

**KOLWEZI TAILINGS PROJECT  
DEMOCRATIC REPUBLIC OF THE CONGO  
ENVIRONMENTAL AND SOCIAL REPORT:  
Revised Environmental and Social Impact Assessment  
(ESIA) and Environmental and Social management Plan (ESMP)**

**Volume 1: EXECUTIVE SUMMARY**

**Final Draft**

**387394**

**April 2008**

# **First Quantum Minerals**

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**April 2008**

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# 1 OVERVIEW

The purpose of this Environmental and Social Report: Environmental and Social Impact Assessment (ESIA) and Environment and Social Management Plan (ESMP) and associated Annexures is to:

- Provide details of the regulatory framework within which the project will operate.
- Describe the project.
- Identify all associated impacts that the project may have on the existing social and biophysical environment.
- Develop mitigation measures to reduce the negative and enhance the positive impacts identified. The ESMP sets out an action plan for the ongoing management of environmental, social and community issues at the site, along with personnel requirements, reporting needs, and the approximate costs of the work.

The ESIA and ESMP have been prepared to meet the laws and regulations of the host country, Democratic Republic of Congo as well as the requirements of the IFC's environmental, health and safety guidelines and the IFC Performance Standards on Social and Environmental Sustainability and the company policies and codes of practice of First Quantum Minerals.

Overall, the conclusions of the ESIA are that the Project will generate significant benefits to the area, both in terms of environmental improvements and socio-economic development. The anticipated negative impacts of the Project are manageable.

There is support for the project from all levels of stakeholders and their concerns can be appropriately managed.

Environmental improvements will accrue from Kingamyambo Musonoi Tailings (KMT) commitments to high management and environmental quality standards, which will result in:

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- A reduction in ambient dust concentration, due to the removal of the two large tailings deposits and ongoing rehabilitation of these areas and of the new tailings storage facility;
- Restoration of the Musonoi river valley to a more usable landscape, following the removal of the tailings deposit in it. This will also remove a major source of pollutants from the Kasobantu dam, thus creating a water body which may be of value to local communities;
- Generally improved waste water quality discharged into the environment, in comparison with the uncontrolled discharges which characterise present conditions;
- Protection of biodiversity resources of value in the Concession Area.

The socio-economic benefits of the project, given KMT's commitments to high standards of health and safety management and community development, are numerous. Broadly, they include:

- Just compensation to affected communities for economic displacement (resettlement of Samukonga village is required) and lost access to resources in the Concession Area, and the provision of job and economic opportunities;
- Generation of employment, payment of wages and improvements in the standard of living of its workers through the provision of health services, education opportunities and assistance with housing;
- Significant tax and foreign exchange earnings, as well as providing local employment and contributing to the revival of the DRC Copperbelt's physical and social infrastructure;
- Establishment of the KMT Foundation, (\$20 million over the life of the mine) a fund controlled by an independent Board with community representation, to support initiatives such as KMT's Community Development Plan, which will coordinate projects prioritized by the community.

Key concerns regarding negative environmental impacts of the project are:

- The disposal of surplus water from the tailings dam pool after rains into the Luilu River. However, this water will be diluted by rainfall when discharged, and further diluted by the wet weather flows in the Luilu River. The Luilu is already significantly polluted by dewatering and effluents from other mining activities, so that its aquatic habitat is non-existent. The Luilu discharges into the Lualaba, which is a large river, and the effects on it will be negligible.
- The plant will generate gaseous emissions such as sulfur dioxide, but the high design standards will maintain this well within legal limits.
- The mining of the Musonoi tailings is expected to cause some lowering of the local water table, which has been artificially elevated due to the damming effect of the tailings. This may impact dambo's and other wetlands in the catchment of the dam.

The negative socio-economic consequences may be:

- Social disruption due to the influx of workers from outside the area and an increase in the prevalence of HIV/AIDS which appears to accompany high levels of migrancy;
- Increased economic gap between the well-off and poor, and social conflict generated by this;

- Due to the proximity of the Tailings Storage Facility (TSF) it is deemed necessary to resettle the small village of Samukonga. This will be done in the framework of a Resettlement Action Plan (RAP).
- The volume of traffic, both light vehicles and heavy vehicles is expected to increase, particularly during construction. This is likely to impact road safety conditions.
- The cessation of benefits at closure. However, the project has a relatively long life (23 years) and it is expected that mining regeneration (development) in the region will be an ongoing phenomenon, so the closure of one project should not have major knock-on effects in the regional economy and alternative opportunities will be available to affected people.

In terms of cumulative impacts, mining development will in all probability be accompanied by migration of people into the region to take up employment and economic opportunities developing there as a result of several mining projects around Kolwezi. Benefits include improvements in employment rates and the re-development of a wage-based economy, expansion of the regional economy, improved infrastructure and social services, including health and education, and improved standards of living and quality of life for many people. The downside may be a steep rise in prices in the area, increased pressure on the areas already deteriorated infrastructure, increased poverty amongst the increasingly marginalised rural poor and an increase in the prevalence of HIV/AIDS in the region.

## 2 INTRODUCTION

The Kingamyambo Musonoi Tailings (KMT) project is located in the Katanga Province of the Democratic Republic of the Congo (DRC). KMT plans to retreat the tailings that were previously deposited on the Kingamyambo tailings dam and in the Musonoi river valley. These tailings still contain copper and cobalt at grades that are economically viable to recover the remaining metals.

This project was initiated by a partnership consisting of: Adastra Minerals Inc represented as the wholly owned subsidiary Congo Mineral Developments (CMD); Gécamines; the Industrial Development Corporation of South Africa (IDC); the International Finance Corporation (IFC); and the Government of the DRC under the name of Kingamyambo Musonoi Tailings SARL (KMT). KMT is the legal entity responsible for the mining of the Kingamyambo and Musonoi tailings dams situated close to Kolwezi town. The partnership structure of KMT is 65% CMD, 12.5% Gécamines, 10% IDC, IFC 7.5% and the DRC Government 5%. The regional location of the project is shown in Figure 1

In 2006, Adastra Minerals Inc was acquired by First Quantum Minerals Ltd. Due to the takeover of Adastra Minerals and further investigations and project optimization work conducted by First Quantum Minerals; the start date for the project was delayed from 2007 to 2008.

In 2004, Adastra appointed SRK Consulting (SRK), a South African founded global group of consulting engineers and scientists, to undertake the ESIA for the Project. The ESIA and its supporting document, the ESMP identified impacts that the project may have on the social and biophysical environment and laid out mitigation measures to reduce the negative and enhance the positive impacts identified. The final report was submitted to Adastra in April 2006. It was subsequently submitted to the DPPEM and approved.

As FQM has made changes to the initial project, the ESIA and ESMP need to be updated to reflect the new situation. FQM has therefore appointed SRK to update the ESIA and ESMP. SRK is a consultant approved by the Ministry of Mines in the DRC to carry out environmental studies and to submit environmental reports locally. SRK's environmental and water scientists have been involved on projects in Kolwezi since 2002. The team has a well-developed understanding of the socio-economic and environmental issues in Kolwezi and regulatory issues pertaining to mining in the DRC.

The KMT tailings resource has the potential to host one of the world's largest and lowest cost cobalt producers. At an initial annual output of 70 000 tonnes of copper and 14, 000 tonnes of cobalt, the project would have an operating life of over 20 years. The Project will generate significant tax and foreign exchange earnings, as well as providing local employment and contributing to the revival of the DRC's Copperbelt infrastructure.

KMT obtained a Certificate of Release from any claims arising out of liabilities that have accrued in its concession area due to past mining and mining related activities of other parties following the submission, in January 2004, of an Environmental Audit and Scoping Study (EASS) for the Project.

The Adastra Environmental and Social Report: Environmental and Social Impact Assessment (ESIA) and Environment and Social Management Plan (ESMP) followed the submission of the Environmental Adjustment Plan (EAP) required by the DRC legislation by mining operations in possession of an existing valid mining right. In this case, the licence for tailings exploitation has been transferred from Gécamines to KMT. The EAP was submitted to the Department for the Protection of the Mining Environment (DPEM) on the 27th May 2005 (within twelve months of obtaining the transferred title on 27th May 2004); as required by the Mining Regulations (Articles 466 to 471). Subsequent to the submission, and approval (6th July 2005), of the EAP final changes were made to the project description based on updated information obtained from the DFS.

KMT has agreed with the DPEM that any changes to the information submitted in the EAP and original ESIA and ESMP will be presented to the DPEM for its perusal, in addition feedback to all project stakeholders will take place on the information contained within the revised ESIA and associated documentation.

The information contained within the three volumes of the updated environmental and social assessment report (Volume 1: Executive Summary, Volume 2: ESIA, Volume 3: ESMP) relates to information provided by FQM on the project changes as well as additional specialist studies undertaken between February and April 2008.

FQM policies require that the ESIA be conducted in accordance with various international environmental standards. The updated ESIA and ESMP will meet all applicable regulatory requirements of the DRC and has been guided specifically by the Mining Code (Law No 007/2002 of July 11, 2002) and Mining Regulations (Decree No 038/2003 of March 2003) for an Environmental Impact Statement (EIS) and Environmental Management Plan for the Project (EMPP) required in order to obtain an Exploitation Licence. In addition, the ESIA process and public participation are in compliance with the Equator Principles and the International Finance Corporation's (IFC) performance standards.



## **3 PROJECT DESCRIPTION**

### **3.1 Project phasing**

The two year construction period is expected to commence in early 2008. Phase 1 of the operations will be from Years 3 to 7 and Phase 2 from Years 8 to 23.

### **3.2 Site description**

Kolwezi is a well established mining town with considerable existing, albeit rundown, infrastructure including a railway, power supply, and a small airport. Over 110 million tonnes of ore have been processed during almost a century of mining for primarily copper and cobalt minerals; the legacy of these activities is evident in the remaining mining-related infrastructure which characterises the area and has led to extensive negative impacts on the environment. The KMT Concession Area, where re-processing operations will occur, is located north of Kolwezi town and north-east of and adjacent to the existing mine workings. Figure 2 illustrates the KMT Concession Area and the proposed infrastructure.

### **3.3 Tailings deposits**

The tailings which will be reprocessed are contained in two areas. The Kingamyambo tailings dam is a conventional tailings facility which contains 42.3 million tonnes of tailings and covers an area of 3 km<sup>2</sup> with an average height of 20 m. The Musonoi River tailings deposit is a valley fill deposit which contains over 70.5 million tonnes of tailings over an area 12 km long and up to 2.5 km wide.

### **3.4 Mining**

The proposed Project involves hydraulic mining of the tailings deposited on both the Kingamyambo tailings facility and in the Musonoi River using high pressure water monitors. In the first four years mining of the Musonoi will be by dredging.

