PROJECT: MANZINI REGION INTEGRATED WATER SUPPLY AND SANITATION PROJECT

COUNTRY: KINGDOM OF ESWATINI

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP) SUMMARY

Date: October 2018
ESMP Summary

**Project Title:** Manzini Region Integrated Water Supply and Sanitation Project (MRIWSSP)

**Country:** Kingdom of eSwatini

**E&S Category:** Category 2

**Sector:** Water & Sanitation

1. **Introduction and Objectives of the ESMP**

The present document is a summary of the Environmental and Social Management Plan (ESMP) developed for the Manzini Region Integrated Water Supply and Sanitation Project (MRIWSSP) and has been prepared in line with both national requirements and those of the African Development Bank (AfDB or ‘the Bank’). The purpose of the ESMP is to set out the action plan of environmental and social management measures to be implemented by Swaziland Water Services Corporation (SWSC). This ESMP formulates mitigation measures which aim to achieve the avoidance, the minimization or mitigation, of adverse environmental and social impacts of the project. The mitigation measures in the ESMP are binding to all parties implementing it. The objectives of the plan are to ensure that:

- All activities are managed in a manner that reduces or avoids negative social and environmental impacts, while enhancing positive impacts;
- Communication between all stakeholders is optimized to ensure that all role players are aware of their specific responsibilities.
- Compliance Reports are submitted to the SEA and ESMP implementation reports submitted to the AfDB according to an agreed schedule.

On the AfDB’s side, the Project is classified as a Category 2 in line with the Bank’s Integrated Safeguards System (ISS) and Environmental and Social Assessment Procedures (ESAP) due to localized and temporal nature of the environmental impacts associated with it, which can be mitigated through the implementation of an environmental and social management plan. The provision of improved water supply and sanitation services will create an enabling environment for improved economic and social development, such as the reduction of water borne diseases and creation of employment opportunities. Negative impacts pertain mainly to the construction phase, including clearance resulting in disturbances and loss of fauna and flora, as well as impacts during the operation phase including sludge production, leaks and spills of wastewater leading to possible groundwater pollution, damage to natural habitats as well as public health hazards. While the majority of water and wastewater pipelines and infrastructure will primarily run along existing servitudes and/or be located on public Swazi Nation Land (SNL) with no need to relocate people during or after project implementation, access to private properties and displacement of economic activities will be required. As such, an Abbreviated Resettlement Action Plan (ARAP) has been developed and is subject to a separate summary.

In terms of national requirements, the Project has been classified as a Category 3 – equivalent to the AfDB’s Category 1– as per the Swaziland Environmental Authority Act (1992) and specifically the Environmental Audit, Assessment and Review Regulations (2000), which classifies all “large-scale” urban water supply and sanitation projects as Category 1 in Bank terms. The corresponding requirements at the national level are the development of a full Environmental Impact Assessment (EIA) and a Comprehensive Management Plan (CMP), which are to be submitted to and approved by the Swaziland Environmental Authority (SEA). These documents, which are equivalent to the Bank’s ESIA and ESMP, respectively, are aligned with the
specific content requirements of the AfDB. Approvals of the EIA and CMP by SEA are to be provided to the AfDB as a condition precedent for first disbursement, or at the very least prior to commencement of works. The present ESMP is to be updated in line with the outcomes of the full EIA to be conducted. SWSC is obligated by law to implement this ESMP. SWSC will ensure that all mitigations recommended in this ESMP have been implemented to the satisfaction of an independent environmentalist tasked with monitoring it. This compliance will be reflected in the periodic monitoring reports to be submitted to SEA at the times stipulated in the compliance certificate as well as regular reporting to the AfDB.

2. Brief Project Description and Key Components

Manzini region is the most populous region in eSwatini. The Swaziland Water Services Corporation (SWSC), the water utility and Project proponent, has been faced with a challenge to provide water supply and sanitation services to unserved areas in the Manzini Region, in particular the peri-urban areas of Nhlanbeni, Manzini South, Mthongwaneni, Mafutseni, and Sidvokodvo. The purpose of this Project is to improve the well-being of the inhabitants and spur economic growth in the Manzini Region through extension of the provision of adequate safe water supply and improved sanitation services. The objective of the Project is to meet the potable water requirements of Manzini and surrounding areas and reduce the risk of environmental pollution of the groundwater through provision of appropriate sanitation services.

The project is based on the development of more reliable and sustainable water sources in the area, and promotion of more environmentally friendly solutions for sanitation. The project is estimated to cost USD 61.71 million (SZL 807.53 million), to be financed by the Bank, AGTF and the Government of the Kingdom of eSwatini (GOE)/Swaziland Water Services Corporation (SWSC). It will be implemented over a period of four years.

Proposed Activities on Site

Implementation of the project is to occur in three stages. Proposed activities on site –per project phase– are articulated below.

Planning Phase: The planning or pre-construction stage will involve detailed planning by the consulting engineers in preparation for construction. Planning includes full consultation with all identified stakeholders to ensure that workable mitigations are derived from all affected parties. At this stage, property owners as well as those with assets and economic activities in the right of way (ROW) will be compensated as per national and AfDB requirements, and transfer of these properties to SWSC will be completed. All compensation requirements are to be completed before commencement of any civil works. This stage will culminate in the tendering process.

Construction Phase: Following the tendering process, in which a contractor will be appointed, construction activities will include;

- Site clearance, where the vegetation will be removed.
- Excavations of trenches along the pipeline routes, platforms for the raw water treatment plant at Matsapha, and waste water treatment plant at Sidvokodvo.
- The erection of structures, which includes construction of inlet works for the two treatment plants with reactors, pumps, and other significant components of the water abstraction and water treatment plant.
- The final stages of construction will include the installation of electrical and mechanical components of the treatment plants at Matsapha and Sidvokodvo.
The construction stage will last for 18 months. Prior to operation, rehabilitation of all areas disturbed by construction activities will be carried out. It is at this stage that all contractor’s temporary structures are decommissioned and all the sites rehabilitated. Landscaping of the sites and other disturbed areas is carried out at this stage. This is the final stage which prepares the constructed facilities for operation.

Operational Phase: The operational phase will follow commission of all the components of the MRIWSSP, and involves the actual operation by experienced and qualified plant operators, who will be responsible for the abstraction of water at Matsapha, and operation of the waste water treatment plant at Sidvokodvo. Regular maintenance will ensure optimal operation of the abstraction and treatment plants and to minimize the incidences of plant failure. As a result of this, the abstraction and treatment plants will operate 24 hours, hence accommodation of shift workers will be a permanent residential feature at both sites. This stage will last for the entire lifespan of the project, estimated at ±30 years. During this lifespan, it is expected that the pipelines will be regularly inspected, maintained and repaired.

3. Positive Environmental and Social Impacts and Enhancement Measures

The following section summarizes a number (non-exhaustive) of positive impacts expected from the project and proposed enhancement measures.

Improved Water Supply and Sanitation for Local Communities: The Project intends to provide water supply and sanitation services to unserved areas in the Manzini Region, in particular the peri-urban areas of Nhlambeni, Manzini South, Mthongwaneni, Mafutseni, and Sidvokodvo. The purpose of this Project is to improve the well-being of the inhabitants and spur economic growth in the Manzini Region through extension of the provision of adequate safe water supply and improved sanitation services. The objective of the Project is to meet the potable water requirements of Manzini and surrounding areas and reduce the risk of environmental pollution of the groundwater through provision of appropriate sanitation services.

