MATUNDASI ASM DEVELOPMENT COMPANY LTD

BUSINESS PLAN
FOR
TRADING IN COPPER CONCENTRATES AND SHIPPING TO THE ZHAOYUAN CITY IN THE P. R. CHINA

SUBMITTED
FOR
BANK FINANCING

PREPARED BY:

PAULSAM GEO-ENGINEERING COMPANY LTD

17th Floor, Mwanga Tower, New Bagamoyo Rd, Makumbusho Area

P. O. Box 70812, Dar Es Salaam, Tanzania

Tel/Fax: +255 222 926017; Mob: +255-755 5611188/+255 758-074630

Web: www.paulsamgroup.co.tz; Email: chairman@paulsamgroup.co.tz ; ceo@paulsamgroup.co.tz

JANUARY 2024

EXECUTIVE SUMMARY

Introduction

Matundasi ASM Development Co. Ltd (MADC) was established in 2008 and is wholly owned by local Tanzanian shareholders as a company specialising in exploration, mining, trading and development of projects mostly gold, industrial minerals, coal and quarries. MADC Sister Companies of Kimani Exploration and Geotechnical Services Ltd (KEGS) and PaulSam Geo-engineering Company Ltd (PSG) have been supporting MADC by providing technical support, logistics and equipment to develop its mineral properties.

KEGS is a specialized contractor registered by the Tanzania Contractors Registration Board (CRB) in exploration and geotechnical drilling with a turnover of more than USD 1.0 million. Some of the major projects KEGS has undertaken include the geotechnical investigation of the Julius Nyerere Hydropower Project, a 2150 MW project constructed along the Rufiji River, as sub-contractor of JV Arab Contractors & Elsewedy Electric of Egypt. Other clients for KEGS include Barrick Gold Ltd, East African Crude Oil Pipeline Project (EACOP), Magnis Resources of Australia, Lahmeyer International of Germany and several others.

PSG is a professional Consulting Company in Mining registered by Engineers Registration Board of Tanzania (ERB) undertaking studies of mineral and fossil fuels exploration programs, mining engineering, environmental and social studies, due diligence studies and geo-technical engineering surveys with a turnover of more than USD 3.0 million. Among the key clients of PSG include EACOP, where social and resettlement services of the 1,150km pipeline from Chongoleani – Tanga to Hoima in Uganda, passing through 7 Regions and 21 Districts in Tanzania were successfully completed. Other local and international clients of PSG include Uranex Tanzania Ltd, OreCorp and Peak Resources, all being Listed Companies in the Perth Stock Exchange, Barrick Gold Tanzania Ltd and several others.

Brief Profile of Directors

Directors of MADC and its sister companies of KEGS and PSG are highly experienced professionals internationally Chaired by Eng. Dr. Samuel G. Mafwenga, former Director General of the National Environment Management Council (NEMC), Lecturer at the University of Dar es Salaam and Consulting Engineer with ERB. Other Directors include Eng. Paul S. Gongo, a consulting engineer with ERB and former University Lecturer, Eng. Benedict A. Mushingwe, a senior retired civil servant and Eng. Pili S. Kantinga, a Professional Mining Engineer with ERB. The companies are supported by non-executive Directors including Mr. Dunstan Mrutu, former Tanzania Private Sector Foundation (TPSF) Executive Secretary and renowned economist, Mr. Hebron Mwakalinga, a renowned private consultant in economics and marketing, and Advocate of the High Court Mr. Martin R. Mdoe, the Company Secretary for the three companies.

Strength of the group (MADC, KEGS and PSG) lies on the more than 20-year efficient delivery of professional services to our clients, with strong local networks to service the mining, energy and construction industry. With an in-house full time workforce of 150 and part-time workforce of more than 200, the group has established a wide network of diverse range of experts to undertake contracts and consultancies professionally to world standards.

Current MADC Activities

Having acquired a closed gold mining operation in 2008 at Matundasi ward, some 95 kms Northwest of Mbeya City at Chunya District, MADC rehabilitated the mine to make it operational. Encouraged by the high-grade ores

inside the mine and within the licenses, MADC mobilized funding to develop the mine and constructed a Vat leaching plant to process the milled ores and the small-scale miner's (SSM) tailings purchased within the Chunya District area. A total of 25.0 kgs of gold was produced during the three-year period of 2011-2013. These incomes facilitated the development of the infrastructure of the area such as workers camp, 3-phase powerline, water storage dam, drilling of water wells in the area and further exploration of the minerals in the granted Primary Mining Licenses (PML).

The existing gravity plant at Matundasi with a capacity of 60 t/day was designed to produce gold bullion only from the existing underground mine. However, the mined ores and samples from cores of the drilling campaign undertaken at Matundasi PMLs, was found to have other minerals associated with gold. Presence of secondary minerals such as Cu, Zn, Fe, Pb, Mn, Ni, etc., hinders effective recovery of gold while also consumes relatively greater quantities of reagents and chemicals resulting in costly operation. While laboratory tests indicated insignificant economic quantities of Zn, Fe, Pb, Mn and Ni, quantities of Ag and Cu can commercially be recovered in the process thereby, improving the economics of the entire project while lowering plant operating costs through the use flotation methods. Flotation reagents such as PAX, SIPX, Lime Powder, Pine Oil, and Carbonates are biodegradable, hence being environmentally friendlier as compared to the use of leaching methods that use Cyanide and other hazard chemicals.

A number of laboratory tests on the Matundasi and Mkwajuni ores and also on leached tailings from the SSM were carried out and positive results were obtained. These results motivated the management of MADC to embark into researching on the economic viability of expanding production operations to concentrate Au, Cu and Ag in addition to gold bullion produced by the gravity method. Concentrates of gold of 75g/t to 200g/t could be produced from ores grading 1.0-3.0 g/t, while Cu could be produced from 0.45% to more than 12% and Ag from 0.5g/t to more than 100g/t. This development alienates the recovery of gold only through the Carbon in Pulp (CIP) planned earlier to be constructed at Matundasi.

Markets for Concentrates of Au, Cu and Ag.

Market of these concentrates were conducted in the period of 1st August 2023 to 11th August 2023 and in the period of 10th – 22nd December 2023. The first market survey was with Zhaoyuan Hwatang Trading Company Limited (ZHTC) of 113 Block A, Wenquan Road, Zhaoyuan, Yantai, Shandong, R.P. China who trade as agents for the Shandong Guoda Gold Stock Company Ltd (SGGSC) of Yantai City who owns a smelter for Cu, Au and Ag. SGGSC do not engage on importation of concentrates and has assigned ZHTC to undertake the importation of concentrates into China on their behalf. The second market survey was undertaken in the period of 10th to 22nd December 2023 with Lingbao Gold Group Company Ltd of the City of Lingbao, Henan Province in the P. R. China. The purpose of the second market survey was to obtain sufficient assurance of the market of the MADC produced concentrates on instances where the earlier market at Shandong is constrained by any unforeseeable happenings.

A 5-year contract that can be extended to 10-years between ZHTC and MADC to trade on concentrate quantities of 540 metric tons per month was signed for concentrates with Au > 75 g/t, Cu > 5 % and Ag >100 %.

