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AFRICAN DEVELOPMENT BANK GROUP

PROJECT: STRATEGIC WATER SUPPLY AND SANITATION IMPROVEMENT PROJECT (SWSSIP)

COUNTRIES: SOUTH SUDAN

ESMP SUMMARY FOR THE PROPOSED STRATEGIC WATER SUPPLY AND SANITATION IMPROVEMENT PROJECT (SWSSIP)

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PROJECT TITLE:	**PROPOSED STRATEGIC WATER SUPPLY AND SANITATION IMPROVEMENT PROJECT**
PROJECT NUMBER:	**P-SS-E00-003**
COUNTRY:	**SOUTH SUDAN**
CATEGORY:	**2**

1. INTRODUCTION

1.1. The proposed Bank group financing to the RWSPILJ is the Bank's response to a formal request by the GRSS to support its efforts aimed at State Building through Capacity Building and Infrastructure Development and the need to rehabilitate and extend existing water and sanitation infrastructure in order to respond to growing urban demands. The proposed project is in line with the implementation of the Juba Water Supply Master Plan (2009) which is part of the South Sudan Development Plan (SSDP 2013-2018) and the Urban Water Supply and Sanitation Action and Investment Plan (2013-2018). Its implementation is also based on the principles of the 2007 South Sudan National Water Policy. Ultimately, the intention of this project will support the national effort towards improvement of public health and quality of life, hence poverty alleviation among the urban poor.

1.2. Juba City is the national capital, state capital of Jubek State and major international, diplomatic, and regional hub. Its water and sanitation infrastructure is inadequate and requires urgent improvement. The water access coverage in the city is only about 20% in spite of the fact that SSUWC Juba Station has the highest water connection density per kilometre of water distribution pipeline, amongst all of the six stations managed by SSUWC in the Country. Moreover, given the fact that Juba Municipality was upgraded to city status in 2010, the SSUWC Juba station service area has almost doubled. It is in this context the government of the Republic of South Sudan through Ministry of Electricity, Dams, Irrigation and Water Resources (MEDIWR) and SSUWC submitted a project proposal for consideration by AfDB for funding assistance to support the rehabilitation / up-grading and extension of water supply infrastructure project in Juba City.

2. PROJECT COMPONENTS

Component A: Urban Water Supply

This component will address the water infrastructure improvement needs in Juba city focusing on the following:

- *Rehabilitation of Approximately 40Km of SSUWC Juba Station Distribution Network; b) Metering, Public Water Collections Outlets, etc*
- The component will also engage consultancy firms to carry out feasibility studies and Engineering designs for two other towns (Bor and Renk) in preparation for future investment projects either by the Bank or any other development partners.

Component B: Rural Water Supply and Sanitation

The RWSSI-TF will support the Directorate of Rural Water and Sanitation at MWRI and Jubek State to:

- Develop 4 solar powered mini water distributions systems (motorized with elevated reservoirs and distribution network within 100 meters' radius from the source, with tap stands and spout stations with an option for tanker trucks, donkey carts and bicycle vendors to supply high density rural communities and institutions.
- The component will also address sanitation infrastructure and hygiene and sanitation (Hysan) advocacy in institutions through radio talk shows, drama and IEC material to target the wider rural community.

Component C: Institutional Capacity Development : This component will address institutional strengthening and building capacity for the relevant government institutions/stakeholders (*SSUWC, MWRI* and States WSS Departments)

Component D: Institutional Capacity Development and Project Management: This component will address project management costs of the Project Implementation Team (PIT), audit requirements, office logistics and communication.

3. PROJECT CONTEXT

3.1. The major geographical features of South Sudan are the White Nile, which flows north from Central Africa's uplands and dominates the centre of the country, and the vast Sudd swamp, one of the world's largest wetlands. The Sudd swamp is fed by the White Nile and covers over 100,000 km2 , more than 15 per cent of the country's area. Rising out of the northern and central plains are the southern highlands along the border with Uganda and Kenya. The Ethiopian highlands border the country to the east, and the Congo River basin highlands are on the southern and western margins.

