Document of

The World Bank

FOR OFFICIAL USE ONLY

Report No: PAD2548

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED CREDIT

IN THE AMOUNT OF SDR 53.4 MILLION
(US$75 MILLION EQUIVALENT)

AND

A PROPOSED IDA GRANT

IN THE AMOUNT OF SDR 17.8 MILLION
(US$25 MILLION EQUIVALENT)

TO THE

THE REPUBLIC OF MALAWI

FOR A

LILONGWE WATER AND SANITATION PROJECT
November 29, 2017

Water Global Practice
Africa Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective October 31, 2017)

Currency Unit =	MWK
725 MWK =	US$1
US$1=	SDR 0.71190085

FISCAL YEAR
July 1 – June 30

Regional Vice President:	Makhtar Diop
Country Director:	Bella Bird
Senior Global Practice Director:	Guang Zhe Chen
Practice Manager:	Jonathan S. Kamkwalala
Task Team Leader(s):	Josses Mugabi, Odete Duarte Muximpua

ABBREVIATIONS AND ACRONYMS

BOD	Biological Oxygen Demand
BOT	Build Operate Transfer
BP	Bank Procedure
CAPEX	Capital Expenditure
CAS	Country Assistance Strategy
CBO	Community-Based Organization
DA	Designated Account
DMA	District Metered Area
DTS	Directorate of Technical Services
DSC	Department of Statutory Corporations
EAD	Environmental Affairs Department
EIB	European Investment Bank
ERR	Economic Rate of Return
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
FM	Financial Management
FMS	Financial Management Specialist
FSM	Fecal Sludge Management
FY	Financial Year
GDP	Gross Domestic Product
GIS	Geographical Information Systems
GHG	Greenhouse Gases
GNI	Gross National Income
GoM	Government of Malawi
GRS	Grievance Redress Service
IA	Implementation Agreement
IDA	International Development Association
IEC	Information, Education and Communication
IFC	International Finance Corporation
IFR	Interim Financial Report
IPC	Internal Procurement Committee
IPF	Investment Project Financing
JICA	Japan International Cooperation Agency
KD1	Kamuzu Dam 1
KD2	Kamuzu Dam 2
km	kilometer
LCC	Lilongwe City Council
LWB	Lilongwe Water Board
LWREP	Lilongwe Water Resources Efficiency Project
LWSP	Lilongwe Water and Sanitation Project
m^3/day	Cubic meter per day
M&E	Monitoring and Evaluation
MAIWD	Ministry of Agriculture, Irrigation, and Water Development

MFEPD	Ministry of Finance, Economic Planning and Development
ML	Million Liters
MLD	Million Liters per Day
MWK	Malawian Kwacha
NGO	Non-Governmental Organization
NPV	Net Present Value
NRW	Non-Revenue Water
NWDP-II	Second National Water Development Project
ODPP	Office of the Director of Public Procurement
OP	Operational Policy
OPEX	Operational Expenditure
OSS	On-Site Sanitation
PAD	Project Appraisal Document
PDO	Project Development Objective
PIM	Project Implementation Manual
PIU	Project Implementation Unit
PPP	Public Private Partnership
PPPC	Public Private Partnership Commission
PPSD	Project Procurement Strategy for Development
PSP	Pathway to Success Program
QCBS	Quality and Cost Based Selection
RAP	Resettlement Action Plan
RPF	Resettlement Policy Framework
SCADA	Supervisory Control and Data Acquisition
SDR	Special Drawing Rights
STF	Sanitation Task Force
STP	Sewage Treatment Plant
STEP	Systematic Tracking of Exchanges in Procurement
TA	Technical Assistance
ToR	Terms of Reference
TTL	Task Team Leader
TW1	Treatment Works 1
TW2	Treatment Works 2
TW3	Treatment Works 3
US$	United States Dollar
WASH	Water, Sanitation and Health
WB	World Bank
WBG	World Bank Group
WHO	World Health Organization

BASIC INFORMATION

Is this a regionally tagged project?	Country(ies)	Financing Instrument
No		Investment Project Financing

[ ] Situations of Urgent Need of Assistance or Capacity Constraints

[ ] Financial Intermediaries

[ ] Series of Projects

Approval Date	Closing Date	Environmental Assessment Category
20-Dec-2017	30-Jun-2023	B - Partial Assessment

Bank/IFC Collaboration	Joint Level
Yes	Complementary or Interdependent project requiring active coordination

Proposed Development Objective(s)

To increase access to improved water services and safely managed sanitation services in Lilongwe City

Components

Component Name	Cost (US$, millions)
Water Distribution Network Rehabilitation, Expansion and NRW reduction	66.00
Priority Sanitation Improvements	19.00
Technical Assistance	8.50
Institutional Capacity Strengthening	8.50

Organizations

Borrower : The Republic of Malawi

Implementing Agency : Lilongwe Water Board

PROJECT FINANCING DATA (US$, Millions)

[✓] Counterpart Funding	[ ] IBRD	[✓] IDA Credit	[✓] IDA Grant	[ ] Trust Funds	[ ] Parallel Financing

Total Project Cost:	Total Financing:	Financing Gap:
102.00	102.00	0.00
	Of Which Bank Financing (IBRD/IDA): 100.00	

Financing (in US$, millions)

Financing Source	Amount
Borrower	2.00
IDA-61720	75.00
IDA-D2660	25.00
Total	**102.00**

Expected Disbursements (in US$, millions)

Fiscal Year	2018	2019	2020	2021	2022	2023	2024
Annual	1.94	9.31	15.42	21.32	23.28	18.16	10.57
Cumulative	1.94	11.25	26.67	47.99	71.27	89.43	100.00

INSTITUTIONAL DATA

Practice Area (Lead)

Water

Contributing Practice Areas

Climate Change and Disaster Screening

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

Gender Tag

Does the project plan to undertake any of the following?

a. Analysis to identify Project-relevant gaps between males and females, especially in light of country gaps identified through SCD and CPF

Yes

b. Specific action(s) to address the gender gaps identified in (a) and/or to improve women or men's empowerment

Yes

c. Include Indicators in results framework to monitor outcomes from actions identified in (b)

Yes

SYSTEMATIC OPERATIONS RISK-RATING TOOL (SORT)

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

9. Other	Low
10. Overall	Substantial

COMPLIANCE

Policy

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

[ ] Yes [✓] No

Does the project require any waivers of Bank policies?

[ ] Yes [✓] No

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment OP/BP 4.01	✓	
Natural Habitats OP/BP 4.04	✓	
Forests OP/BP 4.36		✓
Pest Management OP 4.09		✓
Physical Cultural Resources OP/BP 4.11	✓	
Indigenous Peoples OP/BP 4.10		✓
Involuntary Resettlement OP/BP 4.12	✓	
Safety of Dams OP/BP 4.37	✓	
Projects on International Waterways OP/BP 7.50	✓	
Projects in Disputed Areas OP/BP 7.60		✓

Legal Covenants

Sections and Description

Project Agreement. Schedule, Section III. 1. Except as the Association shall otherwise agree, the Project Implementing Entity shall produce for each of its fiscal years after its fiscal year ending June 30, 2019, total revenues equivalent to not less than the sum of its (i) total operating expenses; and (ii) debt service requirements.

Project Agreement. Schedule, Section III.2. Before January 31 in each of its fiscal years, the Project Implementing Entity shall, based on forecasts prepared by the Project Implementing Entity and satisfactory to the Association, review whether it would meet the requirements set forth in the preceding subparagraph in respect of such year

and the next following fiscal year and shall furnish to the Association the results of such review upon its completion.

Project Agreement. Schedule, Section III.3. If any such review shows that the Project Implementing Entity would not meet said requirements for the Project Implementing Entity's fiscal years covered by such review, the Project Implementing Entity shall promptly take all necessary measures (including, without limitation, financial restructuring, promotion of private sector participation, promotion of efficiency, and making a request of adjustments of the structure or levels of its tariffs and / or of financial assistance to the Recipient) in order to meet such requirements.

Sections and Description

Financing Agreement: Schedule 2, Section IV. 1. The Recipient shall promptly take all necessary measures (including, without limitation, financial restructuring, promotion of private sector participation, promotion of efficiency, adjustments of the structure or levels of tariffs, and provision of financial assistance) to enable the Project Implementing Entity to meet the requirements set forth in Section III of the Schedule to the Project Agreement.

Sections and Description

Financing Agreement: Schedule 2, Section IV.2. The Recipient shall, not later than forty-eight (48) months after the Effective Date, transfer, in a manner satisfactory to the Association, sewerage services and all related assets from Lilongwe City Council to the Project Implementing Entity in accordance with the provisions of the Water Works Act No. 17 of 1995.

Sections and Description

Project Agreement: Schedule, Section 1.C.1. The Project Implementing Entity shall: (a) not later than one (1) month after the Effective Date, prepare and adopt an Implementation Manual; (b) thereafter, ensure that the Project is carried out in accordance with said manual; and (c) except as the Association shall otherwise agree in writing, not assign, amend, abrogate, or waive, or permit to be assigned, amended, abrogated, or waived, said manual.

Sections and Description

Project Agreement. Schedule, Section 1.E.12. The Project Implementing Entity shall establish, not later than one (1) month after the Effective Date, and thereafter maintain throughout Project implementation, for purposes of implementation of Part 4 (a) (iii) of the Project, a panel of dam safety experts, with an institutional framework, composition, functions, and resources satisfactory to the Association for such purpose.

Sections and Description

Project Agreement: Schedule, Section 1.E.10. The Project Implementing Entity shall have carried out independent monitoring and evaluation of the implementation of the Safeguards Instruments, and to this end, shall appoint, in

accordance with the provisions of the Procurement Regulations, as said provisions may be further elaborated in the Procurement Plan, not later than six (6) months after the Effective Date or prior to the award of the first contract for works under the Project, whichever is later, and maintain throughout Project implementation, a consultant with qualifications, experience, and terms of reference satisfactory to the Association, and cause such consultant to prepare and furnish to the Recipient and the Association semi-annual reports, in form and substance satisfactory to the Association, on the implementation of the Safeguards Instruments.

Conditions

Type	Description
Disbursement	Financing Agreement: Schedule 2, Section III.B.1(b): No withdrawal shall be made under Category 2 (goods, works, non-consulting services, consulting services, training and operating costs for Parts 2,3 (b) and 4(b) of the Project), unless the Implementation Agreement has been executed on behalf of the Project Implementing Entity and Lilongwe City Council
Effectiveness	IDA IPF General Conditions: Section 10.01. The Subsidiary Agreement has been executed on behalf of the Recipient and the Project Implementing Entity

PROJECT TEAM

Bank Staff

Name	Role	Specialization	Unit
Josses Mugabi	Team Leader(ADM Responsible)		GWA01
Odete Duarte Muximpua	Team Leader		GWA01
Steven Maclean Mhone	Procurement Specialist(ADM Responsible)		GGO01
Anthony Aggrey Msendema	Procurement Specialist	Procurement	GGO01
Trust Chamukuwa Chimaliro	Financial Management Specialist		GGO31
Anthony Molle	Team Member		GTPFS
Boyenge Isasi Dieng	Social Safeguards Specialist		GSU07
Bruce Douglas Carrie	Team Member		CASPA

Chloe Oliver Viola	Team Member	GWA08
George Campos Ledec	Environmental Safeguards Specialist	GEN01
Jane Jamieson	Team Member	GTPPP
Michael Shinlord Tran	Team Member	GTPGF
Minerva S. Espinosa-Apurada	Team Member	GWA01
Nathalie S. Munzberg	Safeguards Advisor	OPSES
Nicole Andrea Maywah	Environmental Safeguards Specialist	GEN01
Rupinder Kaur Rai	Team Member	GTPPP
Ruth Jane Kennedy-Walker	Team Member	GWA01
Sameena Dost	Team Member	LEGAM
Silvia Maria Tanga	Team Member	CASPA
Tamara Juvenile Mwafongo	Team Member	AFMMW
Violette Mwikali Wambua	Social Safeguards Specialist	GSU07
Zeria Ntambuzeni Banda	Team Member	AFREC
Zione Edith Kansinde	Team Member	AFMMW

Extended Team

Name	Title	Organization	Location
Charles Odonga	Institutional Development Specialist (Utility Management)		Kampala,Uganda
Dewi Rogers	Water Distribution/NRW Expert		Italy
Zvikomborero Hoko	Sanitary Engineer		Harare,Zimbabwe

MALAWI

LILONGWE WATER AND SANITATION PROJECT

TABLE OF CONTENTS

I. STRATEGIC CONTEXT 10
A. Country Context 10
B. Sectoral and Institutional Context 11
C. Higher Level Objectives to which the Project Contributes 14
II. PROJECT DEVELOPMENT OBJECTIVES 15
A. PDO 15
B. Project Beneficiaries 15
C. PDO-Level Results Indicators 15
III. PROJECT DESCRIPTION 16
A. Project Components 16
B. Project Cost and Financing 17
C. Lessons Learned and Reflected in the Project Design 18
IV. IMPLEMENTATION 19
A. Institutional and Implementation Arrangements 19
B. Results Monitoring and Evaluation 20
C. Sustainability 21
D. Role of Partners 21
V. KEY RISKS 22
A. Overall Risk Rating and Explanation of Key Risks 22
VI. APPRAISAL SUMMARY 25
A. Economic and Financial Analysis 25
B. Technical 26
C. Financial Management 28
D. Procurement 28
E. Social (including Safeguards) 29
F. Environment (including Safeguards) 31
G. Other Safeguard Policies (if applicable) 33

H. Citizen Engagement and Gender 33
I. World Bank Grievance Redress 35
VII. RESULTS FRAMEWORK AND MONITORING **36**
ANNEX 1: DETAILED PROJECT DESCRIPTION **45**
ANNEX 2: IMPLEMENTATION ARRANGEMENTS **63**
ANNEX 3: IMPLEMENTATION SUPPORT PLAN **82**
ANNEX 4: STAKEHOLDER ENGAGEMENT AND COMMUNICATION STRATEGY **83**
ANNEX 5: ECONOMIC AND FINANCIAL ANALYSIS **88**
ANNEX 6: PROFILE OF LILONGWE WATER BOARD **95**
ANNEX 7: PROPOSED PPP FOR WATER PRODUCTION EXPANSION **101**
ANNEX 8: LIST OF STUDIES REVIEWED **107**
ANNEX 9: LOCATION MAP OF PROPOSED WATER SUPPLY INTERVENTIONS **108**
ANNEX 10: LOCATION MAP OF PROPOSED SANITATION INTERVENTIONS **109**

I. STRATEGIC CONTEXT

A. Country Context

1. **Malawi is a small, peaceful and democratic country, with a population of about 17 million people.** Most of the population (85 percent) lives in rural areas. Population growth rate is estimated at 2.8 percent per annum. At this growth rate, Malawi's population is expected to reach 23 million by 2025. The country is land-locked, has unexploited natural resources, and is highly vulnerable to hydro-climatic shocks. Despite a recent difficult economic period, Malawi has a stable democratic political system and has initiated economic and political reforms. The country however remains one of the world's poorest, with over half of its population living in poverty.

2. **Poverty levels in Malawi are high.** In 2016, poverty headcount at US$1.9/day (2011 PPP) remained stubbornly high at 69.8 percent of the population[1]. Gross National Income (GNI) *per capita*[2] was estimated at US$340 in 2015. Malawi is ranked 170 out of 188 countries on the United Nations Human Development Index (UNDP, 2016). Almost half (47 percent) of the children under age five in Malawi are short for their age due to long-term effects of malnutrition and 20 percent are severely stunted.

3. **Malawi's economy is heavily dependent on agriculture**. However, most of the population is engaged in smallholder, rain-fed subsistence agriculture which regularly suffers exogenous climate-induced shocks with significant negative impacts on overall growth and poverty reduction. Malawi has a narrow export base consisting mostly of tobacco, with high dependence on imports and external aid flows**.** Investment climate constraints hinder private investment. The 2018 Doing Business report ranks Malawi 110 out of 190 on the ease of doing business. The main obstacles to doing business include poor support infrastructure and services such as electricity, water, transport, an uncertain economic environment, poor legal and regulatory framework, lack of access to long-term finance and a limited skills base. Business confidence remains subdued following two years of drought conditions and weak economic growth.

4. **The country regularly suffers from droughts and floods, and its economic growth is closely correlated with hydrological variability**. In recent years, Malawi has suffered from weather shocks with increasing frequency, including simultaneous floods and droughts in early 2015, followed by another major drought in 2016. Malawi remains grossly underprepared to manage its highly variable hydrology as evidenced by decades of underinvestment in water infrastructure, particularly storage.

5. **Medium-term economic prospects however appear positive as the country recovers from the recent weather-induced shocks in 2016**. Real GDP growth after two consecutive years of drought, fell below three percent in 2016 but is expected to pick up in the range of four to five percent in 2017. Inflation has fallen to 8.3 percent in October 2017—its lowest level in recent years. However, there is still a wide range of constraints to growth in Malawi, including the high-dependence on rain-fed agriculture; low access to electricity; water scarcity and lack of drought resilience; unsafe drinking water and poor sanitation in both rural and urban areas, to name but a few. The Government of Malawi (GoM) is currently developing a medium-term strategy, looking beyond the recent crisis, to establish strong foundations for economic recovery and growth.

[1] World Bank (2017). Malawi Economic Monitor – Unleashing the Urban Economy, Macroeconomics and Fiscal Management Global Practice, Washington, DC: The World Bank.

[2] GNI *per capita* - atlas method (current US$)

6. **While Malawi is still predominantly rural and agrarian, the urban economy is projected to play a significant role in the country's long-term economic growth prospects[3].** Despite common perceptions that Malawi is urbanizing rapidly, the country is still at an early stage of urbanization. In 2010, less than 16 percent of the total population lived in urban areas, with Malawi urbanizing at the moderate average annual rate of 3.7-3.9 percent during 1998-2008 period. At the current rate and with the current base, Malawi is well-positioned to formulate effective plans to maximize the benefits of urbanization, while minimizing the negative impact. Projected urbanization and economic growth rates for the period from 2010 to 2030 show that even a slightly increased rate of urbanization could greatly enhance Malawi's long-term economic prospects[4]. However, a more rapid rate of urbanization may also lead to a phenomenon known as the "urbanization of poverty," unless a higher proportion of public resources are allocated to meet investment needs in urban areas.

7. **Much of the urban growth, and consequent demand for better services, is taking place in Lilongwe, the capital city**. Lilongwe has been the national capital since 1975 and is now the largest city in the country in terms of population size, having "overtaken" Blantyre in 2008. It is an administrative center, the headquarters for most national ministries and institutions, and a services and agro-processing hub. Lilongwe is growing at a rate of 4.3 percent per year, the fastest in the country and the region. Its growth has been strongly driven by its status as the national capital, in which almost all central government head offices are now located. The current population is estimated at 1.1 million, and is expected to grow to 1.5 million by 2021, and to 2.2 million by 2030. Along with this rapid growth, the city is experiencing a rise of informal settlements. About 76 percent of the city population lives in informal settlements[5]. This rapid growth is putting a strain on the city's services, including water supply and sanitation, and thereby limiting the city's potential as a catalyst for economic growth.

B. Sectoral and Institutional Context

8. **The water sector plays a critical role in Malawi's economy, as most of the constraints to growth are related to water**. Water-reliant sectors contribute an estimated 35 percent of the country's GDP. The total renewable water resource available in Malawi is estimated at 17.3 km^3/year, or 1,027 m^3/capita/year, which is very close to water scarcity[6]. Due to population growth, per capita water availability has been declining at a rapid rate. Further, water resources in Malawi are highly variable between wet and dry seasons and from year to year, and the country's stock of water storage infrastructure is one of the lowest in the region.

9. **Unsafe drinking water and poor sanitation in both rural and urban areas remain a binding constraint to Malawi's growth and poverty reduction**. It is estimated that Malawi loses about US$3.8 per capita or 1.1 percent of the country's annual GDP due to poor health outcomes attributed to, among others, low access to safely managed sanitation services[7]. While the country has made significant progress in improving access to water supply (access rates for drinking water supply have increased from 42 percent in 1990 to 87 percent in 2015), progress on sanitation has been slower (from 29 percent in 1990 to 40 percent in 2015). Moreover, official access figures often

[3] World Bank (2017). Malawi Economic Monitor – Unleashing the Urban Economy, Macroeconomics and Fiscal Management Global Practice, Washington DC: The World Bank.

[4] World Bank (2016). Malawi Urbanization Review: Leveraging Urbanization for National Growth and Development, Urban, Rural and Disaster Risk Management Global Practice, Washington DC: The World Bank.

[5] UN-HABITAT (2011). Malawi: Lilongwe Urban Profile, UN-HABITAT

[6] Under the Falkenmark definitions of water scarcity, a country with a total renewable water resource of less than 1000 m^3/capita/year is considered water scarce

[7] Water and Sanitation Program (2012). Economic impacts of poor sanitation in Africa. Water and Sanitation Program, The World Bank.

mask the poor levels of services. High population growth, dwindling water resources, lagging infrastructure development, and aging water systems create large gaps between supply and demand, leading to unreliable services. Globally, Malawi is currently ranked number five out of the top 10 countries (with population greater than one million) with the highest proportion of population at risk of frequent water shortages[8].

10. **Lilongwe City, in particular, faces unique water security challenges**. Lilongwe River – the only source of water for the city is highly variable and very vulnerable during dry years. The river has been dammed twice to create storage for the dry season. The two dams – Kamuzu Dam 1 (KD1) and Kamuzu Dam 2 (KD2) constructed in 1966 and 1989 respectively – have a combined storage of 24 million m^3, which is barely able to sustain current demand during the dry season. Water is abstracted at an intake point on the river about 20 km downstream of KD2 and treated in Treatment Works 1 (TW1) and Treatment Works 2 (TW2), with a combined production capacity of 125,000 m^3/day. However, on average, the plants are operating at 70 percent capacity[9], producing an average of about 90,000 m^3/day. Current peak water demand is estimated at 130,000 m^3/day, and this is projected to increase to 170,000 m^3/day by 2025 and 220,000 m^3/day by 2035. Thus, the water supply system is under strain and the city is already facing water shortages which are expected to become severe over the coming years, unless major investments in new water production is undertaken.

11. **Sanitation is also a major challenge in the city.** A recent city-wide survey[10] showed that only five percent of the population is served by a sewer system, while the majority relies on onsite sanitation systems (70 percent pit latrines and 25 percent septic tanks). Existing sewers and sewage treatment plants are dilapidated due to lack of maintenance, resulting in environmental pollution, as most of the sewage ends up in the environment without treatment. Faecal sludge emptying and collection from onsite systems is mainly done by small-scale private sector operators, with minimal regulation from the city council. There has not been any major investment in sanitation in Lilongwe since the 1980s. Given the current levels of sanitation services, city authorities need to urgently plan for integrated sanitation investments, and address some of the priority infrastructure needs to reduce public health risks and environmental hazards due to poor sanitation.

12. **The Ministry of Agriculture, Irrigation and Water Development (MAIWD) leads the water sector.** MAIWD is responsible for oversight of the water sector, including water resources management, irrigation, and water supply and sanitation. Urban and small town water supply is under the responsibility of the two urban Water Boards (Lilongwe and Blantyre) and the three regional Water Boards (Northern, Central, and Southern). The Water Boards report to MAIWD on technical matters and to the Department of Statutory Corporations (DSC)—under the Office of President and Cabinet—on policy issues (such as financial, administrative and managerial oversight). There is no independent regulator for the water supply and sanitation sector. With respect to sanitation, city councils are currently in charge of sanitation services under the Local Government Act of 1998. At the same time, the Waterworks Act 1995 mandates urban Water Boards to provide sewerage services within their areas of jurisdiction. Despite having the mandate, none of the Water Boards are providing sewerage services and all sewerage assets (where they exist) remain with the city councils. GoM had previously decided to keep city sewerage systems under the responsibility of the city councils. However, recent highly publicized cases of contamination of Lilongwe city's drinking water by a leaking sewer pipe have led to renewed calls for sewerage services to be transferred to Water Boards.

[8]Sadoff C.W., Hall, J.W., Grey, D., Aerts, J.C.J.H., Ait-Kadi, M., Brown, C., Cox, A., Dadson, S., Garrick, D., Kelman, J., McCornick, P., Ringler, C., Rosegrant, M., Whittington, D. and Wiberg, D. (2015). Securing Water, Sustaining Growth: Report of the GWP/OECD Task Force on Water Security and Sustainable Growth, University of Oxford, UK, 180pp.

[9] Due to a combination of low yields from the Kamuzu dam system in the dry season; high levels of siltation in the river during the rainy season; and hydraulic bottlenecks in the existing distribution network.

[10] World Bank (2017). Lilongwe Citywide Sanitation Survey. Interim Report (under preparation)

13. **Lilongwe Water Board (LWB) is a statutory corporation established in 1995 with responsibility for water and sewerage services in Lilongwe City**. LWB currently provides water services to about 70 percent of the city's population. The water distribution network is estimated at 1,758 km in length, serving a total of 67,581 connections. The network is generally characterized by low operating pressures and frequent interruption of water supply due to insufficient hydraulic capacity and elevated levels of leakage. Non-revenue water (NRW) is estimated at 36 percent[11]. LWB's financial performance remains highly unstable, with operating ratios varying between 1.0–2.8 over the past seven years, and collection rates stagnating at around 85 percent (see Annex 6 for further details on LWB's operational performance). Recent assessments show that LWB needs to augment its water production capacity in the medium to long term to meet growing water demand. At the same time, priority investments in network rehabilitation are needed urgently to address hydraulic bottlenecks and control water losses before more water is produced. In addition, it is critical for LWB to diversify its water sources to reduce the water security risk to the city. With the projected rapid growth in water demand, LWB and the GoM has embarked on an ambitious investment program to secure water supply for Lilongwe.

14. **LWB's medium-term investment plan is packaged in what is called the "Lilongwe Water Program"**. The Program consists of a series of investments designed to address the immediate and medium term water security needs, and support a long-term solution to Lilongwe's growing water demands (see Table 1). Over the next three and half years, LWB plans to raise the height of KD1 dam (by 7 m) to increase abstraction capacity, which would enable full utilization of the installed production capacity and allow for an additional 50,000 m^3/day expansion in treated water production capacity (TW3), reaching a total production capacity of 175,000 m^3/day – enough to meet projected 2025 demand. This sub-project (KD1 raising) is financed by the European Investment Bank (EIB) and is already at procurement stage. Recent yield assessment[12] of the Kamuzu dam system confirms that the required 175,000 m^3/day can be abstracted at a reasonable assurance level of between 96 and 97 percent[13], considering environmental flow requirements.

Table 1 – LWB's medium-term investment plan

Project	Cost (US$ M)	Financing	2017		2018		2019		2020		2021		2022		2023	2024	2025
Raising of Kamuzu Dam 1	14	EIB															
Treatment Works 3	15	PPP															
Priority Network Rehabilitation	36	IDA															
Network Expansion	30	IDA															
Diamphwe bulk water supply	220	unknown															
Total	**315**																

Procurement and Construction
Operational

15. Beyond 2025 however, the city will need a new water source since any additional demand on the Kamuzu dam system will reduce assurance levels below acceptable levels. Extensive hydrological, technical, financial, economic, social, and environmental studies recommended a new multipurpose dam on Diamphwe River (35 km

[11] The current level of losses at the 36 percent would be over 43 percent if a continuous supply was provided.

[12] SMEC (2016). Feasibility Study and Preliminary Design of Lilongwe Water Treatments Works 3 (TW3). Kamuzu Dams Yield Assessment. Report to Lilongwe Water Board

[13] By comparison, reservoirs in South Africa - a country with similar hydrological variability to Malawi- are designed and operated to achieve reliability levels of 98 percent for urban water supply

southeast of Lilongwe) as the most feasible water source among the alternatives considered. At the same time, LWB is considering pumping water from Lake Malawi (120 km away) as an alternative to Diamphwe dam, although the feasibility of this option is yet to be established. Irrespective of where the water comes from, LWB will need to invest beforehand in the distribution network to improve its hydraulic capacity, reduce losses, and expand the reach of the network to serve more customers.

16. **To help kick-start the Program, GoM has requested the World Bank to support priority investments in water production and distribution, as well as sanitation improvements**. In addition, GoM would like the World Bank to support a set of technical assistance activities designed to (i) enhance LWB's capacity to plan future investments and to strengthen the pipeline of investment-ready projects under the Lilongwe Water Program; (ii) enhance the capacity of LWB and Lilongwe City Council (LCC) to deliver improved water services and safely managed sanitation services; (iii) enhance LWB's capacity to manage its investment program. GoM has also engaged the International Finance Corporation (IFC) to act as a transaction advisor for a possible public-private partnership (PPP) for water production expansion investments, following a series of studies that showed that it may be feasible to implement priority water production investments under a Build Operate Transfer (BOT) contract with the private sector. The World Bank will thus play a catalytic role through the proposed **Lilongwe Water and Sanitation Project** (LWSP). Participation of the World Bank is key to the Program, and is expected to help catalyze additional financial commitments from other development partners and the private sector. The World Bank has been a long-standing and valued partner in the Malawi water sector for more than 20 years, supporting vital institutional and sector reforms and investments to improve access and quality of service. The proposed investment operation will build upon and leverage the World Bank's deep familiarity and involvement in the sector.

C. Higher Level Objectives to which the Project Contributes

17. **The project is aligned with the current Country Assistance Strategy (CAS) (FY13-17)[14] which acknowledges inadequate water supply and sanitation as one of the constraints to economic growth and poverty reduction in Malawi.** Specifically, the project contributes to theme 1 (promoting sustainable, diversified, and inclusive growth) and theme 2 (enhancing human capital and reducing vulnerabilities) of the CAS.

18. **The project is consistent with the Government's priorities.** Following the 2016 drought that exacerbated water shortages in Lilongwe city, the Government has made improving water security in Lilongwe a top priority. Further, the project contributes to the Malawi Growth and Development Strategy which aims to reduce poverty through sustainable economic growth and infrastructure development. Given the critical role water plays in Malawi's economy, the project is expected to contribute to the country's overall growth prospects. Global evidence suggests that water security is not only an investment in reducing vulnerabilities or protecting communities; it is also an investment in enabling growth.

19. **The project also contributes to the WBG's twin goals of ending extreme poverty and promoting shared prosperity, especially given the historical inequities in water service levels in Lilongwe**. Access to reliable water services and safely managed sanitation will improve the general health conditions and quality of life among poor urban residents that currently rely on expensive water sources and are exposed to serious public health risks due to the lack of improved sanitation. The project is also aligned with the "Investing in Early Years (IEY)" agenda in Malawi, given the growing body of empirical evidence[15] that suggests a strong link between improved sanitation

[14] World Bank (201). Malawi - Country Assistance Strategy for the period FY13 - FY16. Report Number 74159. The Performance and Learning Review of the CAS extended the CAS period for one year.

[15] Cumming, O., and Cairncross, S. (2016). Can water, sanitation and hygiene help eliminate stunting? Current evidence and policy implications. *Maternal & Child Nutrition*, *12*, 91–105. http://doi.org/10.1111/mcn.12258

and reduction in stunting in children under five. Further, the project will help to reduce the burden of water collection, enabling women and girls to manage sanitation and hygiene needs with dignity. Special attention will be given to the needs of women and girls in 'high use' settings such as schools and markets.

II. PROJECT DEVELOPMENT OBJECTIVES

A. PDO

20. The project development objective is to increase access to improved water services and safely managed sanitation services in Lilongwe City.

B. Project Beneficiaries

21. The project is expected to directly benefit a total of 250,000 people with improved water services. A further 250,000 people are expected to benefit from safely managed sanitation services. With respect to water supply, the project's extensive interventions in the distribution network are expected to help eliminate hydraulic bottlenecks, improve network operation and reduce water losses from the current level of 36 percent to 26 percent. This would in turn result in improved quality of services (hours of service and pressure) for about 250,000 people that currently receive intermittent services, without necessarily increasing the volume of water produced[16]. Most of these beneficiaries are in poorer areas in the southern part of the city where intermittent water supply is widespread. Direct beneficiaries for sanitation include (i) about 90,000 people who are expected to benefit from rehabilitation and expansion of the sewerage network through upgrade of existing sewer connections and installation of new connections; and (ii) about 160,000 people who are expected to benefit from interventions involving onsite sanitation. Poor and vulnerable households will be specifically targeted for support to improve their sanitation facilities.

C. PDO-Level Results Indicators

22. The following PDO results indicators will be used to measure achievement of the PDO:

- Number of people (disaggregated by gender and poverty quintile) receiving improved water services; and
- Number of people (disaggregated by gender and poverty quintile) gaining access to safely managed sanitation services;

23. For purposes of this project, an improved water service means a minimum of 18-hour water supply meeting GoM water quality standards, and supplied at an average pressure of 12 m at predetermined points in the distribution network for no less than 300 days in a year, unless the service area is declared a disaster affected area. Safely managed sanitation is defined as the use of an improved sanitation facility (including handwashing facility with soap and water) which is not shared with other households, and where excreta is safely disposed in situ and/or

[16] The project is part of the Lilongwe Water Program which includes investments in expanding water production capacity, with parallel financing from other development partners (EIB), and the private sector. Care has been taken to ensure that the various investments are complementary, but not linked, meaning that other investments are not required for the development objectives of this project to be achieved.

transported and treated off-site. Improved sanitation facilities include flush/pour flush toilets to piped sewer, septic tank or pit latrine; and composing toilet or pit latrine with slab.

III. PROJECT DESCRIPTION

A. Project Components

24. The project scope consists of four components which contribute to the PDO. Below is a summary description of each of the components. Detailed descriptions are provided in Annex 1.

25. **Component 1–Water Distribution Network Rehabilitation, Expansion and NRW Reduction (US$66 million of which US$65 million equivalent IDA Credit)**. This component involves investments in priority network rehabilitation to remove bottlenecks, increase hydraulic capacity of the existing network and reduce losses, and network expansion to increase coverage. Key investments include: upgrading of 142 km of existing distribution network and creation of pressure zone boundaries; construction of 27 km of transmission mains, eight associated pumping stations and four storage reservoirs with a combined storage of 2,600m^3; and performance-based water loss reduction through improvements in network maintenance, active leakage control, speed and quality of leak repairs and pressure management. These interventions alone are expected to help reduce water losses from an estimated 36 percent to about 26 percent and improve the quality of water services (pressure and hours of service) for LWB customers. The component will also finance approximately 186 km of distribution network expansion to areas of the city that are currently not served by piped water. However, network expansion will only be undertaken if water production is increased either through improvements in the efficiency of existing treatment plants, savings from physical water loss reduction activities, construction of a new treatment plant or a combination of these three.