ROM for the Concentrate Production Plant

To have sufficient and reliable source of feed to the processing plant over 10-years of concentrates production to supply the Chinese market, MADC embarked on an intensive exploration program on its PMLs to define further resources. With a portfolio of 91 PMLs with an area of approx. 7.5 sq. km, only 3.3% of the license areas has been explored and drilled. This area has shown to have 24,000 ounces of gold down to 150m of depth and the reefs are still open ended downwards. The current on-going program is to drill in excess of 5,500m of cores on several identified targets to expand the resources at both Mkwajuni and Matundasi areas.

Concentrate Production Plant Design

A survey for the concentrate production equipment was undertaken and Henan Fote Heavy Machinery Co. Ltd (HFHM) of 168 St. Hi-Tech Zone of ZhengZhou, China was selected for the supply tender. Technical discussions between HFHM and MADC engineers led to the design of the process plant flowsheet for the 500 tpd (13,000 tpm) plant feed for monthly concentrate production of more than 540 tonnes. A contract agreement to supply plant machinery was signed between the two parties. Take note that potential of future expansion to produce 3,000 metric tons of concentrates per month from year 2030 is also on the pipeline to meet the needs of Lingbao Gold Smelter in Henan Province. This however, is subject to the on-going program of exploration drilling to define additional resources in the 91 MADC licenses.

Investment of the MADC Expansion

MADC has a book value of the investment as of 2022 of USD 4.1 million. However, the asset register added some more items raising the figure to USD 4.6 million. (NOTE at the time of preparing this feasibility a qualified valuer has been engaged to determine the most reliable current value of the assets). The Company investment comprises of land, developed and undeveloped mines, real estate for accommodation and office, water supply system, elution, ore processing plant, Vat leaching infrastructure, power lines and distribution, transport equipment, services centre and furniture and fittings. In its long-term plan (5-10 years) the Company will continue to invest in excess of USD 3.67 million.

The planned expansion will cost an estimated USD 2,205,000. This will cover concentrate production plant purchase, shipment, installation and commissioning (USD 700.000); construction of foundation for the plant (USD 180,000); New 1,800kW power substation (USD 425,000); construction of a Tailings Storage Facility (TSF) (USD 450,000) and working capital (USD 450,000). MADC is seeking for a loan of USD 1,305,000 to cover part of the investment above. MADC sister companies (PSG and KEGS) will also contribute to the funding of the expansion plan as indicated in the Table below:

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INVESTOR/SHAREHOLDER	VALUE OF INVESTMENT MADE		PROPOSED EXPANSION TRANSACTION		TOTAL INVESTMENT	
	Percent	Value	Percent	Value	Percent	Value
PaulSam Geo-engineering Co. Ltd (PSG)	30.0%	$1,366,017	50%	$450,000	26.9%	1,816,017
Kimani Exploration and Geotechnical services Ltd (KEGS)	30.0%	$1,366,017	50%	$450,000	26.9%	1,816,017
Shareholder's Contribution	40.0%	$1,821,356			26.9%	1,821,356
Requested Loan				$1,305,000	19.3%	1,305,000
TOTAL	**100%**	**4,553,390**	**100%**	**2,205,000**	**100%**	**$6,758,390**

The Loan and Servicing Plan

MADC has opted to seek for a loan to leverage its own funds to implement the expansion project due to its economic attractiveness as the financial and market analyses will testify. The loan of USD 1,305,000 is expected to be contracted at the following terms: -

- Currency – dollar denominated as it will directly be used to purchase, ship, install and commission the Concentrate Production plant;
- Interest applied in the analyses in 10% p.a. to be repaid on quarterly basis;
- Principal will attract a grace period of 1 year (12 months), thereafter repayments will be made quarterly;
- The loan will be liquidated in year 5;

Based on the projected profits and cashflows, the business will be able to service the loan without affecting the optimal level of operations. Important indicators on the MADC's ability to service, are presented in the Table below:

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	TOTAL
Opening loan balance	1,305,000	1,305,000	978,750	652,500	326,250	-	1,305,000
Interest charged	130,500	118,266	97,875	65,250	32,625	-	444,516
Interest paid	130,500	118,266	97,875	65,250	32,625	-	444,516
Principal repaid	-	326,250	326,250	326,250	326,250	-	1,305,000
Total loan servicing instalment	97,875	444,516	424,125	391,500	358,875	-	889,031
Closing balance	1,305,000	444,516	652,500	326,250	-	-	

Profitability Analysis

First, the investment in the flotation plant and allied facilities will be profitable right from the first year due to the fact that MADC has already stockpiled 14,000 metric tons of tailings grading 2.76 g/t from past VAT leaching operations. Secondly, the project will benefit from revenues from Copper and Silver that are usually not possible to extract under current extraction methods. The third reason is that there is high global demand for the targeted products - Au, Ag ad Cu in the world market hence the high prices, as noted over the past 10 years.

The profit in the first year of operations will be $ 5,403,851 (that is 29% of sales), the figure will decrease to and stabilize at $ 4,754,169 (about 26%) of the annual revenue from year 3 onwards. The higher profit in the 1st year after expansion is due to presence of stockpile of ROM that has cost slightly lower than ROM that will be mined after the expansion. It is noted that accumulated profits will reach $29,323,072 in year 6 as shown under Table 4.10 of the main report.

The Business KPIs from the projected balance sheets shows that Current ratio will be 21.89 (year 1) and 53.0 (year 3); Quick ratio of 17.70 (year 1) and 53.63 (year 3); Return on Assets of 45% (year 1) and 71% (year 3); Debt to Equity Ratio of 28% (year 1) and 14% (year 3). The MADC Net Worth will be $10,834,779 (year 1) and $21,538,161 (year 3) as shown under Table 4.11 of the main report.

Payback Period

MADC investment of USD 4,611,553 with an expansion project costing some USD 2,205,000, makes the total investment after expansion to amount to USD 6,816,553 million. The payback period with projected pre-tax profit is found to be covered in just 14 months as shown under Table 4.13 of the main report. This business is characterized by high revenue turnover rate for transaction cycle for most of the goods of one month.

The business also is characterized by high gross margin coupled with comparatively low fixed costs. The two factors interplay to lower the break-even sales to less than 30% of the capacity utilization. Note that capacity utilization in the first month is projected at 50%. The projected break-even sales is USD 5,621,248 that is equivalent to 29% of optimum sales. The USD 5,621,248 when converted into containers this is approximately 54 containers (Minimum of 1.8 kgs of Au for price of $1,800/oz without accounting for revenues of Cu and Ag). This is a production of approximately 4-5 months.

When the cash flows have been subjected to a discount rate of 10% (in USD currency) over a 6-year period of analysis, an NPV of USD 16,865,998 and an IRR of 75% is obtained. The IRR is far above many investment portfolios, blue chip companies at the Dar es Salaam Stock Exchange have their return on investment less than

20% for some years now. Other important business ratios are presented under Table 4.14, Table 4.15 and Table 4.16.

Conclusion:

Tanzania has prioritized mining as one of the main sources of economic growth through forex generation, employment and tax base expansion. The Government has put in place a number of positive policies and regulations to attract and sustain investment. MADC has seen this to be an opportunity to support Government initiatives towards this vision.

