THE PROVISION OF CONSULTANCY SERVICES FOR STUDY AND DESIGN OF STORM WATER DRAINAGE SYSTEM AND PREPARATION OF DRAINAGE & SANITATION DEVELOPMENT PLAN (DSDP) FOR KIGOMA UJIJI MUNICIPALITY FOR A PERIOD OF 2020-2040

DRAFT DSDP REPORT PRESENTATION

<KIGOMA UJIJI MUNICIPALITY>

21th JANUARY 2020

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1. INTRODUCTION

Project Overview

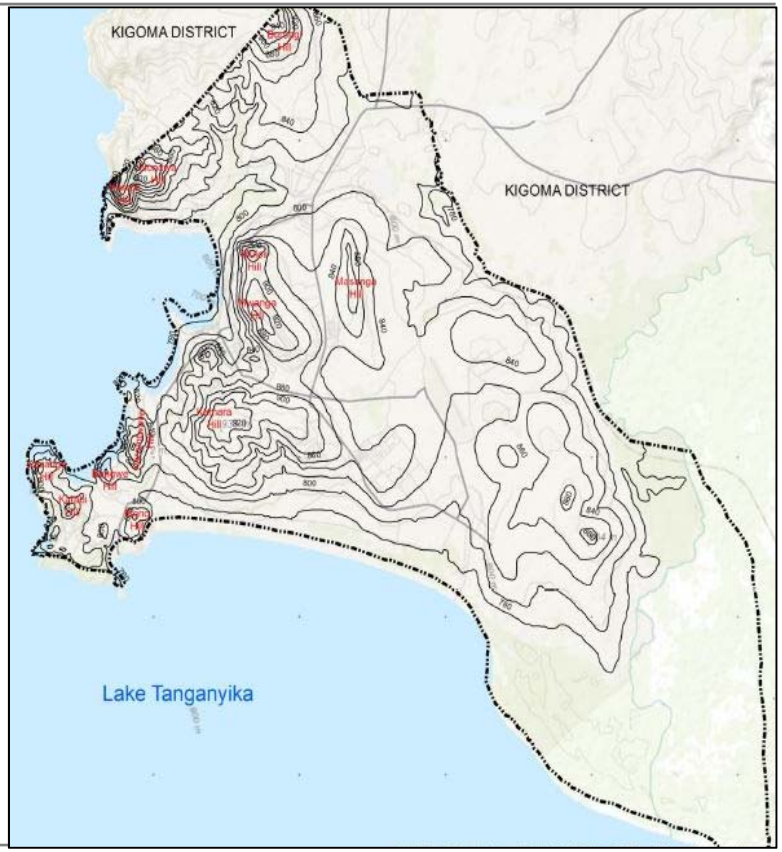
Project Name	• "Study and Design of Storm Water Drainage System and Preparation of Drainage & Sanitation Development Plan (DSDP) for Kigoma Ujiji Municipality for a period of 2020~2040" under the TSCP-Second Additional Financing (AF2).
Project Back Ground	• KUMC DSDP is prepared for 20 years period (2020-2040) • Prepared under TSCP (AF2)
Project Objective	• To improve the quality and access to basic urban services in Kigoma-Ujiji Municipality. • To providing appropriate storm water design and an integrated Municipal-Wide drainage and sanitation development plan.
Project Progress	• Submitted Inception Report, 31th June 2019 (Done). • Submitted Baseline Assessment Report, 30th August 2019 (Done). • Presented Draft DSDP Report to Kigoma Stakeholders, 13th January 2020 (Done). • Presenting Draft DSDP Report to Stakeholders, 21th January 2020 (Today).

1. INTRODUCTION

Situational Analysis

Overview of Project Area

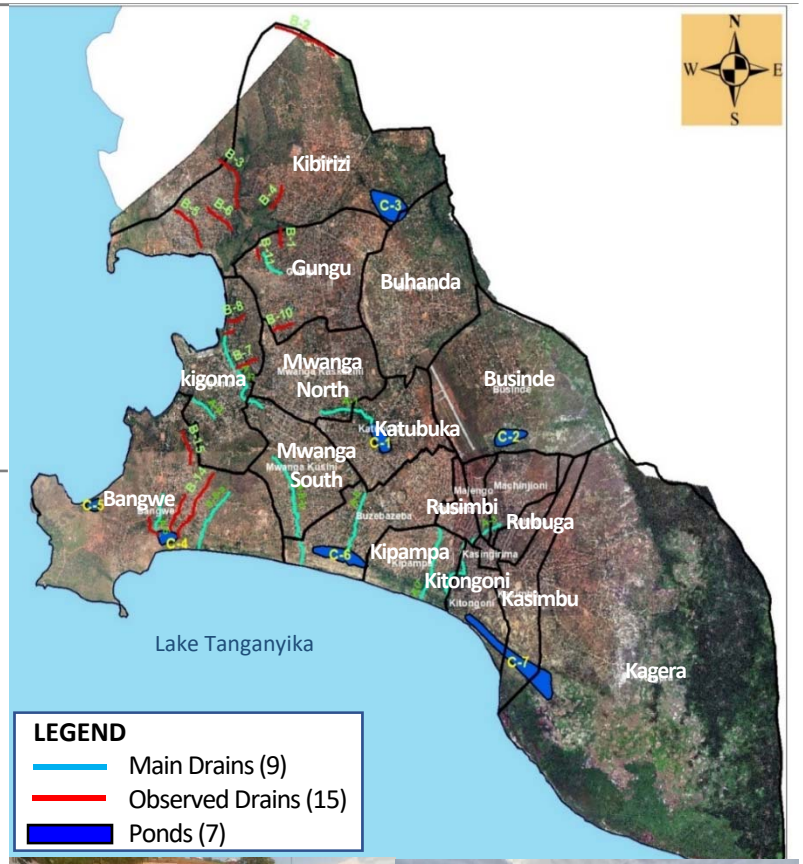
General	• Total area is 128 Square kilometers • Average altitude is 773 to 960 m • Terrain ranges from gentle slopes of less 10% in the south eastern parts to steep slopes of more than 25% in hills.
Kigoma Division	• 2 Divisions (Kigoma North and Kigoma South) • The two(2) divisions are subdivided into 19 wards and 68 sub-wards
Population	• Had a total population of 215,458 (2012 Census) • There were 43,092 households (average household size of 5.0) • Current population estimated at 268,609 people (2019, at 3.2% a.g.r)
Rainfall and Soil	• Annual rainfall varies between from 600 mm- 1500 mm • Soils vary from loam soils to loamy sand soils.



1. INTRODUCTION

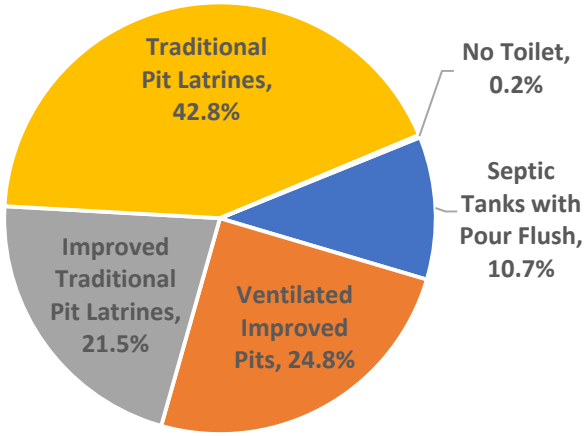
Drainage Status Analysis

General	• The high slope terrain causes high storm water velocity and high erosion of the drain bed and bank • Consequently the hilly areas are affected by severe soil erosion and environmental degradation • The low laying Wards of Katubuka, Kipampa, Rusimbi, Kitongoni, Kasimbu and Kagera are prone to floods during the rainy seasons
Storm water drains and ponds	• There are 9 major drains and over 15 other observed drains → A few Major storm water drainage channels have been partly rehabilitated → Extensive rehabilitation measures are still required to drains • There are 7 major storm water collection/flood attenuation ponds →Flood control measures are highly needed in the low laying areas.



1. INTRODUCTION

Sanitation Status Analysis

Off-site Sanitation	• There is no central sewer system for collection of waste water. • Currently 2 anaerobic ponds located in Kagera Ward used as Faecal Sludge Treatment Plant. • KUWASA owns 1 cesspit emptier truck and collects an average of 20 trips a month	 Faecal Sludge treatment pond Cesspit Emptier Truck 
On-site Sanitation	• With absence of central sewer, most people and institutions practice on–site sanitation • A high percentage of householders use traditional pit latrines(42.8%) • Hence there is high potential to pollution of ground water source.	**% of Population Practicing the method (year 2018)** 

Approach and Methodology of DSDP

Approach in Preparation of DSDP

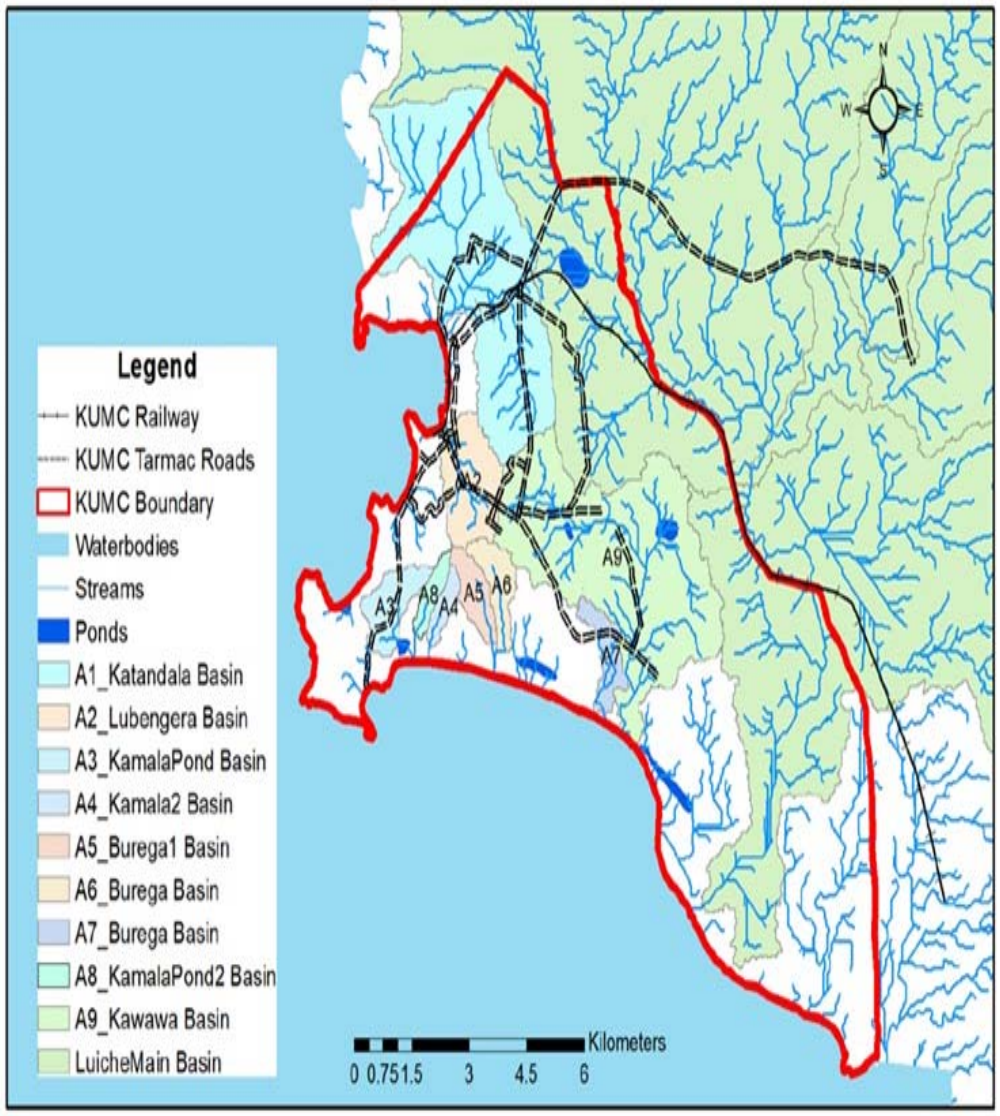
Utilization of Existing Knowledge and Local Expert	• Local experience through focus groups meetings has been used in the process of identity and acceptance issues and solutions.
Sustainability Principles	• In the identification and prioritization of measures, consideration has been to solutions that guarantee long-term sustainability
Design Discharge	• Design discharge has been determined through consideration of geological and hydrological conditions
Innovative yet Locally Appropriate Solutions	• Consultative and approval steps have been taken to ensure that the measures proposed are within technical capability and financial affordability of the implementers.
Comprehensive and Integrated Approach	• Elements of the Plan address local Institutional, Environmental, Sociological, Financial and Technical issues and are integrated such that the combined effects are optimized
Application of GIS	• Through the use of GIS applications to enhance the understanding of the existing situation and provide a clear presentation of the key issues, challenges and constraints

Utilization of Local Experts(Focus Group)

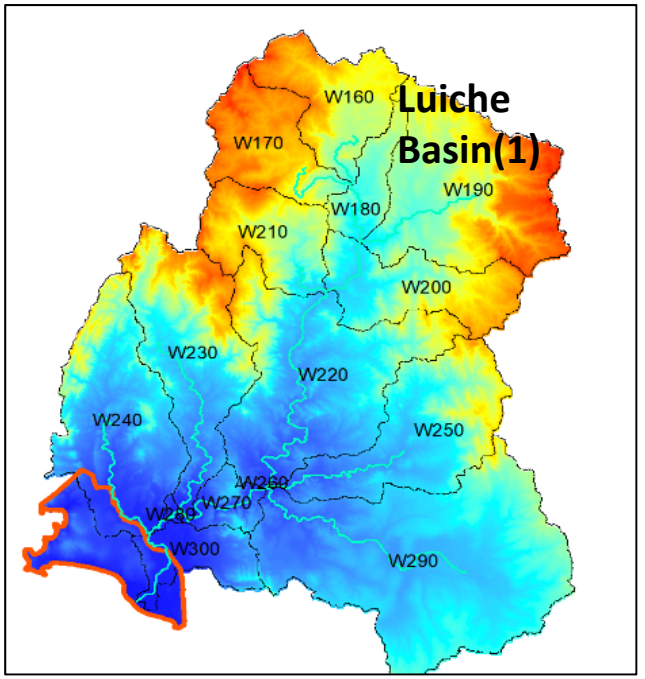
Sn	Date	Stakeholders (Wards)	Meeting Venue	Agenda	Participants
1	22.08.2019	Kipampa, Kitongoni Kasimbu, Kagera	Ward Office and Site	•Identified Issues of Wards •Site Visit	•WEO •KUWASA/KUMC
2	23.08.2019	Rubuga, Machinjioni, Majengo, Kasingirima	Ward Office and Site	•Identified Issues of Wards •Site Visit	•WEO •KUWASA/KUMC
3	26.08.2019	Buhanda, Businde Buzebazeba, Rusimbi	Ward Office and Site	•Identified Issues of Wards •Site Visit	•WEO •KUWASA/KUMC
4	27.08.2019	Gungu, Kibirizi, Kigoma	Ward Office and Site	•Identified Issues of Wards •Site Visit	•WEO •KUWASA/KUMC
5	28.08.2019	Mwanga North, Mwanga South, Katubuka, Bangwe	Ward Office and Site	•Identified Issues of Wards •Site Visit	•WEO •KUWASA/KUMC
6	13.11.2019	KUWASA	KUWASA Office	•Proposed Plan Issues	•KUWASA
7	14.11.2019	TANROAD	TANROAD Office	•Proposed Plan Issues	•TANROAD
8	14.11.2019	TARURA	TANROAD Office	•Proposed Plan Issues	•TARURA
9	15.11.2019	TANROAD	Road Site	•Site Visit	•TANROAD
10	18.11.2019	TARURA	Road Site	•Site Visit	•TARURA
11	19.11.2019 20.11.2019	KUWASA	WWTP Site	•Site Visit	•KUWASA

2. DESIGN OF STORM WATER DRAINAGE SYSTEM

Drainage Catchment Within the KUMC



Kigoma Basin(9)



- 10 Drainage Catchments have been delineated Within the KUMC through Hydrologic Modelling
- Using modelling results, interventions to minimize human and property damage resulting from storm water/flooding in the Kigoma Ujiji area are proposed.