The climate of South Sudan is characteristically hot and dry, with seasonal rains brought on by the annual migration of the Inter-Tropical Convergence Zone. Temperatures range from 25 to 40°C. The growing season is generally between 100 to 250 days, depending on the agro-ecological zone.

3.2. Most of the country is covered with natural and semi-natural vegetation with variable tree density. Vegetation cover is mostly high in the southwest, with thick tropical forests in the Greater Equatoria region, and low in the southeast and north, where semi-arid savannah dominates. Grasslands, aquatic vegetation and open water occupy the wetter regions. A large part of South Sudan is covered by the Sudd swamp, a conglomeration of smaller wetlands. Figure below shows the distribution of the basic land-cover types (cropland, scrubland, grassland, forests, wetlands and lakes).

South Sudan has substantial surface water resources, with four main river basins, namely: Bahr el Jebel, Bahr el Ghazal, White Nile and River Sobat. The White Nile traverses the country from south to north and forms the Sudd, a vast swamp, which measures 30,000 - 40,000 km2 in extent. The Sudd Wetland is one of the main hydrological features of South Sudan and is created by the overflow of the Nile over an extensive area. This area is composed of permanent and seasonal swamps. Over 5% of South Sudan is covered by permanent wetlands and floodplains, with a network of seasonally variable wetlands interlacing multiple small flood plains. Seasonal floods sustain vast grazing lands, which are essential to pastoral communities.

South Sudan is endowed with diverse natural forests and woodlands. Dense forests are located within the Greater Equatoria, Greater Bahr el Ghazal and Upper Nile states. Large areas of the country exhibit low-density woodland savannah vegetation of mixed scrub and grassland, with a wide range of trees from rainforest species to temperate climate species, such as mahogany, teak and eucalyptus to pines and cypresses respectively. Prior to the start of the civil war, forest reserves measured 17,460 km2 in extent, while plantations – largely teak – measured 1,879 km2. However, the demand for land for residential and agricultural purposes, fuelwood and charcoal has resulted in rapid deforestation over the past decade. It is estimated that the current annual loss of forests and other wooded land in South Sudan is approximately 280,000 hectares.

3.3. In mid-2017, the population of South Sudan was estimated at 13,091,132. Jonglei is the most populous area, with 16 per cent of the total population, and Western Bahr el Ghazal is the least populous area with only 4 per cent of the total. The highest population densities are along the Nile River and their tributaries. The majority of the population of South Sudan is young and lives in rural areas. About two-thirds of the population is under the age of 30 and more than three quarters, or 81 per cent of people live in rural areas (RSS, 2010). In northern Bahr el Ghazal, 92 per cent of the population is rural while in Western Bahr el Ghazal, the proportion is 57 per cent.

In relation to the economy: traditional subsistence agriculture is the dominant economic activity in South Sudan with approximately 78% of households reliant upon crop farming and animal husbandry as their main source of livelihood. Typically, such farmers rely upon rain-fed agriculture and use traditional methods of farming. This combination renders them highly vulnerable to climate variability, particularly erratic

rainfall. Unfavourable weather conditions – such as persistent droughts and annual flooding – also result in crop and livestock losses. Droughts are also causing encroachment of the desert southwards, while floods have destroyed forests in low-lying areas, particularly in areas close to the Sudd Wetland and White Nile River.

Poverty is widespread, particularly in the rural areas – which are home to more than 6.9 million people. Approximately 51% of South Sudan's population lives below the national consumption poverty line and are living on an equivalent of less than US$ 1 per day. Over 75% of households are dependent on crop farming or animal husbandry as their primary source of livelihood. South Sudan's Gross Domestic Product (GDP) in 2014 was approximately US$ 13 billion, of which agriculture contributed ~15%. Even when harvests are good, 20% of the population is food insecure and requires emergency assistance and food aid.