Enhancement Measures: SWSC will ensure a sustainable supply of water to the beneficiary Tinkhundla communities at all times and will ensure that all recipients stand a fair chance of benefiting from the reticulation. Metered water kiosks will be assisted with setting up to enable all in the community to buy water from the scheme. SWSC will also engage the local Tinkhundla communities in sanitation and hygiene training, to include also woman and girls.

Employment Opportunities in the Local Communities: Construction of the water supply and sanitation scheme will bring about jobs for the duration of the construction period to the local men and women in the communities. Construction of the treatment plant will take place over a 24-month period, employing 300 laborers, semi-skilled and skilled workers. Employment opportunities translate to an improved standard of living in these communities, and because of the current unemployment in Swaziland, and in the affected communities particularly, this impact is a high positive.

Enhancement measures: The contractor will give first preference to locals from the Mhlaleni, Hhelehhele, Ngculwini, Sidvokodvo and surrounding communities when recruiting workers for construction. The contractor will publicize the number of people required for construction activities and type of positions available. Available jobs could be for cement mixers, truck drivers, bricklayers, plumbers, and electricians.

Entrepreneurship Opportunities Empowering SMEs: New businesses for the transport and construction industry will be created, as portions of works are sub-contracted to local and national suppliers, e.g., food vendors, material supplies such as cement, steel, oil, sand and crush stone, and sub-contractors for drainage,
rehabilitation works, etc. Construction is one of the key revenue earners in Swaziland. The impact is hence assigned a high positive.

Enhancement measures: In order for the local communities to benefit from this project during construction, the contractor will ensure that local and aspiring businesspersons, including women, are given first preference through out-sourcing of certain works. This could be sale and transport of construction materials, drainage, rehabilitation works, and security.

4. Negative Environmental and Social Impacts, Mitigation Measures

The following section identified a number (non-exhaustive) of significant negative environmental impacts identified expected as a result of the project and proposed mitigation measures.

Impacts at planning phase

Impact on Terrestrial Plants: Direct impacts on flora arise from the need to permanently remove vegetation from the water treatment plant site at Matsapha, the water storage facilities at Mhlabeni and Lugaganeni, and the waste water treatment facility at Sidvokodvo. Unplanned and indiscriminate vegetation removal will also result in loss of wooded vegetation along the pipeline route. However, it is expected that the extent of the impact will be confined to the sites and to an area of 20m on either side of the pipeline route as will be specified in the servitude. Approximately ±50 ha of vegetation stands to be lost due to the development. Due to linear nature of the pipeline routes, habitat fragmentation as a result of destruction of whole plant communities is not expected. Hence a medium negative is assigned to this impact.

Mitigation: Although none of the grass species *Sporobolus africanus* sp., etc., and the species *Ficus* sp, etc, found in the riverine areas where water abstraction and water storage facilities will be erected, as well as pipeline route *Acacias* and *Combretum*, etc, are legally protected, it is in the interest of biodiversity conservation that site clearance outside these sites is avoided such that only vegetation in the way of construction activities can be cleared. The project will ensure that only vegetation with the 20m servitude is removed without encroachment onto surrounding areas.

Impact on Protected Flora: Direct impacts on protected flora arise from the need to permanently remove vegetation during project implementation. Red data listed plants found on the site for water abstraction, water storage, and wastewater treatment, include Phoenix reclinata, Kigelia africana, etc. These species are rare. As well threatened species are found along the pipeline routes, notably Terminalia sp near Ngculwini.

Mitigation: SWSC will enlist the services of a botanist to enable identification of species that need protection. These will be marked with red tape. Prior to construction, SWSC will ensure that endangered species are transplanted in order to propagate these species and maintain current biodiversity conservation levels of nearby habitats. To the greatest extent possible, the project will comply with the Public Stream Bank Regulations by leaving vegetation within 33 meters of the Lusushwana River and Lusutfu River uncleared.

Impact on Aquatic Habitat and Fauna: The relative location of the SWSC raw water treatment plant to the Lusushwana River poses a risk of destruction of this sensitive habitat should there be leakage of water treatment chemicals from the raw water treatment plant. As well, the relative location of effluent treatment plant on the Lusutfu River at Sidvokodvo poses a risk of destruction of this sensitive habitat should there be leakage of raw or poorly treated sewer from the waste water treatment plant. The magnitude of loss of fauna is such the protected amphibian and fish species found in these waterways may be significant.
Mitigation: The project will design both treatment plants, at Matsapha and Sidvokodvo, to be durable and leak proof to prevent spills of treatment chemicals and raw sewage, respectively. To allow the riverbanks to serve as a buffer between the treatment plant structures and the rivers, the project will comply with the Public Stream Bank Regulations by having the water treatment structures not nearer than 33 meters from the edge of the Lusushwana River and the Lusutfu River. Redundancy will be designed into the system such that should critical parts of the plant fail or be removed from service (fault or maintenance), there is standby equipment operating as failsafe or on a Duty/Standby basis to reduce the impact of spillage onto the Lusushwana River and the Lusutfu River. Treated water will not be allowed to be discharged to the environment if it does not meet the required standards. As a result, emergency holding tanks will be part of the design to hold untreated water in the event of plant break downs, to hold at least 5 days residence, which must be restored within 24hrs.

Impact on Ground Water: The sites for the raw water treatment plant at Matsapha, the storage facility at Mhlaleni and Helehele, as well as the waste water treatment facility at Sidvokodvo, have not been extensively surveyed to identify all high water table areas. This will impact on the ground water resources of the area if certain structures are erected where ground water will be encountered. The structures in these areas will be mostly concrete, and this means that copious amount of cement, which has a high pH to the detriment of aquatic life, may pollute ground water in high water table areas of the site. Once contaminated, ground water is very expensive and difficult to clean up. The impact is hence a high permanent negative one on the regional ground water.

Mitigation: At detailed design, SWSC will carry out an extensive hydrological survey of the sites where treatment and storage facilities will be built, to establish founding conditions and ground water levels prior to any construction. SWSC will in the design avoid erecting structures on areas where the ground water will be encountered, and these areas will be fenced off and left as permanent open spaces in these areas.

Malodorous Emissions: The relatively good quality of air will be comprised by odorous emissions from the waste water treatment plant at Sidvokodvo. This is because the waste water treatment plant will be receiving industrial effluence which will be 90% sewer. The raw fecal matter at the plants inlet will emit foul odors.

Mitigation: SWSC will, in the design of the effluent treatment plant at Sidvokodvo, use natural odor absorbents such as trees, to shield the plant and reduce odors naturally. SWSC will ensure that the inlet works are enclosed to limit the smells emanating from raw fecal matter.

Impact on Water Supply: The impact on water supply is mainly a social concern, as over exploitation may lead to conflict with the downstream water users. This case particularly because the water is to be supplied to areas far from the river from which it is to be abstracted. The impact is wide spread all the way to Mozambique as the Lusushwana River is an international river governed by the Inco Maputo Tripartite Agreement.

Mitigation: As per the Water Act, SWSC will not abstract water from the Lusushwana River until authorization by the Lusutfu Water River Basin Authority has been granted. SWSC will finalize the designs to inform on the 20-30 years design period in so far as the water quota from the Lusushwana River will accommodate future growth, e.g., the Biotechnology Park, the Innovation Park, etc., in order for SWSC to obtain the Quota allocation from the Water Apportionment Board (WAB).