2. DESIGN OF STORM WATER DRAINAGE SYSTEM

Summary of the Physical Characteristics of the KUMC Catchments

Catchment Code	Catchment Name	Area (km2)	River Length (m)	River Slope (%)	Catchment Slope (%)
A1	Katandala	1.232	9133.17	0.017	0.0948
A2	Lubengera	2.79	1462.8	0.557	0.134
A3	Kamala Pond	1.448	1429	0.0252	0.102
A4	Kamala 2	0.529	686.02	1.53	3.52
A5	Burega 1	1.004	1257.648	-0.11	2.398
A6	Burega 2	1.151	1816.44	-0.074	2.517
A7	Burega Pond	1.078	1853.37	0.018	0.154
A8	Kamala Pond 2	0.578	705.27	0.0596	3.496
A9	Kawawa	14.848	8454.03	0.0044	0.41

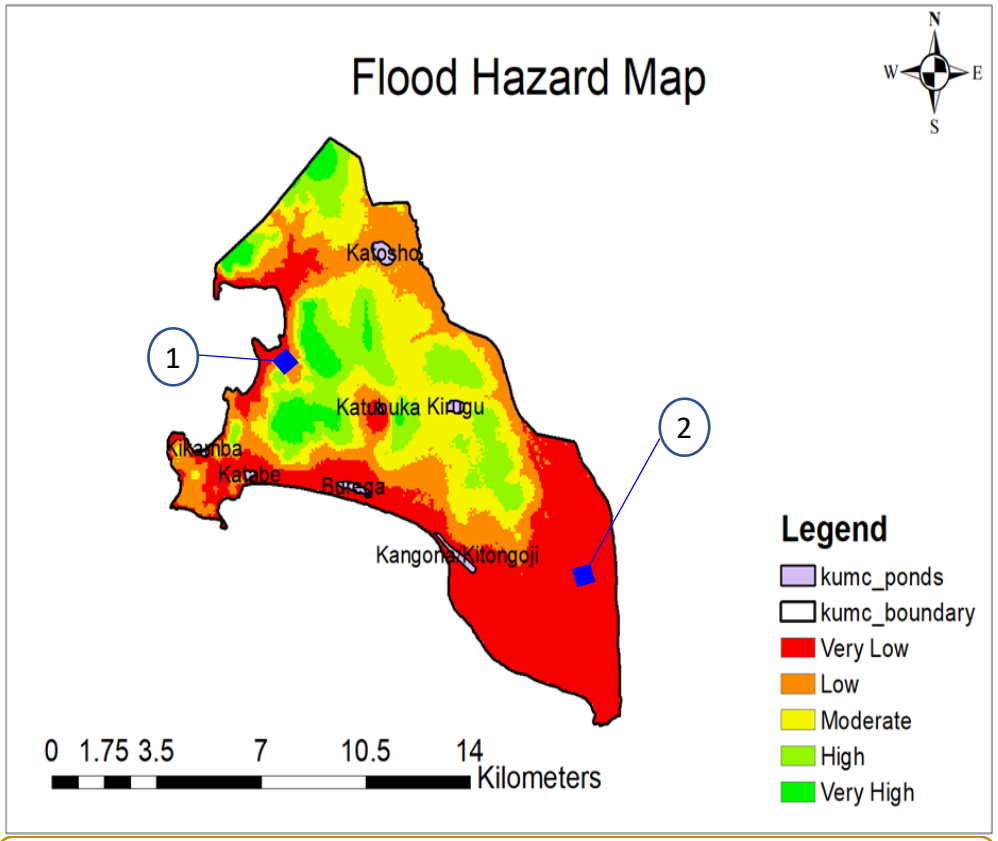
Summary of the Physical Characteristics of Luiche Sub-basins

Catchment Code	Area (km2)	River Length (m)	River Slope (%)	catchment Slope (%)
W160	116.71	81732.51	1.6	2.1871
W170	108.96	73986.82	2.4	1.9981
W180	48.53	55645.03	0.64	2.17811
W190	254.03	114512.27	1.11	2.1453
W200	121.15	90097.85	16.49	2.1314
W210	104.37	68471.89	0.58	2.1956
W220	284.4	144007.85	0.48	2.1902
W230	194.5	116804.99	0.79	2.1983
W240	217.4	106208.89	-0.42	2.2043
W250	186.69	108129.82	4.39	2.2847
W260	0.28	2788.45	0.22	2.7121
W270	33.85	40339.55	5.7	2.0976
W280	4.42	18775.55	0.187	1.8621
W290	431.96	160738.54	0.565	2.3046
W300	63.04	68595.82	-0.36	0.385

2. DESIGN OF STORM WATER DRAINAGE SYSTEM

Flood risk and vulnerability mapping

Flood Hazard Map of KUMC



- The map shows the areas which are more vulnerable to flood.

1 Extreme flood along Lubengera drain

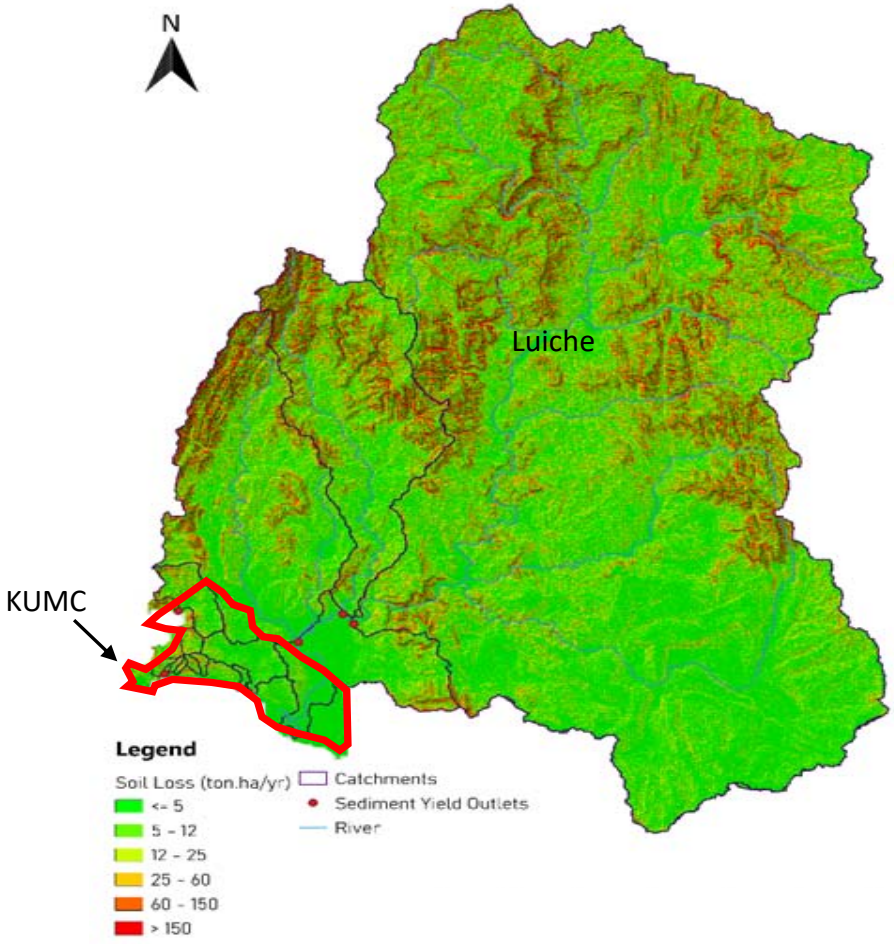
Extreme flood along Luiche river

2

2. DESIGN OF STORM WATER DRAINAGE SYSTEM

Modelling Soil Erosion and Sediment Yield in KUMC

Soil loss distribution map in the KUMC Catchments



Soil Loss Estimate and Analysis

- Estimated soil loss in the whole Catchments is 5,248,415 ton/year
- The Luiche catchment contribute over 99% of the total estimated soil loss.
  - ✓ Luiche Area : 5,213,615 (99.3%)
  - ✓ KUMC Area : 34,800 (0.7%)
- Areas associated with high rates of soil loss are closely linked to communal settlements
- Highly erosional areas includes areas at Lubengera, Kikamba, and Katandala catchments


Soil erosion at Kibirizi Ward in Katandala catchment


Soil erosion at Kigoma Ward in Lubengera catchment

2. DESIGN OF STORM WATER DRAINAGE SYSTEM

Sediment Yield in KUMC

Catchment		Area (Km2)	Soil Erosion			Soil Erosion with Gully Erosion		
			SDR	Soil Loss (ton/year)	Sed. Yield (ton/year)	SDR	Soil Loss (ton/year)	Sed. Yield (ton/year)
Kumc	A1 Katandala	15.62	0.23	20527.80	4656.09	0.42	17368.30	7260.67
	A2 Lubengera	2.92	0.24	5931.90	1440.90	0.50	5274.54	2651.15
	A3 Kikamba pond	1.24	0.18	1802.43	320.79	0.55	1590.84	878.44
	A8 Rutale	0.87	0.23	333.99	75.24	0.57	206.28	118.40
	A9 Kawawa	14.65	0.16	6203.97	965.30	0.42	4220.10	1776.56
	Sub total	**35.30**	**1.04**	**34,800.09**	**7,458.32**	**2.46**	**28,660.06**	**12,685.22**
Luiche	Mngonya	217.62	0.24	588472.00	138339.00	0.31	513823.00	160759.00
	Kaseke	194.15	0.28	690873.00	195878.00	0.32	615797.00	195098.00
	Simbo	1688.99	0.24	3934270.00	953475.00	0.25	3461680.00	864485.00
	Sub total	**2,100.76**	**0.76**	**5,213,615.00**	**1,287,692.00**	**0.88**	**4,591,300.00**	**1,220,342.00**
Total		**2,136.06**	**1.80**	**5,248,415.09**	**1,295,150.32**	**3.34**	**4,619,960.06**	**1,233,027.22**

3. PROPOSED DRAINAGE AND SANITATION MEASURES

DSDP Objectives

- To define Institutional, Structural and non-Structural measures needed to develop, operate and maintain Drainage and Sanitation Systems within the KUMC area

✓Make improvements in storm water collection system and strengthen flood Management

✓Improve faecal sludge management (on-site sanitation)

✓Propose initiatives with regards to wastewater collection and treatment (off-site sanitation)

Proposed Drainage Measure

Challenge	Proposed Measure	
• Erosion of the drain banks • Storm water flooding in low laying areas • Water Sources (Springs) pollution by storm water runoff	Structure Measure	• Options lining methods to existing drainage and storm water channels • Option of storm water collection/flood attenuation structures
• Informal and unplanned settlements in sloppy and low laying areas prone to rainy season floods	Non-Structure Measure	• Public awareness campaigns on flood /storm water erosion control • Resettlement and Compensation • Training and Capacity Building to KUMC

3. PROPOSED DRAINAGE AND SANITATION MEASURES

Options for Drainage Structural Measures

Improvement of Storm Water collection/protection structures

Option	Check Dam	Sand dam	Detention Pond /Constructed wetland
Figure			
Characteristics	• Reduce velocity of storm water • Reduce scoring effect of channel • Used to distribute flow along the channel • Can also function as sand trapping devices	• Low construction cost due to simple construction • Can be made by concrete, Earth and stone masonry materials • Long-term sustainability (High community involvement and commitment).	• Stored water may be used for domestic and agricultural purposes • Protects flood at the downstream area • Can be used to recharge the ground water, springs • Requires large area for storage site

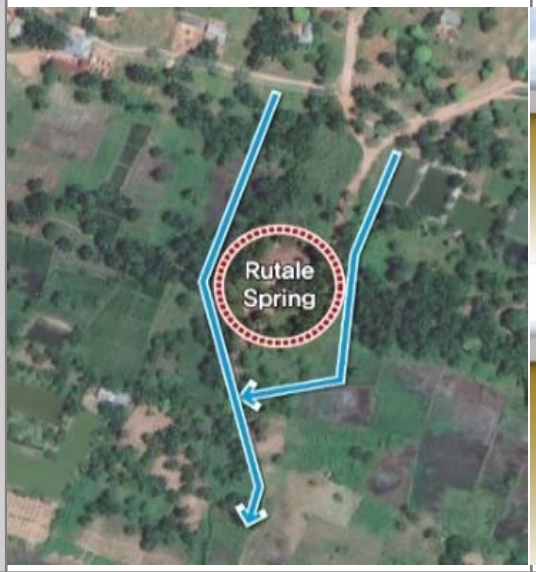
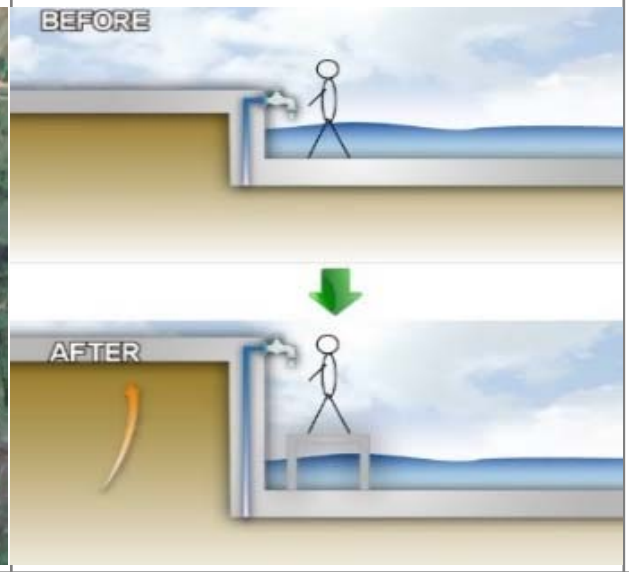
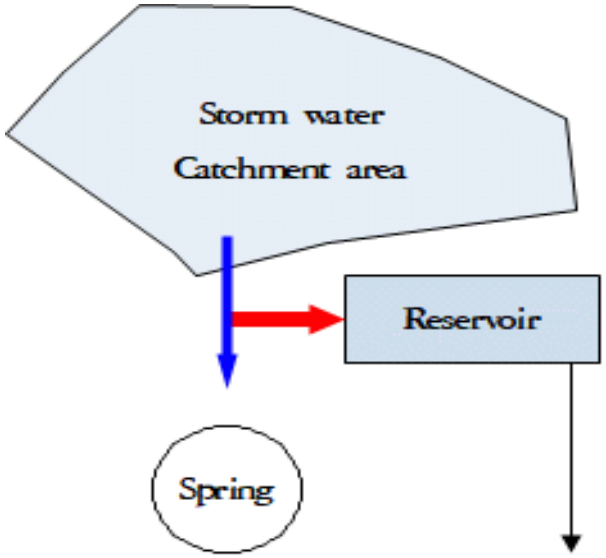
3. PROPOSED DRAINAGE AND SANITATION MEASURES

Improvement of existing drainage and storm water channels

Option	Reinforced concrete lined drain	Gabions boxes and Mattresses drain	Stone masonry pitched drain
Figure			
Characteristics	• Strong in the influence of earth pressure • Rather complicated in construction • an area of concern for the effects of the earth's pressure.	• Strong against water pressure and earth pressure • Heavily loaded and rather complicated in construction • an area of down stream or large in land	• Quick and easy construction • Weak to earth pressure • an area with little influence of earth pressure and a small depth of river

3. PROPOSED DRAINAGE AND SANITATION MEASURES

Installation of storm water protection structures around water sources

Option	Bypass Ditch	Higher Water Intake Facility	Storm water Reservoir
Figure			
Characteristics	• No reuse of Storm water • Rapid drainage during rainy season	• Will be difficult to get water during construction / rehabilitation • Low construction cost due to simple construction	• Requires availability of large storm water storage site • Storm water can be re-used during dry season

3. PROPOSED DRAINAGE AND SANITATION MEASURES

Improvement Targets for Drainage

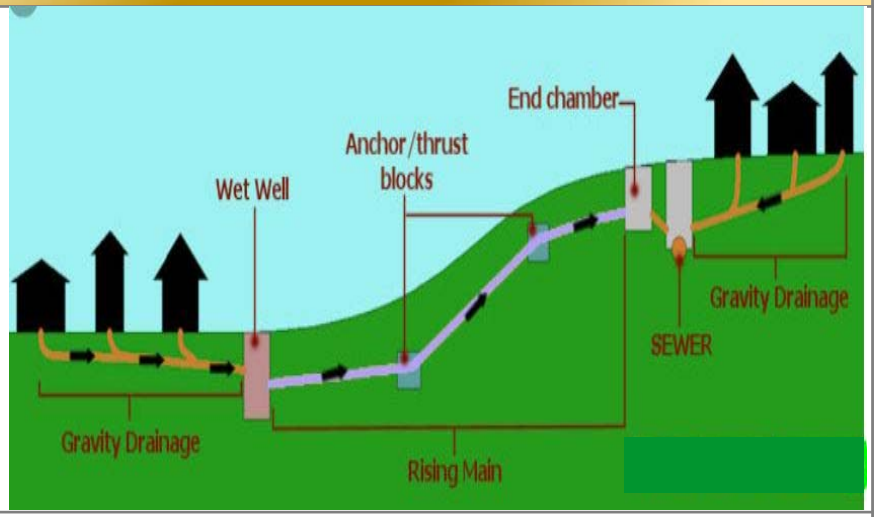
Challenges	Intervention Option	Target year			
		2025	2030	2035	2040
i) Erosion of the drain banks	• Improvement of existing drainage and storm water channels (lining/rehabilitation/protection/backfilling)	7.38 km	2.85km	2.25km	1.35km
ii) Storm water flooding in low laying areas	• Improvement of existing catchment basin	Katandala (A1) Kawawa(A9) Rutale(A8)	Kikamba (A3,A4) Kamala (A5,A6A,A7)	Lubengera (A2)	Luiche
iii) Water Sources (Springs) pollution by storm water runoff during rainy seasons	• Protection of Springs (Construct embankment, Establish water/sand retention dam, Install overflow/bypass channel)	Rutale Nyakageni	-	-	-
iv) Unplanned settlements in low-laying flood prone areas	• Public awareness campaigns on flood /storm water erosion control	V	V	V	V
	• Resettlement and Compensation	V	V	V	V
	• Training and Capacity Building to KUMC Staff	V	V	V	V