The project proponents of MADC have deep knowledge of mining activities in Tanzania and the world in particular where they have more than 20 years of experience as experts in mining, providing insights into any complexity towards development of the project. It has been established in Chapter 3 that globally there is strong demand for Gold, Copper and Silver that will be exported by MADC in form of concentrates. Moreover, Tanzania and China have very long-term cordial business relationship hence there are no trading challenges anticipated. Containers of concentrates will be hauled from Matundasi using contracted trucks to the port of Dar es Salaam for onward sea freighting to China. The terms of trade including minimum order size, prices, currency, delivery mode, payment arrangements and communication protocols have been discussed and agreed between MADC and the importer.

The flotation technology will produce concentrates with commercially attractive recovery rates for Au, Cu and Ag using non-toxic (organic) reagents including PAX, SIPX, Lime powder, Pine oil and Carbonate. Overall, this will reduce the cost of goods sold significantly. MADC has been closely involved in the design of the plant, the plant will be efficiently operated, serviced and maintained by local experts after the exit of the Chinese trainers and operators from the Chinese suppliers in June 2024

The analyses have indicated that everything being equal, the project is quite profitable just as other gold mining projects are performing in Tanzania. Due to a stockpile of 14,000 metric tons of ROM at Matundasi that suffices 3 months production of concentrates, the project will register profit outright after commissioning the plant. The annual net profit is around USD 4.7 million, assuming no withdrawals, the project will have accumulated a profit of USD 27.2 million at the end of year 6. The Net Present Value (from discounted cash flows) is USD 16.6million, that gives an IRR of 75%.

Potential risks of the MADC projects are those related with business environment, mining operational efficiency, policy, laws and regulations, markets and weather, which are mitigatable and considered already in the planning phase of the project.

The study has revealed compelling results that the projects is well positioned with Tanzania's Vision 2025 and Third 5 Year Development Plan. It has many benefits to the nation including generation of foreign exchange, creation of employment, development of local capacity to own and manage modern mining projects. The project is quite profitable comparable to industry standards and therefore is able to repay the loan without exerting serious cashflows stress. The conclusion is that MADC should earnestly pursue the project expansion.

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LIST OF ABBREVIATIONS

ADB	African Development Bank
Ag	Silver
ASM	Artisanal and Small Scale Miners
Au	Gold
BFIs	Banks and Financial Institutions
CDP	Carbo Disclosure Project
Cu	Copper
DJSI	Dow Jones Sustainability Indices
DRC	Democratic Republic of Congo
EACOP	East African Crude Oil Pipeline Project
ERB	Engineers Registration Board
ESG	Environment, Social and Governance
FTSE	Financial Times Foreign Exchange
GCLA	Government Chemist Laboratory Authority
GEI	Gender Equality Index
GHG	Green House Gases
GST	Geological Survey of Tanzania
HFHM	Henan Fote Heavy Machinery
IRR	Internal Rate of Return
KDC	Kasongoma Drilling Company
KEGS	Kimani Exploration and Geotechnical Services Ltd
KEGS	Kimani Exploration and Geotechnical Services Ltd
LTD	Limited
MADC	Matundasi ASM Development Company Ltd
NEMC	National Environment Management Council
NPV	Net Present Value
PAX	Potassium Amyl Xanthate
PLC	Public Liability Company
PML	Primary Mining License
PSG	PaulSam Geo-engineering Co. Ltd
RMI	Responsible Mining Index
ROM	Run of Mine
S&P	Standard and Poors
SDG	Sustainable Development Goals
SGGSC	Shandong Guoda Gold Stock Company Ltd
SIPX	Sodium Isopropyl Xanthate
SIUC	Southern Illinois University at Carbondale
SRBDP	Songwe River Basin Development Program
SSM	Small-scale miners
STAMICO	State Mining Corporation
TFS	Tailings Storage Facility
TPD	Tons per Day

TZS	Tanzania Shilling
TPM	Tons per Month
US	United States
USD	United States Dollar
VAT	Value Added Tax
ZHTC	Zhaoyuan Hwatang Trading company Limited

1 CHAPTER ONE: INTRODUCTION

1.1 The Purpose and Objectives of the Business Plan

The mining industry in Tanzania and indeed all over the world is quite dynamic. It is driven by many factors among which are emerging market opportunities especially demand for new industrial uses and/or new geographical markets, innovation in mining and processing technologies, pressure on production costs, hence the need to rein in costs, etc.

In response to the above factors, Matundasi ASM Development Company Limited (MADC) plans to expand its operations to expanded mining activities that includes improved milling capacities in both gravity and flotation circuits to crush a daily Run of Mine (ROM) of 500 tpd. This will ultimately increase Au, Ag and Cu recovery from both freshly mined ores and from the processed tailings materials from the small scale miners (SSM) in the area that has shown to have recoverable grades.

In this project, MADC is building on vast hands-on knowledge and experience in the industry and more specifically, in the experiences gained from existing small mine and gravity plant in the Matundasi area. Therefore, this study has the following major objectives: -

- To assess the technical feasibility of expanding production operations at Matundasi area of producing gold, copper and silver concentrates contained in the ROM materials at Matundasi and Mkwajuni licenses and from recoverable grades of the processed tailings from SSM in the Chunya District and neighbouring Districts for sale to overseas smelters in the Peoples Republic of China;

- To assess the economic and financial viability of the investment and operational costs against streams of generated revenues for sale of gold, copper and silver concentrates to smelters in China. A number of profitability ratios are assessed to cross-validate the reliability of the financial attractiveness.

A total investment cost of USD 2,205,000 (United States Dollars Two Million, Two Hundred and Five Thousand Only) over the existing mining infrastructure at Matundasi area, is to be invested in the production cycle of the concentrates through acquisition of modern mining and modern milling and flotation plant to produce concentrates of Gold, Copper and Silver. MADC will diversify its production portfolio, enhancing its sales volume and profit, improving business resilience against market shocks, harnessing synergies with existing investments and human resources to improve (lower) costs per output.

The impact of this investment is significant. It will increase gainful and decent employment to more than 200 workers for both direct and indirect employment when it achieves optimum level of operation in 2025. It is important to note that employees in mining activities in the area is currently made up of 75 youths, people who are between 18 and 35 years of age. Further, it is MADC policy to encourage women workers and currently women account for 15 % of the entire workforce at Matundasi. Tanzania will be able to increase its foreign exchange earnings, taxes and contribution to the local community through royalties and Corporate Social Responsibility (CSR) projects.

1.2 The Methodology for Carrying out the Business Plan

The preparation of this Business Plan and its presentation has followed the guidelines provided by the United Nations Industrial Development Organization (UNIDO)[1]. Main sources of information for the major Business Plan aspects analysed and triangulation are tabulated in **Error! Reference source not found.** below.

