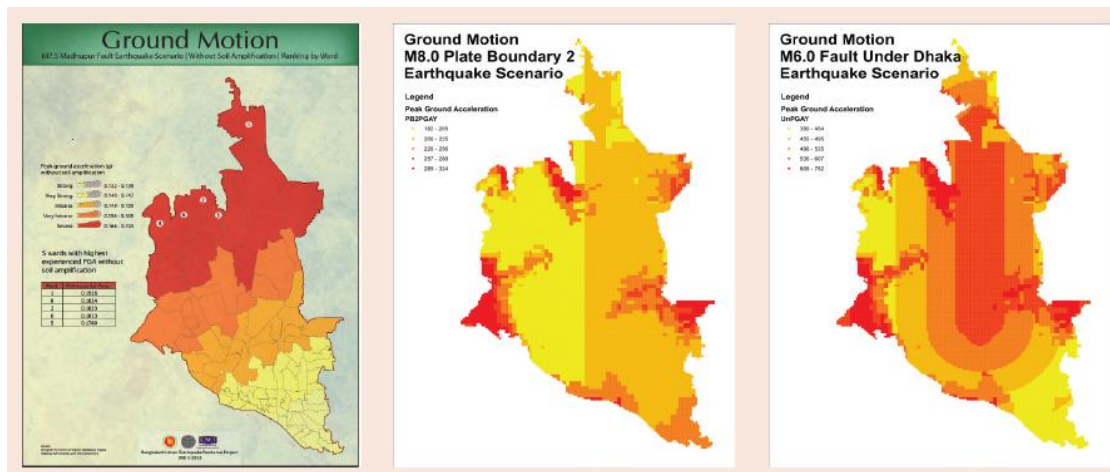
This would have a devastating impact on the city. Historical records show that in the last 150 years, Bangladesh and neighboring states in India have experienced seven major earthquakes of magnitude 7 or above on the Richter Scale. The table below indicates the earthquakes that have impacted Dhaka.

Table A6.2: Earthquakes Impacting Dhaka

Intensity	Earthquake Details
VIII	<ul style="list-style-type: none"> • Bengal Earthquake, 1885, Magnitude 7 • Great Indian Earthquake, 1897, Magnitude 8.1
VII	<ul style="list-style-type: none"> • Srimangal Earthquake, 1918, Magnitude 7.6
VI (intensity where structural damages begin to occur)	<ul style="list-style-type: none"> • 1923, Magnitude 7.1 • 1934, Magnitude 8.1 • 1935, Magnitude 6.0 • 1943, Magnitude 7.2 • 2001, Magnitude 5.1

4. According to the Hazard, Vulnerability, Risk Assessment undertaken by the Bangladesh Urban Earthquake Resilience Program (BUERP), all areas of Dhaka are subject to potentially strong ground motion. The Madhupur fault is to the north of the city. Ground motions generally decrease from north to south and are amplified in areas of soft soil. The Plate Boundary 2 fault is to the east of the city and ground motions decrease going east to west. The Magnitude 6 event under Dhaka has the highest ground motions near the arbitrary location of the fault. An event of this nature could occur anywhere but the likelihood of such an event is less than the Madhupur or Plate Boundary 2 events. The maps below indicate how ground motion would affect Dhaka based on the three modeled scenarios.

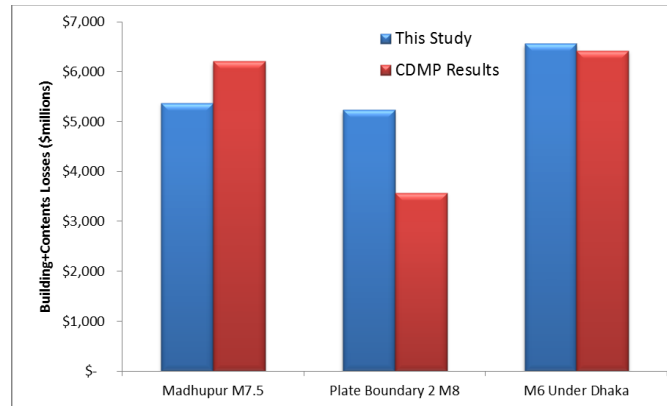
Figure A6.2: Ground Motion Distribution for Dhaka Earthquake Scenarios