The project will remove the majority of tailings from the Musonoi River valley and will remove the majority of the existing Kingamyambo Tailings Dam, leaving a smaller footprint after rehabilitation and a net environmental benefit. The proposed project layout is shown in Figure 2.

The operational dimensions envisage an initial production rate of up to 70,000 tpa copper and 14,000 tpa cobalt, mining both the Musonoi River tailings and the Kingamyambo Dam simultaneously. At this potential mining rate the project life is envisaged to be a minimum of 23 years. Further expansion to produce 105,000 tpa copper and 20,000 tpa cobalt will shorten the project life.

### **3.5 Processing plant**

There are two separate stages to the processing of the tailings: a copper circuit and a cobalt circuit. The process involves the leaching of the tailings using sulfuric acid with added hydrogen sulfide, then solvent extraction with organics to produce a loaded solution from which copper and cobalt can be plated out as cathodes. A number of chemical reagents will be used in the process plant; the greatest volume of these being sulfuric acid and lime or limestone. Sulfuric acid will be generated at site using a sulfur burning acid plant, which uses the combustion of native sulfur to produce sulfur

trioxide followed by the addition of water to produce the acid ( $\text{H}_2\text{SO}_4$ ). The plant will also produce sulfur dioxide, which is used extensively in the process. The plant itself will produce stack gases. Other gaseous emissions will be from the main copper/cobalt leach system scrubber and from the iron/manganese precipitation scrubber. The process flow diagram is provided in Figure 3.

Dust will be generated from the limestone and lime required in the process, mainly from materials transfer points rather than from storage, and also from native sulfur. There will be some acid mist in the tank houses and their ventilation ducts, and some organic vapour from the solvents used in the extraction processes. These waste streams have been identified and calculations of volume and concentration made. None will present an environmental problem when competently managed.

The processing plant and its secured and fenced surrounds will become one of the key Project Affected Areas (PAA's). The footprint will cover approximately 60 ha.

The major waste stream emanating from the plant will be the tailings slurry incorporating the saline aqueous effluent from the solvent extraction and electro winning (SX-EW) process.

### 3.6 Tailings storage facility

Tailings slurry will be transferred from the plant by pipeline to a new tailings storage facility (TSF), to be constructed in the north-eastern portion of the Concession Area. While initially the TSF will be some 50 ha in area, it will grow to cover 420 ha eventually and rise to 57 m. The TSF will have capacity of approximately 87 million  $\text{m}^3$  at an in-situ dry density of 1.28 tonnes/ $\text{m}^3$ . At currently proposed production levels the TSF will receive 2.2 million tpa as solids. The delivery system will comprise a delivery line feeding a spigot pipeline with spigots at approximately 1.8 m intervals.

The TSF design includes an underdrainage system of both toe and elevated blanket drains, with outlets at regular intervals connected to toe paddocks and a solution trench around the perimeter of the facility. Pumping facilities will be provided to empty the solution trench and for return of water to the monitoring and process circuits. Surplus water from the tailings pond during periods of wet weather will be pumped directly to the Luilu River (not into the Kanamwamwa River).

A runoff diversion trench upslope (west) of the TSF will collect and divert clean stormwater runoff from up-gradient of the facility.

Test work performed to date indicates that the waste tailings residue is fully oxidised and non-acid generating, and unlikely to leach significant concentrations of metals. However, the dissolved salts in the spillage from the tailings pool are likely to range between about 3000 and 8,000 mg/l, and expected to increase the TDS in the Luilu River by about 800 mg/l. Similarly, seepage from the TSF is likely to increase the TDS in the shallow groundwater to between 2000 and 3000 mg/l within a radius of about 1 km of the TSF.

### Quarries

Two alternative quarry sites were investigated, the first being the Kibarian quartzite and the second being the basal conglomerate (*Poedingue de base*), which occurs at the base of the Katangan group and overlies the Kibarian. The existing old quarry is about 800m west of the proposed tailings dam site and is on the Kibarian quartzite. The quarry sites are shown on Figure 3.6. The former quarry will be used and not the conglomerate. The quarry will be owned by RPM, a subsidiary of First

Quantum Minerals, and will be used exclusively during the construction phase to provide hard core for foundations, gravel for a number of applications and sand for acid-resistant concrete at the plant site. A temporary quarry licence has been applied for; this is for a period of one year and can be extended for one year. This will cover the requirements of the construction phase. The impacts of the quarry are considered in this document.

### 3.7 Water management

Water supply to the plant is to be provided by a number of boreholes sunk in the concession area. Groundwater in the area is of excellent quality, with low dissolved salts and low metal concentrations, with the exception of manganese and iron in groundwater from the Manga area. The borehole water will be filtered at the plant. This water is then utilised for most plant applications.

A potable water plant will deliver water necessary for human consumption at the plant. A demineralisation plant will deliver demineralised water for use in the boilers and in the make-up of some process reagents.

Volumes of water discharged from the tailings storage facility during average and above average wet months (November to March) are high enough to supply a significant portion of the process water demand that would otherwise come from the well-field. This water (up to 138 m<sup>3</sup>/h) would be used primarily for slurring the tailings back to the tailings dam. However, daily variations in decant volumes, dictated by rainfall patterns, will mean that in practice the process make-up water will be drawn in varying amounts both from the TSF, as well as the ground water aquifer, as required.

Waste streams include the tailings, which will be slurried with process plant water (or recycled water) before being pumped to the newly designed and built tailings storage facility; and sewage effluent from a dedicated sewage treatment plant;

The principal measures to limit contamination of clean stormwater and control contaminated runoff are as follows:

- Upstream stormwater diversion controls will be constructed at the plant and tailings storage facility to divert clean water away from the dirty water infrastructure;
- A pollution control dam will be constructed at the plant to collect dirty run-off water emanating from the open plant areas;
- A tailings return water pumping system to collect supernatant from the tailings storage facility for return to the process and mining areas; while surplus water will discharge into the Luilu River, not into the Kanamwamwa River;
- Toe paddocks, an underdrainage system and solution trench will be constructed down gradient of the tailings facility. The drainings will be collected and forwarded to the plant for reuse, via the tailings pool.
- An additional seepage drain will be constructed along the southern boundary of the tailings storage facility to minimise pollution of the Kanamwamwa River;

#### 3.7.1 River diversion

The Musonoi river will need to be diverted along the edge of the Musonoi tailings and in order to take the 1:50 year event (310 m<sup>3</sup>/s) a diversion canal will be constructed, estimated at 30m wide, (at

least 50 m wide at ground level) and 3 m deep (this is the minimum depth and depending on the topography this could increase for portions of the canal) with side slopes of 1:2. No detailed survey along the canal route has been undertaken so an estimated gradient of 1:300 has been used limiting the velocities in the canal to about 3 m/s. This diversion of the river will divert the water entering the Kasobantu Dam and the water level in the dam will drop significantly. The river diversion will in effect create a by-pass to the settling and pollution 'sink' role played by the Kasobantu Dam. Since the dam will be lowered and the river diverted directly into Nzilo canal, seasonally poor quality water from upstream of the Project will pass directly into Nzilo canal and into Nzilo Lake where it will dilute to insignificant concentrations within the immense volume of the lake.

### **3.8 Waste management**

The retreated tailings waste will be deposited on a new tailings storage facility of 420 ha, to be constructed in the north-western part of the concession area.

The plant layout provides for a general waste landfill, a lined waste site and a pollution control dam. The general waste landfill will be used for all general wastes including domestic and office waste. The lined waste site or hazardous cell in landfill will be used as necessary for solid and organic hazardous waste like drums used to transport hazardous materials, wastes containing acid, oils, greases, medical waste etc.

Ventilation exhaust stacks will be positioned in the plant and service areas where required, at the acid plant, at the boiler and at the electro-winning plants. Heat generated in the sulfuric acid plant will be recovered in waste heat boilers and will provide a portion of the steam required in the processing plant.

### **3.9 Transport**

The Definitive Feasibility Study (DFS) investigated a number of transport modes and routes and the preferred options are presented; these may change depending on the outcome of further detailed investigations and on decisions made as the project progresses such as on price and market stability.

During the period of construction there will be large vehicles delivering plant and materials to the site. Road transport is the most economic transport option from Johannesburg to Kolwezi for container supply as this option is reliable, quick and flexible.

During operations, road will be the primary means of transport from Lubumbashi to Kolwezi for all reagents due to the poor state of rail infrastructure and absence of emergency management capability. Transport movements will comprise delivery of supplies to the plant site by road and transport of employees between the plant and residential areas. Personnel access around the site will be by means of light vehicles on existing (upgraded) and new roads. Copper exports may be sent to South Africa, by road on open flat bed trucks. Cobalt exports will be sent to South Africa via road in 6m containers.

### **3.10 Energy use/power supply**

Initial estimates of energy use for the KMT operations have been made and these estimate the power draw for all activities as 62 MVA, rising to 106 MVA for the 105kt copper output. Power supply to the process plant is derived from the Repartituer Ouest (RO) substation located approximately 7 km north of the plant. This substation belongs to the DRC national electricity supply company La

Société National d'Electricité (SNEL). A dedicated 120 kV power line transmits power from RO substation to the plant main substation. The plant substation is provided with 2 x 120/33 kV, 100/120 MVA transformers for stepping down the 120 kV supply to 33 kV for plant power distribution. The required loads can be met by either of the main transformers, giving full redundancy.

All the power in this area is hydro-electric sourced and therefore 99% of the electrical power utilisation is “clean”. Even the steam boilers are electrode boilers using the power from the DRC national grid. The acid plant generates steam when in production ensuring efficient power use throughout the plant and minimising the draw from the grid. Furthermore, the plant has been designed to use process stream heat interchange where possible (i.e. heat exchange between the various process streams), ensuring efficient energy utilisation.

There are a total of 13 diesel generators which will be used at the plant site, with storage for 48,000l diesel. This will initially be used during a period of 9 months during the construction phase but will remain into the operational phase. The generators are the enclosed ‘silent’ type and will generate between 60 and 300 V. In addition there will be some very small diesel lighting generators used to illuminate (and ensure safety at) the tailings reclamation works at Kingamyambo.

### **3.11 Security and communications**

The DRC is an operationally challenging place to do business. Despite the variety of challenges facing KMT, it is possible to conduct business in a transparent manner and KMT has taken this approach and follows transparent business practices. Inherent in this is an overall business plan, which includes security, which reflects an understanding of and compliance with the appropriate parts of international protocols. Detailed site surveys and liaison with the project managers have been carried out during the pre-construction phase, to ensure that the necessary security measures are in place and the staff trained, as soon as construction begins.

KMT has employed a senior security manager to oversee all security policies and implementation.