Table 1:1 : Major sources of information

SN	BUSINESS PLAN ASPECT	MAJOR SOURCE OF INFORMATION
1	Market opportunities and operations	▪ Site visits and survey of the concentrates market at the smelter owned by Shandong Guoda Gold Stock Co. Ltd in Zhaoyuan City in Shandong Province in the P. R. China in September 2023; ▪ Site visit and survey of the concentrate market at a smelter owned by Lingbao Gold Group Co. Ltd in Lingbao City, Henan Province in the P. R. China in December 2023
		▪ Industry trend data available with the Ministry of Minerals
		▪ Online market databases hosted by key research and trading firms including International Trade Centre/COMTRADE.
		▪ Central Bank of Tanzania export data
2	Market prices	▪ Knowledge from own MADC current operations with periodic sales of gold at the Chunya Gold Market in Tanzania.
		▪ Ministry of Minerals data
		▪ Primary data collection from Chunya Gold bullion market
		▪ Potential buyers of concentrates at Shandong Guoda Gold Stock Co. Ltd in Zhaoyuan City in Shandong Province in the P. R. China; ▪ Potential buyers of concentrates at Lingbao Gold Group Co. Ltd in Lingbao City, Henan Province in the P. R. China
3	Engineering and Technology	▪ Mining sites: Knowledge from own current operations in the areas and past surveys/documents;
		▪ Ore concentrates: Laboratory tests in Tanzania at Nesch Mintek Tanzania Ltd, Geological Survey of Tanzania (GST) and Yantai Renchao Trading Co. Ltd; No. 111 Wenquan Road, Zhaoyuan City, Yantai City in Shandong Province, P. R. China
		▪ Machinery type and specifications: From process flowsheet design and equipment selection of PaulSam Geo-engineering Co. Ltd Engineers in association with Henan Fote Heavy Equipment Manufacturing engineers of Zhengzhou, Henan Province in the P.R of China. ▪ Knowledge from similar designs and operations undertaken by PaulSam Geo-engineering Co. Ltd own current operations and past projects implemented.
		▪ Consultations of engineers from similar projects in Tanzania, particularly the Katavi Mining Co. Ltd in Katavi Region who are running a similar operation with what is planned for MADC.
4	Financial Analysis	▪ Knowledge from own current operations and engagements with experts;
		▪ Government laws and regulations on fiscal regimes in Tanzania and overseas;
		▪ Commercial banks on terms of financing;
5	Business Environment	▪ Bank of Tanzania in respect of the Export Support Credit Schemes;
		▪ Knowledge from own current operations
		▪ Government laws and regulations on export incentives;

[1] Behrens, W. Hawranek, P. M. 1995. *Manual for the Preparation of Industrial Feasibility Studies (Newly Revised and Expanded Edition).* UNIDO

A number of study elements had to be iterated several times to arrive at a working description. The iterations were done with regard to ROM and Concentrates sample testing and financial analysis where various scenarios were tested based on probability of variation during commercial operations.

1.3 Business Plan Development Team

A multi-discipline team had been established by MADC to prepare the bankable study to ensure all the necessary components of the expansion plan are adequately addressed. The team is comprised of:

a) Eng. Dr. Samuel G. Mafwenga, Project Design Expert – Lead Consultant & MADC Expert;
b) Mr. Dan Mrutu, an Independent Consultant (Economist) – Consultant;
c) Mr. Hebron Mwakalinga, an Independent Consultant (Marketing) - Consultant;
d) Eng. Barnabas Mollel, Mineral Process Design expert - Consultant;
e) Eng. Zhang Guowei of Henan Fote Heavy Machinery Process Design Expert – FTM Expert;
f) Ms. Sally Hu of Henan Fote Heavy Machinery Sales Officer – FTM Expert
g) Eng. Paul S. Gongo, Consulting Mine Planning Engineer – MADC Expert
h) Eng. Pili S. Kantinga, Professional Mining expert – MADC Expert.

When working on the study, they managed to consult several other experts iterating facts to minimize error chances.

1.4 The Investor

1.4.1 Matundasi ASM Development Co. Ltd. (MADC)

In 2008, PaulSam Geo-engineering Co. Ltd (PSG) shareholders established Matundasi ASM Development Co. Ltd (MADC) and immediately acquired a closed gold mining operation from the Ministry of Energy and Minerals (by then) located at Matundasi Village, some 95 kms Northwest of Mbeya City at Chunya District, Mbeya Region.

MADC is wholly owned by local Tanzanian shareholders as a company specialising in exploration and mining projects mostly gold, industrial minerals, coal and quarries. Sister companies of Kimani Exploration and Geotechnical Services Ltd (KEGS) and PaulSam Geo-engineering Company Ltd (PSG) have been supporting MADC by providing technical support, logistics and equipment to develop its mineral properties. KEGS is a specialized contractor Class I registered by the Tanzania Contractors Registration Board CRB) undertaking drilling contracts for mineral exploration and geotechnical studies of major infrastructural engineering projects. PSG is a professional Consulting Company in Mining undertaking studies of mineral and fossil fuels exploration works, mine planning and designs, environmental studies, feasibility studies and due diligence studies and geo-technical engineering surveys and analysis of soils and rocks characteristics for construction and engineering projects.

After acquiring the small gold mine at Matundasi, MADC rehabilitated the mine and was encouraged by the high-grade ores inside the mine and within the licenses. In an effort to mobilize funding to develop the project, in addition to support provided by KEGS and PSG, MADC constructed a Vat leaching plant in the period of 2012 to 2014 to process the small scale miner's tailings that were purchased and hauled to the Matundasi area. MADC managed to produce a total of 25.0 kgs of gold during the period, whose incomes facilitated the development of the infrastructure of the area such as workers camp, 3-phase powerline, water storage dam, drilling of water wells in the area and exploration of the minerals in the license areas. The resulting leached large stockpiles of tailings available in the area, when assayed indicated recoverable grades in the range of 1.5 – 3.0 g/t. These are some of the initial hanging fruits, which can be recovered by the new modern plant to be commissioned at Matundasi.

MADC has so far developed an underground mine and constructed several allied facilities and infrastructure in the area to start the production of gold, copper and silver concentrates for export to China. The gravity portion of

the new plant will allow MADC to produce free gold concentrates that can be smelted within the area to produce gold bullion for sale at the Chunya mineral market.

MADC has other mineral rights in the Mkwajuni area, Songwe District, which are being developed concurrently with the Matundasi Underground Gold mine. They are some 20 km away Southwest of the Matundasi Gold project. These 69 PMLs with a total area of 6.5 sq. km., hosts significant mineralized targets that were identified in the years 2015 to 2017 prospecting activities with some limited diamond core drilling of 540m having been completed in the same area. Thick mineralized reefs of 1.5 – 3.5 m that could be mined by open pit were discovered in the area with grades ranging from 0.5 g/t to 5.0 g/t. Gold ore mined from the Mkwajuni PMLs will be transported by trucks to the Matundasi site for production of gold, copper and silver concentrates.

1.4.2 The Profiles of MADC Company Directors

Eng. Dr. Samuel Gwamaka Mafwenga – Chairman and Founder

With a PhD from the University of Dar es Salaam, an MSc. in Mining Engineering from the Southern Illinois University at Carbondale (SIUC) in the USA, and a Bachelor of Mineral Sciences from the University of Zambia, Dr. Mafwenga is one of the founders of MADC. Dr. Mafwenga is a Former Director General of the National Environment Management Council (NEMC) of Tanzania, an environment management authority in Tanzania where he served for 5-years. He is also Chairman of five other private companies namely: PSG, an Engineering Consulting Company in Mining and other fossil fuels; KEGS, a specialized contractor in Exploration drilling technology and geo-technical investigation studies; APY-KEGS Energy Services Ltd, a company providing consulting and technical services in the Gas and Petroleum Industry; Kibungu Investment Ltd, a real estate and logistics Company and; Caste Medical and Health Services Ltd, a Medical and Health service provider in Tanzania.