Impact on Privately Owned Land: The pipeline from the Raw Water Treatment Plant to Mhlaleni will traverse private properties with the Matsapha urban area. These are title deed properties within this heavily-built environment. The pipeline for Mhlaleni to Helehele will similarly traverse the Manzini urban
area, which also comprises Title Deed Land (TDL) in a heavily-built environment. The first portion of the pipeline from Mhlaleni to Sidvokodvo is through the Mhobodleni settlement. Here there is private land ownership through the 99-year lease. The remaining TDL properties in this project are the privately owned farms at Helehele, and others along the pipeline route between Mhobodleni and Ngwane Park, as well as from Ka-Shali to Sidvokodvo. The impact is a medium negative, because SWSC can minimize it by using the existing SWSC servitudes through Matsapha, Manzini, up to Nhlambeni. From Nhlambeni to Sidvokodvo, SWSC has no other option but to apply for a new servitude. However, the pipeline will assume a linear dimension because its outspan is ±20m wide.

**Mitigation:** SWSC will minimize the expropriation of TDL properties into the ROW for the pipelines conveying water from the Matsapha to Mhlaleni, from Mhlaleni to Helehele, and from Mhlaleni to Sidvokodvo, by using the existing servitudes in these areas. SWSC will apply for a servitude from Mhobodleni to KaShali, and from Nhlambeni to Sidvokodvo. The land take for these servitudes can be minimized by use of the outspans on the main roads, e.g., the road reserve on the MR-9 to Sidvokodvo is 38m wide. Department of its use if possible, because in some portions of the pipeline rout, e.g., Manzini Traffic Circle to Helehele, the road rehabilitation project is in the process of clearing this road reserve, and SWSC pipelines are being relocated. Should SWSC opt not to use the road-side servitude in its final designs, negotiations for expropriation and compensation of TDL properties in the ROW will be initiated immediately, and the ESMP will then be fine-tuned to capture the additional mitigation that will result from SWSC choosing this option.

**Impact on Communal Land:** On the left hand side (LHS) from Matsapha to Mhlaleni is Swazi Nation Land (SNL). SNL is under the chief and the Swazi Area’s Act, stipulates that no one is allowed to use the land without the King’s consent, unless, it is acquired from the Chief of the area through the Kukhonta process. Similarly the pipelines from Mhlaleni to Sidvokodvo will traverse SNL land parcels and from Ka-Shali to Nhlambeni, and that from Helehele to Ngculwini will traverse SNL in its entirety. The impact is a medium negative because unlike TDL, there is no monetary comment of land expropriated for public purposes. Expropriated land can only be replaced with consent from the traditional authority.

**Mitigation:** For SNL areas traversed by the pipeline, SWSC will go through the Kukhonta process, whereby the proponent will have to pay a cow to the royal kraal (Umphakatsi). Should road-side SNL owners lose land to the ROW, SWSC on their behalf will lease with the Chief to have this land replaced hectare for hectare. These land owners will not be required to Khonta, and this land replacement will be gender blind. In perpetuity, SWSC will go through the process of kuhlehla, where the proponent will participate in all community activities directed by the royal kraal. A representative from the Umphakatsi will work with SWSC at all times so that the traditional authority can be informed of any activity that will be on-going at the royal kraal. Similarly, SWSC will engage the traditional authority as an important stakeholder for the water reticulation at the 4 Tinkhundla as the community must take ownership of this project in this area.

**Impact on Crown Land:** The general land uses in the area are agricultural as the project site is in vast farmlands of the Manzini Region. Surrounding the site is SNL and TDL. Agricultural activities here are livestock rearing. Similar activities are carried out across the Lugaganeni-Ekupheleni road. Livestock farms and the residential development may not be compatible. However, most of the farmland in this area is being encroached upon by residential developments, i.e., the Ekupheleni settlements on nearby SNL. Whenever SNL boarders TDL, conflict arise as a result of boundary disputed, with complex legal implications and possible loss of life. The Lususschwana River is one of the country’s natural resources, hence it is under concern of the Ministry of Natural Resources Act. On the other hand, the pipeline through the last part of Sidvokodvo traverses industrial estate lands under the concern of the Ministry of
Commerce, Industry and Trade (MoCIT). Similarly the waste water Treatment Plant on the banks of the Lusutfu/Mkhondvo River and within the Sidvokodvo land Estate will be on MNRE and MoCIT. The impact is a medium negative, because although the Crown Lands Disposal Act requires government approvals for expropriation purposes, this MR1WSP involves MNRE lands (SWSC’s parent ministry) and MoCIT lands (MoCIT are also project beneficiaries). This project was approved at government level. Lastly, the project will require portions of Crown Land (CL) to abstract raw water, convey potable water and treat waste water on portions.

**Mitigation:** SWSC will liaise with MoCIT in its final designs of the water and sewer reticulation at Sidvokodvo Industrial Estate, so that these designs are compatible with the industrial estate design. As the WWTP at Sodvokodvo will be built within the Sidvokodvo Industrial Site, negotiations for land take and an appropriate site for the WWTP will be negotiated by SWSC with the MoCIT.

**Impacts during construction**

**Impact on the Aquatic Wildlife:** The process of excavating trenches on dry riverbanks and on natural drainage lines may result in eroded soils to sediment local waterways which are essential as an aquatic life support for aquatic species such as fish. In addition, run-off containing cement, silt, and oils, will be washed down to the rivers as the treatment facilities are constructed there. Cement alters the pH of water, silt affect the clarity of water. Oils are toxic to fish and other aquatic life forms. Bioaccumulation of poison in fish will impact negatively on protected birds species such as the kingfisher Halcyon senegalensis.

**Mitigation:** The stockpiling of earth materials on natural drainage lines will be avoided in order to prevent siltation of streams in the project areas. Cement mixing on waterways will be avoided and alternative “best practice”, such as use of off-site concrete mixers, will be employed whenever possible.

**Impact of Alien/Invasive Plant Species:** Invasive plant species are opportunistic and can colonize newly cleared land. Measures must be put in place to contain and remove any identified invasive weeds. Throughout the project area, Lantana camara is the dominant alien/invasive species. Construction activities must not exacerbate the spread of this and the other alien/invasive weeds.

**Mitigation:** All alien/exotic species will be actively destroyed by the contractor as per the Noxious Weed Act. Effective measures of destroying alien species are: isolated plants must be rooted with a small hand pick; rooted plants must not be burnt, but preferably left to rot. The removal of alien/exotic species will be carried out sustainably, i.e., all means will be made to replace each with an indigenous plant.

**Soil Erosion:** Site clearance for the water treatment structure and residential areas at Matsapha abstraction point, for the storage areas at Mhlaleni and Manzini, as well as the waste water treatment site at Sidvokodvo, will result in the areas bare and prone to erosion during the summer months. Erosion will scar the landscape at these sites. The soil erosion is not limited to the site only, but will extend across and along the pipeline routes, outfall sewer, and reticulation areas, where the trenches and heaps of soil will be visible from the MR-3 causing traffic from Matsapha to Manzini, MR-9 carrying traffic to Sidvokodvo and MR-8 carrying traffic to Ngculwini. The impact is assigned a high negative given the extreme slopes on some areas, e.g., the hillside at Mhlaleni reservoir, and the prevailing erosion of sandy soils in the Helehele-Ngculwini area.

**Mitigation:** At all construction sites, the project will carry out geotechnical surveys to determine the geology and soil types so that corrective measures specific to any site within the area of intense by the MR1WSP can be undertaken to control erosion. During site clearance at the water abstraction site at Matsapha, the water storage facility sites at Mhlaleni and Helehele, as well as at the waste water treatment
site at Sidvokodvo, all reasonable precautions will be taken to prevent damage to land from storm action. As the construction program will cover a large area in the Manzini Region, the excavation of pipeline trenches will be phased such that one section is completed before proceeding to the next, rather than open all the required trenches at once. Therefore progressive rehabilitation, i.e., the grassing of exposed areas immediately after works is finished rather than leaving this process till the end of the project, will be essential. Soil will be returned to trenches in the reverse order of their removal, to ensure that topsoil is returned to the surface. Interference with surrounding vegetation should be minimized, and only vegetation that is directly in the way of construction can be removed after consultation with the environmentalist or design engineer. A detailed program for rehabilitation will be annexed to the ESMP when the detailed ESIA is carried out.