26. **Component 2–Priority Sanitation Improvements (US$19 million of which US$18 million equivalent IDA Grant)**. This component will finance various investments to increase access to safely managed household and public sanitation services in Lilongwe. These investments include: rehabilitation and expansion of the sewerage network (107 km); installation of 5,000 new sewer connections; rehabilitation and upgrading of the existing Kauma sewage treatment plant; support to construction of 8,000 improved sanitation facilities targeting the poor and vulnerable households; sanitation marketing campaigns; and construction of improved sanitation facilities in 10 markets and 10 schools.

27. **Component 3–Technical Assistance (US$8.5 million of which US$5.5 million equivalent IDA Credit, and US$3 million equivalent IDA Grant)**. This component will finance technical assistance (TA) activities designed to support preparation and supervision of all infrastructure investments planned under the project; and to enhance LWB's capacity to plan future investments under the Lilongwe Water Program. The TA activities are organized into two sub-components: (i) technical assistance for water supply, which includes consultancy services for engineering designs, procurement and supervision of distribution network infrastructure planned under the project; preparation/update of safeguards instruments; preparation development of a framework to guide investment planning under the Program; assessment of ground water resources potential; and preparation of a water supply master plan for Lilongwe city, including feasibility studies for priority investments identified in the master plan[17];

[17]Excluding dams. LWB already completed feasibility studies and detailed designs for a new water source (Diamphwe dam), and will therefore not require any further technical assistance under this project. Further, LWB is currently studying the feasibility of abstracting water from Lake Malawi. This study is already underway, and is unlikely to require any further support from this project.

and (ii) technical assistance for sanitation, which includes consultancy services for engineering designs, supervision of priority sanitation infrastructure planned under the project; preparation of environmental and social impact assessments, environmental and social management plans and resettlement action plans for priority sanitation investments planned under the project; preparation of a sanitation master plan for Lilongwe City; feasibility studies for other priority sanitation investment identified in the master plan; and diagnostic studies on urban development and governance issues in Lilongwe and future scenarios for urban services provision.

28. **Component 4–Institutional Capacity Strengthening (US$8.5 million of which US$4.5 million equivalent IDA Credit and US$4 million equivalent IDA Grant).** This component will finance a set of activities designed to: (i) strengthen the capacity of LWB to implement the project and to provide improved water services to its customers; and (ii) strengthen the capacity of LCC to implement the sanitation component of the project, operate and maintain the sanitation infrastructure and support the reforms needed to provide and promote safely managed sanitation services in Lilongwe. With respect to LWB, the component will support implementation of LWB's institutional capacity development action plan code-named "Pathway to Success Program" (PSP). PSP is a five-year (2016-2021) change management program to strengthen corporate governance; improve leadership skills at all levels; improve staff productivity, work culture and motivation; improve customer service; and modernize LWB's internal processes and systems – all critical areas for achieving the project objectives. The PSP has been under implementation for a period of one year. The project will build on and support implementation of the program to enhance its impact on the service delivery outcomes that LWB seeks to achieve under this project. This component will also finance incremental operating costs for LWB's Project Implementation Unit (PIU); preparation of dam safety management plans (including instrumentation plan, O&M plan and emergency preparedness plan) for both KD1 and KD2; and implementation of priority dam safety measures for KD2[18] (which include relocation of gauge boards, installation of chainage markers, installation of vibrating wire piezometers, maintenance of standpipes piezometers, detailed inspection of fuse gates and concrete spillways during seasonal drawdown periods, cleaning and re-commissioning of relief wells, and maintaining the embankment structure free of shrubs and trees); and independent review and expert advice to LWB on implementation of dam safety measures for both KD1 and KD2.

29. With respect to LCC, the component will finance equipment, logistical support, training and specific technical assistance to the engineering and public health departments of LCC to strengthen their capacity to provide sanitation services in the city, until such a time that GoM takes a decision to transfer sanitation services to LWB. The component will also finance incremental operating costs for LCC to manage sanitation activities under the project, as well as coordination and consensus building efforts around a future institutional framework for sanitation services in Lilongwe.

B. Project Cost and Financing

30. **The project cost is US$102 million**. This cost will be financed through an IDA credit of US$75 million, an IDA grant of US$25 million, and a GoM contribution of US$2 million. The GoM contribution will go towards resettlement compensation costs[19]. The proposed World Bank lending instrument is Investment Project Financing (IPF) utilizing IDA credit and grant. The IDA credit/grant will be passed on to LWB on the same terms and conditions as the financing agreement between IDA and GoM, and the grant will be on-granted by LWB to LCC. Table 2 shows a summary of the project costs and financing structure. A detailed cost breakdown is provided in Annex 1. It is

[18] Implementation of KD1 safety measures is included in the scope of the EIB project for KD1 raising and rehabilitation

[19] Costs relate mainly to cash compensation for temporary disruption of business activities during construction of water supply and sewerage network infrastructure under component 1 and 2 respectively. No major resettlement is expected under the project.

envisaged that an IDA guarantee could be provided as a risk mitigation instrument to support the proposed PPP for water production expansion which LWB is currently pursuing with the support of IFC. The guarantee support (if required) will be processed later (through additional financing) once the PPP transaction is well-advanced. Details of the proposed PPP and the potential value-added of the IDA guarantee are presented in Annex 7.

Table 2 –Project Costs and Financing

Components		Estimated Cost (US$ Million)	Financing (US$ million)		
			IDA Credit	IDA Grant	GoM
1	Network Rehabilitation, Expansion and NRW reduction	66	65		1
2	Priority Sanitation Improvements	19		18	1
3	Technical Assistance	8.5	5.5	3	
4	Institutional Capacity Strengthening	8.5	4.5	4	
	Total	**102**	**75**	**25**	**2**

C. Lessons Learned and Reflected in the Project Design

31. The project design draws on lessons from previous water and sanitation projects in Malawi, as well as from global trends and experiences on pathways to water security for cities in developing countries. The lessons learned and reflected in the project design can be summarized as follows:

32. **Expanding water production infrastructure alone does not necessarily result in improved quality of services**. Most water supply networks in developing countries operate on intermittent basis. That means water reaches customers only a few hours per day or a few days per week. Water shortages are a way of life in many cities. In some extreme cases, the pipes spend more time being full of air than they do water. The traditional approach is to invest in ever more expensive water sources to overcome the apparent deficit. However, global experience has shown that intermittent supply is often a direct consequence of high leakage and insufficient hydraulic capacity. Thus, investing in more production without dealing with the network is like refilling a leaky bucket. In designing this project, the team has applied standard network hydraulic modelling tools in new innovative ways to define a viable investment package that balances the reduction of leakage against the development of new production sources. While investments in water production are required for increasing coverage at scale, improving quality of services for existing customers does not require an increase in water production. That said, the project is part of a broader Program which includes investments in expanding water production to match rising demand, with parallel financing from other development partners (EIB) and the private sector.

33. **Investing in infrastructure does not necessarily translate into improved water services.** Institutional capacity strengthening is essential for improving the quality of water services. Experience with previous projects in Malawi and elsewhere show that sustainable service improvements can only be achieved if complementary interventions in institutional capacity strengthening (in the areas of investment planning, implementation and operations) are implemented. Further, experience shows that such interventions are more likely to have lasting impact if they build on and support an existing change management program within the utility. The project's support to institutional capacity strengthening of LWB has been designed with these lessons in mind.

34. **Sanitation is best tackled through a comprehensive city-wide approach.** The initial request from GoM was to finance sewerage improvements, with network upgrading and rehabilitation of the treatment plant. However, improving effluent quality discharging from the wastewater treatment plants will have a minor impact on the overall fecal waste load entering the environment. The project is thus designed to address the sanitation challenge in its

entirety, looking at on-site sanitation, off-site sanitation investments, as well as the necessary capacity building and institutional strengthening required to address these challenges.

35. **Connections to sewers is a persistent challenge in sewerage projects.** International experience has shown that customers can be reluctant to connect to sewers passing the house due to affordability or other constraints. The project has included measures, such as intensive sanitation marketing to ensure effective demand for connections and for on-site facilities, including engaging individual households, community structures, and collaboration with other agencies such as LCC and Ministry of Health to enforce regulations and by-laws.

36. **Global and country trends suggest a dwindling level of concessional public financing available for infrastructure investments in developing countries.** For this reason, the project is deliberately designed to address a key binding constraint to private capital investment in water production capacity for Lilongwe, that is, LWB's old and dilapidated water distribution network. From the perspective of the private sector, an old and dilapidated water distribution network increases the risk profile of any water production PPP and hence its costs. Therefore, by focusing on the distribution network, the project not only allows space for private investors to respond to LWB's investments needs for water production, it will also help to de-risk these investments and make it easier for LWB to attract a competent private partner at an affordable cost. That said, given the lack of water PPP experience in Malawi, it is unlikely that a private concessionaire would take the risk of entering a long-term contract with LWB without adequate risk mitigation guarantees. For this reason, it is envisaged that an IDA guarantee may be required to enhance LWB's creditworthiness. The guarantee support (if required) will be processed later (through additional financing) once the PPP transaction is well-advanced.

IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements

37. **LWB will be the lead project implementing agency responsible for all aspects of project management, including planning, procurement, finance management, results monitoring and evaluation and safeguards.** LWB has an existing Project Implementation Unit (PIU)– under the Directorate of Technical Services (DTS)– which is charged with delivering LWB's capital projects. The World Bank team has carried out an assessment of the capacity of this PIU, as well as LWB's overall capital projects delivery structure. LWB has recently recruited a total of six (6) project engineers to the PIU, thus significantly increasing its technical capacity. Other key personnel currently in the PIU include: project manager, procurement officer and finance officer. The PIU however lacks capacity in monitoring and evaluation, as well as environmental and social safeguards. At the corporate level, LWB does not have a separate directorate for capital projects. The DTS oversees both operations and projects–an arrangement that has proved ineffective as more projects come on board and as operational demands increase. A recent review of LWB's organizational structure recommended, among other changes, the creation of a separate Directorate of Infrastructure Development. However, LWB management is yet to implement the recommendation. The World Bank has assessed the current PIU set up and concluded that it meets the basic requirements for implementing a project of this scale. However, to mitigate risks to the project, LWB has agreed to the following actions to be implemented soon after the project becomes effective: (i) LWB will strengthen the PIU in the areas of monitoring and evaluation, and environmental and social safeguards, through recruitment of additional staff and/or consultants as needed; and (ii) LWB will fast-track the creation of a Directorate of Infrastructure Development to enhance strategic oversight of LWB's capital projects, including LWSP.

38. **LCC will implement the sanitation component of the project, consistent with its current role as the sanitation services provider.** The World Bank assessed the capacity of LCC to implement the sanitation component of the project and to sustain project interventions. Some gaps were identified in technical and project management capacity. Sanitation services are currently split between two departments – Engineering Department (for sewerage services) and Public Health Department (for on-site sanitation and solid waste management). Both departments have limited technical capacity and lack the necessary resources, tools and assets to perform their functions effectively and efficiently. The Engineering Department does not have a qualified sanitary engineer; it lacks basic equipment and logistical support to manage the sewerage network. The council in general faces severe funding constraints, some of which can be attributed to the council's expenditure pattern characterized by high proportion of pay-roll related costs compared to available own-source revenues. The city does not have a revenue stream for sanitation services, yet its sanitation departments employs the highest number of unskilled staff (laborers, street sweepers etc.) and semi-skilled staff (clerical/administrative positions). There are many unfilled senior and technical positions, as the city is not able to offer competitive salaries and career opportunities. Basic financial management and procurement capacity in LCC is generally weak. The city has not implemented any major capital project in the recent past.

39. **While it is beyond the scope of this project to address systemic issues within LCC, some actions have been agreed to mitigate risks to the project.** First, all procurement and financial management under the project will be centralized at LWB. Secondly, LCC will form a small, dedicated project support unit comprised of deputed staff from both Engineering and Public Health Departments to manage the sanitation component on a day-to-day basis. The unit will be supported by three experts recruited under the project (i.e. sanitary engineer, GIS/database specialist and institutional development specialist) and three junior civil engineers and/or sanitation interns. Thirdly, LCC will sign an Implementation Agreement (IA) with LWB that will define the roles/obligations of each entity with respect to project implementation, as well as other joint undertakings related to sanitation services delivery in the city. Finally, a Sanitation Task Force comprising representatives from MAIWD, Ministry of Health, Ministry of Local Government, LWB, LCC and NGOs/civil society will be formed to strengthen coordination of sanitation investments in the city and to facilitate policy dialogue on the future institutional framework for sanitation services in the city.

40. **Project implementation will be governed by a set of four agreements.** The World Bank will sign a financing agreement with the Ministry of Finance, Economic Planning and Development (MoFEPD) as the recipient of the IDA credit/grant. MoFEPD will, in turn, sign a subsidiary financing agreement with LWB, with terms and conditions acceptable to the World Bank. The World Bank will also sign a project agreement with LWB as the lead implementing entity. LWB will sign an implementation agreement with LCC, with terms acceptable to the World Bank. All project operational modalities will be detailed in a Project Implementation Manual (PIM) to be prepared and adopted no later than one month after project effectiveness. Further details on project implementation arrangements are provided in Annex 2.

B. Results Monitoring and Evaluation

41. **Results will be monitored using LWB's existing M&E systems, with some enhancements to accommodate sanitation indicators, which are currently not monitored**. The project results framework (see Section VII) forms the basis for tracking progress in meeting the project's objectives. Process monitoring will focus on processes that are critical to achieving the project's objectives, such as procurement, safeguards, technical assistance and institutional strengthening activities. All teams involved in the implementation of the project will participate in the process of data collection, compilation, analysis, and use. LCC will be responsible for collection of data on sanitation-related indicators, and feeding the information in LWB's M&E system. The exact split of M&E roles between LWB

and LCC will be specified in the implementation agreement. Reporting on project progress will be undertaken on a quarterly basis to build a learning platform to inform project management and to improve project performance. Annual beneficiary surveys will be undertaken as part of project monitoring.

42. **LWB will recruit a M&E specialist in the PIU to be responsible for tracking progress on PDO indicators and intermediate results indicators.** The PIU will prepare semi-annual progress reports that cover implementation status and results; challenges and proposed actions to address them; status of procurement and disbursements; and status of environmental and social safeguards implementation. The project will fund necessary equipment (e.g. computers, software and other goods), capacity building (training), and incremental staff to strengthen results and process monitoring at the project level and to equip the PIU to carry out these responsibilities. To the extent possible, project M&E data will be made publicly available to improve transparency and project governance. Further details on project M&E arrangements are provided in Annex 2.

C. Sustainability

43. **GoM is fully committed to the project and sustainability of project outcomes**. The project is aligned with the Malawi Growth and Development Strategy, and is considered a priority given the water and sanitation challenges facing the nation's capital city. The Government is also committed to supporting the transformation of water utilities in the country into commercially viable entities that can provide high quality services at an affordable price. In 2016, GoM approved an increase in the tariff charged by LWB from US$0.95/m^3 to US$1.06/m^3. This tariff level matches the willingness to pay levels of LWB's customers as assessed in a recent survey[20]. On sanitation services, LCC has recently approved a by-law that enables the council to charge fees for sanitation and other related services. The council is in the process of establishing collection mechanisms, and is expected to progressively increase the fees to cover its operating costs for sanitation services.

44. **The project design includes several features to enhance sustainability**. First, institutional capacity strengthening is included as a separate component of the project to draw attention to its importance as a key factor in enhancing sustainability. Secondly, the project is deliberately designed to crowd in private sector financing by focusing on the distribution network infrastructure and allowing space for the private sector to finance water production infrastructure based on the strength of LWB's cashflows. This approach will help enhance commercial discipline in the management of the utility and put LWB on a path to reducing their heavy dependence on donors and the Government for their infrastructure financing needs. Finally, the project design has benefited from various studies to ensure that the infrastructure supported is of good technical design, maximizes social and economic benefits and is environmentally sustainable.

D. Role of Partners

45. **GoM and LWB are currently mobilizing resources from various development partners to finance the Lilongwe Water Program**. Individual partners will be expected to finance different projects/activities in parallel under the umbrella of the Program. The total cost of the Program is currently estimated at US$315 million. So far, only EIB has committed financing of about US$27 million for rehabilitation and raising of Kamuzu Dam 1. LWSP will be the second parallel project under the Program.

[20] Economic Consulting Associates (2014). Lilongwe Water Board Tariff Review and Willingness to Pay Study. Final Report, September 2014.

46. **In addition, LWB expects to attract a competent private partner to finance the new water treatment plant (TW3), and take over operation of all the plants (TW1, TW2 and TW3) under a single PPP contract**. The PPP options analysis done by IFC showed that integrating the operations of all the plants (TW1, TW2 and the proposed TW3) into one PPP contract results in a lower production cost/per m^3 than having a PPP for TW3 alone. Moreover, this approach allows LWB to maximize the production efficiency of all the three plants. LWB has retained IFC as the transaction advisor for the PPP. IFC's preliminary analysis and market sounding suggest that an IDA guarantee may be required to enhance LWB's creditworthiness. The guarantee support (if required) will be processed later (through additional financing) once the PPP transaction is well-advanced. Details of the proposed PPP and the potential value-added of the IDA guarantee are presented in Annex 7.

47. **Finally, LWB continues to pursue technical assistance partnerships focused on NRW reduction**. Japan International Cooperation Agency (JICA) is in the process of formulating a Technical Cooperation Project (TCP) to provide technical assistance and capacity building on NRW reduction. The JICA TCP will complement existing efforts by Vitens-Evides International (VEI) which has an existing NRW technical assistance partnership agreement with LWB until 2019. After expiry of the TA partnership with VEI, LWB plans to enter a performance-based contract with an experienced firm to further reduce water losses.

V. KEY RISKS

A. Overall Risk Rating and Explanation of Key Risks

48. **The overall risk of the project is considered Substantial.** A brief explanation of the key risks and proposed mitigation measures is provided in the following paragraphs.

49. **Political and Governance Risks – Substantial:** The project is exposed to risks related to corruption and fraud. These are substantial country risks which reach far into most aspects of public services delivery, at both national and local levels. Further, the frequent shortage of potable water in Lilongwe has become a political issue, with political leaders at all levels, media and civil society taking a keen interest in the solutions to address the water problems in the city. There is a heightened sense of urgency on the part of the Government to find a long-term solution to the water security challenges facing the nation's capital. This presents both opportunities and risks. The opportunity is that the project is likely to benefit from high-level political support. The risk is that there may be increased political pressure on LWB to shortcut due process. Although, LWB is a corporate entity, the utility enjoys only limited financial and managerial autonomy. Entrenched political interests often impede decision-making when it comes to capital projects and operations. These risks will, to some extent, be mitigated by building broad public support for the project – as public pressure to improve the credibility of the Government is high, and there is currently greater scrutiny of public sector performance. LWB has developed a communication strategy (see Annex 4) which will be implemented during the life of the project. Further, the project will support institutional strengthening of LWB, including on corporate governance.

50. **Macroeconomic Risks – Moderate:** The project is moderately exposed to macroeconomic risks which may lead to an increase in project costs. Although macroeconomic conditions in the country have improved recently, the prevailing tight fiscal space may undermine the achievement of the project objectives, especially if it leads to a reduction in the availability of counterpart funds. These risks have been mitigated in the following ways: (i) requirement for counterpart funds is limited to resettlement compensation costs which are expected to be minor – relating mainly to cash compensation for temporary disruption of businesses activities during construction of

water supply and sewerage network infrastructure under component 1 and 2; and (ii) substantial price contingencies have been included in the final project cost estimates.

51. **Sector Strategies and Policies – Moderate:** Issues related to sector strategies and policies pose a moderate risk to the project. Sector policies and strategies are generally adequate for the purposes of the project and mostly consistent with the country's development strategy and objectives. However, implementation of some of the policies (particularly sanitation) remains a challenge. For instance, with respect to sanitation, the policy position is that Water Boards are responsible for waterborne sanitation, but the transfer of assets from city councils to the Water Boards has not happened. Further, the sector still lacks an adequate regulatory regime, despite previous multiple attempts at regulatory reform. The process of tariff setting and review remains highly politically constrained, and there is currently no cost recovery mechanism for sanitation services. These policy and regulatory issues, however, are unlikely to impact the achievement of the project objectives. The water tariffs have recently been increased to a level that is sufficient to ensure financial viability of the project, and the project design includes technical assistance to support establishment of a cost recovery mechanism for sanitation services. Finally, a Sanitation Task Force (STF) comprising representatives from LWB, LCC, Ministry of Health, Ministry of Local Government, MAIWD and NGOs/civil society will be formed to facilitate dialogue on unresolved sanitation policy implementation issues.

52. **Technical Design of the Project – Moderate:** Technical risks are assessed as moderate. The project is designed to primarily address the most urgent needs under the broader Lilongwe Water Program – i.e. rehabilitation of the distribution network and control of water losses, as well as priority interventions to improve sanitation. Both the economic rationale and technical soundness of the proposed interventions have been established through feasibility studies, and LWB has experience in implementing similar investments. The Lilongwe Water Program includes investments in expanding water production capacity with parallel EIB financing for Kamuzu Dam 1 raising and private sector financing for a new water treatment plant. Care has been taken to ensure that these parallel investments in water production are complementary, but not necessarily linked to achieving the objectives of the project. Moreover, priority investments in network rehabilitation are needed urgently to address hydraulic bottlenecks and control water losses before more water is produced. With respect to sanitation, LCC has recently completed a city-wide sanitation survey with support from the World Bank. The findings of the survey have been used to identify priorities for sanitation improvements and to design the sanitation component of the project.

53. **Institutional Capacity for Implementation and Sustainability – Substantial:** Risks related to institutional capacity are assessed as substantial. LWB has limited experience in managing complex infrastructure projects involving multiple stakeholders. Both LWB and LCC have no prior experience of working together, and the policy uncertainty around institution roles poses a risk to the sustainability of project outcomes related to sanitation. These risks will be mitigated in the following ways: (i) LWB will strengthen its PIU in the critical areas of project M&E and safeguards through recruitment of individual consultants; (ii) LWB will fast-track the creation of a Directorate of Infrastructure Development to enhance strategic management and oversight of LWB's capital projects; (iii) a sanitation task force will be formed to strengthen coordination of sanitation investments in the city and to facilitate dialogue on unresolved sanitation policy implementation issues; and (iv) the project includes substantial technical assistance to support preparation and supervision of infrastructure investments planned under the project. These measures will be supplemented by increased implementation support from the World Bank team.

54. **Fiduciary Risks –Substantial:** LWB's financial management (FM) arrangements have been assessed as satisfactory for purposes of the project, and the risk is moderate (see Annex 2 for details). Residual risks will be mitigated in the following ways: (i) LWB will maintain dedicated FM staff for the project; (ii) LWB will submit unaudited interim financial reports which will be reviewed and validated by the World Bank FM team; (iii) the project's transactions will be internally audited at least twice a year; and (iv) the project's financial statements will

be externally audited by independent private auditors under terms of reference to be agreed with the World Bank. LCC's financial management arrangements on the other hand are assessed as moderately unsatisfactory and the FM risk is high. To mitigate this risk, financial management for the project shall be centralized at LWB except for incremental operating costs for LCC which will be funded through an exclusive account to be operated by LCC. LCC will prepare monthly liquidation reports to LWB to account for the funds.

55. Procurement management arrangements of LWB are assessed as satisfactory for purposes of the project. However, overall procurement risk rating is substantial (see Annex 2 for details). The risks will be mitigated in the following ways: (i) LWB will maintain dedicated procurement staff for the project; (ii) LWB will use the World Bank's Systematic Tracking of Exchanges in Procurement (STEP) system to monitor procurement progress and identify delays; (iii) LWB shall prepare Contract Management Plans for complex high value works and consultancy contracts; (iv) the project's high value contracts identified in the procurement plan shall be subject to World Bank's prior review; and (v) LWB shall establish, disclose and maintain a procurement complaint redress mechanism.

56. **Environmental and Social Risks – Substantial:** The project is exposed to environmental risks from existing surface water contamination due to a degraded Lilongwe river catchment, as well as risks due to natural disasters or short and long-term climate change impacting on water resources availability. These risks are well understood and have been considered in the design of the water supply infrastructure. Furthermore, although the project is expected to have positive social impacts (in terms of increasing access to improved water services and safely managed sanitation), it is expected that some of the project interventions may result in unintended negative social and environmental impacts. The risk and impacts however are assessed as moderate owing to the nature of the investments. Potential negative environmental and social impacts will largely be associated with civil works during the construction phase of the project. Some of the water distribution network rehabilitation/expansion works will be in densely populated areas of the city. The project is thus expected to disturb settlements, requiring land acquisition leading to temporary or permanent resettlement, and is likely to disrupt livelihood activities. However, no major resettlement is expected in the project. While the impacts of the physical works (water distribution systems and sanitation) are assessed as moderate, the project's reliance on the performance of existing dams (KD1 and KD2) for water availability makes the environmental risk substantial. Environmental and social risks will be mitigated through application of standard World Bank safeguard instruments. LWB staff are familiar with these instruments. However, additional safeguards expertise will be recruited to the PIU to strengthen capacity for monitoring safeguards implementation. All contracts will include the cost of implementing environmental and social management plans.

57. **The project is also exposed to exogenous climate risks**[21]**.** Malawi is rated as "highly exposed" to climate change. The country has experienced climate and geophysical hazards in the past and is expected to experience these in the future with high intensity, frequency, or duration. Climate and geophysical hazards that are relevant to the project include extreme temperature and droughts, along with extreme precipitation and floods. Extreme droughts will lead to a reduction in the amount of water available for abstraction, while extreme precipitation and floods causes high flow volume in the river, which may result in inundation of the intake and deterioration of water quality. This may result in water supply interruptions and an increase in production costs. In this project, Lilongwe's water distribution network will be rehabilitated to control physical water losses and increase water availability (albeit marginally). Further, the city's sewerage system will be rehabilitated and upgraded to make it more resilient to flooding. The project also involves various TA and institutional capacity strengthening activities designed to build resilience to climate shocks. These include: (i) preparation of water and sanitation master plans for the city, which

[21] The task team has used the World Bank's climate and disaster risk screening tool to screen the project for climate and disaster risks

would incorporate climate risks such as flood and drought; (ii) preparation and implementation of water safety plans to guide LWB in maintaining a safe supply of drinking water even under extreme climate events; and (iii) preparation of business continuity plans to ensure that essential operational, financial and managerial functions remain uninterrupted during disasters and emergency events. Although these interventions are expected to improve the resilience of Lilongwe's water supply, the overall risk to the project outcomes is assessed as moderate.

VI. APPRAISAL SUMMARY

A. Economic and Financial Analysis

58. **The project is expected to result in increased access to improved water services and safely managed sanitation services for Lilongwe city residents**. Approximately 500,000 people are expected to benefit from improved water services and safely managed sanitation services, resulting in significant health and economic benefits to the city. Furthermore, the project is expected to help reduce inequalities in service delivery between different segments of the population by increasing access to water services in the underserved areas of the city, and contribute to reducing water rationing in the medium-term. Higher level benefits include improved public health, time savings from water closer to the home, and improved business climate. In addition, LWB's revenues are expected to increase due to the reduction in NRW.

59. **Separate cost-benefit analyses have been undertaken for water supply and sanitation investments**. For water supply, the benefits include: (i) increase in revenue from reduction of NRW; and (ii) health benefits and time savings captured by consumers stated willingness to pay. The difference between the price consumers are willing to pay and the actual price they will pay is considered a lower bound estimate of economic benefits. The non-project counterfactual considers that the current water supply does not meet demand—and that the demand will continue to grow rapidly. In this case, the true counterfactual would be that many people would not get water at all—implying the true economic benefits of this project are much larger. Other non-quantified benefits include the avoided cost of coping with intermittent water supply and with the reduction of volumes supplied during rationing. The reduction of water supply interruptions and improved pressure management is also expected to reduce the burst frequency, lower maintenance costs and decrease the risk of contamination in the water supplied. Benefits from safely managed sanitation services include: (i) avoided direct health expenditure; (ii) income gained due to avoided days lost from work; (iii) days of school absenteeism avoided; (iv) income gained due to avoided days lost from work or because of child illness; and (v) convenience time savings.

60. **Results of the economic analysis show that the project is economically justified with a Net Present Value (NPV) of US$59.8 million and an Economic Rate of Return (ERR) of 12 percent.** The summary results are presented in Table 3 below. A detailed analysis is presented in Annex 5 and in the project files. Sensitivity analyses show that the project is robust, and that even large changes in key variables will not render the project unviable (see Annex 5 for details).

Table 3 – Results of Economic Analysis

	US$
NPV Increase in revenue	57,579,043
NPV Willingness to pay	58,208,924
NPV Sanitation benefits	38,427,779
NPV Net benefits	59,753,471
ERR	**12%**

61. **Similarly, results of the financial analysis show that the project is financially viable for LWB**. The analysis is based on a cost of service assessment, which estimates LWB's total costs of supplying water to end users from 2018 to 2035, assuming implementation of the project. For the project to be financially viable, the total costs to LWB of implementing the project must be supported by the total revenues received by LWB over the period of analysis. The cost of service analysis provides estimates of the levelized tariff[22] necessary to ensure that the project is financially viable. In the case that the levelized tariff is acceptable from a willingness to pay perspective, the project is financially viable, assuming LWB manages their cashflow correctly. The analysis is based on a comprehensive financial model of LWB's future operating and investing activities. Known medium-term investments (including existing EIB-funded investments and the proposed PPP for water production expansion) are included in the financial model, and it is assumed that IDA financing is passed on to LWB on the same terms as GoM borrowing. Financing for sanitation component is assumed to be on-granted to LWB, and therefore not included in the financial model. Details of the financial analysis are presented in Annex 5.

62. **Under a set of assumptions deemed plausible, the levelized cost[23] to LWB of running their current operations together with implementing the project is US$0.63 per m^3**. Therefore, if the levelized tariff is US$0.63 per m^3, with appropriately structured tariffs and adequate cash management, LWB will be financially solvent over the period of analysis (2018-2035). If the levelized tariff is below US$0.63 per m^3, LWB will not be financially solvent over the period of analysis, and if the levelized tariff is above US$0.63 per m^3, LWB will make profits over the period of analysis. The maximum annual tariff required is US$0.75 per m^3 in 2033. LWB's current average tariff in 2017 is US$1.06 per m^3 (the average tariff for residential customers is US$0.75 per m^3). Thus, the current tariff levels are sufficient to support payment for the project over the 20-year period.

63. **However, while the project is financially viable over the period of analysis, LWB will need to manage its cashflows carefully to avoid any debt service payment shortfalls after 2025.** Projected cashflows (based on the base case levelized tariff of US$0.63per m^3) shows that, in early years, LWB has a high debt service cover ratio, 6.79 in 2018 and 2.70 in 2020. However, by 2025 when principle repayments are due on both EIB and IDA loans, the debt service cover ratio is less than one and negative in the years that LWB makes losses (see Annex 5 for details). It is therefore important for LWB to adequately structure its finances to manage cash flows and avoid any debt service payment shortfalls in later years. Recommended measures include: (i) retaining/investing profits in the early years to cover debt service in later years; (ii) negotiating the IDA on-lending terms from MoFEPD to LWB to match repayment obligations with LWB's revenue profile; and (iii) gradually adjusting consumer tariffs over time to more accurately match the debt service profile. Given that this is the first time LWB is taking on a significant amount of debt to finance its investments, a financial advisor will be recruited to provide financial advice to LWB as part of the institutional strengthening component of the project.

B. Technical

64. **The rationale, scope and technical design of the project is based on conclusions from multiple studies and analytical work done over the past five years.** The list of studies that have informed project design is summarized in Annex 8. Although water demand assessments show that LWB needs to augment its production capacity in the medium to long term, given the limited hydraulic capacity of the existing distribution network, priority investments in the network must be undertaken before increasing production capacity. Technical

[22] Discounted average tariff over the period of analysis. Assumed discount rate is 12 percent.
[23] Discounted average of the cost of service per m3 in each year throughout the period of analysis. Assumed discount rate is 12 percent

soundness of the project's infrastructure investments has been established through pre-feasibility assessments, feasibility studies and/or preliminary designs. Cost estimates have been prepared and reviewed by the World Bank. The estimates are based on a comparison of market rates from similar projects recently implemented by LWB and include provisions for escalation and contingencies.

65. **Priority distribution network investments have been determined using a calibrated hydraulic model**. The model was used to analyze how the existing distribution network may be reconfigured, optimized and expanded to serve currently unserved areas and to control water losses. Priority interventions have been identified to address current hydraulic bottlenecks and to ensure that the existing water production and any future additions can be fully exploited while at the same time controlling pressure and leakage. Preliminary designs for these network investments have been completed, and works are expected to start within the first year of the project, and be completed before additional production capacity is put online. The benefits of the interventions (in terms of reduction in losses, increase in hours of service and pressure) have been simulated using the hydraulic model.

66. **Further, the World Bank team has assessed the extent to which LWB may be able to defer investments in a new water source by reducing water losses.** The economic target level of leakage[24] in LWB's distribution has been determined at 26 percent in 2021 (when TW3 becomes operational). Reduction in losses to this level, coupled with increased production (TW3) will be sufficient to meet projected demand[25] until 2025, after which additional investment in the network at a cost of US$38 million will be required to further reduce leakage to 20 percent, and extend the available production up to 2031. Total replacement of the network at an additional cost US$156 million would extend the supply period to 2033 making it uneconomic compared to developing another source (e.g. Diamphwe dam). This assessment implies that beyond 2030, it may not be economically feasible for LWB to save enough water from leakage reduction activities to postpone investments in a new water source[26].

67. **Priority sanitation interventions have been identified through a city-wide sanitation survey jointly undertaken by LCC and the World Bank team**. In the absence of a sanitation master plan for the city, the approach taken was to identify "no-regret" sewerage and on-site sanitation interventions, based on a combination of household surveys and technical assessments of the performance of existing sewerage system. Recommendations from previous studies (including the 2010 city development plan) were also taken into consideration. For onsite sanitation, the focus is on the approximately 29 percent of residents (mainly poor) who rely on unimproved sanitation facilities as revealed in the citywide survey. These will be targeted with a combination of sanitation marketing and partial support to vulnerable households for construction of improved sanitation facilities. Different onsite sanitation technologies (e.g. flush/pour flush toilets connected septic tank or pit latrine; composing toilet or improved pit latrine with slab) will be promoted building on LCC's experience with different technologies and user preferences. Priority sewerage investments on the other hand are focused on the rehabilitation/expansion of Kauma wastewater stabilization pond system and the trunk sewers draining to it. Priority sewerage expansion areas have been determined based on the capacity and reach of the existing trunk sewers. Pre-feasibility level cost estimates have been prepared and checked by the World Bank team. Feasibility studies and detailed design of the priority investments will be undertaken during the first of year of the project, and tendered out for implementation from the second year onwards.