5. BUERP research estimated the building and losses for the three scenarios. Total losses were estimated to be in the range of US\$5 to US\$7 billion. Total estimated exposure values are approximately US\$17 billion for buildings and US\$11 billion for content. Therefore, losses

represent approximately 25 percent of total exposed values. As indicated in the chart, there are multiple scenarios that all result in comparable and extensive losses to Dhaka. Also shown in the chart are estimated losses from a report published by UNDP’s Comprehensive Disaster Management Programme (CDMP). Overall, those losses are quite consistent. The major differences are likely due to differences in ground motion attenuations utilized in the two studies, in particular for the Plate Boundary 2 source where the BUERP study utilized attenuation equations specific to subduction type events.

Figure A6.3: Building and Content Losses

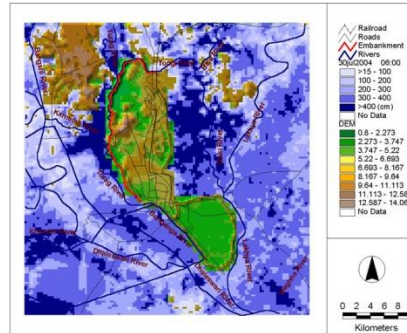


Source: World Bank and EMI, 2014

6. In addition to seismic risk, Dhaka also experiences severe flood risk. According to the Global Water Partnership, on average, Dhaka receives about 2,000 mm of rainfall a year, of which almost 80 percent falls during the monsoon season. The city has become more vulnerable to urban flooding over recent years as its drainage capacity has decreased alarmingly due to unauthorized settlements and illegal occupation of wetlands. The western part of the city is protected from river flooding by an embankment, but the eastern part remains highly vulnerable. During most of the monsoon period, the water level in the river remains higher than that inside the city. Hence, drainage of water by gravity flow is not always possible and increases vulnerability.

7. There have been four major floods in Dhaka in the past 20 years: 1988, 1998, 2004, and 2007. During each of these events, over 50 percent of city residents were impacted, many of them living in informal settlements along low-lying flood plains. In addition to a lack of communications, livelihoods, and service facilities, floods also pose a huge health hazard in Dhaka. In 2007, over 90,000 people suffered from diarrhea during the weeklong flood. A lack of nutritious food and clean drinking water exacerbated the situation.

Figure A6.4: Dhaka Inundation Map, 2004 Flood



8. Climate change will affect Dhaka in two main ways: through floods and drainage congestion, as well as heat stress. Melting glaciers and snow in the Himalayas and increasing rainfall will lead to more frequent flooding (water-logging, drainage congestion from river floods and excessive rainfall during the monsoon already cause very serious damage). Furthermore, Dhaka may also face 'heat island' problems, because temperatures in the city are a few degrees higher than in surrounding areas. The unequal development and management of utilities and poor management of water and waste water will continue unless national policies are enforced and resources are provided to local governments to construct adequate infrastructure to manage flood events.