KMT has employed Group 4 Securicor, a world renowned service provider, with a proven track record in management and a full understanding of working in the DRC environment for the provision of manned guarding, associated risk management services and technology-based applications (access control, CCTV and electronic Occurrence Book and reporting). This also includes the ability to select, vet, train, equip and motivate a well disciplined guard force

### **3.12 Employment**

Construction workers and sub-contractors' employees will progressively be hired and / or brought on site to peak to a level of approximately 1 300 people by late 2008. Around 400 expats from Indonesia and the Philippines will be brought in. Many of them will be ‘twinned’ with a local worker in order to develop local skills. After about 7 months, the number of required construction workers will start to decrease, and will progressively be replaced by the operations workforce. It has been estimated that around 660 employees will be required to run the operations at the plant site in Kolwezi.

Extensive health programmes, including an HIV/Aids and Malaria prevention programme have been put in place.

### 3.13 Associated facilities

#### Housing and social services

Instead of building accommodation in Kolwezi town, KMT has chosen to construct worker and senior management accommodation on site. There will be two dedicated KMT housing areas on the concession. These comprise construction labour accommodation within walking distance of the plant, capable of housing around 600 staff in rooms of up to 5 personnel, and a management camp. Additional accommodation and a visitor's centre may be constructed in the township of Kolwezi at a later date.

While local Congolese will be assumed to have accommodation in town, all employees will receive a housing allowance equivalent to 30% of gross salary. Accommodation will be provided in KMT's furnished housing (either shared compound for single employees, or separate housing units for families) for employees hired outside the work location.

KMT will build a clinic for worker health care and a detailed HIV/AIDS management policy and procedures are in place. KMT will guarantee its employees and their immediate families' access to medical and health care as recommended by KMT's doctor.

## 4 ALTERNATIVES INVESTIGATED

A number of project alternatives were assessed as part of the DFS and the specialist investigations before accepting the current project description. These related to the location of surface infrastructure such as the plant, tailings dam, the mining method (hydraulic mining, dredge mining and mechanical mining); the processing of tailings at the plant and water supply and effluent disposal. . The reasons for selecting the preferred options are briefly outlined below.

### 4.1 Mining method

The feedstock for the Kolwezi project will be a blend of material from the Kingamyambo tailings dam and the Musonoi River deposit. The Musonoi tailings will be recovered through dredge mining initially, switching to hydraulic mining when the Kasobantu dam has been partially drained. It has been established that the material in the Musonoi deposit is not suitable for dry mining.

Hydraulic mining of the Kingamyambo was considered to be the preferred option from an environmental perspective for the following reasons:

- Reduced dust emissions during the mining of the Musonoi and Kingamyambo tailings deposits;
- Reduced safety risks due to transport of material between the tailings deposits and plant; and
- Reduced noise impacts for sensitive receptors.
- The specialist studies focused primarily on the impacts associated with hydraulic mining as this option was agreed on relatively early in the DFS.
- In the Musonoi valley, hydraulic mining will be carried out after dredge mining and when the water level in the Kasobantu dam has been reduced by construction of a river diversion or pumping or siphoning flows. A river diversion channel will also be constructed along the eastern bank of the Musonoi valley to collect and channel water from the Musonoi and its tributaries away from the mining areas to the Nzilo channel or to the Musonoi river channel. Once the

tailings in the Musonoi have drained, the tailings will be removed by hydraulic mining. The river diversion will be removed and the Kasobantu restored at the end of the tailings reclamation operation.

## 4.2 Infrastructure location

The specific locations of the plant, tailings dam and linear infrastructure were chosen due to their suitability in terms of size available, topography and substrate and environmental constraints such as the avoidance of households/villages, graves and cultural and archaeological sites, marshy areas, power lines, water courses and other existing infrastructure. The preferred plant site was selected based on the large surface area, geotechnical characteristics of the site, flat topography and environmental suitability.

SRK has maintained close links with the DFS team in order to ensure that the findings of the specialist studies are incorporated into the design.

## 4.3 Water supply

Water will be used in the reclamation of the tailings and in the process plant with a maximum make-up requirement of approximately 620 m<sup>3</sup>/h. This requirement will reduce by the volume of water that can be returned from the tailings storage facility, estimated conservatively at about 138 m<sup>3</sup>/h, although during the dry season this volume may not be available, while in the wet season many times that volume will be available for use.

Based on the water requirements for the hydraulic transport of tailings to the plant and the retreatment of tailings at the plant a groundwater investigation was undertaken to assess the existing groundwater resources in the KMT Concession Area and to identify a suitable well-field for water abstraction. These included a site on the Manga ore body (preferred location), and at plant site A and on the Kingamyambo ore body. The Manga ore body has the best potential for water supply for the following reasons:

- High yielding borehole BH 1 has shown that at least 100-200m<sup>3</sup>/h could be abstracted from a single borehole.
- There are no other users exploiting this aquifer and no villages close to the site.
- The water quality is good (based on the 12-month dataset) with the exception of the high concentrations of ferrous iron and manganese present.
- The proposed well-field is within the KMT concession area, well placed for monitoring at Kingamyambo tailings as well as the upper reaches of the Musonoi tailings.

## 4.4 Effluent disposal

The tailings slurry liquor from the KMT plant will ordinarily contain total dissolved solids (TDS) concentrations of about 8,000 to 9,000 mg/l, of which sulfate constitutes 6,000 to 7,000 mg/l, the balance being magnesium (1100 to 1400 mg/l) and calcium (575 to 600 mg/l).

The water balance for the tailings circuit shows that on average about 34% of the slurry liquor will become entrained in the tailings sediments, about 3,300 m<sup>3</sup>/d will be returned to the plant for reuse (when available), and the balance will spill from the tailings storage facility and be directed to the Luilu River.

Spillages of rain-diluted slurry liquor from the TSF will vary seasonally depending on rainfall and evaporation. In the dry months no spillage is expected, but at the height of the wet season this may be as high as 1300 m<sup>3</sup>/h for short periods. Similarly, the quality of spillage will be expected to vary between about 8,000 mg/l as TDS (during low-volume spillages) to about 3,000 mg/l TDS during the largest spillages. These spillages will represent settled tailings slurry liquor in excess of the volumes that can be pumped back to the Plant for reuse. These will be pumped from the tailings pond.

Seepage from the base of the TSF is projected on current assumptions to range between 3000 and 4000 m<sup>3</sup>/d containing dissolved salts (TDS) of about 8,000 mg/l. Some of this will be intercepted by the underdrainage system of the TSF and be transferred to the Plant, while the balance will seep into the saprophytic soils beneath and around the TSF. The effect of this will be to raise the TDS in the shallow aquifer from <100 mg/l to between 2,000 and 3,000 mg/l at distances of about 1 km from the TSF.

Reflux circuit effluent is expected to be produced at the rate of about 2500 m<sup>3</sup>/d, containing TDS at typical levels of 10,600 mg/l, made up of calcium 580 mg/l, magnesium 1740 mg/l, chloride 60 mg/l and sulfate 8,200 mg/l. The intention is to include this stream in the tailings slurry liquor estimated at 14,900 m<sup>3</sup>/d.

#### 4.4.1 Plant Effluent and Tailings Slurry Management Options

Various alternatives including disposal of reflux effluent via the tailings dam or directly to the Luilu River have been evaluated. The preferred option is to include this stream in the tailings slurry liquor.

The most feasible disposal option for the excess tailings water during wet periods is to pipe this to the Luilu River, which carries other mining effluent streams and is highly degraded, for eventual dilution in the Lualaba River. It is anticipated that as other mining projects in Kolwezi such as Katanga Mining come on stream, that they too will discharge into the Luilu River. These discharges will be a combination of pit and underground mine water and surplus tailings water. It is not possible at this stage to obtain any more accurate details of the characteristics or volumes of the discharge water.

KMT commits itself to extending its water monitoring programme to the Luilu and Lualaba rivers in liaison with the Regional regulating authorities.

## 5 PUBLIC CONSULTATION

Public consultation preceded the commencement of specialist studies. As part of the ESIA for an IFC “Category A” project KMT put in place a transparent, fair and accountable public consultation process, with stakeholders being consulted at least twice. Stakeholders include the following six categories of people: State government, local government, traditional leaders, non-governmental organisations in Kolwezi and Lubumbashi, affected communities in proximity to the KMT concession area, artisanal miners, Gécamines and civil society organisations.

Between July 2004 and March 2006, SRK organized several public participation meetings in and around the project impacted area, in order to discuss community concerns, and report on the results



of impact studies done by experts. In March 2006, the draft ESIA/ESMP was presented to communities, traditional leaders, local government, civil society and all other relevant stakeholders. Stakeholders comments and questions were included in the final EIES that was presented to Adastra in May 2006.

The Project was initially meant to start in 2007. Due to the takeover of Adastra by FQM and further investigations and project work conducted by FQM, the start date for the project was delayed from 2007 to 2008.

The following specialist studies have been undertaken to update the baseline conditions in the KMT concession area: geology, soils and land capability, air quality, noise, surface and ground water, fauna and flora, traffic and a social impact assessment.

In order to get feedback from the relevant stakeholders on the revised EIES, SRK organised new feedback meetings in April 2008. All stakeholders have been presented with the findings of the ESIA and ESMP and given an opportunity to comment on these identified impacts and proposed management measures. Comments obtained from the feedback meetings will be incorporated into the Draft ESIA.

Once a French version of the ESIA/ESMP is available, it will be made available for a 60-day review period on the World Bank Info Shop and locally in Kolwezi, Lubumbashi and Kinshasa. The Community Liaison Committee will play an important role in its distribution. Stakeholder comments will be incorporated in the final ESIA/ESMP.

## **6 BASELINE**

### **6.1 Biophysical environment**

#### **Specialist investigations**

In order to determine the baseline environmental conditions of the KMT Concession prior to the commencement of the Kolwezi Tailings Project retreatment activities a number of specialist studies were undertaken. These specialist studies describe the pre-mining biophysical environment, including seasonal variations and identify and quantify (where possible) existing liabilities created by previous mining activities in the area. The geology, soils, land, use and land capability of the Concession Area were mapped. Apart from the railway spur route none of the proposed infrastructure overlies mineralised rock. The studies are summarised below.

#### **Soils**

The majority of the Concession Area soils (59%) are classified as marginally suitable for agriculture due to a lack of organic material. Evidence of pollution of the soils due to the existing infrastructure and mining activities was quantified. The land use mimics the land capability, with almost all suitable cultivable areas being utilised for slash-and-burn subsistence agriculture, with the “farmers” typically growing a variety of crops in these cleared areas.

#### **Climate**

Climatic data were obtained from existing Gécamines rainfall stations and a weather station that had been set up by KMT and data collected over the past four years. The area is characterised by two distinct seasons: the rainy season (October-April) and the dry season (May-September). Dust fallout

and SO<sub>2</sub> and NO<sub>2</sub> were monitored and a mineralogical analysis conducted on the dust samples. Particulate Matter (< 10µm) and Total Suspended Solids were modelled.