[24] The level of losses below which it becomes more costly to reduce losses than to invest in new water production.
[25] Calculated at peak consumption. If average consumption is used, the interventions (leakage reduction +TW3) would be sufficient to meet demand until 2028
[26] However, investments in a new water source before 2030 can still be justified for water security reasons (i.e. the need to diversify sources and reduce dependence on one source)

C. Financial Management

68. **LWB's financial management arrangements have been assessed as satisfactory for purposes of the project.** This assessment is based on the following: (i) LWB has the experience of managing World Bank funded projects[27] and financial management arrangements were satisfactory; (ii) LWB has qualified and experienced financial management staff; (iii) experience in use of computerized systems for accounting transaction processing and reporting including for World Bank funded projects; (iv) good record of compliance with control and accountability requirements as demonstrated in the management letters relating to annual audits; and (v) LWB is up-to-date on audits of annual financial statements.

69. **LCC's financial management arrangements are assessed as moderately unsatisfactory**. The council is behind on preparation of audited financial statements. The latest audited financial statements are for FY2010. Bank reconciliations are not up-to-date. There has been instability in the tenure of senior financial management staff. Audit management letters for other World Bank-financed projects[28] have in the past shown serious control and accountability issues. Given these issues, the World Bank team recommended that both financial management and procurement for the project should be centralized at LWB. Both LCC and LWB have agreed with this recommendation. LCC will only be given funds for incremental operating costs that will need to be liquidated to LWB monthly. The liquidation report will be supported by appropriate documentation including Bank reconciliations. LCC will open an exclusive account for this purpose. Details of the financial management (FM) assessment and agreed actions are summarized in Annex 2.

70. **To further strengthen the financial management arrangements for the project, the following measures have been agreed**: (i) LWB's PIU will have a dedicated FM staff who will be responsible for project accounting and reporting, and will be trained in financial management and disbursement arrangements for World Bank funded projects; (ii) LWB will acquire and install an accounting software to be used for transaction processing and reporting or alternatively LWB accounting software should be reconfigured to create a complete sub ledger for the project that will ensure proper transaction processing and reporting; (iii) LWB will open exclusive Dollar and Kwacha accounts for the project at a commercial bank acceptable to the World Bank; (iv) the PIU will be required to submit unaudited interim financial reports which will be reviewed and validated by the World Bank; (v) the project will be visited at least twice a year for implementation support that will include dealing with FM issues; (vi) project transactions will be internally audited at least twice a year; (vii) the project's financial statements will be externally audited by private auditors under terms of reference to be agreed with the World Bank; and (viii) the activities to be financed under the credit will be agreed in advance on an annual basis. This will be in form of annual work plans and associated budgets.

D. Procurement

71. **The World Bank updated the procurement capacity assessment of LWB in July 2017**. The objectives of the assessment were to (i) determine whether existing arrangements meet minimum World Bank requirements, (ii) identify procurement risks to the project; and (iii) identify mitigation measures. Details of the assessment are provided in Annex 2. Procurement capacity assessment of LCC was not carried out, as it was decided early on, based on the financial management assessment, that all procurement and financial management will be centralized at LWB.

[27] LWB was one of the implementing entities for the Second National Water Development Project which closed in October 2015.
[28] Third Social Action Fund (MASAF III) (P075911)

72. **Procurements arrangements at LWB are assessed as satisfactory for the purposes of the project**. LWB staff are generally familiar with World Bank procurement guidelines and procedures as they have implemented a similar IDA financed project in the recent past. In terms of governance, LWB has an Internal Procurement Committee (IPC) which is responsible for award of contracts. The current set up of the IPC is composed of the Director of Technical Services (designated Chairperson), Director of Finance, and Director of Administration and Human Resources. Co-opted members include: Project Engineer, Management Accountant, and Transport Manager. The Procurement Unit is the secretariat to the Committee. Furthermore, LWB has a PIU which is responsible for all capital projects, and is staffed with a Project Manager; six (6) Project Engineers; a Procurement Officer and a Project Accountant. LWB has also recently recruited a Procurement Manager to provide strategic oversight and regular monitoring of all procurement activities.

73. **Nonetheless, with the expected increase in the volume of procurement activities, LWB has agreed to further enhance procurement capacity**. Key actions agreed include: (i) LWB will use the World Bank's Systematic Tracking of Exchanges in Procurement (STEP)– a planning and tracking system which provides data on procurement activities, monitors delays and measures procurement performance; (ii) LWB will procure consultancy services to provide support in supervision and contract management of major works contracts; and (iii) ensure that all major works and TA activities have a contract management plan to guide periodic measurement and reporting on contract performance, with respect to cost, schedule and quality.

74. **Procurement will be carried out in accordance with the requirements in the Procurement Regulations for Borrowers under IPF**: Goods, Works, Non-Consulting Services and Consulting Services dated July 1, 2016; Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants (revised July 1,2016); and provisions stipulated in the Financing Agreement.

75. **A Project Procurement Strategy for Development (PPSD) has been prepared and reviewed by the World Bank**. The PPSD sets out market approaches and selection methods to be followed during project implementation, as well as procurement risks and mitigation measures. Key procurement risks covered in the strategy include: (i) inefficiencies and delays in procurement processes, especially in preparation of ToRs and bid specifications; (ii) poor contract management leading to cost escalation, claims and implementation delays; (iii) fraud and corruption risks, including collusion and outside interference in contracting process; and (iv) weak complaint redressal system. The main elements of the PPSD are summarized in Annex 2, while details are in project files.

76. **In addition, a procurement plan covering the first 18 months of the project has been prepared and reviewed by the World Bank.** The plan sets out the selection methods to be followed by the borrower during project implementation in the procurement of goods, works, non-consulting services, and consulting services. Advance procurement actions are already underway for critical consultancy services linked to major works packages. The procurement plan will be updated at least every 12 months, or as required, to reflect the actual project implementation needs, but each update shall require World Bank no-objection.

E. Social (including Safeguards)

77. **The project will be implemented in several residential and industrial areas in Lilongwe city, including peri-urban settlements where water and sanitation services are particularly poor**. The project covers all the three zones of LWB's distribution network, namely southern, central and northern zones. Maps of project locations are provided in Annexes 9 and 10. The project areas consist of a mixture of urban and peri-urban settings. The peri-urban area is made up of largely unplanned/informal settlements. Approximately 76 percent of the city's population live in high density informal settlements. Water supply is through a combination of yard connections, water kiosks, hand

pumps, and unprotected wells. Sanitation facilities are mostly pit latrines (76 percent) and septic tank systems (25 percent). Some of these households have no latrine at all and depend on shared latrines (38 percent). A small percentage (1 percent) practice open defecation in the outskirts of the city. Poor hygiene practices are among the key public health issues. In a recent survey[29], only half of the toilets were clean and about one third of the people had access to water and soap in the toilet. Peri-urban areas are prone to diarrheal diseases and malnutrition linked to poor hygiene and sanitation.

78. **The project will largely generate positive social impacts.** The major positive social impact of the project is that approximately 500,000 people in Lilongwe city will gain access to improved water services and safely managed sanitation, resulting in significant health and economic benefits for the city. Further, the project is expected to help reduce inequalities in service delivery between different segments of the population by increasing access to water services in the underserved areas of the city, and contribute to reducing water rationing in the medium-term. In accordance with the National Sanitation Policy, vulnerable households[30] will be supported with a partial subsidy to construct improved sanitation facilities. LCC's existing targeting mechanisms for social safety net programs will be used to identify vulnerable households to be supported.

79. **However, it is expected that some of the project interventions may result in unintended negative social impacts**. The impacts however are assessed as moderate owing to the nature of the investments. Potential negative social impacts will largely be associated with civil works during the construction phase of the project. Some of the water distribution network rehabilitation/expansion works and sewer pipeline installation will be in densely populated areas of the city. Although the pipelines will be laid in road reserves to minimize land acquisition and disturbances, there are signs of encroachment on the road reserves in many areas across the city. The project is thus expected to disturb settlements, requiring temporary land acquisition, and is likely to disrupt livelihood activities. However, no major resettlement is expected in the project. The disturbances will result in loss of property; damage to road pavements; damage to concrete driveway; damage to building structures; obstruction to passage on the roads; disruption of public service utilities; and temporary disruption to business activities and loss of income. For priority water distribution network investments, it is estimated that approximately 363 households/businesses will be impacted. For sanitation activities and other water distribution network investments not yet identified, the exact impact is unknown at this stage, but is likely to be of similar magnitude.

80. **Negative social impacts will be mitigated through application of World Bank social safeguard instruments.** The project triggers the World Bank safeguard policy on involuntary resettlement (OP 4.12). For the priority water distribution network investments planned for implementation in the first year of the project, LWB has conducted extensive consultations and socioeconomic studies of the areas affected by these investments, and prepared a Resettlement Action Plan (RAP) in accordance with the World Bank's Operational Policy on involuntary resettlement and the requirements of Malawi regulations. The RAP was publicly disclosed in-country and on the World Bank's website on October 3, 2017. Public consultations on the RAP have been held and appropriate grievance-handling procedures and arrangements for monitoring RAP implementation are in place. For sanitation and other water network investments not yet identified and whose locations are unknown at this stage, LWB has prepared a Resettlement Policy Framework (RPF) in accordance with the World Bank's Operational Policy on involuntary resettlement and the requirements of Malawi regulations. The RPF was publicly disclosed in-country

[29] World Bank (2017). *Lilongwe Citywide Sanitation Survey*. Interim Report (under preparation).

[30] GoM defines vulnerable households as follows: Ultra-poor households with expenditure/consumption below MK 22,956 (US$31) per person/year; poor households (with expenditure/consumption below MK 37,002 (US$51) per person/year) with high dependency ratio i.e. one fit or able bodied person with more than three dependents particularly those who are elderly above 65 years; other members between 0-18 years; with one or more physical challenges that impede that person from doing productive works, HIV/AIDS, chronic illness

and on the World Bank's website on October 25, 2017. The subsequent subprojects will be screened as per the provisions of the project RPF and the appropriate safeguards tools will be formulated and implemented.

81. **LWB staff are familiar with both the national requirements and World Bank requirements for social safeguards**. LWB was one of the implementing agencies under the World Bank-financed Second National Water and Development Project (NWDP-II, P096336) which closed in October 2015. In addition, LWB is currently implementing the RAP for KD1 dam raising – one of the sub-projects under EIB-funded Lilongwe Water Resources Efficiency Program (LWREP). Although LWB has some experience in implementation of safeguards instruments, the capacity to manage social risk at the scale of this project is still weak. Thus, the project will support the recruitment of a social development/safeguards specialist into the PIU in LWB to implement and monitor the mitigation measures described in the various safeguards instruments. In addition, the project will support additional specific capacity building measures to ensure effective social risk management.

F. Environment (including Safeguards)

82. **The project is expected to have positive environmental impacts**. The major positive environmental impact is expected to come from investments in sanitation. Currently, existing sewers and sewage treatment plants are dilapidated due to lack of maintenance, resulting in environmental pollution, as most of the sewage ends up in the environment without treatment. About one third of Lilongwe residents rely on unimproved onsite sanitation systems with unsafe in situ disposal of human excreta which is known to increase the risk of groundwater contamination. This positive impact will be achieved by adopting sustainable pit latrine designs that improve access to sanitation, facilitate hygienic Fecal Sludge Management (FSM), and limit ground water pollution by ensuring separation of fecal waste and urine from grey water. The project is expected to result in reduced public health risks and environmental pollution due to poor sanitation. Further, to maximize environmental benefits from improved sanitation infrastructure, the project will also help strengthen LCC's capacity to provide and promote safely managed sanitation services, including strengthening enforcement of sanitation bylaws. Finally, project investments in rehabilitation of the water distribution network will reduce water losses and improve energy efficiency.

83. **The project is classified as Category B because although there will be negative impacts, they will be small scale and temporary in nature and scope (mostly during construction), and can be easily and cost-effectively mitigated**. There will not be any significant, large-scale irreversible impacts. Most of the direct impacts will be site-specific and will not affect an area broader than the sites or facilities of the physical works. Component 1 activities include upgrading, rehabilitation, expansion of the water distribution network in different residential areas of the city. Priority network rehabilitation works have been identified by LWB. These include laying of approximately 170 km of new pipelines with diameters ranging between 50-800 mm. Potential negative impacts from these sub-projects are site-specific, small scale and temporary (occurring mainly during the construction phase). Impacts may include soil erosion; generation of construction related solid waste; reduced vegetation cover due to clearing of land to pave way for construction activities; impacts on natural habitats such as rivers and wetlands during construction; increased localized noise and dust emissions due to earth moving equipment and machinery, and oil spillage from construction equipment and machinery.

84. Component 2 activities involving upgrade and expansion of the sewer network will have the same short-term construction stage impacts as the water distribution network investments. However, in the medium to long term, upgrading the sewer network will increase the load of effluent discharges into the receiving waters (Lilongwe river). The rehabilitation and expansion of the sewer network may result in increased inflow to the city's main sewage treatment plant (Kauma sewage treatment plant), thereby increasing the pollution load to Lilongwe river.

This negative impact will be mitigated by rehabilitating and upgrading the Kauma sewage treatment plant (which is included in the scope of component 2); as well as enforcement of effluent discharge standards from industries to the sewer line.

85. **Environmental risks will be mitigated through application of standard World Bank environmental safeguard instruments**. The project triggers World Bank safeguard policies on Environmental Assessment (OP/BP 4.01), Natural Habitats (OP/BP 4.04) and Physical Cultural Resources (OP/BP 4.11). With respect to component 1, priority water distribution network investments are known and have been screened for environmental risks and impacts. The scope of activities is limited to rehabilitation and upgrading of existing network infrastructure (pipelines, storage tanks and pumping stations). Environmental impacts associated with these investments are limited and will be managed using an Environmental and Social Management Plan (ESMP). LWB has prepared an ESMP that is acceptable to the World Bank. The ESMP also includes an assessment of potentially affected natural habitats, as well as mitigation measures to minimize impacts. The ESMP was consulted upon and publicly disclosed in-country and on the World Bank's website on October 3, 2017, thereby complying with the requirements of O.P 4.01.

86. For sanitation investments and other water distribution network investments not yet identified or designed and whose exact location is unknown at this stage, LWB has prepared an Environmental and Social Management Framework (ESMF) that is acceptable to the World Bank. The ESMF will ensure that the process of identifying, assessing, and mitigating environmental impacts is integrated in the development of the specific subprojects. Subsequent subprojects will be screened as per the provisions of the ESMF and the appropriate safeguards tools will be formulated and implemented. The ESMF also covers technical assistance activities related to preparation of a water and sanitation master plans, as well as feasibility studies for future water supply and sanitation investments under the program. Consultations on the ESMF have been held and appropriate grievance-handling procedures and arrangements for monitoring implementation are in place. The ESMF was publicly disclosed in-country and on the World Bank's website on October 29, 2017.

87. **The project design has also considered exogenous climate and disaster risks**. Malawi has experienced climate and geophysical hazards in the past and is expected to experience these in the future with high intensity, frequency, or duration. Climate risks that are relevant to the project include extreme temperature and droughts, extreme precipitation and urban floods. Extreme droughts will lead to a reduction in the amount of water available for abstraction from Lilongwe River, while extreme precipitation and floods causes high flow volume in the river, which may result in inundation of the intake, deterioration of water quality, damage to wastewater treatment plants, and increase in water borne disease outbreaks. Climate change adaptation and mitigation measures have been incorporated in the project design to moderate the impact and to ensure continuation of water and sanitation services in case of drought events and flooding. The project has considered water scarcity/drought and floods in the planning and design of all critical water and sanitation infrastructure. Project interventions on the water distribution network are expected to reduce water losses, improve energy efficiency and reduce operational costs. The project will use flood-resilient materials/design for pipelines and other water supply and sanitation infrastructure. Water and sanitation master plans to be prepared under the project will also incorporate climate risks. The project also involves support to preparation of water safety plans and business continuity plans, as well as institutional capacity strengthening in the areas of corporate governance; leadership; staff productivity; operational processes and systems – all of which are critical for building LWB's resilience to climate risks.

88. **Greenhouse gas (GHG) accounting analysis found the project to be slightly emissive**. The net emissions of the project are estimated at **3,170 tCO_2-eq** over the 20-year life of the project, while the gross emissions are estimated to be **199,131 tCO_2-eq**. On average, the project generates estimated net emissions of **159 tCO_2-eq** annually. The water supply activities are estimated to experience net emissions reductions of -3,173 tCO_2-eq due

to energy efficiency gains, while the wastewater activities are slightly emissive on a net basis of 6,343 tCO_2-eq. The sanitation activities are on net emissive largely due to the use of anaerobic wastewater treatment processes without capturing the methane. The project will explore measures to address this issue as part of the feasibility study and design of upgrades to the wastewater treatment plant.

G. Other Safeguard Policies (if applicable)

89. **The project triggers the World Bank policy relating to Projects on International Waterways (OP7.50).** This is because the project lies within the Lilongwe River watershed, a tributary of the Linthipe River that flows to into Lake Malawi. Lake Malawi drains into the Shire River which flows south to the Zambezi River. Both Lake Malawi and Zambezi River are categorized as international waterways for purposes of the policy. Planned sanitation investments under the project are expected to improve the quality of effluent and reduce the overall pollution load to Lilongwe River. Thus, the project will not adversely affect the quality of water flows to the other riparians, and will not be adversely affected by the other riparians' water use. LWB has sought exemption for the requirement for notification of riparian states. The exemption has been approved by the Africa Vice Presidency of the World Bank.

90. **The project also triggers the World Bank policy on Safety of Dams (OP4.37) given that the project relies on the performance of existing dams (KD1 and KD2)[31].** LWB engaged dam specialists in 2013 and 2015 to inspect and evaluate the safety status of KD1 and its performance history. The assessment recommended several remedial works to upgrade the dam, including structural repair works on the spillway concrete and outlet. The remedial works constitute part of the scope of the EIB-funded subproject for rehabilitation and raising of KD1. The works are currently at procurement stage and are expected to be completed by in 2019. The World Bank team has reviewed all documentation relating to the assessment and remedial measures and found it satisfactory, for purposes of the policy. LWB will maintain a Panel of Experts for continuous technical oversight and guidance during construction. Further, the World Bank team will continue its due diligence during implementation of the KD1 dam sub-project and work with LWB and EIB to address any issues identified with respect to compliance with the requirements of OP4.37. With respect to KD2, the safety assessments conducted in 2015 concluded that KD2 dam and its appurtenant structures were performing reasonably well, except for the damaged instrumentation. The assessment recommended several non-structural safety measures which will be financed under this project. The project will also finance preparation of dam safety management plans (including instrumentation plan, O&M plan and emergency preparedness plan) for both KD1 and KD2.

H. Citizen Engagement and Gender

91. **The project will promote meaningful two-way interaction between residents of Lilongwe (the primary beneficiaries of the project) and the project implementing entities (LWB and LCC).** The focus will be on cost-effective engagement mechanisms targeting a wide range of stakeholders, and which can be sustained beyond the project life. Civil society and consumers in Malawi are increasingly demanding for information and transparency from service providers. The project will therefore aim to pro-actively share information, create awareness, elicit feedback from key stakeholders before, during and after the project period.

92. **A stakeholder analysis has been conducted to identify stakeholders affected by the project or whose participation can positively or negatively affect outcomes**. Key stakeholder groups identified include: Consumers or residents of Lilongwe city (the primary beneficiaries of the project); Media; Government Ministries and Agencies;

[31] The dams provide storage which is utilized during the dry season when the river flow is low

Members of Parliament; Local Government Leaders; Civic society organizations/NGOs; and Development Partners. Representation in the project areas is via elected and appointed leadership. Local leadership is through elected ward councilors and Members of Parliament. Local NGOs and Community-Based Organizations (CBOs) that are active on various social activities. NGO activities include outreach to communities to promote sanitation and hygienic practices and support to local sanitation entrepreneurs. As part of project preparation, local NGOs working on water and sanitation in peri-urban areas were identified and consulted. Details of stakeholder analysis and actions are summarized in Annex 4.

93. **A communication strategy has been developed. In Malawi, water access is a social, economic and political issue.** Recently, water investments for the city of Lilongwe have been shrouded with a lot of controversy with wide differences among stakeholder groups on certain investments[32.] Further, a recent highly-publicized case of water contamination by a leaking sewer in the suburb of Area 18 has brought both LWB and LCC under sharp public scrutiny. Consumers, activists, and politicians are all making their voices heard on water in the city. Cumulatively, these issues have heightened the need for properly managed communications on Lilongwe city water supply and sanitation. For this reason, LWB and LCC have developed a joint communications strategy, with the support of the World Bank (see Annex 4 for details). The strategic objectives are: (i) to inform various stakeholders about the project - its activities and outcomes towards improving water and sanitation in Lilongwe city; (ii) to influence sanitation behaviors and create demand for various sanitation products and services envisaged under the project; (iii) to empower key constituencies/stakeholders with relevant information so they execute their roles and responsibilities in helping sustain results of the project; and (iv) to facilitate information sharing within project teams and create synergies with other projects in the Lilongwe Water Program. Implementation of the communication strategy will be supported under the project, including support to strengthening LWB's capacity to influence its operating environment positively and strategically, through communication.

94. **Mechanisms for beneficiary feedback are in place, but will need strengthening.** Grievance-handling procedures are in place for managing grievances related to implementation of safeguards instruments. These mechanisms are documented in the various safeguards documents. LWB recently started undertaking customer satisfaction surveys, albeit on an annual basis, while LCC does not collect any information on citizen satisfaction with its services. As part of the institutional strengthening component, the project will support LWB to develop, test and institutionalize an efficient and cost-effective methodology for regular customer satisfaction measurement to ascertain the importance customers attach to various service attributes, as well as customers' perception of LWB's performance on those attributes. The same support will be provided to LCC with respect to sanitation services (particularly sewerage). Citizen engagement indicators included in the project result framework are: (i) customer satisfaction index for water services – which measures customers' perception that the water services provided LWB have met or exceeded their expectations; and (ii) proportion of sewer blockage complaints resolved within 15 days of being recorded in the database – which measures responsiveness to customer complaints related to sewer blockages[33].

95. **Finally, the project will aim to close specific gender gaps identified to ensure women will fully benefit from the project**. In addition to tracking project beneficiaries using gender-disaggregated data, the project will also focus on two distinct gender gaps: (i) women and youths disproportionately lack access to jobs and employment

[32] For instance, the proposed project to pump water from Lake Malawi to Lilongwe has created a lot of controversy, partly because of the speed at which it is being pursued with no regard to due process and the fact it was not part of the original scope of the Lilongwe Water Program that was jointly formulated by LWB and MAIWD

[33] Sewer blockages can cause an environmental and public health hazard if left unattended for long periods of time.

opportunities in the water and sanitation sector; and (ii) there are gaps in women's participation and representation in water and sanitation decision making at the utility level. The project will address these gaps in two ways. First, project contractors will be encouraged to engage women and youths in project design and during the construction phase, and provide them with training opportunities. Second, the project through Component 4, will support the utility to provide career training and increase the capacity of women in the utility. Their participation and representation in water and decision making will be promoted through training opportunities and through increased representation in decision making roles (both technical and non-technical supervisory or managerial roles). Two intermediate results indicators have been included in the project results framework to monitor the success of these actions. These are: number of female staff trained and percentage of female staff in decision-making roles.

I. World Bank Grievance Redress

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

VII. RESULTS FRAMEWORK AND MONITORING

Results Framework
COUNTRY : Malawi
Lilongwe Water and Sanitation Project

Project Development Objectives

To increase access to improved water services and safely managed sanitation services in Lilongwe City

Project Development Objective Indicators

Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source/Methodology	Responsibility for Data Collection
Name: Number of people receiving improved water services as a result of the project		Number	0.00	250000.00	Bi-annually	Project progress reports and LWB M&E system	Lilongwe Water Board
Of which 50% are women		Number	0.00	125000.00	Bi-annually	Project progress reports LWB M&E system	Lilongwe Water Board
Of which 40% are from the poorest two quintiles of the population		Number	0.00	100000.00	By-annually	M&E system	Lilongwe Water Board

Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source/Methodology	Responsibility for Data Collection
						Project progress reports	
Description: People who will be provided with a minimum of 18-hour water supply meeting GoM water quality standards, and supplied at an average pressure of 12m at predetermined points in the distribution network for no less than 300 days in a year, unless the service area is declared a disaster affected area.							
Name: Number of people gaining access to safely managed sanitation services as a result of the project		Number	0.00	250000.00	Bi-annually	Project progress report	Lilongwe City Council
Of which 50% are women		Number	0.00	125000.00	Bi-annually	Project progress reports	Lilongwe City Council
Of which 40% are from the poorest two quintiles of the population		Number	0.00	100000.00	By-annually	Project progress reports	Lilongwe City Council
Description: People gaining access to an improved sanitation facility (including hand washing facility with soap and water), which is not shared with other households, and where excreta is safely disposed in situ and/or transported and treated off-site.							

Intermediate Results Indicators

Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source/Methodology	Responsibility for Data Collection
Name: Length of water supply pipeline laid under the project		Kilometers	0.00	169.00	Bi-annually	Project progress reports LWB M&E system	Lilongwe Water Board
Description: This indicator measures the total length of water supply pipes installed under the project that are operational. These include the network and transmission main upgrading pipes and the network extensions.							
Name: Household water connections receiving improved water services under the project		Number	0.00	27594.00	Bi-annually	LWB M&E system	Lilongwe Water Board
Description: This indicator measures the total number of water connections in Lilongwe receiving 18-hour water supply meeting GoM water quality standards, and supplied at an average pressure of 12m at predetermined points in the distribution network for no less than 300 days in a year, unless the service area is declared a disaster affected area.							
Name: Length of sewer pipeline laid under the project		Kilometers	0.00	107.00	Bi-annually	Project progress reports	Lilongwe City Council
Description: This indicator measures the total length of the sewage pipes installed under the project, including upgrade of the existing network and extensions.							

Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source/Methodology	Responsibility for Data Collection
Name: Household sewerage connections benefiting from safely managed sanitation services		Number	0.00	15000.00	Bi-annually	Project progress reports	Lilongwe City Council
Of which new sewerage connections		Number	0.00	5000.00			
Description: This indicator measures the total number of sewerage connections which the sewage is safely transported and treated.							
Name: Improved household sanitation facilities under the project		Number	0.00	32000.00	Bi-annually	Progress project reports	Lilongwe City Council
Description: This indicator measures the number of household sanitation facilities constructed under the project through direct financing or as a result of the project sanitation marketing interventions, which are not shared with other households, and where excreta is safely disposed in situ and/or transported and treated off-site.							
Name: Volume of sewage treated (in thousands)		Cubic meters/year	0.00	3175.00	Bi-annually	Project progress reports LCC M&E system	Lilongwe City Council
Description: This indicator measures the total volume of the sewage being treated at kauma treatment plant that meet the GoM standards for effluent discharge in thousands.							
Name: BOD5 removed by		Metric	3741.00	4176.00	Bi-annually	LCC M&E system	Lilongwe City

Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source/Methodology	Responsibility for Data Collection
the treatment plant as a result of project interventions		tons/year				Project progress reports	Council
Description: This indicator measures the amount of BOD removed from the sewage at Kauma treatment plant.							
Name: Number of Master Plans prepared		Number	0.00	2.00	Annually	Project progress reports	Lilongwe Water Board Lilongwe City Council
Description: This indicator measures the number of city-wide water supply and sanitation master plans developed under the project.							
Name: ISO 9001 certification for Lilongwe Water Board		Yes/No	N	Y	Bi-annually	Project progress reports	Lilongwe Water Board
Description:							
Name: Customer satisfaction index for water supply services		Percentage	50.00	80.00	Annually	LWB M&E system	Lilongwe Water Board

Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source/Methodology	Responsibility for Data Collection
Description: This indicator measures the percentage of surveyed customer/citizen that are satisfied with the water services.							
Name: Percentage of sewer blockages complaints resolved within 15 days of being recorded in the database		Percentage	0.00	80.00	Bi-annually	LCC M&E system Project progress reports	Lilongwe City Council
Description: This indicator measures the percentage of sewer blockages resolved within 15 days of being recorded in the database							
Name: Non-Revenue Water		Percentage	36.00	26.00	Bi-annually	LWB M&E system Project progress reports	Lilongwe Water Board
Description: This indicator refers to the percentage of the total water production that is not billed.							
Name: Number of staff trained under the project		Number	0.00	50.00			
Female staff trained		Number	0.00	25.00			
Description:							

Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source/Methodology	Responsibility for Data Collection
Name: Percentage of LWB and LCC female staff in decision-making roles (supervisory or managerial)		Percentage	10.00	30.00			
Description:							

Target Values

Project Development Objective Indicators

Indicator Name	End Target
Number of people receiving improved water services as a result of the project	250000.00
Of which 50% are women	125000.00
Of which 40% are from the poorest two quintiles of the population	100000.00
Number of people gaining access to safely managed sanitation services as a result of the project	250000.00
Of which 50% are women	125000.00
Of which 40% are from the poorest two quintiles of the population	100000.00

Intermediate Results Indicators

Indicator Name	Baseline	End Target
Length of water supply pipeline laid under the project	0.00	169.00
Household water connections receiving improved water services under the project	0.00	27594.00
Length of sewer pipeline laid under the project	0.00	107.00
Household sewerage connections benefiting from safely managed sanitation services	0.00	15000.00

Indicator Name	Baseline	End Target
Of which new sewerage connections	0.00	5000.00
Improved household sanitation facilities under the project	0.00	32000.00
Volume of sewage treated (in thousands)	0.00	3175.00
BOD5 removed by the treatment plant as a result of project interventions	3741.00	4176.00
Number of Master Plans prepared	0.00	2.00
ISO 9001 certification for Lilongwe Water Board	N	Y
Customer satisfaction index for water supply services	50.00	80.00
Percentage of sewer blockages complaints resolved within 15 days of being recorded in the database	0.00	80.00
Non-Revenue Water	36.00	26.00
Number of staff trained under the project	0.00	50.00
Female staff trained	0.00	25.00
Percentage of LWB and LCC female staff in decision-making roles (supervisory or managerial)	10.00	30.00

ANNEX 1: DETAILED PROJECT DESCRIPTION

COUNTRY: Malawi
Lilongwe Water and Sanitation Project

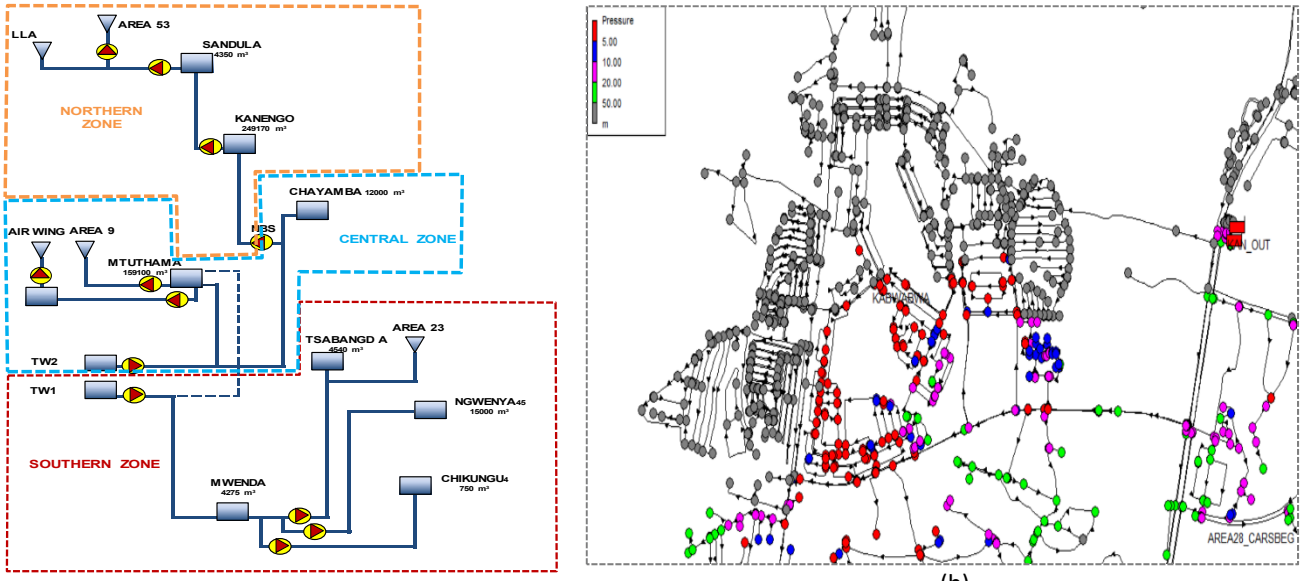
Project Development Objectives

1. The project development objective (PDO) is to increase access to improved water services and safely managed sanitation services in Lilongwe City. The project scope consists of four components as described in the following paragraphs.

Component 1 - Network Rehabilitation, Expansion and NRW Reduction (US$66 million, of which US$65 million equivalent IDA Credit)

2. This component will finance rehabilitation and upgrading of approximately 142 km of existing distribution pipelines; creation of pressure zone boundaries; construction of approximately 27 km of transmission mains; and construction of eight associated pumping stations and four storage reservoirs with a combined storage of 2,600 m^3. These investments constitute the priority network rehabilitation and upgrade required to stabilize and optimize the network before increasing water production capacity. The cost of these priority investments is estimated at US$35.5 million, based on a preliminary design. The component will also finance a performance-based NRW reduction program to reduce both real water losses (physical leakages) and apparent water losses (commercial losses), with a greater priority on reduction of real water losses by improving system maintenance, active leakage control, speed and quality of leak repairs and pressure management. The cost of the program is estimated at US$5 million. The component will also finance approximately 186 km of distribution network expansion to areas of the city that are currently not served by piped water. However, network expansion will only be undertaken if water production is increased either through improvements in the efficiency of existing treatment plants, savings from physical water loss reduction activities, construction of a new treatment plant or a combination of these three. Reduction of physical water losses will help reduce pressure on existing water sources while maintaining a quality level of services. NRW reduction activities are also expected to lead to energy efficiency gains, resulting in net emissions of -3,173 tCO_2-eq over the economic life of Component 1 (see Annex 2 for details).

3. **LWB's existing water distribution network**. LWB currently provides water services to about 70 percent of the city's population. The length of the water distribution network is estimated at 1,758 km, serving a total of 67,518 connections. The network is shown schematically in Figure 1.1 (a). Management of the network is divided into three zones – northern, central and southern. The network has a total of 19 service reservoirs – some with up to 25,000 m^3 of storage – which act both as staging posts for subsequent pumping and to supply the adjacent distribution network. There is a significantly larger quantity of storage in the northern and central zones than in the southern zone. The network is generally characterised by low operating pressures and frequent interruption of supply due to a combination of minimum elevation difference between the reservoir and the customers, insufficient hydraulic capacity of some key pipes and leakage. In some cases, high pressures are experienced leading to excessive leakage in some parts of the network, yet insufficient pressures and even intermittent supply are experienced at the periphery of the very same system. Figure 1(b) illustrates some of the network deficiencies where the red colour shows pressure below five meters whilst the dark grey has pressures more than 50 m. This indicates lack of capacity or inappropriate configuration of the distribution network.