ANNEX 7: ECONOMIC AND FINANCIAL ANALYSIS

Urban Resilience Project

1. Economic analysis was performed under the Bangladesh Urban Earthquake Resilience Program (BUERP) to assess the rate of return of capital investments in emergency response centers and equipment. The physical investment is complemented by human capacity building in the areas of emergency response as well as fire and building code enforcement.
2. The benefit of hazard mitigation of the type proposed in the Project lies in avoiding damage and loss. Mitigation provides protection and so we can calculate its benefit in the event of an actual disaster by asking the counterfactual: what would society have lost had mitigation not occurred? This often makes defining and calculating benefits and costs more difficult because we rarely observe the counterfactual in history, and we must anticipate it for future events.
3. Past disasters provide “real” data on the benefits and costs of mitigation to the extent that we find two, or more, similar communities affected by the disaster, that vary by the application of the mitigation project. Alternately without past data on hazard mitigation impacts, we can employ physical models and simulations to provide estimates of benefits and costs.
4. One must also consider the effect of the mitigation project on the economic environment when defining the counterfactual. For example, if no measures are taken now by the GoB to strengthen its enforcement of building codes and emergency preparedness measures, it is possible that foreign investors may leave or be reluctant to bring in new investments for fear of reputational risks from Rana Plaza type building collapses, which will be reflected in the overall economic wellbeing of the city and country? On the other hand measures to enforce building and fire codes may instill confidence in investors and may even attract new investments in the sector in the future.
5. Broadly, hazard mitigation will have the following benefits:
 - Direct impacts (e.g.: strengthening buildings will reduce the damage in an earthquake or similar events, reducing down time).
 - Indirect impacts (e.g.: less down time for production loss and reduced business disruption after an earthquake or similar events).
 - Intangible impacts (e.g.: better built structures will offer tenants a greater sense of security, just as evacuation plans and frequently checked fire extinguishers create a feeling of safety).
 - Secondary impacts (these impacts could be the same as the indirect impacts, but usually work through the markets that link wholesalers with retailers and retailers with consumers).
6. Recently, DFID, UNDP and the EU prepared a report “Earthquake Risk Assessment of Dhaka, Chittagong and Sylhet City Corporation Area” (CDMP, 2009). This report presents a seismic risk assessment of the buildings, essential facilities and lifelines based on a GIS database that was developed from existing secondary data and field surveys in the DCCs and SCC areas. The assessment provides different scenarios of earthquake occurrence and estimations of damage as well as human and economic impacts in those study areas. The analyses are run on HAZUS

software package. The HAZUS risk assessment methodology includes interdependent modules of (1) potential earth science hazard assessment; (2) inventory of buildings, essential facilities and lifelines; (3) direct physical damage calculations; (4) induced physical damage calculations; and (5) direct economic/social losses.

7. In the CDMP study, the worst damage caused out of four analyzed scenarios estimates that about 270,604 buildings will be at least moderately damaged in the DCCs area. This is over 83 percent of the total number of buildings in the city. There are an estimated 238,164 buildings that will be damaged beyond repair. In Sylhet, damage caused out of five analyzed scenarios estimates that about 51,858 buildings will be at least moderately damaged. This is over 99.50 percent of the total number of buildings in the city. There are an estimated 50,879 buildings that will be damaged beyond repair.

8. In the respective worst-case scenarios, among the lifeline systems, all major highway bridges will be at least moderately damaged in Dhaka and Sylhet. It is estimated that 748 potable water facilities, seven gas compressor stations, and 54,815 electrical power facilities will be at least moderately damaged in Dhaka. In Sylhet, 18 potable water facilities, one gas compressor station, and 9,057 electrical power facilities will be at least moderately damaged. For the utility network, there will be around 1,016 leaks and breaks of potable water pipelines and 684 leaks and breaks of natural gas pipelines in Dhaka. In Sylhet, there will be around 122 leaks and breaks of potable water pipelines and 97 leaks and breaks of natural gas pipelines.

9. The earthquake in the worst-case scenario will generate 72 and five millions of tons of debris in Dhaka and Sylhet respectively. It will also trigger 107 fires following earthquake in Dhaka, and 13 fires in Sylhet.

10. Before the earthquake, there are 59,849 hospital beds available for use in the DCCs area. On the day of the earthquake with the worst-case scenario, the model estimates that only 7,441 hospital beds (12 percent) are available for use by patients already in the hospital and those injured by the earthquake.

11. In Sylhet there are 8,722 hospital beds available for use, and in the worst-case earthquake scenario, it is estimated that only 17 hospital beds (0 percent) are available for use by patients already in the hospital and those injured by the earthquake.

12. HAZUS estimates the number of fatalities to 260,788 and 20,708 for Dhaka and Sylhet respectively if the earthquake occurs during the night (2:00AM). The number of fatalities is expected to amount to 183,450, and 14,276 for Dhaka and Sylhet respectively if the earthquake occurs during day time (2:00PM).

