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PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED CREDIT

IN THE AMOUNT OF SDR 35.9 MILLION
(US\$55.6 MILLION EQUIVALENT)

TO THE

REPUBLIC OF SENEGAL

FOR A

STORMWATER MANAGEMENT AND
CLIMATE CHANGE ADAPTATION PROJECT

April 12, 2012

Africa Environment and Natural Resources Management Unit (AFTEN)
Sustainable Development Department
Africa Region

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CURRENCY EQUIVALENTS
(Exchange Rate Effective January 31, 2012)

Currency Unit = CFA Franc
FCFA 497.80 = US\$1

FISCAL YEAR
January 1 – December 31

ABBREVIATIONS AND ACRONYMS

APIX	Agency for Promotion of Large Investments (<i>Agence Nationale chargée de la Promotion de l'Investissement des Grands Travaux</i>)
BOM	Built Operate Maintain
BOT	Built Operate Transfer
CAS	Country Assistance Strategy
CADAK	Urban Community of Dakar (<i>Communauté des Agglomérations de Dakar</i>)
CDD	Community-Driven Development
CDV	Municipal Agreement (<i>Contrat de Ville</i>)
CMU	Country Management Unit
CPAR	Country Procurement Assessment Review
DAT	Department of Land-use Planning (<i>Direction de l'Aménagement du Territoire</i>)
DAU	Department of Urban Sanitation (<i>Direction de l'Assainissement Urbain</i>)
DECEF	Department of Economic and Financial Cooperation (<i>Direction de la Coopération Economique et Financière</i>)
DEEC	Department of Environment and Classified Entities (<i>Direction de l'Environnement et des Etablissements Classés</i>)
DSCOS	Department of Surveillance, Control and Land use (<i>Direction de la Surveillance, Contrôle et Occupation des Sols</i>)
DPC	Department of Civil Protection (<i>Direction de la Protection Civile</i>)
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
DUA	Department of Urban Planning and Architecture (<i>Direction de l'Urbanisme et de l'Architecture</i>)
EU	European Union
FERA	Road Maintenance Fund (<i>Fonds d'Entretien Routier Autonome</i>)
GDP	Gross Domestic Product
GFDRR	Global Facility for Disaster Reduction and Recovery
GIS	Geographic Information System
GOS	Government of Senegal
ICB	International Competitive Bidding
ISC	Implementation Support Consultant
JAAXAY	<i>Programme "JAAXAY" / Flood related governmental resettlement program</i>
LADP	Local Authority Development Project (<i>Projet de Renforcement et d'Equipement des Collectivités Locales – PRECOL</i>)

MDA	Municipal Development Agency (<i>Agence de Développement Municipal – ADM</i>)
MINT	Ministry of Interior (<i>Ministère de l’Intérieur</i>)
MHCH	Ministry of Habitat, Construction and Hydrology (<i>Ministère de l’Habitat, de la Construction et de l’Hydraulique</i>)
MOU	Memorandum of Understanding
MTR	Mid-Term Review
NAPA	National Action Plan for Adaptation (<i>Plan d’Action National d’Adaptation aux changements climatiques – PANA</i>)
NCB	National Competitive Bidding
NDF	Nordic Development Fund
NGO	Non-Governmental Organization
O&M	Operation and Maintenance
ONAS	National Sanitation Office (<i>Office National de l’Assainissement du Sénégal</i>)
ORSEC	National Emergency Plan (<i>Plan National d’Organisation des Secours</i>)
PDA	Sanitation master plan (<i>Plan Directeur de l’Assainissement</i>)
PDNA	Post Disaster Needs Assessment
PDU	Urban master plan (<i>Plan Directeur d’Urbanisme</i>)
PIC	Communal Investment Plan (<i>Plan d’Investissement Communal</i>)
PIP	Priority Investment Program (<i>Programme Prioritaire d’Investissement</i>)
PRSP	Poverty Reduction Strategy Paper
LDP	Local Development Plan
PNAT	National Land-use Plan (<i>Plan National d’Aménagement du Territoire</i>)
SAP	Early-Warning System (<i>Système d’Alerte Précoce</i>)
SC	Steering Committee
SDAU	Urban land-use master plan (<i>Schéma Directeur d’Aménagement et d’Urbanisme</i>)
SONES	National Water Utility (<i>Société Nationale des Eaux du Sénégal</i>)
SRAT	Regional Land-use Plans (<i>Schémas Régionaux d’Aménagement du Territoire</i>)
TA	Technical Assistance
TC	Technical Committee
TWG/GTO	Technical Working Group (<i>Groupe Technique Opérationnel</i>)
World Bank	International Development Association/IDA

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SENEGAL
Stormwater Management and Climate Change Adaptation Project

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PAD DATA SHEET

Senegal

Stormwater Management and Climate Change Adaptation Project

PROJECT APPRAISAL DOCUMENT

Africa Region

Africa Environment and Natural Resources Management Unit AFTEN

Basic Information	
Date: April 12, 2012 Country Director: Vera Songwe Sector Manager/Director: Idah Z. Pswarayi-Riddihough (AFTEN) Jamal Saghir (SDN) Project ID: P122841 Lending Instrument: Specific Investment Loan Team Leader: Denis Jean-Jacques Jordy	Sectors: Flood protection (60%); General water, sanitation and flood protection sector (40%) Themes: Other urban development (20%); Natural disaster management (30%); Climate change (30%); Other environment and natural resources management (20%) EA Category: A – Full Assessment
Does the project include any CDD component? No.	
Joint IFC: No	
Borrower: Republic of Senegal	
Responsible Agency: Municipal Development Agency (Agence de Développement Municipal, ADM)	
Contact: Mouhamadou Kabir SOW Telephone No.: 221 849 2710	Title: Director General Email: dg.adm@orange.sn
Project Implementation Period:	Start Date: May 10, 2012 End Date: December 31, 2017
Expected Effectiveness Date:	September 1, 2012
Expected Closing Date:	December 31, 2017
Project Financing Data(US\$M)	
<input type="checkbox"/> Loan <input checked="" type="checkbox"/> Credit	<input type="checkbox"/> Grant <input type="checkbox"/> Guarantee
The credit has a final maturity of 40 years including a grace period of 10 years.	

For Loans

Total Project Cost : US\$72.9 million
 Total Cofinancing : US\$17.2 million

Total Association
 Financing : US\$55.6 million

Financing Source	Amount (US\$M)
IBRD	
IDA: New	55.6
IDA: Recommitted	0
Others:	
NDF (Co-funding)	4.0
GoS	10.6
MDA	2.6
Total	72.9

Expected Disbursements IDA (in US\$ Million)

Fiscal Year	2013	2014	2015	2016	2017	2018
Annual	4.4	19.5	22.8	5.2	2.0	1.7
Cumulative	4.4	23.9	46.7	51.9	53.9	55.6

Project Development Objective

The objectives of the Project are to improve stormwater drainage and flood prevention in peri-urban areas of Dakar for the benefit of local residents.

Components

Component Name	Total Cost (US\$ Million)
A. Flood Risk Mainstreaming in Urban Sector	3.9
B. Drainage Investment and Management	55.8
C. Community Engagement in Urban Flood Risk Reduction and Adaptation to Climate Change	4.4
D. Project Coordination, Management, Monitoring and Evaluation	8.8

Compliance**Policy**

Does the project depart from the CAS in content or in other significant respects?	Yes	[]
	No	[X]
Does the project require any exceptions from Bank policies?	Yes	[]

	No	<input checked="" type="checkbox"/>
Have these been approved by Bank management?	Yes	<input type="checkbox"/>
	No	<input type="checkbox"/>
Is approval for any policy exception sought from the Board?	Yes	<input type="checkbox"/>
	No	<input checked="" type="checkbox"/>
Does the project meet the Regional criteria for readiness for implementation?	Yes	<input checked="" type="checkbox"/>
	No	<input type="checkbox"/>
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 Waters OP/BP 7.50		X
Projects in Disputed Areas OP/BP 7.60		X
Conditions and Legal Covenants		
Name	Due Date	
The Subsidiary Agreement has been executed on behalf of the Recipient and the Project Implementing Entity.	By effectiveness	
The Project Implementation Manual has been adopted.	By effectiveness	
The Implementation Support Consultant has been hired.	By effectiveness	
The Municipal Agreements have been executed on behalf of the Project Implementing Entity and each of the Targeted Municipalities.	By effectiveness	
The Recipient has recruited the external auditor, an accountant and a procurement specialist.	Not later than 120 days after effectiveness	
The accounting software has been upgraded.	Not later than 120 days after effectiveness	
The Recipient shall ensure that, for its Fiscal Years 2015 and 2016, funds are allocated to cover the operation and maintenance costs of the stormwater drainage systems of the Targeted Municipalities, in amounts which the Association agrees are adequate for said purpose.	During implementation, starting on Fiscal year 2015-2016	
The Co-financing agreement is effective.	December 31, 2012	
Team Composition		

Bank Staff					
Name	Title	Specialization	Unit	UPI	
Denis Jean-Jacques Jordy	TTL, Senior Environmental Specialist	Team Lead	AFTEN	266183	
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Fadi Doumani	Sr. Environmental Economist	1 202 223 2623	Washington		
Fadhel Ghariani	Sr. Institutional Specialist, Water and Sanitation Sector	216 71 793 270	Tunis/Tunisia		
Locations					
Country	First Administrative Division	Location	Planned	Actual	Comments
Senegal	Dakar region	Municipalities of			

		Pikine and of Guédiawaye			
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I. STRATEGIC CONTEXT

A. Country Context

1. Senegal covers a land area of 197,000 km² and has a very unevenly distributed population of about 12.7 million.¹ The climate is tropical with two seasons: the dry season (October to May) and the rainy season (June to September). Dakar, its capital city, is located at the westernmost tip of the country on the Cap-Vert peninsula.

2. The country is increasingly urbanized with more than 42 percent of the population living in cities and notably in the Dakar Metropolitan Area. The region of Dakar covers only 0.3 percent of the national territory but hosts about 2.7 million (24 percent) of the national population² and concentrates 80 percent of economic activities. The annual urban population growth rate is estimated at 3 percent.³ The city's infrastructure, built to accommodate 300,000 people, is over-stretched. Over 90 percent of the population in peri-urban Dakar (Pikine and Guédiawaye) lives in areas classified as slums or spontaneous settlements.⁴

3. Natural disasters such as floods, droughts and storm surges have been increasingly noted and climate change is expected to increase the extremes of weather patterns and natural hazards in the country (e.g. flooding, sea-level rise, coastal erosion, etc.). They are exposing both the urban and rural poor population to increasing stress and poverty. The vulnerability of Senegal to natural disasters and climate change related changes is largely linked to its 700 km coastline open to the Atlantic Ocean, its latitudinal position which is in a transition zone between the Sahelian climate and the Guinean climate which causes significant rainfall variations within the country, and the existence of two major river systems which results in potentially high groundwater levels during the rainy season. The country ranks 9th in the world related to the largest share of its urban population living in low elevation coastal zones (Dakar, Saint Louis, Thies, Matam, Kaolack, Diourbel, Kolda, Kaffrine and Tambacounda).⁵ This physical vulnerability is exacerbated by a low economic development with GDP per capita of US\$1,900 in 2010,⁶ limited capacity to create permanent and more sustainable jobs, low agriculture production, inadequate resource allocation for urban and social services, and a general land-use planning failure.

4. Climate variability and climate change in the urban areas impact human health, livelihoods and assets, especially of the most vulnerable population women and children, living primarily in fast increasing informal settlements including peri-urban Dakar. Urban adaptation aims at mainstreaming climate change in national policies and programs, urban and land use planning as well as to build climate resilience through community based participatory approaches and awareness raising.

¹ ANSD (National Statistical Office Senegal); CIA World Factbook

² UN-Habitat 2006 and UN-Habitat Country programme Senegal 2008-2009

³ UN-Habitat 2006

⁴ PDU (National urban masterplan) Dakar: Horizon 2025 ; ANSD 2003: Dakar 950,331, Pikine 774,314 and Guédiawaye 248,809

⁵ GRUMP database: Gordon McGranahan, Deborah Balk, Bridget Anderson (2007) "The rising tide: assessing the risks of climate change and human settlements in low-elevation coastal zones" in "Environment and Urbanization, Vol. 19, No. 1, pp. 17-37

⁶ CIA World Factbook

B. Sectoral and Institutional Context

5. Recurrent stormwater flooding is the most serious natural hazard Senegal has been facing over the last three decades. From 1980 to 2008, floods have affected an estimated 400,000 to 600,000 people a year and caused significant damage to infrastructure, public equipment and private property along with economic losses.⁷ In 2009, heavy rainfall once again caused serious flooding in Senegal, particularly in Dakar but also in the rest of the country. According to Government figures about 360,000 people were directly affected. A Post Disaster Need Assessment (PDNA) assessed the cost of the 2009 flooding in Senegal at US\$104 million, including almost 56 million for damages and 48 million for losses.⁸ The peri-urban areas of Dakar were the most affected, with the cost of flooding estimated at US\$82 million.

6. In peri-urban Dakar, flooding has become a recurrent reality since the devastating floods in 2005. They are not only caused by heavy rains but also by unplanned urbanization, the lack and/or obstruction of drainage systems and rising groundwater. Paradoxically, the drought in recent decades is partly responsible for the flooding, because most of the flood-prone areas were urbanized during this period. A recent study financed by GFDRR⁹ highlighted that almost 40 percent of new population in peri-urban Dakar has settled in areas with significant hazard potential, especially inland flooding. Because of the absence of the drainage system or lack of maintenance, and the obstruction of natural drains by urbanization, the stormwater is no longer evacuated and increases the level of groundwater (“nappe de Thiaroye”)¹⁰, aggravating the vulnerability. Although the rains that caused the floods during the last decade were not exceptionally heavy, climate change and variability may probably make flood risks worse through more frequent and severe extreme-weather events, sea level rise and stronger storm surges.

7. The PDNA, concluded that it was critical to address the underlying causes of the recurrent floods and outlined a medium and long-term strategy for flood risk reduction, based on a combination of structural and non structural measures. The priority actions identified in the PDNA include: (i) preparing a master plan for stormwater drainage as planning tool for spatial and temporal interventions; (ii) establishing a primary drainage system for stormwater in priority areas of the periphery of Dakar; and (iii) supporting prevention and mitigation through appropriate urban planning and flood risk mapping, strengthening of flood disaster risk management mechanism and improved awareness and education efforts of affected communities. The proposed project is supporting the implementation of the PDNA priority actions.

⁷ GFDRR Climate Risk and Adaptation Country Profile Senegal, April 2011

⁸ PDNA was carried out at the request of the Ministry of Economy and Finance, under the leadership of the Ministry of Interior, from October 26 to November 13, 2009. The assessment was conducted by a joint team consisting of representatives of the Government of the Republic of Senegal and members of the international community, including the World Bank, United Nations agencies and the European Commission. It was funded by the Global Facility for Disaster Reduction and Recovery (GFDRR) with the financial support from the European Commission and the governments of Luxembourg, Norway and Sweden. Regarding damage, the sectors most affected were housing (49 %), health (14 %), agriculture (11 %), education (10 %) and transport (8 %). The losses mainly concern trade (20 %), public urban infrastructure (15 %), housing (16 %), energy (14 %) and transport (14 %). The private sector was the worst hit, with 65 % of the damages and 64 % of the losses.

⁹ Preparing to Manage Natural Hazards and Climate Change Risks in Dakar, Senegal, World Bank, Geoville, IAGU, June 2009

¹⁰ Thiaroye groundwater system is part of the hydrological groundwater table stretching from Dakar to Kayar (about 300km²) comprised of unconsolidated quaternary sand.

8. Many stakeholders are involved in stormwater management but without clear roles and responsibilities and no lead agency responsible for overall consistency. The principal sectoral ministries and actors involved in stormwater management are the ministries in charge of urban planning, interior, decentralization, housing, water, urban sanitation, and environment as well as the municipalities and inter-communal bodies. A national committee for flood protection was established in 2010 aiming to guide and coordinate flood related activities.

9. With regard to the issue of urban planning, there are many planning documents and technical and regulatory instruments (“Code de l’Urbanisme (Loi 2008-43)”, Strategic Urban Plan, Urban Master Plans, Local Detailed Urban Plans and Construction Plans) but none of them has succeeded in improving the planning and management of the rapidly increasing urban centers. For instance, the Urban Master Plan is hardly implemented for proper spatial evolution in the region. The Master Plan for Urban Planning and Preservation of the Niayes and the Green Zones of Dakar (PDAS, 2004) has not played its role yet, in terms of overall urban planning and preservation of urban wetlands. With respect to the issue of building regulation, Senegal has a Code of Urban Planning which regulates construction standards and has to be reviewed in an effort to integrate hazard aspects in building construction.

10. Limited stormwater drainage investments have been conducted especially in peri-urban Dakar but without a clear vision and coordination mechanism. The key challenges relate to (i) unclear and non-functional institutional mandates regarding infrastructure ownership and responsibility for operation and maintenance at national and local level; (ii) inadequate or nonexistent funds and budget for control and enforcement of regulations as well as infrastructure developments and operation and maintenance of urban services; (iii) municipalities and inter-communal entities with insufficient capacity; and (iv) the disconnect and lack of integration with other sub-sectoral issues (e.g. waste water and sanitation, solid waste, urban roads, disaster risk management, etc.). Inconsistencies in the current regulatory framework related to institutional mandates and responsibilities of entities in charge of waste water and stormwater management, particularly regarding operation and maintenance of such systems have been noted.¹¹ The lack of clarity on ownership has impacted accountability and resulted in limited investments and weak maintenance of existing drainage systems.

11. The project will complement and build synergies with other Bank-funded projects such as the Dakar Diamniadio Toll Highway Project, the Local Authority Development Project, the Water and Sanitation Millennium Program, and the Senegal Transport and Urban Mobility Project. These projects address urban development investments, especially the restructuring of Pikine Irrégulier Sud, in order to provide basic services, improve and extend water production and distribution systems, urban sanitation and drainage networks, on-site sanitation facilities, and rehabilitation and construction of transport network including in the peri-urban Dakar region; thereby generally improving the living conditions of the urban population. The proposed project will further benefit from and contribute to the complementary GFDRR funded “Disaster Risk Management and Climate Change Adaptation Project” that aims to strengthen the national mechanisms responsible for disaster early warning, preparedness and response with an initial focus on floods that will be implemented at the same time. The NDF has a long-standing

¹¹ See sector policy letter covering sanitation in urban and rural areas (2005); the “Code de l’Assainissement (Loi 2009-24)” and the law establishing the National Sanitation Office (Loi 96-02)

cooperation with the World Bank in financing projects in Senegal and the Board of NDF approved on March 12, 2012 the project proposal “Senegal - Flood Risk Management” with a Grant of EUR 3.0 million¹². The project is highly relevant for NDF climate change mandate and the proposed activities may benefit from experience gathered under other ongoing NDF funded climate change interventions in Senegal in terms of climate-proofing capacity building in different ministries and executing institutions.

C. Higher Level Objectives to which the Project Contributes

12. The seriousness of the flooding situation in Dakar and elsewhere is such that floods and Disaster Risk Management are permanently high on the agenda for the Government. The second generation of the Poverty Reduction Strategy Paper (PRSP) covering the 2006-2010 period, referred to “Disaster and Risk Prevention and Management” as a priority pillar, and promotes its systematic integration in sectoral plans and programs linked to social protection. It recognizes that disasters are a constraining factor for the country’s development. Disaster Risk Management (DRM) addressing urban vulnerabilities and flood risk reduction have been confirmed as a governmental priority in the new Economic and Social Policy Document (2011-2015). The project will also contribute to the implementation of the country’s National Climate Change Adaptation Program of Action (NAPA) as it will support the reduction of flood related risks and strengthen urban resilience to climate change in peri-urban Dakar.

13. The Project is consistent with the FY07-10 World Bank Country Assistance Strategy (CAS) for Senegal, approved by the Board on June 20, 2007, which is still valid until a new CAS is approved following the approval of the PRSP which is currently under preparation. The CAS has been designed to support the GoS’ Second PRSP for the period of 2006 to 2010, with an articulation around three pillars: (i) fostering economic growth through support to private sector development; (ii) improving human development through better delivery of social services, notably to the most vulnerable groups; and (iii) enhancing rural and urban synergies. The proposed project has a strong linkage with the broader urban, regional and territorial planning aspects, the lack of infrastructure and especially sanitation systems, and the impact of increased climate variability. The activity will also inform the preparation of the forthcoming CAS (FY12-FY14), which will include a spatial and integrated approach to development issues, with a strong focus on Disaster Risk Management and Climate Change adaptation.

14. The proposed project will strongly contribute to the implementation of the strategies developed by the World Bank with its client countries and development partners in the area of poverty reduction, urban development and climate change. The Bank strategy for Africa emphasizes that closing Africa's infrastructure gap is essential for driving productive development of urban growth poles and for building resilience to the negative effects of climate change and natural disasters, such as floods and droughts. More, the Bank’s Urban and Local Government Strategy for the Africa Region focuses on four areas: (i) increasing infrastructure and urban services access; (ii) enhancing local governments’ financial viability; (iii) improving governance and local government capacity; and (iv) managing cities vulnerability to environmental challenges. The proposed project links all four pillars but particularly addresses

¹² Cofunding to the “Stormwater Management and Climate Change Adaptation Project”.

the need to improve urban services to the poorest residents through strengthened urban planning and drainage investments thereby reducing overall vulnerability of targeted urban population to flood related risks and strengthening urban resilience and adaptation measures to climate change. The project is also consistent with the 2010 World Bank Climate Change Strategy for Sub Sahara Africa, ‘Making Development Climate Resilient’ which states that risk reduction and climate change adaptation need to be managed as a single integrated agenda and emphasizes mainstreaming hazard risk management in existing urban planning.

II. PROJECT DEVELOPMENT OBJECTIVE

A. PDO

15. The proposed Project will improve stormwater drainage and flood prevention in peri-urban areas of Dakar for the benefit of local residents.¹³

Project Beneficiaries

16. The beneficiaries from the Project interventions will be the populations having their permanent residence in the flood-prone areas of the project’s intervention zone (peri-urban Dakar: Pikine and Guédiawaye). There are currently about 1,2 million people (Pikine 900,000 and Guédiawaye 300,000) living in the project intervention zone, of which 600,000 people reside in flood-prone areas (see annex 2 for more socio-demographic details).¹⁴

17. The drainage investments (Component B) will be implemented through a phased approach based on the recently validated Drainage Master Plan¹⁵ (January 2012): the first investments will cover two (2) identified priority catchment areas (Dalifort and downstream Thiourour) where impact is most urgently needed; while the following investments will cover five (5) additional catchment sites (Downstream Yeumbeul north and Mbeubeus 3.1 to 3.4). Details are presented in annex 7.

18. *Direct beneficiaries:* The total number of people that will benefit directly from drainage investments in these selected catchment areas is about 130,000.¹⁶ At least half of the beneficiaries are expected to be female. The total number of people living in the targeted catchments is 424,670.

19. *Benefits:* By putting in place primary (and in some areas secondary) drainage channels, the project aims to improve the stormwater evacuation within the catchments targeted by the project, improve the pumping operations in neighbourhoods where drains cannot be put in place without urban restructuring, contribute to the decrease of groundwater level, and prepare the

¹³ Definitions: (i) Peri-urban Dakar in this context comprises the territories of the municipalities of Pikine and Guédiawaye; (ii) Local residents are defined as citizen with their primary residence in the area.

¹⁴ Diane, 2002

¹⁵ “Drainage Master Plan” means the Recipient’s drainage master plan for the peri-urban areas of Dakar entitled “Drainage Master Plan Study for Stormwater of the Peri-Urban Areas of Dakar” and adopted by the Recipient on January 25, 2012. The Drainage Master Plan is a living instrument and may be updated from time to time

¹⁶ MDA assessment based on existing ANSD and topographic data, 2010 drainage preparation study and finalized drainage master plan 2012.

ground for future investments in tertiary drainage investments and urban restructuring programs of slums and irregular settlements and therefore reduce inundation risks in the intervention areas. The expected additional benefits to local residents¹⁷ include: (i) improvement of general urban sanitary situation; (ii) improvement of (permanent) access to and protection of social infrastructure (health posts, schools, community centres, etc.) during rainy season; (iii) increased health status of residents, particularly children, due to reduction of vector-borne diseases;¹⁸ and (iv) increased employment and/or generation of revenues through participation in community investments and drainage works as well as securing economic activities in the project area.