3. PROPOSED DRAINAGE AND SANITATION MEASURES

Proposed Sanitation Measure

Challenge	Proposed Measure	
• Absence of a centralized sewerage system • The high number of households using pit latrines • Hence there is high potential to pollution of ground water source	Structure Measure	• Installation of a sewer system in the Municipality • Improvement of on-site sanitation & Sludge treatment plant • Installation of DEWATS facilities
• Offensive odors due to lack of proper operation • Lack of awareness of the importance of sanitary environment	Non-Structure Measure	• Public Awareness and Campaigns for sanitation method • Training and Capacity Building to KUMC Staff • Considerations for financial supports to promote connection to sewerage system

Options for Sanitation Structural Measures

Option	Wastewater stabilization ponds Treatment System	Combined Gravity and Pumped Sewerage System
Figure		
Characteristics	• Ponds are simple to design and build • The operation and maintenance is very simple and do not require special skills • By natural processes carry out stabilization of the organic matter • Odor can become a nuisance.	• Possibility of serving a huge area • Additional O&M Costs resetting from Pumping • More operational skills required in pumps Operation and Maintenance

3. PROPOSED DRAINAGE AND SANITATION MEASURES

Improvement Targets for Sanitation

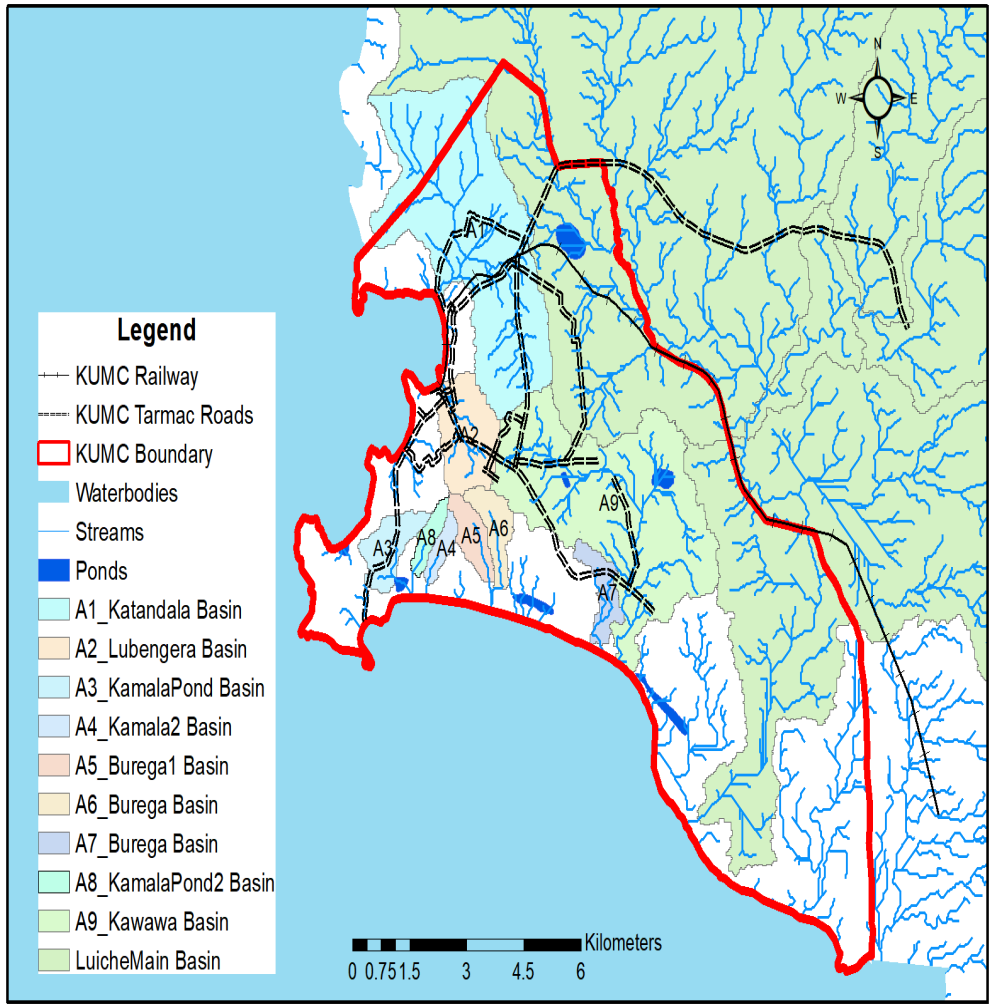
Challenges	Intervention Option	Current	Target year			
		2020	2025	2030	2035	2040
i) Lack of Sewerage System	Length of Construct Sewers	-	27.6km	13.9km	19.2km	12.4km
	% of people with sewer connections compared to total population	-	24%	41%	75%	82%
ii) Low number of Faecal Sludge Collection Trips	no of Cesspit emptier trips to Treatment per month	20 trip	100 trip	200 trip	300 trip	500 trip
	Quantity of processed sludge ready for re-use	-	20 ton/year	30 ton/year	40ton/year	50ton/year
iii) Low application of DE WATS Installations	Installed Capacity of DEWATS	-	-	800m³	1200m³	1600m³
iv) High % of people using Traditional Pit Latrines	% of people using Septic Tanks	11.9%	12.4%	12.3%	6.4%	4.7%
	% of people using VIPs	27.7%	28.7%	28.3%	14.7%	10.7%
	% of people using Improved Traditional Pit Latrines	21.1%	14.2%	9.7%	3.6%	2.1%
	% of people using Traditional Pit Latrines	39.2%	20.2%	8.4%	0.5%	-
	% of people with no Toilets	0.1%	-	-	-	-
v) Lack of awareness of th e sanitary environment	Conduct Campaigns and Workshops/Meetings	-	v	v	v	v
	Budget funds for resettlement and compensation	-	v	v	v	v
	Conduct Trainings, Study Tours and Secondments	-	v	v	v	v

4. DETAILED DESCRIPTION OF SELECTED MEASURES

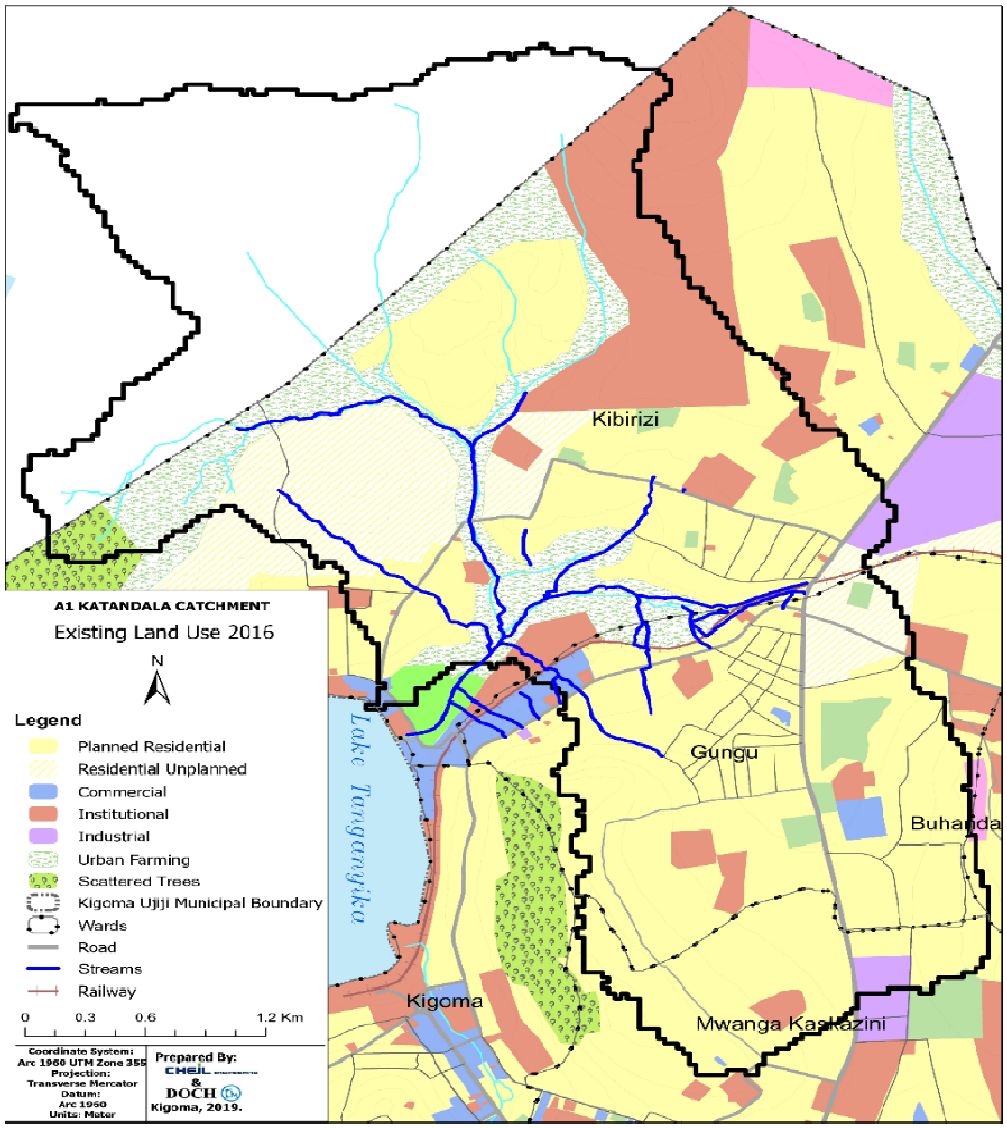
Drainage

Structural Measures Concept

- Ten (10) drainage catchments basin were delineated within the KUMC
- Improvement plans and flooding protection/control measures have been proposed after combining the 10 catchments into 7 catchments which are Katandala(A1) ,Kawawa(A9),Rutale(A8),Kamala(A3+A4),Lubengera (A2), Kikamba(A5+A6+A7) and Luiche
- The 9 Main drains have been combined into one package and improvement measures proposed for each drains.
- Measures for improvement of 15 other observed drains are proposed



Improvement of Katandala Catchment(1/2)

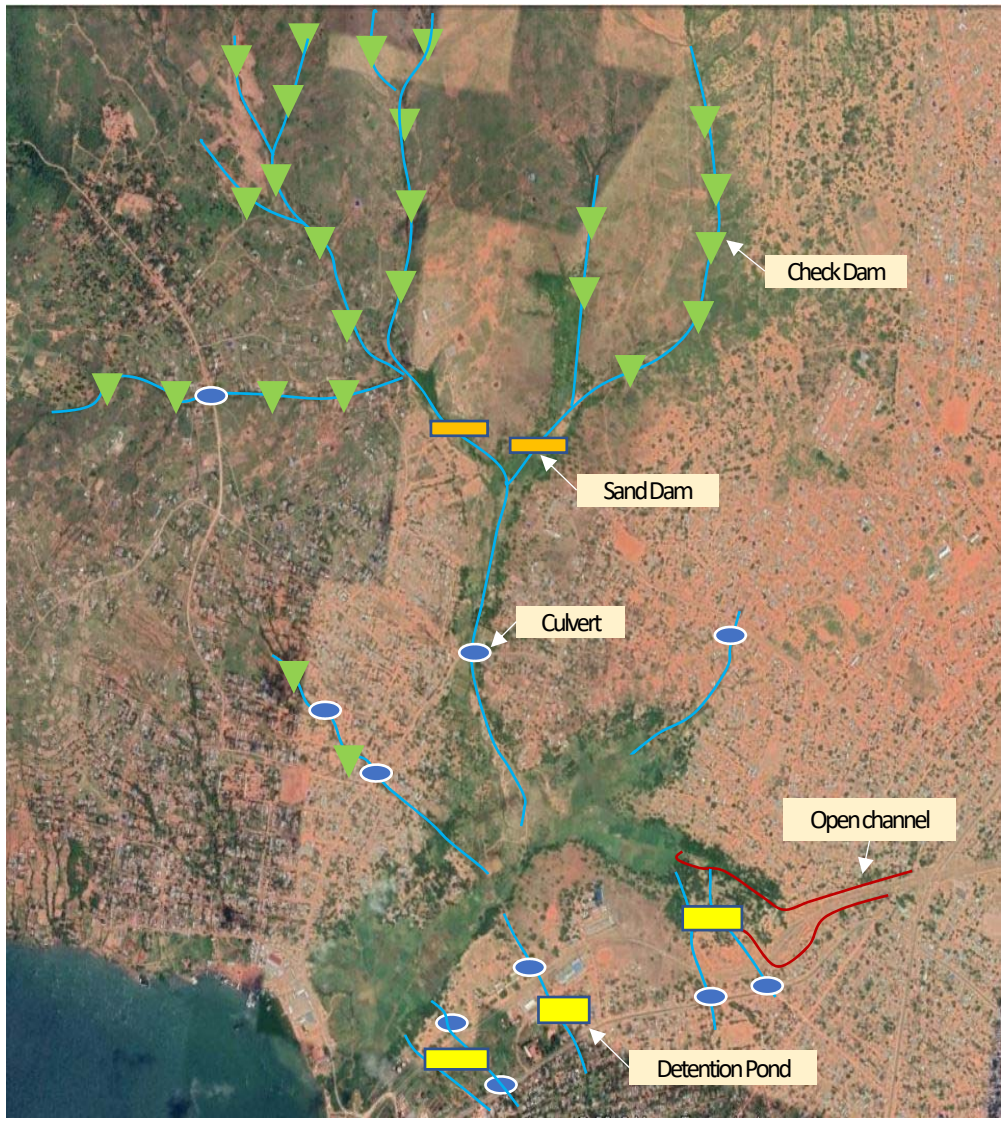


Overview:

- Located within the northern part of the Kigoma-Ujiji Municipality
- Covers a large portion of the Gungu, Kibirizi, Mwanga North Ward.
- The catchment drains an area of 15.4 sq.km.
- Infrastructures are frequently affected by floods

Site Status

Improvement of Katandala Catchment(2/2)



Drainage Challenges :

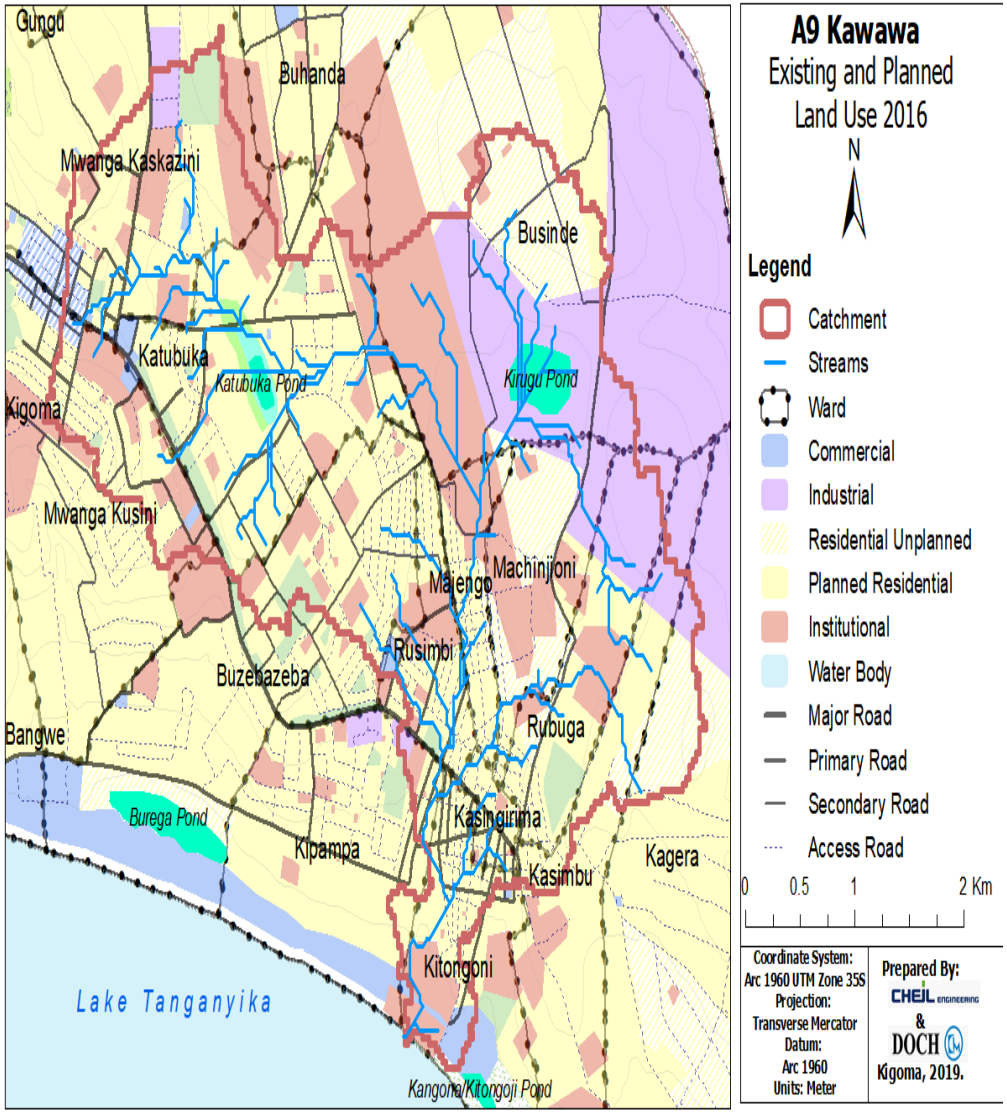
- Blockage of the culverts by sediments & debris
- Damaged culvert inlet and outlet structures
- Inadequacy capacity of the culverts
- Culvert outlet scour and deep gully development in the channels
- Unstable and eroded channel banks
- Railway overtopping flood
- Storm water pollution of the Nyakageni spring