Regarding urbanization, the extent is currently much smaller than the African average. According to the South Sudan State of the Environment and Of South Sudan's population of 12.3 million, less than 20 per cent live in urban areas. The urban population is growing rapidly, however, due to high birth rates and the return of Internally Displaced People as well as the migration of returnees and newcomers from neighbouring countries. The ongoing conflict has uprooted more than 2.3 million people, nearly 1.7 million have been displaced internally and some 650,000 refugees live in neighbouring countries. Many migrants are attracted to cities and towns where socioeconomic and livelihood opportunities are considered better than in the countryside. South Sudan's urban population is expected to grow fourfold from 2014 to 2050, by which time 8.4 million people will be housed in urban areas. Between 2010 and 2015, the rate of urbanisation in the country was 5.05 per cent annually.

Juba is one of the world's fastest growing cities. Its population is about 350,000-400,000, which is double the number of people inhabiting the city in 2005 when the Comprehensive Peace Agreement ended the civil war with Sudan. Immigrants and people returning home after the conflict contributed to swelling the population as the city was considered to be the only safe settlement in Equatoria State during the civil war. Economic and job opportunities also attract newcomers to Juba, including people from neighbouring countries, and movement to the city has been facilitated by regional roads opening such as the Juba-Nimule road.

The annual average rate of urban growth in Juba in 2010-2015 was 4.63 per cent. Without proper urban planning, however, informal and squatter settlements lacking water, sanitation and other services grew up around the city core. Juba is also a hub for humanitarian aid organisations in the country, and the city centre is surrounded by army camps. Another of the city's main features is the expansion of human settlements towards Juba Game Reserve, a protected area of savannah and woodland that is the habitat for some important bird species.

Most South Sudanese lack access to safe drinking water and sanitary facilities. The dearth of sewerage systems means that liquid waste, grey water and sludge from kitchens, laundries, toilets and bathrooms generally flow untreated onto open ground or spaces, while there is also widespread defecation in open spaces, bushes and backyards. This makes urban populations and people in surrounding villages especially vulnerable to waterborne diseases and epidemics, such as cholera. South Sudan's Ministry of Environment and Forestry deems the single most critical environmental issue related to unclean water supplies is the current incidence of gastrointestinal diseases caused mainly from drinking contaminated water. In 2014, 66.7 per cent of people in urban areas had access to improved drinking water and 16.4 per cent had access to improved sanitation facilities. The areas with the highest provision of improved drinking water in 2009 were Lakes, Jonglei and Northern Bahr el Ghazal.

Regarding waste management, the collection, transportation and final disposal of both solid and liquid waste are inefficient or non-existent in most of South Sudan, since urban planning and waste management have not

kept pace with the influx of immigrants and have been hampered by the insecurity of conflict. Towns have also become congested with many people residing in poor and over-crowded shelters where they risk contracting communicable diseases such as tuberculosis. Half of urban residents had access to a private or shared pit latrine, only 3 per cent used a shared flush toilet and the rest (about 46 per cent) had no toilet facility at all.

South Sudan is beginning the process of building its municipal services, key amongst them sanitation. In 2009, it was estimated that urban sanitation coverage in South Sudan had increased to approximately 19 per cent, a very low figure, even by African standards. The challenge is even bigger in towns like Juba, which are growing at a rapid rate. The exact population numbers for Juba remain contested, but the population was estimated to be 163,000 in 2005 and 500,000 in 2013. Provision of sanitation and other services, however, lags behind this population growth. For example, despite the low coverage numbers, only limited government or donor investments have been made in urban sanitation. In Juba, the only notable investment has been the construction of a wastewater lagoon for discharging septic exhauster trucks.