20. *Gender (for details see annex 2 and 3).* Women and children are particularly vulnerable to floods and other natural hazards in urban settings because they have limited access to resources, restricted rights, limited mobility and often limited possibilities in participating in decisions and raising their voices. Gender equality and the empowerment of women will be supported by the project design across all project components and the project implementation arrangements. Gender mainstreaming is addressed at all levels, from development and strengthening of local capacity participation in urban planning and decision-making processes at local committee and municipal level to actual implementation, especially through the highly participatory community investments and inclusive awareness raising campaign.

PDO Level Results Indicators

21. Achievement of the project's development objective will be assessed through the following two indicators:¹⁹

- Direct beneficiaries (number) of which female (50 percent)²⁰
- Area protected against regular flooding through drainage works (ha)

III. PROJECT DESCRIPTION

A. Project Components

22. The project consists of four components described in subsequent paragraphs (see annex 2 for a detailed project description).

Component A. Flood Risk Mainstreaming in the Urban Sector (total US\$3.9 million including taxes and contingencies).

¹⁷ A baseline survey in year one as part of the impact evaluation process will collect baseline data related to benefits of reduced inundation (see annex 1 and 3) with a particular focus on gender related data.

¹⁸ PNDA Senegal 2009, p. 50 – 51: In 2009 a comparison prior and after floods showed substantial increases (almost doubled) in respiratory infections, malaria and diarrheas and impacted the mortality particularly of children in Pikine.

¹⁹ The M&E system is based on the results framework (see annex 1) and the proposed impact evaluation exercise (see annex 1). The M&E system will further include monitoring of the following additional two indicators: (i) # of flood days reduced; and (ii) the price of land used in the economic analysis.

²⁰ Direct beneficiaries are residents in permanently flooded/high risk areas which benefit immediately from drainage infrastructure investments (see RF methodology in annex 1).

23. Component A will comprise three sub-components: (i) Urban planning and management aiming to integrate flood risks into local and national urban planning and management tools to ensure short- and medium-term flood prevention and decreased vulnerability; (ii) Institutional strengthening of national government departments (particularly DAU, DUA, DSCOS, DPC, ONAS) and municipalities of Pikine and Guédiawaye through development and implementation of a module-based training program to address flood risk management and urban climate change adaptation; (iii) Development of an integrated urban flood risk and stormwater management program in the peri-urban areas of Dakar²¹, as well as a national strategy on urban flood risk and climate change adaptation for Senegal based on diagnostic studies in selected cities that are exposed to high flood-risks.

24. The component will provide for (i) consultant services and technical assistance; (ii) goods and small equipment, including GIS-equipment, computers, and office equipment; and (iii) carrying out training and capacity building activities including travel costs related to south-south exchanges. The component is co-funded by NDF to support: (i) GIS equipment and services, (ii) development of communal disaster risk management and climate change action plans for Pikine and Guédiawaye and implementation support for priority activities, (iii) training program, and (iv) design of an integrated follow-up program and diagnostic studies for a national strategy.

Component B. Drainage Investment and Management (total US\$55.8 million including taxes and contingencies).

25. Component B will comprise two sub-components: (i) Drainage infrastructure investments, and (ii) Operation and maintenance of drainage systems. The component aims at establishing a primary drainage system in priority areas of the districts of Pikine and Guédiawaye; to be done in subsequent investments phases and to ensure its effective operation and maintenance through clear institutional responsibilities and adequate financial, technical and human capacity. The component will support rapid response measures related to drainage and stormwater management for extreme floods as well as support the development and implementation of an impact evaluation process in selected phase one investment sites. The first priority investments compliant with the Drainage Master Plan, will cover two catchment areas (Dalifort; and downstream Thiourour including Wakhinane Nimzat, Niety Bar and Bagdad) and will include additional basic urban rehabilitation such as access road improvement, including road connections as a pilot investment that could be scaled up within forthcoming urban development programs. Subsequent investments in phase 2 will cover five additional catchment sites (Mbeubeus 3.1 to 3.4 and downstream Yeumbeul north).

26. The component will provide for (i) consultant services (hydraulic, urban planning) and technical assistance in form of an Implementation Support Consultant (ISC) team assisting the Municipal Development Agency (MDA) and municipalities with implementation and detailed feasibility and technical studies (see annex 4); (ii) goods and equipment needed to support implementation; (iii) works to establish primary drainage system in identified catchment target sectors; (iv) resettlement action plans' related costs; and (v) emergency drainage works and

²¹ Greater Dakar : Dakar, Rufisque, Pikine and Guédiawaye

stormwater management in case of extreme floods. The component is co-funded by NDF to support the impact evaluation process.

Component C. Community Engagement in Urban Flood-Risk Reduction and Adaptation to Climate Change (total US\$ 4.4 million including taxes and contingencies).

27. Component C will comprise two sub-components: (i) Flood resilience awareness, communication and community capacity-building, and (ii) Flood risk-reduction community investments. The component aims at increasing local and national awareness of flood prevention and adaptation measures and to engage municipalities, local residents and community groups within Pikine and Guédiawaye in the project supported preventive measures and responses to reduce the risk of recurrent floods. The component will develop an information, education and communication (IEC) strategy and media support tools targeting local and national stakeholders focusing on stormwater management and flood prevention, preparedness and response, awareness raising and behavioral changes for promoting stronger resilience. Implementation of this strategy at local level will be done by selected “social facilitators” (non-governmental, consulting firms). Throughout project duration, these social facilitators will carry out a highly consultative and participatory process involving local stakeholders and communities to accompany the larger infrastructure investments under component B, to ensure community participation in stormwater management, drainage operation and maintenance, flood prevention. The facilitators will further assist with the development, implementation and monitoring of flood risk reduction community investments²² under MDA’s supervision. The operational modalities including eligibility criteria and procedures are defined in the project’s implementation manual.

28. The component will provide for: (i) consultant services for the development of the IEC strategy and tools as well as technical assistance for carrying out the development, implementation and monitoring of the community investments (social facilitator)); and (ii) community investments including technical assistance, small works, goods, equipment and operating costs needed. The component is co-funded by NDF to support (i) the IEC strategy.

Component D. Project Coordination, Management, Monitoring and Evaluation (US\$8.8 million including taxes and contingencies).

29. Component D will comprise two sub-components: (i) Project coordination and management, and (ii) Monitoring and evaluation. It aims at providing efficient and effective management support for project implementation and monitoring and evaluation. The Project will carry out an impact evaluation of interventions under component B and, possibly, component C, and adequate resources will be made available to carry out a baseline survey and a final evaluation survey at project closure. This will be achieved by supporting the MDA with adequate technical and fiduciary staffing, operational support and equipment and guided by a detailed project implementation manual and M&E plan.

30. The component will provide for: (i) technical and fiduciary consultant support services to strengthen MDA capacity (civil works engineer, monitoring and evaluation officer, accountant,

²² Investments are understood as a combination of soft and hard measures.

procurement specialist and contract manager); (ii) support to the steering committee (mainly workshops) (iii) goods and equipment (computers, office furniture and equipment, vehicles); (iv) training for MDA's staff; (v) financial and technical audit; and (vi) MDA incremental operating costs to assist with project implementation and monitoring. The component is co-funded by NDF to assist MDA's capacity related to M&E through a full-time consultant during project implementation.

B. Project Financing

Lending Instrument

31. The proposed Project will be financed through a US\$55.6 million equivalent International Development Association (IDA) credit.

Project Cost and Financing

32. Total project financing requirements are estimated at US\$72.9, inclusive of price and physical contingencies, taxes and the front-end fee. The Project will be financed as follows: IDA will finance US\$55.6 million, GoS will finance US\$10.6 million for operation and maintenance of drainage systems, cash compensation and land acquisition as part of the Resettlement Action Plan (RAP) and project operating costs; and MDA will finance US\$2.6 million for MDA staff and operating costs (goods and consultants).

33. Cofinancing from international development partners stems from a EUR 3 million grant (equivalent to US\$4 million) from NDF for urban climate resilience related technical assistance (goods and consultants).

34. While NDF cofinancing will be administered separately, it will fund fully earmarked activities of the hereby presented project design. The NDF will finance climate change related activities including under component A the equipment and establishment of an open data GIS system and the production of flood risk maps of the project area; the development and implementation of a flood prevention and climate change adaptation training program; and the development and implementation of communal disaster risk management and climate change action plans for Pikine and Guédiawaye while under component C NDF will finance the development and implementation of an IEC strategy as well as support for an international consultant to assist MDA and social facilitators with the implementation of communal action plans through community investments and monitoring of climate change adaptation measures supported by the project.

35. The following table presents the project financing plan including contingencies.

Table 1: Stormwater Management and Climate Change Adaptation Project
Project Financing Plan including contingencies
(In US\$ Million)

	Total	IDA	NDF	ADM	GOV
A. Flood risk mainstreaming in urban sector					
1. Urban Planning and Management	1.4	0.8	0.6	-	
2. Institutional strengthening of central government departments and municipalities	1.3	0.8	0.5	-	
3. Integrated Urban Stormwater and Management and Climate Change Adaptation program	1.2	0.0	1.0	-	
Subtotal	3.9	1.7	2.2	-	-
B. Drainage investment and management					
1. Drainage infrastructure investment	50.8	45.0	0.6	-	5.3
2. Operation and maintenance of drainage systems	4.9	3.2	-	-	1.8
Subtotal	55.8	48.1	0.6	-	7.1
C. Community engagement in urban flood-risk reduction and adaptation to climate change					
1. Awareness and communication	2.2	1.4	0.8	-	0.0
2. Community pilot investments	2.2	2.2	-	-	0.0
Subtotal	4.4	3.6	0.8	-	0.0
D. Project coordination, management, monitoring and evaluation					
1. Project coordination and management	8.2	2.1	-	2.6	3.5
2. Monitoring and evaluation	0.6	0.1	0.4	-	0.0
Subtotal	8.8	2.2	0.4	2.6	3.5
Total PROJECT COSTS	72.9	55.6	4.0	2.6	10.6

Note: Figures may not add up to total due to rounding

36. Some of the expenditures required for the preparation of the project, as for instance those related to detailed engineering studies, additional environmental and social studies, the recruitment of an Implementation Support Consultant (ISC) and other consultant services and technical assistance, small goods and equipment for project coordination and management will be pre-financed by the Municipal Development Agency and subject to retroactive financing in accordance with relevant Bank procedures up to an aggregated amount not to exceed SDR2 million for payments made on or after August 1st, 2011 and before project effectiveness.

C. Program Objective

37. The project will support under its sub-component A.3. the development of an integrated urban flood risk and stormwater management program in the peri-urban Dakar area, as well as the development of a national strategy on urban flood risk and climate change adaptation for Senegal based on diagnostic studies in selected cities that are exposed to high flood-risks. The proposed project will only finance partially the peri-urban Dakar Drainage Master Plan investment needs, estimated to amount to US\$ 220 million over a 10 year period and additional resources are needed to address definitely the flood issues in peri-urban Dakar. In addition,

devastating and recurrent floods have also affected other cities in Senegal during the last decade (e.g. Saint Louis, Kaolack, Joal Fadiouth, Kolda, Kaffrine, etc.). So far, involvement of donors and development partners in the sector and in peri-urban Dakar has been limited because of the absence of a master plan, the absence of a lead agency responsible for overall consistency and lack of financial sustainability of the stormwater management sector. The program developed under the Project aims to attract other donors and financing partners, close the financing gap regarding the Drainage Master Plan of the peri-urban Dakar and promotes an integrated approach to urban flood risk and stormwater management in Senegal.

38. The program and the national strategy to be developed will include both structural and non structural measures. A particular attention will be given to improved land use planning and flood zoning, early warning, preparedness and response mechanism, awareness campaign and communication, and community based measures to increase resilience to climate change tapping into encouraging experiences made by the Toll Highway Project with participatory planning (e.g. detailed urban plan for Pikine Irregulier South currently updated). Consideration will also be given to effective solid and liquid waste management, which is critical for the sustainability of drainage systems and flood protection works. The program will be identified and developed during the second year of project implementation and validated before the Mid Term Review through a participatory process involving people and institutions that have vested interest in flood management, included people at risk directly impacted by flood while the national strategy will be finalized during the last year of implementation.

D. Lessons Learned and Reflected in the Project Design

39. The project identification and preparation process was assisted through the PDNA report findings prepared following the 2009 floods in Dakar and by using lessons learned from the Bank's engagement in the urban sector mainly through the Local Authority Development Project and Dakar Diamniadio Toll Highway Project in Senegal as well as emerging strategies and instruments to reinforce urban resilience to climate change as outlined in the UNEP-UN-Habitat-World Bank joint work program on cities and climate change, through the Cities Alliance (see Bank's Guide to Climate Change Adaptation in Cities, 2011).

40. These lessons gained within the country and internationally highlight the importance of the following features to be included in the project design:

41. *Beneficiary engagement:* The need to use social facilitators for community engagement and beneficiary participation in investments and operation and maintenance during project implementation and support for strengthening capacity of local level informal or formal stakeholder groups through community investments. Experiences clearly demonstrate that sustainable engagement and changes in public behaviors can only succeed if community participation as well as communication and awareness raising activities are fully integrated in the project design and implementation and address public health risks, emergency responses, as well as adaptation measures, etc. and if feasible alternatives are offered (e.g. household waste disposal and management schemes).

42. *Sustainability of investments*: The need for a realistic operation and maintenance scheme. Lessons in Senegal and elsewhere have shown that investments in stormwater drainage infrastructure or management without provision for organizational, institutional and financial capacity for operation and maintenance will not be sustained (see para. 64-66).

43. *Absorptive capacity of stakeholders involved*: The need to (i) link a stormwater management system to a national and possibly local disaster risk management system in particular related to the establishment and use of early warning systems, prevention measures and capacity building efforts. In countries with limited human capacity and financial resources, such a consolidated approach is more cost-efficient and allows for synergies at national and local level; and (ii) to build capacity through longer-term TA to municipalities, inter-communal bodies and MDA related to urban planning, contract management and infrastructure development.

44. *Climate change adaptation and resilience*: Resilience among the most vulnerable groups is built generally through awareness raising, inclusive planning and support to community organizations. Nonetheless, adaptation of cities must be tailored to local circumstances including the specifics of the informal sector and land regulation. The first step therefore is to assess the specific urban exposure before developing related responsive policies, more integrated urban development plans and adaptation investments that address vulnerabilities to climate change. The training manual, communal climate change action plans and social facilitators as well as South-South exchanges are all means to support this process and the participation in existing global urban networks is expected to assist with experimenting innovative responses.

IV. IMPLEMENTATION

A. Institutional Context and Implementation Arrangements

Institutional Context

45. At this stage, stormwater management in Senegal is not really structured and organized to operate within a multi-sectoral urban context. Many stakeholders and actors are involved in flood management and drainage but there is no lead agency responsible for overall consistency. Following the 2009 floods, a National Committee for Flood Protection was established in 2010 aiming to guide and coordinate related activities.

46. The main governmental institutions concerned are: the Ministry of Urbanism, Habitat, Water and Sanitation (through the Directorate of Urban Sanitation (DAU), the Department of urban Planning and Architecture (DUA), the Department of Surveillance, Control and Land Use (DSCOS) and the National Sanitation Office (ONAS)); the Ministry of Decentralization and Local Governments (through the MDA, intercommunal entity and municipalities) and the Ministry of Interior through the Department of Civil Protection (DPC) and the GNSP (*Groupement National des Sapeurs Pompiers* - National Association of Firefighters). The municipalities are closely involved in the urban flooding issue and stormwater management but lack resources and capacity, despite the transfer of responsibilities in the areas of stormwater (as stated by the sectoral policy letter on sanitation of 2009), health and environmental management.

47. Other relevant stakeholders to be coordinated include the Road Works Agency (Ageroute), and the JAAXAY Plan, the Project for Construction and Rehabilitation of the State Heritage (*Projet de Construction et de Réhabilitation du Patrimoine de l'Etat*), the National Agency for the Promotion of Investment in Major Works (*Agence Nationale chargée de la Promotion de l'Investissement des grands travaux (APIX)*). NGOs such as ENDA Tiers Monde, the International Federation of Red Cross (IFCR), and UN agencies are also working on the ground to mitigate the impact of floods when they occur. Other local stakeholders include local associations, local flood committees, traditional leaders and entrepreneurial groups.

48. Addressing issues such as institutional clarity of the stormwater sector development, its financial sustainability as well as structuring and strengthening capacities of the main actors and stakeholders is critical for the success of the project. Hence, an institutional and financial sustainability study particularly focusing on ensuring operation and maintenance of drainage investments (O&M) is being carried out during preparation and should lead, following consultations with key stakeholders and decision makers during the first two years of implementation, to important sectoral recommendations and reforms by Mid Term Review of the project to be implemented over the rest of the project implementation period.

Project Implementation and Management Structure

49. The following institutional arrangements have been agreed upon, taking account of the priority nature and strategic importance of the project, the institutional context and issues as outline above, and the still limited capacity of the municipalities for fiduciary, technical and monitoring aspects. These arrangements are expected to ensure that funds disburse quickly, multi-sector objectives are reached, and transparency is maintained.

50. *Project oversight.* During project preparation, a project coordination mechanism proving to be working properly was initiated by the Prime Minister's Office building on Integrated Disaster Risk Management lessons' learned from other countries. The inter-ministerial Project Steering Committee (SC) is chaired by a representative of the Prime Minister to ensure the highest level of coordination and political support. It comprises representatives of the ministries in charge of finance, infrastructures, environment and nature protection, interior, urbanism, water and sanitation, decentralization and local collectivities, transport and land use, the mayors of the two beneficiary municipalities, the prefects of Dakar, Pikine and Guédiawaye, and the president of the Dakar Regional Council.²³ The SC will be maintained and will be responsible for providing overall project oversight, ensuring policy support, strategic planning and integration with other urban development programs. Other experts may be invited to attend the SC meetings as required. The SC will meet twice a year and on an ad hoc basis when required. To facilitate the work of the SC, the MDA will function as the secretariat.

51. The SC is assisted by a larger Technical Committee (TC)²⁴ to provide review of key project studies, monitoring of implementation activities and to ensure multi-sectoral participation, particularly in awareness raising related activities including sharing project related

²³ Arrêté portant création, organisation et fonctionnement du comité de pilotage et du comité technique du PROGEP 02.11.2011-012131, Primature

²⁴ Arrêté portant création, organisation et fonctionnement du comité de pilotage et du comité technique du PROGEP 02.11.2011-012131, Primature

information at local level. The TC will meet on an ad hoc basis when required and MDA will function as the secretariat.

52. *Project coordination and monitoring.* MDA will be responsible for the overall coordination of the project. It will work in coordination with the two beneficiary municipalities and the other relevant ministries and agencies involved in the stormwater and drainage sector. In particular, MDA will ensure donor coordination, which will be a key element of a sustainable multi-year programmatic approach. MDA will: (i) monitor and evaluate the overall project implementation and provide regular consolidated reports on progress to the SC (and if needed to the TC) and the World Bank; (ii) assure steady progress in accordance with an implementation schedule reviewed and approved by the World Bank; (iii) monitor the contract obligations of the ISC and ensure adequate and smooth transfer of skills to national staff (MDA and municipalities); monitor the contract obligation of the NGO/consultant firms for implementation of the community investments under sub-component C.2.; and (iv) ensure the maintenance of a high ethical standard and transparency. As mentioned above, MDA will also serve as the secretariat of the SC and the TC.

53. To assist with day to day coordination and technical aspects of project implementation, a technical working group (TWG) (“Groupe Technique Opérationnel (GTO)”) headed by MDA and composed of key technical staff of the two beneficiary municipalities, the focal points of key ministries and selected operational bodies involved will be established. This working group which should preferably be a subset of the ongoing large Technical Committee established during project preparation will meet regularly, and at least monthly, to ensure adequate technical coordination and communication between municipalities and operational entities at the implementation level.

54. *Project management and implementation.* MDA will be the Implementing entity and implement all components of the project. MDA has a strong technical and fiduciary experience in carrying out large infrastructure project. As implementing entity of the ongoing Local Authority Development Project, it is familiar and experienced with World Bank policies and procedures related to environment and social safeguards, financial management and procurement of goods and services, and has shown satisfactory performance to date. MDA will benefit from various technical assistance and additional capacity strengthening and training activities financed by the project.

55. The civil works (component B) will be implemented by MDA in close collaboration with the Technical Working Group (TWG), with the support of an Implementation Support Consultant (ISC) to be hired. Through the ISC support (training on the job), it is expected that the capacity of MDA, the municipalities and the TWG to execute and supervise drainage civil works will be strengthened. The agreed upon responsibilities and roles are detailed in annex 3: Implementation Arrangements. At mid-term review the Bank’s team will reassess the capacity of the municipalities’ and MDA staff and, if possible, the role of the ISC will be revisited and reduced. Non-works activities will be managed by the MDA and implemented by the functional departments of the MDA in close collaboration with the two beneficiary municipalities with the support of the required expertise (financed by the project) and training of the newly recruited fiduciary staff.

B. Results Monitoring and Evaluation

56. Monitoring activities are designed to ensure that all stakeholders through MDA have an on-going understanding of project progress and efficiency. MDA will be reinforced to include a full-time M&E consultant who will support the monitoring process to track progress and improve the quality of implementation. Monitoring and evaluation of outcomes and results during implementation will follow the Bank's regional standards and is outlined in the results framework (see annex 1). The monitoring system is designed to collect data related to the two PDO-level indicators based on defined methodology as well as project component intermediate results through a number of complementary measures including: (a) the community investment related M&E system focusing on community participation and includes a periodic independent monitoring of the social facilitator performance; (b) financial supervision and audits; and (c) carrying out an impact evaluation (IE) process consisting of a baseline survey carried out during year one of implementation prior actual investments to assess socio-economic situation including of women in a defined project intervention area and control group and a final end of project evaluation. The IE is expected to provide quantitative and qualitative evidence on causal impacts of the project on target outcomes. Such evidence can be used to understand project effectiveness, as well as a management and program design tool in scaling up defined operational modalities IE is being considered for activities under components B and C. Specific areas of focus will be defined in conjunction with the project team (see annex 3).

57. A specific monitoring and evaluation chapter describing baseline data and methodology for each indicator and the impact evaluation exercise is currently developed in consultation with key stakeholders at local and national level and included in the project implementation manual to be adopted by prior effectiveness. Monitoring of project activities will be done by the M&E consultant who will collect and present data in a standardized reporting format from the identified data sources in progress reports for bi-annual review by the Project Steering Committee in conjunction with the Bank's supervision missions. Once approved, the progress reports will be partly or fully published on the MDA/project related managed webpage.

58. The project will include external evaluations not only prior the Mid-Term Review and End-of-Project Evaluation processes but provides for annual external evaluation of the component C's impact and results related to the awareness raising campaign and the community participation in the activities supported under component C.2.

59. Communication of projects results and activities as well as project documents (e.g. project documents, safeguard documents, study reports, workshop reports, etc.) will be done through the upgraded existing MDA webpage. This, together with the communication tools developed and disseminated under component C, is expected to improve substantially coordination among the different stakeholders and related initiatives and strengthen engagement and ownership.

C. Sustainability

60. Sustainability of the proposed project will be determined mainly through the following aspects: (i) in order to guarantee the sustainability and efficiency of drainage and flood protection works, a sustainable operation and maintenance related arrangements will be established (Component B, see also para. 64); (ii) a reformed urban planning process through a stronger involvement of municipalities and local residents together with proper zoning (Component A) resulting in detailed local urban plans would put in place a mechanism that would prevent (or mitigate the risk) flood-prone areas and wetlands from being inhabited; and (iii) extensive consultative process and participation of the multi-level stakeholders in implementation will be carried out and build strong national and local ownership. At the local level, behavioral changes for stronger resilience and protection of drainage channels will be promoted through a strong engagement of local communities and municipalities (Component C).

V. KEY RISKS AND MITIGATION MEASURES

61. Given the complexity of the project, involving many stakeholders, the lack of institutional leadership and coordination mechanism, the environmental and social issues as well as the risk related to the sustainability of drainage and flood protection works, the overall risk is rated High (see annex 4 for ORAF). However, appropriate mitigation measures have been put in place and/or built into the project design and implementation risk is rated M-I.

Table 2: Risk Ratings Summary

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

L: : Low
M: Moderate
S: Substantial
H: High

Overall Risk Rating Explanation

62. The following three core risks have been identified during preparation and adequate mitigation measures built into the project design:

63. *Lack of institutional leadership:* Overall, the risks are related to the lack of institutional leadership and an efficient coordination mechanism on stormwater and flood management which might impact efficient project implementation and sustainability of results.