13. In the worst-case scenario, the estimated total building-related economic losses amount to US\$15,603 million, and US\$1,105 million in the DCCs and SCC areas respectively. As for lifeline, the losses are US\$364 million and US\$117 million in Dhaka and Sylhet respectively.

A. Methodology

14. The Project will have many benefits, such as better coordination between emergency response units and better building code enforcement. These will reduce the risks to lives and assets from fires and other disasters that may happen in the normal course of events in the next 20 years.

15. As previously mentioned, without adequate historical data, it is not possible to measure these benefits. But the CDMP report provides a good indication of costs from various scenarios that could trigger both direct and indirect losses in the absence of adequate emergency preparedness measures. We thus focus here on the possible events of major earthquakes in Dhaka and Sylhet, the likelihood of which and resulting damages have already been calculated (CDMP, 2009). By focusing on nine scenarios of major earthquakes, we ignore any benefits that may result from normal fires and smaller earthquakes with minor damages. The benefit calculations are therefore underestimated.

16. Secondly, in the calculation of benefits, we only consider physical assets such as buildings and infrastructure. The worst-case estimates of the number of fatalities are 260,788 and 20,708 for Dhaka and Sylhet.

17.

18. Table A7.1 shows the estimated fatalities under various earthquake scenarios in the two cities. We do not take into account the additional number of lives that could be saved or the injuries that could be avoided by the Project. The CDMP report estimates that under the worst-case scenario, there will be 260,788 deaths in Dhaka and 20708 deaths in Sylhet (Table 1). Other than the statistical value of lives that we do not measure, these omitted benefits also include the prevention of productivity loss by reducing the likelihood of injuries.

Table A7.1: Estimated Worst-Case Fatalities for Various Earthquake Scenarios in Dhaka and Sylhet

Earthquake Scenarios	Dhaka	Sylhet
1	88,503	9,506
2	58,858	892
3	95,267	4,723
4	260,788	13,107
5		20,708

19. This analysis considers the likelihood of four possible earthquake scenarios in Dhaka and five possible earthquake scenarios in Sylhet. Based on the above, the benefits from the four different component streams can be defined as

$$B_b = \begin{cases} V_b \sum_{d=1}^5 DR_d \cdot \Pr(DR_d) & \text{for } b = 1 \\ I_b V_b \sum_{d=1}^5 DR_d \cdot \Pr(DR_d) & \text{for } b = 2 - 4 \end{cases}$$

20. Where B_b is the benefit from stream $b=1-4$, and $b=1$ indicates the direct benefits from the retrofitting of the emergency control building, $b=2,3$, and 4 are prevention of economic losses, prevention of losses from direct damage to buildings and infrastructure, prevention of losses from fire following earthquakes respectively. DR_d and $Pr(DR_d)$ are the damage ratio for the type d and its probability respectively. The index values of $d = 1-5$ represent the state of damage: none, slight, moderate, extensive, and complete. V_b is the value of the benefit for $b = 1$ and the value of losses for $b=2-4$. I_b is the project impact in terms of proportion of averted losses.

21. Then the net present value (NPV) of the Project is calculated as:

$$NPV = \sum_{t=0}^{20} \frac{(1+g)^t}{(1+\delta)^t} \left[\sum_{c=1}^2 \sum_{s=1}^{s_c} P_{cst} \sum_{b=1}^4 B_{bcst} \right] - K_t$$

22. Where subscripts t , c , and s , are indices of time, city, and earthquake scenarios respectively, δ and g are discount and gross municipal product growth rates, s_c takes the value 4 for Dhaka and 5 for Sylhet, P_{cst} is the probability that the earthquake scenario s will happen in city c in the year t , and K_t is the cost of the Project in the year t . K_t takes the value of one-fifth total costs for the first five years and then O&M costs ranging from 0.5 to 1.0 percent of total costs for the remaining years.