4. EXPECTED POSITIVE IMPACTS

POSITIVE IMPACTS	ENHANCEMENT MEASURES
Creation of temporary employment to the local people during construction	Give employment priority to local people employment (men and women) during construction phase. Offer project employment opportunities to men and women during operation, encourage women to apply and select candidates according to their competencies.
Increased income generation to local people, especially women and youth by selling food stuffs to construction workers	Give preference to getting service from the local inputs (food, basic materials, etc.) Create enabling environment for food vendors through construction of temporary shelters with water supply and sanitary facilities.
Reduced incidence of water borne (E.g. cholera and diarrhea) and water washed diseases (E.g. skin infection) due to improved availability of water and improved hygiene and sanitation conditions among the local residents	Intensify awareness and education campaigns on hygiene and sanitation practices among the local residents. Promote household connections to sewerage system in planned areas. • Increase tanker filling stations. • Increase PSP
Reduction in water losses and UfW	Promote campaigns to ensure that people are legally connected with meters and supply the meters. Enforce legislation to prosecute people who are illegally connected. Create awareness among the people to report leakages in water supply pipes and vandalism by unscrupulous people. SSUWC will employ four more water supply network technicians to strengthen its water department with financial and human resources to carry out regular inspection to identify any possible leakages and repair immediately. • Refurbish distribution net work

Improved ground and surface water quality	Promote awareness among the local residents to protect ground and surface water sources against pollution.
Abatement of nuisance of safe disposal of AC pipes and reduction of public health hazards in the serviced areas	SSUWC/Contractor will work with relevant toxic waste disposal organisations for safe disposal of AC pipes

5. EXPECTED NEGATIVE IMPACTS AND MITIGATION

Geology/Hydrogeology

- Interruption or disruption of surface and groundwater flows from construction, excavation and ground clearance, and reduced flows during operation.
- Lowering of water table due to excessive abstraction, this may result in salinization, especially in coastal areas.

Mitigation

- Design to take account of local hydrological conditions (e.g. avoid crossing permanent waterways, do not hamper drainage of surface water, avoid works in areas prone to flooding especially during rainy season).
- Minimise the loss of water caused by leaks, evaporation and infiltration (e.g. use of appropriate materials to construct piped network and regular maintenance of the system, appropriate containment of all water storage areas).
- Ensure proper water management by adjusting abstracted volumes annually depending on aquifer recharge, establishing fees for water users, controlling access to water for other purposes (e.g. industry).

Soils, Run-off and Flooding: Loss, damage or disruption of soil/sediments.
Introduction of sediments to watercourses or interruption of drainage patterns, because of ground clearance, earthworks and the introduction of drainage structures.

Mitigation

- Minimization of cleared areas and soil disturbance, revegetation as soon as feasible (with native species if not crops).
- Early installation and regular maintenance of drainage and diversion structures, silt traps, etc; drainage outlets to discharge into vegetated areas if possible; vegetation along watercourses and drainage lines to be retained if possible.
- Retention of topsoil for restoration (including tilling and revegetation) as soon as practicable.
- Careful consideration of timing of works (overall duration and seasonality).
- Design systems so as to reduce sedimentation and facilitate drainage and maintenance.

Pollution of Soils and Water: Contamination of water within water supply network; pollution of watercourses due to wastewater inputs, especially accidental releases and inadequately treated wastewater; potential contamination of soils as a result of wastewater leaks from treatment basins and sludge mismanagement.

Mitigation

- Ensure that drainage and discharged wastewater complies with discharge standards and treat wastewater accordingly; plan discharge of wastewater in accordance with the absorbing capacity of receiving water bodies.
- Implementation of standard good wastewater and sewage sludge management procedures, including appropriate treatment and monitoring quality of receiving waters and soils.
- Conserve vegetation along water bodies and near wetlands, especially at wastewater discharge points.

- Provide education to workforce on hygienic conditions and behaviours.
- Use of appropriate materials to construct piped network and regular maintenance of the system, appropriate containment of all water storage areas.

Release of hazardous substances during construction or maintenance (e.g. accidental spills and leaks) and during operation (e.g. chemicals used in water and wastewater treatment) leading to soil, surface or groundwater contamination.

Mitigation

- Materials handling and control procedures, use of storage and containment equipment meeting international standards.
- Control of construction/maintenance vehicle movements and prohibition of vehicle washing in watercourses, and similar practices.
- Emergency response plans during construction (contractors and local authorities) and operation (local authorities).