64. *Lack of functional O&M mechanism:* There is a high risk of poor financing for operations and maintenance (O&M) of the drainage system which renders flood control infrastructure useless within short periods of time, as well as the lack of clarity on ownership, impacting accountability for the maintenance of the system. In order to guarantee the sustainability and efficiency of drainage and flood protection works, several aspects will have to be considered. To reduce the recurrent costs, the drainage system will avoid to the extent possible large pumping stations whose maintenance and operation are complex and costly (high energy consumption), and rather promote the natural evacuation of water by gravitation which is possible given the topography of Dakar. A particular attention would also be given to irregular waste water discharge and solid waste disposal which are usually major problems for the operation of drainage systems through support for community investments.

65. The Project will build strong operational capacity for the operating and maintenance of the future drainage system. A financial and institutional sustainability study has been launched as part of project preparation and should lead to major reforms to be agreed to by Mid Term Review of the Project. Prior MTR, the O&M execution related to the drainage system established by the Project will be done on the basis of a two-year BOM (Built Operate Maintain) contract with the enterprise building the drainage infrastructure. Small O&M support at local level will be supported via the community investments under component C.2. After the MTR and based on the recommendations of the above mentioned financial and institutional sustainability study, the Government and municipalities will ensure that at least 2 percent of the investment capital costs is allocated to O&M of the stormwater drainage system in the project intervention areas. The institutional study will also recommend a process for executing the above mentioned O&M.

66. Regarding risks related to solid waste, the performance of the solid waste management system is rather above average in the peri-urban areas of Dakar (with 61 percent collected in Pikine and 40 percent in Guédiawaye) compared to other capital cities in West Africa. Household waste represents about 80 percent of Dakar's solid waste production (1,200 to 2,000tons/day).²⁵ The waste management chain does currently cover only collection, transport and immediate disposal. There is only informal waste segregation but no treatment and elimination at the only managed dumpsite (Mbeubeuss). Ongoing and planned investments related to the closing of the Mbeubeuss landfill and the opening of a new landfill in Sindhia could improve solid waste management, but the recent institutional difficulties with the transfer of responsibilities from the intercommunal entity CADAK to a newly created Government agency raise concerns and could affect the performance of the sector. The other sector challenges relate mainly to a lack of strong legislation and its enforcement; lack of an integrated urban

²⁵ MEPN-CSE 2000

strategy and planning instruments that include waste management aspects adequately; absence of coordination of multiple actors working in isolation; lack of equipment (bins for waste collection and transport); lack of effective, regular services provided by sub-contracted enterprises; and the use of one temporarily designated landfill site (Mbeubeuss). A proposed mitigation measure is the use of closed drainage channels, especially in densely populated areas. Other measures include a strong communication and awareness campaign coupled with participatory community investments (e.g. defining a local strategy of dealing with informal small-scale waste accumulation; assisting with localized O&M of drainage system); and development of integrated local urban plans.

67. *Environmental and social impacts:* While the project is designed to have beneficial impacts on the population in terms of reduced vulnerability to flooding and improved living conditions, there are also potential adverse environmental and social impacts. The drainage investments will take into account the existing settlements and be designed and selected to minimize the resettlement of residents. The environmental impact associated with the construction and operation of the stormwater drainage system is expected to be moderate because the existing environment is already largely degraded.

VI. APPRAISAL SUMMARY

A. Economic and Financial Analyses

68. Economic and Financial Analysis. The analysis covers not only the 2009 devastating flooding but also the recurrent annual flooding during the rainy season as the project benefits will accrue over the lifetime of the proposed component investments: on average flooding represents a disruption of 20 days per year. The project benefits were partly determined as the flood forgone damages and losses affecting private and public human, social, physical, capital and natural assets: health burden, ecological system disruption, inhabitable housing, infrastructure damages, opportunity losses, etc. A cost-benefit analysis was performed to determine the economic viability of the preventive drainage component investments. Moreover, the financial net present value of the component to be funded and maintained by national and/or municipal budgets directly through force account or indirectly through the contracting out of the private sector to perform the drainage management. Hence, the present value of the drainage investment at 5 percent discount rate and operations and management (OMEX) amounts to US\$66.1 million over the 2013-2042 periods.

69. The economic analysis was performed to derive the social benefits accruing to society. The analysis for the preventive investments is meant to reduce by 20 the number of the flood/days/year and value the decrement of land price (hedonic valuation method) in four flood-prone areas in Pikine and Guédiawaye over the lifetime of the project. The project and drainage component are viable as they yield a net present value (NPV) of US\$27 million and US\$39 million respectively over 30 years, a benefit/cost ratio greater in both cases than one associated with an economic internal rate of return (IRR) and modified IRR exceeding 12 percent in both cases.

70. The sensitivity economic analysis is conducted to test the viability of the preventive component with a reduction of the number of disruptive severe-flood-days from 20 days per year to 10 days with a 10 percent reduction of the increment of land value and a 10 percent reduction of the land area considered in the analysis to be affected by floods over the project lifetime. The sensitivity analysis is also performed by increasing the investment by 20 percent and the growth rate of OMEX by 10 percent per year from 2018 to 2042. In both cases, the project and drainage component remain viable. Moreover, a scenario analysis (optimistic, base case and pessimistic) is performed to determine the combined impact of variables of the economic analysis. The pessimistic scenario determines the optimal point beyond which the project and drainage component would not be viable. A risk analysis was also performed and showed there is 100 percent likelihood that the project will generate an economic net Benefit/Cost flow after year 8 (5 years for project implementation and 3 consecutive years for the benefits to accrue) that will substantially exceed the initial project and drainage component investment.

Table 3: Economic Analysis Summary (Source: Annex 6)

Items	Economic Analysis Results
	Discount rate: 12%
Project Level	
Cost/Benefit Analysis	
NPV/30 years	US\$27 million
IRR/30 years	26%
Modified IRR/30 years	14%
Present value Benefit/Cost Ratio/30 years	2
Sensitivity Analysis	
Reduction of flood-day to 10, -10% of land flooded and -10% of land value increment	Viable
Increase of investment by 20% and OMEX increase by 10% per year	Viable
Scenario Analysis	
NPV > 0; IRR/30 years > 12% and PV Benefit/Cost ratio > 1	Viable
Risk Analysis	
NPV/8 years ≥ US\$100 million (Monte Carlo method)	100% likelihood
Drainage Component Level	
Cost/Benefit Analysis	
NPV/30 years	US\$ 39 million
IRR/30 years	43%
Modified IRR/30 years	16%
Present value Benefit/Cost Ratio/30 years	3
Sensitivity Analysis	
Reduction of flood-day to 10, -10% of land flooded and -10% of land value increment	Viable
Increase of investment by 20% and OMEX increase by 10% per year	Viable
Scenario Analysis	
NPV > 0; IRR/30 years > 12% and PV Benefit/Cost ratio > 1	Viable
Risk Analysis	
NPV/8 years ≥ US\$100 million (Monte Carlo method)	100% likelihood

B. Technical

71. The design of the drainage system will be based on the Drainage Master Plan recently finalized and validated (January 2012) by a consortium of international and local consulting firms which worked in close collaboration with high seasoned national local experts (hydrology, urbanism) and the project's Technical Committee. The drainage system will restore to the extent possible the natural flow of the stormwater (by gravitation) which has been degraded through uncontrolled urbanization. As a result, operating and maintenance costs will be reduced. Importantly and responding to the hydrologic characteristics of the Cap Verde Peninsula, the system will include artificial and natural retention ponds (*The Niaves*) allowing to minimize the size of the drainage channel downstream and reduce the investment costs. Sustainable management of these ponds and wetlands will be necessary in order to mitigate the environmental and sanitation risks including the potential increase of water borne diseases. The rehabilitation and conservation of these basins are critical to maintain the performance of the drainage system and concurring activities have been included in sub-component C.2 (eligibility criteria for pilot small-scale community investments).

72. The technical design of the evacuation infrastructure into the sea takes into account the expected sea level rise resulting from climate change. The groundwater table level will be monitored and is expected to decrease from 0.5 to 2 meters depending on the areas once the drainage system is put in place. An indirect result is that autonomous sanitation systems that are currently drown by groundwater will become operational again. The drainage channels will be covered, especially in densely populated areas in order to reduce the risk of clogging and reducing O&M costs. Since the drainage system has been design for a 10 year return period,²⁶ it is critical to inform affected people and local stakeholders about the residual risks and adaptation measures that are needed in case of extreme events. This will be included in the awareness raising campaign planned in subcomponent C1.

73. The investments have been selected in accordance with a multi-criteria approach developed under the Drainage Master Plan, and with a particular focus on the number of beneficiaries.

C. Financial Management

74. A financial management assessment of the MDA, the implementing entity of the project was conducted. The conclusion of the assessment is that the financial management arrangements meet the Bank's minimum requirements under OP/BP 10.02. With the implementation of the financial management action plan, the financial management arrangements for the project will be further strengthened. The residual risk rating for MDA is Moderate.

²⁶ The final Drainage Master Plan will determine the final (possibly higher) return period duration.

75. The MDA existing financial management system can adequately handle the FM tasks of this project: the FM capacity built under the ongoing Local Authority Development Project funded by the World Bank will be consolidated and used to manage the activities of the project and also, an internal auditor has been recruited to strengthen the internal control framework. The overall performance based on the last supervision mission was Satisfactory, and the previous auditor's opinion of the last year was unqualified. However, in order to take into account the specific activities related to the proposed project, the existing FM manual will be updated, the accounting software will be upgraded from "monoproject" to "multiproject", and an accountant will be recruited no later than 120 days after effectiveness to reinforce the existing MDA FM staff comprising of a financial management specialist and two accountants.

76. Details on the Financial Management arrangements for this project are included under annex 3.

D. Procurement

77. Procurement for the proposed project will be carried out in accordance with the World Bank's "Guidelines: Procurement of Goods, Works, and Non-Consulting Services under IBRD Loans and IDA Credits & Grants by World Bank Borrowers", dated January 2011; and "Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits & Grants by World Bank Borrowers", dated January 2011, and the provisions stipulated in the Legal Agreement.

78. The procurement activities for the four Components (A, B, C and D) of the project will be handled by the MDA. An assessment of the capacity to implement procurement actions for the project has been carried out by IDA on October 2011 for the MDA. This entity is familiar with the Bank's procurement rules thanks to the implementation of an ongoing Bank-financed projects, i.e the Local Authorities Development Program, under execution since 2006; however, in conjunction with the municipalities which benefit from the program, the implementation of the infrastructure component of this project has been delegated to a contract management entity. MDA has among other departments, a Technical Department and a Procurement Unit; the latter is filled with one Procurement Specialist.

79. Under the Stormwater Management and Climate Change Adaptation Project, the overall responsibility and coordination of the project implementation belongs to MDA. This new project is an urgent one to prevent recurrent flooding that has negatively impacted vulnerable communities during the past two years or more. In addition, it involves many stakeholders in different sectors which could jeopardize MDA's efforts in project management and coordination, and create additional workload which may require adequate resources. To mitigate eventual problems related to heavy workload and multiple stakeholder perceptions and interests related to project execution and to support broad-based ownership and commitment to the project's design and results, it was agreed that the MDA reinforces its capacity with an ISC for the implementation of the component B. The ISC is required to be procurement proficient in order to perform its missions in a satisfactory manner. It was noted that the implementation of sub-component C will involve the beneficiary municipalities and communities with the assistance of a competitively selected facilitator(s), either a NGO or a consulting firm. It was noted that the

implementation of sub-component C2 of the project includes the development, the implementation and the monitoring of community investments for specific community-based resilience and adaptation measures. These community investments which range from approximately US\$10,000 to approximately US\$70,000 are therefore small contracts. According to the implementation arrangements, the beneficiary communities will receive a technical assistance from competitively selected social facilitator(s), either NGOs or consulting firms, while the MDA remains responsible for overall implementation, including procurement operations related to the investments and the overall supervision of their implementation. In addition, during the first stage of the implementation of the investments, the processing may allow for piloting the building of capacities within the beneficiary communities; if this exercise concludes to some acceptable capacities, there may be windows for certain investments to be implemented with the participation of the beneficiary communities. While the communes and communities have no proficiency nor in the design of community investments, nor in procurement, the MDA may be challenged with additional commitments and a heavier workload due to the implementation needs for these investments, which will require the recruitment of an additional procurement specialist no later than 120 days after effectiveness. As a result, the overall project risk for procurement is high. It may be substantial to moderate when the mitigation measures are in place, in particular the ISC and the capacity building activities.

Governance and anti-corruption

80. Today, Senegal is a country where the civil society and the private sector are both involved in controlling public procurement transactions. The Public Procurement Regulatory Authority (ARMP), set up in early 2008, is managed in a tripartite manner by representatives from the government administration, the private sector, and civil society, and is responsible for policies, handling complaints from bidders, and procurement audits.

81. The Government substantially improved the country's public procurement system to comply with the WAEMU's Procurement Guidelines and international standards and enforced a set of necessary documentation which includes national standard bidding documents (NSBDs) prepared on the basis of Bank's standard bidding documents (SBDs). It has also enforced different measures which have contributed to the private sector's trust in the system, and show a clear commitment from the Government to modernize and ensure transparency of procurement transactions

E. Social (including Safeguards)

82. The ultimate beneficiaries will be the populations living in the most vulnerable flood-prone areas in Pikine and Guédiawaye (130,000 residents directly impacted by the investments and about 425,000 indirectly impacted). They have been affected by floods for many years, and some of them have already left their homes permanently flooded. Most of them have complained that the Government has not yet taken the appropriate measures and would welcome a large and ambitious program that would address the underlying causes.

83. The proposed Project is designed to have beneficial impacts on the population in terms of reduced vulnerability to flooding and improved livelihoods conditions. The drainage investments will take into account the existing settlements and be designed in order to minimize the

resettlement of residents, mainly those living where the drainage channel will be built. During civil works, they might be loss of land or restriction of access to sources of livelihood.

84. A Resettlement Policy Framework (RPF) has been prepared in accordance with the Involuntary Resettlement OP/BP 4.12 for the overall project and will be used for implementation purposes; in particular this framework will fully apply to the subsequent investments under component B. The RPF includes guidance for compensation and resettlement assistance measures, as well as provisions for consultation and grievance redress.

85. The first priority drainage investments covering the two catchments of Dalifort and downstream Thiourour have been identified and interventions have been carefully selected to avoid resettlement of persons and limit restriction to assets or sources of livelihood. As a result, only loss of revenues and land are expected and they will affect less than 200 people, as indicated in the RPF and based on the preliminary engineering studies. Exact locations and alignments of the drainage channels and retentions basins will only be known when the detailed engineering studies, which include complex hydrologic and hydraulic modeling, will be completed. Thus, an Abbreviated RAP (ARAP) will be prepared, and disclosed once the detailed engineering studies have been completed. The ARAP will include any necessary mitigation measures to be implemented.

86. For the subsequent investments to be financed by the project, limited resettlement (around 224 households, according to a preliminary census in the RPF) and loss of revenues are expected. Once sites and works have been finalized, a RAP will be prepared to identify impacts of the drainage works, necessary mitigation measures such as compensations of affected households resulting from unforeseen land acquisition. In addition the awareness raising and communication strategy and the local engagement strategy carried out by social facilitators developed under component C will be designed to facilitate the resettlement process and implemented with the participation of all actors including local communities. The Government will ensure that all measures required to be taken under the RAP prior to the initiation of civil works have been taken, including mobilizing counterpart funds in order to provide timely resettlement compensations as required.

F. Environment (including Safeguards)

87. The project is categorized A because of the potential adverse environmental and social impacts of the civil works related to the construction of the drainage infrastructures in particular, in areas where they were non-existent. Five safeguard policies are triggered: Environmental Assessment (OP/BP 4.01); Natural Habitats (OP/BP 4.04); Pest Management (OP/BP 4.09); Physical and Cultural Resources (OP/BP 4.11); and Involuntary Resettlement (OP/BP 4.12). Though a category A project, some of the environmental and social impacts associated with the operation of the stormwater drainage system and community investments are expected to be site-specific and moderate. In addition to the RPF, the following instruments have been prepared: (i) A full Environmental and Social Impact Assessment (ESIA) for first priority drainage investments in 2 catchment areas; and (ii) an Environmental and Social Management Framework (ESMF) which has been prepared for the overall project and will be used for implementation purposes. The ESIA and ESMF contain acceptable Environmental and Social Management Plans

(ESMPs) that specifies mitigation measures for various potential adverse impacts in the pre-construction, construction and operation stages of the project. The ESMF and the RPF framework documents will fully apply to the subsequent investments under component B and community investment planned under component C. The ESMF states that if cultural resources are found during civil work, a 'chance find' procedures will be launched in accordance with national regulation and OP/BP 4.11 guidelines. The ESMF also includes appropriate mitigations measures related to the control of water borne diseases vectors in conformity with the Pest Management Policy (OP/BP 4.09). The project will not finance any activity that degrade or convert critical habitat. The screening checklist in the ESMF specifies mitigation measures in conformity with the Natural Habitat Policy (OP/BP 4.04).

88. All safeguards instruments have been reviewed, approved and disclosed in-country and at the Infoshop on December 20 and 22, 2011 respectively. Funds for implementing the ESMPs are also included in the project cost estimates.

89. All the relevant key stakeholders have been adequately consulted and informed of the Project and public consultations held from September 20 to 24, 2011. Concerns of the communities and some details of consultations have been provided as annexes in the ESIA, ESMF and RPF. Most of the people have been affected by floods for many years, and they welcome the project. The key concerns raised during the consultation process include the lack of involvement of population in project activities, the risk of clogging of drainage channel by solid wastes, weak O&M that could affect the performance of the system, resettlement without compensation, and delay in project implementation. All these concerns have been addressed in project design mainly through a strong participatory process in project preparation, the construction of closed channels in densely populated areas and support to a sustainable O&M system.

90. The MDA is experienced in safeguard policies in line with existing country legislation and World Bank procedures. MDA has already prepared and implemented successfully an ESMF and a RPF for large urban investments with potential environmental and social impacts under the Local Authority Development Project. The MDA, the Senegalese Environment Agency, the participating enterprises and supervising consultants have been given well defined roles in the different instruments to ensure that environmental and social safeguards guidelines including occupational, health and safety guidelines. Appropriate training will be provided to MDA to further strengthen its capacity to supervise the implementation of environmental and social measures and ensure compliance with safeguards policies..

ANNEX 1: RESULTS FRAMEWORK AND MONITORING

SENEGAL: Stormwater Management and Climate Change Adaptation Project

Project Development Objective (PDO): To improve stormwater drainage and flood prevention in peri-urban areas of Dakar for the benefit of local residents												
PDO Level Results Indicators*	Core	Unit of Measure	Baseline	Cumulative Target Values** ²⁷					Frequency	Data Source/ Methodology	Responsibility for Data Collection	Description (indicator definition etc.)
				YR 1 (2013)	YR 2 (2014)	YR3 (MTR) 2015	YR 4 (2016)	YR5 (2017)				
Indicator One: Direct beneficiaries (number) of which female (50%)	X	#	0	0	32,250	65,700	98,686	132,000	Annually	Drainage Master Plan, Drainage Investment plan, ANSD household data, DUA household data 2025 study / calculated by households/drain ed surface.	ADM	Measures increased opportunities and reduced vulnerabilities against a 10-year flood return period (design DMP based on decennial rains above 129mm/day). Detailed methodology developed and included in m&e section of implementation manual.
Indicator Two: Area protected against recurrent ²⁸ flooding through drainage works.	□	ha	0	0	125	290	460	660	Annually	Drainage Master Plan, Drainage Master Plan investment plan, Drainage Master Plan detailed studies / calculated by drained surface.	ADM	Measures increased opportunities and reduced vulnerabilities against a 10-year flood return period (design DMP based on decennial rains above 129mm/day).

²⁷ Implementation years (starting Jan 2013 as aligned with Senegal's fiscal/calendar year)

²⁸ During the last decade, floods occurred in the peri-urban areas in 2002, 2005, 2008, 2009 and 2010

INTERMEDIATE RESULTS												
Intermediate Result (Component A): Urban planning and management addressing flood related risks.												
<i>Intermediate Results indicator One:</i> Detailed local urban plans (PUD) for Pikine and Guédiawaye which integrate flood prevention developed and promoted.	<input type="checkbox"/>	y/n	Detailed local urban plan (PUD 2003) exist for Pikine Irregulier Sud (currently under review for up-date by APIX).	PDD based flood risk mapping launched. Draft version of the PDU of Pikine and Guediawaye for first tranche available and submitted to validation	GIS based flood risk mapping finalized and GIS open data transfer system designed and operational. Final participatory PUD of the first phase (Pikine and Guédiawaye) available.	Monitoring and surveillance mechanism at local and supported Final participatory PUD for first sectors (Pikine and Guédiawaye) disseminated.	Monitoring and surveillance mechanism at local level supported	Evaluation and lesson's learned from PUD preparation and implementation	Annually	GIS-based maps, PU Dakar, PUD, DSCOS, DU and municipalities reports / Technical committee reports.	ADM	Measures increased municipal capacity for long-term urban planning and enforcement through availability of adequate urban land use plan and promoting low-risk growth corridors to prevent new settlement in flood-prone areas.
<i>Intermediate Results indicator Two:</i> Capacity building program related to flood-risk management and climate change adaptation completed.	<input type="checkbox"/>	y/n	No capacity building program exists.	Training plan and 4 modules ²⁹ developed	2 modules implemented	1 additional module implemented	1 additional module implemented.	Evaluation of training program	Annually	Training plan and modules / Training reports	ADM	Measures increased planning and management capacity through implementation of training program.
<i>Intermediate Results indicator Three:</i> Program and National Strategy on integrated urban stormwater management and climate change adaptation developed			None		Draft program for Peri-Urban Dakar developed	Program validated and donor roundtable organized	Draft national Strategy for Senegal developed	National strategy validated				

²⁹ Modules proposed: urban climate change adaptation and resilience; urban planning and management; construction standards/building codes; and O&M/enforcement

Intermediate Result (Component B): Effective drainage systems in place.												
<i>Intermediate Result indicator One:</i> Primary drainage system put in place.	<input type="checkbox"/>	m	0	0	3,520	10,500	17,500	28,200	Annually	Drainage Master Plan, project reports / Calculated by investments funded by the project.	ADM	Measures stormwater drainage investments in project area.
<i>Intermediate Results indicator Two:</i> An O&M stormwater drainage management system is functional.	<input type="checkbox"/>	y/n	No functional O&M system in place.	Policy reforms to establish an O&M system for drainage systems identified	Policy reform discussed and disseminated	Policy reform validated and priority activities launched	O&M system in Pikine and Guediawaye functional	O&M system in Pikine and Guediawaye functional	Annually	Budget reports (Min. Finance, municipalities, project reports	ADM	Measures O&M capacity to ensure functionality of drainage system.
<i>Intermediate Result indicator Three:</i> Drainage channels cleaned at least once per year before rainy season in project area.	<input type="checkbox"/>	%	Current pre-rainy season cleaning program is only partially implemented	0	80 % of constructed drainage channels in intervention areas cleaned prior rainy season.	90 % of constructed drainage channels in intervention areas cleaned prior rainy season.	100 % of constructed drainage channels in intervention areas cleaned prior rainy season.	100 % of constructed drainage channels in intervention areas cleaned prior rainy season.	Annually before flood season.	Municipality reports / supervision described in project progress reports.	ADM	Measures planning and financial resources for maintaining functionality of existing channels prior rainy season under leadership by municipalities
Intermediate Result (Component C): Community engagement in flood risk reduction and climate change adaptation measures.												
<i>Intermediate Result indicator One:</i> People reached by the information, education and communication strategy at local and national level.	<input type="checkbox"/>		0	Information Education (IEC) strategy and annual campaign action plan developed including tools produced for national and local level. Target number to be finalized in Communication strategy.	10,000	30,000	50,000	80,000	Annually	IEC action plan progress reports, project progress reports, independent evaluator report, IEC products / Review of progress against targets.	ADM	Measures quantitative results of IEC Strategy and annual communication/awareness raising plan.

<i>Intermediate Result indicator Two:</i> Local flood management committees in Pikine and Guédiawaye are engaged in stormwater management activities.	<input type="checkbox"/>	y/n	Baseline related to inventory of existing local flood committees to be defined prior effectiveness .	Local committees identified and capacity needs assessed.	Committees are technically and operationally strengthened.	Additional Committees are strengthened.	Additional Committees are strengthened.		Annually	Social facilitator reports, municipality reports, municipality budgets / Review of reports.	ADM	Measures engagement of local residents and municipalities in local level engagement in flood risk reduction measures and O&m.
<i>Intermediate Result indicator Three:</i> Eligible flood risk reduction community investments completed.	<input type="checkbox"/>	#	None	0	10 completed	20 subprojects completed.	40 subprojects completed.	50 subprojects completed.				