Proposed Measures :

- Provision of the appropriate culvert inlet & outlet protection structures
- Construction of the storm water detention pond/wetland ***(3places)***
- Replacement of the culverts ***(21places)***
- Construction of the open channels ***(L=2.2km)***
- Construction of the check dams ***(25places)***
- Construction of sand dams along the drain ***(2places)***

4. DETAILED DESCRIPTION OF SELECTED MEASURES

Improvement of Kawawa Catchment(1/2)

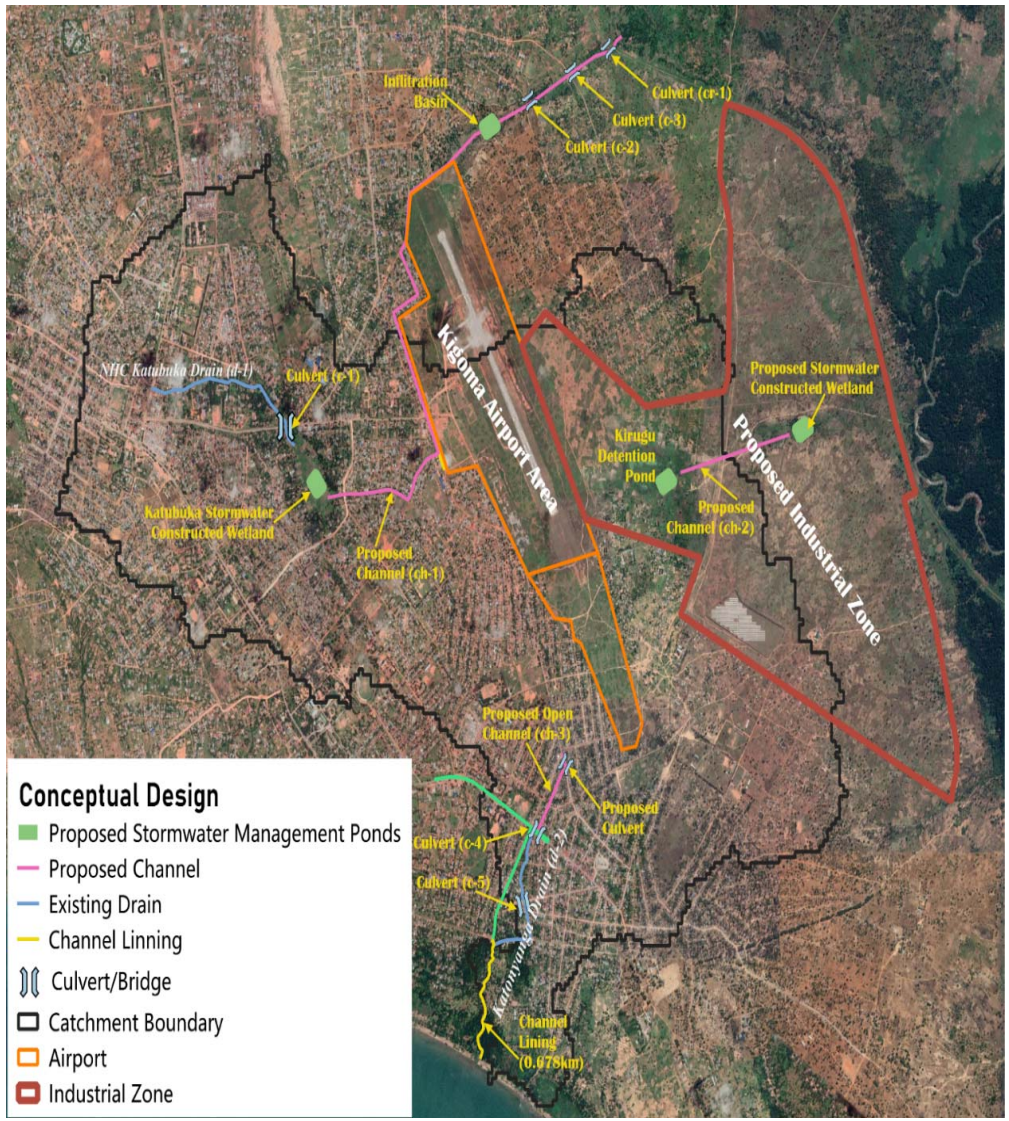


Overview:

- The catchment Drains an area of 14.8 sq.km
- Covers 14 out of 19 Wards of within the KUMC
- Consists two dry ponds (Katubuka and Kirugu) and two constructed drains (NHC Katubuka and Katonyanga)

Site Status

Improvement of Kawawa Catchment(2/2)



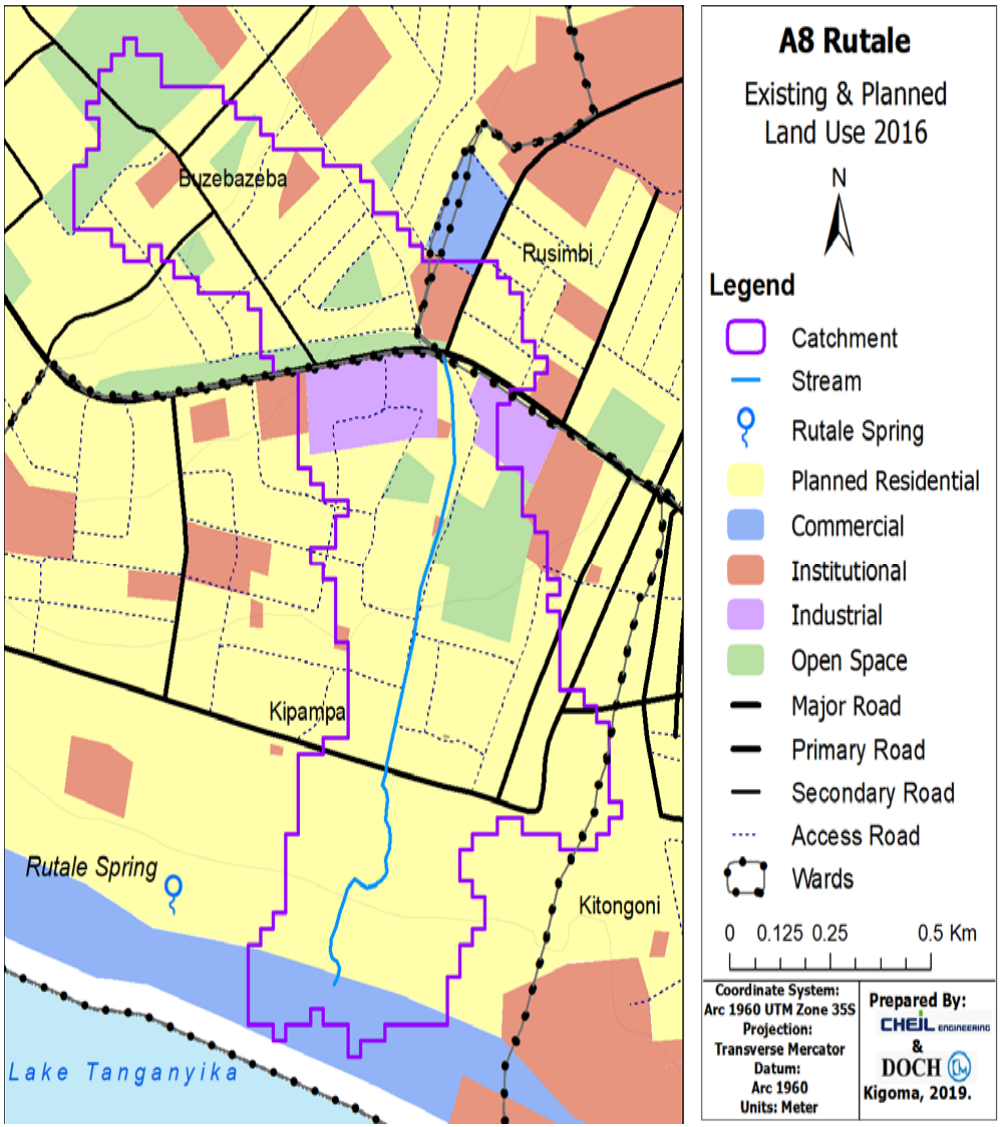
Drainage Challenges :

- Flooding of the Katubuka and Kirugu ponds affecting nearby settlements and Kigoma Airport area
- Railway culvert (cr-1) over topping
- Inadequacy capacity of the culverts
- Blockage of culverts by sediments and debris
- Channel bed and bank erosion

Proposed Measures :

- Replacement of the culverts with inadequacy capacities
- Provision of a culvert and open channel ***(L=5.5km)***
- Construction of the constructed wetland ***(2places)***
- Construction of the storm water infiltration basin ***(1place)***
- Construction of the Kirugu detention pond ***(1place)***
- Replacement of the culverts ***(7places)***

Improvement of Rutale Catchment(1/2)



Overview:

- Covers a Buzebazeba, Kipampa Ward.
- The catchment drains an area of 1.15sq.km, with Rutale drain as the main drain
- Rutale spring is a major domestic water source to the people of Kipampa Ward and nearby communities.

Site Status

Improvement of Rutale Catchment(2/2)

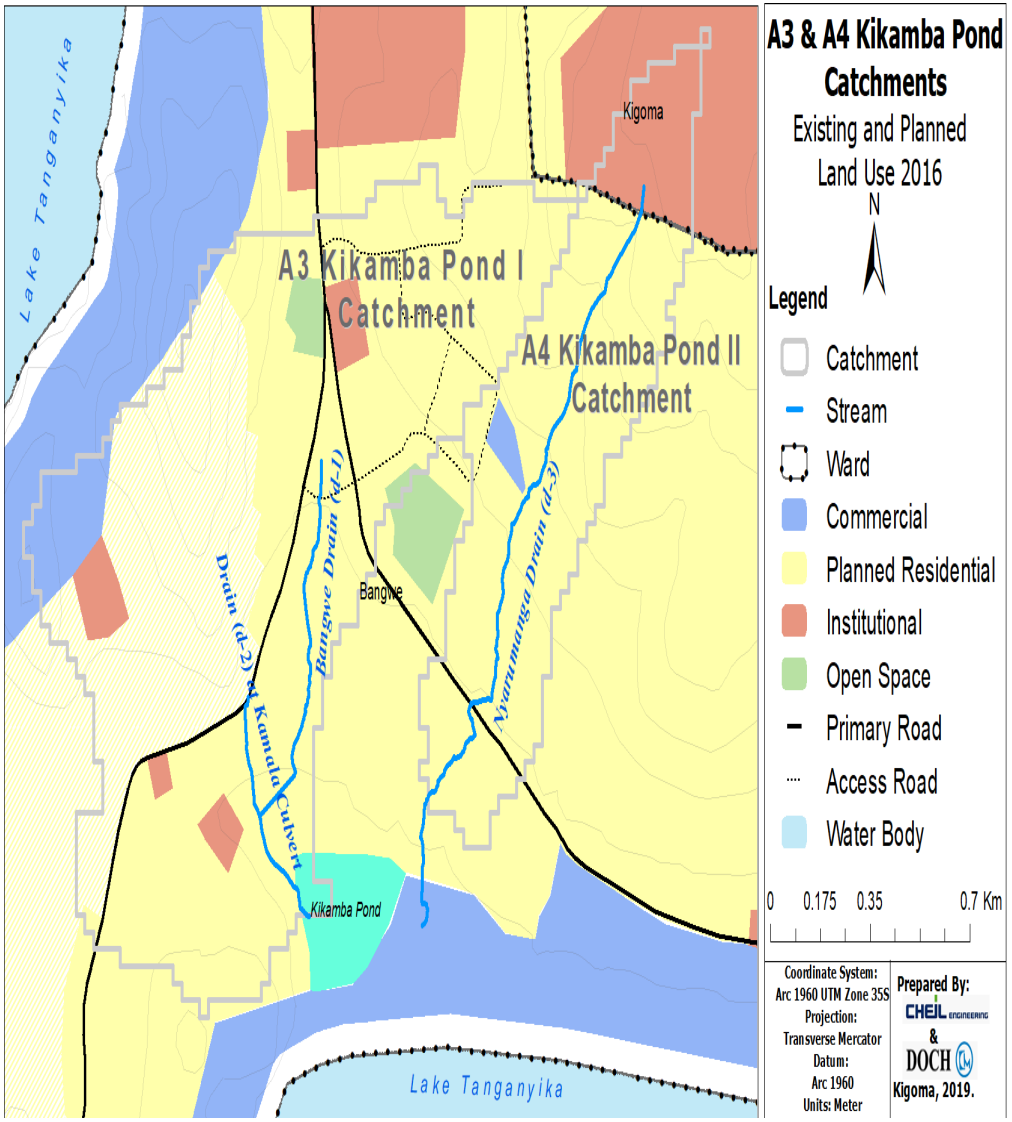
Drainage Challenges :

- Blockage of the culverts by sediments and debris
- Inadequacy capacity of the culverts
- Lack of proper culvert inlet and outlet protection structures
- Culvert outlet scour and deep gully development in the channels
- Unstable and eroded channel banks expanding to the nearby settlements

Proposed Measures :

- Provision of the appropriate culvert inlet and outlet protection structures
- Replacement of the culverts ***(5places)***
- Provision of the check dams ***(3places)***
- Rutale spring runoff protection
  - ✓Expansion of the existing open channel to Lake Tanganyika ***(L=1.25km)***
  - ✓Provision of the road side drains ***(L=950m)***

Improvement of Kikamba Pond Catchment(1/2)

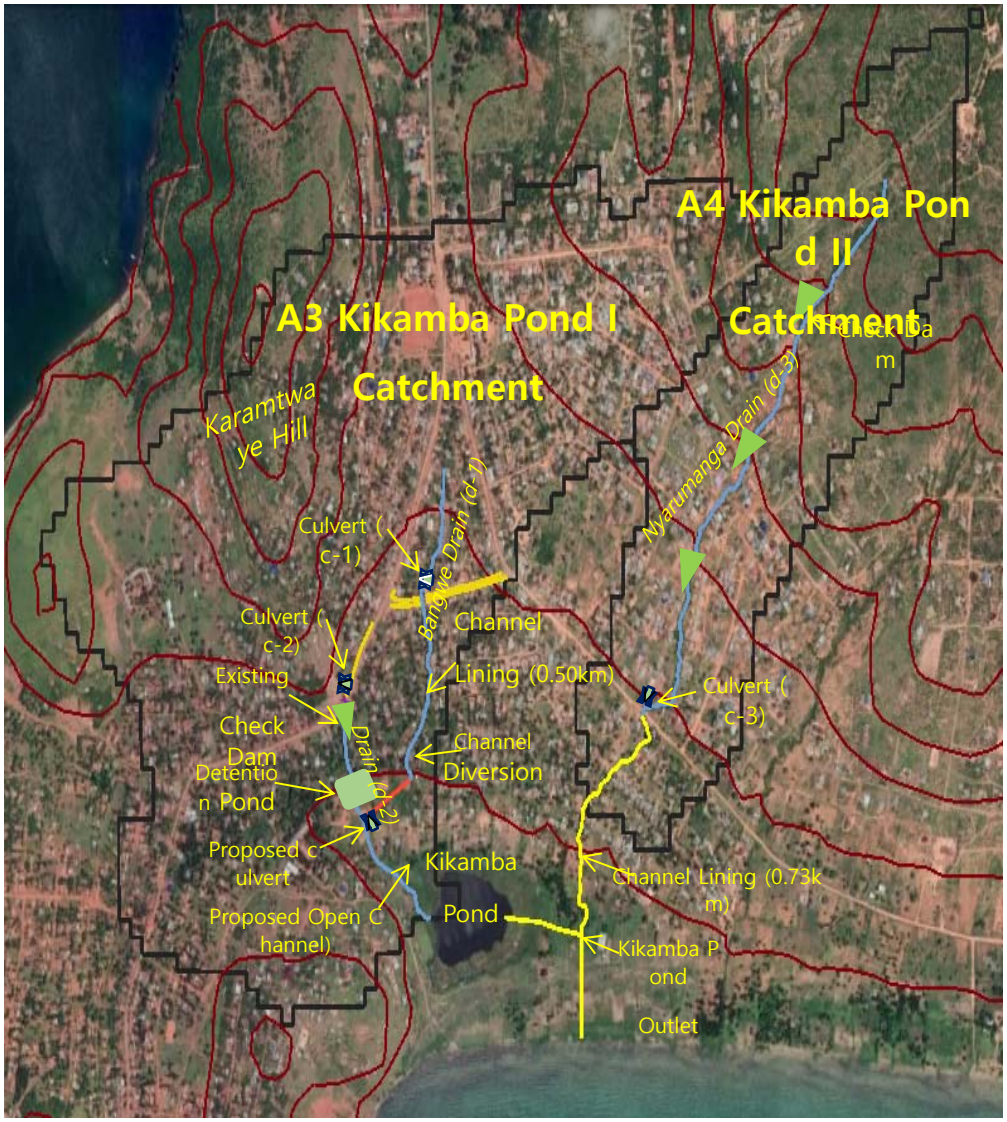


Overview:

- The two catchments are located adjacently in the western part of Kigoma-Ujiji Municipality
- They both drain through Bangwe Ward to Kikamba Pond and overflow to Lake Tanganyika.
- Kikamba Pond I catchment:
  ✓covers 1.44 sq.km
- Kikamba Pond II catchment
  ✓covers 0.58sq.km