Air Quality: Dust and emissions from construction and maintenance activities, and noxious gases or odours from sewage treatment and sludge disposal, could affect human health, vegetation and wildlife, and may have nuisance value for nearby receptors

Mitigation

- Sensitive site selection and siting of project components.
- Use of modern equipment meeting appropriate emissions standards, and regular preventative maintenance.
- Dust control and suppression measures such as dampening, use of vegetation hedges etc.
- No use of ozone depleting substances during construction.
- Ensure sewage storage and treatment facilities are appropriately contained; cover sludge with lime/earth at disposal sites.

Noise and Vibration: Noise and vibration from construction and maintenance equipment, traffic and activities, may disturb sensitive noise receptors (i.e. humans).

Mitigation

- Sensitive local access road route selection and siting of construction facilities, accompanied where necessary by noise attenuation measures.
- Use of modern, well-maintained equipment fitted with abatement devices (e.g. mufflers, noise enclosures).
- Strict controls of timing of activities, e.g. blasting and other high noise emissions; prohibition on night working.

Resources and Waste: Abstraction of significant volume of water from surface or ground water sources may affect supply for other water users and ecosystems, and result in conflicts over water use.

Mitigation

- Abstraction to take place with approval of relevant authorities at all locations.
- Water study prior to any abstraction, to inform a Sustainable Water Management Plan.
- Regular preventative maintenance of all system components to ensure that water wastage is as far as possible limited.
- Promotion of water efficiency and water recycling: implement water fees/tariffs and other demand management measures to avoid the wastage of water or over-consumption.
- Clearly define water rights and water user fees and conditions in consultation with affected groups.

Inefficient waste management during construction, operation and maintenance leading to excess consumption of materials, generation of wastes/emissions, pollution of soils and water.

Mitigation:

- Preparation of Waste Management Plan following the waste hierarchy, supported by staff training.
- Earthworks to be designed to achieve a balance between cut and fill wherever possible.
- Use of authorized contractors for hazardous and any other wastes, which the project cannot dispose of safely.
- Implementation of standard good wastewater and sewage sludge management procedures.

Loss, fragmentation and degradation of habitat, and severance of animal migration routes and pathway: Earthworks and construction causing loss, degradation or fragmentation of protected or ecologically sensitive areas (e.g. wetlands, urban natural areas and open spaces), and other areas of conservation interest, and degradation following poorly managed rehabilitation.

Impacts on habitats and species from habitat alteration and degradation (e.g. reduction in water supply, changes in water flow and drainage, soil erosion, pollution of water, soils or air, introduction of invasive species).

Mitigation: Careful siting of all project components.

- Wherever feasible, establishment of buffer zones around conservation areas, watercourses, and other locations identified as ecologically sensitive and avoidance or minimization of activity within these zones.
- Rehabilitation of cleared areas with native species, and ecosystem restoration in habitats of conservation value, using specialist advice and input to maintain the integrity of the habitat, backed up by a long-term monitoring programme and corrective actions as necessary.
- Where development in sensitive areas cannot be avoided, mitigation may include:
    - Minimization of area impacted, clear demarcation of remaining intact areas of habitat, and prohibition of activity into those areas for any purpose; prohibit or minimize activities in vicinity of sensitive areas, e.g. upstream.
    - Habitat rehabilitation and ecosystem restoration of areas no longer required to occur as soon as possible after construction.

Direct Impacts on Flora and Fauna: Earthworks and clearance may lead to loss of plant species and habitats of conservation interest. In addition, development could displace animals and disturb their habitats, by direct disturbance during construction and operation (e.g. from noise, light disturbance at night).

Mitigation

- Careful site selection and siting of all project components, with advice from biodiversity authorities/wildlife specialists.
- Careful planning of phasing and timing of construction activities.
- Demarcation and avoidance of areas of conservation interest (high value species, feeding or breeding sites, migration routes, etc.) where possible, and wildlife rescue and translocation where appropriate, under expert supervision.