**Streambank Erosion:** A lot of construction activity will take place on the river banks. First is the construction of an intake structure on the Lusushwana River. Secondly is the excavation of pipeline routes through dry riverbeds on the numerous seasonal streams, particularly in the Ngculwini area. Construction on the banks would impact negatively on the sandy soils in these riverbanks. Any destabilization of the stream banks would result in ecological damage, and besides, the Stream Bank Regulations prohibit any activity within 30-m of any public stream bank. This impact is a high negative, given the large number of drainage lines or streams that the pipelines will traverse but is short-term, lasting the duration of construction.

**Mitigation:** The contractor will prohibited, in accordance to the Stream Bank Regulations, from carrying out construction within 33m of the edge of the Lusushwana River and Mkhondvo River. Because it is inevitable that the abstraction point is constructed on the riverbank itself, the Water Pollution Control Regulations will be used as a waiver, provided as little time is spent on the riverbank as possible, and that future scouring of the riverbank at the discharge point is prevented through proper drainage that will reduce water velocities and vetiver grass is planted to permanently stabilize the riverbanks.

**Soil Pollution:** During construction, oils generated by construction vehicle maintenance will likely be released to the environment, and almost without exception, the recipient of these hazardous oils is the soil. The impact is a medium negative, but long term in duration. This is because polluted soils remain so for long periods.

**Mitigation:** Proper fuel spill containment facilities will be built around temporary fuel storage tanks in order to prevent ground water contamination. The facilities will be bunded, with an outlet that can be opened at the required time. As well, in the event of accidental spillage, measures are to be undertaken, by the contractor, to remove wastes as soon as possible. Downstream water consumers will be alerted and alternative water supplies to be provided if required. All oil bituminous products, hydraulics, batteries, etc, to be removed from site, will be collected in sealable containers which must be emptied at least twice monthly at an approved facility.

**Borrow Pits and Spoil Sites:** Borrow pits will be needed in the construction of roads within the water treatment site in Matsapha, the access roads to water storage at Mhlaleni and Helehele, as well as the construction of roads in the Sidvokodvo waste water treatment plant. The impact of use of land to borrow material is that borrowing results in deep holes in the ground, rendering the land unfit for anything else. As well, construction may involve the partial or total removal of the site soils since they may inevitably be unfavorable for construction. This will present another problem, and that is identifying a site to spoil in an area where the surrounding lands are held under title or private concession. This impact is a medium negative and is long-term, as erosion will lead to loss of valuable land permanently. Moreover, use of land for extracting materials is subject to negotiations and approvals of the traditional authority of the area and the licensing by the Department of Geological Surveys and Mines.
Mitigation: The contractor will comply with the Ministry Of Natural Resources Act, where the suppliers of sand will ensure that they obtain the requisite License to Deal with Minerals from the Department of Geological Surveys and Mines, and a Permit from Swazi Sand. The contractor will obtain a license from the Department of Geological Surveys and Mines to deal with gravel from borrow pits. Once the license is secured, the Contractor will prepare an Environmental Management Plan (EMP) for every identified site for borrow pits, and will not borrow material until the EMP is approved by SEA. The Contractor will at all times identify and arrange for appropriate compensation for use of the identified pits. The Contractor will engage contractors of the nearby industrial site at Matsapha, or residents of Sidvokodvo, with the view of selling through Swazi Sands the sand that will be removed from the Lusushwana and Mkhondvo River banks. Should this arrangement not materialize, it is the prerogative of the Contractor to identify a spoil site for this purpose. In this regard, the Contractor will prepare an Environmental Management Plan (EMP) for every identified site for spoiling, and will not spoil material until the EMP is approved by SEA.

Water Pollution: It is the nature of their purpose that contractor’s sites are a main cause of concern in so far as water pollution is concerned. Contamination of water resources during erection of foundations, fuel storage tanks, solid waste pits, spent oils, may all cause pollution. Wherever materials, fuels and chemicals are stored, such as at contractor’s sites, there is a potential of surface water contamination from storm water run-off.

Mitigation: The contractor will ensure that only one service yard is allowed to operate to avoid widespread discharges of waste oil. Proper fuel spill containment facilities will be built around temporary fuel storage tanks. Spill containment will be erected by spreading a 0.5m thick layer of sand around the fuel storage facilities. The adsorbed organics will be charred off at an approved incinerator at the contractor’s expense. Alternatively the facility will be bunded, with an outlet that can be opened at the required time. As well, in the event of accidental spillage, measures are to be undertaken, by the contractor, to remove wastes as soon as possible. All oil bituminous products, hydraulics, batteries, etc, to be removed from site, will be collected in sealable containers which must be emptied at least twice monthly at an approved facility.

Sedimentation: Sedimentation and siltation will be an issue near the rivers, due to its soils with highly erodible elements. The amount of soil sediments carried out to water bodies will also be exacerbated by the treatment plant sites being located on a catchment area of, and close proximity of, the Lusushwana River at Matsapha, and from the Lusutfu River at Sidvokodvo. As well, the prevailing soils conditions on site are such that most of the sand will have to be removed and be replaced with suitable materials from borrow pits. In other words, the entire site will be bare during construction.

Mitigation: Direct drainage of storm water run-off from exposed areas of the treatment plants site into the Lusushwana River at Matsapha, or from the Lusutfu River at Sidvokodvo, is to be avoided in order to prevent siltation. Stockpiles of soil and construction materials shall not be placed along drainage lines. In dedicated site stockpile areas, cutoff drains will be placed above the stockpiles so as to divert storm water.

Land Use: During construction, the use of public roads and grazing lands will be affected. Regarding the former, construction vehicles will disturb traffic flows through the MR-3 road, the MR-9 road, and the MR-8 road. These are public roads to Matsapha, Manzini, Sidvokodvo and Ngculwini: This is because a large section 2 of the water supply pipeline will be excavated on the side of these roads. Any disturbance to these roads will negatively affect the 1000 daily road users, especially during the morning and afternoon rush hours. In terms of grazing lands, portions of land used for communal grazing by the road-side communities adjacent to which the pipeline trenches will be excavated may cause conflict with the community in the deep cuts that will be created. The impact is a high negative as it impacts on non-SWSC lands but is short-term in duration, lasting the construction period.
Mitigation: The contractor will ensure that the public roads MR-3, MR-8 and MR-9, adjacent to which pipeline routes will be excavated, are not disturbed in any way during construction. There shall be demarcation of dug areas using road tape to warn motorists and livestock herders passing through the area of on-going construction works, and the contractor will make sure that dangerous locations and materials are labeled with warning signs and symbols. Where pipelines cross the public roads, as will be the case at Matsapha, on the MR-3, Mhlaleni across the interchange, and where road excavators will be avoided.

Health Risks: A residential camp may be needed to house the 300 or so construction workers who will be employed by the proponent. A likely significant health risk associated with construction in this regard is that of HIV/AIDS. HIV/AIDS incidence in sub-Saharan Africa is the highest in the world, and Swaziland tops all of the countries in the region. Previously, more than 40% of Swaziland’s 1 million people were thought to be seropositive, making the country the fourth largest carrier of the virus in the world, even with the current review figure of 20%. The risk is extremely high, especially that the prevalence in the sexually reproductive age groups of 15 to 49 years at 26%, is high. The risk is high as HIV/AIDS is an incurable disease that has taken its toll on the manpower in Swaziland and has contributed a great deal to increased numbers of orphans and poverty.