(a) (b)

Figure 1.1 (a): schematic of the Lilongwe water distribution network; (b) pressure distribution along a section of the water supply network - high pressure (grey); low pressure (red)

4. The supply problems are due not just to an inadequate production, but also to an elevated level of leakage and insufficient hydraulic capacity to distribute the available resource. To intervene just to eliminate one is likely to lead to the worsening of the other components. For example, eliminating the bottlenecks will increase the pressure and consequently the losses whilst incrementing the production without controlling the losses will yield only a marginal improvement in the quality of service. A hydraulic study[34] carried out by LWB with support from the World Bank, recommended a two-stage approach to stabilize the network and improve efficiency in water supply. The first phase would focus on priority network interventions to improve the hydraulic performance of the system, control pressures and leakages. A second phase would encompass a NRW reduction program through a performance based contract with a competent and experienced firm.

Phase 1 – Stabilise and Optimise the Existing Network (Estimated cost US$36 million)

5. **Upgrade of distribution and transmission network**. The main objective of these interventions is to eliminate the hydraulic bottlenecks to ensure that the total production capacity reaches the service reservoirs and achieve a more even distribution of the pressure throughout the network. The entire network shall be reconfigured to ensure smooth operation of the whole LWB distribution system. The upgrading works shall involve (i) replacement of 142 km of the existing distribution pipelines with larger diameter pipelines; (ii) construction of four new reservoirs, each with a capacity of 650 m^3, at Chikungu, Mwenda, Area 25, and Chitedze; (iii) construction of 27 km of new transmission mains; and (iv) construction of eight pumping stations of varying capacities. With these investments, it is expected that intermittent water supply currently being experienced in the peripherals of Lilongwe City mainly in the southern zone, the western part of the city and Area 25 – one of the largest settlements in the city – shall be reduced. All interventions were designed for the 2035 demand requirements and considered

[34] Rogers, D. (2016). *Hydraulic Analysis of Lilongwe City's Water Distribution of Network and Identification of Priority Investments*. Report to Lilongwe Water Board, May 2016.

potential future expansion areas. Details of investments and cost estimates are summarized in Table 1.1 and Table 1.2 below[35]. A location map of the investments is provided in Annex 9.

Table 1.1– Priority Distribution Network Rehabilitation

Zone	Pressure Area	New Pipes	
		Length (km)	Estimated cost (US$ million)
Southern	Mwenda	11.80	1.55
	Ngwenya	5.16	0.60
	Chikungu	3.01	0.34
	Tsabango	9.61	1.17
	Tsabango tower	1.70	0.17
Central	Chayamba	7.75	0.88
	Mtunthama	14.15	2.12
	Area 9 tower	8.60	1.59
	Air wing low	14.03	2.59
	Airwing high	28.12	5.08
Northern	Kanengo	32.84	4.66
	Kanengo HL (ex Sandula)	5.77	1.28
Total		**142.56**	**22.03**

Table 1.2– Priority Transmission Network Investments

			Estimated cost (US$ million)
	Priority transmission mains	**Length (km)**	
1	Air wing to Chitedze DN 600	7.7	1.88
2	Mwenda to New Reservoir DN 300	6.5	0.79
3	TW2 to Mtunthama DN700	2.6	1.01
4	TW2 to TW1 DN700	0.2	0.09
5	Elimination of offtakes		0.23
6	Reservoir inlet and outlets		0.50
	Sub-total		**4.5**
	Reservoirs		
7	Chikungu Tower	1no.	0.68
8	Mwenda Tower,	1no.	0.92
9	Area 25 New Reservoir,	1no.	0.89
10	Chitedze Tower (new site),	1no.	0.31
	Sub-total		**2.8**
	Pumping stations		
11	TW1 to Mwenda	1no.	1.2
12	Tsabango low level to Tower	1no.	0.65
13	Mwenda to Tsabango	1no.	0.19
14	Treatment works to Mtuthama	1no.	1.28
15	Airwing to Chitedze	1no.	0.43
16	Kanengo to New reservoir	1no.	0.25
	Sub-total		**4.00**
	Grand Total		**11.23**

[35] These cost tables exclude resettlement compensation costs and contingencies. The full breakdown of the cost of component 1 (including resettlement costs and contingencies) is provided in Table 1.7.

6. **Permanent pressure and leakage control system**. Under the project, a permanent pressure and leakage control system will be installed. It will be composed of 25 pressure zones supplied by a single pipe, with a flow meter installed, and where possible a pressure reducing valve (PRV), to ensure that the leakage level is kept under control. In this way, the presence of a new burst can be immediately identified and more easily located and any recovery can be maintained over time. This will then be the starting point for a concentrated leakage reduction activity in the second phase. Table 1.3 shows details of pressure zones to be established and estimated costs.

Table 1.3 –Pressure Zones

Zone	Pressure Area	PRV meters	
		Number	Estimated cost (US$ million)
Southern	Mwenda	3	0.15
	Ngwenya	1	0.05
	Chikungu	1	0.05
	Tsabango	6	0.3
	Tsabango tower	1	0.05
Central	Chayamba	1	0.05
	Mtunthama	1	0.05
	Area 9 tower	2	0.1
	Air wing low	2	0.1
	Airwing high	2	0.1
Northern	Kanengo	2	0.1
	Kanengo HL (ex Sandula)	3	0.15
TOTAL		**25**	**1.25**

Phase 2 – NRW Reduction and Network Expansion (estimated cost US$30 million)

7. **NRW reduction program**. Once the network has been stabilized in Phase 1 above, and the basic pressure management system is in place, LWB will implement a performance-based NRW reduction program. This program is expected to commence in the third year of the project (beginning of 2020)[36]. The objective of the program is to rapidly reduce both real water losses (physical leakages) and apparent water losses (commercial losses), with a greater priority on reduction of real water losses by improving system maintenance, active leakage control, speed and quality of leak repairs and pressure management. LWB will engage the services of a competent and experienced firm to provide leakage reduction and management services under a performance-based contract. The cost of the program is estimated at US$5 million.

8. The scope of services to be provided will include: (i) verifying all the existing District Metered Areas (DMAs) established by LWB; (ii) carrying out a baseline 7-day inflow and pressure measurement prior to starting any activities in any of the DMAs;(iii) leak detection surveys (using appropriate equipment and technologies); pressure management: stabilizing, managing and reducing average DMA pressure using PRVs and controllers and various techniques as appropriate; (iv) leak repair: repair of leaks on mains and replacement of leaking service connections; (v) detection of illegal connections; (vi) quarterly leakage modelling; (vii) continuous monitoring of DMA inflow, pressure and minimum night flow and execution of leak detection and repair should the tolerance limits be exceeded; and (viii) execution of the final inflow and pressure measurement. These services will be

[36] Priority network interventions are expected to start in the first year of the project and will take at least 18 months to complete (end of 2019). In addition, LWB's existing NRW technical assistance partnership with Vitens-Evides International (VEI) expires at the end of 2019. This means the proposed new performance-based NRW contract can only start at the beginning of 2020.

offered and remunerated by a quarterly fixed-fee[37]; a performance fee per volume of leakage reduction; and a fee per detected illegal connection. The World Bank will provide specialist technical assistance in designing an appropriate contractual framework, based on experiences from similar contracts around the world.

9. **Network expansion**. This sub-component will finance expansion of the distribution to increase coverage of improved water services. Investments will include construction of approximately 186 km of distribution pipelines and connecting approximately 14,700 new household connections; construction of three new reservoirs and three new pumping stations; and construction of 60 communal water points. However, network expansion will only be undertaken if water production is increased either through improvements in the efficiency of existing treatment plants, savings from physical water loss reduction activities, construction of a new treatment plant or a combination of these three. The proposed network expansion areas include Area 25, western bypass, Nanjiri, Chitedze and Mchezi. These areas have registered considerable development over the last five years, but currently lack potable water supply and most of the areas do not have a piped water network.

10. Table 1.4 provides a breakdown of the estimated cost for Phase 2 investments

Table 1.4 – Network Expansion and NRW reduction

	Description	Estimated Cost US$ million
1	Performance-based contract for NRW reduction	5.00
2	Distribution pipes for network expansion (186 km)	15.30
3	Reservoirs (3no)	1.90
4	Pumping stations (3no)	0.50
5	Construction of 60 Communal Water Points (Nanjiri, Western	0.50
6	Procurement of materials for new household connections (14,700)	1.80
7	Resettlement compensation	0.50
	Sub-total	**25.50**
	Contingencies (17%)	**4.50**
	Total	**30.00**

Expected Benefits from the Network Interventions

11. The above network interventions are expected to result in improved reliability of water services by significantly reducing, and in some cases, eliminating intermittent supply conditions. Figure 1.2 shows the comparison between the current and future (2035) demand scenarios where the red colour represents the parts of the network experiencing inadequate service. It is evident that with the interventions there will be significant improvements on the pressure, even with the projected demand for 2035.

12. The interventions will also result in stabilised pressures, both maximum and minimum, which will ensure that losses and burst frequency are reduced and the quality of the service is improved. Finally, subject to increasing water production capacity, the network interventions will result in expanded coverage, with an additional 14,700 households being connected to the network and receiving improved water services.

[37] To reduce the risk to the contractor, the interventions to repair leaks may be paid at cost

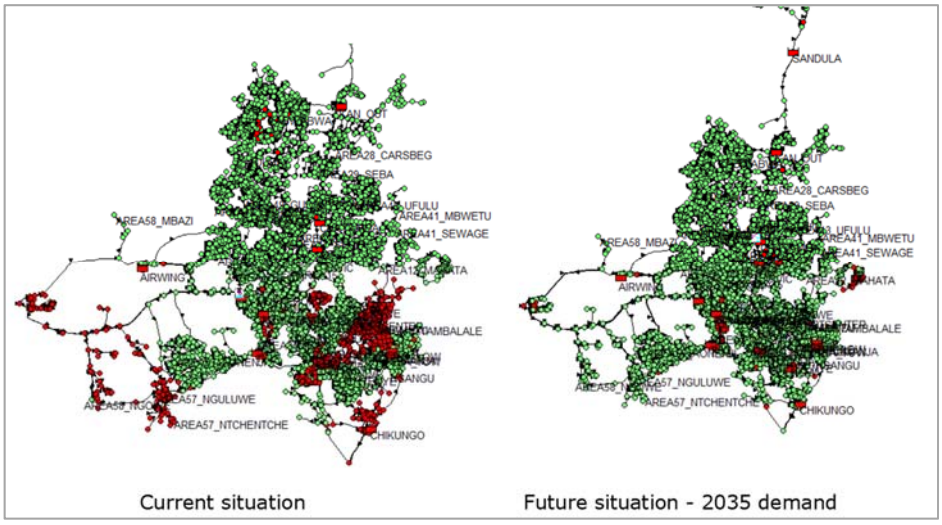


Figure 1.2- Comparison between current and future pressures

Component 2–Priority Sanitation Improvements (US$19 million, of which US$18 million equivalent IDA Grant)

13. This component will finance the rehabilitation and expansion of approximately 107 km of sewerage network and connecting approximately 5,000 new households to the sewer network; and rehabilitation and upgrading of the existing Kauma sewage treatment plant. The component will also finance construction of 8,000 improved on-site sanitation facilities targeting poor and vulnerable households; sanitation marketing campaigns to influence sanitation behaviours and create demand for sewer connections and onsite sanitation services; and construction of improved sanitation facilities in 10 markets and 10 schools. The cost of these interventions is estimated at US$19 million, based on a pre-feasibility assessment. These investments are the most urgent interventions to improve the sanitation situation in the city. Additional investments will be identified during preparation of an integrated sanitation masterplan to be supported under Component 3 of the project.

14. **Existing coverage of sanitation services in Lilongwe**. Figure 1.3 shows the existing coverage of sanitation services in Lilongwe, based on a recent citywide sanitation survey conducted by LCC with support of the World Bank. It is estimated that only five percent of the residents of Lilongwe are served by sewers, while the remainder rely on onsite sanitation systems (69 percent pit latrines and 25 percent septic tanks) or open defecation. LCC is currently responsible for maintaining public sewers, and there are some private developers who have invested and maintain their own sewers and treatment facilities. Pit latrines are the most common sanitation facility and most of them do not comply with standards for safely managed sanitation.

15. There is very limited availability of faecal sludge management (FSM) services, with only four formal vacuum tank operators servicing septic tanks across the city. The main reason for that is the low demand for emptying services. At the time of the city-wide survey, only nine percent of the systems visited have ever filled up. Of those, about half have emptied their system and the other half replaced with a new system. An explanation for that may be the construction methods, with average storage capacity of 9m^3, partially lined pits, on very well drained soils. These practices may result in groundwater contamination, and pose a risk to public health, especially in areas where the residents rely on wells and boreholes for consumption. Further, recent cases of contamination of the city's drinking water by a leaking sewer pipe in parts of the city (Area 18) have created a sense of urgency

to fix the city's ailing sewerage system. Below is a detailed description of the priority interventions – both for sewerage and onsite sanitation.

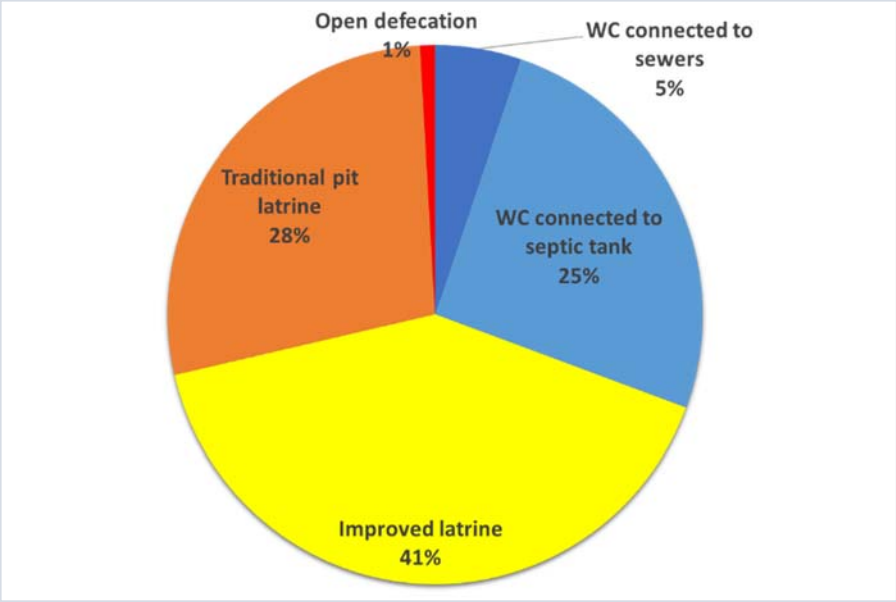


Figure 1.3– Sanitation Coverage in Lilongwe

Priority Sewerage Improvements (Estimated cost US$13 million)

16. **Rehabilitation and expansion of Kauma Sewage Treatment Plant**. Existing sewers and sewage treatment plants are dilapidated due to lack of maintenance, resulting in environmental pollution, as most of the sewage ends up in the environment without treatment. Preliminary assessments suggest that the current capacity of the Kauma sewage treatment plant which is around 6,000 m^3/day could be increased to about 13,000 m^3/day through construction of additional ponds. The main constraint at the treatment plant is on the facultative and maturation ponds. Existing anaerobic ponds can handle up to 17,000 m^3/day when all three are used and up to 11,000 m^3/day when two are operated (to allow for desludging). The current capacity of the facultative ponds based on preliminary calculations is about 5,700 m^3/day. Thus, the critical stage is facultative ponds, and therefore investments on treatment expansion should be focused on the facultative ponds to a capacity that will be comparable to that of two anaerobic ponds.

17. The project will thus prioritize the rehabilitation and desludging of the existing ponds, construction of additional ponds (two facultative ponds and three maturation ponds) to increase treatment capacity from an estimated 6,000 m^3/day to about 8,700 m^3/day, and Biological Oxygen Demand (BOD) removal efficiency from about 86 percent to 96 percent[38]. Figure 1.4 shows the existing pond system and the proposed expansion area[39]. Other rehabilitation works will include: installation of a perimeter fence around the treatment plant; flow

[38] The existing pond system currently achieves a BOD removal efficiency of 86% (from 500mg/l to 70 mg/l). The national standard for effluent BOD is 20mg/l. Rehabilitation and upgrade of the plant is expected to result in increased BOD removal efficiency to achieve the national effluent standard.

[39] Most of the land for expansion is owned by Lilongwe City Council

measurement equipment installation; baffle installation; and tertiary treatment for waste water reuse to support farming activities downstream the treatment plant[40]. The exact nature and scope of the treatment plant rehabilitation/expansion will be determined after a detailed feasibility study to be carried out during the first year of the project implementation.

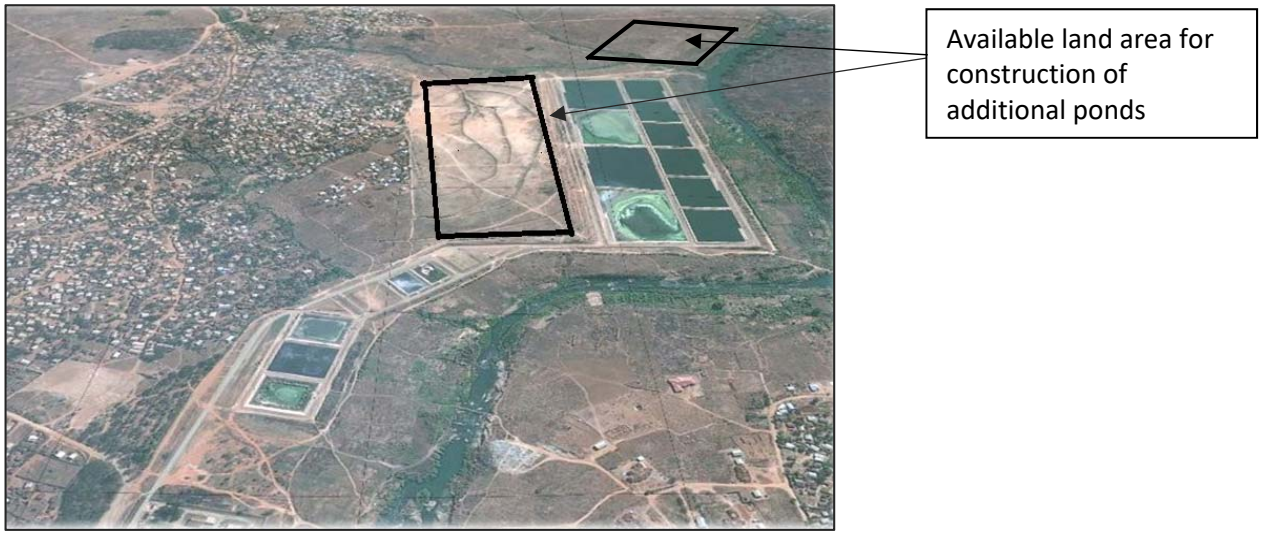


Figure 1.4 - Existing Kauma Sewage Ponds and Expansion Area

18. **Rehabilitation and expansion of the sewerage network**. The project will finance the upgrade and expansion of sewers in priority areas under the Kauma sewer catchment and connect an additional 5,000 households to the sewer network. Priority areas have been identified based on the following criteria: (i) availability of capacity in nearby trunk sewers; (ii) proximity to nearby trunk sewers; (iii) risk to groundwater pollution-densely populated areas; and (iv) potential for densification. Preliminary assessments conducted by the World Bank team suggest that existing trunk sewers in the Kauma catchment have the capacity to accommodate more flow. Estimates indicate that up to 40,000 m^3/day dry weather flow can be conveyed to the sewage works against a current estimated flow of just under 4,000 m^3/day. Thus, the main trunk sewers are likely to require only extension rather than expansion in capacity.

19. Prioritization of areas for sewer network extension is based on preliminary assessments of the need to extend existing trunk sewers. The areas that can be connected without significant extension of existing trunk sewers have been categorized as Priority 1 while those that would require significant extension of the trunk mains have been categorized as Priority 2 and those that have large property sizes that would result in a high network length per property and with significant extension of trunk sewers required have been taken as Priority 3. Given the resources available, the project will focus on Priority 1 areas. Table 1.5 (and Annex 10) shows the Priority 1 areas to be targeted for sewer network expansion and estimated number of beneficiaries.

[40] Given the current setup, the maturation ponds including the retention of all ponds has potential to produce effluent with coliforms levels below the limit of 1000 CFU/ 100 ml – WHO standard for microbiological quality of effluent to be used for irrigation.

Table 1.5 – Priority Areas for Sewer Network Extension

Area	Area [ha]	Average plot size m^2	Approximate density of plot per Ha	Total No. of connections	Occupancy per property	Estimated No. of people benefiting
Area 3	64	3,200	2.66	170	6	1,020
Area 6	118	2,100	4.05	478	6	2,866
Area 12	259	2,800	3.04	786	6	4,718
Area 18	92	630	13.49	1,241	12	14,895
Area 30	41	600	14.17	581	12	6,970
Area 47	27	1,800	4.72	128	8	1,020
Area 48	64	4,000	2.13	136	3	408
Total				**3,519**		**31,897**

20. The project will finance upgrade and construction of 107 km of sewers, covering seven urban areas, aiming at improving services for the existing 10,000 customers (approximately 50,000 people) and connect 5,000 new properties (of which 3,519 in extension areas), serving about 30,000 people. Details of proposed sewerage network interventions are summarized in Table 1.6.

Table 1.6 – Priority Sewerage Network Rehabilitation and Extension

	Description	Length (km)	Estimated Cost US$ million
1	Collector sewers 160 mm diameter average depth 1.6 m	76	1.4
2	Main sewers onsite 200 mm diameter average depth 1.8 m	15.2	0.35
3	Trunk sewer extensions 200 mm average depth 2.2 m	10	0.29
4	Trunk sewer extensions 250 mm average depth 2.5 m	2.7	0.12
5	Trunk sewer extensions 315 mm average depth 2.8 m	3.2	0.24
6	Trunk sewer rehabilitation		1.30
7	Construction of manholes		1.51
8	Household sewer connections		0.25
9	Other costs (stream crossings, road crossings etc)		0.41
10	Resettlement compensation		0.60
	Sub-total		**6.47**
	Contingencies (25%)		**1.53**
	Total Cost Estimate		**8.00**

Onsite Sanitation Improvements (Estimated cost US$6 million)

21. About 94 percent of the Lilongwe residents rely on onsite sanitation systems, and a small percentage (1 percent practice open defecation in the outskirts of the city. There are very limited services for onsite sanitation and households rely on local artisans and household members to construct and maintain their systems. About 30 percent of the residents are currently using unimproved sanitation facilities. Most of the households using unimproved sanitation facilities are considered poor and vulnerable. LCC with support from local and international NGOs implemented some projects aiming at supporting targeted households and artisans with toilet construction programs. However, past efforts did not result in significant increase in coverage for safely managed sanitation systems, due to limited financial capacity of the poor households. In addition, hygiene behavior is also critical in Lilongwe. During the city-wide assessment, only 19 percent of the interviewed households had soap and 36 percent had water in their toilets. The project will intervene on three fronts: sanitation marketing and hygiene promotion to influence sanitation behaviors; support to construction of onsite sanitation facilities for the poor

and vulnerable households in the city; and support to construction and better management of public sanitation facilities.

22. **Sanitation marketing and hygiene promotion.** The project will finance a sanitation marketing and hygiene promotion campaign to influence sanitation behaviors and create demand for safely managed sanitation services (sewer connections and improved onsite sanitation facilities). An experienced consultancy firm/NGO will be engaged by LCC and LWB to develop a sanitation marketing strategy, and provide support in implementing the strategy. The campaign will apply the latest social and commercial marketing practices, as well as cutting edge behavior science to influence sanitation behaviors and create demand for various sanitation products and services (i.e. sewer connections, improved On-Site Sanitation (OSS) systems and emptying services) that will be supported under the project. The sanitation marketing approach will be implemented across the entire city of Lilongwe. However, specific areas may require more intense interventions, tailored messages and marketing activities to support adoption of services, especially sewer connections. The campaign will involve mass media, direct contact, as well as product demonstrations and possibly working with locally present CBOs/NGOs. The sanitation marketing campaign will be complemented by strengthened enforcement of the city's sanitation bylaws. Taken together, these two activities (marketing and enforcement of bylaws) are expected to result in about 5,000 households connecting to the upgraded sewer network. An additional 20,000 households are expected to invest in improving their sanitation facilities.

23. **Support to construction of improved OSS facilities for vulnerable households.** LCC recognizes that there are areas within the city that will not be sewered in the medium to long-term due to technical and socio-economic considerations. Moreover, a recent survey shows that about 30 percent of the city residents (mostly poor) still rely on unimproved sanitation facilities (traditional pit latrines), and previous attempts at sanitation marketing alone have not resulted in a reduction in the proportion of households using unimproved facilities. Studies suggest affordability as a key barrier to moving up the sanitation ladder. Given the public health benefits of improving sanitation, the project will finance a partial, targeted and time-limited subsidy to support construction of OSS facilities for poor and vulnerable households. The households will be targeted using existing official social safety net mechanisms. The project is expected to partially finance construction of 8,000 household OSS systems. Priority target areas will be identified through a multi-criteria analysis based on both technical and social considerations.

24. Two technical solutions are envisaged: (i) a communal septic tank connected to either pour flush or low-flow flush toilet systems; and (ii) ventilated improved latrines. The choice between the two solutions will depend on site conditions, affordability and user preferences. The project will either upgrade existing systems (where feasible) or construct new facilities. Key points to consider in deciding whether to upgrade or construct a new facility include: (i) relative cost of upgrading compared to building a new facility; (ii) remaining useful life of the existing facility; (iii) structural soundness of the existing facility; and (iv) user affordability and acceptability of upgraded design. Given the condition of existing facilities and the fact that robustness of the system depends largely on the substructure, it is expected that most of the interventions will involve construction of entirely new facilities.

25. The cost of the OSS system will be shared between LCC and the targeted households. LCC (through the project) will pay for the substructure (materials and labor), as well as labor for the superstructure (to ensure good construction quality of the entire unit). The household will contribute (either cash or materials) for construction of the superstructure. Construction will not commence until the household contribution has been made. In practice, this will be achieved by any of the following methods: (i) specifying a consumer price equal to the cost of materials for the superstructure, which would then be collected by the contractor or paid to LCC directly; or (ii) household is given a bill of quantities of the required materials for the superstructure and he/she purchases the materials and delivers them on site.

26. Construction will be implemented through an output-based contract with either a contractor or a community-based enterprise[41]. The output-based contract will be structured in such a way that the demand risk is shared between LCC and the contractor. LCC (through the project) will engage sanitation marketing firm/NGO to provide sanitation marketing services at the city level, with specific and targeted marketing activities for the priority intervention areas. The sanitation marketing firm/NGO will also provide technical assistance, materials and training to contractors, local artisans engaged by LCC. In addition, the LCC will make use of its existing social capital and community level structures and to support the marketing effort. At the same time, the contractor will be expected to engage in field level marketing, and will be expected to reflect the cost of such marketing activities in the bid price.

27. Interested contractors will bid on a unit cost basis for each standard OSS system design, excluding the cost of materials for the superstructure– which is the responsibility of the household. Payments will be structured in such a way that a proportion of the price of each unit is paid upon 'signing up' households as indicated by verified household contributions, and the other proportion is paid upon verified completion of construction of the unit per pre-specified quality standards. The project will finance a specific TA to help structure the most appropriate delivery model for the onsite sanitation systems. It is expected that NGOs/CBOs already working with LCC on sanitation issues will play a significant support role during implementation of the onsite sanitation interventions.

28. **Construction of public sanitation facilities**. The project will finance construction of 10 school sanitation facilities. Standard designs that include hand-washing and ensure easy accessibility for people with disabilities will be used. For maximum health impact, pre-primary/nursery and primary schools will be targeted. In addition, hygiene will be promoted through existing behaviour change programs. LCC will also build ten market sanitation facilities to be delegated to private management. LCC will engage small-scale private operators and sanitation entrepreneurs through public private partnership contracts who will run the market sanitation facilities as businesses and keep them maintained.

Component 3 – Technical Assistance (US$8.5million of which US$5.5 million equivalent IDA Credit, and US$3 million equivalent IDA Grant)

29. This component will finance technical assistance activities to support preparation and supervision of all infrastructure investments planned under the project; and to enhance LWB's capacity to plan future investments and strengthen the pipeline of investment-ready sub-projects under the Lilongwe Water Program. Activities to be financed include: consulting services to prepare and supervise all major infrastructure works packages planned under this project; preparation and/or update of safeguards instruments; preparation of water and sanitation master plans and related studies; feasibility studies for priority investments identified in the masterplans; and support to institutionalization of a sound framework for investment planning and decision making. These activities are estimated to cost US$8.5 million, and are categorised in two sub-components: technical assistance for water supply (US$5.5 million) and technical assistance for sanitation (US$3 million). Their contribution to the PDO is indirect in that they address existing capacity gaps and risks that may otherwise jeopardize the achievement of project objectives.

30. **Rationale for Technical Assistance**. LWB has limited technical capacity and experience in preparing and managing complex infrastructure projects, and will therefore require technical assistance. In addition, LWB's ambitious investment program to secure water supply for the city still requires fine-tuning through further

[41] Possible candidates would include, but not be limited to, private sector vacuum tanker operators, community-based enterprises providing solid waste, toilet construction microenterprises and CBOs

assessments (including assessment of ground water potential; sanitation investments); integration with city development plans; reassessment of realistic pathways to water security given constraints on available financing; and development of a framework for investment decision-making and sequencing.

31. With respect to ground water, previous studies have concluded that ground water is not a feasible alternative to meet Lilongwe's long term needs[42]. Further, GoM's Water Resources Investment Strategy (WRIS) states that "due to its relative scarcity in comparison to surface water resources, combined with the low overall yield of aquifers and of boreholes, groundwater resources are unlikely to form a significant part of the overall water resources investment strategy for Malawi". Notwithstanding these conclusions, LWB still wants to undertake a detailed study on groundwater in and around Lilongwe – with a view to understand the potential for emergency use during periods of low flows in the rivers. This is in line with the WRIS which recommends "significant inter-seasonal storage, backed up by conjunctive use of groundwater where appropriate" to increase water supply security.

32. Experience shows that most pathways to water security in cities invariably start with drinking water supply, followed by sanitation and drainage. This project thus includes technical assistance to prepare an integrated sanitation master plan for Lilongwe in readiness for the next step on the water security pathway – sanitation and drainage. Safely managed sanitation and drainage is a major challenge in the city, and it will get worse as the city population grows, and as water coverage is increased (leading to increased wastewater volumes). A study on urban development master plan carried out by LCC with support from JICA in 2010 identified sanitation as a key environmental development issue and outlines several initiatives and actions that need to be undertaken. These include: (i) undertaking a city-wide baseline assessment for sanitation, drainage and solid waste management; (ii) preparation of a sanitation master plan; (iii) sewerage network expansion in selected areas; (iv) a sanitation tariff study; (v) on site sanitation development; and (vi) school sanitation. However, to date there has not been any preparatory work undertaken to better understand the nature and scope of sanitation interventions required, and there is still no consensus on the strategy and institutional framework for sanitation in Lilongwe. This component will support relevant TA and studies required to inform formulation of an integrated sanitation strategy, investment plans and relevant institutional reforms. The component will also support a Lilongwe City development diagnostic to assess the medium and long-term growth scenarios of the city, examining population and spatial trends, institutional structures, and investment demands. This will be utilized to assess future urban service provision scenarios in the water, sanitation, drainage, solid waste and other sectors.

Sub-component 3.1 – Technical Assistance for Water Supply (US$5.5 million of which US$5.5 million equivalent IDA credit)

33. This sub-component will finance detailed engineering designs, tender documentation and construction supervision of water distribution network infrastructure planned under the project. The component will also finance preparation and/or update of environmental and social management plans and resettlement action plans for network investments. Further, to strengthen the pipeline of projects under the Lilongwe Water Program, the component will finance development of an investment framework to serve as a guide for improving the quality and speed of preparation of future water supply investments. Such a framework has become a necessity in LWB given the haphazard nature in which investment decisions are made. The framework will outline basic criteria, quality standards and guidelines for planning and preparing projects under the Program, covering technical, financial and economic analysis; social and environmental assessments; institutional issues; risk assessments etc.

[42] NIRAS-Norconsult (2001). Water Resources Development Plan for Lilongwe. Report to Lilongwe Water Board

The framework is envisaged to become an overarching instrument for strengthening the pipeline of projects and will be institutionalized within LWB's planning process for capital projects.

34. The sub-component will also finance an assessment of the quantitative and qualitative characteristics of the groundwater resources in and around Lilongwe city to map the groundwater potential and vulnerability. This assessment will provide a basis for groundwater planning and management, especially as it relates to conjunctive use. Finally, the component will finance preparation of a water supply master plan for Lilongwe City, drawing on the findings from multiple studies conducted over past few years and new studies (such as the one on groundwater), as well as feasibility studies for priority water supply infrastructure identified in the master plan (excluding dams)[43].

Sub-component 3.2 – Technical Assistance for Sanitation (US$3 million of which US$3 million equivalent IDA Grant)

35. This sub-component will finance (i) feasibility studies, engineering designs, tender documentation and construction supervision of priority sanitation investments planned under the project; (ii) preparation of environmental and social impact assessments, environmental and social management plans and resettlement action plans for priority sanitation investments planned under the project; (iii) preparation of a sanitation master plan for Lilongwe City, as well feasibility studies for other priority sanitation investment identified in the sanitation master plan; and (iv) Lilongwe city development diagnostic, which will include assessing the medium and long-term growth scenarios of the city, examining population and spatial trends, institutional structures, and investment demands. The city diagnostic will be utilized to assess future urban service provision scenarios in the water, sanitation, drainage, solid waste and other sectors.

Component 4 – Institutional Capacity Strengthening (US$8.5 million, of which US$4.5 million equivalent IDA Credit, and US$4 million equivalent IDA Grant)

36. This component will finance a program of activities to strengthen the capacity of both LWB and LCC to implement the project and to provide improved water services and safely managed sanitation in Lilongwe. The component will also finance incremental operating costs as well as implementation of citizen engagement and communication plans and gender action plans. The estimated cost of the component is US$8.5 million, and is categorised in two sub-components: institutional capacity strengthening for LWB (US$4.5 million) and institutional capacity strengthening for LCC (US$4 million). The component contributes to the PDO by addressing some of the underlying institutional issues that may hinder achievement and sustainability of project outcomes.