Dr. Mafwenga has also worked as Lecturer at the University of Dar es Salaam for several years and is one of the founders of the Mining Engineering and Mineral Processing Engineering Degree programs at the University of Dar es Salaam. He is an expert in mine planning and design, Mineral Economics, and design of material transport and handling systems in mines. He is a registered consulting engineer with the Engineers Registration Board of Tanzania (ERB).

Prior to joining the University as a Lecturer, he worked with a number of companies ranging from exploration and mining projects in Tanzania, Zambia, Malawi, Uganda and DRC. Dr. Mafwenga has also served as member in several Boards including the Government Chemist Laboratory Authority (GCLA), Geological Survey of Tanzania (GST), College of Earth Sciences of the University of Dodoma, and others.

Among the notable projects overseen by Dr. Mafwenga prior to his appointment as Director General of NEMC, was the spearheading of the East African Crude Oil Pipeline Project (EACOP) from Hoima in Lake Albert in Uganda to Chongoleani in Tanga, Tanzania for the social and Resettlement Services component of the Project; Consultant of the CRDB Bank PLC investment funding for several mining projects worth USD 50 million; Consultant for Geotechnical Investigation and Laboratory Analysis for the Lower Songwe 170MW Hydro-electric Power Project for the Songwe River Basin Development Program (SRBDP), a Tanzania/Malawi joint project funded by the African Development Bank (ADB); Consultant for many environmental studies and geotechnical investigations of large infrastructural projects.

Eng. Paul Simbanane Gongo – Director and Founder

With a Master's degree in Engineering Management (Projects) from the University of Dar-es-Salaam, and a Bachelor of Mineral Sciences from the University of Zambia, Eng. Paul Gongo is one of the founders of MADC. Eng. Gongo is also a director of two other private companies namely:

- PaulSam Geo-engineering Co. Ltd, an Engineering Consulting Company in Mining and other fossil fuels;
- Kimani Exploration and Geotechnical Services Ltd (KEGS), a Class-I specialized contractor in Exploration drilling technology and geotechnical investigation studies;
- APY-KEGS Energy Services Ltd, a company providing consulting and technical services in the Gas and Petroleum Industry;

Eng. Gongo has also worked as Chief Laboratory Engineer and Lecturer at the University of Dar es Salaam for fourteen years (2003-2017) for the Mining Engineering and Mineral Processing Engineering Degree programs at the University of Dar es Salaam. He is an expert in Coal mining, Mine Ventilation and Underground Mining Methods. He is a registered consulting engineer by the ERB and also registered with NEMC as an Environmental Impact assessment and Environmental Audit expert.

Prior to joining the University, he worked with a number both public and private of companies dealing with mining and exploration projects. Among the major projects that he has participated as a Consultant includes the EACOP from Hoima in Lake Albert in Uganda to Chongoleani in Tanga, Tanzania for the social and Resettlement Services component of the Project; and overseeing the on-going social and Resettlement Services component of the Nyanzaga Gold project in Mwanza region. He has also worked with many other environmental impact assessment and environmental audits for many other notable projects including Ngualla Rare Earth project in Ngualla, Songwe Region.

Eng. Pili Seleman Kantinga – CEO of PaulSam Group of Companies

With BSc. In Mining Engineering (2010) from the University of Dar es Salam, Eng. Pili is an experienced professional mining engineer with over 14 years of experience in mines, quarries, exploration projects and management of complex projects. After graduation, she intensively got engaged with mine design works and database management activities for PaulSam Geo-engineering Co. Ltd, a consultancy firm with a focus in geological, geotechnical, mining and environmental works internationally, having carried out contracts in Tanzania, Uganda, DRC and Malawi. She spearheaded and supervised some of the large Greenfield exploration contract drilling projects in DRC, Zambia, Malawi and Tanzania as site supervisor and later rose to head all field operations as Manager.

Eng. Pili advanced her career through a number of short courses nationally and internationally on risk management and finance to equip her with tools that enhanced her capacity to head managerial positions. She managed to establish Kimani Minerals (Zambia) Limited as Country Manager for one year before heading to DRC to manage operations in Kolwezi DRC under Kasongoma Drilling Company (KDC), in Kolwezi and Likasi in Shaba Province where Kasese Copper Mine had its operations.

Through hard work, dedication and exemplary working capacity, it lead to her being promoted to assume the position of Deputy CEO for PaulSam Geo Engineering Co. Ltd, before being appointed the CEO of three companies

namely MADC, KEGS and PSG in 2018. She is a registered Professional Engineer with ERB and a renowned environmental consultant registered by NEMC.

Eng. Benedict Anthony Mushingwe - Director

Eng. Mushingwe is a registered Mining Engineer with Engineers Registration Board of Tanzania having graduated from the University of Zambia, School of Mines in 1986 with Bachelor of Mineral Sciences in Mining Engineering. He worked briefly with the State Mining Corporation (STAMICO), then joined the Ministry of Energy and Minerals as Mining Engineer. Eng. Mushingwe is a graduate of the Queen's University, in Canada where he graduated with a Master of Science in Engineering in 1995 and thereafter worked for Gold Corp. - a gold mining company based in Red Lake, North Canada for a period of 1 year. Eng. Mushingwe returned to Tanzania in 1997 and re-joined the Ministry of Energy and Minerals and served in various senior positions as public officer for over 30 years.

During the period with the Ministry of Energy and Minerals, Mr. Mushingwe, carried out a number of projects funded by international financial institutions and donor agencies. He served as Deputy Project Manager for the World Bank's Mineral Sector Development Technical Assistance Project and later, with financial assistance from the Nordic Fund in the last phase of the project. Eng. Mushingwe retired from the Public Service in December 2017.

Mr. Hebron Anania Mwakalinga

Hebron Anania Mwakalinga is an economist with a B.A. Arts (Economics) from the University of Dar es Salaam. After college he joined the Small Industries Development Organization (SIDO) responsible for project appraisal and IT. In 1995 he joined Business Care Services, then one of the leading Tanzanian management consulting firm as information management specialist for a 5-year, USAID funded, Tanzania Finance and Entrpise Development (TFED) project. Between 2000 and 2002 he worked as an IT Manager, Consultant Trainee and Project Manager. Within Business Care Services, from 2003 he focused on consulting services and management of projects. The projects included Business Information Services supporting agricultural marketing, Mtaji Fund that provided wholesale credit to micro-finance. The largest of the projects managed was a TZS 2 billion, IFAD-funded Rural Business Support Project that was contracted to Business Care Services by SIDO between 2010 - 2016. and covered the regions of Iringa and Njombe.

Apart from project management, Mr. Mwakalinga specialises in market studies, value chain analysis and business plan development. Among the business plans done include a business plan for a 50K litres dairy plant in Rungwe hired by Heifer Internationsl, Morizella Juice production and marketing hired by Insitutite of Traditional Medicine at Muhimbili, sunflower processing plants in Manyara and Singida hired by MEDA, etc. Market studies implemented include avocado, milk, cashewnuts, maize, rice, etc. Value chain analyses done includes horticulture, avocado, dairy, groundnuts, sunflower, soya, common beans, etc.