Physical and Economic Displacement

Mitigation:

- Careful site selection and siting of all project components, avoiding occupation of areas which are inhabited or regarded as of high value by communities (e.g. horticulture, community orchards) where possible.

- Early development and sensitive implementation of resettlement planning, in accordance with national regulations and international good practice to compensate for any losses (both physical and economic).
- Develop corrective/compensation measures for affected parties where required (e.g. vulnerable groups).
- Create a water user organization to effectively manage water resources and ensure equitable access among users.

Cultural Heritage: Displacement or damage to cultural heritage sites by construction activities, harm to local setting, amenity value, etc. Also expected is change to intangible cultural heritage due to increased access, and interaction with workforce.
Mitigation: Careful site selection and siting of all project components, taking account of community consultation/specialist surveys.

- Development of a Cultural Heritage Management Plan covering tangible and intangible (e.g. local traditions and practices) cultural heritage.
- Implementation of a "Chance Finds" procedure during construction

Community Health, Safety and Security: Poor construction management practices may lead to adverse effects on safety, human health and wellbeing. Further, interaction between workforce and local communities may increase occurrence of communicable diseases, including HIV/AIDS and sexually transmitted diseases (STDs).Changes in exposure to water-borne and water-related diseases, especially those associated with water-dwelling disease vectors (new areas of standing water created) and with wastewater (if not properly treated). Improved health through better access to drinking water; potential for adverse effects if water quality or availability is poor or unreliable.
Mitigation:

- Good construction site "housekeeping" and management procedures (including site access).
- Risk assessments and emergency response planning to consider impacts on local communities.
- Implementation of a health management system for workforce, to ensure it is fit for work and that it will not introduce disease into local communities.
- Training and awareness raising for workforce and their dependents on HIV/AIDS and other STDs, and communicable diseases including malaria; health awareness raising campaigns for communities on similar topics.
- Provide information, education and communication about safe uses of water and hygienic behaviour.
- Implement environmental management measures for vector control: e.g. monitoring for key vectors; contact avoidance via site selection; focal insecticide and molluscicide application.
- Ensure adequate water supply for addressing the effective demands of the local community.
    - Establish regular controls and maintenance activities to improve reliability and quality of water supply (e.g. through education and training, measures to limit contamination of source and equipment).
    - Facilitate programmes/measures to ensure appropriate sanitary and medical facilities are available.

Workforce-Community Interactions: Real or perceived disruption to normal community life, through the physical presence of a workforce; in particular, potential for conflicts to occur over water use.
Mitigation*:* Adoption of a Stakeholder Engagement Plan, as a framework for early and ongoing community consultation.

- Implementation of a Grievance Procedure (see Grievance Procedure and Redress Mechanisms guidance section).
- Works procedures, defining a Code of Appropriate Conduct for all workers, including acceptable behavior with respect to community interactions.
- Adoption of a Sustainable Water Management Plan, which considers existing community usage.

Labor and Working Conditions

- Poor management of occupational health and safety leading to accidents, injuries and illnesses among workers (e.g. risks of working close to water); mental health issues due to remote or enclosed living.
- Differences in nationality, ethnicity, religion, etc. may lead to discrimination and harassment, and differences (perceived or real) in working conditions between workers may lead to resentment.

Mitigation:

- Employment practices and working conditions should conform to International Labour Organisation (ILO) Standards and national regulations.
- Rest and recreational facilities and time should be provided, and rules on alcohol and drugs defined and clearly communicated to workers.
- The basis for differences in the standard of accommodation should be non-discriminatory; it should be documented and communicated transparently to the workforce.
- Clear and comprehensive health and safety reporting and grievance procedure system should be established, and be freely available to all of the workforce.

The proposed mitigation measures have been assessed and deemed practical and cost effective and will ensure realization of project benefits whilst mitigating potential adverse environmental and social impacts and enhance positive environmental and social impacts of the project. Effective implementation of the mitigation measures is critical for successfully addressing the projected environmental and social impacts.