### **Ground and surface water**

A description of the catchment and flood lines for the Musonoi River and its tributaries were established. Fourteen surface water monitoring points were installed, where data on water quality and surface water flows were collected over the course of a year. Aquatic biomonitoring was also undertaken at strategic points to establish baseline invertebrate diversity in the water. A borehole census was conducted around the concession area to measure rest water levels; investigate groundwater use and where possible to collect groundwater samples for chemical analyses. Fifteen new monitoring boreholes were installed in the concession area and monitored for levels and water quality over the course of a year. Water quality parameters were compared with DRC discharge water quality standards and the IFC discharge water quality guidelines for mining (2007) as well as World Health Organisation (WHO) Drinking Water Quality Guidelines (WHO 2006). Where these guideline values were exceeded this was noted. Potential water supply options were investigated and a water balance developed.

### **Noise**

Background noise measurements were taken at UZK, Tshala, Kamimbi and Luilu since these villages are closest to the proposed project infrastructure and will be the most sensitive receptors and in Kolwezi. Based on the DRC land category classification all of these villages except Kamimbi are classified as Category B, Kamimbi is classified as Category C. The implications of this are that Category B villages are permitted to have noise levels of 50 dBA during the night and 55 dBA during the day and Category C villages can have noise levels of 45 dBA during the day and 40 dBA at night. Measured noise levels in these villages all fell within the DRC guidelines, except for Kamimbi, which experienced higher baseline noise levels during the day and night than was recommended by the DRC regulations for Category C settlements.

### **Aquatic ecology**

Aquatic macro-invertebrate diversity in the concession area is generally low; there is little aquatic habitat of good quality, even where riparian habitat is in a reasonable state, such as the Kanamwamwa stream. Mammal diversity in the concession area is far lower (only 11 species identified) than would be expected for intact Miombo woodland in the Katanga province. Ten edible reptile species were recorded as being present in the area. Only 59 species of birds were directly observed on site, with a further 25 noted as being present from interviews with local people; many of these being caught by local people for food. Four mammal species and three bird species that have formerly existed or could presently occur in the KMT Concession Area, which were observed, are categorised as partially protected by the DRC Regulations.

The aquatic ecology of the Luilu River between Kolwezi and its confluence with the large Lualaba River has been assessed, with the broad finding that the habitats and species diversity along the Luilu have been seriously degraded by decades of mining discharges. However, the impacts of mining are rapidly diluted into insignificance in the Lualaba River.

### **Fauna and flora**

The vegetation types for the Concession Area were mapped. Approximately 97% of the non-built-up area in the KMT Concession comprises a mosaic of agro-ecosystems in a significantly degraded state, due to extensive slash-and-burn subsistence agricultural activities, charcoal-making and

previous large scale farming activities in some areas. The tree component of what would have been Miombo woodland has been largely lost, and the understorey has been severely disturbed by shifting cultivation. These areas are of little conservation value. Steppes and swards on heavy metal polluted deposits are commonly found around the existing Kingamyambo and Musonoi tailings deposits. A few remnant pockets of high biodiversity were identified on the Concession Area; these included the riparian “gallery” forest in the vicinity of the Muninga stream, some of the dambos and areas where Copper-Cobalt flora was found to have established itself on disturbed areas. The cemetery forest comprises Miombo woodland (Berlinio-Marquesion type) and although this forest is partially degraded due to the placement of grave sites here, these graves have simultaneously served to protect this section of forest since the trees have not been cut for wood and some of them are up to 20 m tall. A section of intact Miombo woodland also exists on the north-facing slopes north-east of the Kasobantu dam wall.

## **6.2 Socio-economic environment**

### **Economics**

For many decades, mining has been the mainstay of the economy of Kolwezi town and the Kolwezi District. The decline of Gécamines and the drastic curtailment of mining operations from 1997 onwards brought great hardship to the town and its surrounds, both in terms of job and income losses, and in terms of the erosion of sectors of employment supported by mining. The Ministry of Labour estimated the level of local unemployment at 90% in 1994, and poverty is widespread in Kolwezi town and rural villages in and close to the KMT Concession Area (combined population estimated at 600 000). Per capita incomes of less than one US Dollar per day are common, and all households surveyed as part of the baseline social assessment fell into this category. The Kolwezi economy currently depends very strongly on informal activities among people seeking to secure livelihoods for themselves and their families. Key informal activities are agriculture, artisanal mining (heterogenite, a cobalt mineral, and gold mainly), and small-scale trading.

### **Settlements**

The Concession Area contains a few small hamlets or villages. These are Samukonga, Kipepa, and Kamimbi, with a combined population of about 1 000. One of the Gécamines mine villages, UZK, straddles the Concession Area boundary. The existing mining infrastructure, Kolwezi town, Gécamines villages and other villages lay largely outside and south and south-west of the Concession Area.

### **Government and land management**

The DRC has a system of government which incorporates both modern and traditional systems, with a local government structure that seeks to integrate and coordinate sectoral jurisdictions. At present the local government function is seriously under-resourced. The land management system is clear, with a role for traditional chiefs in the allocation of small parcels of agricultural land. The system appears to be well accepted. There is no restriction on women in terms of owning and working land.

### **Demography**

The Project Impacted Area (Kolwezi and settlements within and proximate to the Concession Area) has a youthful population that mirrors broader DRC demographic patterns. Population growth through natural increase is therefore likely, probably supplemented by opportunity-driven immigration.

## **Education**

There is a good spread of educational facilities in the Project Impacted Area, concentrated mostly in Kolwezi and the Gécamines villages. Many of these facilities are in poor condition, but pupil-teacher ratios are reportedly reasonable. Low school attendance is a problem, with many youths diverted to subsistence and livelihood sustaining economic activities (including “stone picking” and artisanal mining).

## **Health and health infrastructure**

Malaria is by far the most common serious disease, accounting for the largest number of deaths. Measles and gastro-intestinal complaints are also prominent, with significant numbers of fatalities especially in the infant population. HIV/AIDS is a growing threat, but current reported infection rates are low in the context of sub-Saharan Africa. Health care facilities comprise two major hospitals and a number of smaller establishments (small hospitals, clinics, health centres and dispensaries). Some of the health infrastructure is operated by Gécamines. Most facilities are poorly equipped and under-staffed, but appear to be utilised by a wide spectrum of the project impacted area population, including people from the traditional villages.

## **Infrastructure**

Basic municipal infrastructure (water, electricity, formal roads) is present in Kolwezi proper and the Gécamines villages. Water and electricity services are intermittent where they exist, and the operating agencies recover little of the cost of supply from users. The roads within Kolwezi and the mine villages are poor, as are the roads connecting them and the regional road network. The traditional villages have no piped water supply and no electricity, relying on wells and streams for water, and on wood, charcoal and other locally-available fuels for lighting and heating. Internal roads and tracks are informal and in many cases in poor condition. There is little evidence of local government spending in these settlements.

## **Economic sectors**

The key economic sectors are mining and agriculture. There is limited formal activity in either sector, but significant numbers of people are engaged in informal farming and mining. Small scale low intensity agriculture is ubiquitous in the Project Impacted Area. This form of agriculture is critical to livelihoods for poor households in the traditional and Gécamines villages. All households in a survey undertaken as part of the baseline assessment have at least one member engaged in informal farming. Any mine-related activity taking land or impeding access to fields will clearly impact livelihoods if not adequately mitigated. Artisanal mining or “stone picking” is widespread, but very fluid based on cobalt prices and the presence of buyers. The industry is largely unregulated, but efforts are underway to promote more structure in the sector. Many youths are involved in artisanal mining, some dropping out of school to earn small sums of money. Other sources of employment and income include commerce (formal and informal) and government.

## **Non-governmental organisations**

A large body of international and local NGOs are active in the project impacted area. The local NGO's are mostly small, and many of them provide support to communities and individuals dealing with the multiple manifestations of deep poverty. The main areas of support by NGOs are agriculture, small business, medicines, micro-credit and emergency relief. The NGO community is potentially a valuable resource in the context of future development activities supported by KMT.

### **Archaeology and cultural heritage**

Given the highly disturbed nature of the concession area, little of archaeological interest was found. Several sites of ethnographic importance were located, including 12 cemeteries and/or grave sites, three sacred sites and one site used for conducting ceremonies. The cemeteries and graves are mostly recent (less than 60 years old). The sacred sites are associated with specific graves or with the presence of specific and useful flora in the two surviving gallery forests. None of the sites occur in the proposed KMT footprint areas.

## **7 ASSESSMENT OF IMPACTS**

### **7.1 Biophysical impacts**

The impacts that the project will have on the biophysical environment need to be viewed in an historic context. The Project will take place in a landscape that has been mined or affected by mining, directly and indirectly, for over 70 years. Although the bulk of the concession area has not been mined, it lies adjacent to the extensive mining areas of Luilu and Kolwezi and is degraded due to its proximity to former mining activities.

#### **7.1.1 Noise**

Noise generated by the project will generally not be a mayor issue due to the distance between residential areas and the sources of noise, with one notable exception: Samukonga village. However, due to the expansion of the TSF it is deemed necessary to resettle the small village of Samukonga. This will be done in the framework of a Resettlement Action Plan (RAP)

Natural habitats

Other negative biophysical impacts of the project are predicted to be generally moderate. Parts of the concession area have been directly impacted by past mining, notably the Musonoi River and Kasobantu Dam filled by tailings, which constitutes the project resource. Where mining has not occurred, past commercial agriculture and currently subsistence, slash-and-burn agriculture has extensively transformed natural habitats, leaving tiny isolated pockets of intact habitat with conservation value.

#### **7.1.2 Soils**

Soils beneath the TSF and other Project infrastructure will be sterilized (permanently in the case of the tailings dam and until demolition for the other surface infrastructure).

#### **7.1.3 Air quality**

Air quality impacts from the plant are predicted to be within acceptable norms, due to the adoption of strict design standards for emissions.

#### **7.1.4 Biodiversity and sensitive ecosystems**

Project infrastructure siting has largely eliminated any significant impacts on biodiversity and sensitive ecosystems. Where artificially created wetlands (created by the filling of the Musonoi valley) are threatened, the impacts can be mitigated as deemed necessary by KMT, in discussion with the local communities, as part of the ongoing closure planning process. The mining of the Musonoi tailings is anticipated to create an opportunity to restore some of the ecological form and function of the 12 km of river valley that has been destroyed by the tailings deposit. There is a risk of

degradation of terrestrial and wetland/ riverine ecosystems due to runoff and stream pollution as a result of effluent discharge into the Luilu River. There may be impacts to riparian habitats on the Kanamwamba stream due to contaminated seepage from the TSF.