Site Status

Improvement of Kikamba Pond Catchment(2/2)



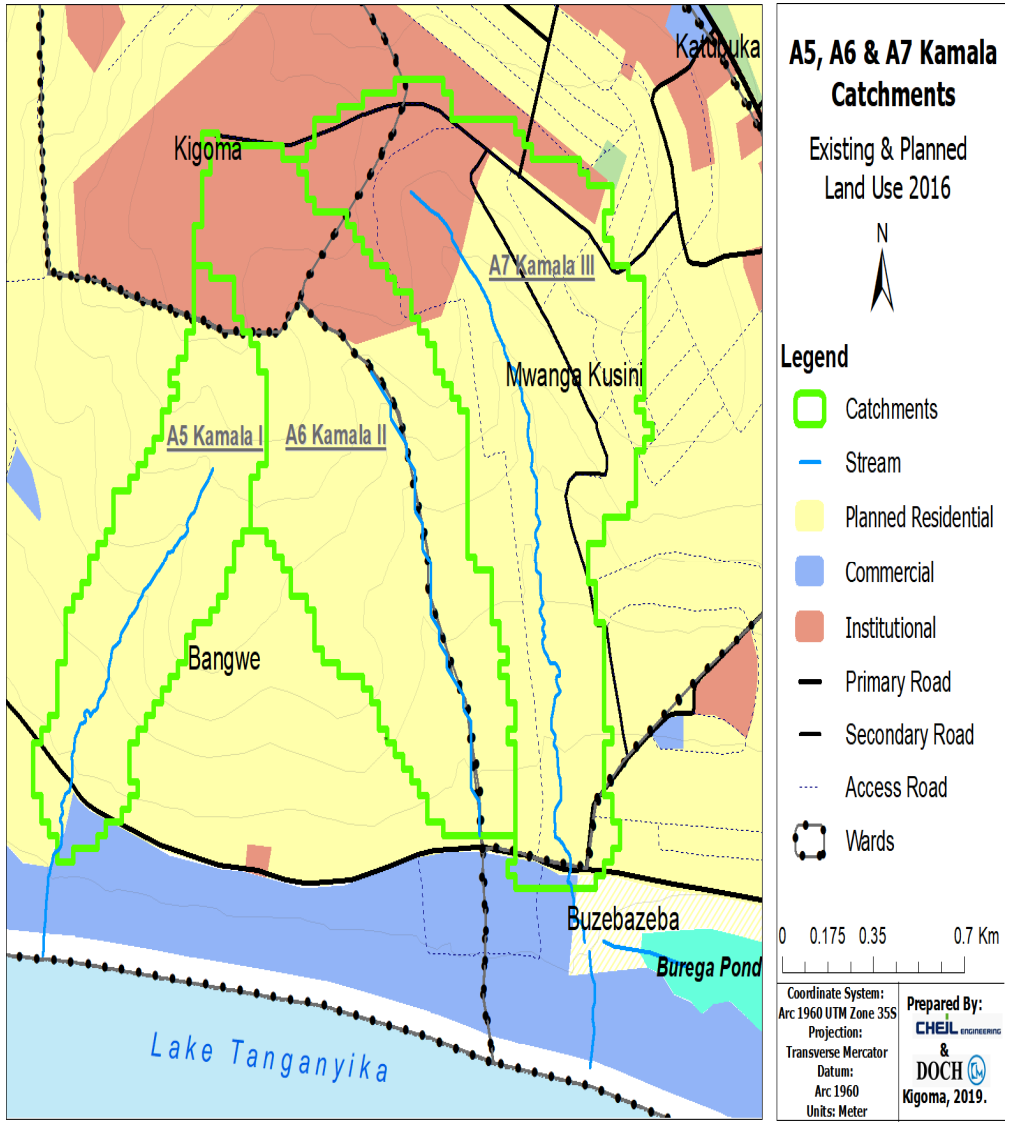
Drainage Challenges :

- Blockage of the culverts by sediments and debris
- Inadequacy capacity of the culverts
- Lack of proper culvert inlet and outlet protection structures
- Culvert outlet scour and deep gully development in the channels
- Unstable and eroded channel banks expanding to the nearby houses

Proposed Measures :

- Provision of the appropriate culvert inlet and outlet protection structures
- Replacement of the culverts ***(4places)***
- Construction of the check dams to prevent soil loss ***(4places)***
- Construction of the open channels ***(L=950m)***
- Construction of a storm water detention ***(1place)***
- Construction of the Kikamba pond outfall structure to the Lake Tanganyika.

Improvement of Kamala Catchment(1/2)

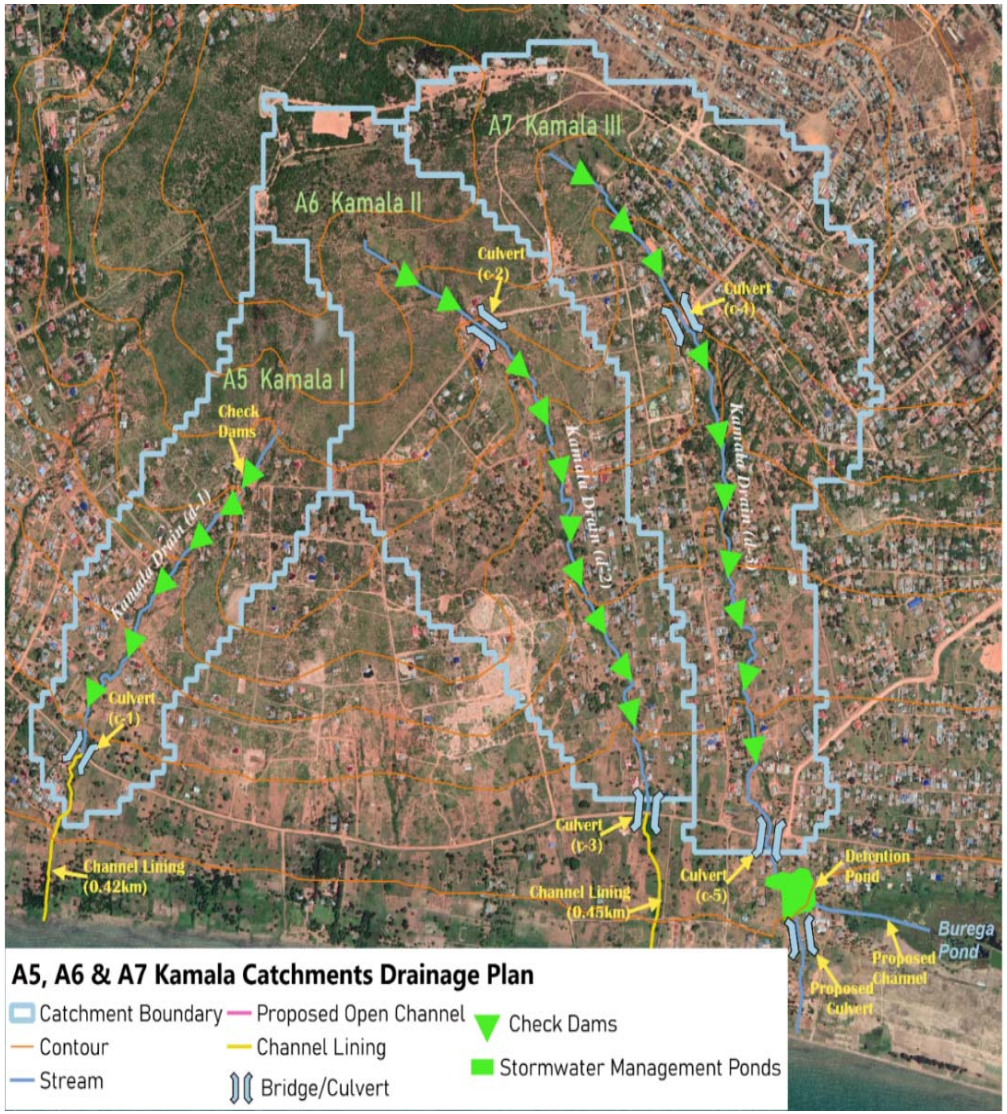


Overview:

- The three Kamala catchments (I, II and III) drains the western part of Kigoma-Ujiji Municipal area to the Lake Tanganyika.
- Kamala I catchment
  - ✓covers 0.53sq.km
- Kamala II catchment
  - ✓ covers 1 sq.km
- Kamala III catchment
  - ✓covers 1.15sq.km

Site Status

Improvement of Kamala Catchment(2/2)



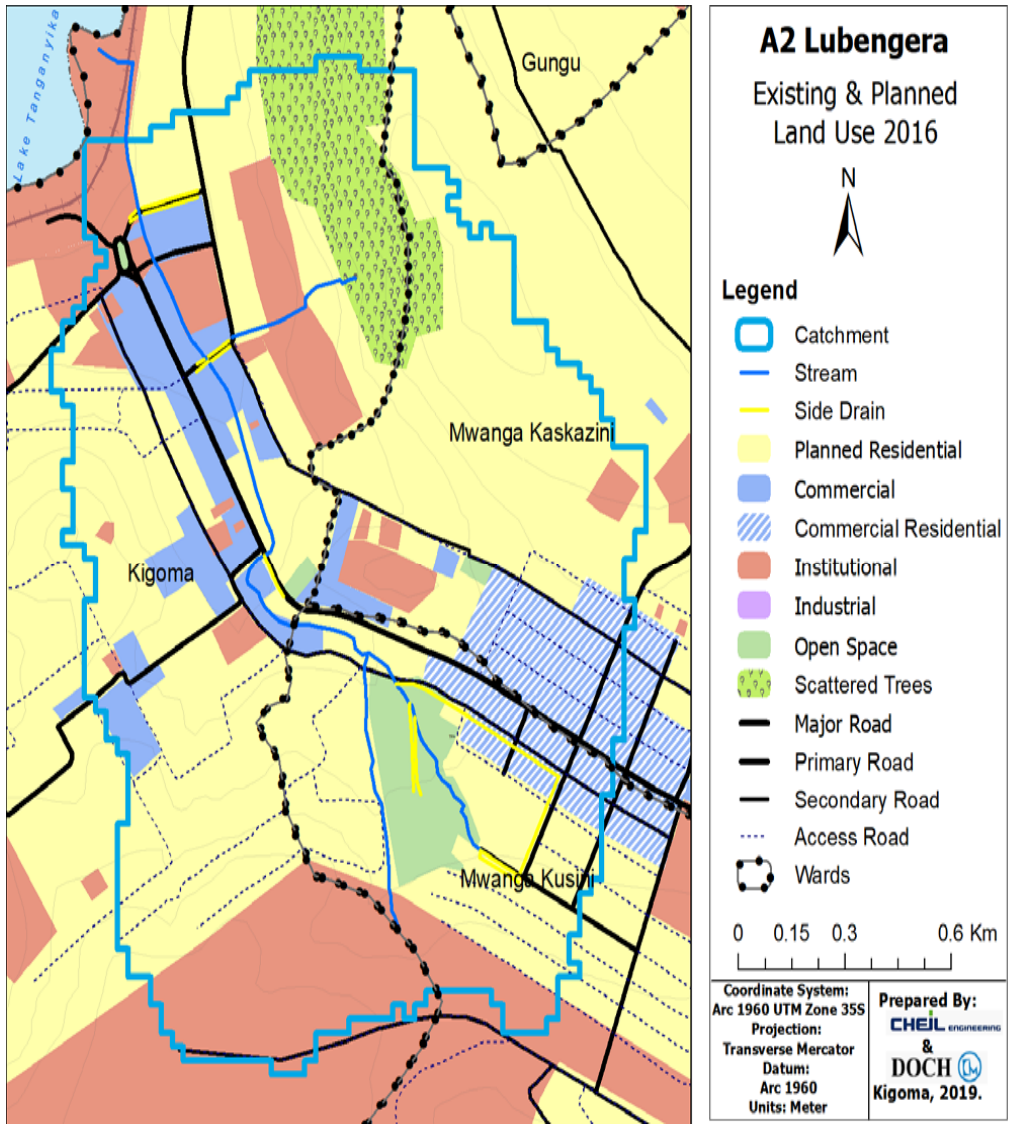
Drainage Challenges :

- Blockage of the culverts by sediments, debris and solid wastes
- Lack of proper culvert inlet and outlet protection structures
- Culvert outlet scour and deep gully development in the channels
- Unstable and eroded channel banks expanding to the nearby settlement houses
- Storm water ponding in the clay pit mining area.

Proposed Measures :

- Provision of the appropriate culvert inlet and outlet protection structures
- Replacement of the culverts ***(6places)***
- Construction of the check dam ***(26places)***
- Construction of the open channels ***(L=650m)***
- Construction of a storm water detention pond ***(1place)***
- Construction of the overflow channel from the detention pond to Burega pond

Improvement of Lubengera Catchment(1/2)



Overview:

- Located within the central part of Kigoma-Ujiji Municipal area covering Kigoma, Mwanga south and Mwanga North wards
- The catchment drains an area of about 2.8sq.km and covers approximate 0.54sq.km of the Central Business District (CBD) area.

Site Status

Improvement of Lubengera Catchment(2/2)

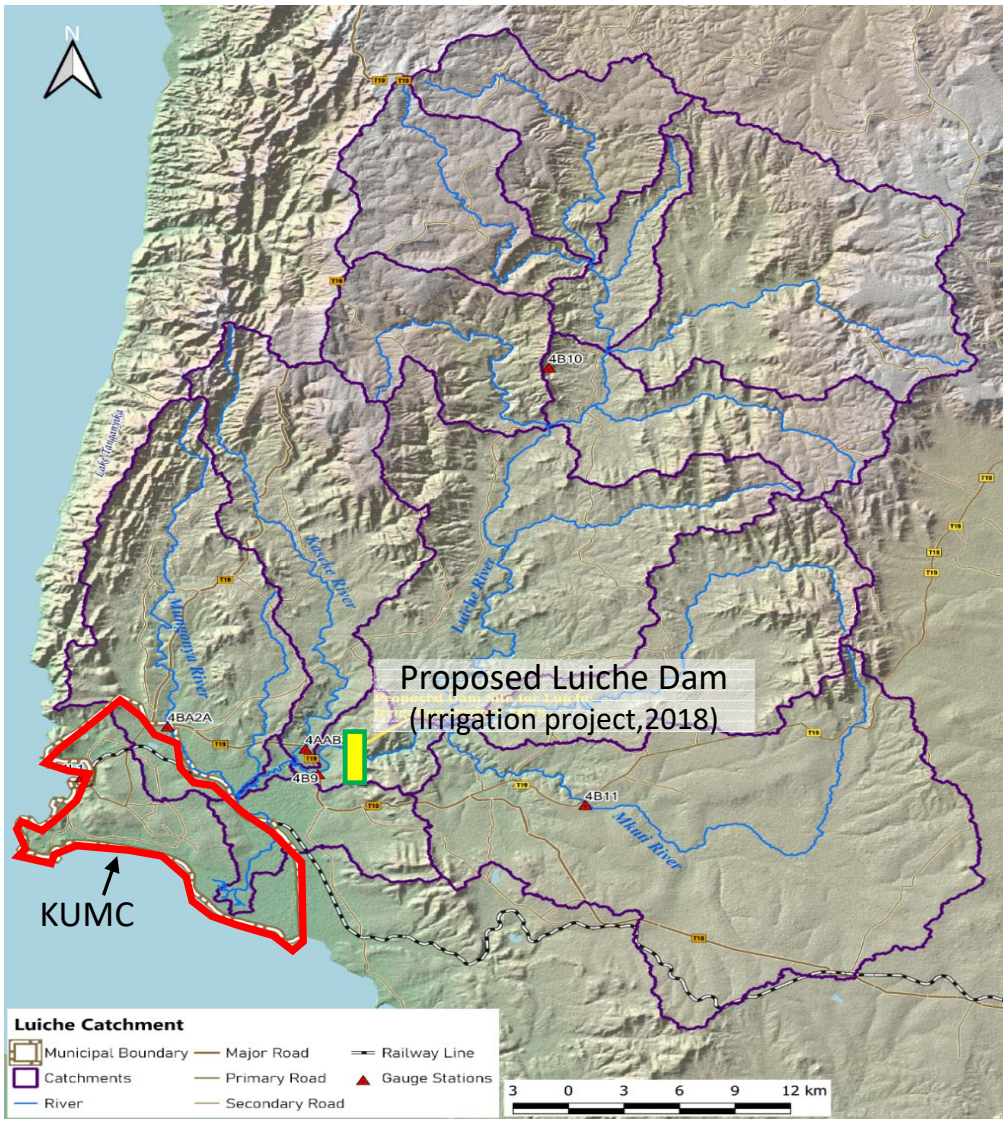
Drainage Challenges :

- Blockage of the culverts by sediments and debris
- Sediment deposition in the railway
- Railway overtopping flood
- Inadequacy capacity of the culverts
- Culvert outlet scour and deep gully development in the unlined channel

Proposed Measures :

- Replacement of the culverts ***(3Places)***
- Provision of the appropriate culvert inlet and outlet protection structures
- Construction of the sedimentation basin in the lower part ***(1Place)***
- Construction of the storm water detention pond in the upper part***(1Place)***
- Construction of the check dams in the gully formed unlined channels***(6Places)***