On business development supporr services Mr. Mwakalinga provides support to Guavey Tanzania Limited (a fertilizer production company) and GHEMS Africa Limited (a grain commodity trading company.

1.5 The Business Expansion Study

The Business Plan is aimed at determining the technical, financial and economic viability of the expansion of its mining and processing operations from the current plant feed of 60 tpd to 500 metric tpd after the expansion. This will result into producing 20 metric tons of concentrates per day (500 metric tons per month). Future expansion to produce 3,000 metric tons of concentrates per month from year 2025 is subject to defining sufficient gold resources in the MADC licenses, an activity which is in progress. This is done against the backdrop of confirmed order for Au, Cu and Ag from the Shandong Gouda Gold Stock Company Ltd in Shandong Province (>500 tpm) and Lingbao Gold Company Ltd of Lingbao City in the Henan Province (>2,000 tpm) both in the P. R. of China.

The study is also aimed to be submitted to financial institutions that MADC will approach to finance part of the expansion project. The report presentation has followed the requirements of a Bankable Study (BS). Adequate focus has been paid on financial and economic aspects as demanded by Banks and Financial Institutions (BFIs) as well as other prospective investors as reference document for extending support to the MADC project.

The study evaluates production and revenue streams from sale of gold bars (85% purity) and concentrates (Au @ 75.0 g/t, Cu @5% and Ag @100 g/t) against major cost outlays categorised as:

- Capital Costs (CAPEX) comprising mine specific investment costs, plant and machinery, custom duties, port charges and fees, preliminary expenses and how the costs are proposed to be funded;

- Operating Costs (OPEX) comprising mining and processing expenses, overheads, financial and capital charges.

Economic and commercial pointers (such as national and international inflation, exchange rate fluctuation, commodity markets, etc.) and other external factors that may affect the MADC project are also assessed.

Emerging from the financial and economic analyses, the study recommends Bank financing of the MADC project to achieve the envisaged benefits and high returns. Detailed technical and engineering aspects of the project are freely available on request from PSG as they form the basis of key assumptions of this report, recommended to be read together.

1.6 MADC Mining Areas

MADC holds 22 PMLs at Kungutas site as the field sub-head office and also as the main mining and gold processing area. The other key and prominent site is the Mkwajuni area with 69 PMLs making a total of 91 PMLs owned and managed by MADC. Mkwajuni PMLs are located some 20 kms from the Matundasi area. **Error! Reference source not found.** is a map showing the location of Matundasi project area in Chunya District, Mbeya Region.

Figure 1:1: Matundasi Mining Project Area in Tanzania

1.7.1 Matundasi Project Site Access and Weather

Matundasi is accessible from Mbeya via the Mbeya-Chunya-Makongolosi tarmac road about 95 km to Kunguta village outside Matundasi township. The climate at Chunya is generally classified as tropical with precipitation being highest from November to April with highest rainfall average of 778 mm in January and lowest of 3.99 mm in August. July is the coldest month with temperatures averaging 10°C while the hottest month is October reaching 28^0C. Most of the roads in Chunya District and particularly from Matundasi site to other mining sites are accessible throughout the year albeit the frequent heavy downpours in between December and February. The climate is generally not a major hindrance to mining and transportation activities are assumed prudential for operating period of 300 days as a full operation year.

At Matundasi area, is the main site where the new 500-tpd processing plant that will produce concentrates from the ROM will be located. At Matundasi area, an area of 180 Hectares covered by 22 PMLs will accommodate all infrastructure for the project that will include a processing plant, a Tailings Storage Facility (TFS), offices, engineering workshops, and an underground mine. The 22 PMLs have been partly explored to provide a resource of 24,000 ounces of gold to an indicated resource estimate level. Figure 2.2 provides the locations of the Mkwajuni mining site and the Matundasi mining site where the source of the ROM will be obtained.

Figure 1:2: Locations of the MADC Licenses and Their Proximity

2 CHAPTER TWO: TECHNICAL FEASIBILITY OF THE EXPANSION PROJECT

Usually, the engineering and technology feasibility analysis of this project is the second most important aspect after the market analysis. The mining technical analysis, looks at mineral rights (PMLs) under which gold deposits have been hosted. It provides an analysis of the resources (contents of gold, copper and silver) for economic exploitation against costs being spent on machineries for production of concentrates, transportation and maintenance activities.

2.1 THE CURRENT MADC PRODUCTION STATUS

The existing gravity plant at Matundasi has a capacity of 3 t/hr or 60 t/day. The gravity plant is for gold recovery only and other minerals such as Cu, Zn, Fe, Pb, Mn, Ni, etc., apart from hindering effective recovery of gold, they also cause higher consumption of chemicals in the process hence costly and they are left to report to the tailings (wasted). While laboratory tests indicated insignificant economic quantities of Zn, Fe, Pb, Mn and Ni, quantities of Ag and Cu are significant and constitute economic secondary minerals if efficiently recovered in the process.

The low recoveries of gold in the existing gravity process and other leaching methods, worsened by the higher costs of running the production unit, prompted MADC to carry out a series of laboratory tests to solve this challenge. It became apparent that floating Au, Cu, and Ag is technically feasible and can potentially lower costs of production for MADC. This demands a change in the process flowsheet for MADC that could provide the following major impacts:

a) Reduce plant operating costs caused by the high consumption of Cyanide and other chemicals due to the presence of copper and other secondary minerals in the ores;

b) Improve economics of the mine by including silver and copper into the sales of the entire product as secondary products;

c) Will have an environmentally friendly process that uses biodegradable chemicals such as PAX, SIPX, Lime Powder, Pine Oil, and Carbonates instead of Cyanide and other strong acids in the process, avoiding another major costly undertaking of construction and management of the Tailings Storage Facility (TFS);

d) Will lower the mine cut-off grade to less than 0.5g/t from the existing 1.5g/t, if flotation flowsheet is used thereby, increasing resources at the Mkwajuni and Matundasi prospects and hence lengthening the life of the mine.

2.2 Concentrates Production Through Laboratory Flotation Test Works

The several laboratory tests have been carried out for the Matundasi and Mkwajuni ores and also for leached tailings from the small-scale miners in Chunya District area. All have been very positive and attractive as shown under Table 2.1 below. Raw materials were collected at Matundasi mine for metal content determination and flotation tests. Equal amounts of samples were collected from different piles and blended to get one bulk of the mixture of samples ready for assay and flotation test.