Mitigation: There shall be no campsite for the project in order to maximize employment from the local communities. An education program (possibly through information leaflets distributed in toilets, site office) should be initiated to inform workers and the local public of HIV/AIDS/STD’s and the best defense against these. The contractor is to organize workshops, through NGO’s such as FLAS on STD’s/HIV/AIDS and any other related diseases to HIV/AIDS for his workforce. The contractor will ensure that his staff is supplied with condoms so as to minimize the rate of spread of HIV/AIDS and that the site is not to be turned to a social or recreational facility. Employees found guilty must be warned and disciplined, with the possibility of dismissal if the disciplinary recommendation warrants it. As the project will be carried out in four Tinkhundl’s, the contractor will prepare an HIV/AIDS program, to include awareness training, VCT, for all the communities where the project impacts.

Sanitation: Poor sanitation is a public health hazard. The remoteness of the site from settlements and their associated public amenities would result in workers using bushes to relieve themselves. As ±300 workers are expected on site, the health risk due to poor sanitation is high. At any given time, ±50 workers will be engaged in construction activity which will take place at Mhlaleni, Hhelehlehele, Ngculwini and Sidvokodvo. Ablution facilities if not provided for at these remote areas, shall impact on sanitation at these communities.

Mitigation: The contractor will ensure that adequate sanitary facilities and ablutions are provided for construction worker’s usage to avoid the use of open spaces and bushes to relieve themselves. The Contractor will engage local sanitation providers to enhance the positive benefits of the project. The contractor will ensure that pit latrines with standpipes are installed at strategic locations throughout the project area. The contractor will ensure that toilets are enough for the workers and that high sanitary standards are practiced at all times. The contractor will ensure that his workforce is actively dissuaded from using riverine bushes to defecate. All toilet facilities shall not be sited less than 33m of the verge of the Lusushwana River, Mhobo stream, Lusutfu River, and streams. They shall be shielded from public view.

Accident Risk: Construction sites have inherent hazards associated with them. Workers will be handling machinery. Workers will be navigating heavy duty trucks. Workers will be exposed to live electric wires and transformers. Workers will be working with cranes and scaffolds. Popular wisdom dictates that occupational safety should be given priority by every employer because the work force is the highest priced resource in any company. As well, a danger to the public exists because members of the
communities will be grazing their livestock in the vicinity of the site, exposing them to construction hazards. Construction vehicles will be moving along the MR-3, MR-9, and MR-8 roads. All these activities will expose both workers and the public to considerable risk. Fatalities in big construction sites are not uncommon. Safety has always been seen as being at the forefront of safeguarding workers from injury and machinery from damage. Health and safety in the workplace implies that the worker has the ability to go to work, complete his duties and get back home free from injuries, illness or disease.

**Mitigation:** Occupational health will be given top priority by the Contractor, who shall ensure that all staff are safe at all times, and will not be exposed to harmful substances at work. This will ensured in the form of protective clothing e.g., gloves, overalls, boots, masks, goggles, hard hats, etc. The contractor will comply with the Occupational Health and Safety Act (OHSA) in ensuring good workplace safety and health practices, including reporting, inspection and standards, all of which are essential in reducing the number of accidents, injuries, and illnesses on the job, as well as improving productivity. To assure that injuries and accidents at construction phase are kept at a minimum, the contractor will ensure that vehicles and other equipment used are in good working condition.

**Impacts at operational phase**

**Impact of Spills of Treatment Chemicals:** When the raw water treatment plant is operational at Matsapha, water purification chemicals will be used in significant amounts. Spills will be a possibility. Spills will likely affect the aquatic habitat associated with the Lusushwana River.

**Mitigation:** Personnel at the Matsapha Treatment Plant will be trained on how to avoid chemical spills, how to report spills and how to clean up these spills.

**Impact of Spills of Untreated Effluent:** When the effluent treatment plant is operational at Sidvokodvo, spills of untreated effluent will be a possibility. Spills will likely affect the aquatic habitat associated with the Lusutfu River.

**Mitigation:** Personnel at the Sidvokodvo waste water treatment plant will be trained on how to avoid untreated effluent spills, how to report spills, and how to clean up these spills.

**Soil Erosion at Abstraction Point and Storage Areas:** With time, the river banks at the abstraction point will require constant attention and repairs. This impact will last for the entire lifespan of the treatment plant.

**Mitigation:** The contractor will ensure that all areas disturbed during construction are rehabilitated without delay. This includes general rehabilitation at the construction site, as well as vetiver planting on the river bank at the discharge point. The contractor will ensure that all access roads are sealed with bitumen as early as practically possible. These access roads shall be those associated with the supply infrastructure, staff housing, and those leading to the storage areas.

**Soil Erosion along Pipeline Routes and Reticulation Points:** During operation, erosion at the slopes along the pipeline routes may occur, needing attention and maintenance. This impact will last for the entire lifespan of the project.

**Mitigation:** SWSC will regularly monitor pipeline routes for long-term erosion problems and fix any areas showing signs of erosion without delay. SWSC will engage the community in the reticulation areas so that community progress can include the repair of their eroded reticulation network at all times.
**Emissions:** Emissions of interest at operational phase will emanate from the waste water treatment facility at Sidvokodvo, where anaerobic processes will release greenhouse gas.

**Mitigation:** SWSC will burn off any emitted by the waste water treatment plant, if activated sludge will be used to treat the industrial effluent at Sidvokodvo.

**Workers Health:** The entire treatment process at Sidvokodvo is about handling waste water containing dangerous pathogens that cause many illnesses. This risk borders on the long-term exposure to workplace environments, which are legislated under the OHSA and Workman’s Compensation Act.

**Mitigation:** SWSC will supply all necessary health and safety facilities and equipment to each employee, and to the extent that is reasonable practicable, maintain those facilities and that equipment in a serviceable and hygienic condition. SWSC will provide appropriate safety equipment to workers and shall include the plant in the organization’s first aid training program. SWSC will comply with the Occupational Health and Safety Act (OHSA) in as far as providing protective clothing to workers is concerned.

**Safety of Workers:** At both the raw water treatment plant at Matsapha, and at the waste water treatment plant at Sidvokodvo, workers will be exposed to various occupational hazards. Workers will be exposed to electrical components that may cause shock or even death. Also there is a risk of injury from hot surfaces and mechanical components. There will be an ever present danger when chemicals are used. At operational stage, workers at the treatment plants are at risk of tripping and falling into the open treatment tanks, clarifiers, etc. as the water is more than 10m deep in some areas.

**Mitigation:** SWSC will ensure that tools and equipment used are of good condition and will be kept safe to prevent accidents from occurring. SWSC should be aware that good workplace safety and health practices, including reporting, inspection and standards, are essential in reducing the number of accidents, injuries, and illnesses on the job, as well as improving productivity.