Improvement of Luiche Catchment(1/2)

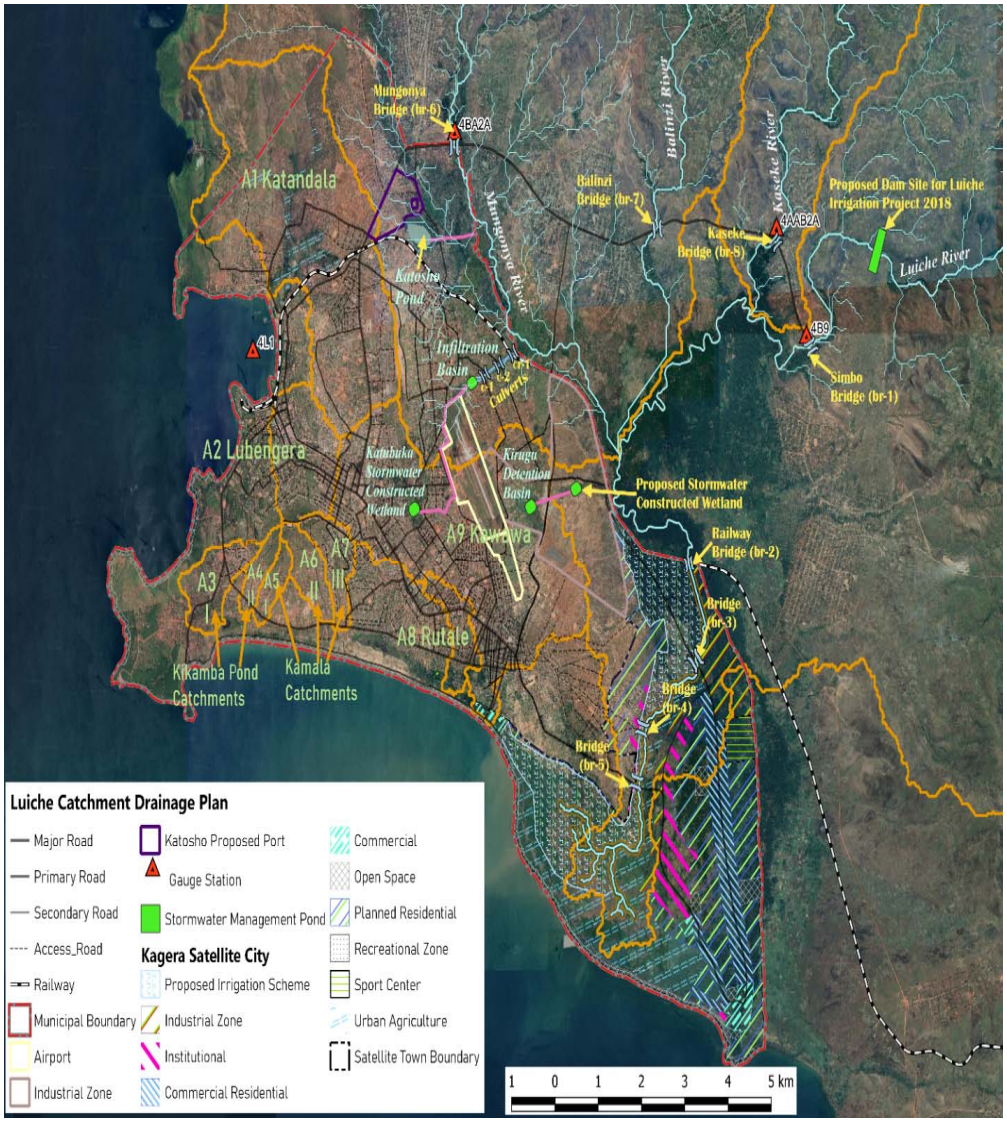


Overview:

- The Luiche catchment extends beyond the KUMC boundary
- The catchment drains an area of about 2,166 sq km through Kigoma Ujiji Municipal Council (KUMC) to Lake Tanganyika.
- The Luiche river flows through the planned Kagera Satellite City (KSC) within the KUMC.
- Luiche Dam already proposed as Irrigation project 2018.

Site Status

Improvement of Luiche Catchment(2/2)



Drainage Challenges :

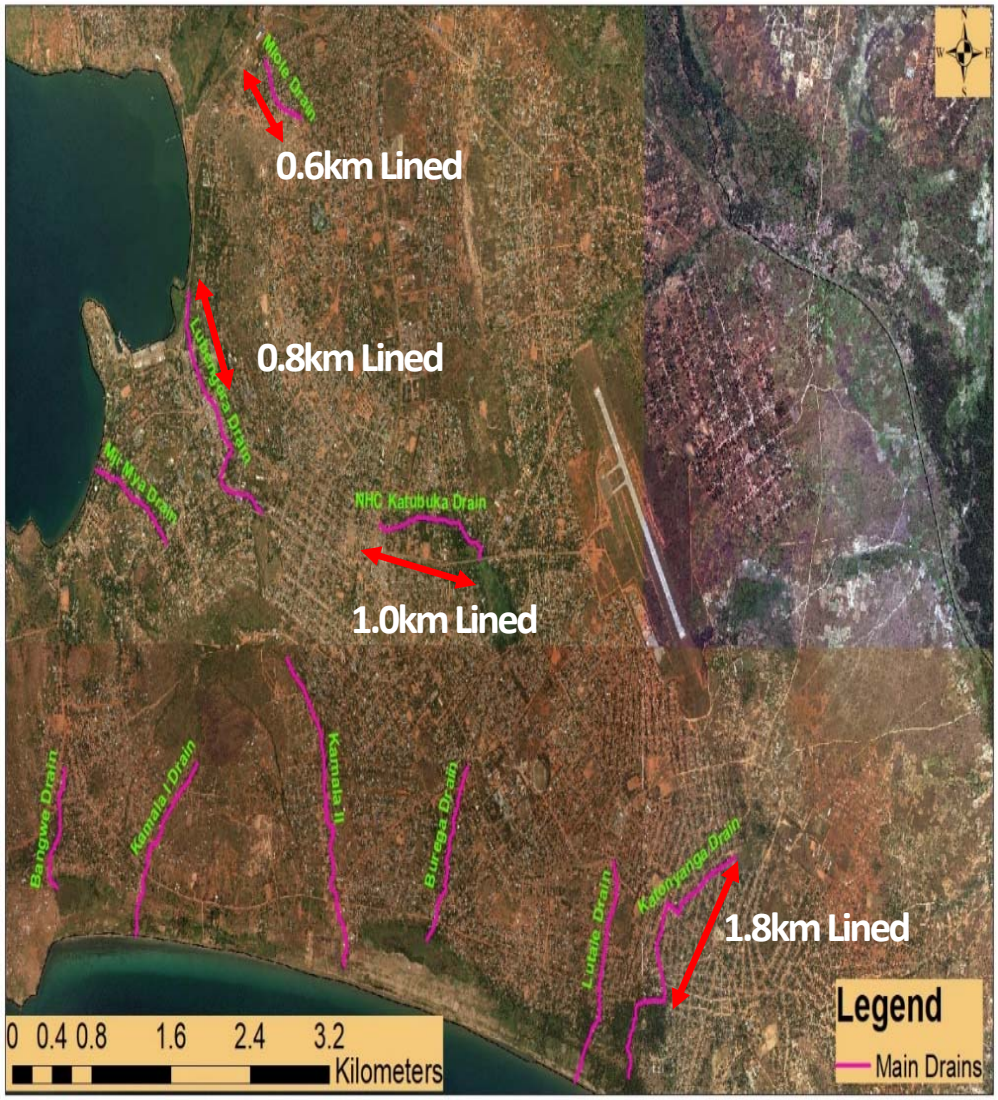
- Flooding
- Unstable river bank erosion
- Catchment soil erosion

Proposed Measures :

- Construction of the Luiche Dam (Already proposed irrigation project 2018)
- Construction of the infiltration basin
- Construction of the Katosho pond overflow drainage channel towards the Mungonya river
- Construction of the bridges (br-3, br-4 and br-5) (Road plan portion)

4. DETAILED DESCRIPTION OF SELECTED MEASURES

Improvement of Existing Main Drainage



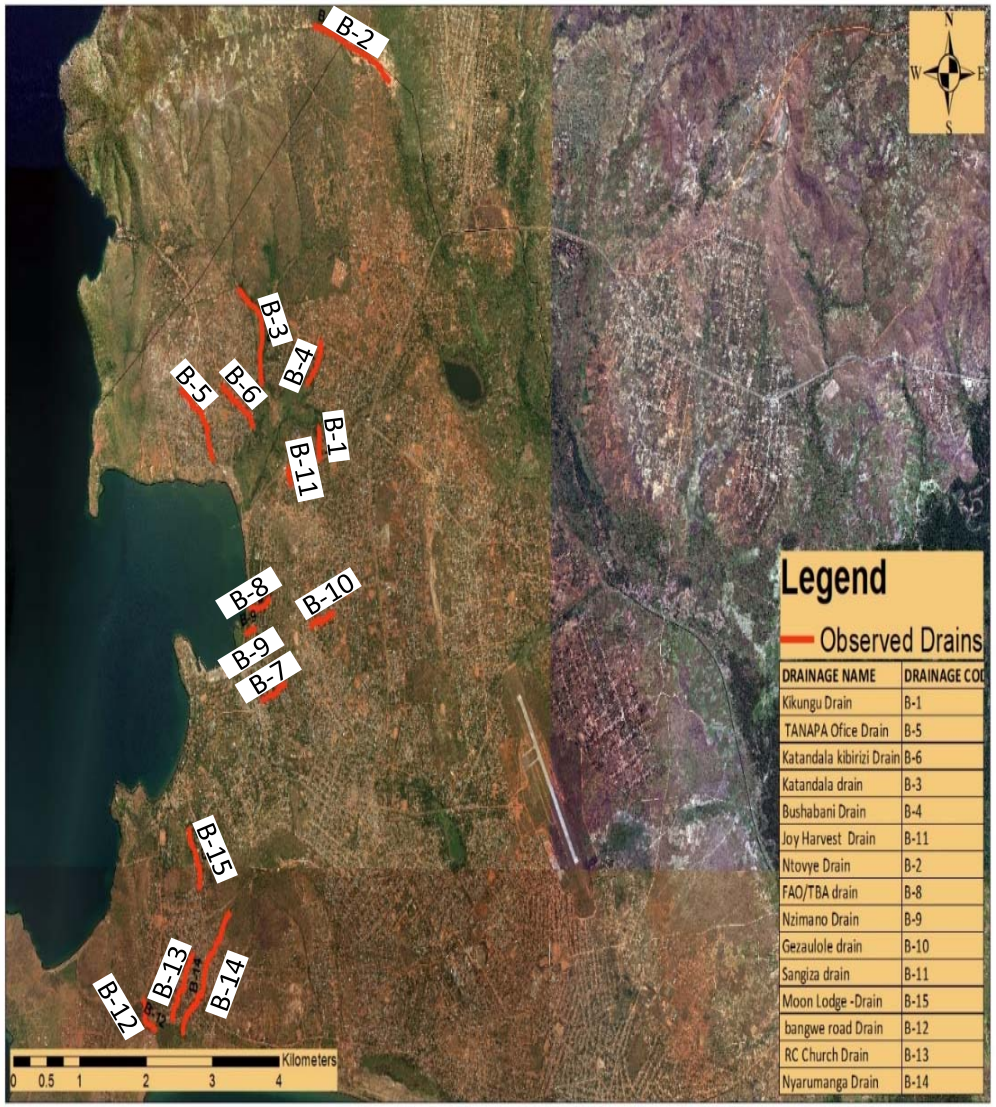
Drainage Challenges :

- Total 9 drains length, L=15.6 km
- There have been initiatives by the Kigoma-Ujiji Municipal Council to rehabilitate some major drains. (NHC Katubuka, Lubengera, Katonyanga and Mlole drains)
  - ✓ Total current lined length, L= 4.2 km

Proposed Measures :

- It is proposed to continue with on-going options to all the main drain
  - ✓ Lining of some parts of Channels with Gabions/ concrete/stone masonry ***(approximate L=7.4km)***
- Backfilling/Redirection of Drains
- Construction of storm checks
- Placing Culverts with adequate capacities at identified main roads crossings

Improvement of Other Observed Drains



Drainage challenges :

- Total of 15 observed drains length, L=10.2 km
- Unstable and eroded channel banks

Proposed Measures :

- It is proposed to continue with on-going options to all the observed drain
  - ✓ Lining of some parts of Channels with Gabions/ concrete/stone masonry ***(approximate L=6.4 km)***
- Backfilling/Redirection of Drains
- Construction of storm checks
- Placing Culverts with adequate capacities at identified main roads crossings

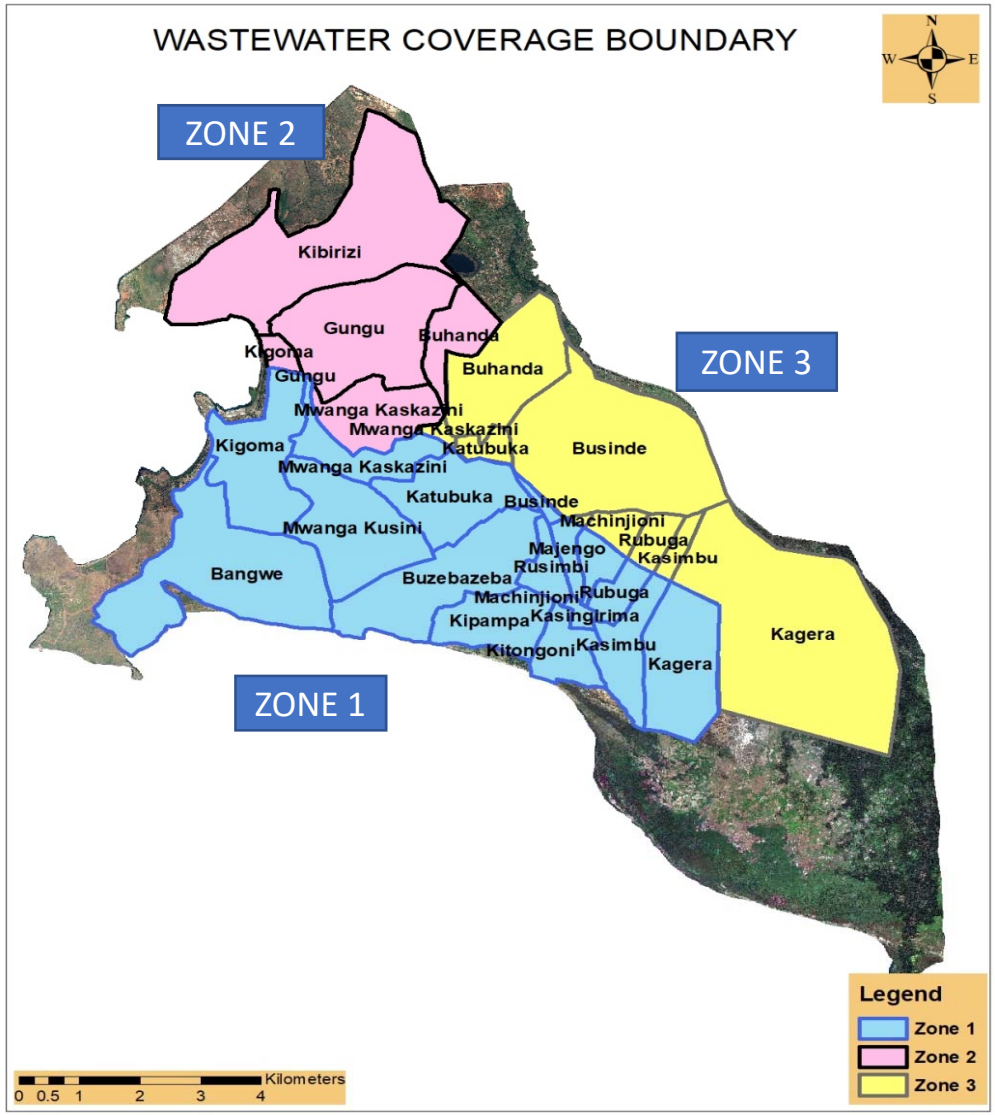
4. DETAILED DESCRIPTION OF SELECTED MEASURES

Sanitation

Sewer System Connection Concept

- Areas served with water supply services
- Areas with major socio-economic activities
- Areas with high population density
- Areas with terrain permitting gravity flow from a large catchment area to a pumping station/treatment plant.
- Areas located near the Lake shores for protection of Lake Tanganyika, especially around the port area and its vicinity