A bulk of sample was divided to produce 10 working samples with codes from MADCL 0001 MADCL 0002, MADCL 0003, MADCL 0004, MADCL 0005, MADCL 0006, MADCL 0007, MADCL 0008, MADCL 0009 to MADCL 0010 as shown below

1. Sampling and submission
2. • Sample receving nd loggging
3. • Sample preparation (drying at 105°C and communition)
4. • Sample mixing and division (Conning and Quartering)
5. • Sample codding
6. • Sample weighing
7. • Ashing, digestion and filtration (600°C ashing and, 250°C Disolution)
8. • AAS finish
9. • Results verification and reporting
10. • Dispatching of the Results

Figure 2:1 Preparation and Methodologies Applied During Sample Tests and Analysis

Table 2:1: Results of the Raw Samples for Au and Cu Concentration by Flotation

	Raw data		Concentrate Raw data		Tails data	
Sample ID	Au (ppm)	Cu (%)	Au (ppm)	Cu (%)	Au (ppm)	Cu (%)
MADCL 0001	3.77	0.49	97.33	9.89	0.98	0.07
MADCL 0002	3.90	0.45	100.43	11.38	1.07	0.06
MADCL 0003	4.11	0.49	100.02	12.12	0.88	0.08
MADCL 0004	4.66	0.51	92.61	8.77	0.68	0.07
MADCL 0005	3.33	0.44	91.34	9.08	0.99	0.07
MADCL 0006	3.65	0.55	91.27	6.65	0.70	0.09
MADCL 0007	4.00	0.44	98.54	7.85	1.08	0.10
MADCL 0008	3.47	0.44	99.04	9.07	0.79	0.11
MADCL 0009	3.98	0.41	89.58	10.18	0.96	0.08
MADCL 0010	4.08	0.45	100.30	8.55	0.74	0.09

The results (shown in Table 2*:1*) motivated the management of MADC to embark into researching on the economic viability of producing Au, Cu and Ag concentrates as against the existing production of the gold bullion (containing Au, Cu, Ag and other metals) that need to go through elution to raise the Au percentage. Simulation of costings based on laboratory test results obtained, provided the following important results:

2.2.1 Maintain Constant Production of 10 metric tons of Concentrates per Day.

Assuming unchanged Mineralogy, Ore characteristics and Flotation Conditions, if we are to maintain constant production of 10-tonnes concentrates grading 75g/t, the following cost curves shown under Figure 2.2 (a) were developed for the Matundasi Operations.

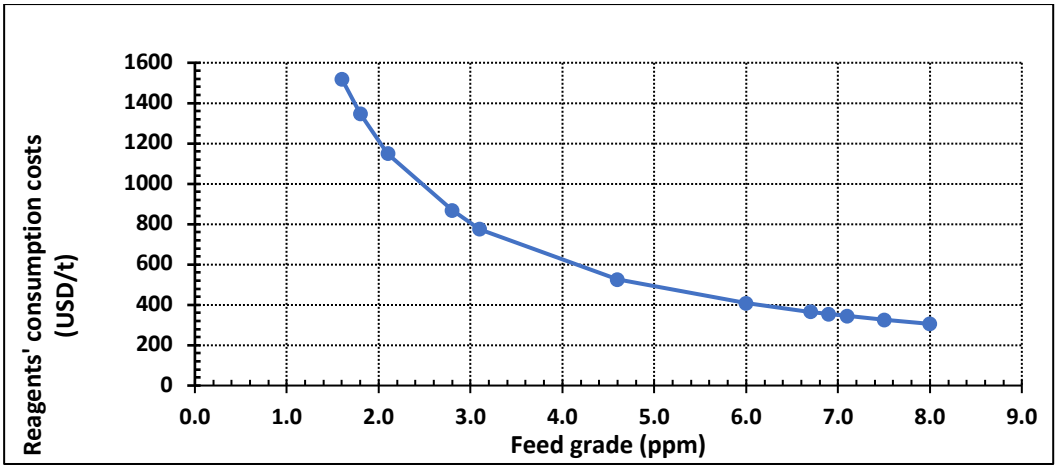

***Figure 2:2(a)**: Reagents Costs for Production of 10-tpd of Concentrates for Varying Ore Grades.*

A cut-off graded of 1.5 g/t will provide a cost of production of $1,500 per tonne of concentrates to produce daily production of 10-tonnes on chemical reagents only. The cost of power, labor and others when added, will raise this amount further up.

2.2.2 Maintain Constant Feed of 500 tpd with Variable Production of Concentrates for Au grades of 75 g/t .

When a cut-off grade of 0.5 g/t is to be considered and variable tonnages of concentrate production is undertaken, the following cost curve is developed as shown under Figure 2.3. Reagents consumption for grades of 0.5g/t and lower will attract prohibitive operating costs during flotation in excess of $18,000 per tonne of concentrates produced of 75g/t.

These curves will be used to ensure efficient blending of the ROM during feeding of the processing plant to ensure costs of reagents are minimized.

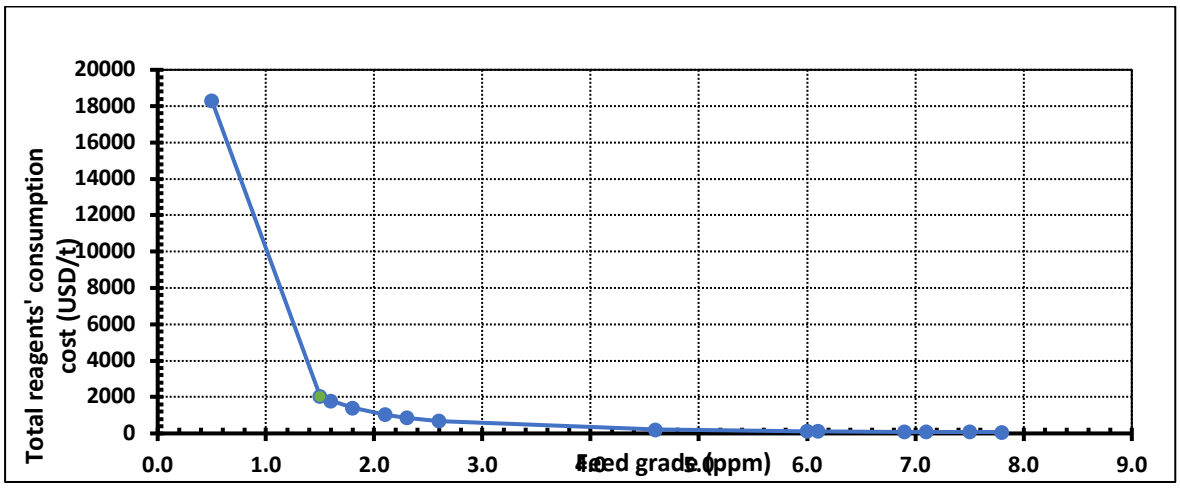

***Figure 2:3**: Reagents Costs for Feeding 500 tpd of ROM for Concentrates Production for Varying Ore Grades.*

2.3 Status of Geological Exploration Works at Matundasi and Mkwajuni Sites

At Matundasi site, MADC mining activities are guided by seventeen boreholes that were drilled to depths ranging between 70 m to 150 m dipping between 45^0 and 60^0. Drilling results at Matundasi site proved to have an average grade of mineralization of 12 grams/ metric ton and in some intersections above 20 grams/ metric ton for an average rock density of the sulphide reef of 2.6 tons/cum. Resources of 24,000 ounces of gold prompted MADC to commence developing an underground mine that has been feeding the gravity plant at the site with a capacity to mill 60-metric tons per day. Challenges of low gold recovery has been providing MADC with poor production targets over the past few years due to presence of high levels of copper and silver, metals which currently are not being commercially recovered. This prompted MADC to conduct a series of laboratory tests and analyses to obtain a recovery method that provide a profitable undertaking. Production of concentrates of gold, copper and silver by the use of froth flotation method was identified to be the best option.