***Please indicate whether the indicator is a Core Sector Indicator (see further <http://coreindicators>)**

****Target values should be entered for the years data will be available, not necessarily annually**

ANNEX 2: DETAILED PROJECT DESCRIPTION

SENEGAL: STORMWATER MANAGEMENT AND CLIMATE CHANGE ADAPTATION PROJECT

1. The project consists of four components that are described below. Component A addresses more the conceptual issues (institutional strengthening and planning) related to stormwater management and urban climate change adaptation; component B the actual infrastructure investments and O&M arrangements; component C the awareness raising strategy, local participation and engagement in flood risk reduction prevention, climate change resilience and local O&M measures; and component D project management activities.³⁰ The project's interventions are expected to improve the living condition of the most vulnerable groups with a particularly focus on women.

Component A: Flood Risk Mainstreaming in the Urban Sector (total costs estimated at US\$3.9 million; IDA amount US\$1.7 million).

2. **Objective:** This component aims to integrate flood risks into national and local urban planning, management and particularly in enforcement tools to ensure short- and mid-term flood prevention preparedness, decreased vulnerability and increase urban resilience to climate change.

3. **Summary:** This component is crucial to move away from previous disconnected activities and to integrate finally flood related risks into urban planning and management tools. It will assist with institutional strengthening and provide capacity building support in order to address the problem of urban floods and mainstream flood risks into urban planning, thereby strongly reinforcing the role of municipalities and local population in flood management, adaptation to climate change and improve urban governance and land use regulation. This will be achieved by developing a set of tools integrating results from preparatory baseline studies related to the hydrological situation, institutional and financial sector diagnostic, the Drainage Master Plan as well as flood risk mapping into national and detailed local urban plans for use by municipalities, local government and national stakeholders.

4. **Gender:** The component will specifically enhance the participation of women within national and local level institutions in the capacity-building program.

5. The component has three sub-components:

A.1. Urban planning and management (US\$1.4 m total, IDA US\$0.8m)

A.2. Institutional strengthening of national government departments and municipalities (US\$1.3 m total, IDA US\$0.8 m)

A.3. Integrated Urban Stormwater Management and Climate Change Adaptation Program for peri-urban Dakar (US\$1.2 m total, IDA US\$0 m)

³⁰ All costs including contingencies.

Subcomponent A.1. Urban planning and management

6. The sub-component aims at ensuring effective integration of flood risks into national and local urban planning, development and management. It will include the following activities:
- i. Dissemination of the first Drainage Master Plan for Dakar and peri-urban areas through a public workshops for each of the catchments (21 catchments need to be covered) and three national stakeholder workshops;
 - ii. Development and installation of an open-access Geographic Information System for flood risk mapping and climate change mapping covering the peri-urban areas of Dakar, the District of Pikine and Guédiawaye (following open data standards and promoting interoperability of GIS data across multiple systems) and production of flood risk maps of the project area including acquisition of orthophotos. The GIS server will be hosted temporarily at MDA until MTR when the recommendations of the institutional study are expected to be clarified;
 - iii. Participatory development of detailed urban plans (so-called '*plan d'urbanisme détaillés/locaux*' (PUD)) for District of Pikine and Guédiawaye including flood risks. This will be done through studies, consultations and regulations to define and support authorized urban land uses (e.g. "zones non-aedificandi") in flood-prone areas for inclusion in local Urban Development plans (see iv);
 - iv. Develop communal climate change action plans of Pikine and Guédiawaye to strengthen local resilience to climate change and launch implementation of priority actions (e.g. review of local legal and organizational framework conducive to DRR and adaptation to climate change, development of curricula, strengthening of local DRR committees, etc.) to be implemented under component C. These communal climate change action plans will support the development of local DRM mechanisms to improve capacities of communities in preventing, preparing and responding to floods;³¹
 - v. Development of housing construction standards and dissemination at national and local level for a strengthened resilience to climate change; and development of regulation for housing construction.

Subcomponent A.2. Institutional support and capacity building for national government departments, intercommunal entities related to peri-urban Dakar and municipalities

7. The sub-component aims at strengthening the capacity of national and local stakeholders to integrated flood related risks in their urban planning, management and monitoring systems and to

³¹ The establishment of local DRM mechanisms requires the strengthening of existing local Disaster Risk Reduction (DRR) platforms especially focused on floods issues in the project areas, development of floods risk observatories, development of preparedness and response tools. DRR local platforms and risks observatories should improve communities risk awareness as well as floods early warning system. The preparation of emergency plans and reinforcement of civil security should allow a better coordination and utilization of local resources during emergency phases. Municipalities have an important role to play in the implementation of the national Disaster Risk Reduction program. Therefore, these reinforcement objectives of municipalities in DRM are fully in line with those of the DRR program.

support adaptation to climate change in urban areas. A particular focus is set on the municipalities which lack know-how, capacity and resources.

This sub-component will include the following activities:

- i. Clarification of roles and responsibilities of key stakeholders related to stormwater management urban sector and reform implementation support: the institutional and financial study launched during project preparation will provide recommendations to be validated in three national workshops prior their implementation. In addition, the project will support a study-tour in two countries to assist with the decision-making process regarding the project supported proposed institutional and financial stormwater management reforms;
- ii. Development and implementation of a four module-based training program covering the following core themes: (i) improved integrated urban governance; (ii) O&M/enforcement; (iii) construction standards; and (iii) cities resilience programs and adaptation to climate change . The target audience includes local and national stakeholders (municipalities, inter-communal bodies, DUA, DAU, DSCOS, DPC, DEEC, NGOs, local associations, etc.). The training manual will be presented in form of an “toolbox” for urban planning and management, housing and infrastructures construction standards addressing flood risks and stormwater management at national and local level;
- iii. Strengthening land use regulation, oversight and enforcement system, coordination of investments to key urban stakeholders (DAU, DUA, municipalities, DSCOS) with small equipment such as computers, GPS, information panels to improve delivery on their prevention tasks and to link to urban planners based on stakeholders annual work programs;
- iv. Technical Assistance to prepare a study tours/exchange visit program with other urban entities to strengthen rudimentary efforts to establish a South-South urban partnership and participate actively in existing climate resilient city networks.³²

A.3. Integrated Urban Stormwater Management and Climate Change Adaptation Program for peri-urban Dakar

8. The sub-component aims at developing a program for the peri-urban Dakar area and a national strategy on integrated urban stormwater management and climate change adaptation based on the full set of investment plans and technical studies emerging from the Drainage Master Plan as well as from the Sanitation Master plan and diagnostic studies and consultations in selected cities. This is necessary as the current project has been designed to reduce the flood-risks in the priority zones but does not provide the necessary resources to cover the full investment plan

³² South-South exchanges between Dakar and other municipalities affected by flood around the world will be promoted and build on the successful GDLN cross-regional session on "Urban Flood Risk Management" where Dakar has been linked to Jakarta, Manila, Hanoi, Ho Chi Minh City (December 2010) and the JICA supported Asia-Africa urban cities exchange initiated in Dakar in November 2011.

of the Drainage Master Plan for Dakar (US\$220 million) and the broader range of integrated urban stormwater management related activities

9. This sub-component will include the following activities:

- (i) Technical Assistance to develop a program and a national strategy design including technical, financial and institutional/implementation arrangements and in Community Driven Climate Change Adaptation;
- (ii) Stakeholder workshops to review, adjust and validate a program and a national strategy on integrated urban stormwater management and climate change adaptation program;
- (iii) Round-table discussions for presentation of the program as well as a later point of time the national strategy between the Government and development partners aiming to attract future funding.

10. The component is co-funded by NDF to support including (i) equipment and establishment of an open data GIS system, and production of flood risk maps of the project area; (ii) development and implementation of a flood prevention and climate change adaptation training program; (iii) preparation of a design study to establish an integrated urban stormwater management and climate change adaptation program for peri-urban Dakar; (iv) implementation of a diagnostic study as a basis for a national program to extend the climate change adaptation interventions to other cities; (v) TA assigned to MDA specialized in Community Driven Climate Change Adaptation; and (vi) development and implementation support of communal climate change action plans for Pikine and Guédiawaye.

Component B: Drainage Investment and Management (total cost estimated at US\$55.8 million; IDA amount US\$48.1 million)

11. Objective: This component aims at establishing a primary (and secondary on some areas) drainage system in the peri-urban areas of Dakar (Pikine and Guédiawaye) as the most vulnerable districts to recurrent floods and ensure their effective operation and maintenance. This will be achieved through infrastructure investments, implementation of agreed institutional and financial reforms needed for an effective operation and maintenance system.

12. Summary: The component will finance the construction of primary drainage infrastructure, which will allow the evacuation of stormwater of the high-risk flood-prone areas within the district of Pikine and Guédiawaye and provide for its operation and maintenance. The investment will be done in a phased approach (see details in annex 7): (i) The first priority investments compliant with the Drainage Master Plan will cover 2 catchment areas (Dalifort; and downstream Thiourour including Wakhinane Nimzat and Niety Mbar and Bagdad) and include primary drainage system and basic urban rehabilitation (access roads and small public space rehabilitation); while (ii) subsequent investments include five additional catchment sites (Mbeubeuss 3.1 to 3.4 and downstream Yeumbeul north).

13. Gender: The most vulnerable and poorest group of residents, including women and children, is often restricted in its mobility due to lack of resources, socio-economic function and tasks within a household and nature of their income-generating informal activities and are exposed primarily by the increasing floods. The benefits of the drainage works supported under the component B related to the improved evacuation of stormwater are expected to contribute to improved living conditions of local residents in particularly of women.

14. The component has two sub-components:

B.1. Drainage investments (US\$50.8 m total (US\$22.2 m priority investments, US\$28.7 m subsequent investments); IDA US\$45.0 m)

B.2. Operating and maintenance of drainage systems (US\$4.9 m total, IDA US\$3.2 m)

B.1. Drainage investments

The sub-component aims at addressing the urgent need of establishing a primary drainage system in peri-urban Dakar (Pikine and Guédiawaye) to remediate the recurrent floods in these areas.

It will include the following activities:

- i. Technical feasibility studies based on preparatory work (hydrology study, financial study, Drainage Master Plan for Dakar and revised sanitation master plan) and engineering design and bidding documents for priority investments for a primary drainage network in Pikine and Guédiawaye districts; the first priority investments include 2 catchment areas: Dalifort; downstream Thiourour (including Wakhinane Nimzat; Niety Mbar and Bagdad). Subsequent investments include 5 additional catchment sites (Mbeubeuss 3.1 to 3.4 and downstream Yeumbeul north). The design of the drainage system will take into account to the extent possible climate change impacts.
- ii. Potential resettlement of residents and/or compensation where the drainage channels will be built as well as the implementation of the Environmental and Social Management Plans;
- iii. Priority drainage infrastructure investments following a phased approach (first priority investments with 2 catchment areas selected, and subsequent investments with 5 catchment areas (Mbeubeuss 3.1 to 3.4 and downstream Yeumbeul north) as identified by the recently completed and validated Drainage Master Plan and detailed technical studies) and will include additional basic urban rehabilitation such as access road improvement, including road connections as a pilot investment that could be scaled up within forthcoming urban development programs; work supervision;
- iv. Technical and institutional study assessing a proposal of pumping the Thiaroye groundwater for its transfer to the Niayes areas where it could be used for horticultural irrigation to substitute heavily subsidized potable water, which is currently provided to smallholders by the water company of Senegal.³³ The result of the study will be presented

³³ Several studies concluded that the pumping of 16 000 m³/day would result in a 0.5 to 1.5 meter decrease of groundwater table level, without causing further sea water intrusion. The water would be transferred to the Niayes zone where it would be used for horticultural irrigation in substitution of potable water which is currently provided to smallholders by the water company of Senegal (SONES/SDE) and heavily subsidized (US\$ 4 million/year). The expected positive impacts are a more sustainable and cost effective management of water resources, increase of horticultural production.

to the SC and assessed during the MTR of the Project for further recommendation. This is considered as a support to a potential flood prevention investment as the groundwater level will be reduced;

- v. Consultant services (hydraulic, urban planning) and technical assistance in form of an ISC which will assist in the preparation of ToRs for technical studies, short listing of consultants, (studies and supervision), RFPs, evaluation of technical and financial proposals, bidding documents, bid evaluation and reports, general work supervision, performance management and quality control, and final reception. A key role of the ISC will be capacity strengthening of the MDA and the municipalities to ensure gradual handing over of responsibilities for the national program.
- vi. Impact evaluation study based on methodology with counterfactual control group to be defined and baseline data to be collected prior launch of actual works. The data collection process will be repeated by EOP.

B.2. Operating and maintenance of drainage systems

15. The sub-component will ensure that the priority investments financed by the project will be cost-effective and managed adequately by a designated entity. It will include the following activities:

- i. Agreement and establishment of an institutional and financial mechanism for O&M of the stormwater drainage systems based on the recommendations of the ongoing institutional and financial sustainability study.
- ii. Support to on-the ground O&M including annual cleaning drainage channels on the basis of a maintenance plan for each municipality and in compliance with the Municipal Agreement ("*contrat de ville*") and the agreed O&M institutional and financial reforms (after MTR). O&M support includes the procurement of goods and operating costs, preventive treatment of natural or artificial retention basins to reduce water-borne and vector-borne diseases in project area in cooperation with National Malaria Program, local labor, renting of truck to remove waste, etc. Prior MTR, the O&M execution related to the drainage system established by the project will be done on the basis of a 2-year BOM (Built Operate Maintain) contract with the enterprise building the drainage infrastructure. After the MTR and based on the recommendations of the above mentioned financial and institutional sustainability study, the Government and municipalities will ensure that funds are allocated to cover the Operating and Maintenance (O&M) of the stormwater drainage system in the project intervention areas.
- iii. Contingency measures for rapid response related to emergency drainage works and stormwater management in case of extreme floods (criteria defined in the project implementation manual) to secure project investments.

Component C: Community Engagement in Urban Flood Risk Reduction and Adaptation to Climate Change (total cost estimated at US\$4.4 million; IDA amount: US\$3.6 million)

16. Objective: This component aims at empowering municipalities, residents and community groups within the project intervention zone to engage actively in urban flood-risk reduction measures and adaptation to climate change through piloting the development and implementation of participatory urban community investments and an awareness raising and communication campaign.

17. Summary: Lessons learned from other flood management projects demonstrate that the planning and construction of (primary) drainage networks has to be coordinated with municipalities and local population in order to facilitate their acceptance and their sustainability. The component will develop and implement an information, education and communication (IEC) strategy targeting local as well as national stakeholders focusing on stormwater management, flood risk reduction, preparedness and response, awareness raising and behavioral changes for stronger resilience. The component will support community participation in urban flood risk management, small-scale pilot investments aiming at rehabilitation and maintenance of natural or artificial retention basins and/or urban wetlands allowing for natural run off. The component will provide for: (i) consultant services for the development of the IEC strategy and tools as well as technical assistance for carrying out the development, implementation and monitoring of the community investments; and (ii) small-scale pilot community investments including small works, goods, equipment and incremental operating costs needed.

18. Gender: The component's awareness raising strategy and CDD-like community investments aim to remove some of the barriers to gender equality at local level. The component aims to strengthen the capacity of women to become active participants in the project supported consultative, planning and decision-making processes through the emphasis of the local engagement strategy (social facilitators) and increased awareness to adapt to climate change related increased flood risks.

19. The component has two sub-components:

C.1. Flood resilience awareness, communication and community capacity-building (total cost estimated at US\$2.2 million, IDA amount: UD\$1.4 million)

C.2. Flood risk-reduction community-investments (total cost estimated at US\$2.2 million, IDA amount: UD\$2.2 million)

C.1. Flood resilience awareness, communication and community capacity-building

20. The sub-component aims at strengthening awareness, capacity and knowledge of two different target groups, national stakeholders as well as local level stakeholders (communities – municipalities, intercommunal entities and local residents in the project area) to understand and participate in the project, to provide for a feed-back mechanisms to the project implementation agency (MDA), to inform on flood related economic, health and general residential risks and respect of non-aedificandi zones and construction standards as well as enforcement measures, promote behavioral change including on waste management practices and resilience to be better

prepared for dealing with recurrent flood situations, drainage management and rehabilitation and protection of wetlands, operation and maintenance tasks). It will include the following activities:

- i. Design of project and sector related awareness raising strategy, media support tools and annual work plans based on previous experiences and best practices (*Fondation Droit à la Ville*, Cities alliances) by a specialized communication consultant firm;
- ii. Implementation of a local level engagement strategy by selected non-governmental/private “social facilitators”.³⁴ Throughout project duration, the social facilitators will carry out a highly consultative and participatory process involving local stakeholders, communities and committees to accompany the larger infrastructure investments under component B, to assist with safeguard policy implementation, to implement the local IEC plan measures ensuring community participation, in local operation and maintenance activities and informing the local level M&E system of the project. In addition, the facilitators will assist with the information on the community investments characteristics, their development and if approved, implementation and monitoring of flood risk reduction community investments that are administered through a designated sub-manual as part of the project’s implementation manual under MDA’s supervision.
- iii. Annual external and independent evaluation of the implementation results of the communication strategy at national and local level to improve and inform the action plan for the following year.

C.2. Flood risk-reduction community investments

21. While community participation has been recognized as an essential component in rural development, the importance of participation in urban development activities has lagged behind. Previously, beneficiaries in urban projects have been seen primarily as consumer of services and their role in developing and maintaining supply systems has been accorded less importance. Experiences demonstrate that community-based organizations and residents can make important contributions to the provision and operation and maintenance of urban systems. Benefits derive not only from cost reduction and resource mobilization but also from better targeting of project measures to local needs through their involvement in urban rehabilitation activities and enhanced ownership of the facilities and infrastructure provided.

22. The sub-component aims to assist local communities (local associations, local flood risk reduction committees, local women groups, youth groups, etc.) in the project area to reduce their vulnerability to flood related risks and improving overall urban service delivery for local residents and economic actors within the intervention zone. It will include the following activities:

³⁴ Local context: The use of so-called facilitators (“social coaching”) for enabling community engagement and participation of beneficiaries in urban and infrastructural projects has been increasingly tested with success in Senegal over the past years.³⁴ The approach consists of engaging local beneficiaries and stakeholders throughout the project development and implementation and intends to strengthen ownership and sustainability of investments in particular due to community-driven operation and maintenance mechanisms. Such a process needs to be complemented by a dedicated information, education and awareness raising campaign. In Senegal, there are only a few facilitator entities (NGOs, private consultant firms) that have tested and/or are working under such modalities and objectives in urban and rural areas.

23. Development, implementation and monitoring of community investments for specific community-based resilience and adaptation measures which will be guided by procedures described in a specific chapter of the project's implementation manual and supervised by MDA. The social facilitators will assist the beneficiaries (local community groups) to prepare community investment proposals which will be submitted to an approval committee (chaired by the municipality involved and ADM). The social facilitator will verify compliance with the eligibility criteria and safeguard compliance stated in the sub-manual prior submission to the approval committee. The community investment ranges from approximately US\$10,000 to approximately US\$70,000. For small works, a technical review will be ensured by MDA through its ISC for component B and the technical working group if needed. During preparation the following types of community investments addressing prevention, rehabilitation and O&M have been identified: 1. Local level O&M (cleaning of drainage channels and clearance of household waste piles if needed); 2. Rehabilitation of natural or artificial retention ponds; 3. Protection and Rehabilitation of non-aedificandi zones; 4. Protection and rehabilitation of social infrastructure affected by floods (school, health posts); 5. Connection work of priority flood-prone areas to secondary drainage system; 6. Development and pilot/implementation of community enforcement mechanisms in synergy with DSCOS particularly in flood-prone areas identified by flood risk mapping within project area (e.g., planting of trees, vegetable fences, etc.); And 7. Development/Strengthening capacity and functionality of local level flood committees and related bodies. The activities that are eligible for funding through the community investments include those that (i) can be preferentially undertaken by the community-based beneficiary with locally available technical assistance; (ii) are technically and financially feasible; and (iii) benefit the community, especially the poor and women.

24. An evaluation of the implementation results of the community investments and the local engagement strategy will be included as part of the MTR review to provide recommendations for a potential fully-fledged CDD approach with transfer of funds directly to local recipients and beneficiaries.

25. The component is co-funded by NDF to support the design and implementation of a project and sector related Information, Education and Communication (IEC) strategy to improve stakeholder awareness.

Component D: Project Coordination, Management, Monitoring and Evaluation (total cost estimated at US\$8.8 million; IDA amount: US\$2.2million)

26. **Objective:** This component aims to provide efficient and effective management support for the implementation of the project, including the development and operationalization of an effective and efficient Monitoring and Evaluation System, and all fiduciary requirements (safeguards, procurement and financial management).

27. **Summary:** This will be achieved by supporting the MDA with adequate technical and fiduciary staffing, operational support and equipment.

28. Gender: The recruitment of additional technical and fiduciary staff to strengthen MDA's capacity to deliver on the project will encourage the application of qualified women.

29. The component has two sub-components:

D.1. Project coordination and management (total cost estimated at US\$8.2 million, IDA amount: UD\$2.1 million)

D.2. Monitoring and evaluation (total cost estimated at US\$0.6million, IDA amount: UD\$0.1 million)

30. The component will provide for: (i) technical and fiduciary consultant support services to strengthen MDA capacity (civil engineer, urban specialist, hydraulic expert, M&E officer, accountant, procurement specialist and contract manager); (ii) support to the PSC (mainly workshops); (iii) goods and equipment (computers, office furniture and equipment, vehicles); (iv) training for MDA's staff; (v) financial and technical audit; and (vi) MDA incremental operating costs to assist with project implementation and monitoring. The component is co-funded by NDF to assist MDA's capacity related to M&E through a full-time consultant during project implementation.

31. MDA will have the following functions: (i) follow-up and evaluation of work performed by the ISC and the NGO/consultant firm; (ii) liaise with the focal points in the other ministries/agencies working on project activities and coordinate with related initiatives; (iii) act as secretariat of the project's Steering and Technical Committee as well as operational working group; (iv) prepare consolidated technical and financial project reports for the including audits; and (v) carry out monitoring and evaluation tasks according to the M&E manual and the results framework through its M&E specialist (data collection, data analysis and data presentation; MTR review report, EOP review report and supervision of independent evaluations).