37. **Institutional challenges facing LWB.** LWB is a statutory state corporation established under the Water Works Act 1995. It is governed by a 10-member Board of Directors appointed by the Government. The Chief Executive Officer is responsible for the overall management of the utility. LWB's corporate structure is organized in four directorates: Technical Services, Finance, Administration and Human Resource and General Management. Operations are decentralized to three zonal units – northern, central and southern – each headed by a zonal manager. LWB's performance on key indicators has remained largely stagnant over the past 10 years (see Annex 6 for details). Total coverage of services has varied between 60-70 percent over the last 10 years, while coverage

[43] LWB already completed feasibility studies and detailed designs for a new water source (Diamphwe dam), and will therefore not require any further technical assistance under this project. LWB is also currently studying the feasibility of abstracting water from Lake Malawi as an alternative to Diamphwe dam. This study is already underway, and may not require any further support from this project.

of household connections has stagnated at around 50 percent. Non-revenue water has remained stubbornly high since 2007, ranging between 35-40 percent. Operating ratio on the other hand has improved from 0.9 in 2009 to 2.8 in 2016. However, financial performance has remained highly unstable, with operating ratios varying between 1.0–2.8 over the past seven years, and collection rates stagnating at around 85 percent.

38. A rapid institutional analysis conducted by the World Bank in February 2016 identified three key challenges that are holding back LWB. The first is the lack of managerial autonomy. Although LWB is a corporate entity, the utility enjoys only limited financial and managerial autonomy. The board of directors and managers are unable to make important managerial and operational decisions (such as those relating to budgets, staff recruitment, pay and incentives, and organizational restructuring) without approval from the parent ministry or the department of statutory corporations. In many instances, decisions made by the board of directors are referred to the Government for final approval – a practice that slows down decision-making and action on important strategic and operational issues. Second, LWB's internal operational processes are outdated and there are no standard operating procedures and no management plans for critical assets such as dams.

39. Third, there are serious leadership skill gaps at all levels, especially at the middle and lower (field) levels, and there are no mechanisms for internal accountability for performance. Although staff productivity (measured by number of staff per 1000 connections) has improved over the last five years, managers continue to face challenges in developing a positive work culture and motivating staff. From an organizational behavioural perspective, the biggest challenges are lack of a commercial and customer orientation. Further, an assessment of LWB's staff list shows that there is a gap in women's participation and representation in decision making roles. Most of the women in LWB hold low-level positions. For instance, at the management level of the Technical Service Department, there is no woman out of seven members that make up the management team. This suggests a difficult environment for the promotion of gender issues in the sector and the project.

40. Despite these challenges, LWB has put in place the basic foundations for progress, and it remains a proactive and performance oriented utility. In March 2016, LWB developed its five-year (2016-2021) institutional development program code named the 'Path to Success Program" (PSP). The program has five objectives: (i) improving governance and general management; (ii) improving staff productivity; (iii) improve customer services, (iv) develop and enhance systems and structures and (v) reduce non-revenue water. The PSP has been under implementation for a period of one year, but with mixed results[44]. This project will build on and support implementation of the program to enhance its impact on the service delivery outcomes that LWB seeks to achieve under the project. The priorities for improvement include: strengthening corporate governance; building effective leaders at all levels (including addressing gender gaps); cultivating a positive corporate culture that builds a sense of mission and identity; strengthening customer orientation; and improving the technical operation processes and systems of the utility.

41. **Institutional challenges facing LCC**. LCC faces several institutional challenges that are increasingly making it difficult for it to provide basic urban services, including sanitation[45]. Sanitation services are currently split between two departments – Engineering Department (for sewerage services) and Public Health Department (for on-site sanitation and solid waste management). Both departments have limited technical capacity and lack the necessary resources, tools and assets to perform their functions effectively and efficiently. The Engineering Department does not have a qualified sanitary engineer; it lacks basic equipment and logistical support to manage the sewerage network. There are many unfilled senior and technical positions, as the city is not able to offer competitive salaries and career opportunities. The council in general faces severe funding constraints, some of

[44] Only about half of the planned actions for the first year were implemented
[45] Some of the challenges stem from systemic issues within LCC which are beyond the scope of this project

which can be attributed to the council's expenditure pattern characterized by high proportion of pay-roll related costs compared to available own-source revenues. LCC does not have a revenue stream for sanitation services, yet its sanitation departments employ the highest number of unskilled staff (laborers, street sweepers etc.) and semi-skilled staff (clerical/administrative positions). However, the city council has recently approved a new by-law on sanitation fees and charges, and is expected to start implementing the new bylaw in 2018.

42. GoM recognizes the institutional challenges faced by city local governments in delivery of basic urban services. To reduce the burden on LCC, GoM is considering transferring sewerage services to LWB in line with the Waterworks Act 1995. The project will support dialogue and consensus building efforts around this reform as well as transitional arrangements. The support will include provision of equipment, logistical support, training and specific technical assistance to the engineering and public health departments of LCC to strengthen their capacity to provide sanitation services in the city, until such a time that GoM takes a decision to transfer sewerage services to LWB.

Sub-component 4.1 – Institutional Capacity Strengthening of LWB (US$4.5 million, of which US$4.5million equivalent IDA Credit)

43. This sub-component will finance (i) design and implementation of an incentive-based, utility-wide performance management system as a driver for both individual and team performance; (ii) staff training and change management in the areas of water distribution network management; water treatment process optimization; PPPs and guarantees; corporate utility management and finance; (iii) modernization of LWB's operational processes, including development of standard operating procedures and training of staff in their use; (iv) development and implementation of quality management systems and preparing LWB for ISO 9001 certification; (v) preparation and implementation of water safety plans and business continuity plans for disasters and emergency events; (vi) preparation and implementation of a customer services improvement plan, including branding and remodelling of zone customer service centers; (vii) support to consensus building efforts around corporate structure reforms and capacity of building of LWB to influence the necessary legal and regulatory reforms; (viii) project management support, including incremental operating costs for the PIU, consultants to support the PIU on project M&E and environmental and social safeguards implementation, and implementation of citizen engagement and communication plans and gender action plans; (ix) preparation of dam safety management plans (including instrumentation plan, O&M plan and emergency preparedness plan) for both KD1 and KD2; (x) implementation of priority dam safety measures for KD2[46] (which include relocation of gauge boards, installation of chainage markers, installation of vibrating wire piezometers, maintenance of standpipes piezometers, detailed inspection of fuse gates and concrete spillways during seasonal drawdown periods, cleaning and re-commissioning of relief wells, and maintaining the embankment structure free of shrubs and trees); and (xi) independent review and expert advice to LWB on implementation of dam safety measures for both KD1 and KD2.

Sub-component 4.2 – Institutional Capacity Strengthening of LCC (US$4 million, of which US$4 million equivalent IDA Grant).

44. This sub-component will finance equipment and logistical support, technical assistance, training and incremental operating costs for LCC's engineering and public health departments to strengthen their capacity to delivery sanitations services. This will include the following: (i) provision of equipment for faecal sludge management, sewer and plant maintenance; (ii) rehabilitation and equipping of the laboratory; (iii) logistical

[46] Implementation of KD1 safety measures is included in the scope of the EIB project for KD1 raising and rehabilitation

support including operational vehicles and office space; (iv) specific technical assistance and training on sewerage operations and asset management and establishment of a revenue stream for sanitation services; (v) support to on-site sanitation implementation, including hygiene promotion, targeting of vulnerable households to be supported under the project; establishment of appropriate partnerships with the private sector and civil society with respect to management of public sanitation facilities and provision of faecal sludge management services; (vi) incremental operating costs associated with coordination and consensus building efforts around a future institutional framework for sanitation services in Lilongwe; and (vii) incremental costs associated with day-to-day management of sanitation activities by both the engineering and public health departments in line with the MoU signed between LCC and LWB.

Detailed Breakdown of Project Costs

45. A breakdown of project costs is provided in Table 1.7 below.

Table 1.7 - Detailed Breakdown of Project Costs

Project Components and Activities	Estimated Cost (USD million)
Component 1 - Network Rehabilitation, Expansion and NRW reduction	
Phase 1 - Priority Network Rehabilitation	
Transmission mains (27 km)	4.50
Reservoirs (4no)	2.80
Pumping stations (7no)	4.00
Distribution pipes (142km)	22.03
Pressure reducing valves (25)	1.25
Ressetlement compensation	0.42
Sub-total	**35.00**
Contigencies (3%)	**1.00**
Total (Phase 1)	**36.00**
Phase 2 - NRW reduction and Network Expansion	
Performance-based contract for NRW reduction	5.00
Distribution pipes for network expansion (186km)	15.30
Reservoirs (3no)	1.90
Pumping stations (3no)	0.50
Construction of 60 Communal Water Points (Nanjiri, Western Bypass/Bunda Road, Chitedze and Mpingu)	0.50
Procurement of materials for new household connections (14,700)	1.80
Resettlement compensation	0.50
Sub-total	**25.50**
Contigencies (17%)	**4.50**
Total (Phase 2)	**30.00**
Total Cost for Component 1	**66.00**

Table 1.7 Continued

Project Components and Activities	Estimated Cost (USD million)
Component 2 - Priority Sanitation Improvementts	
Rehabilitation and Expansion of Kauma Sewage Ponds	
Inlet works rehabilitation and expansion	0.05
Perimeter fencing	0.20
Flow measurement equipment	0.05
Tertiary treatment system	1.50
Pond desludging (primary anaerobic ponds, septage ponds and facultative ponds)	0.30
Additional pond construction (2 facultative pond and 3 maturation ponds)	1.50
Installation of baffles in the four facultative ponds	0.15
Other miscellaneous items	0.05
Ressetlement compensation	0.2
Sub-total	**4.00**
Contigencies (25%)	**1.00**
Total	**5.00**
Rehabilitation and Expansion of the Sewerage Network	
Collector sewers (160mm diameter, average depth 1.6m; length 76km)	1.40
Main sewers (200mm diameter average depth 1.8m; length 15km)	0.35
Trunk sewer extensions (200mm diameter, average depth 2.2m; length 10km)	0.29
Trunk sewer extensions (250mm diameter average depth 2.5m; length 2.7km)	0.12
Trunk sewer extensions (315 mm diameter average depth 2.8m; length 3.2km)	0.24
Priority trunk sewer rehabilitation	1.30
Construction of manholes	1.51
Household sewer connections	0.25
Other costs (stream crossings, road crossings etc)	0.41
Ressetlement compensation	0.60
Sub-total	**6.47**
Contigencies (25%)	**1.53**
Total	**8.00**
Onsite Sanitation Improvements	
Sanitation marketing campaign	0.70
Construction of 8000 improved sanitation facilities for poor and vulnerable households	4.00
Construction of public sanitation facilifies (in 10 schools and 10 markets)	0.50
Ressetlement compensation	0.20
Sub-total	**5.40**
Contigencies (10%)	**0.60**
Total	**6.00**
Total Cost for Component 2	**19.00**

Table 1.7 Continued

Project Components and Activities	Estimated Cost (USD million)
Component 3 - Technical Assistance	
Sub-component 3.1- Technical Assistance for Water Supply	
Detailed design and construction supervision of priority network rehabilitation and expansion	2.20
Update to ESMP and RAP for network rehabilitation and expansion	0.20
Groundwater assessment and mapping	1.00
Preparation of a water supply master plan for Lilongwe (including investment framework)	1.50
Feasibility studies for water supply infrastructure identifed in the master plan	0.60
Sub-total	**5.50**
Sub-component 3.2 - Technical Assistance for Sanitation	
Preparation of a sanitation master plan, feasibility study and design of priority sanitation interventions (sewerage and onsite)	1.70
Lilongwe city development diagnostic	0.30
Construction supervision of priority sanitation intereventions (sewerage network and Kauma STP)	0.50
Construction supervision of priority onsite sanitation (public and household)	0.30
Preparation of ESIA, ESMPs and RAPs for priority sanitation investments	0.20
Sub-total	**3.00**
Total Cost for Component 3	**8.50**
Component 4 - Institutional Capacity Strengthening	
Sub-component 4.1- Institutional capacity strengthening of LWB	
Support to implememantion of LWB's "pathway to success program"	1.50
Preparation of dam safety management plans for KD1 and KD2	0.50
Implementation of priority dam safety measures for KD2	0.50
Incremental operating costs and project management support to PIU (including cost of dam safety panel of experts)	2.00
Sub-total	**4.50**
Sub-component 4.2- Institutional capacity strengthening of LCC	
Equipment for sewer maintanance, rehabilitation and equipping of laboratory	1.50
Training and special technical assistance	0.20
Development of a customer database for sewerage services	0.20
Study on tarrifs and revenue collection mechanisms for sanitation services	0.30
Kauma site office rehabilitation/construction	0.30
Incremental operating costs and project management support to LCC	1.50
Sub-total	**4.00**
Total Cost for Component 4	**8.50**
Total Cost (all components)	**102.00**

ANNEX 2: IMPLEMENTATION ARRANGEMENTS

COUNTRY: Malawi
Lilongwe Water and Sanitation Project

Project Institutional and Implementation Arrangements

1. **Lead Project Implementing Entity**. Lilongwe Water Board (LWB) will be the lead implementing agency responsible for all aspects of project management, including planning, procurement, finance management, results monitoring and evaluation and safeguards. LWB has an existing Project Implementation Unit (PIU)– under the Directorate of Technical Services (DTS)– which is charged with the responsibility of delivering LWB's capital projects. The World Bank team has carried out an assessment of the capacity of this PIU, as well as LWB's overall capital projects delivery structure. LWB has recently recruited a total of six (6) Project Engineers to the PIU, thus significantly increasing its technical capacity. Other key personnel currently in the PIU include: Projects Manager, Procurement Officer and Finance Officer. The PIU however lacks capacity in monitoring and evaluation, as well as environmental and social safeguards. At the corporate level, LWB does not have a separate directorate for capital projects. The DTS oversees both operations and projects–an arrangement that has proved ineffective as more projects come on board and as operational demands increase.

2. A recent review of LWB's organizational structure recommended, among other changes, the creation of a separate Directorate of Infrastructure Development. However, LWB management is yet to implement the recommendation. Nevertheless, the World Bank has assessed the current PIU set up and concluded that it meets the basic requirements for implementing a project of this scale. However, to mitigate risks to the project, LWB has agreed to the following actions to be implemented within three months after project effectiveness: (i) LWB will strengthen the PIU in the areas of monitoring and evaluation, and environmental and social safeguards, through recruitment of additional staff and/or consultants as needed; and (ii) LWB will fast-track the creation of a Directorate of Infrastructure Development to enhance strategic management and oversight of LWB's capital projects, including LWSP.

3. **Role of Lilongwe City Council (LCC).** LCC will implement the sanitation component of the project, consistent with its current role as the sanitation services provider. The World Bank assessed the capacity of LCC to implement the sanitation components of the project and to sustain project interventions. Some gaps were identified in technical and project management capacity. Sanitation services are currently split between two departments – Engineering Department (for sewerage services) and Public Health Department (for on-site sanitation and solid waste management). Both departments have limited technical capacity and lack the necessary resources, tools and assets to perform their functions effectively and efficiently. The Engineering Department does not have a qualified sanitary engineer; it lacks basic equipment and logistical support to manage the sewerage network. The council in general faces severe funding constraints, some of which can be attributed to the council's expenditure pattern characterized by high proportion of pay-roll related costs compared to available own-source revenues. The city does not have a revenue stream for sanitation services, yet its sanitation departments employs the highest number of unskilled staff (laborers, street sweepers etc.) and semi-skilled (clerical/administrative positions). There are many unfilled senior and technical positions, as the city is not able to offer competitive salaries and career opportunities. Basic financial management and procurement capacity in LCC is generally weak. The city has not implemented any major capital project in the recent past.

4. While it is beyond the scope of this project to address systemic issues within LCC, some actions have been agreed to mitigate risks to the project. First, all procurement and financial management under the project will be centralized at LWB. Secondly, LCC will form a small, dedicated Project Support Unit comprising of deputed staff from both Engineering and Public Health Departments to manage the sanitation component on a day-to-day basis. The unit will be supported by three experts recruited under the project (i.e. sanitary engineer, GIS/database specialist and institutional development specialist) and three junior civil engineers and/or sanitation interns. Thirdly, LCC will sign an implementation agreement (IA) with LWB that will define the roles/obligations of each entity with respect to project implementation, as well as other joint undertakings related to sanitation services delivery in the city. Finally, a Sanitation Task Force (STF) comprising members from MAIWD, Ministry of Health, LWB and LCC will be formed to strengthen coordination of sanitation investments in the city and to facilitate policy dialogue on the future institutional framework for sanitation services in the city.

5. **Project Legal Agreements.** Project implementation will be governed by a set of four agreements (Fig 2.1). The World Bank will sign a financing agreement with the Ministry of Finance, Economic Planning and Development (MoFEPD) as the recipient of the IDA credit/grant. MoFEPD will, in turn, sign a subsidiary financing agreement with LWB, with terms and conditions acceptable to the World Bank. The World Bank will also sign a project agreement with LWB as the lead implementing entity. LWB will sign an implementation agreement with LCC, with terms acceptable to the World Bank. All project operational modalities will be detailed in a Project Implementation Manual (PIM) to be prepared and adopted no later than one month after project effectiveness.

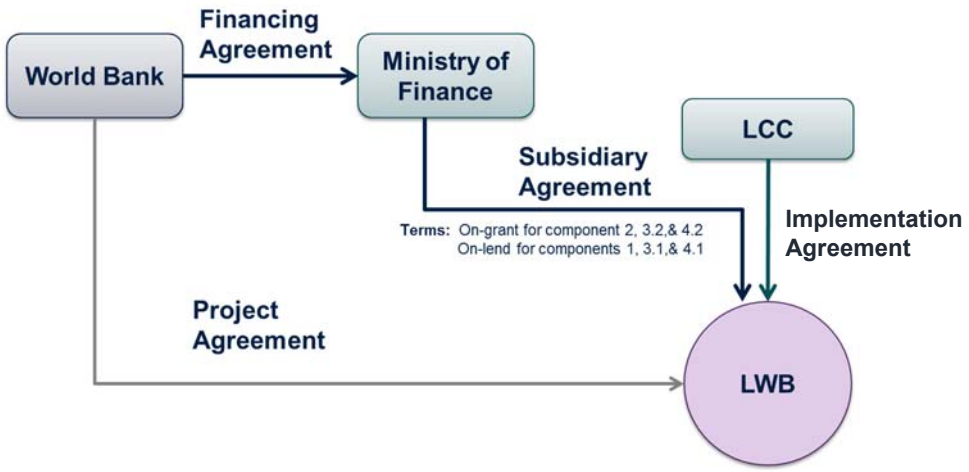


Figure 2.1 – Project Legal Agreements

Financial Management

6. Financial management will be the responsibility of LWB. The FM arrangements of LWB have been assessed as satisfactory for purposes of the project. This assessment is based on the following: (i) LWB has the experience of managing World Bank funded projects[47] and financial management arrangements were satisfactory; (ii) LWB has qualified and experienced financial management staff; (iii) experience in use of computerized systems for accounting transaction processing and reporting including for World Bank funded projects; (iv) good record of

[47] LWB was one of the implementing entities for the Second National Water Development Project which closed in October 2015.

compliance with control and accountability requirements as demonstrated in the management letters relating to annual audits; and (v) LWB is up-to-date on audits of annual financial statements.

7. LCC's financial management arrangements on the other hand were assessed as moderately unsatisfactory. The council is behind on preparation of audited financial statements. The latest audited financial statements are for FY2010. Bank reconciliations are not up-to-date. There has been instability in the tenure of senior financial management staff. Audit management letters for other World Bank-financed projects[48] have in the past shown serious control and accountability issues. Given these issues, the World Bank team recommended that both financial management and procurement for the project should be centralized at LWB. Both LCC and LWB have agreed with this recommendation. LCC will only be given funds for incremental operating costs that will need to be liquidated to LWB monthly. The liquidation report will be supported by appropriate documentation including Bank reconciliations. LCC will open an exclusive account for this purpose.

8. **Overall FM assessment and risk rating**. The conclusion of the assessment is that the financial management arrangements for the project meet the World Bank's minimum requirements under OP/BP10.00. The overall residual FM risk rating for the project is **Moderate.**

Table 2.1 - Risk Assessment Matrix

Risk	*Risk Rating*	*Risk Mitigating Measures Incorporated into Project Design*	*Residual risk rating*
Country Level • Lack of accountability, poor enforcement and compliance with existing regulations/procedures, • Lack of implementation of auditors' recommendations; and the lack of sanctions for offenders. • Weak accounting system, including poor control environment of the automated IFMIS, which affects the quality of financial statements produced by ministries implementing projects • Weak audit committees in government ministries that do not follow up on the issues raised in the audit reports to ensure they are addressed by the project • Weak legislative scrutiny of external audit reports • Problem of timeliness and regularity of various accounts reconciliations.	H	To address the recent frauds committed in the IFMIS through collusion, the cooperating partners are working with the Government to plug the gaps in the system and to strengthen the functional and system controls. The Government has taken disciplinary and legal actions against some of the perpetrators and a forensic audit has been done that provided more details about the theft. Another forensic audit is planned to include the period prior to 2013 which was not covered by the initial forensic audit. The Government is implementing a PFM reform agenda supported by cooperating partners. These reforms include strengthening of the IFMIS and reporting and oversight functions which if properly implemented should be able to resolve some of the identified risks. However, the impact of the reforms will take time to be felt. Until then, some ring fencing arrangements will be put in place. LWB - the implementing entity is a quasi-government institution that is independent and not directly affected by weaknesses in accounting arrangements in central government.	S

[48] Malawi Social Action Fund (MASAF)

		The project will be using a separate and exclusive accounting package for transaction processing and reporting.	
Entity Level The entity is already working on various projects funded by several donors and this additional project may cause problems of focus	S	A PIU has been established and this unit will be responsible for coordinating all activities of the project	M
Project Level The project has several components to be funded by different partners and this could cause problems of coordination and sequencing.	S	The PIU will be staffed with personnel who have experience in coordinating multiple entities.	M
Budgeting Budgeting not including all activities expected to be done and incorrect assumptions	S	Budget will be informed by annual work plans which will be agreed between government and the World Bank. LWB has experienced in preparing budgets in similar activities.	M
Accounting The accounting system may not be able to process transactions timely, accurately, and completely leading to problems and delays in reporting. The Control environment may compromise the integrity of the accounting system	M	LWB has a computerized accounting system that is used for transaction processing and reporting. The control environment is good judged from management letter reports which do not show serious control and accountability issues. The project will have its own accounting software to be used for transaction processing and reporting	M
Internal Control Weak control environment leading to errors, fraud, and other irregularities.	M	LWB has a history of good compliance to procedures and controls and project transactions will be subjected to the same. Project transactions will also be subjected to regular internal audit by LWB' internal audit department	M
Funds Flow Funds may not be timely available for implantation of the project activities due to reporting.	M	LWB is familiar with the reporting requirements and the computerized system should be able to produce accurate and timely reports leading to timely disbursements of funds	M
Financial Reporting Poor reporting due to use of inappropriate accounting standards and delays due to poor accounting systems in place.	M	LWB uses international Financial Reporting Standards for its own reporting and will apply the same for the proposed project. The reporting will be facilitated by the computerized accounting system that will be the necessary reporting template embedded.	M
Auditing NAO does not fully use international standards in carrying out their work and this may result in unacceptable audit reports.	S	The audit of the proposed project's financial statements will be subcontracted to a private auditor who will be familiar and apply international standards on auditing.	M
Overall FM Risk Rating	**S**		**M**

9. **FM actions.** To further strengthen the financial management arrangements for the project, the following measures have been agreed: (i) LWB's PIU will have a dedicated FM staff who will be responsible for project accounting and reporting, and will be trained in financial management and disbursement arrangements for World Bank funded projects; (ii) LWB will acquire and install an accounting software to be used for transaction processing and reporting or alternatively LWB accounting software should be reconfigured to create a complete sub ledger for the project that will ensure proper transaction processing and reporting; (iii) LWB will open exclusive Dollar and Kwacha accounts for the project at a commercial bank acceptable to the World Bank; (iv) the PIU will be required to submit unaudited interim financial reports which will be reviewed and validated by the World Bank; (v) the project will be visited at least twice a year for implementation support that will include dealing with FM issues; (vi) project transactions will be internally audited at least twice a year; (vii) the project's financial statements will be externally audited by private auditors under terms of reference to be agreed with the World Bank; and (viii) the activities to be financed under the credit will be agreed in advance on an annual basis. This will be in form of annual work plans and associated budgets.

10. **Budgeting arrangements**. The PIU will work with LCC to prepare annual work plans and budgets based on activities summarized in the PAD. The budget will be required to be ready before commencement of each fiscal year during the implementation of the project.

11. **Accounting arrangements**. LWB uses a computerized accounting system for transaction processing and reporting. LWB has a comprehensive accounting manual detailing controls and procedures required in accounting and related activities. These procedures and controls will be incorporated in the project's accounting requirements to be detailed in the project implementation manual.

12. **Internal control and internal auditing arrangements**. LWB's internal audit department will be responsible for the internal audit function for the project. The department has an Internal Audit Manager who is a qualified accountant, one internal auditor and two internal audit assistants. The Audit Manager functionally reports to the Audit Committee of the Board on a quarterly basis and administratively reports to the CEO of the LWB. LWB's accounting manual includes internal controls that ensure integrity of transactions. A review of the latest management letters indicates that controls are functioning as designed as there are few control and accountability issues reported.

13. **Financial reporting arrangements.** LWB will prepare unaudited Interim Financial Reports (IFRs) for the designated accounts and the related project accounts. The IFRs are to be produced on a quarterly basis and submitted to the World Bank within 45 days after the end of each calendar quarter. The reporting requirements will be incorporated into the accounting package to enable automatic generation of the IFRs. The IFRs submitted to the World Bank will have a section on Financial Reporting and Disbursement containing the following:

a. Reporting Section includes: (i) statement of Sources and Uses of Funds by disbursement category; and (ii) Statement of Uses of Funds by Project Activity/Component.

b. Disbursement Section includes: (i) Designated Account (DA) Activity Statement; (ii) Bank Statements for both the Designated and Project Accounts; (iii) Summary Statement of DA Expenditures for Contracts subject to Prior Review; and (iv) Summary Statement of DA Expenditures not subject to Prior Review.

14. **Auditing arrangements.** The project will also prepare the annual audited accounts/financial statements which must be submitted to the World Bank within 6 months after the end of the accounting year (that is, no later than December 31). The LWB and the World Bank will agree on the ToRs to be used for recruitment of external

auditors. The project will prepare its accounts in accordance with International Public Sector Accounting Standards. The accounts/financial statements will comprise of:

a. A Statement of Sources and Uses of Funds/Cash Receipts and Payments, which recognizes all cash receipts, cash payments, and cash balances controlled by the entity, and separately identifies payments by third parties on behalf of the entity.

b. The Accounting Policies Adopted and Explanatory Notes. The explanatory notes should be presented in a systematic manner with items on the Statement of Cash Receipts and Payments being cross referenced to any related information in the notes. Examples of this information include a summary of fixed assets by category of assets, and a summary of IFR Withdrawal Schedule, listing individual withdrawal applications; and

c. A Management Assertion that World Bank funds have been expended in accordance with the intended purposes as specified in the relevant World Bank legal agreement**.**

15. **Fraud and Corruption**. The major contracts will fall under World Bank's prior review and therefore will be subjected to necessary World Bank's oversight checks. The project will have procedures and controls to ensure that transactions have integrity and fraud and errors are minimized. The project will be subjected to both external and internal auditing which will further provide assurance regarding the compliance with both World Bank and government policies and procedures.

16. The World Bank team will ensure the compliance with World Bank procurement and financial management rules through its oversight with World Bank procurement and financial management specialists reviewing documentation; carrying out office visits, interviews and inspections; and recommending actions to be taken if any inconsistencies are identified. World Bank technical experts will also be involved in the review of all documentation deemed necessary including but not limited to prequalification documents, requests for proposals, ToRs, bidding documents, contract documents, and evaluation awards. In terms of institutional building, the World Bank will ensure that training of staff in procurement and financial management issues is offered to strengthen internal technical capacity.

Disbursements

17. **Funds Flow Arrangements**. LWB will open two separate US dollar Designated Accounts – one for the IDA Credit and the other for the IDA Grant. LWB will also open a Malawi Kwacha Operating Account with a commercial bank acceptable to the World Bank. The PIU will be responsible for managing the project's Designated Accounts and ensuring proper and timely project accounting and reporting of project expenditures, and preparing consolidated progress reports. Funds flow arrangements for the project are illustrated in Figure 2.2 below. Eligible expenditure categories (as per the Financing Agreement) are provided Table 2.2.

18. Funds will flow from the World Bank to the Dollar Designated Accounts and finally to the Kwacha operating account. Subject to signing of an Implementation Agreement between LCC and LWB, a second Kwacha Operating Account will be opened by LCC to cater for incremental operating expenditures related to sanitation activities. LWB will prepare a six-month cash flow forecast based on agreed work plans then submit a withdrawal application request to the World Bank. The six-month forecast will be revised quarterly and the resultant funds requirements will be used to replenish the Designated Accounts. Project expenditure can be paid from either the Designated Accounts or any of the Operating Accounts.

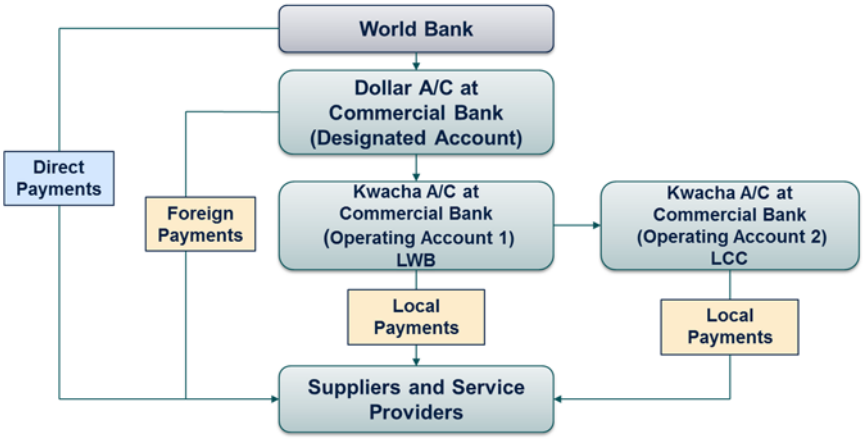


Figure 2.2– Funds Flow Chart

Table 2.2: Eligible expenditure categories

Category	Amount of the Credit Allocated (expressed in SDR)	Amount of the Grant Allocated (expressed in SDR)	Percentage of Expenditures to be Financed (inclusive of Taxes)
(1) Goods, works, non-consulting services, consulting services (including for audits), Training, and Operating Costs for Parts 1, 3 (a), and 4 (a) of the Project	53,400,000	0	100
(2) Goods, works, non-consulting services, consulting services (including for audits), Training, and Operating Costs for Parts 2, 3 (b), and 4 (b) of the Project	0	17,800,000	100
Total Amount	**53,400,000**	**17,800,000**	

19. **IDA Disbursement Methods.** The following disbursement methods shall apply. The IDA Disbursement Letter will provide details about each of the above disbursement arrangements. The following disbursement methods shall apply. The IDA Disbursement Letter will provide details about each of the above disbursement arrangements.

a. **Special Commitments and Direct Payments**: Special Commitments using irrevocable letters of credit may be used as well as direct payments to suppliers for works, goods, and services upon the borrower's request.

b. **Advances**: The project will also receive funds into the designated account using the report based disbursement method. IDA will make the initial disbursement to the project after receiving a withdrawal application with a six-month cash flow forecast. This withdrawal application should be prepared within one month after project effectiveness. Thereafter, IDA will disburse into the respective Designated Account based on quarterly IFRs, which would provide actual expenditure for the preceding quarter (three months) and cash flow projections for the next two quarters (six

months). The IFR will be reviewed by the World Bank's Financial Management Specialist (FMS) and approved by the Task Team Leader (TTL) before the request for disbursement is processed by the World Bank' Finance and Accounting Department.

c. **Reimbursements:** Government can request for reimbursement in cases where project activities have been pre-financed.

Procurement

20. **Guidelines.** Procurement will be carried out in accordance with the requirements in the World Bank Procurement Regulations for Borrowers under IPF: Goods, Works, Non-Consulting Services and Consulting Services dated July 1, 2016 (Procurement Regulations); "Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants (revised as of July 1, 2016)"; and provisions stipulated in the Financing Agreement. Staff from LWB and LCC shall be oriented on the application of the Procurement Regulations.

21. **Systematic Tracking of Exchanges in Procurement (STEP).** The World Bank's STEP system will be used to prepare, clear, and update procurement plans and conduct all procurement transactions for the project. Staff from LWB and LCC have undertaken STEP training.

22. **Procurement Templates.** The World Bank's Standard Procurement Documents (SPDs) shall be used for procurement of goods, works, and non-consulting services under International Competitive Procurement. National Bidding documents may be used under National Procurement Procedures (NPP) subject to the exceptions stipulated in the textual part of the Procurement Plan. Similarly, selection of consultant firms and individual consultants shall use the World Bank's SPDs, in line with procedures described in the Procurement Regulations.

23. **Fiduciary Oversight by the World Bank.** The World Bank shall prior review contracts as provided in the procurement plan. All contracts not covered under prior review by the World Bank shall be subject to post review during implementation support missions and/or special post review missions, including missions by consultants hired by the World Bank.

24. **Frequency of Procurement Supervision.** In addition to prior review and regular World Bank supervision missions, one supervision mission shall be undertaken every 12 months to carry out post review of procurement actions.

25. **Operating Costs.** These items will be procured using the Borrower national procurement and administrative procedures acceptable to the World Bank including selection of project implementation support personnel.

26. **Project Procurement Strategy for Development (PPSD) and Procurement Plan.** As per the requirement of the Regulations, the borrower has developed a PPSD. The main elements of the PPSD are summarized in the following paragraphs.

27. **Summary of the proposed procurement contracts.** The main contracts to be undertaken will include the following:

a. Various Technical Assistance contract to enhance capacity of LWB and LCC to implement the project and plan future investments in water and sanitation;
b. Various types of consultancy services including design and construction supervision of water supply and sanitation infrastructure;

c. Works contracts for the upgrading and expansion of water distribution system, rehabilitation and upgrading of priority sanitation infrastructure; and
d. Supply of various goods including new water connection materials, equipment for implementation of Non-Revenue Water reduction strategy, motor vehicles and cycles, IT equipment, office furniture, etc.