5. **Climate Change Risk and Adaptation Measures**

The Project has been classified as Category 2 in terms of Climate Risk in accordance with the Bank’s Climate Safeguards System. On climate change, the Project will deliver adaptation benefits in relation to water resources management that is sustainable in the face of climate change impacts, particularly given the threat of significant water stress facing the country as a result of high inter-annual rainfall variability in both dry and wet years and expected decrease in annual run-off volumes on the one hand, and increasing demand projects on the other. Provision of safe and reliable water is therefore intended to alleviate the impacts of climate change on the receiving population. Additional practical risk management and adaptation options are to be further integrated into the project design and implementation plans. For instance, the risk assessment indicates that the water supply component has meteorological risk associated with it. This is because of the changing weather patterns seen in the country over a decade, where flooding of rivers has been more frequent, as well as prolonged drought, through which SWSC has experienced dropping water levels in rivers and dams. The risk is that the project may over extract during drought, or the water treatment facilities may be destroyed during floods. The mitigation measures proposed stipulate that SWSC will climate-proof the designs of the treatment plants which will be located in the vicinity of the Lusushwana River and the Lusutfu River, at Matsapha and Sidvokodvo, respectively. SWSC will design these plants on the basis of 1:100 year flood event. SWSC will design the pipelines crossing river and stream channels to be of adequate strength so as to withstand flash floods across these channels. SWSC will liaise with all water supply stakeholders in the river basin, to ensure, for example, that SEC’s eMkinkomo reservoir for generating electricity at Dwaleni, also remains functional in times of drought.
6. **ESMP Impact and Mitigation Measures Table Summary** (non-exhaustive illustration of impact and mitigation measures table)

<table>
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<tr>
<th>Project Activity</th>
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<th>Objective</th>
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<th>Monitoring and Reporting (including performance indicators)</th>
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<tr>
<td>1. Planning/Pre-Construction Stage</td>
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<tr>
<td>Impact of Water Abstraction on Land Use</td>
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<tr>
<td>Abstraction facility at Matsapha will require land expropriation.</td>
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<td>Objective: To Compensate all PaPs at Matsapha abstraction point.</td>
<td></td>
<td>1. Initial Monitoring Report to EEA, AfDB (Settlement Specialist) 2. Resettlement Monitoring Report (Halfway) to EEA, AfDB</td>
<td>SWSC Design Team  - Engage Property Valuator  - Eligibility for compensation</td>
<td>SWSC Management  - Notify all Project Affected People  - Engage PaPs as per ARAP  - Issue Letters of Compensation Acceptance  - Effect Compensation</td>
<td>Immediately (Prior to Construction)</td>
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| Impact on Privately Owned Land | | | Objective: To minimize cost of expropriation of TDL properties, compensate where inevitable | | 1. Initial Monitoring Report to EEA, AfDB (Settlement Specialist) 2. Resettlement Monitoring Report (Halfway) to EEA, AfDB | SWSC Design Team  - Engage Property Valuator  - Eligibility for compensation | SWSC Management  - Notify all Project Affected People  - Engage PaPs as per ARAP  - Issue Letters of Compensation Acceptance  - Effect Compensation | Immediately (Prior to Construction) | | | |

<p>| Expropriation of land for abstraction, storage, pipeline routes, sanitation | | | | | | | | | | |</p>
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| Impact on Aquatic Habitats and Fauna | The relative location of the SWSC raw water treatment plant to the Lusushwana River poses a risk of destruction of this sensitive habitat should there be leakage of water treatment chemicals from the raw water treatment plant. | **Objective:** To protect aquatic habitats  
- The project will design both treatment plants, at Matsapha and Sidvokodvo, to be durable and leak proof to prevent spills of treatment chemicals and raw sewage, respectively.  
- To allow the riverbanks to serve as a buffer between the treatment plant structures and the rivers, the project will comply with the Public Stream Bank Regulations by having the water treatment structures not nearer than 33 meters from the edge of the Lusushwana River and the Lusatufa River.  
- Redundancy will be designed into the system such that should critical parts of the plant fail or be removed from service (fault or maintenance), there is standby equipment operating as fail-safe or on a Duty/Standby basis to reduce the impact of spillage onto the Lusushwana River and the Lusatufa River.  
- Treated water will not be allowed to be discharged to the environment if it does not meet the required standards. As a result, emergency holding tanks will be part of the design to hold untreated water in the event of plant break downs, to hold at least 5 days residence, which must be restored within 24hrs. | Monitoring:  
- SWSC Safety Health and Environment Report to ADB  
**Indicators:**  
- Final Design Report, with redundancy built into it.  
- Final Design Report, with emergency holding tanks built in it. | SWSC (Design Team) | At Final Design Stage | Design costs are part of the Project Budget | With Silvokodvo community  
With MOH for spillage  
With EHA for discharge compliance | Treatment plants fall under “Not In My Backyard” type or projects when viewed by communities. |
| Malodorous Emissions | The relatively good quality of air will be comprised by odorous emissions from the waste water treatment plant at Sidvokodvo. | **Objective:** To limit odour from the waste water treatment plant.  
- SWSC will, in the design of the effluent treatment plant at Sidvokodvo, use natural odour absorbents such as trees, to shield the plant and reduce odours naturally.  
- SWSC will ensure that the inlet works are enclosed to limit the smells emanating from raw faecal matter. | Monitoring:  
- SWSC Safety Health and Environment Report to ADB  
**Indicators:**  
- Final Design Report, with odour shields built into it.  
- Final Design Report, with odour prevention and treatment. | SWSC (Design Team) | At Final Design Stage | Design costs are part of the Project Budget | With Silvokodvo community  
With MOH for spillage  
With EHA for discharge compliance | Treatment plants fall under “Not In My Backyard” type or projects when viewed by communities. |
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| Excavation of Pipelines Land Uses Pipeline excavation in the vicinity of the MR-3, MR-8, and MR-9, will impact on traffic in the urban areas and livestock herding in the road-side areas. | **Objective:** To minimize disturbances on public roads during construction  
- The contractor will ensure that the public roads MR-3, MR-8 and MR-9, adjacent to which pipeline routes will be excavated, are not disturbed in any way during construction.  
- There shall be demarcation of dug areas using road tape to warn motorists and livestock herders passing through the area of on-going construction works, and the contractor will ensure that dangerous locations and materials are labeled with warning signs and symbols.  
- Where pipelines cross the public roads, as will be the case at Matsapha, on the MR-3, at Mhlaleni across the interchange, and where road curvatures will be avoided, the Contractor will initiate STOP/GO procedures, and will always have at least one lane open to traffic. | Reporting:  
Monthly Environmental Report to SEA, ADB | Contractor +  
Environmental Consultant (ECO) | Contractor Site Agent  
- Duty of care  
- Monitoring report Monthly  
**SWSC Supervision**  
- Monthly Progress Monitoring  
- Environmental Reporting | During Construction | - Cost of mitigation is R.5 million as part of Traffic Accommodation in Project Budget | - Consult Complaints Register and Refund | | |
| Excavation at abstraction points, storage, treatment plant Soil Erosion Construction will result in the site being bare in most areas where the project will be executed. Erosion will scar the landscape and increase sediment loads in the stream and rivers in the project area. | **Objective:** To prevent soil erosion during construction.  
- At all construction sites, the project will carry out geotechnical surveys to determine the geology and soil types so that corrective measures specific to any site within the area of influence by the MRIWSS can be undertaken to control erosion.  
- During site clearance at the water abstraction site at Matsapha, the water storage facility sites at Mhlaleni and Hulehehe, as well as at the waste water treatment site at Sidvokodvo, all reasonable precautions will be taken to prevent damage to land from storm action. | Reporting:  
Monthly Environmental Report to SEA, ADB | Contractor +  
Environmental Consultant (ECO) | Contractor Site Agent  
- Duty of care  
- Monitoring report Monthly  
**SWSC Supervision**  
- Monthly Progress Monitoring  
- Environmental Reporting | During Construction | - Cost of mitigation is part of Project Budget  
- Incidents to be recorded daily  
- Reporting to ADB to be generated weekly | - With downstream users | | |
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| **Streambank Erosion** | Construction activities, being carried out on many river and stream bank in the project area, will result in stream bank erosion. This will sediment the waterways and change their courses. | **Objective:** To minimize sedimentation of waterways in the region.  
- The contractor will, in accordance to the Stream Bank Regulations, refrain from carrying out construction activities within 33m of the edge of the Lunushwana River at Matsapha and the Mikendvo River at sididokodvo.  
- Because it is inevitable that the abstraction point is constructed on the riverbank itself, the Water Pollution Control Regulations will be used as a waiver, provided as little time is spent on the riverbank as possible, and that future securing of the riverbank at the discharge point is prevented through proper drainage that will reduce water velocities. Vertiver grass will be planted to permanently stabilize the riverbanks. | Contractor + Environmenta 1 Consultant (ECO) | Reporting:  
Monthly Environmental Report to SEA, ADB  
Indicators:  
No. Incident of land damage  
No. hectares vertiver planted | Contractor Site Agent  
- Duty of care  
- Monitoring report Monthly  
SWSC Supervision  
- Monthly Progress Monitoring  
- Environmental Reporting | During Construction | | | | |
| **Excavation at abstraction points, storage, treatment plant** | | | | | | | | | |
| **Oil Spills** | During construction, oils generated by construction vehicle maintenance will likely be released to the environment, and almost without exception, the recipient of these hazardous oils is the soil. | **Objective:** To minimize pollution of soil by oils.  
- Proper fuel spill containment facilities will be built around temporary fuel storage tanks in order to prevent ground water contamination.  
- The facilities will be bunched, with an outlet that can be opened at the required time. As well, in the event of accidental spillage, measures are to be undertaken, by the contractor, to remove wastes as soon as possible. Downstream water consumers will be alerted and alternative water supplies to be provided if required.  
- All oil bituminous products, hydraulics, batteries, etc, to be removed from site, will be collected in sealable containers which must be emptied at least twice monthly at an approved facility. | Contractor + Environmenta 1 Consultant (ECO) | Reporting:  
Monthly Environmental Report to SEA, ADB  
Indicators:  
No. bunched facilities  
No. oil spills reported  
No. Corrective measures of frequent collection of hazardous oily wastes | Contractor Site Agent  
- Duty of care  
- Monitoring report Monthly  
SWSC Supervision  
- Monthly Progress Monitoring  
- Environmental Reporting | During Construction | | | | |
<p>| <strong>Servicing of equipment</strong> | | | | | | | | | |</p>
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</table>
| 2. Construction Stage | Employment (+) | **Objective:** To ensure that local SME’s benefit from the project.  
• In order for the local communities to benefit from this project during construction, the contractor will ensure that local and aspiring businesspersons are given first preference through outsourcing of certain works. This could be sale and transport of construction materials, drainage, rehabilitation works, security.  
• The contractor will encourage local women to sell food items to the workforce at tea time or lunch. However, high sanitary standards shall be enforced.  
• Repetitive work that is not physically challenging shall be preferably given to women, such as vertiver grass planting and gabion mat filling. | Contractor  
+ Environmental Consultant (ECO) | Reporting:  
Contractor Site Agent  
- Duty of care  
- Monitoring report  
Monthly  
SWSC Supervision  
- Monthly Progress Monitoring  
- Environmental Reporting | Cost will be part of the Project Budget | During Construction | - | | - Vulnerable sectors of the population must be included | |