Table 1: Project Cost and Financing Plan

Republic of Senegal
Storm Water Management and Climate Change Adaptation Project
Project Cost Summary
(US\$ Million)

	Cost Including Contingencies	% of Total	International Development Association Financing	% Financing
A. Flood risk mainstreaming in urban sector				
1. Urban Planning and Management	1.4	2.0	0.8	56.4
2. Institutional strengthening of central government departments, and municipalities	1.3	1.8	0.8	61.7
3. Integrated Urban Storm Water and Management and Climate Change adaptation program	0.3	0.4	0.0	0.0
Subtotal	3.9	5.4	1.7	42.5
B. Drainage investment and management				
1. Drainage infrastructure investments				
Drainage investments - Master Plan Phase 1	22.2	30.4	20.6	92.8
Drainage investments - Master Plan Phase 2	28.7	39.3	24.4	85.0
Subtotal	50.8	69.8	45.0	88.4
2. Operation and maintenance of drainage systems	4.9	6.8	3.2	64.4
Subtotal	55.8	76.5	48.1	86.3
C. Community engagement in urban flood-risk reduction and adaptation to climate change				
1. Awareness and communication	2.2	3.0	1.4	64.2
2. Community pilot investments	2.2	3.1	2.2	100.0
Subtotal	4.4	6.0	3.6	82.4
D. Project coordination, management, monitoring and evaluation				
1. Project coordination and management	8.2	11.2	2.1	25.5
2. Monitoring and evaluation	0.6	0.8	0.1	24.5
Subtotal	8.8	12.0	2.2	25.5
Total PROJECT COSTS	72.9	100.0	55.7	76.4

Republic of Senegal
Stormwater Mgt and Climate Change Adapt. Project
Project Components by Year -- Totals Including Contingencies
(US\$ Million)

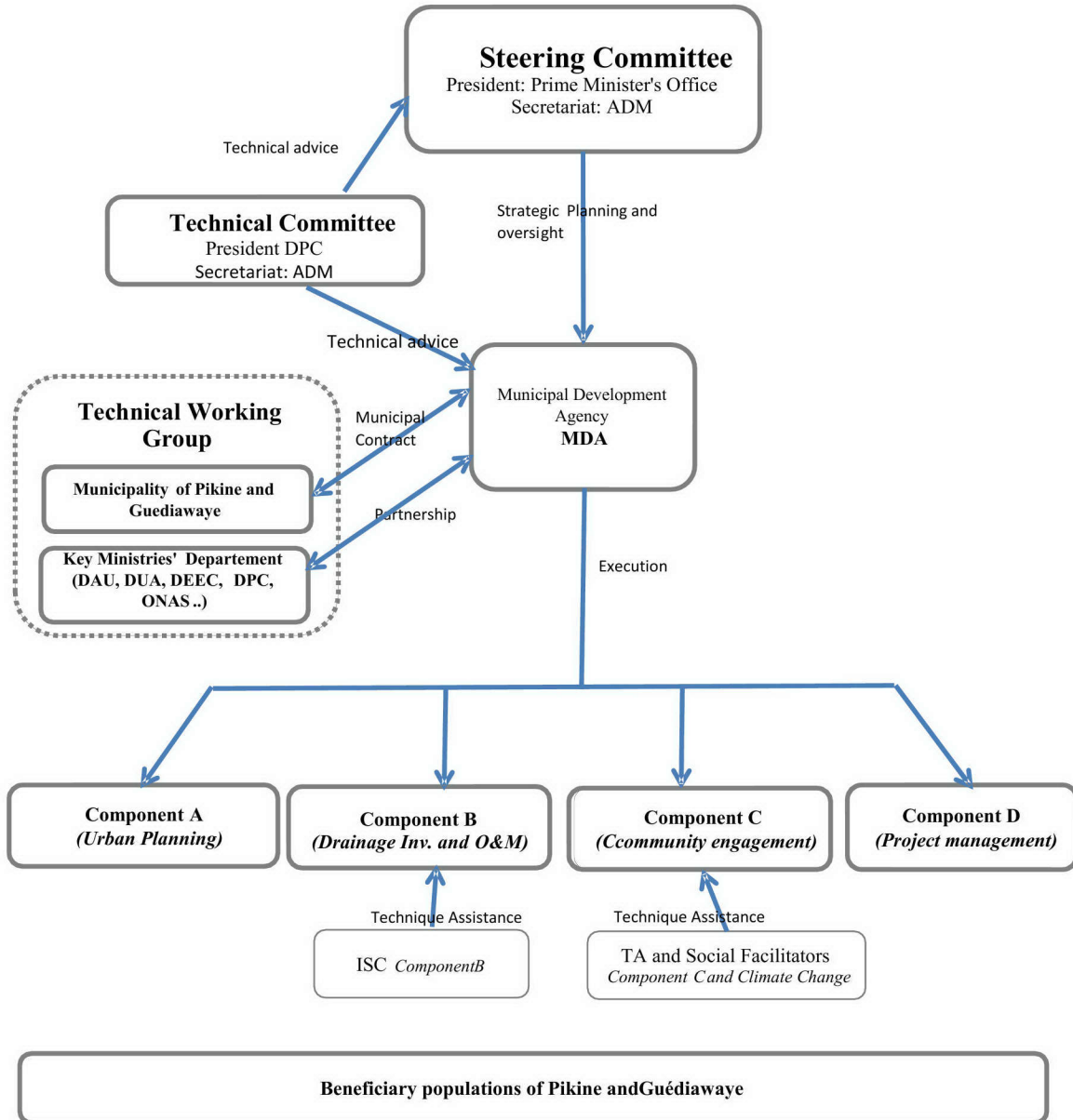
	Totals Including Contingencies					Total
	2013	2014	2015	2016	2017	
A. Flood risk mainstreaming in urban sector						
1. Urban Planning and Management	0.7	0.7	0.0	0.0	0.0	1.4
2. Institutional strengthening of central government departments, and municipalities	0.7	0.1	0.1	0.3	0.1	1.3
3. Integrated Urban Storm Water and Management and Climate Change adaptation program	0.1	0.2	0.6	0.1	0.1	1.2
Subtotal	1.5	1.0	0.8	0.4	0.2	3.9
B. Drainage investments and management						
1. Drainage infrastructure investments						
Drainage investments - Master Plan Phase 1	14.0	6.4	0.6	0.7	0.4	22.2
Drainage investments - Master Plan Phase 2	6.1	15.7	5.4	0.7	0.7	28.7
Subtotal	20.1	22.1	6.0	1.4	1.2	50.8
2. Operation and maintenance of drainage systems	0.7	1.0	1.1	1.1	1.1	4.9
Subtotal	20.8	23.1	7.1	2.5	2.3	55.8
C. Community engagement in urban flood-risk reduction and adaptation to climate change						
1. Awareness and communication	0.6	1.2	0.1	0.1	0.1	2.2
2. Community pilot investments	-	0.2	0.5	0.8	0.7	2.2
Subtotal	0.6	1.4	0.7	0.9	0.8	4.4
D. Project coordination, management, monitoring and evaluation						
1. Project coordination and management	1.5	1.0	1.9	1.9	1.9	8.2
2. Monitoring and evaluation	0.1	0.1	0.2	0.1	0.1	0.6
Subtotal	1.6	1.1	2.1	2.0	2.0	8.8
Total PROJECT COSTS	24.5	26.7	10.6	5.8	5.3	72.9

ANNEX 3: IMPLEMENTATION ARRANGEMENTS

A. Institutional context

1. Stormwater management in Senegal is not really structured and organized, operating within a multi-sectoral urban context. It involves several ministries and stakeholders, including the ministries in charge of urban planning, interior, decentralization, housing, water, urban sanitation, environment, agriculture; and the municipalities and inter-communal bodies. Many stakeholders and actors are involved in flood management and drainage but there is no lead agency responsible for overall consistency.
2. The main governmental executing institutions are the Ministry of Urbanism, Habitat, Water and Sanitation (through its Directorate of Urban Sanitation, DAU and National Sanitation Office, ONAS), and the Ministry of Decentralization and Local Governments (through its MDA, intercommunal body and municipalities), the Interior Ministry (through DPC). The municipalities are closely involved in the urban flooding issue and stormwater management but lack resources and capacity, despite the transfer of responsibilities in the areas of stormwater (as stated by the sectoral policy letter on sanitation) health and environmental management. Other relevant stakeholders to be coordinated include the Road Works Agency (Ageroute), and the Jaxaay plan, the Project for Construction and Rehabilitation of the State Heritage (*Projet de Construction et de Réhabilitation du Patrimoine de l'Etat*, PCRPE), the National Agency for the Promotion of Investment in Major Works (*Agence Nationale chargée de la Promotion de l'Investissement des grands travaux*, APIX), the Civil Protection Directorate (*Direction de la Protection Civile*, DPC) and the National Unit of Firefighters. NGOs such as ENDA Tiers Monde, the International Federation of Red Cross (IFCR), and UN agencies are also working on the ground to mitigate the impact of floods when they occur. Other local stakeholders include local associations, traditional leaders and entrepreneurial groups.
3. An institutional and financial sustainability study has started during project preparation and is being carried which should lead to important sectoral recommendations and reforms validated by the Government by the Mid Term Review of the project. These reforms are expected to be implemented over the rest of the project implementation period addressing issues as institutional clarity of the stormwater sector development, its financial sustainability as well as structuring and strengthening capacities of the main actors and stakeholders, in particular. The implementation of the study's action plan which is expected to be finalized during the Mid Term Review of the project will be funded and supported by the project within Component B.
4. The figure below presents the proposed institutional set up, clearly distinguishing responsibilities for project oversight, coordination and monitoring; and implementation and management.

Figure 1: Project implementation arrangements



B. Capacity of the municipalities related to stormwater management

5. According to the Code de l'Assainissement (sanitation law, 2009), the municipalities are responsible for stormwater infrastructure investments and O&M. To accomplish this, transition arrangements are needed to empower their technical staff and improve their management exposure and decision making capacity. The Authorities and the World Bank have proposed an arrangement that seeks to match the municipalities' and other key stakeholder's expectations while ensuring that the Bank's fiduciary requirements can be met. Hence during project preparation, it was agreed that MDA will be the implementing entity agency for the project and that the services of a ISC to be recruited by MDA will be required to ensure the smooth and rapid implementation of the component B. The ISC recruitment is expected to be finalized by the time of effectiveness and its recruitment is a condition of effectiveness. The ISC will be recruited on a competitive basis and will support municipalities, MDA and key stakeholders. The terms of reference of the ISC clearly reflect these objectives and include specific on-the-job training targets. For the municipalities to take full responsibility according to its mandate the definition of permanent institutional arrangements for stormwater management, such as operational responsibilities and bodies need to be identified and properly mounted and staffed (see table 1, p. 45).

C. Project implementation and management structure

6. The following institutional arrangements have been agreed upon, taking account of the priority nature and strategic importance of the project and the still limited capacity of the municipalities and other key stakeholders for fiduciary, technical and monitoring aspects. These arrangements are expected to ensure that funds disburse quickly, multi-sector objectives are reached, and transparency is maintained.

7. *Project oversight.* During project preparation, a project coordination mechanism proving to be working properly was initiated by the Prime Minister's Office building on Integrated Disaster Risk Management lessons' learned from other countries. The inter-ministerial Project Steering Committee (SC) was chaired by a representative of the Prime Minister to ensure the highest level of coordination and political support. It comprises representatives of the ministries in charge of finance, infrastructures, environment and nature protection, interior, urbanism, water

and Sanitation, decentralization and local collectivities, transport and land use, the mayors of the two beneficiary municipalities, the prefects of Dakar, Pikine and Guédiawaye, the president of the Dakar Regional Council.³⁵ The SC will be maintained and will be responsible for providing overall project oversight, ensuring policy support, strategic planning and integration with other urban development programs. Other experts may be invited to attend the SC meetings as required. The SC will meet twice a year and on an ad hoc basis when required. To facilitate the work of the SC, the MDA will function as the secretariat.

8. The SC is assisted by a larger Technical Committee (TC)³⁶ to provide review of key project studies, monitoring of implementation activities and to ensure multi-sectoral participation, particularly in awareness raising related activities including sharing project related information at local level. The TC will meet on an ad hoc basis when required and MDA will function as the secretariat.

9. *Project coordination and monitoring.* MDA will be responsible for the overall coordination of the project. It will work in coordination with the two beneficiary municipalities and the other relevant ministries and agencies involved in the stormwater and drainage sector. In particular, MDA will ensure donor coordination, which will be a key element of a sustainable multi-year programmatic approach. MDA will: (i) monitor and evaluate the overall project implementation and provide regular consolidated reports on progress to the SC (and if needed to the TC) and the World Bank; (ii) assure steady progress in accordance with an implementation schedule reviewed and approved by the World Bank; (iii) monitor the contract obligations of the ISC and ensure adequate and smooth transfer of skills to national staff (MDA and municipalities); monitor the contract obligation of the NGO/consultant firms for implementation of the participatory community investments under sub-component C.2.; and (iv) ensure the maintenance of a high ethical standard and transparency. As mentioned above, MDA will also serve as the secretariat of the SC and the TC.

10. To assist with day to day coordination and technical aspects of project implementation, a technical working group (“Groupe Technique Opérationnel”) headed by MDA (Technical Director including the ISC) and composed of key technical staff of the two beneficiary municipalities, the focal points of key ministries and selected operational bodies involved will be established. This working group which should preferably be a subset of the ongoing large Technical Committee established during project preparation will meet regularly, and at least monthly, to ensure adequate technical coordination and communication between municipalities and operational entities at the implementation level.

11. *Project management and implementation.* MDA will be the implementing entity and implement all components of the project. For the component B (civil works part), the two beneficiaries municipalities (Pikine and Guédiawaye) will delegate (through an adjusted “*Contrat de Ville*” (CdV)³⁷ most of the implementation responsibilities to MDA which, with the

³⁵ Arrêté portant création, organisation et fonctionnement du comité de pilotage et du comité technique du PROGEP 02.11.2011-012131, Primature

³⁶ Arrêté portant création, organisation et fonctionnement du comité de pilotage et du comité technique du PROGEP 02.11.2011-012131, Primature

³⁷ CdV/contrat de ville: The municipal agreement concept was used under the Local Authority Development Project as a legally binding instrument between municipalities and MDA. An adjusted version has been developed to build on this existing planning, management and

close support of the ISC and the constant implication of the municipalities; will be in charge of implementing the investments under the overall responsibility of MDA.

12. MDA has a strong technical and fiduciary experience in carrying out large infrastructure project. As implementing entity of the ongoing Local Authority Development Project, it is familiar and experienced with World Bank policies and procedures related to environment and social safeguards, financial management and procurement of goods and services, and has shown satisfactory performance to date. MDA and the beneficiary municipalities will benefit from various technical assistance and additional capacity strengthening and training activities financed by the project.

13. Table 1 below presents the detailed roles and responsibilities of each actor as confirmed during the appraisal mission and which has been used as basis for the finalization of the Terms of Reference of the ISC to be recruited internationally on a competitive basis. Non-works activities will be managed by the MDA and implemented by the functional departments of the MDA in close collaboration with the two beneficiary municipalities with the support of the required expertise (financed by the project) and training of the newly recruited fiduciary staff. The agreed responsibilities of the municipalities, MDA and the ISC are detailed in the Table 1 below. Prior to the mid-term review the Bank’s team will reassess the capacity of the municipalities’ and MDA staff and, if possible, the role of the ISC will be revisited and adjusted.

Table 1: Distribution of responsibilities
between municipalities, MDA and implementation mechanism of the ISC,
Implementation mechanism of drainage works under Component B

Responsibilities	Municipalities	ISC	MDA
Establishment ISC			
Selection of the ISC	(X)		X
Signature of the ISC’s contract		X	X
Monitoring of the ISC’s Financial contract			X
Administrative, Financial and Technical management			
Coordination of the of the civil works program implementation	(X)		X+TWG
Monitoring of the civil works program implementation	(X)	X	X
Financial allocation of the civil works program	X		X+TWG
Identification of civil works projects	X		X+TWG
Assistance for the selection of civil works projects	X		X+TWG
Management of required logistics and equipment	(X)	X	X
Contract management	(X)	X	X
Liaison with World Bank			X

monitoring tool. The purpose of the municipal agreement for the Project is mainly to specify investment support in the municipal territory supported by the project and to specify agreed implementation arrangements via MDA as well as O&M obligations for the municipalities.

Civil works design			
Preparation of Terms of reference	(X)	X	X
Approval of Terms of reference			X+TWG
Preparation of short lists for civil works design studies and supervision	(X)	X	X
Approval of short list of consultants	(X)	(X)	X
Preparation of RFP for the consultants	(X)	X	X
Preparation of other consulting services as required		X	X
RFP approval for the consulting firms			X
Submission of RFP for the consulting firms		(X)	X
Evaluation of proposals and preparation of evaluation reports		X	X
Approval of evaluation reports	(X)		X
Recommendation for the selection of consulting firms		X	
Assignment(s) of contract for civil works design studies and supervision	(X)		X
Signature of contract for civil works design studies and supervision	visa		X
Monitoring of technical studies: Preliminary studies (<i>APS</i>), detailed studies (<i>APD</i>), cost estimates	(X)	X	X + TC
Responsibilities	Municipalities	ISC	MDA
Approval of consulting firms proposal and technical studies: Preliminary studies (<i>APS</i>), detailed studies (<i>APD</i>), confidential estimates (after review by the ISC)	(X)		X+TWG
Control of bidding documents submitted by the consulting firms	(X)	X	X
Approval of bidding documents (after review by the ISC)	(X)		X
Monitoring of ESIA and RAP	(X)	X	X
Validation of ESIA and RAP (after review by the ISC)	(X)		X+TWG +DEEC
Validation of payments to consulting firms	(X)	X	X
Payments to consulting firms			X
Civil Works Implementation			
Publication of tender		(X)	X
Evaluation of proposals and preparation of reports	(X)	X	X
Approval of evaluation reports			X
Signature of civil works contract(s)	visa		X
General supervision of ongoing works	(X)	X	X+TWG

Implementation and supervision of works, including quality control and monitoring of works	(X)	X	(X)
Monitoring of ESMP and RAP	(X)	X	X
Accounts checking	(X)	X	X
Payment of contractors			X
Organization of prior operations required before works acceptance (pre-acceptance)		X	
Preliminary certification of completion of work	X	(X)	X + TC
Monitoring of issues at preliminary certificate until they have been addressed	X	X	X
Preparation of dossier for the works executed (end works report, 10 year insurance...)		X	
Final Certification of works completion	X		X
Financial payment of contracts (cautions, etc.)	(X)	X	X
Monitoring of performance indicators related to the technical and financial implementation of contracts	(X)	X	X+TWG

X : **Primary Responsibility**; (X) : **Secondary Responsibility**

ISC : Implementation Support Consultant

TC : Technical Committee

14. The scope of services of the ISC is determined by the above-mentioned implementation mechanisms for works and includes: assistance in the preparation of ToRs for technical studies, short listing of consultants, (studies and supervision), RFPs, evaluation of technical and financial proposals, bidding documents, bid evaluation and reports, general work supervision, performance management and quality control, and final reception.

15. **ISC Contract Review:** The MDA will arrange for an independent review of contract compliance on an annual basis or as needed.

D. Financial Management, Disbursements and Procurement

16. The following are the financial management arrangements for the project

17. **Budgeting arrangements:** The budgeting process and monitoring will be clearly defined in the FM Manual and the budget will be adopted by the Project Steering Committee before the beginning of the year and the execution will be monitored on a quarterly basis. Annual draft budgets will be submitted to the World Bank's non objection before adoption and implementation.

18. **Accounting arrangements:** The current accounting standards in use in Senegal for on-going Bank-financed projects will be applicable. SYSCOHADA is the assigned accounting system in West African Francophone countries. Project accounts will be maintained on an accrual basis, supported with appropriate records and procedures to track commitments and to safeguard assets. Annual financial statements will be prepared by the MDA in accordance with

the SYSCOHADA. The ROSC Accounting and Auditing identified some differences with the International Accounting Standards but they are not expected to impact the project. Accounting and control procedures will be documented in the updated FM Manual.

19. Internal control and internal auditing arrangements

- **Internal Auditing:** A consultant has been recruited to perform quarterly ex-post audits.
- **Internal Control Systems:** The FM manual will be updated to better describe the internal controls procedures and the budget monitoring system.

20. External Auditing arrangements

The Financing Agreement requires the submission of Audited Financial Statements for the project to IDA within six months after year-end. External auditor with qualification and experience satisfactory to the World Bank will be appointed to conduct an annual audit of the project’s financial statements. A single opinion on the Audited Project Financial Statements in compliance with International Auditing Standards will be required. The external auditors will prepare a Management Letter giving observations and comments, and providing recommendations for improvements in accounting records, systems, controls and compliance with financial covenants in the credit Agreement.

The Audit Report and Due Date table below summarizes the auditing requirements:

<i>Audit Report</i>	<i>Due Date</i>
Annual audited financial statements and Management Letter (including reconciliation of the Designated Accounts with appropriate notes and disclosures).	End of June

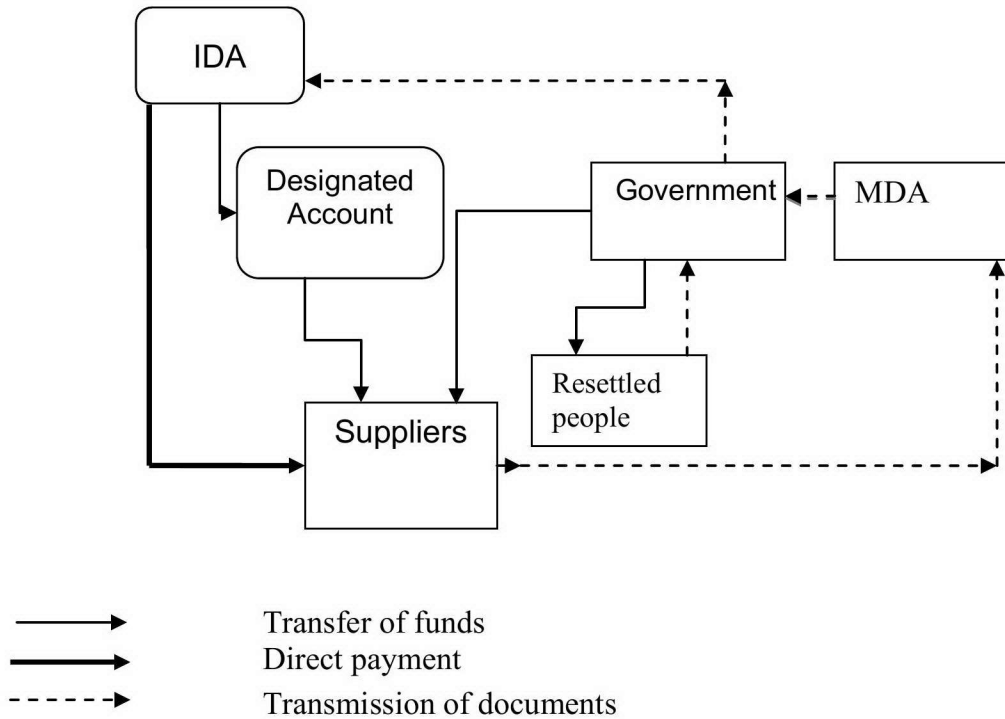
21. Funds Flow and Disbursement Arrangements

22. Disbursement Methods

Disbursements under the Credit would be IFR’s based. Direct Payment will apply as appropriate. A Designated Account (DA) will be opened at a commercial bank to facilitate payment for eligible expenditures. The Designated Account will be managed according to the disbursement procedures described in the FM Manual and Disbursement letter. The daily management of the DA will be ensured by MDA and the provision by DDI.

23. Funds Flow Arrangements: Funds flow arrangements for the project are as follows:

Funds Flow Chart



24. The following table specifies the categories of Eligible Expenditures that may be financed out of the proceeds of the Financing (“Category”), the allocations of the amounts of the Financing to each Category, and the percentage of expenditures to be financed for Eligible Expenditures in each Category:

Table 1: Categories of Eligible Expenditures

Category	Amount of the Credit Allocated (expressed in SDR)	Percentage of Expenditures to be Financed (inclusive of Taxes)
(1) Goods, works, non-consulting services, Operating Costs, Training and consultants’ services of the Project (excluding Part A.1.b, A.1.d, Part A.2.a, Part A.3, Part B.1.e, Part C.1.a, Part D.3 thereof)	32,900,000	100%
(2) Non allocated	3,000,000	
TOTAL AMOUNT	35,900,000	100%

Financial Reporting Arrangements

25. MDA will produce quarterly unaudited Interim Financial Reports (IFRs) which will include sources and uses of funds by project expenditures classification and a comparison of

budgeted and actual project expenditures (commitment and disbursement) to date and for the quarter. The IFRs are to be produced on a quarterly basis and submitted to the Bank within 45 days after the end of the calendar quarter. MDA will prepare and agree with the Bank on the format of the IFRs by negotiations.

26. MDA will produce Annual Financial Statements, and these statements will comply with SYSCOHADA and World Bank requirements. These Financial Statements³⁸ will comprise of:

- A Statement of Sources and Uses of Funds
- A Statement of Commitments
- Accounting Policies Adopted and Explanatory Notes
- reconciliation of the Designated Accounts
- A Management Assertion that project funds have been expended for the intended purposes as specified in the relevant financing agreements

³⁸ It should be noted that the project financial statements should be all inclusive and cover all sources and uses of funds and not only those provided through IDA funding. It thus reflects all program activities, financing, and expenditures, including funds from other development partners.

27. Financial Management Action Plan

The following actions need to be taken in order to enhance the financial management arrangements for the project:

FM Action Plan			
	Action	Date due by	Responsible
1	Prepare and agree with the Bank on the format of the IFRs.	Received by the Bank	MDA
2	Update the existing FM manual (as part of the Project Implementation Manual) to take into account the financial management arrangements of this project	Done	MDA
3	Recruit an accountant under terms of reference acceptable to the Bank	No later than 120 days after effectiveness	MDA
4	<ul style="list-style-type: none">• Draft the ToRs for the accounting software to be upgrade and start the bidding process; Upgrade the accounting software for the project.	No later than 120 days after effectiveness	MDA
5	<ul style="list-style-type: none">• Draft the ToRs for financial audits of the Project,• Selection of the auditor	Received by the bank Not later than 120 days after effectiveness	MDA

Procurement

A) General

28. Procurement for the proposed project will be carried out in accordance with the World Bank's "Guidelines: Procurement of Goods, Works, and Non-Consulting Services under IBRD Loans and IDA Credits & Grants by World Bank Borrowers", dated January 2011; and "Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits & Grants by World Bank Borrowers", dated January 2011, and the provisions stipulated in the Legal Agreement. The general descriptions of various items under different expenditure categories are described below. For each contract to be financed by the Credit, the different procurement methods or consultant selection methods, the need for prequalification, estimated costs, prior review requirements, and time frame are agreed between the Borrower and the Bank project team in the Procurement Plan. The Procurement Plan will be updated at least annually or as required to reflect the actual project implementation needs and improvements in institutional capacity.