#### **7.1.5 Ground water**

Seepage from the TSF is likely to raise the TDS of the shallow groundwater around the TSF to levels in the range 2000 to 3000 mg/l, impacting on the use of this water, however, there are no known uses of ground water in the area. Elsewhere, groundwater quality impacts, using the absence of significant pollution to groundwater of the past mining activities in the area as a guide, are likely to be minimal from this project. However, the mining of the Musonoi tailings is expected to cause some lowering of the local water table, which has been artificially elevated due to the damming effect of the tailings. This might impact the dambos.

#### **7.1.6 Surface water**

The majority of significant biophysical impacts are related to surface water (i.e. potential pollution of surface water courses and impairment of aquatic habitats), but even here project infrastructure siting and design standards have circumvented many potential impacts. The TSF has been located so as to avoid direct impact on the Muninga and Kanamwamba streams, and drainage from the return water/pollution control dam will be piped directly into the Luilu River. Mining in the Musonoi will require lowering the level of the Kasobantu reservoir in order to keep the mining area drained. The Musonoi River will need to be diverted along the edge of the Musonoi tailings and a canal of 30m wide (at base) and 3-4 m deep will need to be established, resulting in a channel width of about 50 m at ground level. This diversion of the river will prevent the water entering the Kasobantu dam and the water level in the dam will drop significantly. The river diversion will in effect create a by-pass to the settling and pollution 'sink' role played by the Kasobantu Dam. Since the dam will be lowered and the river diverted directly into Nzilo canal, poor quality water from upstream of the Project will pass directly into Nzilo canal and into Nzilo Lake.

The spillage of variably saline tailings water in the wet season (3,000 to 8,000 mg/l) into the Luilu River may have perceived negative impacts in terms of discharging into a natural water course, however, this river is already severely degraded (aquatic macro-invertebrate diversity is almost non-existent) and discharge from other mining operations is already taking place into this stream.

#### **7.1.7 Traffic**

Even though the volume of both light vehicles and heavy vehicles are expected to increase during construction of the plant, particularly along Boulevard Lumumba, Road 1 and the main access road to the FQM concession area, existing traffic flows along these roads are very low and this road network has spare capacity even though the road surfaces of many sections of road are in poor condition.

Similarly, the Kolwezi – Likasi – Lubumbashi road has sufficient capacity to accommodate the FQM construction generated traffic.

### **7.2 Positive biophysical impacts**

Positive impacts that the project will have on the biophysical environment include the longterm, partial restoration of the Musonoi river valley and re-establishment of natural habitats along these

water courses after the tailings are mined out (although this depends on upstream activities over which the project has no control). Improved air quality, due to the removal of the Kingamyambo tailings (which is presently a major source of dust and management of the Project's new TSF will ensure that it does not become a new source of dust).

## 7.3 Social Impacts

The decline in mining, coupled with the political instability of the DRC during this time, has had extensive negative socio-economic effects. These negative trends are indicated by the extent of subsistence agriculture practiced in the KMT Concession Area, a relatively recent phenomenon, as local residents have shifted from the security of mining jobs to survival strategies. Even more dramatic has been the rise over the past three years in artisanal, 'illegal' mining of heterogenite (a cobalt mineral) in the Kolwezi area, spilling over also into the KMT concession area, as Gécamines' production has all but ceased and the international cobalt price increased dramatically. The result of this history is that the greater Kolwezi area, although it now offers very few formal jobs, is host to some 240 000 people.

### Positive socio-economic impacts

The KMT project will change the socio-economic baseline conditions in many ways. The major drivers of change will include the construction and operation of the KMT mine, the creation of jobs (the project will employ approximately 1 300 people during construction and 660 during operations), the procurement of goods and services, the construction and upgrading of infrastructure, capacity building and training for KMT staff, payment of taxes and levies, and the implementation of social policies and programmes. Against this background, social and economic impacts will be felt in the national and local economies, around land and resources, in the context of social services, and in social organisation and community well-being.

The KMT capital investment of US\$ 593 million is clearly significant in this context, as is the ongoing economic value added throughout the life of the mine. The impacts in the economic domain are all strongly positive, with the creation of jobs, the mobilisation of household income and the provision of procurement and mine-linked business opportunities.

KMT will initiate the establishment of a non-profit, independent foundation, the KMT Foundation, to identify, plan and implement community-selected, sustainable development projects and programmes, within carefully formulated guidelines. KMT will inject funds into the Foundation amounting to \$20 million over the life of the mine, to support local development initiatives. It is hoped that other mining companies will join and contribute to the Foundation.

The Project will bring about significant improvements in the local human environment not only due to the economic benefits that it will bring, by resulting in considerable improvements in physical infrastructure and social services. Payment for existing services (water and electricity) by KMT and its staff will restore some cost recovery in the supply agencies, and steady incomes will give KMT employees access to schools and other social facilities. KMT health support will enable employees and their immediate families to secure good medical care. KMT will upgrade roads and power supply where relevant to its operations, and work undertaken through the CDP will address community social infrastructure needs, among other things.

### **Negative socio-economic impacts**

There are some socio-economic costs, however, relating mostly to loss of access to land for subsistence agriculture in the concession area and loss of standing crops when project construction begins, as well as the resettlement of the small village of Samukonga (home to 76 people) and changes in the sense of place of the immediate, rural landscape. There is potential for disruption of communities by construction workers, and migrant-driven increase in HIV/AIDS infection is a significant risk. Overall, the number of people affected by these impacts is relatively small and although the impacts have the potential to alter their quality of life they are not expected to be unmanageable. There are also significant benefits at community/village level, including development projects undertaken through the Community Development Plan (CDP), and the purposeful involvement of local government and NGOs.

There is little artisanal mining in the tailings, and ore recovery in these areas, for artisanal miners, will be low in comparison to mining the waste rock dumps. On the whole, disruption of artisanal mining and associated activities in the Project concession area will be low, and in many cases transitory.

In an environment of limited resources, few formal employment opportunities and widespread economic hardship, the Project has the potential to generate social division, mainly if the various benefits are seen to be unevenly or unfairly distributed. These benefits include jobs, procurement opportunities, compensation for lost land and crops, and access to the CDP and its programmes and projects. There is little overt evidence of the social and ethnic divisions that have afflicted Kolwezi in the past, but recognition of possible sources of tension and the careful and sensitive management of these is important.

Mine closure will of course reverse many of the benefits of the project, but appropriate pre-closure counselling and the cumulative impacts of other mining operations should ensure that there is no return to the present baseline. The life of mine is predicted to be 23 years, so there is time for economic consolidation and the broader revival of the Kolwezi economy.

The construction of project infrastructure will not directly affect any of the identified graves, sacred sites and the ceremonial site. However, until all linear infrastructure is finally located prior to construction, there are grave sites that could potentially be disturbed. There is similar potential for the disturbance of graves in the operational phase. It is believed that there is at least one grave in the Musonoi tailings. This and possibly others will not be located until the tailings are mined. Uncontrolled access to sacred and ceremonial sites could disturb the cultural landscape, especially in the case of the Muninga forest site. This lies between the plant and the new TSF, and pipelines and haul roads will be constructed in its vicinity. The probability of random access is low due to KMT's control of the Concession Area.

Overall, the Project will generate significant benefits to the area both in terms of environmental improvements and socio-economic development. FQM does not deem there to be any socio-economic issues that cannot be managed.

## **7.4 Cumulative impacts**

The assessment of cumulative impacts looks at the accumulating consequences of other development proposals in the Kolwezi area on the KMT project's significant impacts. The analysis of cumulative



impacts proceeds from the assumption that the playing field for the development of all mining and mineral processing projects will be level, in terms of the DRC's new Mining Code. This means that:

- The environmental standards to which KMT is committed through FQM may be broadly followed by other projects;
- The social development goals to which KMT is committed through FQM may be met by other projects;
- Environmental assessment procedures and mitigation measures will be applied to all projects;
- The legislation and pollution control standards will be uniformly enforced on all projects;
- Liabilities accruing from past – Belgian and Gécamines' – mining activities will be excluded from the liabilities of new projects. This means that new projects will not be responsible for cleaning up existing pollution and degradation.

Clearly, those projects which might be developed in the Kolwezi area some distance from Kolwezi will have no direct impact on the KMT project (or vice versa), their only potential interaction being the increased demand for skilled labour, the gradual expansion of the regional economy and improvement in regional infrastructure. From the current degraded state of mines in the region, if standards are enforced, there will probably be an initial improvement with respect to water and air pollution in the region, although in the very long term the situation might reverse as more and more mines and mineral processing projects are developed and discharge their wastes into the environment.

### **Bio-physical impacts**

It will be important to understand the cumulative impact on the atmosphere and water bodies of mining development. Because of KMT's proposal to discharge surplus tailings water into the already polluted Luilu River during wet weather, SRK Consulting has modelled a scenario of potential discharges into the Luilu and the impacts thereof on the almost pristine Lualaba River, of which the Luilu is a tributary. The projection is based on limited knowledge of the other projects in the Kolwezi area (and the associated TDS of their effluents) and on the assumption that almost all the mines will discharge their effluents into the Luilu. Discharges from the proposed mine plants are guesses at the moment based on what has been developed by KMT. Thus it has been estimated that each plant discharges 8Ml/d at a TDS concentration of about 6,000 mg/l into the river. The expected flow in the Luilu will be about 350 Ml/d with a TDS of about 1170 mg/l. As at present, the water will be unsuitable for human or animal consumption, although based on TDS alone, the levels are unlikely to cause health effects. The water in the Lualaba River upstream of the confluence with the Luilu River has a TDS of less than 300 mg/l and an average flow of 7430 Ml/d. The flow data was abstracted from releases through the hydro-electric scheme and the TDS values were estimates based on water quality samples collected from site. The resultant water quality in the Lualaba River after the confluence with the Luilu River is a TDS of 340 mg/l. which is a moderate incremental impact in relation to the economic benefit to the country that mining will provide.

### **Socio-economic impacts**

On the socio-economic front, mining development will in all probability be accompanied by migration of people into the region to take up employment and economic opportunities developing there, given the paucity of economic development in contiguous regions to the north, west and east of Katanga province. Benefits include improvements in employment rates and the re-development of a wage-based economy, expansion of the regional economy, improved infrastructure and social services, including health and education, and improved standards of living and quality of life (for many people). The downside may be increased poverty amongst the increasingly marginalised rural poor and an increase in the prevalence of HIV/AIDS in the region can be expected to be associated with high levels of migrancy. A growing population and increasing mining activity will increase pressures on regional infrastructure and on the regional environment in different ways, notably with respect to water demand, water pollution, fuel wood and other natural resource demand and habitat and biodiversity fragmentation and loss.