The Contractors are required to prepare construction environmental management plans (CEMPs) for their respective program areas to ensure effective implementation of mitigation measures. SSUWC will hire social and environmental experts who will oversee the effective implementation of mitigation measures.

Enhancement design, equipment description and operating procedures

Project Stage and equipment/ material	**Impacts and level of importance**	**Mitigation Measures**	**Responsibility for Implementation**	**Responsibility for Monitoring**	**Estimated Costs**
Construction (designs, road equipment, done after laying pipes)	Possible damage to road pavement (high)	• Coordinate with road authorities to identify affected roads to plan restoration of damaged road pavements • Properly plan construction works to avoid unnecessary crossings on important roads, under building structures and storm water drainages Develop construction management plan during detailed design. The design should focus on improving the existing roads leading to construction sites.	Ministry of Transport and Roads (MTR), Roads Authority, Juba City Council SSUWC	Ministry of Environment	UA30,000

Construction (as built drawings)	Possible disruption of public service utilities (medium)	• Coordinate with relevant authorities to identify and map the location of existing underground utilities such as power lines and telephone cables	Contractor/ASSUWC	Project consultant	0
Construction (backfill material, ramming equipment, Dredging dump site	Soil erosion and sedimentation of storm water drainage / watercourses (high)	• To immediately resurface and stabilize exposed surfaces. • To backfill trenches as soon as pipelines are laid • Plant grass on exposed surface around WSP and Sludge ponds • To properly Plan the disposal of surplus soils and demolition materials to designated areas	SSUWC/Contractors	Environmental compliance officer	UA 15,000
Preparation / Construction Construction equipment , water bowsers, Dust masks,	Air pollution (medium)	• Operate construction vehicles, machinery / equipment at agreed time near sensitive areas • Cover trucks hauling soils and dusty construction materials with tarpaulins during transportation. the contract during detailed • Spray water on dusty roads and control vehicle speeds on dusty roads. • Keep moisture on dusty construction materials to prevent them from being blown by wind. • Minimize stockpiling of dusty construction materials on-site and cover stockpiled materials to prevent wind.	SSUWC or Contractor	Environmental compliance officer	UA 5000

		• Select transportation route to minimize impact on sensitive receptors (E.g. residential or business areas) • Limit excavations and land levelling works to more or less wet seasons. • Provide dust protection mask to construction workers. • Carry out proper maintenance of engines and operate vehicles and machinery / equipment in good			
Construction First aid kits, Protection gear,	Construction related accidents (High)	• Ensure that machinery / equipment are operated by trained personnel. • Provide First Aid Kit on-site administered by a qualified person. • Provide personal protection equipment (PPE)	Contractor/ Project consultant	SSUWC / City health official	UA3000
Construction Traffic plan Flag bearers, Sign posts,	Disruption of traffic flow and public mobility (medium)	• Enforce traffic management plan in collaboration with Traffic Officers. • Deploy flag personnel to guide traffic movement in critical points • Use signboards to warn motorist • Create alternative pathways for easier public mobility	Contractor/project consultant	Project consultant/ City traffic police	UA 1000
Construction Low pitch equipment, Ear plugs,	Creation of noise nuisance and vibration (low)	• Avoid use of high pitch noise creating equipment (E.g. Jack hammer) in breaking concrete or road pavement. Instead, employ manual labour using shovels and pick axe.	Contractor	SSUWC/ Public health officers	UA 1000

		• Limit use of noise creating or noisy construction activities in residential areas during night hours (18:00 to 6:00). • Provide ear plugs to construction workers and avoid exposure of workers to noisy environment for a prolonged time			
Construction Sludge testing equipment	Risk of soil pollution (high)	• Direct backwash water from WTP into a designed wetland. • Test dried Sludge to ensure that it meets or complies with agricultural standards. • Toxic Sludge should be properly discharged in safe place approved by Resident Engineer. • Fuel, oil , grease and haphazard materials from construction equipment should be careful disposed to designated areas	Contractor or project consultant	Environmental compliance officer	UA 15,000
Construction Lining material, Excavation equipment	Risk of ground and surface water pollution (high)	• Lining and sealing the base and sides of the ponds with impermeable material during construction • Construct flood protection bunds around WSP • Monitor ground water quality around the WSP through lab test • Monitoring of effluent form WSP to ensure that it meets the national standards.	Contractor	Environmental compliance officer	UA 6000
Construction	Occupational Health and Safety risk (high)	• Regularly check workers health • Provide vaccine to prevent spread of	Contractor and project consultant	SSUWC / Health officers from the city	UA 5000