29. National procurement system and reforms. The Government substantially improved the country's public procurement system to comply with the WAEMU's Procurement Guidelines

and international standards including: (i) the setting up of an Independent Regulatory Body (ARMP) responsible for policy and handling complaints from bidders and a Procurement Control Department (DCMP) responsible for controls of procurements transactions, which are both fully operational and they appropriately deal with their respective missions. Controls within the contracting authorities (CA) are effective through their respective Procurement Commission and Procurement Units; and (ii) an electronic system (SIGMAP) for collecting, disseminating, managing procurement information and monitoring procurement statistics and procurement complaints. The Government has enforced a set of necessary documentation which includes national standard bidding documents (NSBDs) prepared on the basis of Bank's standard bidding documents (SBDs). It has also enforced different measures which have contributed to the private sector's trust in the system, and show a clear commitment from the Government to modernize and ensure the transparency of procurement transactions.

30. In general, Senegal's procurement laws and regulations do not conflict with IDA's Guidelines on procurement. However, provisions restricting eligible bidders for domestic preference to those from WAEMU countries only will not be applied. No special exceptions, permits, or licenses need to be specified in Credit documents since IDA procedures take precedence over these laws and regulations.

31. National Competitive Bidding (NCB) procedures may be used for work contracts with a cost estimate less than US\$5,000,000 and for goods contracts less than US\$500,000. The procedures may be those described in the national public procurement code under its "Section 2 - Appel d'offres ouvert" included in Chapter 4 of the Title III of the Procurement Code.

32. Some provisions of this code are not concordant with the World Bank's Procurement Guidelines: (1) the procurement of fuel for vehicles for the public administration (the provisions 3.4c (i) of the public procurement code) and the procurement of hotels services (the provisions 3.4c (iii) of the code) may not be submitted to the code and may not be done with transparency and equity; (2) domestic preference may be used in NCB, and bidders from any WAEMU (West African Economic and Monetary Union) country may be eligible for domestic preference (provision 50 of the code) instead of national bidders only; (3) possible restrictions excluding foreign bidders' participation in direct contracting for operations financed under the National Budget (provision 52 of the code); (4) the general procurement notice (GPN) is prepared for each fiscal year instead of the duration of the project; the publication of this GPN and of all ICB procurement notices on UNDB portal is not clearly mentioned as mandatory (provision 56 of the Senegal Code of public procurement); (5) the paragraphs 2(b) and 2(c) of the provision 76 related to direct contracting in the context of imperious urgency refers to possible implication of political authorities in the related cases, which leads to political interference in the procurement process; and (6) the provision 108 related to quality control, allowing possible price refecton in case it happens that the goods, works or services delivered are not fully compliant with the specifications/description/terms of reference inserted in the contract. These provisions have been seen as weaknesses in the procurement regulation and special attention should be accorded to them. In particular, the provisions related to (i) the procurement of fuel and hotel services; (ii) the possible involvement of political authorities in direct contracting for imperious urgencies; and (iii) the quality control and possible price refecton, have been raised by the Bank and discussed with the authorities for improvement.

33. With regard to the procurement code, in order that the above referred procurement method designated as “Appel d’Offres Ouvert” be acceptable to IDA to be used for NCB, the following special requirements will need to be followed : (a) bids shall be advertised in national newspapers with wide circulation; (b) bid evaluation, bidder qualification and award criteria shall be specified clearly in the bidding documents; (c) bidders shall be given an adequate response time (minimum four weeks following the date of the invitation to bid or the date of availability of the bidding documents, whichever is later) to prepare and submit bids; (d) bids shall be awarded to the lowest evaluated bidder; (e) eligible bidders, including foreign bidders, shall not be precluded from participating; and (f) no preference margin shall be granted to domestic contractors.

34. Furthermore, in accordance with para.1.16 (e) of the Procurement Guidelines, each bidding document and contract financed out of the proceeds of the Financing shall provide that: (i) the bidders, suppliers, contractors and subcontractors shall permit IDA, at its request, to inspect their accounts and records relating to the bid submission and performance of the contract, and to have said accounts and records audited by auditors appointed by the association; and (ii) the deliberate and material violation by the bidder, supplier, contractor or subcontractor of such provision may amount to an obstructive practice as defined in paragraph 1.16(a)(v) of the Procurement Guidelines.

35. Procurement of Works: Works procured under this project, would include: under component B, the construction of primary/secondary drainage infrastructures for the evacuation of stormwater of the high-risk flood-prone areas within the most affected districts as defined by the Drainage Master Plan and project investment plans tranche 1 and 2 for Pikine and Guédiawaye; under component C, community participation in small investments for the rehabilitation and maintenance of priority tertiary storm-water drainage systems and/or urban natural or artificial retention basins and wetlands as well as related small urban rehabilitation measures allowing for natural run off and connection to secondary/primary drainage systems. The procurement will be done using the Bank’s Standard Bidding Documents (SBD) for all International Competitive Bidding (ICB). Domestic preference may be used by the Borrower for ICB. In the case of NCB, while the Borrower has developed National SBD, it has been agreed that for this project, the Bank’s SBD be adapted (or modified to meet the exceptions authorized under NCB) and used for NCB.

36. Other procurement methods may be used for works contracts that meet the requirement for such methods, according to the Procurement Guidelines, in particular: shopping as described in paragraph 3.5 of the Procurement Guidelines, framework contracts as described in paragraph 3.6 of the Procurement Guidelines, and direct contracting as per paragraph 3.7 of the Procurement Guidelines. The sub-component C2 includes the development, the implementation and the monitoring of community investments for specific community-based resilience and adaptation measures. These community investments which range from approximately US\$10,000 to approximately US\$70,000 are therefore small contracts. According to the implementation arrangements, the beneficiary communities will be assisted by competitively selected social facilitator(s), either NGOs or consulting firms, while the MDA will be responsible for the procurement operations related to the investments and the overall supervision of their implementation. In addition, during the first stage of the implementation of the

investments, the processing may allow for piloting the building of capacities within the beneficiary communities; if this exercise concludes to some acceptable capacities, there may be windows for certain investments to be implemented with the participation of the beneficiary communities.

37. Procurement of Goods: Goods procured under this project would include: equipment for pumping purpose, curing/cleaning of drainage systems, equipment for maintenance of drainage systems for municipalities, vehicles, and equipments for information systems in order to enhance the capacities of the stakeholders in their institutional responsibilities and for the management of the project. The procurement will be done using Bank's SBD for all ICB. In the case of NCB, while the Borrower has developed National SBD, it has been agreed that for this project, the Bank's SBD be adapted (or modified in order to meet the exceptions authorized under NCB) and used for NCB. Other procurement methods may be used for goods contracts that meet the requirements for such methods, according to the Procurement Guidelines, in particular: shopping as described in paragraph 3.5 of the Procurement Guidelines; framework contracts as described in paragraph 3.6 of the Procurement Guidelines; and direct contracting as described in paragraphs 3.7 and 3.8 of the Procurement Guidelines.

38. Procurement of non-consulting services: Non-consulting services procured under the project would include: general services related to training/workshop sessions, office house-keeping and office cleaning; general services-related information; education and communication for the project. These activities are not likely to be at high value. As such they may be contracted through the shopping process, as it would be described in the project operational manual.

39. Selection of Consultants: Consultant services procured under Component A would include: technical assistance for institutional strengthening of all stakeholders; consultants services under component B will concern support to the implementation of the project including supervision of technical studies and procurement related to the project, technical studies for the rehabilitation of primary/secondary drainage infrastructures, consulting services for supervision of project works; Consultant services procured under Component C would include consulting services for social facilitation related to community investments, technical studies for these investments and supervision of the execution the related investments works. Consultant services will also include services for the general coordination, monitoring and evaluation, capacity building, audits Short lists of consultants for services estimated to cost less than US\$200,000 equivalent per contract may be composed entirely of national consultants in accordance with the provisions of paragraph 2.7 of the Consultant Guidelines. The project will also cover consulting services for training for the staff of MDA, the staff of the beneficiary districts and their communities. The selection method will be mostly quality and cost-based selection. However, other selection methods may be used for services that meet the requirements for such methods, according to the Consultants Guidelines, in particular: selection under fixed budget as described in paragraph 3.5 of the Consultants Guidelines; least-cost selection as described in paragraph 3.6 of the Consultants Guidelines; selection based on the consultants' qualifications as described in paragraph 3.7; single-source selection as described in paragraphs 3.8 through 3.11 of the Consultant Guidelines, and selection of individual consultants as described in Section V of the Consultants Guidelines. The World Bank's Standard Request for Proposals, including standard contracts, will be use for the selection of consultants.

40. Operating costs will include equipment/vehicle operating and maintenance costs, office supplies and office furniture, energy and water, telephone, fax and internet/intranet. They will also include all costs related to the implementation of the project.

Assessment of the agency's capacity to implement procurement

41. The procurement activities for the four Components (A, B, C and D) of the project will be handled by the MDA.

42. An assessment of the capacity to implement procurement actions for the project has been carried out on October 2011 for the MDA by Cheick A. T. Traore, Sr. Procurement Specialist, Dakar Office. The assessment reviewed the organizational structure for project implementation and the interaction between the project staff responsible for procurement and the beneficiary districts and the Ministry's relevant national unit for administration and finance.

43. MDA is familiar with the Bank's procurement rules thanks to the implementation of an ongoing Bank-financed projects, i.e the Local Authorities Development Program, under execution since 2006; however, in conjunction with the municipalities which benefit from the program, it has delegated to a contract management entity, the implementation of the infrastructure component of this program. MDA has among other departments, a Technical Department and a Procurement Unit; the latter is filled with one Procurement Specialist.

44. Most of the issues/risks concerning the procurement component for implementation of the project have been identified considering the following context: the new project is an urgent one to prevent recurrent flooding that has negatively impacted vulnerable communities during the past two years or more. In addition, it involves many stakeholders in different sectors which represent a risk which could jeopardize MDA's efforts in the project management and coordination, and create additional work-load which may require adequate resources. The risks include:

- Huge work-load for the MDA's procurement specialist;
- Possible lack of procurement experience for new technical staff to be eventually recruited for the project implementation;
- The implementation of sub-component C.2 will involve a facilitator entity (NGO or private firm) to work with the communities who have no experience in community investments and who may be influenced by political interference in procurement decisions; this may impact the procurement efficiency; and
- Non compliance with the specific sub-manual for community investments due to lack of experience;

The agreed mitigations measures include:

- MDA will reinforce its capacity with an Implementation Support Consultant (ISC) for the implementation of components B; the ISC is required to be procurement proficient in order in order to perform its missions in a satisfactory manner; hiring a new

procurement specialist will be necessary, in particular to handle procurement under component C2 ;

- Staff, especially new staff, will be trained in the use of the new Guidelines date January 2011 and of the standard bidding documents, the beneficiary communities will be assisted by a capacity-proven facilitator with experience in the development and implementation of community investments;
- MDA will manage and ensure that other existing flood management projects under execution by national entities are concordant and do not affect negatively the implementation and quality execution of the actual project;
- MDA will ensure that no political interference affects the procurement decisions under the project implementation; and
- Technical audits will be done twice a year before and after the raining season to assess quality control.

45. The overall project risk for procurement is high. It may be substantial to (even) moderate when the mitigation measures are in place, in particular the ISC and the capacity building activities.

Procurement Plan

46. The Borrower has developed a Procurement Plan for project implementation which provides the basis for the procurement methods. This plan has been commented by the Bank: the actual format is being updated by the Borrower for approval. Once it is agreed between the Borrower and the project Team, the approved plan will be available on UNDB newspaper, at the respective offices of MDA and the beneficiary districts. It will also be available in the project's database and on the Bank's external website. The Procurement Plan will be updated in agreement with the project Team at least annually or as required to reflect actual project implementation needs and improvements in institutional capacity.

Frequency of Procurement Supervision

47. In addition to the prior review supervision to be carried out from the Bank offices, the capacity assessment of the implementing agencies has recommended one supervision. The Bank may conduct an IPR after one year of the project implementation.

Environmental and Social (including safeguards)

48. The proposed project is designed to have beneficial impacts on the population in terms of reduced vulnerability to flooding and improved livelihoods conditions. The project is categorized A because of the potential adverse environmental and social impacts of the civil works related to the construction of the drainage infrastructures in particular, in areas where they were non-existent. Five safeguard policies are triggered: Environmental Assessment (OP/BP 4.01); Natural Habitats (OP/BP 4.04); Pest Management (OP/BP 4.09); Physical Cultural Resources (OP/BP 4.11) and Involuntary Resettlement (OB/BP 4.12).

49. Three instruments have been prepared: (i) An Environmental and Social Impact Assessment (ESIA) for first priority investments; (ii) An Environmental and Social Management Framework (ESMF); and (iii) a Resettlement Policy Framework (RPF). These frameworks will fully apply to the subsequent investments under component B and community investment planned under component C. Since the project includes land use planning aspects due consideration will be given to the guidance in the Interim Land Use Guidance note. These instruments have been developed to address triggered safeguards issues. These safeguards instruments have been reviewed, approved and disclosed in-country and at the World Bank infoshop on December 20 and 22, 2011 respectively.

50. The MDA, which is the Implementing Entity of the Project, is experienced in safeguard policies in line with existing country legislation and World Bank procedures. MDA has already prepared and successfully implemented an Environmental and Social Management Framework and a Resettlement Policy Framework for large urban investments under the Local Authority Development Project. The MDA has already recruited an environment and social focal person who will be responsible for ensuring that all safeguards concerns and documents are adequately addressed, prepared and implemented. The Senegalese Environment Agency will monitor the implementation of the safeguards instruments in conformity with Senegalese legislation. The participating enterprises and supervising consultants are required to have environmental and social specialists in their respective teams. The enterprises are expected to prepare an enterprise Environmental and Social Management Plan (ESMP) before the commencement of civil works. The MDA will ensure that it is a contractual obligation that the supervising consultant be responsible for the adequate supervision of the Enterprise ESMP. The norms and standards therein in the ESMP will have to be in conformity with the Senegalese legislation and Bank's "General Environmental, Health and Safety Guidelines (April 2007)". The MDA will also ensure that all bidding documents and contracts have the environmental and social management clauses to tie the enterprises and supervising consultants on the need to adhere to sustainable environment, social, health, and safety guidelines during civil works.

51. To assist in capacity building, and to provide subsequent guidance in the review and implementation of the safeguards instruments, the World Bank environmental and social safeguards specialists in the project task team will provide continuous guidance to the MDA. All the relevant bodies and key stakeholders have been adequately informed of the project. Concerns of the communities and some details of consultations have been provided as Annexes in the ESIA, ESMF and RPF.

52. The participatory approach of this project from the onset will be sustained throughout project implementation. The environmental and social assessment studies, namely the ESIA, ESMF and RPF, were also carried out according to the same principle, using broad-based public consultation approach, involving the key stakeholder groups and beneficiaries. The objective was to raise awareness of project activities and impacts and foster ownership on their part.

Monitoring & Evaluation

53. Monitoring activities are designed to ensure that all stakeholders through MDA have an on-going understanding of project progress and efficiency. MDA will be reinforced to include a

full-time M&E consultant and a technical assistant for community driven climate change adaptation who will support the monitoring process to track progress and improve the quality of implementation. Monitoring and evaluation of outcomes and results during implementation will follow the Bank's regional standards and is outlined in the results framework (see annex 1). The monitoring system is designed to collect data related to the two PDO-level indicators as well as project component intermediate results through a number of complementary measures including: (a) the community investment related M&E system focusing on community participation and includes a periodic independent monitoring of the social facilitator performance; (b) financial supervision and audits, and (c) carrying out an impact evaluation (IE) as described below.

Impact evaluation (IE)

Design and methodology

54. The impact evaluation is proposed to estimate the economic and social impacts on floods affected local residents (with a particular focus on women) from the project investments in stormwater drainage infrastructure. This rigorous analysis will provide lessons on key aspects of putting in place a stormwater drainage primary network in the project priority intervention area, which will be used into later investment design of an integrated program and a national strategy on urban flood risk reduction (under component A.3). The impact evaluation will evaluate the overall impact of the project against specific outcome indicators, which will be related to project level and intermediate level indicators (from the results framework), each with a clear baseline value. Indicators, including those related to environmental and social impacts, will be defined in relation to specific hypotheses and research questions identified by the project team. An impact evaluation of small-scale investments under component C may also be considered.

55. Baseline data used for the impact evaluation would be the first assessment for ascertaining the benchmarks against which project progress in respect of key results, outcomes and impacts would be measured. Findings from the baseline study would be used to fine tune the project strategy and interventions (under component A and C). Additional data collection on specific impact evaluation indicators, and important covariates, will be carried out in treatment and control areas.

56. Impact evaluation design/methods will be determined in conjunction with the project team. It is anticipated that some combination of non-experimental and, possibly, experimental methods be used. For large-scale infrastructure investments under component B, a matching design may be employed to find suitable comparison or control areas. The matching design aims to ensure that the intervention and non-intervention area is comparable after controlling for a large set of characteristics. The control area would be selected from catchment sites covered by the Drainage Master Plan. By comparing the change over time in target outcomes in intervention and non-intervention sites (a so-called difference-in-differences approach), the project's causal impact on these outcomes can be ascertained. To evaluate the small-scale investment under component C, an experimental impact evaluation design may be considered.

Research Questions and Indicators for Evaluating Impacts

57. Final indicators for the impact evaluation will be defined in conjunction with the technical working group to test specific hypotheses and answer related research questions. These questions currently include, for example:

- What is the economic and social impact of the stormwater drainage investments on local residents/ households?
- What are the main elements of the investments proposed that should be replicated?

58. The initial focus will be on household and community level-benefits in terms of livelihoods security (mobility, access to social infrastructure, health, etc), environmental security and physical security (in terms of flood related natural disaster risk). Specific indicators for each of these will be defined in conjunction with the technical working group, the MDA's M&E officer and MDA's project related technical assistance.

Implementation of the Impact Evaluation

59. Data for the impact evaluation in the selected site and control area will be collected during the first year of implementation and prior to actual launch of investment activities through a consultant assignment. Data collection process and principles will be defined in the impact evaluation concept note and questionnaire (to be developed). The drafting of specific impact evaluation documents (concept note which will be subject to peer review, followed by the detailed implementation and work plan, instruments, etc.) will commence in the run up to project effectiveness with a practical Impact Evaluation Workshop run by the World Bank's Development Impact Evaluation Initiative (DIME). Representatives from MDA's project preparation team and Bank's staff are expected to participate. During the preparation, the project will be guided by a senior Bank researcher. Ongoing support, guidance, and technical assistance, and supervision will be provided by the DIME secretariat.

60. A specific monitoring and evaluation chapter describing baseline data and methodology for indicator measurement and evaluation and the impact evaluation exercise is currently developed in consultation with key stakeholders at local and national level prior effectiveness and included in the project implementation manual. Monitoring of project activities will be done by the M&E consultant who will collect and present data in a standardized reporting format from the identified data sources in progress reports for bi-annual review by the Project Steering Committee in conjunction with the Bank's supervision missions. Once approved, the progress reports will be partly or fully published on the MDA/project related managed webpage.

61. The project will include external evaluations not only prior the Mid-Term Review and End-of-Project Evaluation processes but provides for annual external evaluation of the component C's impact and results related to the awareness raising campaign and the community participation in the community investments.

62. Communication of projects results and activities as well as project documents (e.g. project documents, safeguard documents, study reports, workshop reports, etc.) will be done amongst other tools by using the upgraded existing MDA webpage referring to the project. This, together with the communication tools developed and disseminated under component C is

expected to improve substantially coordination among the different stakeholders and related initiatives and strengthen engagement and ownership

ANNEX 4: OPERATIONAL RISK ASSESSMENT FRAMEWORK (ORAF)

SENEGAL: STORMWATER MANAGEMENT AND CLIMATE CHANGE ADAPTATION PROJECT

Stage: Board

1. Project Stakeholder Risks	Rating	Substantial			
<p>Description : Municipalities and key national ministries: Weak capacity impacts actual engagement in urban planning, management, monitoring/enforcement and O&M.</p> <p>Local residents: Poor residents will continue occupying low-lying flood-prone areas.</p>	<p>Risk Management: The Implementation Support Consultant and the training modules will assist stakeholders in developing priority skills and capacity needed for effective and efficient stormwater management. A sustainable institutional and financial system for O&M is expected to be established based on the recommendations and reforms of the institutional and financial sustainability study during project implementation.</p> <p>A highly consultative process will be maintained between all stakeholders to strengthen awareness, information and consensus on the project’s activities and expected results (SC, TC, TWG; MDA webpage, information and awareness campaign under sub-component C.1.</p> <p>The engagement of local residents through participatory community investments, awareness raising and communication and dissemination of the flood risk maps prepared under component A is expected to enhance engagement and ownership of community groups and raise awareness on the need to preserve areas from urbanization and avoid any construction.</p>	<p>Resp: MDA</p>	<p>Stage: Preparation and implementation</p>	<p>Due Date : Negotiation</p>	<p>Status: ongoing</p>
2. Implementing Agency Risks (including fiduciary)					
3.1. Capacity	Rating: Substantial				
<p>Description : MDA is a specialized agency with demonstrated capacity in urban infrastructure investments and World Bank safeguards and fiduciary procedures</p> <p>The project will bring a certain work-load to ADM’s portfolio: as such the urgent character of the project and a sufficient number of qualified staff both in technical and aspects may be a challenge</p> <p>The implementation of sub-Component C.2. will involve the beneficiary municipalities and</p>	<p>Risk Management : MDA has been reinforced with additional staff during preparation (and this will continue during implementation) (urban expert, hydraulic expert, full-time M&E specialist, civil engineer, procurement and accountant staff, and TA for community investments and climate change adaptation). An Implementation Support Consultant selected through a competitive process will provide on-the-job capacity building to MDA according to defined ToRs and assist with procurement the civil works, support contract management, etc..</p> <p>NDF is funding international TA to assist with component C implementation and climate change adaptation aspects. A local engagement strategy has been defined and uses two social facilitators (non-governmental organization/private firms) to support community investment development, implementation and monitoring.</p>	<p>Resp: MDA</p>	<p>Stage:</p>	<p>Due Date :</p>	<p>Status: Ongoing</p>

communities who have no proficiency in procurement.		Preparation/Implementation	Effectiveness	
3.2. Governance	Rating: Moderate			
Description : The beneficiary municipalities and communities may be influenced by multiplicity of actors in procurement decisions	Risk Management : Stakeholders to be trained in procurement and aware on the enforcement of procurement rules and measures against fraud and corruption.			
	Resp: MDA	Stage: Preparation/Implementation	Due Date : Before the approval of the 1 st community investment under Component C.	Status: Not yet started
4. Project Risks				
4.1. Design	Rating:	Substantial		
Description : Overall, the project design is based on the flood risk reduction strategy outlined by the Post Disaster Need Assessment conducted by the Government in 2009, with support of the WB, UNDP and the EC. The drainage system might not operate as expected if its design is not based on rigorous and detailed technical studies. The design of the participatory community investments under C.2. is based on a CDD like approach. Implementation will be sourced out to two strong NGOs/consultant firms (“social facilitators”) with sound fiduciary and social capacity. Importantly, buy-in from residents and a simple fast implementation scheme will be a key success factor.	Risk Management : The drainage network design will be consistent with the recently completed and validated Drainage Master Plan. Detailed engineering studies are underway for the first priority investments and will be prepared following effectiveness for subsequent investments. The implementation manual will include arrangements regarding the community investments. Consultation with other initiatives (APIX) and locally-based NGOs and similar CDD approaches supported by the Bank in Senegal will continue to ensure realistic design and set-up prior effectiveness. The awareness raising and communication strategy will be implemented throughout the project implementation phase and regular evaluated to ensure it is meeting its targets.			
	Resp: MDA	Stage: Preparation/Implementation	Due Date : Effectiveness	Status: A shortlist of interested facilitators will be established.
4.2. Social & Environmental	Rating:	Substantial		
Description : While the project is designed to have beneficial impacts on the population in terms of reduced vulnerability to flooding and improved living conditions, there are also potential adverse	Risk Management: A particular emphasis has been given during project preparation to environmental and social aspects in accordance with the World Bank safeguard policies. An Environmental and Social Management Framework (ESMF) and Resettlement Policy Framework (RPF) have been prepared for the overall project and will serve to screen investments planned under component B (drainage) and C (small-			

environmental and social impacts. The drainage investments will take into account the existing settlements and be designed / selected in order to minimize the resettlement of residents, mainly those living where the drainage channels will be built. The environmental impact associated with the construction and operation of the stormwater drainage system and the community investments is expected to be moderate.	scale community investments). An Environmental and Social Impact Assessment (ESIA) has been prepared for the first priority drainage investment under component B and requirement will be incorporated in bidding documents. ESIA and RAPs will be prepared for subsequent investments.			
	Resp: MDA	Stage: Preparation/Implementation	Due Date : At appraisal	Status: Up-dated RPF, ESMF and ESIA are disclosed.
4.3. Program & Donor	Rating:	Moderate		
Description : The various initiatives in the stormwater management in the urban sector are not well coordinated by the Government.	Risk Management: Besides the project's consultative efforts (SC, TC) and information policy, the project will disseminate and use the Drainage Master Plan as basis for complementary and additional donor support (JICA, EU and others). Noteworthy, the Sanitation Master Plan will also provide for an appropriate framework for donor coordination.			
	The GFDRR-funded parallel project is expected to strengthen overall national coordination through training and equipment related to early warning systems, preparedness and response to floods. Active dialogue with the Ministry of Finance and the Country Office will be maintained to increase leverage of funds for the Drainage Master Plan and prepare an integrated urban program for peri-urban areas of Dakar and a national integrated strategy. Donors will most likely express a new interest in the sector once the investments are clearly identified and a sustainable O&M has been established.			
	Resp: DAU	Stage: Preparation/Implementation	Due Date : Ongoing	Status: Ongoing
4.4. Delivery Monitoring & Sustainability	Rating:	High		
Description : There are a number of factors that might impact delivery quality and sustainability: (i) maintenance (operational and financial) of the drainage networks; (ii) maintenance of the community investment supported works; (iii) preservation of the non aedificandi zones; (iv) ownership clarification; and (v) waste water discharges and solid waste disposal in stormwater drainage systems.	Risk Management : Project design focuses on strengthening the operational and financial capacity for the maintenance of the future drainage systems and community investments through activities such as the institutional and financial study, training of stakeholders, urban tool box etc. The project will prepare an integrated larger program for peri-urban Dakar under its component A.3.			
	Implementation success is highly dependent on performance of TA and other consultants – therefore ToRs will be drafted carefully and selection will be closely monitored by the Bank.			
	Resp: MDA	Stage: Preparation/Implementation	Due Date : Ongoing	Status:
Overall Risk Following Review:	High	Given the lack of institutional leadership and coordination mechanism, the environmental and social issues and the risk related to Operation & Maintenance of the drainage system, the overall risk has been rated high since the beginning of project preparation.		
Implementation Risk Rating:	Substantial	Appropriate mitigation measures have been put in place and/or built into the project design and includes: (i) the establishment of a coordination mechanism under the Prime Minister's Office and the preparation and dissemination of a Drainage Master		

		<p>Plan; (ii) the launch of a financial and institutional sustainability study which should lead to major reforms and adequate Operation& and Maintenance mechanisms by MTR (iii) the preparation and disclosure of three safeguard instruments (ESIA, ESMF, RPF) which contain acceptable mitigation measures</p> <p>During appraisal and negotiation, implementation risks have been carefully reviewed in light of the risk mitigation activities carried out during preparation and the implementation risk is rated M-I.</p>
<p>Comments:</p>		

Note : Include on average no more than 3 Risk Management Measures per Risk Category

ANNEX 5: IMPLEMENTATION SUPPORT PLAN

SENEGAL: STORMWATER MANAGEMENT AND CLIMATE CHANGE ADAPTATION PROJECT

1. **Strategy and approach to implementation support.** The strategy for implementation support has been developed based on the nature of the project and the ORAF risk profile (see annex 4). It will aim to provide primarily field based implementation support to the client. The team will have regular review meetings with MDA to monitor progress and on a quarterly basis will meet jointly with MDA to review implementation. Under the Bank funded ongoing Local Authorities Development Project, MDA has been supported with dedicated training on procurement, financial management. Under this project, additional training support will be offered to new recruited MDA full-time consultants and staff.