Operating Context

28. **Governance Aspects.** Malawi is a stable democratic country, and has a presidential system of government with separation of powers amongst the executive, the legislative and the judiciary. However, fraud, corruption and financial irregularities are a major challenge in the public sector. Public Procurement in Malawi is governed by the Public Procurement Act of 2003 and the Public Procurement Regulations of 2004. A Public Procurement and Disposal of Assets has just been passed by Parliament that will create a Public Procurement and Disposal of Assets Authority whose independence would enhance oversight and monitoring of procurement in the public sector. Security in Malawi is good for contractors to set up businesses and work without any form of interruption. As a result, contractors carry out their work in a conducive environment which in turn encourages competition. The Government under the Malawi Public Procurement Law and Regulations allows bidders who may suffer, loss or injury due to breach aggrieved through the procurement process to lodge complaints and the mechanism of complaint handling has been laid down.

29. **Economic Aspects.** Malawi is a small economy relying heavily on rain-fed agriculture with limited irrigation. The local currency, the Malawi Kwacha, has been unstable for a number of years. Malawi has a high unemployment rate that allows bidders to have a competitive edge as they are able to attract reasonably priced labor on the labor market.

30. **Technological Aspects.** Access to internet is at reasonable level. Further, there are no government restrictions on use of internet. Cell phone access and coverage is relatively high even in remote areas of the country. This enables people, including bidders to exchange and access information quite easily. This access to information brings in competition amongst bidders. In addition, LWB has a website through which bidders can access business opportunities.

31. **Procurement Capacity Assessment of LWB.** Procurement arrangements at LWB are assessed as satisfactory for the purposes of the project[49]. LWB staff are generally familiar with World Bank procurement guidelines and procedures as they have implemented a similar IDA financed project in the recent past. In terms of governance, LWB has an Internal Procurement Committee (IPC) which is responsible for award of contracts. The current set up of the IPC is composed of the Director of Technical Services delegated Chairperson, Director of Finance, Director of Administration and Human Resources. Co-opted members include: Operations Engineer, Management Accountant, and Transport Manager. The Procurement Unit is the secretariat to the Committee. Furthermore, LWB has a PIU which is responsible for all capital projects, and is staffed with a Project Manager; six (6) Project Engineers; a Procurement Officer and a Project Accountant. LWB has also recently recruited a Procurement Manager to provide strategic oversight and regular monitoring of all procurement activities.

32. **Market Research and Analysis.** The main activities under the project is procurement of works, consultancy services and goods. The project has high value infrastructure components with works packages and consultancy services. The country does not have many contractors with capacity to implement these works, and

[49] Procurement capacity assessment of LCC was not carried out, as it was decided early on, based on the financial management assessment, that all procurement and financial management will be centralized at LWB.

the local consultants do not have capacity to design and supervise construction of the infrastructure. The magnitude of the works and consultancy services will require international bidding. Goods and other non-consultancy services can be accessed from both local and international suppliers. It is expected that for these contracts mostly the international bidders would participate probably with joint venture with local players.

33. **Procurement Risk Management.** The overall Project Procurement Risk is **Substantial.** The following risks have been identified under the project and mitigation measures have also been proposed as follows.

Table 2.3- Procurement Risk Mitigation Measures

S/No	Risk	Risk Factor		Mitigation Measure	Time frame	Responsibility
		Impact	Likely hood			
1	Record Keeping and documentation not maintained	Major	Unlikely	All implementation agencies will maintain all procurement records	Whole life time of project	PIU/ LWB/LCC
2	Fiduciary Risk relating to Main principles of the World Bank Procurement Guidelines not being followed	Major	Unlikely	• Experienced procurement staff/consultant shall be engaged to guide the PIU • Attend training in Bank procurement • Conduct training on new Bank Procurement Regulations and use of STEP • Regular supervision support and monitoring	Whole life time of project	LWB/LCC /IDA
3	Inefficiencies and delays in procurement process especially preparation of ToRs and Bid specifications	Major	Likely	• Regular monitoring through procurement plan • Timely preparation of ToRs/ bid specifications • Train staff in preparation of ToRs/bid specifications	Whole life time of project	LWB/LCC and IDA
4	Insufficient competition in procurement	Major	Unlikely	Appropriate contract packaging in order to attract potential bidders	Whole life time of project	PIU
5	Contract Management	Major	Likely	Disclosure of all contracts awards in UNDB for prior review contracts and post review contracts in local newspapers and website of Office of Director of Public Procurement Periodic measuring and reporting of contractors, /consultants' performance (cost, schedule, performance/quality) using a Contract Management Plan for complex contracts	Whole life time of project	PIU/LWB /LCC

S/No	Risk	Risk Factor		Mitigation Measure	Time frame	Responsibility
		Impact	Likely hood			
6	Fraud and Corruption risks (including collusion and outside interference in contracting process)	Major	Likely	• Disclosure of procurement plan • Disclosure of contract awards • Creating awareness on effects of fraud and corruption • Regular reviews such as PPR, internal audit, external audit	Whole life time of project	LWB/IDA
7	Weak complaint redress system	Major	Likely	• Disclosure of complaint redress procedure through Office of Director of Public Procurement • Bi annual report of all complaints received and action taken	Whole life time of project	LWB

Legend: Impact- MJ-Major, MI-Minor, Ne-Negligible, NA-Not Applicable
Likelihood- L-Likely, EL- Equal Likelihood, UL-Unlikely, NA-Not Applicable

34. **Procurement Arrangements.** Based on the risks identified above, the following procurement arrangements will be used:

a. **Selection method for goods, works and non-consultancy services**: Request for Bids (RFB), Request for Quotations (RFQ) and Direct Selection (DIR) will be used as appropriate. The procurement of most items from local market shall be done by the *open national procurement procedure as recommended by the Procurement Regulation for IPF Borrowers July 2016 paragraphs 5.3 to 5.6.*

b. **Selection method for consultancy services:** The preferred method would be Quality and Cost Based Selection (QCBS). However, other methods including Consultants Qualification Selection (CQS), Direct Selection (CDS) would be used, in accordance with the provisions of the Procurement Regulation for IPF July 2016 and as stipulated in the Procurement plan.

c. **Contract strategy**: Goods, services and civil works will be packaged in economical packages to attract bidders who are qualified and can offer good prices and complete contracts within stipulated period resulting into value for money.

d. **Approach to Market:** Based on previous experience and available local market, the thresholds provided in Table 2.4 will generally be used for open national/international and RFQ bidding unless otherwise indicated in the Procurement Plan (All figures in million US$)

Table 2.4 - Thresholds for Procurement Approaches and Methods (US$ millions)

Works			Goods, IT and Non-Consulting Services			Shortlist of National Consultants	
Open International ≥	Open National <	Request for Quotation ≤	Open International ≥	Open National <	Request for Quotation ≤	Consulting Services ≤	Engineering & Construction Supervision ≤
7	7	0.2	1	1	0.1	0.2	0.3

e. For consultancy services, open international advertisement shall be done for all cases equal and above US$300,000.

35. **Procurement Plan.** A draft Procurement Plan (PP) for the first 18 months has been prepared that sets out the selection methods to be followed by the borrower during project implementation in the procurement of goods, works, non-consulting services, and consulting services. The PP will be updated at least every 12 months, or as required, to reflect the actual project implementation needs, but each update shall require World Bank no-objection.

36. **Contract Management**. Under the project some contracts have been identified to be complex as indicated in the procurement plan, therefore a mandatory Contract Management Plan will be put in place for those contracts. The PIU would develop the key performance indicators (KPIs) for these contracts and the KPIs would be monitored during the execution of the contract.

Environmental and Social (including safeguards)

37. **Environmental and social impacts**. Environmental and social impacts attributable to this project are mainly linked to (i) rehabilitation and upgrading of 142 km of existing water distribution pipelines and 27 km of transmission pipelines in different residential areas of Lilongwe city; (ii) laying of an additional 186 km of water distribution pipelines to the network to reach unserved areas of the city; (iii) rehabilitation and upgrading of approximately 107 km of sewer pipelines, as well as and improvements to onsite sanitation systems; and (iv) rehabilitation and expansion of Kauma sewage treatment plant from 6 MLD to 8.7 MLD. These investments are not expected to generate any large scale, significant and/or irreversible impacts. Instead, the investments will generate largely positive environmental and social impacts.

38. The major positive social impact of the project is that approximately 500,000 people in Lilongwe city will gain access to reliable water services and safely managed sanitation, resulting in significant health and economic benefits for the city. Further, the project is expected to help reduce inequalities in service delivery between different segments of the population by increasing access to water services in the underserved areas of the city (most poor areas), and contribute to reducing water rationing in the medium-term. The major positive environmental impact is expected to come from investments in sanitation. The project is expected to result in reduced public health risks and environmental pollution due to poor sanitation. Further, project investments in rehabilitation of the water distribution network will reduce water losses and improve energy efficiency.

39. The project is classified as Category B based on the minimal negative environmental impacts. Potential negative impacts are small-scale, temporary in nature and scope, and can be easily and cost-effectively mitigated. Most of the direct impacts will be site-specific and will not affect an area broader than the sites or facilities of the physical works. Potential negative social impacts will largely occur during the construction and operational phases of the project. During construction, the likely temporary impacts will largely be associated with civil works emanating from digging of trenches to install the water distribution and sewer pipelines. Impacts may include soil erosion; generation of construction related solid waste; reduced vegetation cover due to clearing of land to pave way for construction activities; impacts on natural habitats such as rivers and wetlands during construction; increased localized noise and dust emissions due to earth moving equipment and machinery, and oil spillage from construction equipment and machinery.

40. During the operational phase, the principal environmental risks are largely related to environmental and human health effects from effluent discharges. Preliminary assessment of the likely impacts of the effluent to the water quality of the Lilongwe River indicates long term improvement in the water quality of the effluent

discharged into the Lilongwe River. Incremental wastewater to be collected will be treated in the rehabilitated Kauma sewage treatment plant to comply with the national BOD5 standard of 20mg/L before discharging into the Lilongwe River.

41. The project is also expected to result in negative social impacts. Some of the water distribution network rehabilitation/expansion works and sewer pipeline installation will be in densely populated areas of the city. Although the pipelines will be laid in road reserves to minimize land acquisition and disturbances, there are signs of encroachment on the road reserves in many areas across the city. The project is thus expected to disturb settlements, requiring temporary land acquisition, and is likely to disrupt livelihood activities. The disturbances will result in loss of property; damage to road pavements; damage to concrete driveway; damage to building structures; obstruction to passage on the roads; disruption of public service utilities; and temporary disruption to business activities and loss of income. For priority water distribution network investments, it is estimated that approximately 363 households/businesses will be impacted. For sanitation activities and other water distribution network investments not yet identified, the exact impact is unknown at this stage, but is likely to be of similar magnitude. Overall, the negative social impacts from the project are temporary, site specific and reversible.

42. **Climate change.** The project is exposed to exogenous climate and disaster risks. Malawi has experienced climate and geophysical hazards in the past and is expected to experience these in the future with high intensity, frequency, or duration. Climate risks that are relevant to the project include extreme temperature and droughts, extreme precipitation and urban floods. Extreme droughts will lead to a reduction in the amount of water available for abstraction from Lilongwe River, while extreme precipitation and floods causes high flow volume in the river, which may result in inundation of the intake, deterioration of water quality, damage to wastewater treatment plants, and increase in water borne disease outbreaks. Climate change adaptation and mitigation measures have been incorporated in the project design to moderate the impact and to ensure continuation of water and sanitation services in case of drought events and flooding. The project has considered water scarcity/drought and floods in the planning and design of all critical water and sanitation infrastructure. Project interventions on the water distribution network are expected to reduce water losses, improve energy efficiency and reduce operational costs. The project will use flood-resilient materials/design for pipelines and other water supply and sanitation infrastructure. Water and sanitation master plans to be prepared under the project will also incorporate climate risks. The project also involves support to preparation of water safety plans and business continuity plans, as well as institutional capacity strengthening in the areas of corporate governance; leadership; staff productivity; operational processes and systems – all of which are critical for building LWB's resilience to climate risks.

43. **GHG accounting**. For each component of the project, greenhouse gas emissions were estimated in t-CO2eq using the World Bank's Water GP's GHG accounting Excel tool. Table 2.5 below summarizes the results obtained considering a 20-year project life. The analysis shows the project to be slightly emissive. The net emissions of the project are estimated at **3,170 tCO_2-eq** over the 20-year life of the project, while the gross emissions are estimated to be 199,131 tCO_2-eq. On average, the project generates estimated net emissions of 159 tCO_2-eq annually. The water supply activities are estimated to experience net emissions reductions of -3,173 tCO_2-eq due to energy efficiency gains, while the wastewater activities are slightly emissive on a net basis of 6,343 tCO_2-eq. The sanitation activities are on net emissive largely due to the use of anaerobic wastewater treatment processes without capturing the methane. The project will explore measures to address this issue as part of the feasibility study and design of upgrades to the wastewater treatment plant.

Table 2.5: Estimated GHG emissions by component

Component	Description	Timeline	Emissions Estimate ($t\text{-}CO_2eq$)
Component 1: Network Rehabilitation, Expansion and NRW Reduction	NRW Reduction and Improved Quality of Service	20 years	-3,173
Component 2: Priority Sanitation Improvements	Wastewater Collection and Treatment	20 years	6,343
		Total	**3,170**

44. **Safeguards policies triggered and mitigation instruments**. Environmental risks will be mitigated through application of standard World Bank environmental safeguard instruments. The project triggers the following World Bank safeguard policies:

- The policy on **Environmental Assessment (OP/BP 4.01)** applies because planned works under the project will have environmental and social implications. Priority water distribution network investments are known and have been screened for environmental risks and impacts. The scope of activities is limited to rehabilitation and upgrading of existing network infrastructure (pipelines, storage tanks and pumping stations). Environmental impacts associated with these investments are limited and will be managed using an Environmental and Social Management Plan (ESMP). LWB has prepared an ESMP that is acceptable to the World Bank. The ESMP was consulted upon and publicly disclosed in-country and on the World Bank's website on October 3, 2017, thereby complying with the requirements of OP 4.01. For sanitation and other water investments whose scope and/or specific locations are unknown at this stage, an Environmental and Social Management Framework (ESMF) has been prepared and publicly disclosed in-country and on the World Bank's website on October 29, 2017. All subsequent sub-projects will be screened, assessed and site-specific environmental assessment carried out during the implementation stage of the project per the provisions of the ESMF. The framework also cover technical assistance activities related to preparation of a water and sanitation master plans, as well as feasibility studies for future water supply and sanitation investments. Consultations on the ESMF have been held and appropriate grievance-handling procedures and arrangements for monitoring implementation are in place.
- The project triggers the policy on **Natural Habitats (OP/BP 4.04)** because trenching activities associated with rehabilitation/expansion of the water distribution, sewer networks and expansion of the wastewater treatment plant may have impacts on natural habitats such as wetlands and rivers during the construction phase and operational phases. Sanitation interventions, in particular rehabilitation of sewerage network, rehabilitation and expansion of sewage treatment plant, construction of public/household onsite sanitation systems, may result in impacts to water quality in receiving waters. The ESMP for priority network rehabilitation works includes an assessment for potentially affected natural habitats, as well as mitigation measures to minimize impacts. Similar assessments will be done for sanitation investments as part of preparation of site-specific safeguards for these investments, in accordance with the provisions of the ESMF.
- The policy on **Physical Cultural Resources (OP/BP 4.11**) applies because project activities may have impacts on physical cultural resources. Although, the project area is already impacted by the laying of existing water and sewer pipelines, road network and residential areas, chance finds are still possible. The project ESMF incorporates chance-find procedures for construction contracts. The ESMF also

provides for an assessment of the impacts on physical cultural resources for sub-projects as an integral part of the environmental assessment process.

- **Involuntary Resettlement OP/BP 4.12** is triggered because some of the project activities will disturb settlements, requiring land acquisition leading to temporary or permanent resettlement, and is likely to disrupt livelihood activities. However, no major resettlement is expected in the project. For the priority water distribution network rehabilitation, LWB has conducted extensive consultations and socioeconomic studies of the areas affected and prepared a Resettlement Action Plan (RAP) in accordance with the provisions of OP/BP 4.12. The RAP was publicly disclosed in-country and on the World Bank's website on October 3, 2017. Public consultations on the RAP have been held and appropriate grievance-handling procedures and arrangements for monitoring RAP implementation are in place. For sanitation and other water network investments not yet identified and whose scope and/or locations are unknown at this stage, a Resettlement Policy Framework (RPF) has been prepared and publicly disclosed in-country and on the World Bank's website on October 25, 2017. The framework will ensure that the process of identifying, assessing, and mitigating resettlement-related impacts is integrated in the development of the specific subprojects. Subsequent subprojects will be screened as per the provisions of the RPF and the appropriate safeguards tools will be formulated and implemented. Consultations on the RPF have been held and appropriate grievance-handling procedures and arrangements for monitoring implementation are in place.

- The project triggers the World Bank policy on **Safety of Dams (OP/BP4.37)** given the project relies on the performance of existing dams (KD1 and KD2) during periods of low flows in Lilongwe River[50]**.** LWB engaged dam specialists in 2013 and 2015 to inspect and evaluate the safety status of KD1 and its performance history. The assessment recommended several remedial works to upgrade the dam, including structural works on the spillway and outlet. The remedial works constitute part of the scope of the EIB-funded subproject for rehabilitation and raising of KD1. The works are currently at procurement stage and are expected to be completed by in 2019. The World Bank team has reviewed all documentation relating to the assessment and remedial measures and found it satisfactory, for purposes of the policy. LWB will maintain a Panel of Experts for continuous technical oversight and guidance during construction. Further, the World Bank team will continue its due diligence during implementation of the KD1 dam sub-project and work with LWB and EIB to address any issues identified with respect to compliance with the requirements of OP4.37. With respect to KD2, the safety assessments conducted in 2015 concluded that KD2 dam and its appurtenant structures were performing reasonably well, except for the damaged instrumentation. The assessment recommended safety measures (mainly nonstructural) which will be financed under this project. The project will also finance preparation of dam safety management plans (including instrumentation plan, O&M plan and emergency preparedness plan) for both KD1 and KD2.

- The project triggers the policy relating to **Projects on International Waterways (OP 7.50)** because the project lies within the Lilongwe River watershed, a tributary of the Linthipe River that flows to into Lake Malawi. Lake Malawi drains into the Shire River which flows south to the Zambezi River. Both Lake Malawi and Zambezi River are categorized as international waterways for purposes of the policy. Planned sanitation investments under the project are expected to improve the quality of effluent and reduce the overall pollution load to Lilongwe River. Thus, the project will not adversely affect the quality of water flows to the other riparians, and will not be adversely affected by the other riparians' water

[50] The dams provide storage which is utilized during the dry season when the river flow is low

use. LWB has sought exemption for the requirement for notification of riparian states. The exemption has been approved by the Africa Vice Presidency of the World Bank.

45. **Arrangements for safeguards implementation and monitoring**. LWB, through its PIU, will have the overall responsibility to implement, monitor and report on the implementation of all safeguards instruments. Key PIU responsibilities include:

- Overall coordination and management of the project's social and environmental safeguard instruments;
- Prepare, implement and monitor the safeguards instruments under the project;
- Establishment of good and operational relations with affected communities;
- Implementation of the project communication plan and continuing consultation with project affected communities and other stakeholders;
- Communication and cooperation with LCC and other institutions and actors involved in implementation of safeguards;
- Ensure and monitor overall social and environmental due diligence as per the provisions of each safeguard instrument;

46. The PIU's Environmental and Social Specialists will conduct the environmental and social screening of subprojects. Site-specific safeguards instruments (such as ESIA/ESMP, RAP) will be prepared by consultants recruited by the PIU. The Environment Affairs Department (EAD) will review and approve the ESMPs or ESIAs in line with the national approval processes. LWB, through its PIU, will implement, monitor, supervise and report on implementation of all the safeguard instruments under the project. LWB will also contract a third-party agency to conduct regular evaluation of implementation of safeguards instruments, as well as audit of compliance and completion. Finally, all contractors will be required to follow the Environmental Rules for Contractors (ERCs) and any site-specific environmental management actions agreed and incorporated into all construction contracts.

47. **Assessment of LWB's capacity to implement safeguards**. LWB will have the overall responsibility to implement, monitor and report on the implementation of the various safeguards instruments for the project. LWB staff are familiar with both the national requirements and World Bank requirements for social safeguards. LWB prepared the ESMF and RPF itself, demonstrating commitment and ownership of the necessary measures for mitigation. LWB was also one of the implementing agencies under the World Bank-financed Second National Water and Development Project which closed in October 2015, with satisfactory safeguards performance. In addition, LWB is currently implementing the RAP for KD1 dam raising – one of the sub-projects under EIB-funded Lilongwe Water Resources Efficiency Project (LWREP). Although LWB has some experience in implementation of safeguards instruments, the capacity to manage social risk at the scale of this project is still insufficient. Thus, the project will support the recruitment of a social development/safeguards specialist into the PIU in LWB to implement and monitor the mitigation measures described in the various safeguards instruments. In addition to the other professionals in the PIU, there will be a full-time Environment Specialist and a full-time Social Specialist to lead implementation of the ESMF, RPF, ESMP, RAP and any other safeguard instruments to be developed under the project. Budget for implementation of safeguard instruments has been estimated and included in the project cost estimate. Costs related to cash compensations (estimated at US$2 million for the entire project) will be funded by GoM. Other safeguards implementation costs not related to cash compensations are eligible for financing under the project.

48. **Gender and social inclusion**. LWB has conducted a gender analysis to identify specific gaps and issues that may prevent women from fully benefiting from the project. The analysis identified the following issues: (i) women, girls and children disproportionally bear the burden of lack of access to improved water services, given

they are responsible for collecting water in the household; (ii) women disproportionately lose time caring for children who have contracted water borne diseases because of poor sanitation and water access (iii) women and youths disproportionately lack access to jobs and employment opportunities in the water and sanitation sector; and (iv) there are gaps in women's participation and representation in water and sanitation decision making at the utility level. The project will address these gaps in the following ways. First, the project will monitor benefit flows to women by collecting gender disaggregated data on project beneficiaries. This information will be used by the project implementing agencies to enhance gender inclusiveness. Second, project contractors will be encouraged (through relevant contractual provisions) to engage women and youths in project design and during the construction phase and provide them with training opportunities. Third, the project through Component 4, will support the utility to provide career training and increase the capacity of women in the utility. Their participation and representation in water and decision making will be promoted through training opportunities and through increased representation in decision making roles (both technical and non-technical supervisory or managerial roles). Specific indicators have been included in the project results framework to monitor the success of these actions.

49. Further, a recent citywide survey of water and sanitation services in Lilongwe identified huge inequalities in access to services between the poor and rich**.** Figure 2.3 shows the water supply and sanitation coverage by poverty quintile. With respect to water supply, the data shows that the poor rely mostly on sources outside their premises (public taps and yard taps). Many of these public taps are in the southern part of the city where most of the city's poor live. Moreover, intermittent supply is widespread in these areas and the frequency of water rationing is much higher compared to other areas. On sanitation, the most common facility among the poorest quintiles are the unimproved traditional latrines, followed by improved pit latrines, whilst the less poor use WC connected to septic tanks. The project design includes deliberate measures to reduce these inequalities in service delivery, including targeted network interventions in the southern zone of the city to remove hydraulic bottlenecks and improve reliability of services and assistance for toilet construction and improvements for the poor and vulnerable households. In addition, data on PDO indicators will be disaggregated by poverty quintile to track benefits flows to the poor.

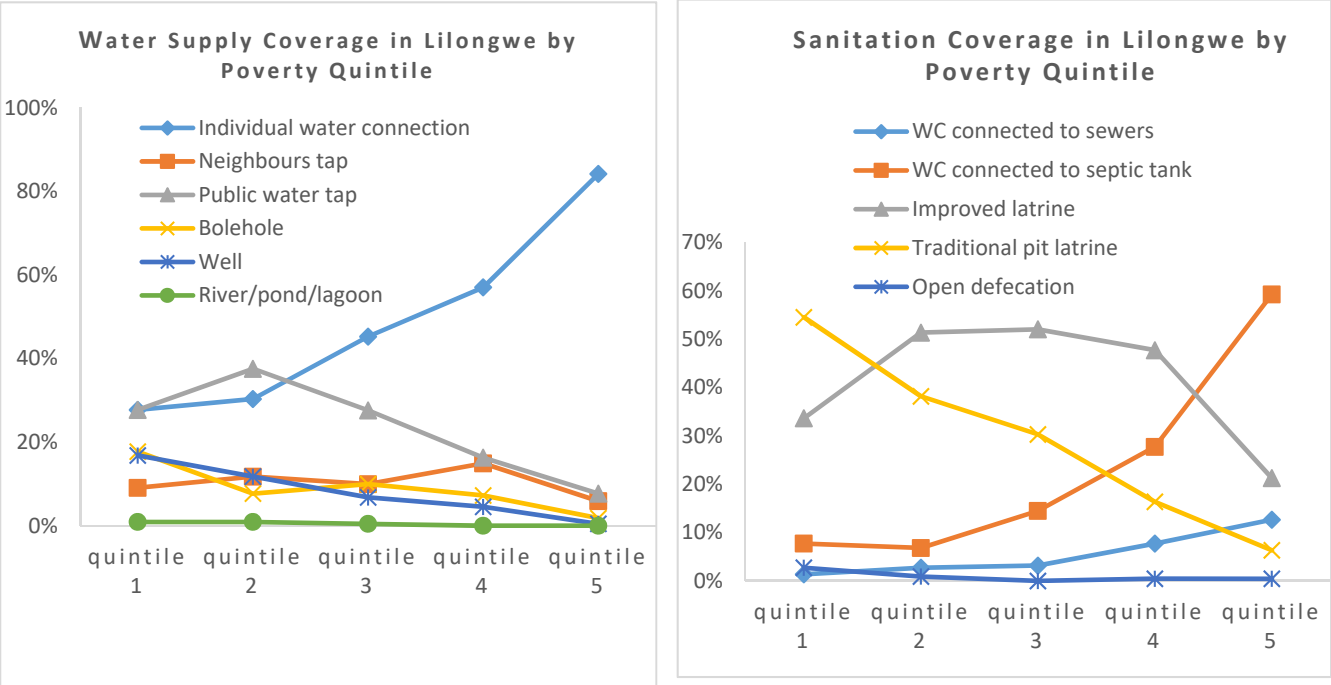


Figure 2.3: Water and sanitation coverage in Lilongwe, by poverty quintile

Monitoring and Evaluation

50. **Arrangements for results monitoring**. LWB will be responsible for results monitoring, with support from LCC. Results will be monitored using LWB's existing M&E systems, with some enhancements to accommodate sanitation indicators, which are currently not monitored. The project results framework (see Section VII) forms the basis for tracking progress in meeting the project's objectives. However, data on other indicators not included in the result framework (such as health indicators) will be to monitored and integrated in the overall M&E framework to provide a full picture of the project's impact.

51. The project's PDO will be measured using two indicators: (i) number of people receiving improved water services; and (ii) number of people gaining access to safely managed sanitation services. For purposes of this project, an improved water service is defined as a minimum of 18-hour water supply meeting GoM water quality standards, and supplied at an average pressure of 12 m at predetermined points in the distribution network for no less than 300 days in a year, unless the service area is declared a disaster affected area. LWB will record daily data on hours of service and pressure using data loggers installed at pre-determined points in the distribution network. Data logs will be stored in an appropriate format for easy data retrieval. With respect to water quality, LWB will monitor physical, chemical and bacteriological quality of water at source, distribution network and customer end in conformity with the prevailing national standards on drinking water quality. LWB will prepare annual reports on the number of household connections (and number of people) receiving an improved water service as defined in this project.

52. Safely managed sanitation is defined as an improved sanitation facility (including a handwashing facility with soap and water) which is not shared with other households, and where excreta is safely disposed in situ and/or transported and treated off-site. Improved sanitation facilities include flush/pour flush toilets connected to piped sewer, septic tank or pit latrine; and composing toilet or pit latrine with slab. With respect to sewerage services, LWB (with support of LCC) will collect data on the number of new household connections to the public sewer system and number of existing household sewer connections that are benefiting from sewer rehabilitation and upgrade. With respect to onsite sanitation facilities, LCC will be responsible for collecting data on the number of households gaining access to an improve sanitation facility.

53. Process monitoring will focus on processes that are critical to achieving the project's objectives, such as procurement, safeguards, technical assistance and institutional strengthening activities. All teams involved in the implementation of the project will participate in the process of data collection, compilation, analysis, and use. LCC will take a lead on collection of data on sanitation-related indicators, and feeding the information in LWB's M&E system. The exact split of M&E roles between LWB and LCC will be specified in the MoU. Reporting on project progress will be undertaken on a semi-annual basis to build a learning platform to inform project management and to improve project performance. Annual beneficiary surveys will be undertaken as part of project's M&E system.

54. **Assessment of institutional capacity for M&E**. LWB has established systems for collection, reporting and using data on various operational indicators related to water supply. However, their experience in monitoring projects involving multiple stakeholders and reporting results that go beyond normal operational indicators is limited. For this reason, LWB will recruit a M&E specialist in the PIU to be responsible for tracking progress on PDO indicators and intermediate results indicators, and design and implementing specific evaluation studies as needed**.** The PIU will prepare semi-annual progress reports that cover implementation status and results; challenges and proposed actions to address them; status of procurement and disbursements; and status of environmental and social safeguards implementation. The project will fund necessary equipment (e.g. computers, software and other goods), capacity building (training) and incremental costs to strengthen results and process monitoring at the project level and to equip the PIU to carry out these responsibilities. To the extent possible, project M&E data will be made publicly available to improve transparency and project governance.

55. **Beneficiary feedback mechanisms.** Mechanisms for beneficiary feedback are in place, but will need strengthening. Grievance-handling procedures are in place for managing grievances related to implementation of safeguards instruments. These mechanisms are documented in the various safeguards documents. LWB recently started undertaking customer satisfaction surveys, albeit on an annual basis, while LCC does not collect any information on citizen satisfaction with its services. The project will support LWB to develop, test and institutionalize an efficient and cost-effective methodology for regular customer satisfaction measurement to ascertain the importance customers attach to various service attributes, as well as customers' perception of LWB's performance on those attributes. The same support will be provided to LCC with respect to sanitation services (particularly sewerage). Citizen engagement indicators included in the project result framework are: (i) customer satisfaction index for water services – which measures customers' perception that the water services provided LWB have met or exceeded their expectations; and (ii) proportion of sewer blockage complaints resolved within 15 days of being recorded in the database – which measures responsiveness to customer complaints related to sewer blockages.

ANNEX 3: IMPLEMENTATION SUPPORT PLAN

COUNTRY: Malawi
Lilongwe Water and Sanitation Project

Strategy and Approach for Implementation Support

1. The strategy for implementation support has been developed based on the nature of the project and its risk profile. The aim is to make implementation support to the client more flexible and efficient by focusing on implementing the risk mitigation measures defined in the Systematic Operations Risk-rating Tool (SORT).

Implementation Support Plan and Resource Requirements

2. The World Bank Task Team Leaders (TTLs) will provide ongoing support by coordinating with the client and among World Bank staff who will provide implementation support on technical, fiduciary (FM and procurement), and safeguards aspects. The TTL will be based in Lilongwe, and implementation will be supported by task team members in the World Bank's Washington, DC offices as well as selected field offices. Field missions can be organized quickly should the need arise and international expertise can be mobilized to provide global best practices. Formal missions will be carried out at least twice per year. Table 3.1 shows the expected skill requirements, timing and resource requirements for implementation support over the life of the project. The implementation support plan is flexible and open to adjustment throughout the project period.

3. In conjunction with Government counterparts, the World Bank will monitor progress against the monitoring indicators in the Results Framework. The World Bank will also monitor risks and update the risk assessment and risk management measures, as needed. A midterm review will involve a more in-depth stocktaking of performance under the project. Based on the assessment of progress at the midpoint, Government counterparts and the World Bank will consider recommendations for improvements or changes. The World Bank team will also maintain close coordination with other development partners supporting the Lilongwe Water Program.

Table 3. 1 - Implementation support skills mix

Skills Needed	Resource Estimate (Staff weeks/year)	
Task Team Leader	12	Based in Country Office
Co-Task Team Leader	12	Based in Regional Office
Procurement Specialist	6	Based in Country Office
Financial Management Specialist	6	Based in Country Office
Water Engineer	12	Based in Regional Office
Sanitary Engineer	12	Based in Regional Office
Communication Specialist	12	Based in Country Office
Infrastructure Economist	10	Based in HQ
Social and Environmental Specialists	8	Based in Regional Office
Administrative and Client support	12	Based in Country Office
Senior Legal Counsel	4	Based in HQ
PPP Specialist	12	Based in HQ
Infrastructure Finance Specialist	6	Based in HQ
Institutional Development Specialist	6	Based in Regional Office

ANNEX 4: STAKEHOLDER ENGAGEMENT AND COMMUNICATION STRATEGY

COUNTRY: Malawi
Lilongwe Water and Sanitation Project

Introduction

1. This Annex summarizes the results of a stakeholder analysis[51], and identifies key stakeholders in the Program; the issues related to each stakeholder that either threaten or offer opportunities to the progress of the Program; the strategic approaches to deal with such issues especially if they come as threats and how the project can ride on issues that come as opportunities to be exploited; and the tools to be used.

Strategic Communication Assessment and Operational Analyses

2. **Project communication context**. The communication assessment covers such issues as the communication environment, stakeholder and political dynamics, cultural characteristics, role and capacity of civil society, and related/existing communication campaigns and partnership opportunities. In Malawi, water access is a social, economic and political issue. Recently, water investments for the city of Lilongwe have been shrouded with a lot of controversy with wide differences among stakeholder groups on certain investments. Issues have ranged from EIAs, resettlement to project costs. Further, a recent case of water contamination in the suburb of Area 18 by a leaking sewer has increased media attention on both LWB and LCC. Consumers, activists, and politicians are all making their voices heard on water in the city. Cumulatively, these issues have heightened the need for properly managed communications on Lilongwe city water supply and sanitation. Both traditional and social media have played a significant role in communicating all these water issues. With two institutions implementing different components of the project, there is need to strongly coordinate the communications management function between the two institutions.

3. Both institutions already have communication teams in place, but their capacity will need to be strengthened in managing operational communications, as well as crisis communication. Capacity building could also be required to revamp websites. LWB has plans to establish the position of Communications Manager. Beyond the communication professionals, senior management and technical staff will also have a communication role to play, especially in articulating policy and technical issues around the project. Further, all the teams will be crucial in creating synergies on messages emerging from the various projects under the Lilongwe Water Program supported by different partners.

4. The project will be implemented during a critical part of the political electoral cycle. Water issues in the city may therefore not be immune to politically charged mention in the run-up to the May 2019 elections. The project should therefore ensure adequate information is disseminated timely to all stakeholders so they are objectively informed to reduce capture by political rhetoric.

5. Both civil society and service consumers in Malawi are now more upfront in demanding for information and transparency from service providers. Water is not an exception. This project therefore should pro-actively share information and create relevant awareness and sustain behavior change with these stakeholders before, during and after the project implementation period. Part of this will include having vibrant websites and other social media channels.