23. The internal rate of return (IRR) is value of δ for which $NPV = 0$.

B. Cost Calculations

24. For the purposes of the economic analysis, the total cost of the Project is taken to be US\$82 million to be disbursed in equal amounts over the five-year period from 2015 to 2019. Following the end of the Project, the continued operating and maintenance costs of the Project is considered to be between 0.5 and 1.0 percent of the overall costs.

C. Counterfactual Loss Calculations Without the Project

25. To understand the counterfactual of potential losses from major earthquakes, we begin with the components of measured benefits. The measured benefits are divided into four components; the first component looks at the two emergency control building to be constructed in Dhaka and Sylhet. The Project aims to make these buildings resistant to damages from earthquakes. Thus, the first benefit comes from the prevention of the loss of these buildings and disaster management equipment in the buildings. Table A7.2 shows the exposure values for the control building retrofitted under the Project.

Table A7.2: Exposure Values for the Control Buildings Retrofitted under the Projects

	Building (US\$ m)	Content: Equipment and Furniture (US\$ m)
Dhaka	15	20
Sylhet	12	15

26. The second component of the benefits stems from the prevention of damages to the buildings and lifeline infrastructure. CDMP (2009) estimated there are 326,000, and 52,000 buildings in the DCCs and SCC areas respectively. The buildings in Dhaka include 600 hospitals, 2,737 schools, 10 fire stations, 62 police stations and 18 emergency response agency offices. The buildings in Sylhet include 87 hospitals, 211 schools, two fire stations, six police stations, and nine emergency response agency offices. These buildings have an aggregate total replacement value of US\$16,759 million for Dhaka, and US\$940 million for Sylhet. The total population of Dhaka and Sylhet are approximately 7.2 million and 0.4 million respectively.

27. The lifeline inventory in the DCCs area includes over 1,270 kilometers of highway road, 10 highway bridges, and 2,582 kilometers of potable water, waste water, and gas pipes. In Sylhet, the lifelines include 148 kilometers of highway road, two highway bridges, and 268 kilometers of potable water and gas pipes.

28. Table A7.3 shows the replacement values of these assets in Dhaka and Sylhet.

Table A7.3: Exposure Measured as Replacement Value of all Assets in Dhaka and Sylhet

	Buildings (US\$ m)	Lifeline (US\$ m)
Dhaka	16,764	1,974
Sylhet	926	232

29. The third component of the benefits stems from the prevention of economic losses from lost productivity and other factors. The fourth and final component of the benefits stems from the prevention and suppression of fire that result as an aftermath of large earthquakes.

30. Based on the values of the assets as well as the state of damage and their corresponding probabilities, the expected losses were calculated for three types of losses for the various earthquake scenarios in each city: (a) expected economic losses stemming from damages to the buildings and lifeline infrastructure, (b) expected direct losses from damages to the buildings and lifeline infrastructure, and (c) expected losses due to fire following earthquakes.

32. Table A7.4 and Table A7.5 show these expected losses in Dhaka and Sylhet.

Table A7.4: Expected Losses from Different Earthquake Scenarios in Dhaka

Dhaka	Expected losses from earthquake scenarios (US\$m)			
	1	2	3	4
Economic losses	6,371	3,632	6,631	15,967
Direct losses of building and infrastructure	6,259	3,828	7,247	14,536
Losses due to fire following earthquake	1.2	1.1	4.8	5.5

Table A7.5: Expected Losses from Different Earthquake Scenarios in Sylhet

Sylhet	Expected losses from earthquake scenarios (US\$m)				
	1	2	3	4	5
Economic losses	624	78	381	818	1,222
Direct losses of building and infrastructure	714	148	497	864	1,141
Losses due to fire following earthquake	0.1	0.1	0.2	0.1	0.2

D. Economic Analysis

33. We assume the Project will reduce the expected economic losses by at least 3 to 10 percent. The reduction of the expected economic loss will occur through the following channels: (a) direct losses to building and infrastructure will be reduced through better building code enforcement derived from capacity building and training; (b) better emergency management response will be derived from a more robust emergency management infrastructure as well as the emergency response equipment funded by the Project (this will reduce losses due to fire following an earthquake); and (c) economic losses due to loss of productivity.