2. A number of measures aimed at ensuring implementation proceeds as expected will be put in place as follows:

- First, the core task team is based in the Senegal Country Office which will ensure that the Bank can undertake regular field supervision and an ongoing policy dialogue on the national strategy and the future program and more broadly in GoS flood reduction and urban climate change adaptation related efforts. The local task team includes the TTL (Mr. Denis Jordy), the DRM Specialist (Ms. Isabelle Kane), the Senior Procurement Specialist (Mr. Cheick A. T. Traore), the Financial Management Specialist (Mrs. Fatou Fall Samba), and the Social Senior Safeguard Specialist (Mr. Demba Balde). The core team also includes the Senior Environmental Safeguard Specialist (Mr. Africa Olojoba) based in Ivory Coast Country Office.
- Second, the Bank will conduct at least two formal implementation support missions per year, preferably as joint supervision mission with NDF. The mission team will include Bank staff from AFTEN, AFTWR and WBI working on urban climate change adaption.
- Delivery Quality: The Bank will work closely with MDA to ensure that the key design features of the project, such as strong facilitation and formal and informal fiduciary controls. Bank's supervision will focus on monitoring that agreed requirements and quality standards including training for facilitators and other governmental staff are being met.
- Role of NDF: NDF has agreed to share all ToRs of NDF-funded activities and activity reports with the Bank's task team leader. The implementation support should consist of joint supervision missions.

3. Detailed inputs from the team are given below:

Technical: Drainage and other appropriate technical specialists will review and guide the component B and participate in missions, and review the quality of infrastructure works and the local engagement strategy.

Fiduciary: Financial Management specialists will conduct regular financial assessments as part of formal supervision missions to gauge compliance with key elements of formal and informal fiduciary controls, including: budgeting and counterpart funding; disbursement status; internal controls including internal audits; accounting and financial reporting; FM facilitation. In addition to the procurement prior review to be carried out by the Task Team, continuous support missions will visit the field on an ongoing basis to carry out spot check post review of procurement actions. The procurement team will provide training to MDA staff and social facilitator as needed, and suggest improvements to the community investment and administrative manual.

Safeguards: The project task team members responsible for environmental and social safeguards will participate in formal supervision missions to assess the status of safeguard implementation and reporting.

Gender: A social specialist, preferably also a gender specialist will participate in supervision missions to assess whether women are active participants in planning and decision-making, and whether community investments funded respond to women’s needs and increase the potential for women’s economic activity. They will propose strategies and modifications to project design for effective gender mainstreaming.

1. Implementation Support Plan

Time	Focus	Skills Needed	Resource Estimate
First twelve Months	<ul style="list-style-type: none"> • Establishment of the Special Account. • Quality of terms of Reference and bidding documents. • Procurement of key contracts • Execution of contracts (first priority investments) • Implementation of the ESIA, ESMF and RPF. • Community investments preparation • Impact evaluation baseline survey 	<ul style="list-style-type: none"> • Drainage • DRM • Institutional specialist (water and sanitation) • Urban climate change adaptation • Procurement • Financial management • Environment and social safeguards • M&E 	US\$150,000 in BB
12 – 48 Months	<ul style="list-style-type: none"> • Quality of ToRs, studies and bidding documents • Procurement and execution of key contracts • Application of the ESMP and RAPs. • Institutional reforms of the sector • Community investments monitoring 	<ul style="list-style-type: none"> • Core team skills • DRM • Institutional specialist (water and sanitation) • Urban climate change adaptation • Procurement • Financial management • Environment and social safeguards 	US\$130,000 in BB per annum

2. FM Implementation Support Plan

Based on the outcome of the FM risk assessment, the following implementation support plan is proposed. The objective of the implementation support plan is to ensure the project maintains a satisfactory financial management system throughout the project's life.	Frequency
FM Activity	
Desk reviews	
Interim financial reports review	Quarterly
Audit report review of the program	Annually
Review of other relevant information such as interim internal control systems reports.	Continuous as they become available
On site visits	
Review of overall operation of the FM system	Annual for MDA(Implementation Support Mission)
Monitoring of actions taken on issues highlighted in audit reports, auditors' management letters, internal audit and other reports	As needed
Transaction reviews (if needed)	As needed
Capacity building support	
FM training sessions	During implementation and as and when needed.

3. Skills Mix Required

Skills Needed	Number of Staff Week / year	Number of Trips / year	Comments
Task team leader	10	2 national	Core team based in Senegal
Drainage specialist	4	2 international	To be identified
Institutional Specialist	4	2 international	To be identified but possibly selected within current support team
Operational and M&E support	5	1 international	To be identified but possibly selected within current support team
DRM	8	1 local	Core team based in Senegal
Urban environment specialist	4	1 international	
Procurement	6	1 local	Core team based in Senegal
Financial Management	4	1 local	Core team based in Senegal
Environmental and Social Safeguards	6	1 international	Core team (2) based in region and in Senegal
Impact evaluation specialist	4	1 international	HQ DEC support

ANNEX 6: ECONOMIC AND FINANCIAL ANALYSIS

SENEGAL: STORMWATER MANAGEMENT AND CLIMATE CHANGE ADAPTATION PROJECT

Background

1. Financial analysis (i.e., commercial profitability analysis) and economic analysis (i.e., national profitability analysis) differ in several ways. The objective of commercial profitability analysis is to assess the net financial results of a project from the investor point of view, while the national profitability analysis aims to identify and measure the net economic benefits of the project from the society point of view. Moreover, commercial profitability analysis is based on prevailing market prices, while national profitability analysis is determined with the help of adjusted prices (i.e., shadow prices) that are deemed to be an approximation of true economic prices (reflecting the social opportunity cost). Similarly, for commercial profitability analysis, the time value of money is tackled by application of the private discount rate based on the prevailing interest rate of the capital market, while in the case of national profitability analysis, the social discount rate is applied, i.e., the rate at which Senegal can borrow money taking into consideration the country risk.

2. In the analysis, three indicators are considered for the financial and economic analysis:
- The Net Present Value (NPV) which is the difference between the discounted total benefits and cost;
 - The Internal Rate of Return (IRR), which is the discount rate that zeroes out the NPV or, the interest rate that makes the net present value of all cash flows equal to zero;
 - The modified IRR, which is the discount rate that zeroes out the NPV considers that positive cash flows are reinvested at the country financing cost whereas the IRR assumes the project cash flows are reinvested at the rate of the IRR and therefore, the modified IRR more accurately reflects the cost and viability of a project; and
 - The Benefit-Cost Ratio, which is the ratio of the present value (PV) of benefits over the PV of costs over the lifetime of the project.

Financial Analysis of the proposed flood prevention component

3. There is no financial analysis to be done in this context as the drainage system is considered as a public good that will need to be funded and maintained by national and/or municipal budgets directly through force account or indirectly through the contracting out of private services to perform the drainage management. Hence, the PV of investment cost inclusive of contingencies and constant OMEG at 5 percent discount rate amounts to US\$80.5 million for the entire project and US\$66.1 million for the Drainage Component over the 2013-2042 periods.

Economic Analysis of the proposed flood prevention component

4. The major difference between the financial and economic analysis is that the economic analysis consists in eliminating all the distortions of prices on the inputs used for the drainage system. There is therefore a need to identify and quantify price distortions that affect the operating expenditures as well as the investments. The evaluation of these distortions makes it possible to rectify the financial prices and to obtain the economic prices. From the corrected structure of the economic prices, the revaluation coefficients were estimated.

5. Determination of Price Distortions. The conversion of the financial costs into economic costs is essential to reflect the value of the output for the community. The objective of this calculation is to determine the opportunity costs of both the inputs and outputs. As taxes, duties and subsidies such as for electricity constitute internal flows in the national economy, those were not taken into account in the calculation of the economic costs.

6. Labor. The wages applied for unqualified skills is the minimum wage without the social contribution. For the skilled job salaries, the conversion factor is taken equal to 1 but the social contributions are also not considered. Moreover, most labor needed for the whole project and other activities are assumed to be locally hired.

7. Equipment, Goods and Infrastructure. A conversion factor of 0.8 (import and other taxes) has been applied to calculate the economic costs of equipment, goods and infrastructure in order to deduct from them the included taxes (construction).

8. The economic analysis was performed for prevention infrastructure investments in terms of 4 drainage improvement areas in Pikine and Guédiawaye in the Peri-urban area of Dakar. The analysis, which will not only cover the 2009 devastating flooding *per se*, covers the recurrent annual flooding during the rainy season: on average flooding represents a disruption of 20 days per year. The component is illustrated in Table 1.

9. The total economic cost of the Drainage Component inclusive of contingencies amounts to CFAF 20.8 billion equivalent to US\$38 million including contingencies (Table 1). The drainage component is divided into 2 phases that will include the following elements: pumping stations and equipments, setback delimitation, resettlement and complementary works and runoff management.

Table 1: Economic and Financial Cost of Investment and Mgt., CFAF billion

Component	Target		Project Economic Value			Project Financial Value		
	Area	Population	% OMEX over Com. 2 Cost per year	Investment	Total Cost	% OMEX over Com. 2 Cost per year	Investment	Total Cost
	Km ²	#	%	CFAF Bn	CFAF Bn	%	CFAF Bn	CFAF Bn
Phase 1: start in 2013	2.5	199,854		8.4	8.4		13.3	13.3
Phase 2: start in 2015	4.1	224,816		10.6	10.6		14.3	14.3
OMEX 1 & 2					1.7			2.5
Drainage Component			1.8%	19.0	20.8	1.9%	25.7	28.1
Total Project	6.6	424,670			26.9			36.4

Note: % OMEX increases to 2.0% of the project cost at the end of project implementation. Contingencies are included in the economic and financial values. Totals may not add up due to rounding.

Source: Adapted from Seck (2010); and de Naurois (2011).

10. A number of socioeconomic and environmental benefits could accrue with the implementation of the project but could not be valued due to time constraints and readily available data. A “without project” scenario could notably have the following negative direct and indirect effects:

- Health: averted in terms of premature death, drowning, injuries, water-related diseases, vector-borne diseases especially since malaria prevalence seems to be on the rise in Dakar peri-urban areas, etc.;
- Environmental: ecological system disruption, water resource pollution, air pollution due to additional traffic jams, land degradation;
- Global externalities: carbon emission (e.g., due to additional traffic jams, animal putrefaction, vegetal decomposition, etc.);
- Damages: infrastructure (transport, energy, water, etc.), land, household, business, private property including vehicles, etc.;
- Economic opportunity: loss of economic opportunities and increase poverty incidence and therefore vulnerability (loss of wages, loss of time, yield, sales, commerce, tourism, etc.); and
- Social: disruption of health services, schools, universities, etc.

11. The economic analysis only covers the disruption days from severe floods accruing to the population in the targeted drainage improvement areas. The project will provide social benefits in terms of the value added of land in the drainage areas over the next 30 years should disruptive flooding be averted as well as the 20 days of avoided floods per year in the project area illustrated by the gross national income per capita.

12. The retained methods to derive the social benefits for the economic analysis are: (i) the averted loss of opportunities by the reduction of 20 disruptive severe-flood-days per year during the course of the project; and (ii) a hedonic pricing for the incremental value of land associated with the reduction of 20 disruptive severe-flood-days.

13. A number of key assumptions have been considered for the economic analysis:

- The exchange rate used is US\$1 = CFAF 500 (January 2012).
- The civil work will target Pikine and Guédiawaye in the following neighborhoods: Phase I targeting Dali Fort and Lac Tiourour-Gounas or 2.5 km² and 199,852 inhabitants; and Phase II targeting Mbeubeuss and Yeumbeul or 4.1 km² and 224,816 inhabitants (Table 1).
- The economic analysis is carried out over a period of 30 years (from 2013 to 2042) with the assumption that no investment in new asset is needed over the periods.
- A real discount rate of 12% per annum is used and the cash flow will be reinvested at 12%.
- The overall standard conversion factor for adjusting market prices to shadow prices is set at 0.84. The shadow exchange rate is 1. The shadow wage is 1 as most labor needed for the project will be locally hired.
- Priority investments are disbursed over 5 years of the implementation of the project (see Table 1). The right-of-way including the price of land and any structures upon it is zero as it is owned by the government although it should be usually accounted for. However, the government leases out land and the number of impacted concessions was estimated at

220 homes when the channels are drawn with a 10 m setback. The cost of resettlement reaches CFAF 500 million for Phase I and CFAF 2.1 billion for Phase II.

- OMEX cost is on average set at 1.8% during project implementation and 2.0% afterwards, and is based on the subcomponent hardware (pumping stations, etc.). Minor infrastructure, mechanical and equipment investments are covered by OMEX over the lifetime of the investments.
- The lost opportunity (monetized by the GDP) of 20 disruptive severe-flood-days are considered although an improved drainage management should help the targeted peri-urban Dakar avoid any major disruptive floods in the future. Actually, floods have lasted in certain instances more than a month notably due to the missing link between these drainage areas and the basins.
- The Gross National Income (GNI) per capita per year adopted for the calculation is CFAF 285,159 in 2010 (WDI, 2010; and IMF Article IV, 2010 for the 2010 over 2009 growth rate of 3.4%) with an annual growth of 3% over the projected periods and a distribution of 50% for the under 14 years of age, 100% for the 15 to 64 years age bracket and 30% for more than 64 years of age.
- A hedonic method is suggested to derive the incremental cost of land with the reduction or containment of annual floods (see below). Land price used in the analysis reflect the actual prices of land as an update of the prices was performed by the government in 2010.
- All benefits are assumed to begin to accrue in 2015 for Phase I and 2018 for Phase II. Land price increase is assumed to accrue over 3 years with equal increments.

Hedonic Pricing Methodology

14. Ninety three neighborhoods were considered in Dakar, Pikine and Guédiawaye with the price of land obtained from the Official Gazette No. 2010-400 of March 23, 2010 with 2010 prices. Most land is owned by the Government of Senegal and leased out to the population (the annual rent is equivalent to 2 percent of one third of the m² of nominal land price). In the analysis, the land price log is the dependent variable and only the land priced CFAF 90,000 per m² and below was considered as higher land prices are mainly prime, commercial or tourism land; structural attributes of houses are not considered as if they are controlled for (no apartment attributes); and environmental attributes include the flood-prone areas that are derived from Wang et al. (2009) and the neighborhood density obtained from the Atlas (2008) to which a mapping of malaria entomological inoculation rate (EIR) was overlaid and obtained from Paget et al. (2008). In the latter study, *Anopheles arabiensis* and *An. melas* were the only representatives of the *An. gambiae* complex caught on human bait. *An. arabiensis* was the main species identified during September and October 2007 and it accounted for 94.2 percent of the *An. Gambiae* caught. *Plasmodium falciparum* infection was detected only in *An. arabiensis* specimens. The dataset (Table 8) is appended at the end of the annex.

15. The Box-Cox transformation indicated that a log linear functional form would best fit the data. Consequently, the general specification of the regression equation is:

$$\text{Costlog}_i = \beta_0 + \sum \beta_j \text{flooding}_{ji} + \sum \beta_j \text{density}_{ji} + \sum \beta_j \text{malaria}_{ji} + \varepsilon_i$$

For $i = 1, 2, \dots, n$ and where:

Costlog_i is the natural logarithm of the land price i
 β are the various regression coefficients
 flooding_{ji} is to determine variable i consisting of having the land in a flood-prone area (dummy variable $F=0$ means no flooding and $F=1$ means flooding)
 densityha_{ji} is to determine the population density of the land variable i
 malariaeir_{ji} is to determine variable i consisting of having the malaria EIR in various areas
 ε_i is the error term for land i , with $E(\varepsilon) = 0$ and $V(\varepsilon) = \sigma^2 > 0$.

Table 2: Regression Results for Land Price \leq CFAF 90,000 per m^2

Source	SS	df	MS			
Model	2.45115675	3	.817052251	Number of obs =	69	
Residual	2.29696128	65	.035337866	F(3, 65) =	23.12	
Total	4.74811804	68	.069825265	Prob > F =	0.0000	
				R-squared =	0.5162	
				Adj R-squared =	0.4939	
				Root MSE =	.18798	

costlog	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
flooding	-.3372285	.0461496	-7.31	0.000	-.4293955	-.2450615
densityha	.0005883	.000188	3.13	0.003	.0002129	.0009638
malariaeir	.0002922	.0077904	0.04	0.970	-.0152663	.0158507
_cons	4.700534	.0528537	88.93	0.000	4.594978	4.80609

Source: Calculations for the PAD.

16. Hence, the linear regression was performed to determine if the predictors --in terms of flood-prone areas, population density and malaria EIR in the various zones of Dakar, Pikine and Guédiawaye-- are statistically significant, and affect the price of land. We expect that higher land prices are at least associated with lower flood-prone areas. The log land price skewness is slightly negative (-0.55) meaning a heavier left tail and the Kurtosis is just smaller than 3 (2.1) meaning a slightly lighter than normal tail.

17. Flood-prone area (flooding, $b=-0.3372$ with a 95% confidence interval) is significant ($p=0.000$) and the coefficient is negative which would indicate that higher land price is related to lower flood-prone areas. However, the effect of density ($b=.0005$, $p=.003$) and malaria ($b=.0002$, $p=.970$) are insignificant and the coefficients are almost null indicating that density and malaria are not affecting the price of land. Overall significance levels are within acceptable limits, with an $R^2= 0.52$ for the regression model (meaning that the model explains around 52% of the possible variance in the data) and Adjusted $R^2= 0.49$. The significant result from the Cook-Weisburg test indicates that the regression of the residuals on the predicted values reveals significant heteroskedasticity (Table 2).

18. Because a semi-log form was used, the coefficients can be interpreted as a percentage, that is, the percentage change in the dependent variable given a one unit change in an independent variable. Hence, the location of land in a flood-prone area is estimated to decrease the land price by 33.7% and 34.6% when all the other variables are controlled for. By contrast, the density and malaria variables have a negligible effect on land prices: 0.05% and 0.02% respectively.

19. From the hedonic land price function estimated in the equation above, the mean premium weighted land prices due to flood-free areas, which are the integral with respect to land area of the product of the land price premium, are illustrated in Table 3.

Table 3: Land Price Premium in Pikine and Guédiawaye

Commune with Considered Land \leq CFAF 90,000/m ²	Flooding	Area m ²	Weighted Average Land Cost/m ²		Benefits CFAF billion
			CFAF	Coef. β for flooding	
Dakar, Pikine and Guédiawaye land	Area not prone to major flooding	51,213,333	76,021		
	Area prone to or affected by major flooding	101,066,667	28,106	-34.6%	
Pikine and Guédiawaye land	Area not prone to major flooding	7,180,000	60,000		
	Area prone to or affected by major flooding	85,770,000	27,168		805.7

20. Under or equal to CFAF 90,000 per m² with and without flood-prone areas in Dakar, Pikine and Guédiawaye were considered and compared: they resulted in an average weighted land price of CFAF 27,168 per m² in Pikine and Guédiawaye in flood-prone areas; the flood-prone land average price increase is CFAF 9,392 equivalent to US\$18.8 per m² for an area of 85,770,000 m²; and the total land price increment amounts to CFAF 805.7 billion that accrue in Pikine and Guédiawaye should all flood-prone areas are targeted. Regarding the current project, the area covered is 6,610,000 m² with benefits of CFAF 62 billion (US\$124.2 million) accruing between 2017 and 2022 (5 year price adjustments as further increase over the periods is attributable to a number of non-related flood factors) should the investment is implemented to make of the targeted neighborhood of Pikine and Guédiawaye flood-free areas.

Economic Analysis Results

Determination of NPV, Modified IRR and Benefit/Cost Ratio for the Project

21. The project and drainage component aggregate economic net present value (NPV) discounted at 12% is positive amount to US\$27 million and US\$39 million respectively over 30 years. The benefit/cost ratios are greater than one while the economic modified IRRs are positive and exceed 12%. (Table 4). Despite the conservative stance and the few benefits considered in the economic analysis, the project and drainage component are economically viable.

Table 4: Economic Indicators with 12% Discount Rate and 12% Reinvested Cash Flow

Key Economic Indicator	Results	Interpretation
Project Level		
NPV/30 years	US\$27 million	Net benefit exceed cost
IRR/30 years (12%)	26%	Positive and greater than 12%
Modified IRR/30 years (12 and 12%)	14%	Positive and greater than 12%
PV Benefit/Cost Ratio/30 years	2	Discounted benefit > discounted cost
Result: The above three criteria indicate that the project is economically viable		
Drainage Component Level		
NPV/30 years	US\$39 million	Net benefit exceed cost
IRR/30 years (12%)	43%	Positive and greater than 12%

Key Economic Indicator	Results	Interpretation
Modified IRR/30 years (12 and 12%)	16%	Positive and greater than 12%
PV Benefit/Cost Ratio/30 years	3	Discounted benefit > discounted cost
Result: Three criteria indicate that the project is economically viable		

Sensitivity Analysis

22. The sensitivity analysis is conducted to test the viability of the project and drainage component with a reduction of the number of flood day from 20 to 10 days per year and 10% reduction in the benefits accrue from land price increase and 10% reduction of the land area considered in Pikine and Guédiawaye targeted areas prone to floods. The project and drainage component are still viable with an NPV of US\$11.3 million and US\$23 million respectively while benefit/cost ratios are greater than 1 and the economic modified IRRs are positive and exceed 12%. (Table 5).