[51] A stakeholder analysis was conducted by specialist from LWB, with support of the World Bank team. Full report of the analysis is available in project files.

6. All the project components have various aspects that relate to communication and will attract the attention of various interest groups who need to be communicated to ensure they understand what each of the components entails. The outcomes of the project also need to be well articulated, even more so by the water and sanitation services consumers. These voices will be captured through this communication strategy. Also, there is a need to create message synergies with other projects in the Lilongwe Water program.

7. The communication strategy will help achieve the objectives outlined above through (i) facilitating internal communication fora within and between the implementing entities. This will enhance collaboration in monitoring of outcomes, use of resources, and message consistency throughout the life of the project; (ii) creating communication partnerships with other projects to ensure messages being delivered across the whole LWP complement each other.

Communication Objectives and Strategic Actions

8. There are several issues arising from the communication assessment and operational analysis of the project that will benefit from strategic communication interventions. The communication assessment shows that the following issues will need to be addressed: political interference, stakeholder resistance and sabotage, backlash from the media through negative reporting, poor policy implementation, gender insensitivities, and transparency and accountability issues. All components of the project covering both water supply and sanitation issues will benefit from actions taken through this strategy. The strategy objectives are: (i) to inform various publics about the project - its activities and outcomes towards improving water and sanitation in Lilongwe city; (ii) to empower key constituencies/stakeholders with relevant information so they execute their roles and responsibilities in helping sustain results of the project; and (iii) to facilitate information sharing within project teams and create synergies with other projects in the Lilongwe Water Program.

9. Key strategic actions to be taken throughout the project implementation are:

- *Identification of messages* - Based on the issues arising from the communication assessment and operational analysis above, broad message areas will be identified. This process will involve the operation and communication teams from both implementing entities, and a few selected key stakeholders.
- *Stakeholder consultation and engagement* - Key stakeholders will be informed, consulted and engaged starting from the initial stages of the project. Managers of the various components will take the lead in these engagements. Stakeholders will also be engaged to seek support on issues that are pre-identified to enhance operations or as they arise during implementation.
- *Production of Information, Education and Communication (IEC) materials* - At various stages of the project, IEC materials such as jingles, leaflets and posters will be produced to provide an educational and informative platform to stakeholders about the project. IEC materials will present project information and messages in a digestible format to help achieve the purpose of communicating.
- *Publication of results stories through social and traditional media* - At various milestones across all components, results stories will be published in the local newspapers and websites of implementing entities showcasing beneficiary voices and technical progress. This will help to build project profile and image, and help to disseminate updated information to the public. A photo database will also be developed to facilitate pictorial profiling of progress. Audio voices of the beneficiaries will also be captured and published through appropriate web-based and social media channels.

- *Strategically engage the media* - The media has been singled out as a key stakeholder because of the role it plays in shaping discourse on critical issues as water and sanitation. Key media activities will include an initial orientation workshop, field visits, briefings, press releases, and advertorials. For the briefings and field visits, arrangements will be made for selected operational staff to be interviewed as per their area of expertise in both English and vernacular.
- *Hold community mobilization and sensitization campaigns* - The campaigns will be tailored towards mobilizing people through traditional leaders and other influential figures in their communities to build support and awareness of specific project components, using the existing structures at the community level. Community mobilization activities across the city will include interface meetings and open-day- community sensitization talks, drama, and music- aimed at engaging community members and build community knowledge. The activities will help to build knowledgeable communities empowered to take good care of water and sewer investments in their areas, and set up local water and sanitation committees.
- *Programs on national public and private radio and television stations* - Several programs for both radio and television will be produced to help create awareness and inform consumers on key water and sanitation messages identified through this strategy. Much as the project area is Lilongwe City, the issues on water and sanitation apply across various cities, hence for the benefit of the greater nation radio and TV stations to be used are those with national coverage.
- *Facilitate inter and intra-agency communication*- To facilitate information sharing, each implementing agent will hold internal staff meetings to twice a month to update each other on progress. These meetings will not cover the LWSP only, but all other initiatives the Board is engaged in so that staff have a holistic view of the complementarity of efforts to provide water to the city, and through such fora ensure consistency of messaging. Once a month the two implementing entities will also meet for progress updates.

Target Audiences

10. The project's audiences are those that would, in one way or the other, be affected by the project or themselves influencing the successful implementation of the project. This strategy will focus on the following audiences:

- *Consumers (Residents of Lilongwe City)* - Consumers or residents of Lilongwe city are the primary beneficiaries of the project. They are to be engaged at various stages of the project to ensure they are aware and well informed of the importance of the project to their communities. Such issues as safeguarding water pipes and use of sanitation infrastructure are in the best interest of the consumers. The designed messages will target them as primary audiences. Special consideration will be given to gender and vulnerable population in the design of communication and marketing campaigns
- *The media* - The media is critical in shaping opinion and has ability to reach out to all the targeted stakeholders. The media will be kept informed and engaged as much as possible. The strategy will target the media as both primary and tertiary audiences.
- *Government ministries, agencies* - Government ministries and agencies are policy implementers. Several of them will engage with the project to varying degrees, with the most engagement being

with the Ministries of Water, Land and of Health. They will need to be adequately informed about the project for smooth policy guidance, regulation and enforcement.

- *Members of Parliament* - MPs are the ones that will ratify the project authorization bill so they need to know the content of the project early on. Beyond that Lilongwe City has several seats for MPs. Water is usually a campaign issue both in urban and rural areas, and those contesting are likely to raise it. This project is therefore unlikely to go without scrutiny by MPs and as a tool to gain political mileage. To mitigate the risk of political capture, information about the project has to be adequately made public. Parliamentary Committees have recently sharpened their oversight roles and LWB management could be summoned at any time to explain its provision of water to the city.
- *Local Government leaders* - Local Government leaders include chiefs at various levels, and elected councilors. These together with Members of Parliament have influence on consumers or communities they serve. Their engagement in the project will be valuable to communicate key messages and ensure they help to shape consumers/public's opinion about the project.
- *Civil society organizations/NGOs* - Civic organizations are significant in influencing policy decisions and public opinion on water rights. They will be essential in mobilizing and sensitizing consumers. At the same time, they could derail the project with wrong or negative messaging on any matter that could arise such as compensation, imbalances in gender issues surrounding water, etc.
- *Development Partners* - Development partners play a critical role of advocating for implementation of policies that are in line with the project. They also play a role of ensuring that there is transparency, accountability and good governance as well as efficiency in use of project resources. It is therefore imperative to keep them engaged and informed where possible.
- *Internal audiences* - This comprises the implementing entities (LWB and LCC), the parent Ministries, and the project financiers (World Bank) staff. They all have a responsibility to ensure the project is implemented on time and within the resource envelop; and manage public information disclosure.

Summary of Budget, Core Deliverables and Timeline

11. The activities under this communication strategy are budgeted at US$135,000. The cost is included in the project budget (under project management support). These resources will be used for the development of communication messages, activities for dissemination of the developed messages through selected tools/channels and production of IEC materials. Some tools will need to be strengthened such as websites. The budget will also help strengthen the capacity of communication staff, e.g. procuring equipment such as cameras, hiring consultants to assist in specific communication deliverables, and specific short-term skills development training necessary for the delivery of the communication strategy.

12. Identification of messages will be the first core deliverable as most of the activities will depend on the messages. As soon as the messages are concretized, a communication action plan will be developed divided into six month periods. Communication will be continuous throughout the project with focus varying depending on the progress in implementing various project components.

Monitoring and Evaluation

13. To facilitate monitoring, an implementation schedule with detailed timeline of activities and preparatory work will be prepared by LWB before project effectiveness. Broadly, the schedule will begin with the development of messages, then populated based on the communication management decisions made to deliver the messages through the strategic actions identified in this strategy. M&E will be done at three levels:

i. activity level
ii. strategic message level
iii. impact of entire strategic communication intervention at component level at helping meet the project development objective

14. Various mechanisms will be employed to get feedback on communication activities such as focus groups, interviews with component managers, and media monitoring.

ANNEX 5: ECONOMIC AND FINANCIAL ANALYSIS

COUNTRY: Malawi
Lilongwe Water and Sanitation Project

Economic Analysis

1. **Expected development impact of the project**. The project is expected to result in increased access to improved water services and safely managed sanitation services for Lilongwe city residents. Approximately 250,000 people are expected to benefit from improved water services. The project is also expected to increase access to safely managed sanitation services to an additional 250,000 people, resulting in significant health and economic benefits to the city. Further, the project is expected to help reduce inequalities in service delivery between different segments of the population by increasing access to water services in the underserved areas of the city, and contribute to reducing water rationing in the medium-term. Higher level impacts include improved public health, time savings from water closer to the home, improved business climate. Further, LWB's revenues are expected to increase due to the reduction in NRW.

2. **Rationale for public financing**. There is a strong rationale for public financing of the project, given the urgency and need to increase water supply to meet growing demand, the size of planned investments as well as the market, sector and macro-economic context that would make commercial financing unaffordable and/or highly uncertain. Moreover, for water supply and sanitation investments of this nature, international experience points clearly to the need for public concessional financing, especially for sanitation. No country has achieved universal water supply and sanitation coverage without significant public financing. Nonetheless, given the dwindling level of concessional public financing available for infrastructure investments in developing countries, the World Bank (through this project) will assist GoM and LWB to leverage private finance for the water production component of the project.

3. **Value added of World Bank's Support**. Participation of the World Bank Group (WGB) is key to the success of the Lilongwe Water Program and to this project. The WBG has been a long-standing and valued partner in the Malawi water sector for more than 20 years, supporting vital institutional and sector reforms and investments to improve access and quality of service. The proposed project will build upon and leverage the World Bank's deep familiarity and broader involvement in the sector. The World Bank will play a catalytic role by providing concessional finance for priority infrastructure investments, as well as technical assistance designed not only to strengthen the pipeline of investment-ready projects under the Program, but also to enhance LWB's capacity to deliver better services to its customers, which would in turn strengthen the utility's financial position and expand the options available to finance the rest of the Program. Participation of the World Bank is also expected to help catalyze additional financial commitments from other development partners. This packaging of financial, knowledge and convening services is at the heart of the World Bank's value proposition in this project.

4. **Methodology for Economic Analysis**. For the economic analysis, the team followed the Economic Analysis Guidance for Cost Benefit Analysis to evaluate the project' development impact, whether public financing is the appropriate vehicle, and the World Bank's value added. The analysis evaluated the contribution to economic welfare by comparing a "with project" with a "without project" scenario. Costs consist of additional Capital Expenditure (CAPEX) and Operational Expenditure (OPEX) for each of the project components for which the World Bank is providing financing[52]—as summarized in the Table 5.1 below. Maintenance, direct operating expenditures,

[52] Excluding TA and institutional strengthening components

personnel, administration, and other expenses associated with the investments were calculated as a fixed percentage of the investment costs. Separate cost-benefit analyses have been undertaken for water supply and sanitation investments.

Table 5.1 - Project Cost Used in the Economic Analysis

Project's key investments	Estimated cost (US$)
Water distribution network rehabilitation	36,000,000
NRW reduction and distribution network expansion	30,000,000
Priority sanitation improvements (sewerage and on-site)	19,000,000
Total	**85,000,000**

5. **Description of Benefits – Water Supply**. For water supply, the benefits include increase in revenue from reduction of NRW; and health benefits and time savings captured by consumers stated willingness to pay. Other non-quantified benefits include the avoided cost of coping with intermittent water supply and with the reduction of volumes supplied during rationing. The reduction of water supply interruptions and improved pressure management is also expected to decrease the risk of contamination in the water supplied.

6. LWB's current level of non-revenue water (NRW) is about 36 percent. The analysis assumes that this rate will remain constant for the first three years of the project, and thereafter reduce by two percent per year as LWB intensifies water loss reduction activities to reach the end-of-project target level of 26 percent. NRW level is assumed to remain constant thereafter. The revenues are calculated using the current average residential tariff of US$0.75 per m^3. The model also assumes that in the "without project" situation, NRW will continue increasing at a rate of 0.5 percent per year, the average yearly increase from 2006–2013.

7. The economic benefits of water supply not captured under the increased revenue were captured by customers' willingness to pay (WTP)[53]. The difference between the price consumers are willing to pay and the actual price they will pay is considered a lower bound estimate of economic benefits. The non-project counterfactual considers that the current water supply does not meet demand—and that the demand will continue to grow rapidly. In this case, the true counterfactual would be that many people would not get water at all—implying the true economic benefits of this project are much larger.

8. **Description of Benefits – Sanitation**. The project will provide access to improved sanitation—through on-site and off-site sanitation—to approximately 250,000 beneficiaries. Benefits from the project from the sanitation component used for this economic analysis include: (i) avoided direct health expenditure; (ii) income gained due to avoided days lost from work; (iii) days of school absenteeism avoided; (iv) income gained due to avoided days lost from work or because of child illness; and (v) convenience time savings. It is noted that the assumptions about the value of time may also overestimate the opportunity cost of time and the actual economic value of some of the benefits. Because of unemployment and underemployment, in some cases, the changes in time uses will lead to income gains, but in others, they will simply lead to more non-productive time available to the targeted population. While this additional non-productive time surely still has intangible value for the targeted population the economic value of it is more questionable. For the analysis to remain conservative in its conclusions, some of the assumptions related to estimating the opportunity cost of time were reduced from levels suggested by the World Health Organization (WHO). The following paragraphs briefly describe the methodology and results for each of the benefit of sanitation interventions under the project.

a. *Avoided direct health expenditure*—The calculation of this benefit is based on the WHO's estimated burden of environmental diseases and, more specifically, the estimated share of diseases that can be

[53] The analysis used WTP estimates from a willingness to pay study conducted by Economic Consulting Associates in September 2014

attributed to water, sanitation, and hygiene (WASH) risks. The analysis considers only diarrheal diseases. The burden of diseases attributable to lack of WASH services (at 30 percent of total diseases) is combined with USAID estimates on annual health expenditures per capita. The total annual benefit for this category is about US$1,674,000.

b. *Income gained due to avoided days lost from work*—This benefit is calculated based on the estimated total incidence of sickness per person in the targeted areas, multiplied by the working age population targeted by the project. Out of an estimated three incidences of sickness in the targeted population, about 30 percent are estimated to be WASH-related based on the burden of disease, and the project is expected to prevent about 30 percent of the incidence of sickness. This translates to two days per incident. The total annual benefit for this category is about US$126,984.

c. *Days of school absenteeism avoided*—This benefit uses the same assumptions as the previous benefit for estimating the total avoided incidence of WASH-related sickness in the targeted school age population. The number of absent days per episode of sickness—three days per incident for school-aged population based on WHO data—is applied, together with the estimated opportunity cost of time of school-aged target population. The opportunity cost of time for this segment of the population is taken at 50 percent of the adult working population's figure. Even though most of the school age population is probably not productively employed, it can be argued that school absenteeism affects the future earning potential of the target population and therefore assigning economic value to this benefit based on the population's estimated future earning potential is justified for this analysis. The total annual benefit for this category is about US$88,624.

d. *Income gained due to avoided days lost from work because of child illness*—The calculation methodology for this benefit is similar to the previous two categories in that it is based on the total incidence of sickness in the targeted population: 0-59 months. According to the WHO study, the duration of illness in this target population is 5 days. This estimate was then combined with the opportunity cost of caretakers' time to calculate the benefit. To avoid overestimating this benefit, and taking into consideration the likelihood that not all caretakers in the targeted population may be productively employed, opportunity costs were estimated at 50 percent of the adult population's opportunity cost of time (based on minimum wage), as per the WHO methodology. The total annual benefit for this category is about US$53,540.

e. *Convenience time savings*—The final benefit quantified for this analysis is the convenience time savings because of improved sanitation access. Time savings occur because of, for example, closer access to latrines and shorter waiting times at public latrines. These time savings potentially translate to more productive activities or more leisure time. The value of convenient time savings is estimated by assuming a daily time saving per individual for access to sanitation facilities, and then multiplying that by the estimated opportunity cost of time (in this case, minimum wage). The 2004 WHO study estimated that time saved per day due to less distant sanitation facilities and less waiting time is about 30 minutes per person. For this analysis, a more conservative estimate of 15 minutes per day was used, resulting in about 2.5 days' equivalent of sanitation access time saved per person per year because of the project's planned interventions. The total annual benefit for this category is about US$587,888.

9. **Results of the Economic Analysis.** Results of the economic analysis show that the project is economically justified with a positive Net Present Value (NPV) and an Economic Internal Rate of Return (EIRR) of **12 percent.** The summary results are presented in Table 5.2 below.

Table 5.2 - Results of Economic Analysis

	US$
NPV Increase in revenue	57,579,043
NPV Willingness to pay	58,208,924
NPV Sanitation benefits	38,427,779
NPV Net benefits	59,753,471
ERR	**12%**

10. **Sensitivity Analysis.** The results above assume that all variables are certain. A sensitivity analysis was conducted to determine the impact on the results when some of the assumed values for critical variables change. The sensitivity analysis also considers the potential overlap between beneficiaries for improved water supply and those for sanitation. This is achieved by including an option with "no benefits" from sanitation" in the sensitivity analysis. Table 5.3 presents the results of the sensitivity analysis. The results show that the project is robust, and that even large changes in key variables will not easily render the project unviable.

Table 5.3 - ERR sensitivity analysis

Criteria	ERR
Increase in costs	
10% increase in costs	10%
20% increase in costs	8%
30% increase in costs	7%
Decrease in benefits	
10% decrease in benefits	9%
20% decrease in benefits	6%
Increase in benefits	
10% increase in benefits	15%
20% increase in benefits	19%
30% increase in benefits	23%
40% increase in benefits	28%
Increase in maintenance costs (base model is 1% CAPEX)	
Maintenance as 2% CAPEX	9%
Maintenance as 3% CAPEX	5%
Decrease in water sold	
Decrease in water sold by 10%	11%
Decrease in water sold by 20%	11%
Decrease in water sold by 30%	10%
Combined increase in total cost and decrease in benefits	
Increase in costs and decrease in benefits by 5%	9%
Increase in cost and decrease in benefits by 10%	7%
Increase in cost and decrease in benefits by 20%	3%
Combined decrease in total cost and increase in benefits	
Decrease in cost and increase in benefits by 5%	15%
Decrease in cost and increase in benefits by 10%	18%
Decrease in cost and increase in benefits by 20%	27%
Decrease in benefits from sanitation	
Decrease in benefits from sanitation by 10%	11%
Decrease in benefits from sanitation by 20%	11%
Decrease in benefits from sanitation by 30%	10%
No benefits from sanitation	6%

Financial Analysis

11. **Introduction**. A financial analysis of the Lilongwe Water and Sanitation Project has been completed based on available data and assumptions. The analysis is based on a cost of service assessment, which estimates LWB's total costs of supplying water to end users from 2018 to 2035, assuming implementation of the project. For the project to be financially viable, the total costs to LWB of implementing the project must be supported by the total revenues received by LWB over the period of analysis. The cost of service analysis provides estimates of the levelized tariff[54]necessary to ensure that the project is financially viable. In the case that the levelized tariff is acceptable from a willingness to pay perspective, and LWB correctly manages their cashflow, the project is financially viable.

12. **Methodology**. The analysis is based on a comprehensive financial model of LWB's future operating and investing activities. Known medium-term investments (including existing EIB-funded investments and the proposed PPP for water production expansion) are included in the financial model, and it is assumed that IDA financing is passed on to LWB on the same terms as GoM borrowing, apart from financing for sanitation which is assumed to be on-granted to LWB. Details of costs and financing assumptions included in the model and provided in Table 5.4 and Table 5.5 below.

Table 5.4- Costs and Financing

	IDA (US$ million	EIB (US$ Million)	Private (US$ Million)
Rehabilitation and Raising of KD1		12	
New Water Treatment Works (TW3), 50 MLD			20
Distribution Network Rehabilitation and Expansion	65	10	
Technical Assistance (water supply only)	10	4	
Total	**75**	**26**	**20**

Table 5.5. Financing Sources and Terms

Source	Amount (US$ million)	Term	Grace period (years)	Interest rate (%)
IDA Credit	75	25	8	2
EIB	26	20	5	1.45
Private	20	20-25	NA	13% (WACC)*

* Weighted average cost of capital

13. **Costs**. The cost of service model has six key cost components: bulk water charges, operating costs, replacement/maintenance capex, interest costs, principle repayment costs and a provision for bad debts.

- *Bulk water charges* - the model assumes that LWB enters a PPP agreement for water production expansion (i.e. construction of TW3 and the maintenance and operation of TW1, 2 and 3 for a concession of 20 years). The component comprises the estimated cost to LWB of this PPP agreements paid by way of the bulk water charges.
- *Operating costs* – this includes: LWB staff, administration and general expenses and maintenance costs (driven by the number of connections), and electrical and chemical (driven by production volumes). All costs are treated as local, except for chemical costs which are assumed to be foreign.
- *Replacement capex costs* – this is the cost of maintaining the existing LWB infrastructure by replacing capex as needed, this is estimated using the depreciation value of existing assets.
- *Financing costs* – calculated per the terms indicated in Table 5.5 above.

[54] Discounted average tariff over the period of analysis

- *Bad debts* – calculated based on LWB's collection rate which increases to 95 percent by 2019.

14. **Sales Volumes**. The model uses sales volumes based on the conservative estimate of future consumption which took account of the network capacity and historical growth trends. The model also assumes a decrease in non-revenue water from 36 percent to 26 percent by 2023.

15. **Results of the Financial Analysis**. Figure 5.1 shows LWB's cost of service in nominal US$ per m^3. As can be seen from the chart below, the first bulk water charge payment is made in 2021 when TW3 starts operations and the private sector operator takes over operations of TW1 and TW2. With regards to financing costs, the model currently assumes that LWB receives funding from IDA in 2019 and pays interest on the amounts borrowed. Principle repayments only start from 2024.

16. Operating costs increase in line with sales volumes and number of connections. Operating costs associated with the production of water drop to zero once the private sector operator takes over the operation and maintenance of TW1 and 2 as part of the PPP concession agreement.

17. The levelized tariff for LWB is the discounted average of the costs of service per m^3 in each year throughout the period of analysis. The discount rate assumed is 12 percent (since LWB is meant to operate as a commercial enterprise and 12 percent is the return that the Ministry of Finance has indicated that LWB should be able to generate). Given that the annual cost of service per m^3 throughout the period of analysis is reasonably uniform, the discount rate has a minimal impact on the levelized tariff.

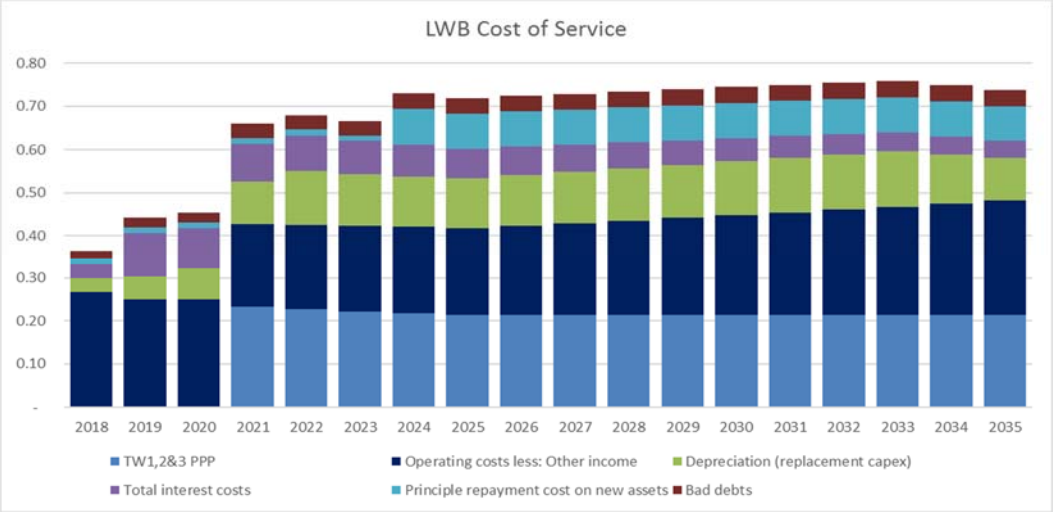


Figure 5.1 - LWB's Cost of Services

18. Under these assumptions, and assuming an exchange rate of MWK 700 to the dollar, the levelized cost to LWB of running their current operations together with implementing the project is **US$0.63 per m^3**. Therefore, if the levelized tariff is US$0.63 per m^3, with appropriately structured annual tariffs and adequate cash management (as discussed below), LWB will be financially solvent over the period of analysis (2035). If the levelized tariff is below US$0.63 per m^3, LWB will not be financially solvent over the period of analysis, and if the levelized tariff is above US$0.63 per m^3, LWB will make profits over the period of analysis. The maximum annual tariff required is US$0.75 per m^3 in 2033. The overall average tariff in 2017 is US$1.06 per m^3, while that of residential customers is US$0.75 per m^3. Thus, the current tariff levels are sufficient to finance the project over the 20 year period.

19. **Exchange rate sensitivity analysis.** Table 5.6 below shows the levelized tariff under different exchange rate scenarios, the base (MWK 700 per dollar) case plus 30 percent and the base case minus 30 percent. As can be seen from the table, since several costs are in local currency (staff time, administration, bad debts), the model is sensitive to exchange rate fluctuations. IFC will be conducting additional analysis on impact of the exchange rate as part of their due-diligence for the PPP transaction.

Table 5.6 - Exchange Rate Sensitivity Analysis

Exchange rate scenarios	+30%	Base Case	-30%
Levelized tariff (US$ per m^3)	0.56	0.63	0.71

20. **Forecast of LWB's Net Revenues and Debt Service Cover ratio.** While the project is financially viable over the period of analysis, LWB will need to manage its cashflows carefully to avoid any debt service payment shortfalls after 2025**.** Table 5.7 below shows a forecast of LWB's revenues (based on the base case levelized tariff of US$0.63 per m^3) and operating costs from 2018 to 2035. Additionally, the table shows LWB's debt cover ratio which shows its ability to service its debt burden in each year. If the debt cover ratio is greater than 1, then LWB has sufficient funds in that year to pay all its interest and principle obligations due that year (although lenders may demand a debt cover ratio greater than one to provide additional security for themselves).

21. As can be seen, in the early years LWB has a high debt service cover ratio, 6.79 in 2018 and 2.70 in 2020. However, by 2025 when principle repayments are due on the EIB and IDA loans, the debt service cover ratio is less than one and negative in the years that LWB makes losses.

22. This analysis indicates that it will be important for LWB to adequately structure their finances to manage their cash flows and avoid any debt service payment shortfalls in later years. Recommended measures include: (i) retaining/investing profits in the early years to cover debt service in later years; (ii) negotiating the IDA on-lending terms from MoFEPD to LWB to match repayment obligations with LWB's revenue profile; and (iii) gradually adjusting consumer tariffs over time to more accurately match the debt service profile. Given that this is the first time LWB is taking on a significant amount of debt to finance its investments, a financial advisor will be recruited to provide financial advice to LWB as part of institutional strengthening component of the project.

Table 5.7 - Forecast of LWB's Operating Costs and Revenues (2018-2035)

	2018	**2020**	**2025**	**2030**	**2035**
LWB financials (US$ million)					
Water sales revenues ($m)	19.96	22.75	28.46	28.46	28.46
Other income	0.15	0.17	0.22	0.22	0.22
Total revenue ($m)	20.11	22.93	28.67	28.67	28.67
Bulk water Charge	0.00	0.00	(9.64)	(9.64)	(9.64)
Staff costs	(2.96)	(3.40)	(4.32)	(4.86)	(5.47)
Administration and general expenses	(1.83)	(2.09)	(2.66)	(2.99)	(3.37)
Maintenance	(1.73)	(1.99)	(2.53)	(2.84)	(3.20)
Chemicals	(0.35)	(0.37)	0.00	0.00	0.00
Electricity	(1.58)	(1.18)	(1.41)	(1.59)	(1.79)
Depreciation (replacement capex)	(1.03)	(2.61)	(5.27)	(5.65)	(4.48)
Total operating expenses	(9.48)	(11.63)	(25.83)	(27.58)	(27.94)
Profit/(loss) from operating activities	10.63	11.30	2.84	1.10	0.73
Provision for doubtful debts	(0.58)	(0.82)	(1.62)	(1.68)	(1.66)
Profit/(loss) before finance costs	**10.06**	**10.48**	**1.22**	**(0.58)**	**(0.93)**
Debt service (interest and principal)	1.48	3.88	6.45	5.66	4.56
Debt service cover ratio	6.79	2.70	0.19	(0.10)	(0.20)

ANNEX 6: PROFILE OF LILONGWE WATER BOARD

COUNTRY: Malawi
Lilongwe Water and Sanitation Project

Overview

1. Lilongwe is the capital city and main urban center of Malawi. With about 1 million inhabitants[55], the city has been experiencing rapid population growth, partially driven by the relocation of Government head offices from Blantyre, which was concluded in 2005. Currently, over 70 percent of its population resides in peri-urban areas, with inadequate access to social infrastructure and basic urban services. Among these key basic services is water supply and sanitation services, which are currently limited and negatively impacting public health.

2. Water is supplied by Lilongwe Water Board (LWB), a utility established in 1947 and reconstituted as a parastatal organization in 1995. LWB is estimated to cover 70 percent of the population residing in the service area. Households are mainly serviced by individual house connections and communal water taps, especially in informal and peri-urban settlements. With increasing water demand, the utility is challenged to strengthening its production capacity and expand services to peri-urban areas, where most of the population is residing.

System/Network Characteristics

3. Water for Lilongwe is abstracted from two embankment dams, Kamuzu I and II, about 25 km upstream of the abstraction point on Lilongwe River with total storage capacity of 24.2 million m^3. Water is treated in two treatment works (TW1 andTW2) with a total design capacity of 125,000 m^3/day. Actual average water production per day is 90,000 m^3, and total average water consumption is about 56,000 m^3/ day (64 percent of production). The network length is about 1758 km. Currently the system is servicing about 67,581 connections, ranging from residential connections to institutional, industrial/commercial connections and communal taps in peri-urban areas. LWB also supplies bulk water to Central Region Water Board

4. Current water losses are estimated at 36 percent due to leakages from pipe cracks, illegal connections, unmetered consumption in some parts of the city and inefficient maintenance. System geo-referencing and network modelling is underway, but still lack updating of the pipework and hydraulic elements, as well as customer demand and losses. System operational accessories are lacking in critical sections, especially flow and pressure measurement equipment for network and reservoir operation.

Characteristics of Customer Base and Coverage Area

5. Due to rapid population growth, LWB has been challenged to increase water supply coverage. Since 2006, the company has doubled its network from 860 km to 1758 km. However, a combination of production capacity constraints and high water losses forces the company to ration its water, reducing hours of operation and therefore, resulting in intermittent supply with water services. The population growth in the last years, has been affecting the ability of LWB to maintain coverage, despite its efforts in connecting on average 3,700 new customers every year over the last six years.

[55] NSO, 2015, Statistical Year Book 2015,

6. From the 2017 data, LWB served a total of 67,581 connections from four customer categories (excluding CRWB), with total sales of MWK 16.015 x 10^9, correspondent to 20.45 x $10^6 m^3$ of water. Residential connections account for almost 90 percent (Table 6.1) of connections and most sales (60 percent) in terms of volume of water.

Table 6.1 - Consumption profile of LWB costumer groups

Customer Category	Connections	Sales Volume	Sales Income
Residential	90%	60%	42%
Institutional	2%	17%	26%
Commercial	7%	19%	31%
Community kiosks	2%	4%	1%

7. Low income areas are mainly served by water kiosks. A survey done in these low-income areas in 2013[56] revealed that 45 percent of the sampled population use public taps or kiosks as the main source of water supply; 23 percent had their water piped into dwellings; 27 percent had their water piped into yards and the remainder access water from other sources which include boreholes, protected and unprotected wells, spring, river, rain water, and dam. The consumption rates are quite low in low income areas, compared to those of the high-income zones, as presented in the Table 6.2 below.

Table 6.2 - Water consumption rate per settlement pattern

Ward Density	Consumption rate(l/person/day)
Low density area/ high income	150
Medium density area/ medium income	80
High density area/Low income	44

Source: *JICA, 2010, The Study on urban Development Master Plan for Lilongwe in the Republic of Malawi and from LWB, 2013, Final Strategic Sanitation Plan Report*

8. Benchmarking data from IBNET suggests that average water tariff in Lilongwe is high, compared to countries of the similar development and GNI per capita. Apart from the kiosks, tariff is based on Increase Block Tariff varying according to customer category, with the lowest being for residential customers. Connection fee varies according to connection distance and materials used in connection. Table 6.3 below shows the tariff breakdown per user category.

Table 6.3 - 2016-17 Water Tariffs per consumer category

Customer Category	Tariff Block	2015-16 Tariffs	2016-17 Approved tariffs
		MWK	MWK
Residential	**Up to 5m3**	220	286
	6-10m3	316	410
	>10 m3	424	571
Institution	**Up to 10m3**	846	1145
	11- 40m3	945	1280
	>40 m3	1013	1371
Commercial	**Up to 5m3**	944	1275
	6-40m3	1035	1401
	40>	1125	1523
Community Kiosks	**Flat rate**	137	178
LWB Kiosks	**Flat rate**	152	198
Bunda (CRWB)	**Flat rate**	183	308

[56]LWB, 2013, Final Strategic Sanitation Plan Report

Operation/Technical Performance

9. The current production capacity is below the demand and is negatively impacting LWB technical performance. Despite having satisfactory water quality, estimated water losses have been stagnant at 35 percent over the past four years (Table 6.4). Network operation and distributions is managed on an ad-hoc basis, lacking bulk metering in key network sections, including the distribution tanks. Supply to these tanks is rudimentarily managed, with no automatized control systems and network optimization procedures, and therefore resulting in higher losses (masked often by intermittent supply) and poor quality of service to the customers. Hence, the quality of service provided is patchy with some areas receiving continuous supply and others a few hours per day. The table below gives the summary of the operating/technical performance of LWB under selected key performance indicators over the last six years.