## **8 ESMP and ANNEXURES**

The ESMP comprises:

- A summary description of key project features;
- The overall approach to environmental and social impact management;
- A listing of the significant impacts at each project site against the proposed mitigation measures, and project phasing with cross-references to the applicable management programmes and plans;
- An outline of the integrated management programmes that will be implemented to address significant impacts;
- The organizational structures for and functions of the Health Safety Environment and Community (HSEC) division of the company;
- An Action Plan with estimate of costs and implementation schedule, as per project phases;
- Seven Annexures, each of which describes a specific management plan as per IFC requirements.

### **8.1 Overall approach**

Environmental and social and health and safety issues will be integrated into a HSEC programme. The management approach comprises five interlinked components which conform also to the principles of the ISO14001 environmental management system (EMS):

- HSEC policy;
- Negative impact mitigation planning;
- Positive impact enhancement planning;
- Implementation and operation;
- Checking and corrective action; and
- Management review.

## 8.2 Impact mitigation and management programmes

Overall, the socio-economic benefits of this project can be considered to outweigh the negative biophysical impacts and resource losses, given that Project commitments are to the highest standards of design, development and management.

The significant impacts at each project site (source areas, plant and new tailings facility sites, linear infrastructure) have been analysed in the ESIA and are listed against specific mitigation measures and project phases in Table 4.1 of the ESMP.

The majority of mitigation measures cannot be implemented as discrete, isolated actions, since there are spatial and causal interactions amongst impacts, therefore they must be implemented via integrated management programmes. While generally the programmes have been divided into construction and operational phase programmes, some of them start during construction and continue into operations, such as soil stripping and management, air quality and water management.

The management programmes, the principles of which are detailed in the ESMP, and which will have to be elaborated into detailed management programmes, including contract specifications, during the detailed design phase, are:

- Soil stripping and stockpiling management programme;
- Air quality management programme;
- Water management programme;
- Noise management programme;
- Blasting and explosives management plan;
- Conservation of natural habitats programme.
- Traffic Management programme
- Influx management strategy
- Artisanal mining Strategy

Nine specific management plans, detailed in the Annexures, will direct the implementation of mitigation and management measures for largely socio-economically related impacts. It is recommended that a tenth, a traffic management plan, be developed by FQM shortly.

### Annex A

- The combined Labour and Human Resources Plan, Workplace Health and Safety Plan and Community Health and Safety Plan describes how KMT will manage labour issues, will address all aspects of workplace health and safety and of community health and safety during the construction and operational phases of the project.

### Annex B

- The Framework Resettlement Action Plan (FRAP): KMT has managed economic displacement to date under the Land Acquisition and Compensation Plan (LACP) prepared for this purpose (see overview of the LACP in Annex B). Due to the expansion of the TSF it is deemed necessary to resettle the small village of Samukonga. This will be done in the framework of a Resettlement Action Plan (RAP). Negotiations underpinning the RAP are underway, and the

Samukonga community is supportive of the proposed resettlement. A preliminary census and inventory have undertaken, and will be refined shortly. A full work plan and timetable for the completion of the Samukonga RAP is included.

#### **Annex C**

- The Emergency Preparedness Plan outlines how KMT will undertake an Awareness and Preparedness for Emergencies at Local Level (APELL) type process to involve local agencies and the community in planning for possible emergencies related to mining activities.

#### **Annex D**

- Community Development Plan describes how KMT will establish a sustainable and locally appropriate framework and model for sustained and cooperative socio-economic development in Kolwezi and its surrounds, and illustrates how the Adastra and KMT community development policies and responsibilities will be put into practice throughout the life of the project.

#### **Annex E**

- The Rehabilitation and Closure Plan will ensure effective closure of the project in approximately 23 years once the operations are complete and outlines the Closure Management Strategy for Environmental and Social issues and also the rehabilitation plan for restoring the footprint of the mining project post-closure.

#### **Annex F**

- The Stakeholder Engagement Plan (SEP) guides and describes the public consultation and engagement process. It has two parts, the first guiding and describing ESIA and ESMP related engagement, and the second showing how KMT proposes to engage stakeholders during the life of the KMT project. In the context of the ESIA, stakeholders were informed of the proposed project activities prior to specialist studies being undertaken. After the draft ESIA was finalised they were informed how their issues have been addressed in the ESIA. The first version of the PCDP was drafted prior to the first set of public meetings in order to guide the public consultation process; it was then updated after these meetings in August 2004, and further updated following the completion of the draft ESIA in Dec 2005, and has been revised to reflect the April 2008 consultations undertaken in the context of the ESIA revision.

#### **Annex G**

- The Waste Management Plan outlines the principles of waste management (excluding tailings) which will be adopted, details the waste streams, methods of treatment and disposal, and associated management requirements.

#### **Annex H**

- The Influx Management Strategy (IMS) outlines KMT's contribution to the mitigation of negative impacts associated with uncontrolled influx. Influx management should be a collective responsibility of all new mining ventures in Kolwezi.

#### **Annex I**

- The artisanal mining strategy describes KMT's strategic options and commitments to address and manage the interface with artisanal miners on and around their concession.

Several of these plans will continue to be updated during the life of the project, notably the Rehabilitation and Closure, Emergency Preparedness and Response Plan, Community Development Plan and PCDP.

### **8.3 Organizational Structure and HSEC Management**

HSEC forms part of the core corporate management and administration structure, in recognition of its key functions in the company and in order to ensure that environmental and social concerns are integrated throughout company activities and line function divisions. The Resource Optimisation Manager will be responsible for ensuring that all HSEC requirements that have been identified in this ESIA and others that arise during project implementation are addressed in a systematic manner.

Key posts (Figure 4) under him/her will be established at the onset of project implementation, that is, once the go-ahead is given and detailed design and construction start. These key posts include the site Safety Superintendent, the HSEC superintendents and the Environmental Manager, who will ensure compliance with KMT environmental management plans and mitigation measures. The KMT Site & Community Liaison Manager will take particular responsibility for community liaison issues.

In the construction phase, the site Safety Superintendent, who will report to the Resource Optimisation Manager and the Engineering Services Contractor, will coordinate reporting. The HSEC superintendents will be responsible for managing contractors involved in construction activities that will impact communities. The Environmental Manager will ensure compliance with KMT environmental management plans and mitigation measures. The KMT Site & Community Liaison Manager will ensure that construction addresses or heeds social mitigation measures where appropriate.

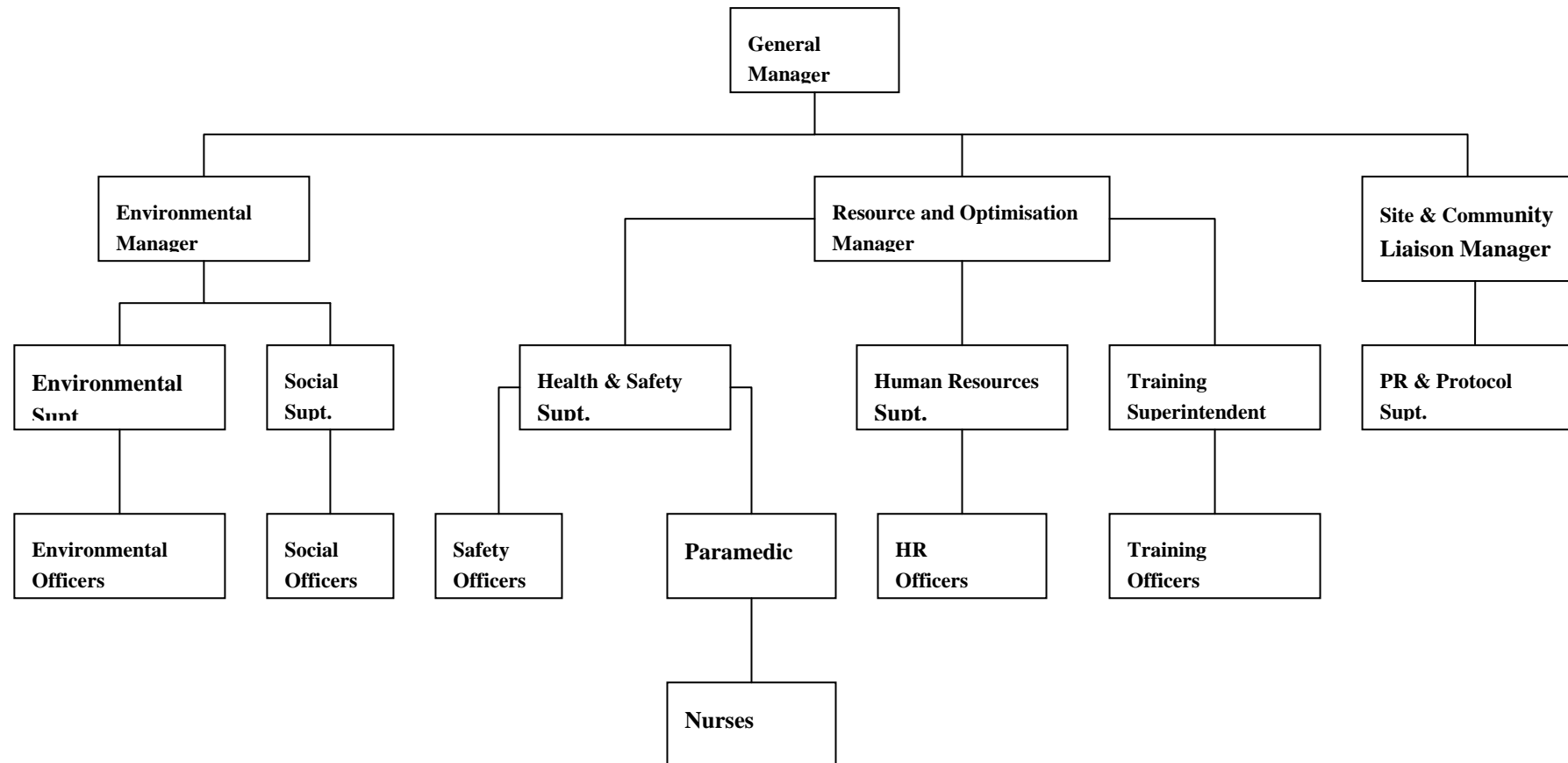
Meetings will be held quarterly and will have the purpose of reviewing progress in respect of the implementation of the various ESMP requirements.

### **8.4 Planning for Negative Impact Mitigation**

Significantly negative impacts of each project phase, construction through closure, and the management programmes and plans applicable to their mitigation are laid out in Tables 4.1 and 4.2 of the ESMP. A summary of this is given below Table 1.

### **8.5 Action Plan**

The ESMP action plan, estimated costs and schedule are presented in Table 2.