Table 5: Economic Indicator Sensitivity Scenario: Flood-Days, Area and Land Price

Key Economic Indicator	Results	Interpretation
Project Level		
NPV/30 years	US\$11.3 million	Net benefit exceed cost
IRR/30 years (12%)	19%	Positive and greater than 12%
Modified IRR/30 years (12 and 12%)	13%	Positive and greater than 12%
PV Benefit/Cost Ratio/30 years	1.8	Discounted benefit > discounted cost
Result: The above three criteria indicate that the project is economically viable		
Drainage Component Level		
NPV/30 years	US\$23 million	Net benefit exceed cost
IRR/30 years (12%)	34%	Positive and greater than 12%
Modified IRR/30 years (12 and 14%)	15%	Positive and greater than 12%
PV Benefit/Cost Ratio/30 years	2	Discounted benefit > discounted cost
Result: Three criteria indicate that the project is economically viable		

23. The sensitivity analysis is also conducted to test the viability of the project and drainage component when investments are increased by 20% and OMEX are increased by 10% per year between 2018 and 2042. The project and drainage component are economically viable with a NPV of US\$16 million and US\$30 million respectively. The benefit/cost ratios are greater than 1 while the economic modified IRRs are positive and exceed 12%. (Table 6).

Table 6: Economic Indicator Sensitivity Scenario: Investment & OMEX Cost Increase

Key Economic Indicator	Results	Interpretation
Project Level		
NPV/30 years	US\$16 million	Net benefit exceed cost
IRR/30 years (12%)	22%	Positive and greater than 12%
Modified IRR/30 years (12 and 12%)	13%	Positive and greater than 12%
PV Benefit/Cost Ratio/30 years	2	Discounted benefit > discounted cost
Result: Three criteria indicate that the project is economically viable		
Drainage Component Level		
NPV/30 years	US\$30 million	Net benefit exceed cost
IRR/30 years (12%)	39%	Positive and greater than 12%
Modified IRR/30 years (12 and 12%)	16%	Positive and greater than 12%
PV Benefit/Cost Ratio/30 years	2	Discounted benefit > discounted cost

Key Economic Indicator	Results	Interpretation
Result: Three criteria indicate that the project is economically viable		

24. The project and drainage component investments remain viable as they are not sensitive over the lifetime of the project to either: a decrease by 10 flood-days per year, 10% reduction of the flooded area and 10% reduction of the land hedonic increment; or an increase in investment by 20% and OMEX by 10% per year.

Scenario Analysis

25. A scenario analysis is performed to determine the combined impact of variables of the project economic analysis that are usually analyzed separately. Table 7 provides the various modified IRR associated with the combined impact of variables for an optimistic, base case and pessimistic scenarios for the project. All scenarios are viable. However, only when the cash flow interest rate of the modified IRR is brought from 12% to 5% under the assumption consisting in the contraction of the economic activity that the project is no longer viable under the 3 scenarios (Table 7).

Table 7: Scenario Analysis of the Economic Analysis Variables for the Project

Variable	Scenario	Optimistic Scenario	Base Case Scenario	Pessimistic Scenario
Investment cost (US\$ million)		45.0	50.3	60.3
OMEX growth over 2018-2042		-1%	+0%	+10%
Flooding days that are averted		30	20	10
Land area with averted flooding (km ²)		7.6	6.6	3.3
Land price increment		+40.0%	+34.6%	+17.3%
NPV/30 years		US\$56.0 million	US 27 million	US 0.4 million
IRR/30 years (12%)		38%	26%	12%
Modified IRR/30 years (12% initial and 12% cash flow)		16%	14%	12%
Modified IRR/30 years (12% initial and 5% cash flow)		10%	8%	5%
PV Benefit/Cost Ratio/30 years		3	2	1.4

26. A scenario analysis is also performed for the Drainage Component. Table 8 provides the various modified IRR associated with the combined impact of variables for an optimistic, base case and pessimistic scenarios. All scenarios are viable. However, only when the reinvested cash flow interest rate of the modified IRR is brought from 12% to 5% under the assumption consisting in the contraction of the economic activity that the project is no longer viable under the Base Case and Pessimistic scenarios (Table 8).

Table 8: Scenario Analysis of the Economic Analysis Variables for Drainage Component

Variable	Scenario	Optimistic Scenario	Base Case Scenario	Pessimistic Scenario
Investment cost (US\$ million)		35.0	38.0	46.0
OMEX (% of investment for 2018-2042)		-1.0%	2.0%	+10%
Flooding days that are averted		30	20	10
Land area with averted flooding (m ²)		7,601,500	6,610,000	3,305,000
Land price increment		+40.0%	+34.6%	+17.3%
NPV/30 years			US\$ 39 million	US\$ 15 million
		US\$ 67 million		
IRR/30 years (12%)		57%	43%	29%
Modified IRR/30 years (12% initial and 12% cash flow)		18%	16%	14%
Modified IRR/30 years (12% initial and 5% cash flow)		12%	11%	8%
PV Benefit/Cost Ratio/30 years		4	3	2

Risk Analysis

27. A risk analysis by using the Monte Carlo method was performed on the economic net Benefit/Cost flow over the first 10 years of the project and drainage component. With an initial investment of US\$53.7 million and US\$42.5 million respectively, the net Benefit/Cost flow at year 8 (5 years for project implementation and consecutive 3 years for the benefits to accrue) will substantially exceed (more than US\$100 million) the initial investment with a likelihood of 100%.

Table 9: Hedonic Pricing Dataset

City	Commune	#	Zone	Neighborhood	Cost log CFAF/m ²	Cost CFAF/m ²	Flooding 0=No; 1=Yes	Density ha	Malaria EIR
Plateau		2	Secteur 1 Corniche Pompidou	Bordure Corniche	5.5	300000	0	70	1.4
		2		Place de l'Indépendance	5.4	250000	0	70	1.4
		2		Autres terrains	5.2	150000	0	70	1.4
		2	Secteur 2 Corniche	Corniche	5.5	300000	0	70	1.4
		2		Bordure grands axes	5.3	200000	0	70	1.4
		2		Autres terrains	5.0	100000	0	70	1.4
		2	Secteur 3 Ave Blaise Diagne	Corniche	5.3	200000	0	70	1.4
		2		Grands axes	5.0	100000	0	70	1.4
		2		Autres terrains	4.9	80000	0	70	1.4
Médina		3	Canal IV	Bld De Gaule	5.0	100000	0	367	1.4
		3		Grands axes	4.9	80000	0	367	1.4
		3		Autres terrains de la Médina	4.9	75000	0	367	1.4
Gueule Tappée/Fass/Colobane		4		Autres terrains de Fass	4.8	65000	1	235	1.4
Dakar		4		Autres terrains de Colobane	4.8	65000	1	235	1.4
Hann		5		Plage	4.7	50000	0	34	1.3
		5		Parc Forestier	4.5	35000	0	34	1.3
		5		Rufisque	4.4	25000	0	34	1.3
		5		Village	4.2	15000	1	34	1.3
		5		Pêcheurs	4.2	15000	1	34	1.3
		5		Montagne	4.2	15000	0	34	1.3
		5		Ferrailles	4.2	15000	1	34	1.3
		5		Portuaire	4.8	65000	0	34	1.3
		5		Industrielle	4.8	65000	0	34	1.3
HLM Cité des Eaux		6		Cité Port	4.8	65000	0	244	1.3
		6		HLM V	4.8	65000	0	244	1.3
		6		HLM I	4.8	60000	0	244	1.3
		6		SODIDA	4.8	70000	0	244	1.3
		6		Cité des Eaux	4.8	60000	0	244	1.3

City	Commune	#	Zone	Neighborhood	Cost log CFAF/m ²	Cost CFAF/m ²	Flooding 0=No; 1=Yes	Density ha	Malaria EIR
	Biscuiterie	7		Usine Bene Tally	4.8	60000	0	501	1.4
	Grand Dakar	8	Dial Diop	Zones A et B	4.9	80000	0	452	1.4
		8		Bopp	4.8	70000	1	452	1.4
	Fann -Point E Amitiés	9	Anta Diop	Bordure Corniche	5.3	220000	0	43	4.4
		9		Autres terrains de Fann Résidence	5.2	175000	0	43	4.4
		9		Autres terrains de Fann Mermoz	5.2	175000	0	43	4.4
		9		Autres terrains de Fann Hock	5.0	110000	0	43	4.4
		9	La Rocade	9 bis	5.2	150000	0	43	4.4
		9	Boulevard Canal IV	Bordure	5.0	100000	0	43	4.4
	Mermoz	10	VDN	Bordure	5.0	90000	0	59	4.4
		10	Cheikh Anta Diop	Bordure	5.0	90000	0	59	4.4
		10	Ancienne piste	Bordure	5.0	90000	0	59	4.4
		10	Ecole de Police	Autres terrains	5.0	110000	0	59	4.4
		10	Sicap Mermoz	Autres terrains	4.9	75000	0	59	4.4
		10	Pyrotechnie	Autres terrains	4.9	75000	0	59	4.4
		10	Sacre Cœur	Autres terrains	5.0	90000	0	59	4.4
	Dieuppeul-Derklé	11		SICAP Dieuppeul	4.9	75000	0	265	0.3
		11		Derkle et Castor	4.8	60000	0	265	0.3
	Lotissement SICAP et Derklé	12		SICAP Amitié rue 10	5.0	100000	0	187	0.3
		12		SICAP Amitié Baobabs	5.0	110000	0	187	0.3
		12		SICAP Darabis	4.9	75000	0	187	0.3
	Ouakam	13		Mer et route de la plage	5.3	200000	0	89	4.4
		13		Village traditionnel	4.5	30000	0	89	4.4
		13		Autres terrains	4.9	75000	0	89	4.4
	Ngor	14		Village traditionnel	4.5	30000	0	25	16.8
		14		Littoral	5.3	220000	0	25	16.8
		14		Almadies	5.0	100000	0	25	16.8
		14		Autres zones hôtelières	5.2	175000	0	25	16.8
		14		Autres terrains	4.9	75000	0	25	16.8

City	Commune	#	Zone	Neighborhood	Cost log CFAF/m ²	Cost CFAF/m ²	Flooding 0=No; 1=Yes	Density ha	Malaria EIR
Yoff		15		Village traditionnel	4.5	30000	1	39	0
		15		Littoral	5.1	125000	0	39	0
		15		Autres terrains	4.8	65000	0	39	0
Grand Yoff		16	Khar-Yalla	Village traditionnel	4.5	30000	0	240	1.6
		16		Foire et Sud Foire	5.0	90000	0	240	1.6
		16		Autres terrains	4.9	75000	0	240	1.6
Patte D'Oie		17		Keur Damel	4.9	80000	0	81	1.6
		17		Grand Médine	4.4	25000	1	81	1.6
		17		Autres terrains	4.8	65000	0	81	1.6
HLM Grand Médine		18	VDN	Bordure	4.9	80000	0	335	0.1
		18		Littoral	5.0	100000	0	335	0.1
Camberene		19		Village traditionnel	4.5	30000	1	304	0.1
		19		Autres terrains	4.7	50000	1	304	0.1
Pikine		1p	Secteur 1 Ville	Tally Boubess	4.6	40000	1	154	5.8
		1p		Autres terrains viabilisés	4.5	30000	1	154	5.8
		1p		Autres terrains non viabilisés	4.3	20000	1	154	5.8
		2p	Secteur 2 Thiaroye	Terrains viabilisés	4.6	40000	1	237	5.8
		2p		Terrains non viabilisés	4.3	20000	1	237	5.8
		2p		Bordure route nationale	4.6	40000	1	237	5.8
		3p	Secteur 3 Yeumbeul	Terrains viabilisés	4.3	20000	1	202	5.8
		3p		Terrains non viabilisés	4.2	15000	1	202	5.8
		4p	Secteur 4 Malika	Littoral	4.7	50000	1	22	5.8
		4p		Terrains viabilisés	4.7	50000	1	22	5.8
		4p		Terrains non viabilisés	4.2	15000	1	22	5.8
		5p	Secteur 5 Keur Massar	Terrains viabilisés	4.4	25000	1	46	5.8
		5p		Terrains non viabilisés	4.2	15000	1	46	5.8
		6p	Secteur 6 Mbao, Keur Mabaye Fall et Kamb	Bordure route nationale	4.5	30000	1	18	5.8
		6p		Terrains viabilisés	4.3	20000	1	18	5.8
		6p		Terrains non viabilisés	4.2	15000	1	18	5.8

City	Commune	#	Zone	Neighborhood	Cost log CFAF/m ²	Cost CFAF/m ²	Flooding 0=No; 1=Yes	Density ha	Malaria EIR
		6p		Terrains de la ZAC	4.4	25000	1	18	5.8
		6p	Secteur 7 Département	Autres Terrains	4.0	10000	1	18	5.8
	Guediawaye	1g	Station 10	Golf Sud – Nations-Unies	4.7	50000	0	143	0.1
		2g		Sam Notaire	4.7	50000	1	269	0.1
		3g		Ndiareme	4.8	70000	0	326	0.1
		4g		Wakhinane	4.6	40000	1	266	0.1
		5g		Médina Gounas	4.6	40000	1	484	0.1

Note: Goree's Island is not included in the dataset.

Source: Atlas (2008); Paget et al. (2008); Wang et al. (2009); and Official Gazette (2010).

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ANNEX 7: INTERVENTION AREA FOR INVESTMENTS

SENEGAL: STORMWATER MANAGEMENT AND CLIMATE CHANGE ADAPTATION PROJECT

General background information

Population targeted by project interventions

The project is targeting the peri-urban zone of Dakar comprising the districts of Pikine and Guédiawaye with a total population of **1,180,054 habitants** (ANSD, 2008) of which about **50 % are women**.

The table 1. below shows the specific demographic data per district and sub-district:

	Men	Women	POPULATION
REG. DAKAR	1242463	1239831	2482294
<i>Urban area</i>	<i>1207158</i>	<i>1206057</i>	<i>2413215</i>
<i>Rural area</i>	<i>35305</i>	<i>33774</i>	<i>69079</i>
DEP. GUÉDIWAYE	148139	149487	297626
AROND. GUÉDIWAYE	148139	149487	297626
<i>CA GOLF SUD</i>	<i>41062</i>	<i>42194</i>	<i>83256</i>
<i>CA SAM NOTAIRE</i>	<i>33906</i>	<i>33881</i>	<i>67787</i>
<i>CA NDIAREME LIMAMOU LAYE</i>	<i>16957</i>	<i>17325</i>	<i>34282</i>
<i>CA WAKHINANE</i>	<i>36015</i>	<i>36465</i>	<i>72480</i>
<i>CA MEDINA GOUNASS</i>	<i>20199</i>	<i>19622</i>	<i>39821</i>
DEP. PIKINE	443379	439049	882428
AROND. NIAYES	146810	147082	293892
<i>CA YEUMBEUL NORD</i>	<i>59988</i>	<i>59985</i>	<i>119973</i>
<i>CA YEUMBEUL SUD</i>	<i>45670</i>	<i>45423</i>	<i>91093</i>
<i>CA MALIKA</i>	<i>8455</i>	<i>8238</i>	<i>16693</i>
<i>CA KEUR MASSAR</i>	<i>32697</i>	<i>33437</i>	<i>66134</i>
AROND. PIKINE DAGOUDANE	168560	166083	334643
<i>CA PIKINE OUEST</i>	<i>25139</i>	<i>25338</i>	<i>50477</i>
<i>CA PIKINE EST</i>	<i>18119</i>	<i>17465</i>	<i>35584</i>
<i>CA PIKINE SUD</i>	<i>21193</i>	<i>21802</i>	<i>42995</i>
<i>CA DALIFORD</i>	<i>11838</i>	<i>11448</i>	<i>23286</i>
<i>CA DJIDA THIAROYE KAO</i>	<i>51928</i>	<i>51554</i>	<i>103482</i>
<i>CA GUINAW RAIL NORD</i>	<i>17518</i>	<i>16988</i>	<i>34506</i>
<i>CA GUINAW RAIL SUD</i>	<i>22825</i>	<i>21489</i>	<i>44314</i>
AROND. THIAROYE	128008	125883	253891
<i>CA THIAROYE / MER</i>	<i>21526</i>	<i>21202</i>	<i>42728</i>
<i>CA DIACK SAO</i>	<i>18440</i>	<i>17791</i>	<i>36231</i>
<i>CA DIAMAGUENE SICAP MBAO</i>	<i>60090</i>	<i>58996</i>	<i>119086</i>
<i>CA THIAROYE-GARE</i>	<i>12728</i>	<i>12562</i>	<i>25290</i>
<i>CA MBAO</i>	<i>15224</i>	<i>15333</i>	<i>30557</i>

(ANSD, 2008 « Projection de la Population de Dakar 2002 – 2012)

Project supported stormwater drainage investment maps

The table and figures below show the location of the phased investments planned (phase 1 and 2) under component B:

Figure 1: Location of consolidated drainage investments (phase 1 and 2) and avoided floods based on ten-year return period

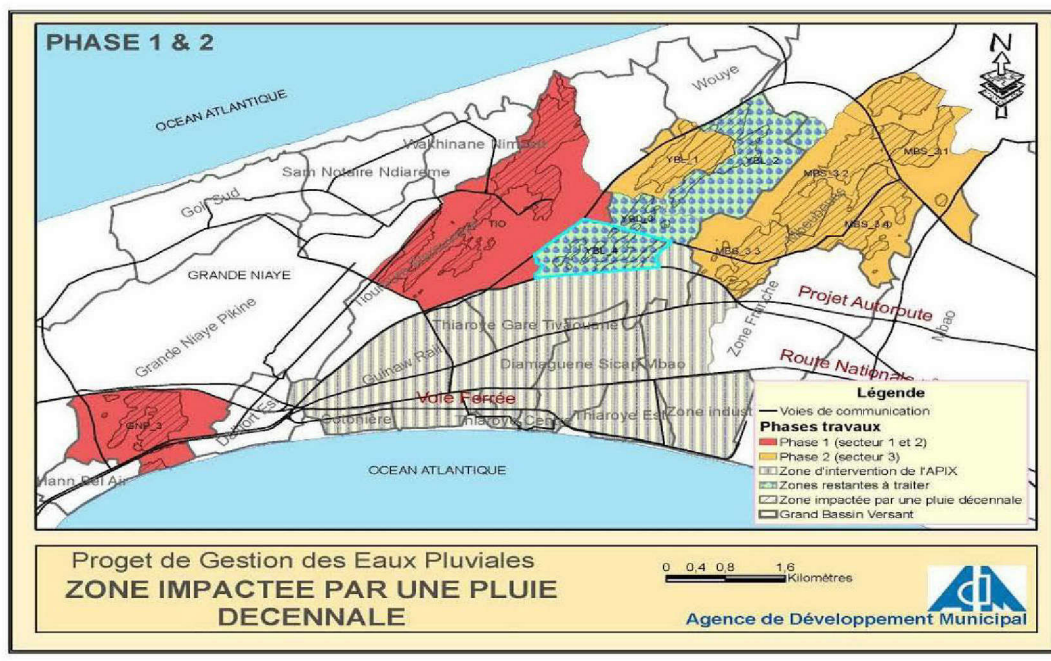


Table 2: Location of drainage investments (phase 1 and 2) and expected project impact

PHASE	Catchments	Area total Catchments (ha)	Population total Catchments	Waterflow (10 year return flood) in m3	Area impacted in ha	Area impacted in %	Population impacted	# Housheolds impacted
PHASE 1	Thiourour Aval	552	182,000	662,400	180	33%	60,000	8,500
	Dalifort	226	17,854	271,200	70	31%	5,500	800
TOTAL TRANCHE 1		778	199,854	933,600	250	32%	65,500	9,300

PHASE	Catchments	Area total watershed (ha)	Population total watershed	Catchments (10 year return flood) in m3	Area impacted in ha	Area impacted in %	Population impacted	# Housheolds impacted
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PHASE 2	Mbeubeus MBS 3_1	232	61,248	278,400	80	34%	13,120.0	1,874
	Mbeubeus MBS 3_2	200	52,800	240,000	110	55%	18,040.0	2,577
	Mbeubeus MBS 3_3	179	47,256	214,800	64	36%	10,496.0	1,499
	Mbeubeus MBS 3_4	178	46,992	213,600	114	64%	18,696.0	2,671
	Yeumbeul nord aval YBL1_	118	16,520	142,000	43	36%	6,020.0	860
TOTAL TRANCHE 2		907	224,816	1,088,800	411	45%	66,372	9,482

PHASE 1 and 2 TOTAL	Area total watershed (ha)	Population total watershed	Waterflow (10 year return flood) in m3	Area impacted in ha	Area impacted in %	Population impacted	# Housheholds impacted
		1,685	424,670	2,022,400	661	39%	131,872

Figure 2: Location of drainage investments for Dalifort and avoided floods based on ten-year return period

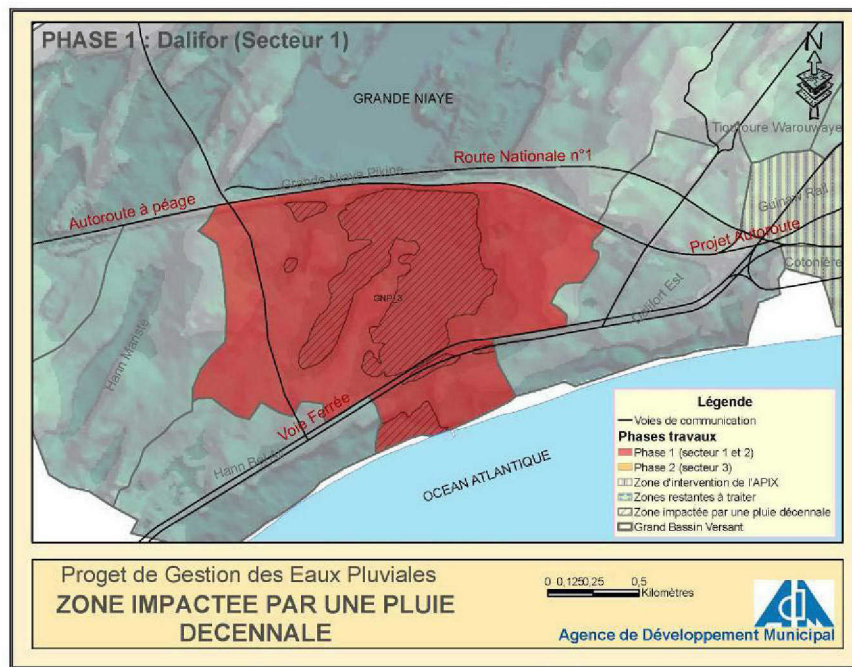


Figure 3: Location of drainage investments for Thiourour and avoided floods based on ten-year return period

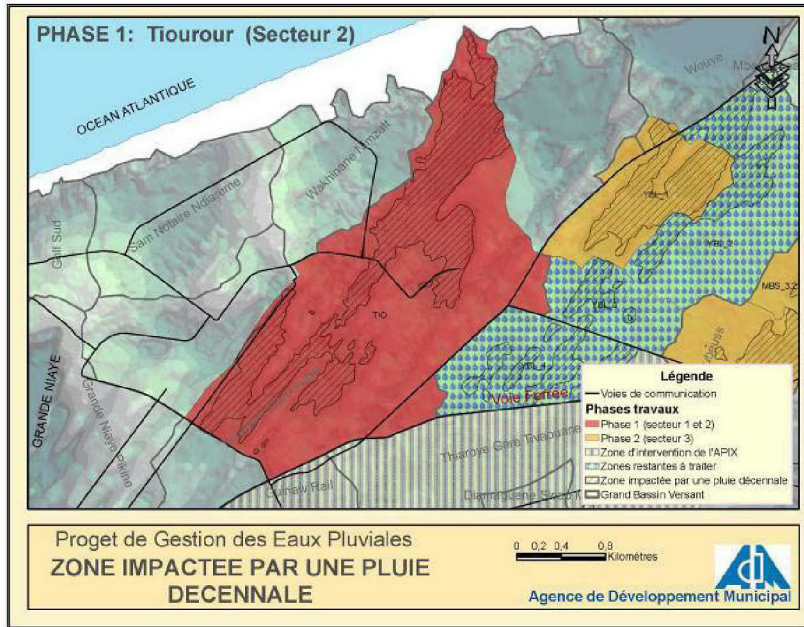


Figure 4: Location of drainage investments for 5 catchments (Mbeubeus 3.1. to 3.4 and downstream Yeumbeul north) and avoided floods based on ten-year return period