1. Decommissioning Stage

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| Rehabilitation | Erosion Prevention at Abstraction Points and Storage Areas | **Objective:** To rehabilitate the water abstraction area, and the waste water treatment plant area.  
• The contractor will ensure that all areas disturbed during construction are rehabilitated without delay. This includes general rehabilitation at the construction site, as well as vertiver planting on the river bank at the discharge point, and the river bank at the abstraction point, and the river bank at the abstraction point.  
• The contractor will ensure that all access roads at the Matsapha Raw Water Treatment Plant, are sealed with bitumen as early as practically possible. These access roads shall be those associated with the water supply infrastructure, staff housing, and those leading to the storage area at Mhlaleni and Lugangani. | Contractor  
+ Landscape Specialist  
+ Environmental Consultant (ECO) | Reporting:  
Contractor  
- Final Compliance Report  
Indicators:  
Ha. hydro seeded  
Ha. vertiver planted | | | | | |

Prior to site handover to SWSC

- Hydro seeding cost is part of Project Budget.  
- Vertiver grass is additional E2 m

- With landscape specialist

- Grassed areas to be closely monitored and maintained.
7. Environmental and Social Monitoring Program

The monitoring program aims to ensure that the management measures are satisfactorily implemented, and that the targets in the ESMP for environmental and social protection are achieved. These targets, with guidance and thresholds for initiating corrective action are set out in the ESMP impact and mitigation table (a summary sample of which is presented in Section 6 of this document). Specific monitoring and evaluation indicators, as well as the technical expertise required to measure these performance indicators have also been developed.

Monitoring

Monitoring involves systematic checking or examining and recording of the progress of a project for the purpose of detecting any changes resulting from the implementation of that project. As per the requirement of the SEA, this activity will be carried out regularly during construction and reported to the SEA through Project Compliance Reports (PCRs). At operational stage, internal monitoring will be carried out by the SHE department of SWSC, while external auditors will monitor all processes and procedures once the plant attains ISO 14001 certification.

Water quality monitoring will be made a part of the overall environmental compliance monitoring and reporting. Monitoring tests are to be carried out independently of the routine daily discharge monitoring. The Drinking Water Standard shall be used in these tests for samples taken upstream of the discharge point, and downstream of it. Monitoring will be conducted frequently (at least once a month). Sampling procedures will be carried out in accordance with standard procedures, particularly with regards to handling and storage of samples. It is essential that monitoring is carried out by an independent qualified scientist. As well, specialized equipment and services of a trained analytical chemist are required. The resultant data should be weighed against past baseline data, and the Drinking Water Standards are available for use by the SWSC. Decisions to take action, if any, should be based on these standards. As the effluent treatment plant at Sidvokodvo is designed to conform with the Water Pollution Control Regulations 2010, SWSC is legally bound to sample, test, and monitor treated effluent at the discharge point in the Lusutfu River.

The application and monitoring of the biodiversity-related impacts and mitigation measures will help to prevent the loss of biodiversity. The warning and imposition of penalties for hunting should be properly applied and the Environmental Compliance Officer (ECO) should ensure these are adhered to. The Project Engineer is to seek the assistance of an ecologist who shall assist in transplants of legally-protected species, identify for protection nesting sites and breeding grounds, give advice on assisting slow moving creatures to migrate safely and to seek any additional advice from experts such as ENTC, MoA, UNESWA, EEA and others where necessary. Biodiversity monitoring during construction will culminate in Environmental Compliance Monitoring reports which will be submitted to the EEA detailing the findings.

In terms of air quality and emission control, monitoring will involve annual audits of all the project sites. This is to ascertain to what degree SWSC is achieving its goals of minimizing the carbon footprint of its operations as well as complying with the Air Pollution Control Regulations of 2010.

SWSC will also monitor the socio-economic mitigations and enhancement measures, during project execution, to ensure that all four (4) communities are connected to the scheme, and that community member benefit from it during construction. Monitoring will also involve annual audits to ensure that the initial objectives when the project was conceived are being met.
**Reporting**

The monitoring program will be reported on, as it forms a major element of the Bank’s activities to monitor the implementation of the ESMP.

- **Planning Phase**: SWSC will monitor all planning activities in relation to the design elements, and report to the AfDB through its Environmental Manager.

- **Pre-Construction/Mobilization Stage**: As soon as the contractor is appointed, the Supervising Consultant, who shall have an Environmentalist on board, will report on the items such as plant relocation, site office establishment, etc., as part of the Mobilization Program. The Environmental Report on Mobilization shall be prepared by the Environmentalist for onward transmission to AfDB through SWSC.