**Figure 1: HSEC Management Structure**

Table 1: **Summary of Areas, Aspects and Impacts (Impacts rated low and very low significance do not appear in this table)**

Aspect	Impact Ref.	Impact	Significance	Mitigation
<b>Kingamyambo Tailings Facility</b>				
Air Quality	A-1	Increase in nuisance and health risks to residents due to increase in ambient dust concentrations (PM10 and TSP)	Medium – Low	Air Quality Management Programme Annexure A: Community Health and Safety Plan Annexure E: Rehabilitation and Closure Plan
	A-3	Reduced Ambient Dust Concentrations	Medium – High Positive	
Surface Water	SW-1a	Pollution of downstream water courses	Medium – High/Medium – Low	Water Management Programme Annexure G: Waste Management Plan Annexure E: Rehabilitation and Closure Plan
Noise	N-1	Noise disturbance to local communities	Medium – Low	Annexure A: Community Health and Safety Plan Annexure A: Labour and Working Conditions Plan
Flora and Fauna	F-8	Re-establishment of natural habitats	Medium – Low Positive	Conservation of Natural Habitats Programme Water Management Programme Annexure E: Rehabilitation and Closure Plan
<b>Musonoi Tailings</b>				
Air Quality	A-1	Increase in nuisance and health risks to residents due to increase in ambient dust concentrations (PM10 and TSP)	Medium – Low	Air Quality Management Programme Annexure A: Community Health and Safety Plan Annexure C: Emergency Preparedness Plan
	A-3	Reduced Ambient Dust Concentrations	Medium – High Positive	
Surface water	SW-1a	Pollution of downstream water courses	Medium – High/ Medium Low	Water Management Programme Annexure G: Waste Management Plan Annexure E: Rehabilitation and Closure Plan
Noise	N-1	Noise disturbance to local communities	Medium – Low	Noise Management Programme Annexure A: Community Health and Safety Plan
Flora and Fauna	F-7	Destruction of vegetation swards in Musonoi tailings useful for rehabilitation (due to monitoring).	Medium – Low	Conservation of Natural Habitats Programme Annexure E: Rehabilitation and Closure Plan
	F-8	Re-establishment of natural habitats	Medium – Low Positive	
Archaeological and cultural	C-1	Loss of sites of archaeological or cultural importance such as graves and cemeteries.	Medium – Low	Cultural Resources Management Programme
	C-2	Offence to cultural practices of local communities	Medium – High	

Aspect	Impact Ref.	Impact	Significance	Mitigation
Plant				
Soils and land capability	S-1	Loss of productivity of soils due to sterilization	Medium – High	Soil Stripping and Management Programme Annexure E: Rehabilitation and Closure Plan
Air Quality	A-1	Increase in nuisance and health risks to residents due to increase in ambient dust concentrations (PM10 and TSP)	Medium – Low	Air Quality Management Programme Annexure A: Community Health and Safety Plan Annexure E: Rehabilitation and Closure Plan Annexure C: Emergency Preparedness Plan
	A-2	Health risk to local villagers over the long term due to increases in ambient gas concentrations (SO <sub>2</sub> , NOx and Volatile Organic Compounds)	Medium – Low	
Surface water	SW-1a	Pollution of downstream water courses	Medium – High/ Medium - Low	Water Management Programme Annexure G: Waste Management Plan Annexure E: Rehabilitation and Closure Plan Annexure C: Emergency Preparedness Plan
Ground water	GW-1a	Pollution of ground water resources	Medium High/Medium Low	Water Management Programme Annexure B: Land Acquisition and Compensation Plan
	GW-2	Lowering of groundwater table resulting in reduction in groundwater resources for local communities	Medium – Low	
Noise	N-1	Noise disturbance to local communities	Medium – Low	Noise Management Programme Annexure A: Community Health and Safety Plan
Flora and Fauna	F-1	Destruction, degradation or fragmentation of natural (terrestrial) habitats. Special note should e taken of the Miombo woodland and the cemetery site	Medium - High/ Medium – Low	Conservation of Natural Habitats Programme Annexure E: Rehabilitation and Closure Plan
	F-8	Re-establishment of natural habitats	Medium – Low Positive	
Archaeological and cultural	C-1	Loss of sites of archaeological or cultural importance such as graves and cemeteries	Medium – Low	Cultural Resources Management Programme
	C-2	Offence to cultural practices of local communities	Medium – High	
Tailings Disposal Facility				
Geology	G-2	Exposure of receptors to small quantities of radioactivity on the tailings dam site during construction//Potential litigation	Medium – Low	Precautionary radiometric survey Annexure A: Community Health and Safety Plan
Geophysics	GP-1	Tailings dam failure due to poor design and/or operational management	Medium – High/Medium - Low	Annexure C: Emergency Preparedness Plan



Aspect	Impact Ref.	Impact	Significance	Mitigation
Soils and land capability	S-1	Loss of productivity of soils due to land sterilisation	Medium – High	Soil Stripping and Management Programme Annexure E: Rehabilitation and Closure Plan
Surface water	SW-1a SW-1b SW-5	Pollution of downstream water courses Pollution of the Kanamwamwa R Impairment of aquatic habitats	Medium – High / Medium Low Medium High / Medium Low Medium – Low	Water Management Programme Annexure G: Waste Management Plan Annexure E: Rehabilitation and Closure Plan Annexure C: Emergency Preparedness Plan
Ground water	GW-1a GW-1b	Pollution of groundwater resources Pollution of groundwater in the vicinity of Kanamwamwa R	Medium – High / Medium Low High / Medium High	Water Management Programme Annexure E: Rehabilitation and Closure Plan
Flora and Fauna	F-1	Destruction, degradation or fragmentation of natural (terrestrial) habitats	Medium – High / Medium Low	Conservation of Natural Habitats Programme Annexure E: Rehabilitation and Closure Plan Water Management Programme
Archaeological and cultural	C-1	Loss of sites of archaeological or cultural importance such as graves and cemeteries.	Medium – Low	Cultural Resources Management Programme
	C-2	Offence to cultural practices of local communities	Medium – High	
Noise	N-1	Noise disturbance to local communities.	Medium – Low	Noise Management Programme Annexure A: Community Health and Safety Plan Annexure A: Labour and Working Conditions Plan
<b>Linear Infrastructure</b>				
Geology	G-1	Sterilisation of exploitable ore body – loss of mineable resource	Medium – High / Medium Low	
Soils and land capability	S-1	Loss of productivity of soils due to sterilization	Medium – High	Soils Stripping and Management Programme
Air quality	A-1	Increase in nuisance and health risks to residents due to increase in ambient dust concentrations (PM10 and TSP)	Medium – Low	Air Quality Management Programme Annexure A: Community Health and Safety Plan Annexure E: Rehabilitation and Closure Plan Annexure C: Emergency Preparedness Plan
Surface water	SW-1a	Pollution of downstream water courses	Medium – Low	Water Management Programme Annexure G: Waste Management Plan Annexure E: Rehabilitation and Closure Plan Annexure C: Emergency Preparedness Plan

Aspect	Impact Ref.	Impact	Significance	Mitigation
	SW-4	Pollution of surface water courses due to discharge of process water to the Luilu river.	Medium – Low	
Noise	N-1	Noise disturbance to local communities.	Medium – Low	Noise Management Programme Annexure A: Community Health and Safety Plan
Traffic	T 1	Change in traffic conditions on the surrounding road network due to construction traffic	Medium - Low	Road safety strategy, road rehabilitation. Construction of alternative route.  Annexure C: Emergency Response and Security Plan
	T2	Change in traffic conditions on the surrounding road network due to accumulated construction traffic	Medium- High/Medium-Low	
	T3	Impact of accumulated construction traffic on the existing condition of the road network likely to be used by the accumulated construction traffic.	Medium-high	
	T4	Impact of additional mine operations generated traffic construction traffic on existing road safety conditions for pedestrians and cyclists on identified roads	Medium – High	
	T5	Impact of additional mine operations generated traffic on existing traffic conditions ( road capacity and congestion) on the surrounding external road network	High-Medium Low	
Flora and Fauna	F-1	Destruction, degradation or fragmentation of natural (terrestrial) habitats	Medium – High / Medium Low	Conservation of Natural Habitats Programme Annexure E: Rehabilitation and Closure Plan
	F-8	Re-establishment of natural habitats	Medium – Low Positive	
<b>Socio-Economic General</b>				
Archaeological and cultural	C-1	Loss of sites of archaeological or cultural importance such as graves and cemeteries.	Medium – Low	Cultural Resources Management Programme
	C-2	Offence to cultural practices of local communities	Medium – High	
Macro-economic	ME-1	Increase in national Gross Domestic Product	High Positive	Cultural Resources Management Programme Corporate Communication and Information Programme Annexure A: Labour and Working Conditions Plan
	ME-2	Increase in Kolwezi District Gross Geographic Product	Very High Positive	
Socio-economic	SE-1	Secure jobs, incomes and social security for KMT employees. Benefits end with closure.	High Positive / Medium – Low	

Aspect	Impact Ref.	Impact	Significance	Mitigation
	SE-2	Increased disposable income among KMT employees and local multipliers. Benefits end with closure.	High Positive / Medium – High	Annexure A: Community Health and Safety Plan Annexure B: Framework Resettlement Action Plan Annexure D: Community Development Plan Annexure F: Stakeholder Engagement Plan
	SE-3	Local business opportunities arising from KMT procurement of goods and services. Benefits end with closure.	High Positive / Medium – High	
	SE-4	Construction of permanent and temporary housing and impacts on the building industry (suppliers and contractors)	Medium - Low Positive	
	SE-5	Increase in business confidence and attraction of investors.	Medium High Positive / Medium High	
	SE-6	Dividends to KMT shareholders. Dividends end with closure.	Medium High Positive / Medium High	
	SE-8	Increased involvement of and cooperation with traditional authorities and local government	Low Positive / Medium High Positive	
	SE-9	Loss of land, crops and associated livelihoods in project footprint areas	Medium High	
	SE-10	Loss of crops and associated livelihoods due to changing dambo and river water levels	Medium High	
	SE-11	Inconvenience and danger to proximate villages	Medium High	
	SE-12	Increased demand for privately and publicly provided social services	Medium Low Positive / Medium High Positive	
	SE-13	Increased risk of HIV / AIDS with influx of workers and opportunity seekers	Medium High / Medium Low	
	SE-14	Payment for services by KMT income earners, improving viability of providers. Loss of payment capacity post closure.	Medium High Positive / Medium Low	
	SE-15	Local improvements to road, power and other infrastructure by KMT	Medium High Positive	
	SE-16	Increased access to social facilities by salaried KMT employees. Loss of access post closure	Medium Low Positive / Medium Low	
	SE-17	Improved employee and community access to health care via KMT facilities. Loss of access post-closure	Medium Low Positive / Medium Low	
	SE-19	Income to government through payment of taxes by KMT and employees. Income ends with closure.	Medium High Positive / Medium High	