34. The four earthquake scenarios for Dhaka and five scenarios for Sylhet defined by the CDMP report are based on hypothetical parameters of earthquake magnitude, location, depth and type of faulting. For this analysis, the annual probability of occurrence was derived from our best scientific judgment based on the literature review and discussions with international seismologists whose expertise extends to Bangladesh.

35. We reviewed existing, credible scientific literature and focused on three documents that provide information on recurrence rates for seismic zones for Bangladesh. They included active fault mapping documents (CDMP, 2013), Sil et al (2013) as well as the CDMP unpublished report (CDMP unpubs.). We acknowledge there is great uncertainty in determining recurrence rates for seismic zones for Bangladesh. Some of these uncertainties arise from the definition of equal area probabilities within seismic zones, and event characterization to limited knowledge of maximum likelihood of earthquakes.

36. We used the most conservative set of recurrence intervals of the three studies, which was in the CDMP 2013 study. As the study does not provide recurrence interval for all scenarios required, we used scientifically peer reviewed information from Sil et al., (2013) and applied those

to the CDMP 2013 study to deduce the remaining recurrence rates for all scenarios for Dhaka and Sylhet. The annual rates of recurrence for Dhaka and Sylhet for the respective scenarios are presented in Table A7.6. We also considered other earthquakes that might not cause damage due to their small magnitude. This magnitude threshold based on our seismological evidence and literature, such as Sil et al (2013), was set at magnitude 4.5.

Table A7.6: Magnitude and Probability of the Occurrence of Earthquake Scenarios for Dhaka and Sylhet

Scenarios	Dhaka		Sylhet	
	Magnitude (Mw)	Probability	Magnitude (Mw)	Probability
No Earthquake (0)	0	0.95	0	0.611066
1	7.5	0.000575	8	0.002857
2	8	0.00257	8.3	0.001054
3	6	0.004731	6	0.047417
4	8.5	0.001035	8	0.002857
5			8.5	0.001416
Others	4.5	0.038462	4.5	0.333333

37. We assume zero expected damage from the category of other earthquakes of magnitude 4.5, captured by the column “Others” in Table A7.6. For example, Table A7.6 shows a one in three probability of other earthquakes in Sylhet. However, these lower magnitude earthquakes may have less damage. By ignoring these losses, we estimate a lower bound of project benefits.

E. Simulations

38. A Monte Carlo simulation analysis was performed to account for the uncertainty in the areas of O&M, project impacts, and the future growth rates of the two cities. The simulation covers a period of 20 years using a discounting rate of 12 percent. The 20-year project life assumption is on the lower end, which leads to conservative results.

39. The O&M costs K_t for the years 2020 to 2035 (0.5-1.0 percent), the project impacts I_b (3-10 percent) and city growth rates g (5-7 percent) are randomly drawn from the respective ranges of uniform distribution 1000 times and NPV and IRR are calculated for each draw. Table A7.7 shows the descriptive statistics for IRR and NPV.

40. Overall the Project fares very well with IRR of 21.6 percent and NPV of about US\$73 million. The probability that the IRR would fall below 12 percent is zero. The possible IRR ranges of between 13.6 and 28.2 percent show that the rate of return on the investments is sufficiently high and satisfactory, even when values of the variables that impact benefits are at their probable lower ends.

Table A7.7: Simulation Results for IRR and NPV

	IRR	NPV (m\$)
Expected Value	21.6%	73
Standard Deviation	2.7%	25
Minimum	13.6%	9
Maximum	28.2%	145
Coefficient of Variance	0.13	0.35
Probability of Low*	0.0%	0.0%
Outcome		
*Low: < 12% IRR, < 0 NPV		

F. References

Comprehensive Disaster Management Program (CDMP) – Ministry of Disaster Management and Relief, Bangladesh (2013), *Report of active fault mapping in Bangladesh: Paleo-seismological study of the Dauki fault and Indian-Burma plate boundary fault*, pp 67.

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