Table 6.4 - Operational performance indicators

Key Performance Indicator	FINANCIAL YEAR							
	2010	2011	2012	2013	2014	2015	2016	2017
Water Produced (ML)	31.981	31.981	31.303	30.319	33.679	34.145	33.372	31.965
Water Sold (ML)	19.662	19.663	20.572	19.621	22.058	21.948	20.950	20.457
Service Connections (No.)	34,792	38,023	40,153	44,026	51,405	53,339	60,550	67,581
No. Staff/1000 Connections	12.4	12.2	11.5	10.5	9.0	9.0	6.4	8
Average Tariff (MWK/m^3)	89	94	105	133	151	445	583	778
Average hours of service	24.0	22.0	20.0	20.0	18.0	10.0	8.0	9.0
NRW (%)	38.5%	38.5%	34.3%	35.3%	34.5%	35.7%	37.89%	36.00%
NRW (m^3/ km/day)	17.73	17.49	13.91	14.94	18.1	19.0	19.7	18.0
NRW (m^3/connection/day)	0.79	0.82	0.65	0.73	0.53	0.51	0.51	0.48
Commercial losses (estimated at 35% NRW)	13.5%	13.5%	12.0%	12.4%	12.1%	12.5%	18%	12.6%
Collection ratio %	80%	80%	80%	80%	80%	85%	85%	85%
Operating Ratio	117%	104%	127%	110%	140%	202%	278%	196%
Water Quality (Sample tests satisfying free chlorine level)	96.6%	98.9%	99.3%	97.4%	98.6%	98.5%	98.5%	99.0%

Financial Performance

10. LWB's key financial performance data over the past three years is provided in Table 6.5 below. The company registered a 27 percent increase in operating revenue in 2017, largely due to an increase in tariffs. Net income increased by 34 percent in 2017.

Summary of Debt Situation

11. The current debt burden of LWB is sustainable, as the debt service cover ratio was 4.5 in 2016. A point of concern in terms of liabilities is the deferred tax liability which in 2015 was a total of MK 7,248M (approx. US$10 million). Table 6.6 present the current outstanding loans and borrowings.

Table 6.5- Financial Operating Results

Year	**2015** (MWK'000)	**2016** (MWK'000)	**2017** (MWK'000)
Operating Revenues	9,319,005	12,634,454	16,090,686
Operating Expenses	4,663,980	7,208,642	8,458,135
Interest Expense	360,537	808,620	826,938
Depreciation Expense	679,301	1,051,236	1,535,742
Net Income	1,238,435	2,753,324	3,692,510
Operating Cash Flow	14,420	1,647,625	1,567,896
Debt Payments	407,857	407,857	407,857
Total Assets	36,313,448	43,855,372	48,669,389
Current Liabilities	2,182,108	3,495,051	3,053,509
Working Capital	3,018,192	3,695,118	3,744,413
Current Ratio	2.38	2.05	3.78
Debt Service Coverage Ratio	5.8	4.5	9.0

Table 6.6- Outstanding loans

Loans	**2014 (MWK'000)**	**2015 (MWK'000)**	**2016 (MWK'000)**	**Comments**
IDA NWDP II (WB Loan)	1,294,530	2,814,028	4,503,728	2% per annum above the prevailing rate of inflation (Malawi). The loan is repayable over a period of 20 years starting in 2027
EIB Peri Urban Loan	1,992,930	2,070,247	2,318,677	Aim of loan is to address safe and sustainable water supply and basic sanitation services to low income areas. Loan bears an interest of 12% per annum for Lilongwe Water Board. Loan is repayable over 20 years starting from 2014
EIB finance credit loan	644,100	921,900	109,648	In consideration for the credit, EIB is entitled to 50% of any dividends that the Government of Malawi may receive from Lilongwe Water Board in respect of that part of the Lilongwe Water Board capital financed by EIB.
Total	**3,931,560**	**5,806,175**	**6,932,053**	

Management, Institutional and Other Issues

12. LWB is a statutory state corporation established under the Water Works Act 1995. It is governed by a ten-member Board of Directors who is appointed by the Government. The Chief Executive Officer is responsible for the overall management of the utility. It currently has four directorates namely, Technical Services, Finance, Administration and Human Resource and General Management. Although the utility is supposed to be an autonomous organization, this is not the case as all key decisions of the Board have to get approval from government before implementation. This includes getting approvals for reviews of organizational structure, employment of additional staff outside the approved establishment, salary reviews, procurement decisions above certain thresholds and water tariff increases.

13. LWB currently faces several challenges, from lack of governance to appropriate systems for efficient utility management. A recent performance assessment has identified five management fields that require attention: (i) inadequate or unsatisfactory governance and general management; (ii) poor employee productivity; iii) poor customer services; (iv) inadequate or ineffective structures and systems; and (v) reduction of water losses. Some of the key challenges include poor staff motivation towards work; lack of human resource development plan, inadequate operation manuals and customer management systems, as well as inadequate MIS and Billing systems.

14. The Board has developed a strategic plan to guide its development and operations; and tap into the organizational challenges it has been facing. Recently, LWB signed a one year performance contract with the government in which key performance targets are to be achieved.

Strategic Objectives

15. The vision of LWB is to be a leading customer focused, financially viable water utility in Southern Africa. In working towards achieving this vision, the utility has developed four strategic objectives or goals to be achieved over the next five years namely: (i) adequate and reliable water supply services; (ii) meet customer needs; (iii) strengthened financial capacity for development of infrastructure; and (iv) development of institutional capacity.

Investment Priorities

16. In the Infrastructure Investment Plan for LWB 2016- 2026, the following projects/investments were selected as requiring immediate implementation in order of priority (costs are preliminary estimates only):

- Water distribution network rehabilitation and expansion -US$75 million;
- Kamuzu Dam I rehabilitation and raising – US$14 million;
- Treatment Works 3 – US$15 million;
- Diamphwe dam and bulk water supply – US$288 million;
- Non-Revenue Water Reduction Project – US$9.5 million;
- Alternate energy source for the treatment plant and booster station – US$10 million;
- Construction of Aqueduct for Kamuzu Dam II to intake – US$20 million;
- Lake Malawi water supply project (still to be estimated); and
- Catchment rehabilitation/conservation– US$0.5 million

Actions to Improve Performance

17. LWB is currently implementing several actions aimed at improving performance and achieving its strategic objectives. To provide adequate and reliable water supply services, the Board is looking at improving water distribution to 24 hour of supply, increase supply coverage from 70 percent to 80 percent, improve water quality, and reduce non-revenue water from 36 percent to 26 percent. The provision of 24-hour water supply will include the rehabilitation and upgrading of existing infrastructure, improvement in systems reliability and development of new water sources.

18. In March 2016, LWB developed its five-year (2016-2021) institutional development program code named the 'Path to Success Program' (PSP). The program has five objectives: (i) improving governance and general management; (ii) improving staff productivity; (iii) improving customer services; (iv) developing and enhancing systems and structures; and (v) reducing non-revenue water. The PSP has been under implementation for a period of one year. The plan was largely based on an institutional analysis conducted by the World Bank which assessed LWB to be at level 3 on the water maturity scale[57] . This basically means that LWB has not only built the basic foundations (behavioral orientations, structure, capabilities and tools) for progress, but is a proactive and performance oriented utility. Aggregated maturity scores for each of the five attributes are presented in Figure 6.1 below. The figure shows where LWB is at now (baseline maturity level) and where it wants to be (target

[57] Water utility maturity is a measure (between 1-5) of institutional capacity of a water utility that is based on a qualitative assessment of a utility's organizational behavior, structure, capability, tools and ability to influence its operating environment

maturity level). Figure 6.2 on the other hand gives more granularity to the assessment results by showing the disaggregated institutional development road map for LWB for the different sub dimensions under the five attributes. The figure shows the current grading under the different sub dimensions compared to where LWB wants to be.

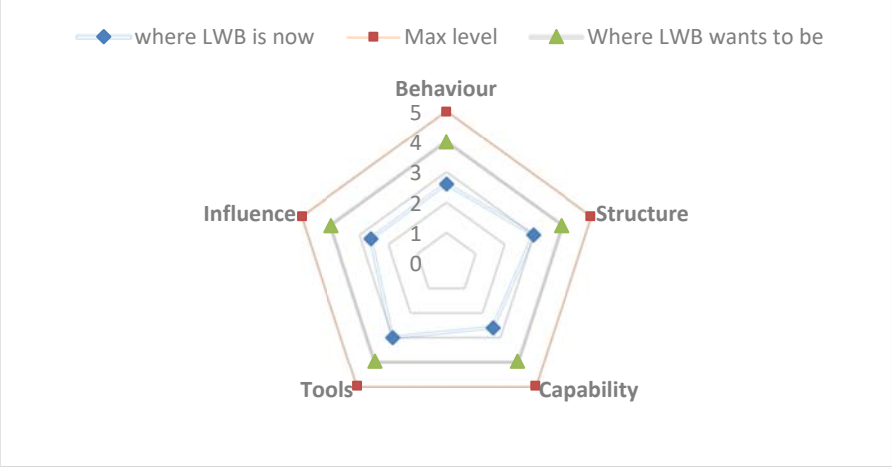


Figure 6.1: LWB's aggregated institutional capacity development road map

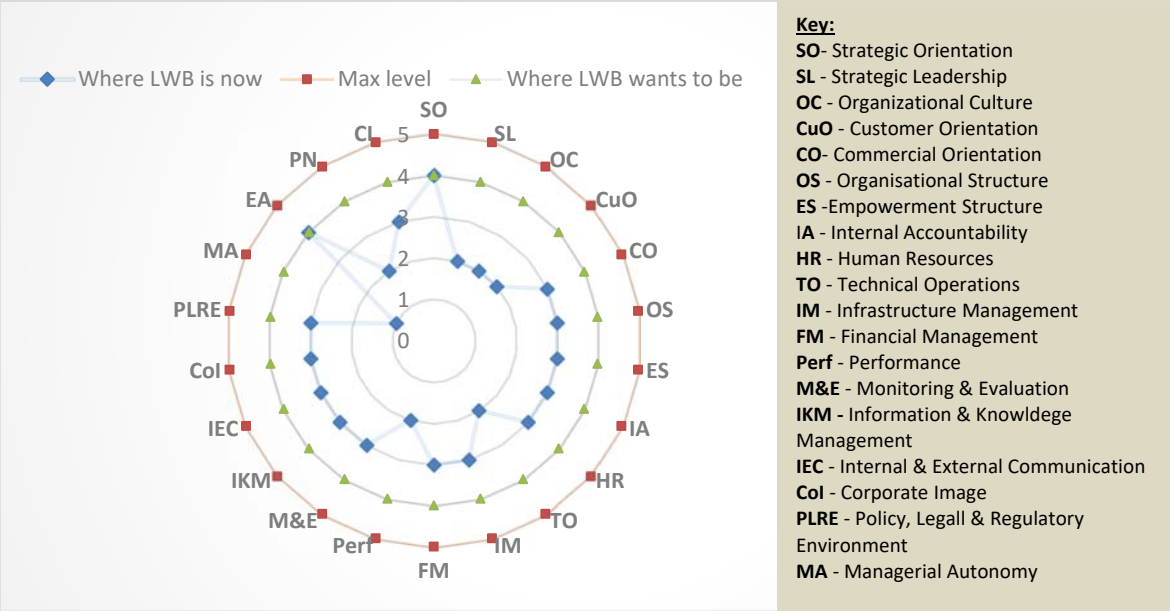


Figure 6.2: LWB's disaggregated institutional capacity development road map

19. Priority actions for institutional strengthening include: (i) strengthening managerial autonomy, as provided for in the Water Works Act of 1995; (ii) building effective leaders at all levels; (iii) cultivating a positive corporate culture that builds a sense of mission and identity; (iv) strengthening customer orientation; and (v) improving technical operation processes and systems of the utility to minimize water losses and improve service quality. These and other actions are included in the PSP.

ANNEX 7: PROPOSED PPP FOR WATER PRODUCTION EXPANSION

COUNTRY: Malawi
Lilongwe Water and Sanitation Project

Background

1. This Annex summarizes details of the proposed PPP for water production expansion which LWB is pursuing with the support of IFC advisory, and the potential value-added of an IDA guarantee to support the PPP.

2. LWSP is designed to address hydraulic bottlenecks in LWB's existing water distribution network – which is one of the key constraints to private investment in water production capacity. From the perspective of the private sector, an old and dilapidated water distribution network increases the risk profile of any water production PPP and hence its costs. Therefore, by focusing on the distribution network, the project not only allows space for private investors to respond to LWB's investments needs for water production, it will also help to de-risk these investments and make it easier for LWB to attract a competent private partner at an affordable cost. That said, given the lack of water PPP experience in Malawi, it is unlikely that a private concessionaire would take the risk of entering a long-term contract with LWB without adequate risk mitigation guarantees. For this reason, it is envisaged that an IDA guarantee may be required to enhance LWB's creditworthiness. The guarantee support (if required) will be processed later (through additional financing) once the PPP transaction is well-advanced.

LWB's Medium-Term Investments in Water Production

3. Recent water demand assessments show that LWB needs to augment its production capacity in the medium to long term, even under the most conservative demand estimates. Current peak water demand is estimated at 130,000 m^3/day, and this is projected to increase to 170,000 m^3/day by 2025 and 220,000 m^3/day by 2035 (see Figure 7.1 below). At present, there are two existing water treatment works with a combined design production capacity of 125,000 m^3/day. However, on average, the plants are operating at 70 percent capacity producing an average of about 90,000 m^3/day – of which about 32,400 m^3/day (36 percent) is unaccounted for. The low production efficiency is due to a combination of factors: low yields from the Kamuzu dam system during the dry season; poor raw water quality; inefficiencies in the existing treatment processes; and limitation in the hydraulic capacity of the distribution network.

4. LWB plans to raise the height of Kamuzu Dam 1 (KD1) by 7 m to increase abstraction capacity, which would enable full utilization of the installed production capacity and allow for an additional 50,000 m^3/day expansion in water production capacity (TW3), reaching a total production capacity of 175,000 m^3/day – enough to meet projected 2025 demand. Beyond 2025 however, the city will need a new water source. The KD1 raising sub-project (EIB financed) is at procurement stage and is expected to be completed by 2020.

5. At the same time, LWB plans to modify and improve treatment processes at the existing plants to cope with the deteriorating raw water quality. The water quality has rapidly deteriorated over the years due to land degradation on the river banks of Lilongwe River from Kamuzu Dam 2 to the intake point. This has resulted in high sediment load into the river and at the intake points. The raw water turbidity has been increasing unprecedentedly over the years and has in recent years gone as high as 16,000 NTU. However, the existing intake design does not incorporate mechanisms for reduction of sand and silt entry into pump sumps. As such, the raw water contains a lot of sand and silt in addition to high turbidity due to catchment degradation. This has resulted in increased cost of chemicals and increased frequency of backwashing resulting on overall reduction in the production capacity. Due to several factors including the frequent backwashing, the filter media is replaced every two years instead of

the design three-year replacement interval leading to increased operational cost. Excess sand and silt reaching the intake plant has caused problems for electromechanical equipment resulting in increased maintenance and repair cost. A preliminary process review of the existing plants has been conducted by LWB and reviewed by the World Bank. The assessment formed the basis for identifying and costing the required improvements to both TW1 and TW2. The improvements are expected to increase production from the existing plants to an average of 115,000 m^3/day (90 percent of installed capacity). With the additional 50,000 m^3/day from TW3, LWB should be able to produce an average of 165,000 m^3/day by 2020.

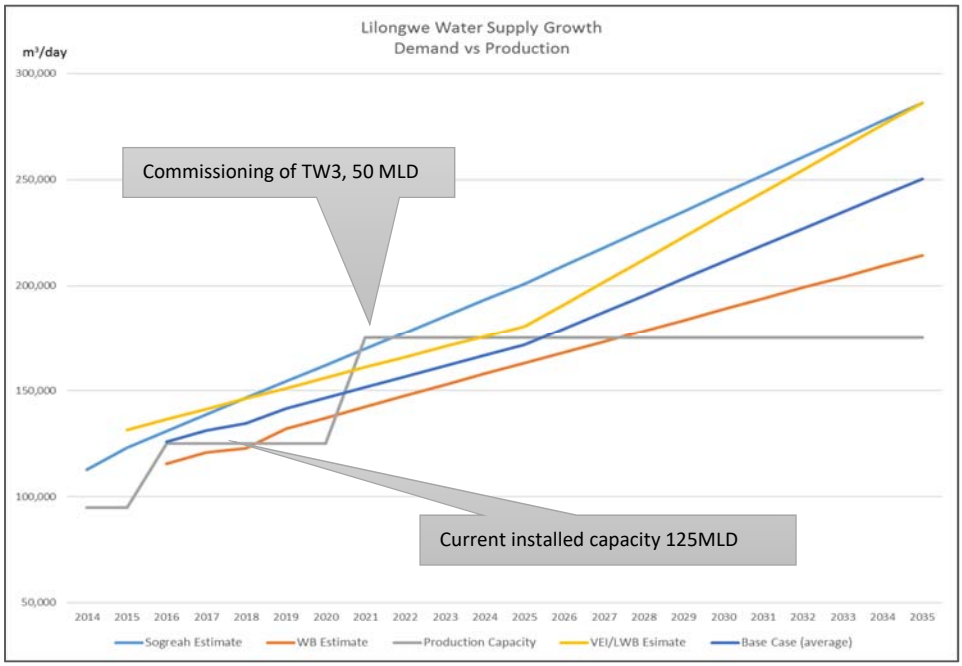


Figure 7.1- Water Demand Vs Production

Proposed PPP for Water Production Expansion

6. **Rationale for a PPP**. Given the limited amount of concessional public financing available for LWB's investment program, both GoM and LWB have since 2016 been exploring whether part of the scope of the program could be financed by the private sector on commercial terms, while remaining affordable. In this regard, GoM appointed IFC in 2016 to assess options for expansion of water production capacity on a PPP basis to free up scarce IDA resources for other aspects of the program, particularly the large unfunded investment requirements for the distribution network. The proposed PPP is aimed at leveraging private sector financing for TW3 which, based on market sounding, was found to be more attractive to the private sector as opposed to investing in the water distribution network.

7. From the analysis conducted by IFC, a 20-year combined Build Operate Transfer (BOT) – lease hybrid model was recommended for the treatment plants where the private sector designs, builds and finances the new TW3 and operates all three treatment plants (TW1, TW2 and TW3) under a single PPP agreement. TW1 and TW2 would be leased to the operator for the duration of the PPP Agreement and responsibility for any upgrade and maintenance of the facility will be transferred to the operator. LWB would make payments, with a fixed and

variable component, to the Concessionaire for the provision of water. The payments would be subject to deductions if the operator does not meet the performance requirements (e.g., quality, volume) during the operations period.

8. This PPP model has several advantages, besides private sector financing. First, it allows for integration of all operations into a single PPP contract thereby achieving economies of scale operational costs; increasing efficiency of operations and introducing private sector expertise in asset management across all treatment plants. Second, while still a small project in terms of investment, this option is more attractive to potential bidders given the increased production capacity of the facilities. Third, revenues from operating TW1 and TW2 from the start may facilitate better financing terms for the project.

9. IFC PPP Advisory[58] is providing transaction advisory services to LWB to help structure the most appropriate PPP arrangement to deliver an affordable and bankable project. These services include supporting LWB, in collaboration with Malawi's PPP Commission, to implement a transparent and competitive bidding process to identify the most appropriate private partner to deliver the project at a competitive price.

10. Market sounding with potential PPP private partners suggests that mitigating contractual payment risks is a key bankability issue for the PPP. For this reason, this component will finance an IDA project-based guarantee to provide payment security and support private capital mobilization for the water treatment plant investments. The use of IDA guarantees will be included as part of the PPP project transaction structure to mitigate contractual payment risks. The IDA payment guarantee will (i) enhance the creditworthiness of LWB by guaranteeing its payment obligations under the PPP contract; and (ii) mitigate the risk of non-payment by LWB of compensation on termination, in the event of a contractual termination. The IDA guarantee is expected to provide adequate comfort to the private sector that the contractual payments will be made on time.

11. **Scope of the PPP**. The scope of the proposed PPP contract includes a new Lilongwe Water Treatment Works (TW3) utilizing the additional abstraction capacity resulting from the raising of Kamuzu Dam 1 (EIB-funded) as well as improvements to the existing two plants (TW1 and TW2) to optimize production and improve efficiency. The works for the new plant will include a new intake on Lilongwe River and a new 50,000 m^3/day water treatment plant adjacent to the existing two treatment plants. The works will involve construction of a new intake, a water treatment plant based on a conventional process (pre-settling, coagulation, flocculation tanks, settling tanks, filters and disinfection tank), pipework to connect the new plant to the existing distribution system and other auxiliary structures. The cost of the new plant is estimated at US$15.5 million (including contingencies), based on a preliminary engineering design. Improvements to the existing plants include (i) modifications to the intake works – including raising intake platform, installing course screens and sediment traps, and installing sluice gates; (ii) replacement of raw water pumps and chemical dosing pumps; (iii) modification to the inlets and outlets of the clarifiers and sludge drainage system; and (iv) rehabilitation of filter beds and backwashing system. The cost of the improvements is estimated at US$4.5 million, including contingencies.

12. **Summary of IFC Due-Diligence**. IFC undertook technical and financial due diligence on the proposed PPP and analyzed the legal and regulatory environment for the water sector, as well as the PPP policy. IFC also analyzed the financial performance of the off-taker, LWB, and sought feedback from potential private sector bidders. Market sounding has been undertaken to assess market appetite and identify critical factors for any potential investors. Fourteen companies were contacted of which ten provided written feedback and structured interviews were held with several companies, who responded positively. Key findings from the market sounding are summarized below:

[58] With financial support from the Global Infrastructure Facility

a. Seventy percent of firms responded positively expressing either a strong or medium interest in participating in a bulk water supply project for Lilongwe.
b. All respondents were interested in taking over the operation of TW1 and 2 as it offered greater economies of scale for operations and made the PPP a more attractive proposition. Some felt that thorough due diligence of assets to be taken over will be critical. Others responded that labor and staffing arrangements for existing staff would also be a critical factor.
c. The top risks identified by the firms were regulatory and payment risks. All potential private partners felt that some form of payment guarantee to mitigate the risk of non-payment by LWB, provided by the Government, potentially back stopped by an International Financing Institution (IFI), would be critical if they were to invest in the project.
d. Land leases and right of ways and relocation and resettlement, if necessary, would need to be secured by the Government.

13. **Cost of Service and Financial Viability**. Based on an assumed US$15.5 million capital investment from the private party to finance TW3 and an additional US$4.5 million to upgrade TW1 and TW2 to provide a total production capacity of 175 m^3/d, the equivalent bulk water tariff will be approximately US$0.127 per m^3, with a 40:60 breakdown between fixed (mainly financial costs) and variable operational costs. To determine if the project is viable from a sector perspective a cost of service analysis was undertaken for LWB. This calculated the annual total cost to LWB of supplying water to customers including all existing costs together with the cost of LWSP (excluding sanitation), with TW3 being operated as a PPP. The inflation adjusted willingness to pay (WTP) in 2024 was estimated from an earlier survey to be US$1.07/$m^3$, whereas cost of service for that year is calculated to be US$0.84/$m^3$.

Potential Use of an IDA Guarantee

14. **Rationale for an IDA Guarantee.** PPPs are yet to evolve in Malawi, while the need for mobilizing private capital for infrastructure projects is significant, in the context of limited public and Multilateral Development Bank (MDB) finance. As indicated in the market sounding, it is unlikely that a private concessionaire would take the risk of entering a long-term contract with LWB (state owned entity) without providing adequate risk mitigation guarantees. The presence of the IDA payment guarantee would not only save costs but build a track record for the Government of Malawi into honoring payment obligations to a private entity over a long-time horizon. The provision of IDA guarantee will help establish a track record for the country, enhance investor confidence and enable future PPP projects to implement with private capital.

15. An IDA payment guarantee is proposed to mitigate payment risks, which will help increase access to mobilization of private capital with competitive borrowing terms; enhance competition from wider market PPP partners, reduce risk premium and improve overall affordability of services. IDA guarantee is proposed primarily to mitigate non-payment of contractual termination compensation amount due from LWB/GoM. In situations, where there is an early termination of the PPP contract, the contractual agreement would specify the amount of compensation due to the project company and its lenders. The risk of non-payment of such compensation amount is an important bankability issue for potential lenders and sponsors. The proposed IDA guarantee will mitigate the risk of non-payment and provide comfort to the potential lenders and sponsors. IDA Payment Guarantee is also proposed to backstop the payment security required under the BOT contract during the contract period.

16. **Structure of the PPP and IDA Guarantee.** The proposed scope of the PPP includes the design, financing, and construction of TW3, and the operations and maintenance of TW1, TW2, and TW3 for 20 years. The

Concessionaire would be responsible for providing bulk water, at an agreed upon quality, volume, and price, to LWB for distribution to its customers. LWB would make availability payments, with a fixed and variable component, to the Concessionaire for the provision of water. The availability payments would be subject to deductions if the Concessionaire does not meet the performance requirements (e.g., quality, volume) during the operations period. The concessionaire would arrange financing (debt and equity) for the construction of TW3 and rehabilitation of TW1 and TW2. It is envisioned that the PPP would follow a project finance structure, where a special purpose vehicle (SPV) would be created to act as the Concessionaire. At the end of the PPP, the Concessionaire would return the assets back to LWB in an agreed upon condition.

17. Potentially, an IDA Payment Guarantee could cover the risk of non-payment by LWB. A termination payment guarantee could also be included to compensate the Concessionaire**.** This would be triggered if the contract terminates for reasons attributable to LWB or the Government of Malawi. However, the amount of this termination payment guarantee and coverage will be determined once the contractual provisions are detailed along with the risk allocation matrix.

18. IDA payment guarantees could be offered either through a revolving letter of credit (L/C) structure to be issued by an "L/C Bank" (as a beneficiary of IDA guarantee) or as a direct payment guarantee to the selected project company (as a direct beneficiary of IDA guarantee). Subject to further development of risk allocation (between the public and private sector) and the design of payment security escrow account, the amount and nature (direct or L/C structure) of IDA guarantees can be confirmed. Any payment under the IDA Payment Guarantee would trigger the obligation of the Government of Malawi to repay the IDA amount under obligation the Indemnity Agreement (to be concluded between IDA and GoM). The Indemnity Agreement will require Malawi to repay IDA on demand, or as IDA may otherwise direct. A term sheet for IDA guarantees will be developed in detail that sets out the terms and conditions of the guarantee. Once developed, the term sheet will be shared with the bidders as part of the bidding documentation as an option to incorporate in their bid responses. The fees related to the IDA guarantees are expected to be paid by the PPP project company as part of the project costs.

19. **Complementary investments.** The PPP structuring and procurement will be closely coordinated with other investments under the broader Lilongwe Water Program (e.g. KD1 raising) and under LWSP (e.g. distribution network rehabilitation) to ensure sufficient water is available from the raising of KD1 and that additional water production can be distributed and sold to customers through the rehabilitated and expanded distribution network. The sequencing and interdependence is illustrated in **Table 7.1** below.

Table 7.1 – Schedule of other investment projects linked to the PPP

Project	2017		2018		2019		2020		2021		2022 <
Raising of Kamuzu Dam 1											
TW3 Procurement											
TW3 Construction-commissioning											
TW3 Operational											
Investment in Priority Network Rehabilitation											
Investment in network expansion											
Procurement and Construction											
Operational											

20. **Additional PPP due-diligence required**. IFC has been retained by LWB to further analyse and advise on the most appropriate PPP arrangement to deliver an affordable and bankable project. IFC will provide support to LWB, in collaboration with the PPP Commission, to implement a transparent and competitive bidding process to

identify the most appropriate private partner to deliver the project at a competitive price. Refining the transaction structure will include: (i) updating the technical due diligence, including asset assessment for TW1 and 2 to fully inform bidders of the condition of the existing assets to be transferred, and assessment of operational staff to inform the process and terms and conditions of any transfer (in compliance with IFC-PS2) to the private operator for the duration of the contract; (ii) updating the legal due diligence and prepare draft term sheet; (iii) updating the financial analysis, in line with latest technical due diligence; (iv) conducting additional market sounding; (v) refining the risk allocation and transaction structuring; and (vi) developing options for risk mitigation instruments and defining the IDA guarantee term sheet. Following this the IFC team will support the LWB to launch an open and transparent bidding process. The expected timeline for this process is 18 months.

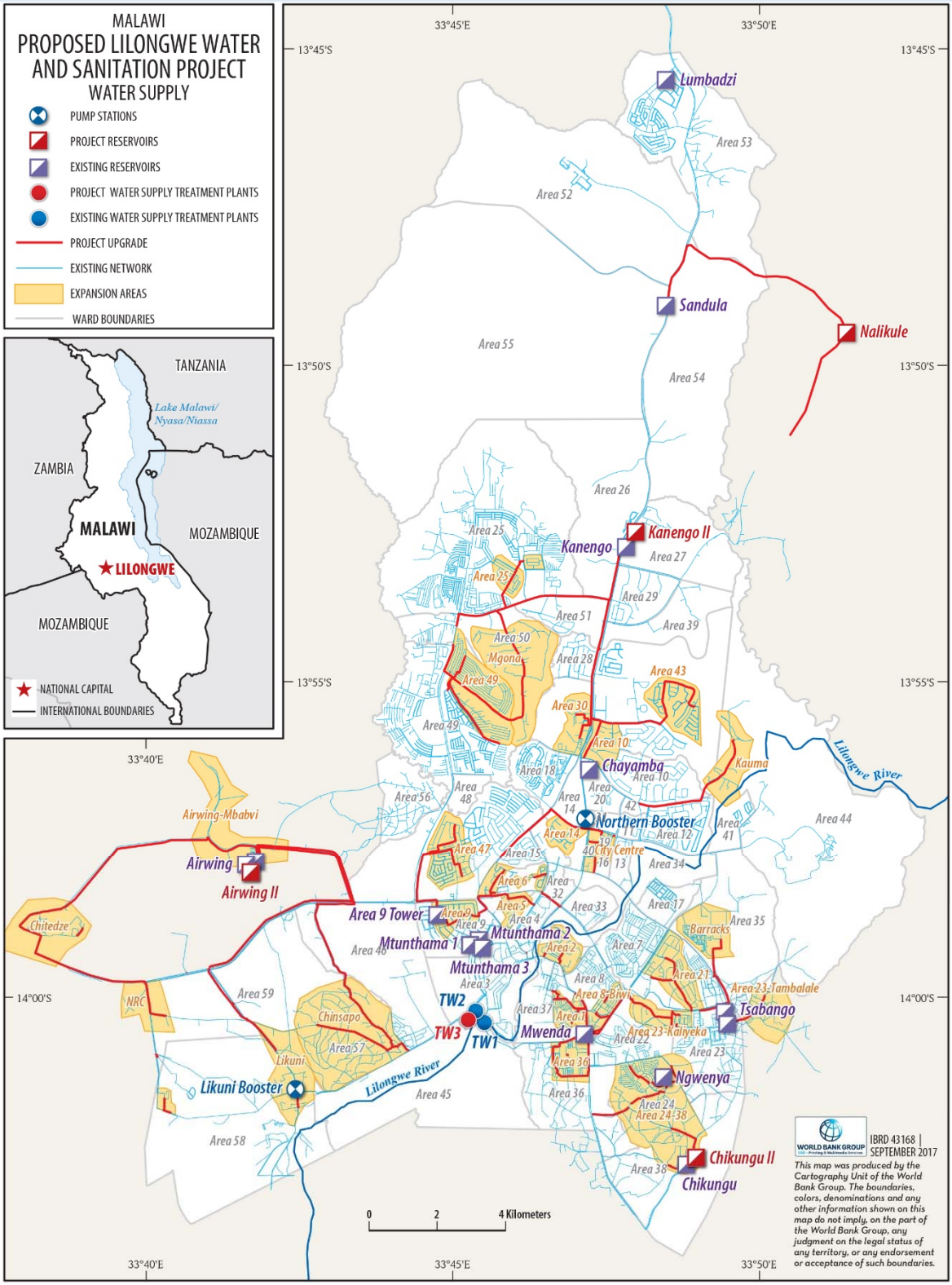
ANNEX 8: LIST OF STUDIES REVIEWED

COUNTRY: Malawi
Lilongwe Water and Sanitation Project

The following studies where the key references consulted for the preparation of this Project Appraisal Document.

1. SMEC (2016). *Feasibility Study and Preliminary Design of Lilongwe Water Treatment Works 3*. Report to Lilongwe Water Board, September 2016.
2. SMEC (2015). Kamuzu Dam 1 – Dam Safety Checking Report. Report to Lilongwe Water Board, May 2015
3. SMEC (2015). Kamuzu Dam 2 – Dam Safety Checking Report. Report to Lilongwe Water Board, May 2015
4. SMEC (2016). *Kamuzu Dam Yield Analysis*. Report to Lilongwe Water Board, August 2016.
5. IFC (2016). *Lilongwe Bulk Water Supply Project. PPP Strategic Options Report*. Report to Lilongwe Water Board and Ministry of Finance, Economic Planning and Development, July 2016.
6. Rogers, D. (2015). *Rapid Assessment of Lilongwe City's Water Distribution Network*. Report to Lilongwe Water Board and the World Bank, October 2015.
7. Rogers, D. (2016). *Hydraulic Analysis of Lilongwe City's Water Distribution of Network and Identification of Priority Investments*. Report to Lilongwe Water Board, May 2016.
8. Rogers, D. (2016). *PALM+ Analysis: Defining the Optimum Economical Level of Losses in Lilongwe's Water Distribution Network*. Report to Lilongwe Water Board & World Bank, April 2016
9. Riemersma, M. Beckers, R. Groenewald, D. Banda, E., Sumbwi, E., Bierling J., Balkema, S., Janssen, M., and Floris, M. (2016). *Lilongwe Water Distribution Network Project. Priority Investment Program and Hydraulic Analysis*. Report to Lilongwe Water Board, February 2016.
10. Safege (2002). *Engineering Studies for Lilongwe Water Board: Sanitation Final Report* to Lilongwe Water Board, January 2002
11. ECA (2014). *Lilongwe Water Board Tariff Review and Willingness to Pay Study*. Report to Lilongwe Water Board, September 2014.
12. Water, Waste and Environmental Consultants (2011). *Strategic Sanitation Plan for Lilongwe's Low-Income Areas.* Report to Lilongwe Water Board, April 2011.
13. Lilongwe City Council (2017). *Sanitary Arrangements By-laws*, 2017
14. World Bank (2017). *Lilongwe Citywide Sanitation Survey*. Interim Report (under preparation)
15. World Bank (2016). *Malawi Urbanization Review: Leveraging Urbanization for National Growth and Development*. World Bank, Washington DC, April 2016
16. Odonga, C. (2016). *Institutional analysis of Lilongwe Water Board: Diagnostic Report*. Report to Lilongwe Water Board and World Bank, February 2016
17. Lilongwe Water Board (2016). *Institutional Capacity Strengthening of Lilongwe Water Board: Pathway to Success Program,* February 2016
18. Odonga, C. (2017). *Review of the Implementation of the Lilongwe Water Board's "Pathway to Success Program" for the period March 2016 – June 2017*. Report to Lilongwe Water Board, July 2017.

ANNEX 9: LOCATION MAP OF PROPOSED WATER SUPPLY INTERVENTIONS



ANNEX 10: LOCATION MAP OF PROPOSED SANITATION INTERVENTIONS