➡ Wastewater coverage zone : 3 Zone

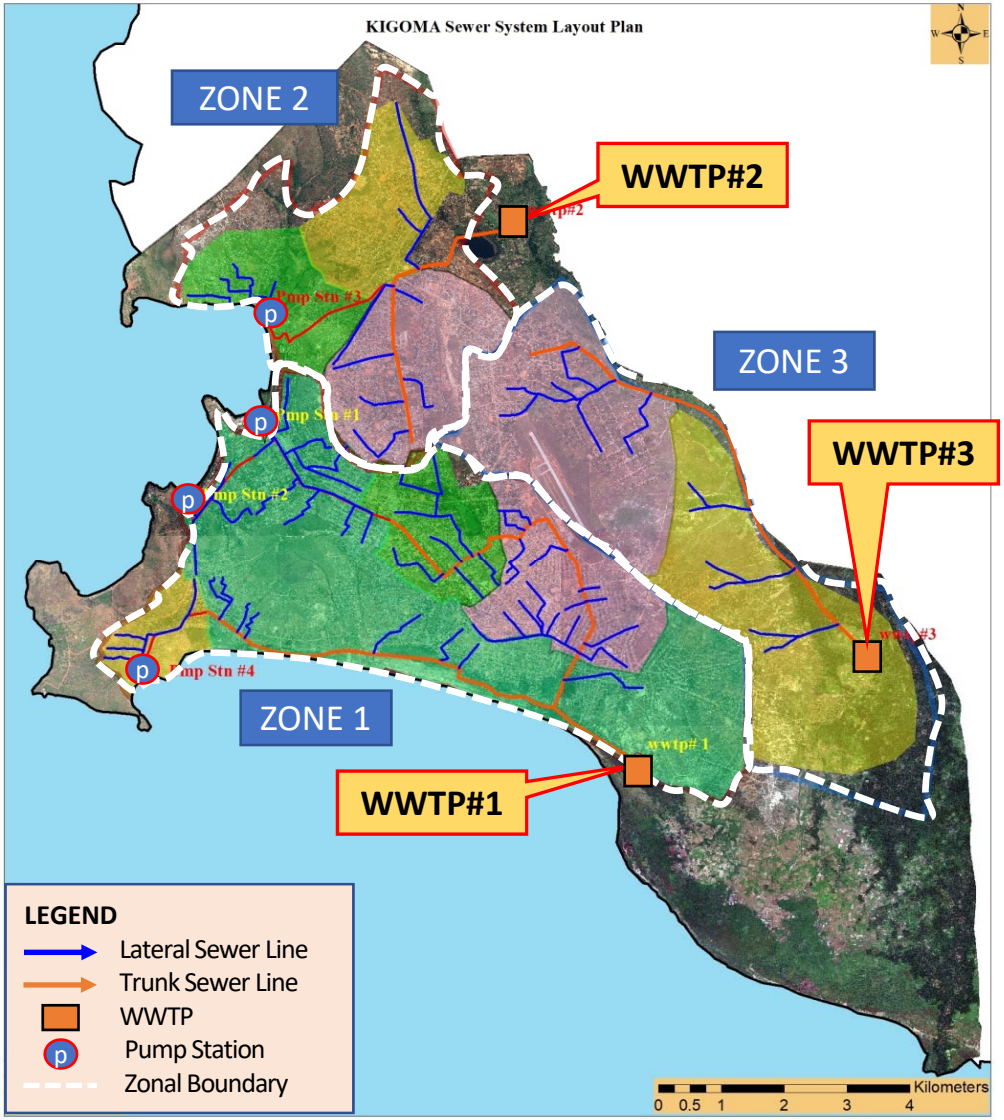


Sewer Coverage Targets

- Phase I : 2025 – 24%
- Phase II : 2030 – 41%
- Phase III : 2035 – 75%
- Phase IV : 2040 – 82%

Proposed Sewerage Infrastructures

Zone	Infrastructure
ZONE 1	• **Sewer Line : L=39.1km** ✓ Lateral line D200-D400, L=24.6km ✓Trunk line D500-D800, L=14.5km • **Pumping Station** ✓P/S #1 Flow Q=3,874㎥/d ✓P/S #2 Flow Q= 483㎥/d ✓P/S #4 Flow Q= 693㎥/d • **WWTP #1 : Flow Q=26,500㎥/d** ✓#1-1 Flow Q=13,500㎥/d (Phase Ⅰ) ✓#1-2 Flow Q=13,000㎥/d (Phase Ⅲ)
ZONE 2	• **Sewer Line : L=16.5km** ✓ Lateral line D200-D300, L=12.5km ✓Trunk line D400, L=4Km • **Pumping Station** ✓P/S #3 Flow Q=2,751㎥/d • **WWTP #2 : Flow Q=11,500㎥/d** (Phase Ⅱ)
ZONE 3	• **Sewer Line : L=15.6km** ✓ Lateral line D200, L=7.6km ✓Trunk line D300, L=8Km • **WWTP #3 : Flow Q=3,100㎥/d** (Phase Ⅳ)



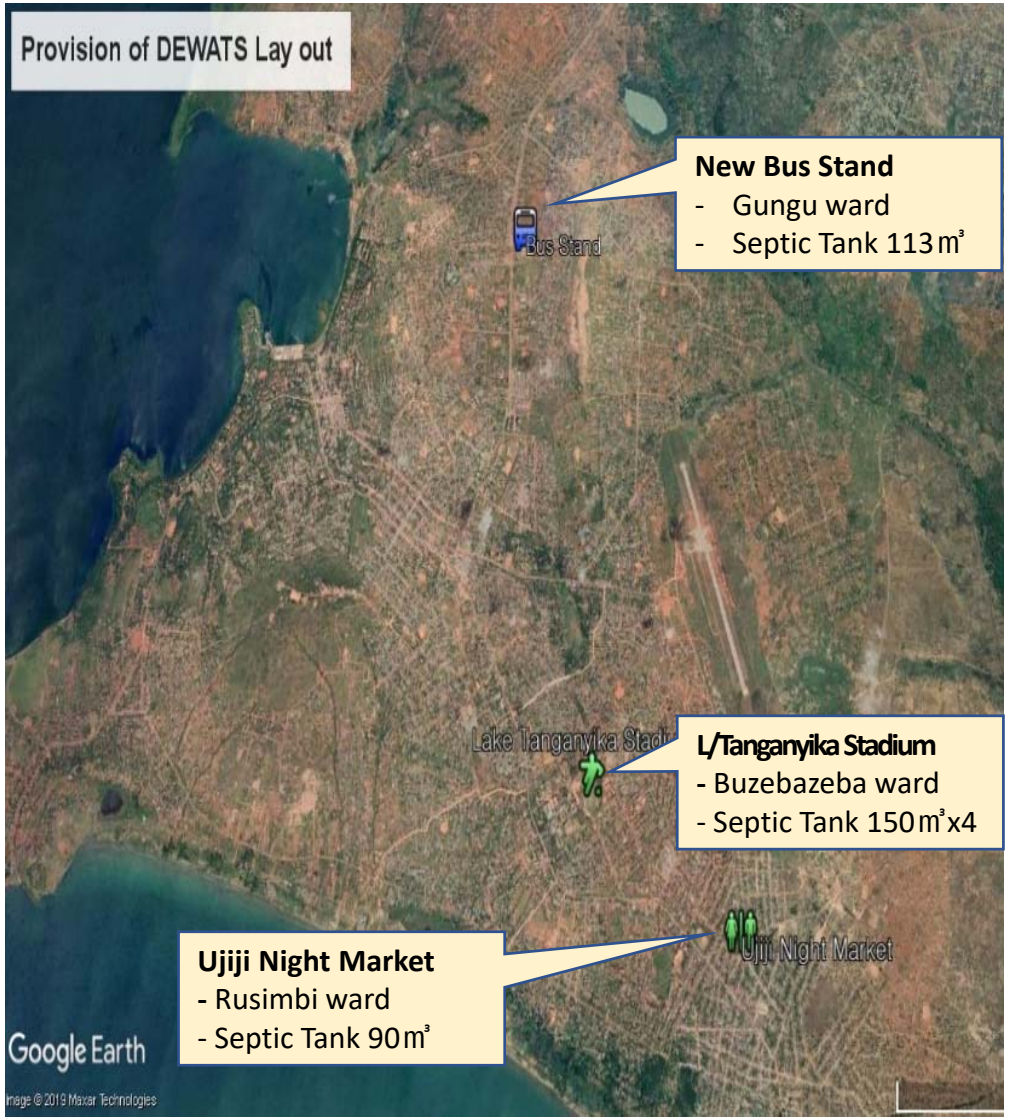
Improvement of On-site Sanitation

Overview :

- A strategy on service improvements for on and off-site sanitation services is proposed.
- To be implemented in all the 4 phases of the DSDP

Proposed Measure :

- Promotion of use of appropriate onsite sanitation methods especially in the periphery of the Municipality
- Target: traditional pit latrines to be phased out by 2040.
- Provision of Decentralized Waste Water Treatment Systems (DEWATS) to a few public areas where ***(3 Place)***
  - ✓there is absence or unsafe sanitation facilities, and proposed sewerage system will not cover those areas soon.
  - ✓these DEWATS can serve as promotional installations for alternative sanitation facilities.



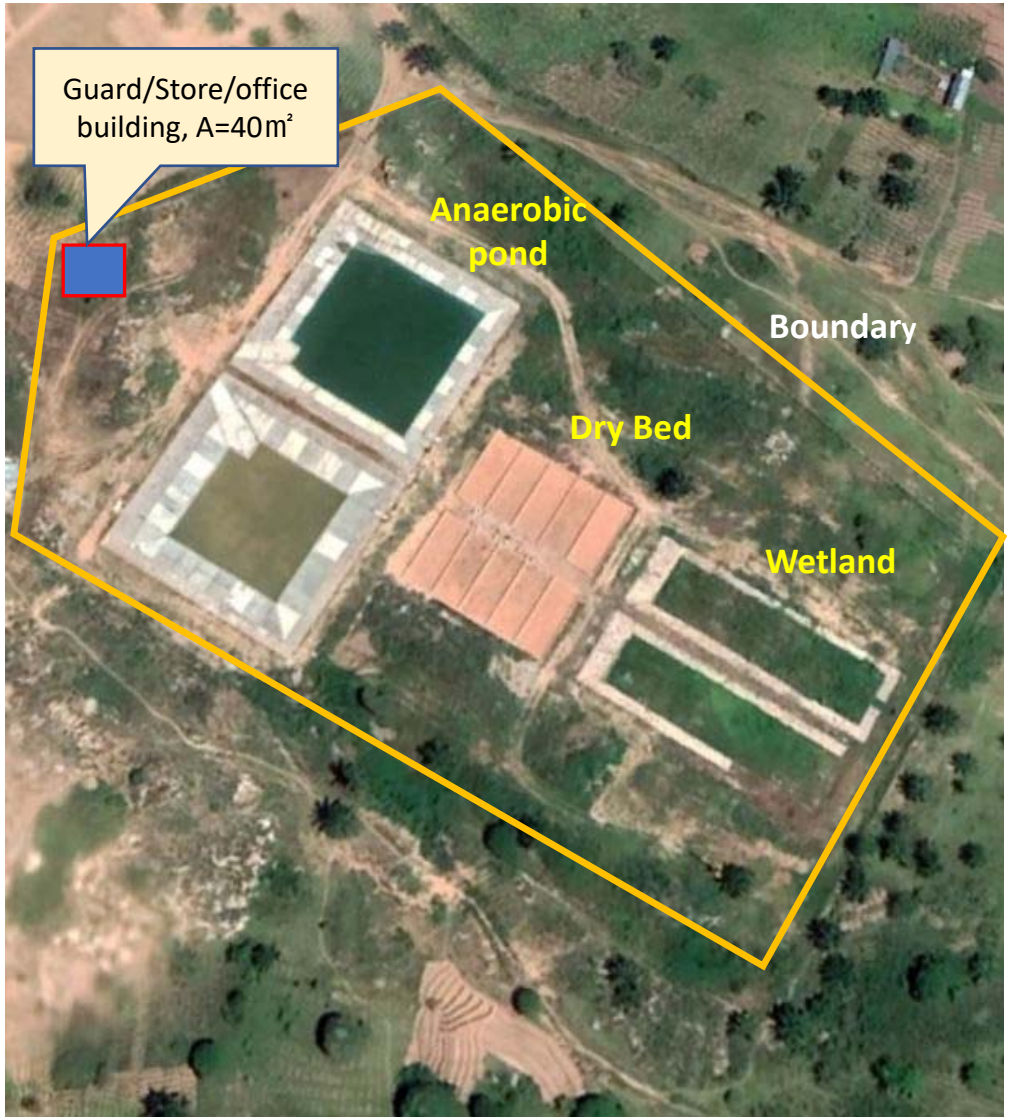
Improvement of Faecal Sludge Collection and Treatment

Existing Pond Capacity Analysis:

- Existing Faecal Sludge Treatment Pond was observed to be adequate
- No expansion measures are currently required

Proposed Providing Measure :

- Guard/Store/Office building : A=40㎡
- Laboratory for Waste Water and treated Sludge quality Testing :
  → A=50㎡ , Located at KUWASA Yard
- Sludge desilting equipment : Excavator/Back hoe
- Working Tools :
  → laboratory equipment, safety gears, etc.
- Additional Cesspit emptier truck : (Now) Single
  → 1 additional 10㎥ capacity truck(Phase 2)
- Re-use of treated sludge :
  → Agricultural use and clay brick production



4. DETAILED DESCRIPTION OF SELECTED MEASURES

Non Structure Measure in Drainage and Sanitation

Measure	Detail Description		Remark
	Drainage	Sanitation	
1. Awareness and Campaigns	• For storm water erosion and flood control methods.	• Promotion of appropriate and affordable sanitation methods	**National sanitation campaign**  **Workshop on DEWATS O&M** 
2.Training	• Appoint Expert/ Firm • Training of KUMC Management • Theoretical and Practical training of Technical staff • Study tour of KUMC staff • Secondment of KUMC staff to other Council	• Appoint Expert/ Firm • Training of KUWASA Manage ment • Theoretical and Practical traini ng of Technical staff • Study tour of KUWASA staff • Secondment of KUWASA staff to other UWSA	
3.Ressettlement and Compensation	• To owners of Land used by Dams or Ponds	• To owners of land used by W WTP's, P/S or other Infrastruct ure	
4.Financial Support	-	• To attract new connection to sewerage system	

5. FINANCIAL ANALYSIS

Costs Associated with DSDP

- Two categories identified
  - ✓Capital Expenditure (CAPEX) Requirements
  - ✓Operational Expenditure (OPEX) Requirements

Capital Expenditure (CAPEX) Requirements

- **Structural Measures**
  - ✓Land acquisition and compensation costs
  - ✓Cost of construction
  - ✓Procurement of equipment costs
  - ✓Costs for upgrading of existing infrastructures and sustaining their operations
  - ✓Costs of demonstration facilities
- **Non-Structural Measures**
  - ✓Green climate resilience measures
  - ✓Creation of permeability zones
  - ✓Public awareness and campaigns

Operational Expenditure (OPEX) Requirements

- Engineering services expenses (Consultancy expenses)
- Institutional development (capacity building)
- Physical and price contingencies
- Administrative and logistical expenses
- Financing and legal costs

5. FINANCIAL ANALYSIS

Tentative Cost of the Projects Implementation in the Plan

Item	Project Package	Estimated Cost (USD)				
		Phase I (2025)	Phase II (2030)	Phase III (2035)	Phase IV (2040)	Total
A. Drainage	1. Improvement of Katandala catchment	12,647,264	-	-	-	12,647,264
	2. Improvement of Kawawa catchment	24,403,674	-	-	-	24,403,674
	3. Improvement of Rutale catchment	504,724	-	-	-	504,724
	4. Improvement of Kamala catchment	-	3,145,250	-	-	3,145,250
	5. Improvement of Lubengera catchment	-	-	4,634,512	-	4,634,512
	6. Improvement of Kikamba catchment	-	3,040,393	-	-	3,040,393
	7. Improvement of Luiche catchment	-	-	-	214,947	214,947
	8. Improvement of Main drain	9,534,181	-	-	-	9,534,181
	9. Improvement of observed Storm water channels.	-	7,020,539	5,250,678	3,355,995	15,627,212
	Sub-total	**47,089,843**	**13,206,182**	**9,885,190**	**3,570,942**	**73,752,157**
B. Sanitation	1. Installation of a sewer system in the KUMC	22,050,675	16,477,639	23,801,738	1,106,750	63,436,802
	2.Improvment of On-site sanitations	-	296,586	-	-	296,586
	3. Improvement of KUWASA Sludge treatment plant	-	233,478	-	-	233,478
	Sub-total	**22,050,675**	**17,007,703**	**23,801,738**	**1,106,750**	**63,966,866**
Total (A+B)		**69,140,518**	**30,213,885**	**33,686,928**	**4,677,692**	**137,719,023**

5. FINANCIAL ANALYSIS

Cost Recovery Strategy

Drainage and Storm water Management

- Municipal Property Tax
  - ✓ Allocate certain percentage of property tax to support and sustaining the drainage and storm water infrastructures.
- Private sector participation
  - ✓ Introducing parks and rehabilitation facilities of different types to be built and operated by the private sector
  - ✓ KUMC can collect levies from private sector
- Introduction of Urban Storm Water Fees
  - ✓ Introduction of Urban Storm water Fees at 10% of the cost of Business Licensing for all licensed businesses in Kigoma -Ujiji.