Aspect	Impact Ref.	Impact	Significance	Mitigation
	SE-20	Community capacity building through KMT social programmes	Medium High Positive	
	SE-21	Increased role for NGOs and CBOs through the KMT Community Development Plan	Medium High Positive	
	SE-22	Community social infrastructure improvement due to KMT social programmes	Low Positive	
	SE-24	Social division over limited jobs and perceived preferential access	Medium Low	
	SE-25	Social division over perceived preferential access to procurement	Medium Low	
	SE-26	Social division over perceived preferential access to the Social Fund	Medium Low	
	SE-28	Assistance to vulnerable groups through KMT social programmes	Medium Low – Positive	
	SE-29	Disruption of artisanal mining and associated activities in the Project Concession Area.	Medium Low	

**Table 2: ESMP Action Plan, Cost Estimate and Schedule**

Item no.	Budget	Description	Detailed Activities	Timing of Implementation	Estimate of Costs (US\$ 1000's) <sup>1</sup>	
				Date <sup>2</sup>	Provision	Recurrent
1	HR	<i>Health, Safety, Environment and Community (HSEC) Management Organisation:</i> Recruit staff and set up systems	<ul style="list-style-type: none"> <li>Populate HSEC structure for construction and operation</li> <li>Finalise job descriptions</li> <li>Complete staff recruitment</li> <li>Establish management systems</li> </ul>	April 2008 for construction Dec 2009 for operations	25	-
2	OPS	<i>Outstanding design and operational issues</i> Complete design and feasibility of: <ul style="list-style-type: none"> <li>Effluent discharge structures</li> <li>Solwezi-Kolwezi road (DRC section)</li> <li>River diversion</li> </ul>	<ul style="list-style-type: none"> <li>Carry out ESIA and ESMP for diversion channel</li> <li>Carry out ESIA and ESMP for the Kolwezi-Solwezi road (DRC section)</li> <li>Carry out ESIA and ESMP for effluent discharge structures</li> </ul>	Immediately; prior to construction where this has not fully commenced	600	-
2	ESMP	<i>Environmental and Social Monitoring and Reporting Programme:</i> Develop and integrate monitoring programme	<ul style="list-style-type: none"> <li>Develop monitoring protocols</li> <li>Establish monitoring systems</li> <li>Procure environmental monitoring equipment</li> <li>Agree format of monitoring report for disclosure with DPEM and lenders</li> <li>submit annual monitoring report to DPEM</li> </ul>	April 2008 for construction Dec 2009 for operations Report within 90 days of calendar year start.	30	8
3	ESMP	<i>Environmental Training Programme:</i> Train staff to ensure compliance with the ESMP	<ul style="list-style-type: none"> <li>Develop training materials and curricula</li> <li>Develop training schedule</li> </ul>	July 2008 for construction July 2009 for operations	15	8
4	ESMP	<i>Environmental &amp; Social Management Plan:</i> Finalise ESMP, refine programmes and set up systems	<i>Refine programmes and set up systems for:</i> <ul style="list-style-type: none"> <li>Soil Stripping and Stockpile Management Programme</li> <li>Air Quality Management Programme</li> </ul>	September 2008	70	10-

<sup>1</sup> Provisional estimate, to be reviewed and amended as necessary<sup>2</sup> Indicates start date

Item no.	Budget	Description	Detailed Activities	Timing of Implementation	Estimate of Costs (US\$ 1000's) <sup>1</sup>	
				Date <sup>2</sup>	Provision	Recurrent
			<ul style="list-style-type: none"> <li>Noise Management Programme</li> <li>Biodiversity and Natural Resource Management Programme</li> <li>Cultural Resources Management Programme</li> <li>Traffic management Programme</li> </ul>			
6	ESMP	<i>ESMP Revision 1</i> : Update ESMP based on 'as built' configuration and disclose publicly	<ul style="list-style-type: none"> <li>Update project information based on 'as built' configuration and disclose publicly</li> </ul>	June 2010	15	-
7	ESMP	HIV/Aids programme	<ul style="list-style-type: none"> <li>FQM has a programme around HIV/AIDS at its other operations and a similar programme will be set up in Kolwezi, starting in May 2008</li> </ul>	May 2008	25	-
8	ESMP	<i>Effluent Management</i> : Refine and expand effluent management programme	<ul style="list-style-type: none"> <li>Finalise water management programme and set up systems</li> <li>Develop Luilu River Management component,</li> <li>Include Lualaba river below confluence with Luilu in monitoring programme</li> <li>Develop joint approach with DPEM</li> <li>Finalise effluent management programme and set up systems</li> </ul>	Dec 2008	20	-
9	ESMP	<i>Tailings Management</i> : Refine tailings dam design and management from HSEC perspective, independent review of design and construction to include stability	<ul style="list-style-type: none"> <li>Agree TOR for design and operation review with DPEM and lending agencies</li> <li>Independent review of tailings dam design and operation</li> <li>Independent review of management plan for tailings dam</li> <li>Monitor HSEC management of tailings dam</li> </ul>	June 2008 for TOR September 2008 for review Monitoring at the beginning of tailings dam construction	40	

Item no.	Budget	Description	Detailed Activities	Timing of Implementation	Estimate of Costs (US\$ 1000's) <sup>1</sup>	
				Date <sup>2</sup>	Provision	Recurrent
11	ESMP	<i>Artisanal Mining</i> : Refine and coordinate contributions to the regional management of artisanal mining and the development of small scale enterprises	<ul style="list-style-type: none"> <li>Implement Artisanal Mining Strategy</li> </ul>	Begin implementation January 2008, disclose plan Jan 2009	5	20
12	ESMP	<i>Corporate Communication and Information Programme</i> : Develop and finalise CCIP	<ul style="list-style-type: none"> <li>Design and implement communication vehicles (newsletter, radio slots)</li> <li>Build capacity of Public Liaison Committee</li> </ul>	July 2008 for vehicles Capacity building PLC started Jan 2008	10	5
13	Regional	<p><i>Management of Cumulative Impacts</i>: Participate in regional cooperation for the management of cumulative impacts, led by DPEM, WBG and other agencies</p> <p>Regional co-operation will occur through the Katanga Extractive Industries Development initiative etc, where responsible mining companies look at capacity building etc with DFID and USAID etc. Detailed activity will be restricted to communities directly affected or adjacent to our concession.</p>	<ul style="list-style-type: none"> <li>Promote establishment of DPEM presence in Kolwezi</li> <li>Draft strategy and action plan</li> <li>Final action plan with co-funding</li> <li>Participate in greater Kolwezi land use planning</li> <li>Participate in greater Kolwezi planning and management of water quality impacts (surface and ground)</li> <li>Participate in monitoring of Lualaba River (water quality and biodiversity) and greater Kolwezi modelling of assimilative capacity</li> <li>Participate in greater Kolwezi modelling of noise, air and radioactivity</li> <li>Promote and participate in infrastructure cost-sharing opportunities</li> <li>Participate in regional malaria and HIV/AIDS awareness initiatives</li> <li>Participate in greater Kolwezi monitoring of radioactivity</li> </ul>	September 2008 for strategy and draft action plan March 2009 for agreed action plan with adequate resources (co-financing)	300	-

Item no.	Budget	Description	Detailed Activities	Timing of Implementation	Estimate of Costs (US\$ 1000's) <sup>1</sup>	
				Date <sup>2</sup>	Provision	Recurrent
14	LHRP	<i>Labour and Human Resources Plan</i> : Review and refine plan at the end of the construction phase	<ul style="list-style-type: none"> <li>Review and refine plan as necessary and disclose changes</li> </ul>	July 2009	HR budget	-
15	WHSP	<i>Workplace Health and Safety Plan</i> : Develop detailed plan	<ul style="list-style-type: none"> <li>Design and implement participatory workplace health and safety planning as described in the WHSP (Annex A)</li> </ul>	30 May 2008 for construction phase 30 June 2009 for operational phase	7	-
16	CHSP	<i>Community Health Safety and Security Plan</i> : Develop detailed plan	<ul style="list-style-type: none"> <li>Design and implement participatory community planning as described in the CHSSP (Annex A)</li> </ul>	May 2008 for construction phase March 2009 for operational phase	12	-
17	FRAP	<i>Framework Resettlement Action Plan (FRAP)</i> : Monitor, report on and revise as necessary	<ul style="list-style-type: none"> <li>Refine FRAP and procedures</li> <li>External evaluation of the FRAP at six-monthly intervals during construction and first two years of operation</li> </ul>	31 May 2008 for first review, 30 September 2008 first evaluation	5	7
18	EPRP	<i>Emergency Preparedness and Response Plan</i> : Develop detailed Emergency Preparedness and Response Plan	<ul style="list-style-type: none"> <li>Undertake participatory emergency preparedness planning according to APELL procedures (Annex C)</li> </ul>	June 2008 for construction phase June 2009 for operational phase	12	-
19	CDP	<i>Community Development Plan</i> : Establishment of management structures and processes	<ul style="list-style-type: none"> <li>Detailed consultation with stakeholders regarding the purpose and structure of the CDP</li> <li>Re-establish and sustain Public Liaison Committee which was re-established in January 2008</li> <li>Establish KMT Foundation</li> </ul>	31 December 2008 for stakeholder consultation for Foundation 30 June 2009 for Foundation Establishment	20  (20 million to be provided through the Social Fund)	-
20	RCP	<i>Rehabilitation and Closure Plan</i> : Review and refine plan at the end of the construction phase	<ul style="list-style-type: none"> <li>Refine plan as necessary and disclose changes</li> </ul>	October 2010 for trials and refinement of plan	25	-



Item no.	Budget	Description	Detailed Activities	Timing of Implementation	Estimate of Costs (US\$ 1000's) <sup>1</sup>	
				Date <sup>2</sup>	Provision	Recurrent
			<ul style="list-style-type: none"> <li>Investigate opportunities for rehabilitation of Musonoi river valley</li> </ul>			
21	SEP	<i>Stakeholder Engagement Plan (SEP)</i> : Develop and sustain participatory mechanisms	<ul style="list-style-type: none"> <li>Sustain Public Liaison Committee which was re-established in January 2008.</li> <li>Implement Corporate Communication and Information Programme (see CCIP above)</li> </ul>	May 2008 for full operation of PLC and CCIP	-	-
22	WMP	<i>Waste Management Plan</i> : Review and refine plan at the end of the construction phase	<ul style="list-style-type: none"> <li>Refine plan as necessary and disclose changes</li> </ul>	October 2008	10	-

## Figure 2: Regional Layout of KMT Concession Area

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**Figure 3: KMT Concession Area and Proposed infrastructure**

**Figure 4: Process Flow Diagram KMT Project**