- **Construction Stage**: Construction stage monitoring will be through the Supervision Team’s Environmentalist reporting on the project’s Monthly Report, for onward transmission to AfDB through SWSC.

- **Operational Stage**: SWSC’s Environmental Manager will be reporting on environmental and social issues as per the Bank’s guidelines to Borrowers.

**8. Public Consultation**

The goals of the Public Consultation/Communication Program are:

- To provide ongoing information on the project to the affected community and general public on the implementation of mitigation measures

- Facilitate open and continuous communication and consultation between the various groups including, SWSC, the Supervision and Construction Teams, the Stakeholders, impacted community, and the general public

- Providing timely and appropriate information prior to and during construction to enable informed participation in the MRIWSSP Program as it suits their interest, the recipients

- To encourage participation in the consultation process groups that do not normally participate but who could potentially be impacted by the project and who can both benefit from participation and contribute to its overall success.

There will be formal scheduled consultations and meetings. In addition specific information will be provided on an ad hoc basis to address significant changes in the schedule or other important developments. Two critical aspects in implementation of the Public Consultation/Communication Program are:

- A Program Public Relations Coordinator who will be responsible for the coordination of communication and consultation with interested Stakeholders the general public.

- A Grievance Redress Mechanism which to address community concerns on the implementation of the MRIWSSP.

Relevant stakeholders in the Project Area, especially potentially affected communities, have been identified through a stakeholder mapping analysis which will inform the development and implementation
of a Stakeholder Engagement Plan (SEP). Stakeholders include land owners, businesses, municipal councils, civic groups and organizations, schools and clinics. Thorough and meaningful consultations with affected communities and stakeholders are to be carried out as part of the development of the ESMP, Abbreviated Resettlement Action Plan and the detailed ESIA, which is to be submitted to the SEA for approval and the AfDB for validation prior to commencement of works. The stakeholder engagement process is to be meaningful (i.e. free, prior and informed), and the project proponent is ultimately able, through such stakeholder engagement, to achieve Broad Community Support (BCS) for the project. The engagement process will also capture the perspectives of vulnerable individuals or groups, and ensure that their requirements for meaningful engagement and consultation are adequately fulfilled. Stakeholder engagement activities will be adequately documented, so that such activities and their outcomes can be confirmed and verified.

9. Responsibilities and Institutional Arrangements

The key institutions and personnel responsible for the implementing the ESMP are:

**Swaziland Water Services Corporation (the Proponent)**

SWSC is advised by the ECO on environmental aspects of the project. The proponent must be aware of the importance of the environment and ensure that the contractor, who is carrying out the project on his behalf, acts in an environmental acceptable manner. SWSC will also be tasked with ensuring that all governmental/non-governmental agencies are aware of their specific roles and responsibilities as per the recommendations of the ESMP, to ensure effectiveness and compliance. Such organizations or agencies involve, the essential services providers (Swaziland Posts and Telecommunications, Swaziland Electricity Company, Swaziland National Fire and Emergency Services), the various government ministries (Ministry of Natural Resources and Energy, the Department of Water Affairs), and NGO’s, e.g., Yonge Nawe, etc.

**The Environmental Compliance Officer (ECO)**

SWSC will elect an independent environmentalist to ensure that all work conducted is environmentally acceptable and adheres to all aspects of the ESMP in general. The ECO, being knowledgeable about SEA requirements for monitoring ESMP’s will act as the SEA liaison in the project, in the sense that all matters requiring SEA approval or consideration will be reported to the SEA through the ECO. The ECO must therefore be aware of all environmental obligations of the Contractor and of all areas of environmental concern at all times. Due to the involved nature of this position, the ECO will ideally be a full time employee and must be located on site.

**The Resident Engineer (RE)**

The Resident Engineer (RE) is the one who will be responsible for supervising all construction works and monitoring activities of the contractor. His role will include:

- Produce a Photographic Record / Inventory prior to commencement of construction for rehabilitation purposes.
- Run a Site Diary to record events and daily activities in ESMP implementation.
- Forward copies of all records, site diary, site instructions and other data collected, in terms of the ESMP, to the ECO on a fortnightly basis (i.e. every two weeks).
• Issue Site Instructions to the Contractor, as and when required (requested by the ECO), where the ESMP has been contravened or with regards to more specific issues arising which are not addressed in the ESMP.
• Keep an up-to-date Site Visitors Register.
• Keep a Complaints & Claims Register, including a record of follow up action.

**The Contractor (CO)**

Is on the forefront of environmental damage by nature of his activities. The ESMP is to guide his actions so as to cause minimal damage to the environment. As it is unlikely that the contractor can monitor his own activities, the ECO will be required to monitor all contractor’s activities. In order to ensure that the contractor is committed to this, and generally ensure that the nation, through the SEA, does not find itself left with an environmental disaster due to bad faith, the SEA will not issue the certificate for the project until there is proof of commitment by the contractor as evidenced by inclusion of the ESMP in the Tender Documents.

**The Worker (WO)**

It is crucial that all workers on site are aware of their environmental responsibilities and understand the environmental impacts of their actions. Site induction must include an environmental code of conduct that must be adhered to at all times, e.g., no killing of animal (even snakes), no hunting of birds – an illegal activity in Swaziland. Because the actions of workers tend to mirror that of the contractor who supervises them, the contractor will act in an environmentally responsible manner, and will actively encourage the workers to do the same.

**The Swaziland Environment Authority (SEA)**

The Swaziland Environment Authority (SEA) is responsible for enforcing the ESMP, through periodic monitoring of environmental reports generated during the execution of the project. The main purpose of monitoring is to ensure that the prescribed mitigation measures / actions are carried out and to track the progress in implementation of the ESMP in achieving the stated objectives. This will be done by means of submitting the findings of the monitoring exercise in the form of a Project Compliance Report (PCR) to the SEA.

**10. Estimated Costs**

The estimated cost of implementation and monitoring of the ESMP is estimated at E14,410. This is intended to ensure that planning, construction and operations comply with the national environmental laws and AfDB requirements. A number of implementation measures are already part of the Contractor’s purview and construction practices are monitored as part of the supervisory activities. Monitoring costs are mainly associated with the activities planned to confirm the implementation of mitigations measures. Costs associated with ESMP implementation and monitoring –as well as costs associated with ARAP implementation which are estimated separately and to be fully borne by SWSC/GoE– are to be further confirmed upon the finalization of the full ESIA process as per national requirements.
11. Conclusion

The ESMP was developed on the basis of an initial impact assessment which did not identify any fatal flaws. The provision of improved water supply and sanitation services will create an enabling environment for improved economic and social development, such as the reduction of water borne diseases and creation of employment opportunities. Negative impacts pertain mainly to the construction phase, including clearance resulting in disturbances and loss of fauna and flora, as well as impacts during the operation phase including sludge production, leaks and spills of wastewater leading to possible groundwater pollution, damage to natural habitats as well as public health hazards. All impacts will be mitigated as per the Environmental and Social Management Plan (ESMP). The majority of water and wastewater pipelines and infrastructure will primarily run along existing servitudes and/or be located on public Swazi Nation Land (SNL) with no need to relocate people during or after project implementation. However, access to private properties and displacement of economic activities will be required and all necessary compensation will be done in line with the Abbreviated Resettlement Action Plan (ARAP) prior to the commencement of any civil works. Both the ESMP and the ARAP are to be updated based on the outcomes of the full ESIA exercise to be conducted as per national requirements. The EIA and CMP –ESIA, ESMP and ARAP for the Bank – are to be submitted to and approved by the Swaziland Environmental Authority (SEA) and the AfDB.