Sanitation Service

- Tariff
  - ✓ Operate a commercially responsive water and sanitation tariff
- Private sector participation
  - ✓ Acquisition, ownership and operation of cesspit emptier trucks
  - ✓ Provide easily accessible modern technologies
- Subsidies for Urban Poor
  - ✓ Institutionalizing special plans and programmes for low-income groups.
- Cost Optimization
  - ✓ Low cost technology
  - ✓ Apply economies of scale – spread costs to large number of potential customers
  - ✓ Monitor changes in variable costs such as energy, consumables, maintenance and repair. (Organize preventive maintenance activities)

5. FINANCIAL ANALYSIS

Financing Source

Traditional Sources

- Tax Revenue
- Non tax revenue
- Domestic Borrowing
- External Sources
- Service Tariffs

Innovative Sources

- Foreign Markets Bonds
- Local Government Bonds/Municipal Bonds
- Pension Equity Fund
- Climate Change Financing
- Public Private Partnerships (PPPs)

Proposal for Changes in Institutional and Financial Arrangements

During Projects Implementation

- Joint Project Implementation / Supervision (KUMC+KUWASA)
- Community Engagement, Sensitization and Participation - an opportunity to assess social feasibility of project measures
- Efficient Financial Management
- Capacity Building

Post-Project Measures

- Community Engagement and Ownership – Creation of Community Steward System

5. FINANCIAL ANALYSIS

Financial Appraisal of Implementing Institutions

OVERVIEW

- Financial analysis reflect ability to implement the proposed plan
- KUMC and KUWASA are appraised by using corporate appraisal approach of Financial Ratios Analysis
- Based on their recent financial performance which is entailed in their audited financial statements.
- The ratio analysis focus on the institutions'
  - ✓asset utilization and profitability
  - ✓operational liquidity
  - ✓capitalization and asset leverage
  - ✓operational efficiency

Fund Ratio Analysis of KUMC/KUWASA (2016-2018)

Observations	Recommendations
• *Both KUMC and KUWASA* ✓Struggle to generate profits; ✓Unable to efficiently meet their short term obligations (liquidity insufficiencies); ✓Have a poor leverage condition (high debts are burdening the assets) ✓Operational efficiencies unmet for both entities.	• Employ strategic measures to improve income generation and collection • Employ efficient cost control measures • Institute operational performance measures that ensure improved operational outcome.

6. INVESTMENT PROJECT PHASING

Overview

Phasing of the Projects into the four 5-year periods of implementation

- Done after identification of all Projects in the DSDP
- Based on the multi criteria assessment
- Involved key Stake holders (KUMC, KUWASA)

Criteria used in Phasing of the Projects

Measure	Description	Rating			
		1	2	3	4
1.Technical	Responsible Agency's capability of implementing the project	High			Low
2. Financial Cost/Economic Benefit	The project can attract funding and there will be cost recovery	Immediate			Slow
3.Socio-Political Acceptance	Project acceptance by Community/Stakeholders/Government	High			Low
4.PPP Possibility	PPP can be introduced in the project operational stage	Easily			Difficult
5.Objective Achievement	The project is urgently required so as to improve drainage and sanita tion	High			Low
6. Environmental Impacts	Effects of the Project on the Environment	Low / +Ve			High/-Ve

6. INVESTMENT PROJECT PHASING

Proposed Phasing of The Projects(1/2)

Item	Project Package	Invest Phase			
		2025	2030	2035	2040
A. Drainage (9 Package)	1. Improvement of Katandala catchment	Check Dam 25, Detention Pond 3, etc			
	2. Improvement of Kawawa catchment	Channel 5.5km, Detention Pond 4, etc			
	3. Improvement of Rutale catchment	Channel 2.3km, Check Dam 3, etc			
	4. Improvement of Kamala catchment		Check Dam 26, Detention Pond 1, etc		
	5. Improvement of Lubengera catchment			Check Dam 6, Sedimentation basin 1, etc	
	6. Improvement of Kikamba catchment		Check Dam 4, Detention Pond 1, etc		
	7. Improvement of Luiche catchment				Channel 1km, Detention Pond 1, etc
	8. Improvement of Main drain (Total 9 drains)	9 drain (Katubuka drain, etc.)			
	9. Improvement of observed Storm water channels (Total 15 Drains)		6 drain (Kikungu drain, etc.)	5 drain (Gezaulole drain, etc.)	4 drain (Ntovye drain, etc.)

6. INVESTMENT PROJECT PHASING

Proposed Phasing of The Projects(2/2)

Item	Project Package	Phase			
		2025	2030	2035	2040
B. Sanitation (3 Package)	1. Installation of a sewer system in the KUMC	Sewer network (Zone 1-1)	Sewer network (zone 1-2) Sewer network (zone 2-1)	Sewer network (zone 1-3) Sewer network (zone 2-2) Sewer network (zone 3-1)	Sewer network (zone 1-4) Sewer network (zone 2-3) Sewer network (zone 3-2)
		Pump Station #1 Pump Station #2	Pump Station #3	-	Pump Station #4
		WWTP #1-1	WWTP #2	WWTP #1-2 WWTP #3	
	2.Improvment of On-site sanitations				
	3. Improvement of Feacal Sludge collection and treatment				

Proposed Investment Phase Plan

- DSDP for KUMC (2020-2040)
  - ✓Drainage 9 + Sanitation 3 = 12 project

- Priority project (2020-2025)
  - ✓Drainage 4 + Sanitation 1 = 5 project

7. PRE-FEASIBILITY STUDY FOR PRIORITY PROJECT

Overview

Objective

- Two key objectives of the pre-feasibility study are:
  - ✓ Assess the viability of Priority Project
  - ✓ Provide initial guidance on whether to take the project forward

Study Approach

Overview	Pre - feasibility Assessment	Project - Implementation
• Previous Plans, Reports, Policies and Regulations • Description of Existing Situation • Description of the Priority Project	• Technical Assessment • Impact Assessment • Risk Assessment • Project Costs • Project Benefits • Financing Options and Mechanism	• Required Implementation, Institutional and Regulatory Arrangements • Implementation Timeline • Conclusion and Recommendation

7. PRE-FEASIBILITY STUDY FOR PRIORITY PROJECT

Study Findings

Priority Project

- Priority Project is planned to be implemented in the first 5-year phase of the Plan.
- The 5 Sub-Projects are:

1) Improvement of Katandala Catchment

2) Improvement of Kawawa Catchment

3) Improvement of Rutale Catchment

4) Improvement of existing main drainage and storm water channels

5) Installation of a sewer system in KUMC(Phase I)

- Sewer laterals
- Trunk main
- Pump stations
- Waste Water Treatment Plant

Study Findings

- **Technical Assessment**
  - ✓ The Project is within the Technical capability of the implementing/owner institutions, i.e KUMC and KUWASA
  - ✓ It can be sustainably operated and maintained
  - ✓ Technical concerns have been provided for the Sewerage sub-project
- **Impact Assessment**
  - ✓ Economic, Social and Environmental Impacts have been identified
  - ✓ Their effects are not expected to highly affect the Project
- **Risk Assessment**
  - ✓ Assessment of technical, operational, financial, social and environmental risks was conducted
  - ✓ Proposed mitigation measures to address the risks has been presented.
- **Project Costs**
- **Project Benefits**
- **Financing Options And Mechanism**
- **Recommendation**

8. ToR FOR DETAILED DESIGN OF PRIORITY PROJECT

Overview

- The purpose of these Terms of Reference is:
  - ✓To highlight the project background and objectives
  - ✓ To define the prevailing conditions and tasks involved in the Project.

Out line of ToR

1)Background
2)Drainage And Sanitation Challenges in Kigoma-ujiji Municipality
3)Objective of The Assignment
4)Scope of Work
5)Methodology
6)Required Expertise, Qualifications, Roles And Responsibilities
7)Outputs/Expected Deliverables
8)Consultant's Obligations
9)Client's Obligations
10)Meetings Schedule
11)Payment Modality
12)Suggested References

9. DSDP MONITORING AND EVALUATION FRAMEWORK

Objective

- To guide KUMC and KUWASA in monitoring the progress made in implementing the DSDP measures

DSDP Monitoring and Evaluation Framework (1/2)

Measure	Indicator	Derivation	Current	Target			
			2020	2025	2030	2035	2040
GOAL : Drainage and Sanitation Development Plan Implementation	DSDP Implementation Report	Report Preparation	No Implementation	Priority Projects Implemented	2nd phase projects implemented	3rd phase projects implemented	4th phase projects implemented
A.DRAINAGE **1.Structural Measure**							
1.1 Improvement of Catchments	All storm water properly drained	Catchment with all Storm water properly drained		A1, A8, A9	A3,A4,A5,A6, A7	A2	Luiche Main
1.2 Main Drainage Chanel Rehabilitation/ Lining	% of length of drainage channels rehabilitated	total rehabilitated length compared to total length to be rehabilitated (11.58km)	4.2km (36%)	7.38 km (64%)			
1.3 Other Observed Drainage Chanel Rehabilitation/Lining	% of length of drainage channels rehabilitated	total rehabilitated length compared to total length of drains needing rehabilitation			2.85km (44%)	2.25km (35%)	1.35km (21%)
2.Non-Structural Measure							
2.1 Public Awareness Campaign				1	1	1	1
2.2 Resettlement and Compensation		Funds availability		Katubuka Pond area			
2.3 Training and Capacity Building to KUMC Staff				5	5	5	5

DSDP Monitoring and Evaluation Framework (2/2)

Measure	Indicator	Derivation	Current	Target			
			2020	2025	2030	2035	2040
B.SANITATION **1.Structural Measure**							
1.1 Sewerage System Installation	Sewer pipe laying	Total Length of sewers Installed	-	27.6km	13.9km	19.2km	12.4km
1.2 On-Site Sanitation	Increase in DEWATS Installations	Installed Capacity of Septic Tanks in DEW ATS	-	-	800 m³	1200 m³	1600 m³
	Increase/Decrease in Septic Tank and Flush To ilets Installations	% of people using Septic Tanks	11.9%	12.4%	12.3%	6.4%	4.7%
	Increase/Decrease in VIP Installations	% of people using VIPs	27.7%	28.7%	28.3%	14.7%	10.7%
	Increase/Decrease in Improved Traditional Pit Latrine Installations	% of people using Improved Traditional Pit Latrines	21.1%	14.2%	9.7%	3.6%	2.1%
	Decrease in Traditional Pit Latrine Installations	% of people using Traditional Pit Latrines	39.2%	20.2%	8.4%	0.5%	-
1.3 Improve Faecal Sludge Treatment	Increase in Faecal Sludge Collection and Treat ment	No of Cesspit emptier trips to Treatment per month	20 trips	100 trips	200 trips	300 trips	500 trips
	Use of Processed Treated sludge as manure	Quantity of processed sludge ready for re-use	-	20 ton/year	30 ton/year	40 ton/year	50 ton/year
2.Non-Structural Measure							
2.1 Public Awareness Campaign				1	1	1	1
2.2 Resettlement and Compensation		Funds availability		WWTP1-1 ,PS1, PS2	WWTP2, PS3	WWTP1-2 WWTP3	PS4
2.3 Training to KUMC Staff				5	5	5	5

10. TRAINING NEEDS ASSESSMENT FOR KUWASA/KUMC OFFICIALS

Overview

- Training is proposed as part of Non-Structural Measures
- The detail design Consultant should conduct a Training needs assessment
- Then prepare a detailed Training Program whose implementation will form part of the non-structural measures of the project.
- The Assessment and the program shall address the following issues:
  - ✓purpose of the training
  - ✓personnel to be involved in the training
  - ✓what will be trained and how

Objective of SESA

Objectives	• Assess significant environmental and social impacts of the plan; • Identify and recommend mitigation measures and needed institutional adjustments • Identify and recommend measures needed to build the capacity of the KUMC for mainstreaming enviro nmental and social considerations into infrastructures of the DSDP
SEA in Tanzania	**Required by:** • Environmental Management Act (CAP. 19.1) Regulations of 2007, and • Strategic Environmental Assessment (SEA) Regulations of 2008.
Integrated SEA objectives for KUMC	❑**Storm water and Sanitation Management (Protection of Land and Water, Resources)** • Limit water pollution to levels that do not damage natural ecosystems or risk human health • Safeguard catchments and wetlands as good water source areas, • Protecting soil and land resources ❑ **Protecting Water Sources for Nature (Fauna, Flora and Protected Areas)** • Understand and maintain essential water and sediment flows within important river systems • Maintain viability and sustainable management of ecological processes • Maintain biodiversity of ecosystem services and vulnerable species (e.g in Lake Tanganyika). ❑**Protection of Environment for Socio-economic Development and Welfare** • Protect and promote health and reduce health inequalities. • Support the development of sustainable livelihoods. • Preserve and protect cultural heritage and the identity of vulnerable groups, • Promote gender equality and the rights of other vulnerable groups. • Decrease vulnerability to climate change.

Methodology for Conducting SESA

Steps Adopted in Undertaking SESA for KUMC DSDP:

1) Screening;

2) Scoping;

3) Developing Terms of Reference;

4) Identification of alternatives and assessing likely impacts;

5) Preparation of draft strategic environmental assessment report;

6) Consultation and participation;

7) Revision of draft strategic environmental assessment report;

8) Approval of strategic environmental assessment report; and

9) Monitoring of significant environmental impacts of implementation of the plan

Consultation Meetings

Strategic Areas for Kigoma Ujiji Municipality DSDP

Strategic Areas Assessed	Description of Characterization
Strategic Direction #1	• **Measures to manage the risks from floods which may affect community** ✓ by reducing the community's vulnerability and exposure to flooding.
Strategic Direction #2	• **Measures to manage Storm water** ✓ structural and non structural measures that receives runoff and convey it into a water body
Strategic Direction #3	• **Measures to safely manage wastewater and faecal sludge** ✓ to be safely contained onsite, or safely emptied and transported to a treatment plant, treated and used for resource recovery or disposed of
Strategic Direction #4	• **Measures to manage risks associated with climate change impacts** ✓ incorporate the measures into storm water drainage and sanitation development plan

Outline of SESA Report

- SESA is on-going and its report is presented in a separate volume

Chapter	Description
1.Introduction	• Preamble, background, objectives, Scope of DSDP, assessment and methodology
2. Plan Overview	• Outline of the contents and main objectives of the plan • Overview of Integrated Drainage and Sanitation Development Plan
3. Baseline	• Current state of storm water drainage and sanitation and the likely evolution
4. Framework	• Overview of relevant Institutional, Legal and Policy Framework • Description of the main priorities and policies in Kigoma-Ujiji Municipality
5. Contribution	• Plan's Contribution to Environmental and Macro-Economic Development Policies
6.Biophysical	• Evaluation of the impact of proposed DSDP projects on environmentally significant areas.
7. Socio economic Impact Assessment	• Likely significant effects on the environment of the plan • Measures envisaged to prevent, reduce and offset significant adverse effects on the environment
8. Alternatives Reasoning	• Outline of the reasons for the selecting the alternatives for dealing with environmental impacts
9. Environmental and Social Management Framework	• Description of the variables and measures envisaged for monitoring environmental and social impacts

11. STRATEGIC ENVIRONMENTAL AND SOCIAL ASSESSMENT –SESA

Current Status

- The SESA study has been completed up to chapter 6 of the final SESA report
- Project brief has been submitted to the Vice President Office, Division of Environment since 10th September 2019 for comments and the way forward (as part of the requirements of the law).
- Stakeholder's consultation within the project vicinity has been undertaken in different stages of plan preparation.
- Currently evaluating environmental and social impacts of proposed interventions.

PRESENTATION TO KIGOMA STAKEHOLDERS

PRESENTATION TO STAKEHOLDERS

OUTLINE OF WORKSHOP

CLASSIFICATION	CONTENTS
DATE	13 January 2020 (11:00 ~ 13:20)
LOCATION	Kigoma Ujiji Municipal Council Hall
ATTENDANCE	KUMC (28), TARURA (1) KUWASA (3), LTBWB (2) TANROADS (1), KIGOMA PRISON OFFICER(1) EWURA(1), TRC(1) CLOUD TV(1), MEDIA TANTANIA(1) CONSULTANT(6)
AGENDA	Presentation of Draft DSDP report to Stakeholders

PRESENTATION TO STAKEHOLDERS

Feedback with Stakeholders

DISCUSSION/COMMENTS QUESTIONS	COMMENTS	RESPONSE & ACTION.
1	- How KUWASA have been involved during the whole period of the preparation of the plan. It was asked whether their comments have been incorporated into the report.	- All comments raised during consultation have been incorporated and also, we shall give you a copy of the reports prepared to make thorough review and more comment if you have more.
2	- Confusion of the location of Katubuka Pond and Katonyanga Drain. Are they closely located?	-Katubuka Pond and Katonyanga drain are located within the same catchment (Kawawa catchment), and their improvements are separate.
3	- Flooding Hazard map is confusing because areas indicated to have high floods are low laying area.	-The flooding map depicted areas where flood comes from (upper areas) and low laying terrain which is flood prone.
4	- Under Master Plan for KUMC (2017- 2037) a Satellite city is proposed at Mgumile area. Has this area been considered to be incorporated into the sewerage system?	-We shall consider to serve this area under the DSDP though it seem DEWATS would be the best option
5	- What are the expected Source of fund for implementation of the proposed DSDP, because the proposal seems to need huge financial resources of which KUMC and KUWASA might not be able to finance?	- Further: financial analysis and indicative costs of the implementation will be carried out during detailed feasibility study and find out the possibilities of funding as proposed in the Draft Report.
6	- Naming of drains and catchments might lead into confusion. It's better to involve the residents of the specific areas so that they can give exact names of the drains or catchments.	-Consultant agreed that we shall take this point and adhere to the recommendation
7	- There are floods experienced on the railway infrastructures every rainy season. What are the plans for this situation?	-We have proposed construction of sand traps and flood retaining dams to protect them, and for Lubengera drain we have proposed sand trap basin and replacement of culvert at the railway crossing point.

THANK YOU
ASANTENI SANA