Health check schedules, first aid kits, Fencing material, Sign posts		communicable diseases. • Establish and operate dispensary with sufficient medicine and equipment. • Provide First Aid Kit complete with medicines and managed by a qualified personnel Provide regular training to workers on occupational health and safety. • Construct fence around WSP to prevent encroachment by nearby residents, especially children. • Put warning signs to discourage trespassing by people into WSP and Sludge ponds.			
Constructio n	Health and Safety Risk – Disposal of AC Pipes(high)	• Safely dispose AC pipes to recommended standard	Contractor / Project Consultant	Health Officers from the City	UA 3000
Operation Disposal sites Simulation models	Creation of odour nuisance (Low)	• Ensure proper operation and maintenance of WSP. • Plant trees to create green belt as buffer zone around WSP to minimize visual impact. • Assess direction of odor nuisance by running a simulation model based on wind direction	Contractor	Environmental compliance officer	UA 1000

6. INSTITUTIONAL STRENGHTHENING

The SSUWC – the Implementing Agency of this project – will be involved with the construction supervision team to oversee the implementation of the environmental monitoring plan. The implementation of ESMP monitoring plan and appropriate reporting schedules shall be developed by phases and in co-ordination with the overall project implementation plan. SSUWC will engage an independent environmental consultant to

carry out environmental compliance monitoring. The Contractor shall be responsible for implementation of environmental and social mitigation measures under the Supervision of Resident Engineer and Environmental consultant. This is to ensure that technical and environmental clauses are followed and well implemented by the Contractor.

a) The Bank during its supervision missions will review the ESMP reports and provide guidance's where necessary.
b) All mitigation and enhancement measures should be implemented whenever necessary in all phases of the project. As mentioned earlier, progress on the implementation of the ESMP will be included in the overall periodic progress reports, midterm review and monitoring and evaluation reports of the project that is to be sent to the RSS Ministry of Environment and the AfDB.
c) In terms of the proposed ESMP, the contractors will have to prepare quarterly compliance reports. SSUWC, through the environmental consultants will also prepare quarterly report on the status of the implementation of the proposed ESMP, and propose appropriate measures for improvement.
d) The above-mentioned measures will be implemented by the consultant and reported directly to the client and financier (AfDB) and assessment criteria will be determined during project implementation.

Other measures, which have been proposed in this ESMP, will need separate implementation and reporting separately due to the fact that will not be implemented by the contractor. These separate measures include:

1. Training to Juba station Staffs on :
    i. Water quality testing equipments
    ii. Environment safety and sanitations
    iii. Use of personal protective equipments
2. Awareness raising to the general public
    i. Conduction general Public awareness and sensitization about the project on the National TV (SSBC), National Radio (SSRC), and other private commercials radio stations taking in to considerations key Environmental issue.
3. Compensation of the trees that are affected during the operational phase
    i. Planting of trees that are affected during the operational phase of the project.
    ii. Planting of trees in the selected schools within the Urban and Rural areas.
    iii. Introduction of community tree nurseries, ideally operated by women to address the climate change issues in the rural areas

7. The total budget for ESMP monitoring and capacity building activities is USD 100,000

8. REFERENCES AND CONTACTS

8.1. Environmental and Social Management Plan for the Proposed Strategic Water Supply and Sanitation Improvement Project

8.2. ***FOR AfDB***

1) A. MBIRO , Water and Sanitation Specialist: A.MBIRO@AFDB.ORG
2) E.B. KAHUBIRE, Social Development Officer: E.KAHUBIRE@AFDB.ORG