However, to be able to produce concentrates of Au, Cu, and Ag, three major challenges were to be solved to make the entire project workable and become viable;

a) Market of the concentrates for Au, Cu, and Ag need to be searched because a smelter to produce final products of Au, Cu and Ag is not available locally. It has to be shipped and sold to overseas smelters;

b) Sufficient and reliable source of feed material to the processing plant over a period of more than 10-years that will produce concentrates of Au, Cu and Ag continuously need to be made available.

c) A new modern plant needs to be designed, manufactured, procured and commissioned at Matundasi area to produce the desired concentrates.

The first issue of the market challenge has been already overcome after conducting the two market surveys in China as explained under section 2.3 above. The second and third aspects are dealt with also as follows:

2.4 Potential Sources of Feed Material to the Processing Plant to Produce Concentrates of Au, Cu and Ag.

2.4.1 Mkwajuni Source of Fresh Ore

Exploration works undertaken at Mkwajuni Mineral Right in the period of 2015 to 2017 managed to identify 3 initial potential anomalous targets in the area. These are named target 1, target 2 and Target 3 and have been shown in Figure 2.2. These were followed by two programs of field mapping using Induced Polarization (IP) and later diamond core drilling which commenced on 23rd March 2017 totalling 547.7 of core meters, all being in target 2.

The best mineralization within Mkwajuni prospect is recorded in hole no. MKDD001, which assayed 0.82g/t @ 2.15m including 5.01g/t @ 0.30m width. This high-grade gold value of 5.01g/t is hosted in the lower part of the white quartz vein with mafic xenoliths. Some of the drilled holes were characterized with wide and weak mineralization envelopes up to 0.13g/t @ 11.40m. This suggested the possibility of a vein type deposit of low to medium grade which can be potentially mineable by surface mining methods. A total of 10 diamond holes (895m) were recommended for follow up of significant targets, which is the current program in progress, having commenced on September 2023.

Mkwajuni Prospect is the primary source of ROM for the planned expansion of sourcing a total of 500 tpd of feed for the concentrate production project in addition to the existing 22 PMLs at Matundasi area, which is being explored as well. Satellite open pits are planned to be developed at the three potential targets of Mkwajuni to produce ROM in excess of 500 tpd. The three targets where open pits are to be developed are shown under Figure 2.3.

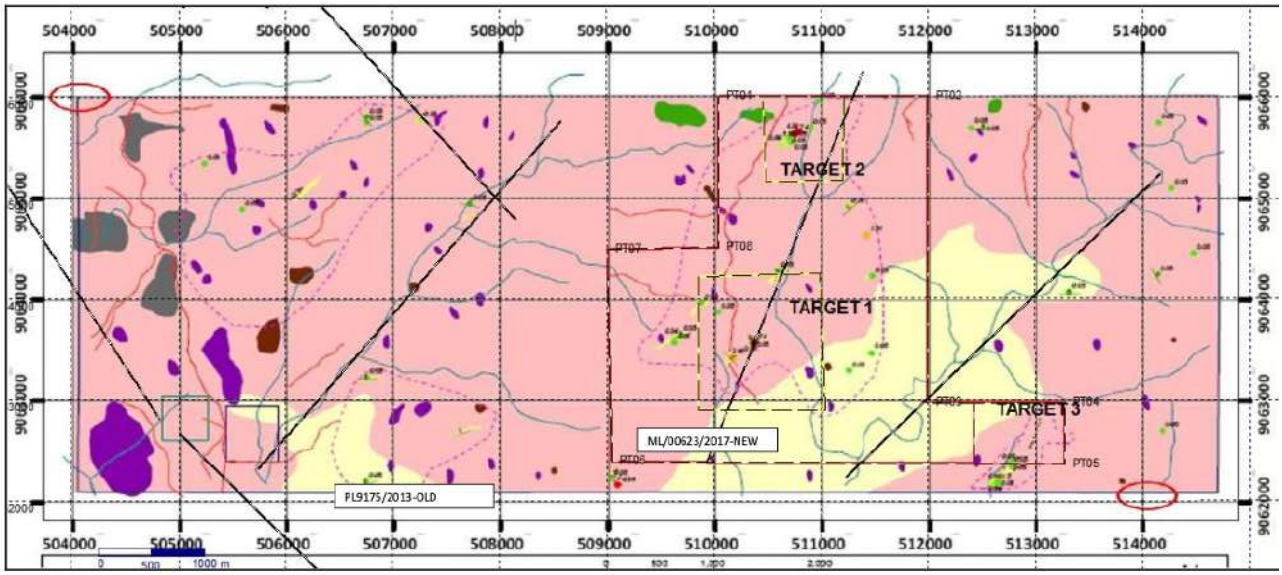

Figure 2:4: Geological Map of the Mkwajuni Mineral Right

However, mining and transporting ore from Mkwajuni, some 20km from Matundasi site, will require investment in mining and transporting equipment. A minimum of these, which may be required include the following: -

a) Two sets of Excavators, preferably type CAT320DL with bucket capacity of 2.5 cum;
b) Two sets of bulldozers with ripper, type CATD6H or CATD8H;
c) Two sets of wheel loaders type CAT950 or similar;
d) A fleet of 3 units of 20 tonne trucks, preferable Chinese Howo or Shacman models for ore and waste removal;
e) 6 Units of 30-tonne trucks for ore transport from Mkwajuni to Matundasi area for concentrates production;
f) Two units of blasthole drilling rigs with relevant accessories;

To reduce the burden of initial capital of acquiring these equipment, transport of ore from Mkwajuni area to Matundasi can be contracted to an experienced independent transporter, preferably KEGS, who already owns some of these equipment, while others can be hired.

2.4.2 Matundasi Source of Fresh Ore

Currently, the Matundasi mining site operates an underground mine with a capacity to hoist 100 tonnes per day of ROM. To increase capacity to produce in excess of 500 tpd, significant development of the mine needs to be undertaken, that will include sinking several additional shafts in the area to open up more areas for ore extraction.

The existing underground mine infrastructure is geared to develop two inclines (outlets) from the -80 m level to the surface. This is a distance of some 200 m from the existing operating shaft along the strike of mineralization on both the Southwestern portion of the mine and the north-eastern side of the mine. This will provide additional capacity of producing 200 metric tons per day to provide a total of 300 tpd. This however, will attract significant

investment of mining equipment and machinery (drills, ventilation fans, monorope systems, submersible pumps, hoisting systems, etc.). This development is planned to take approximately 12 months to be completed.

While development for expansion of the underground mine is being undertaken, ore extraction of the 100 tpd ROM from this mine will continue to feed the existing gravity plant. This gravity plant produces milled products for recovery of coarse gold only by the Knelson concentrator, while the rest of the un-cycloned materials will be stockpiled for feeding the more efficient new plant for production of concentrates of Au, Cu, and Ag. Alternatively, stockpiles of fresh ROM from the underground mine in excess of 500 tpd could be fed directly to the new plant for recovery of both gold concentrates for production of gold bullion and concentrates of Au, Cu and Ag for export to overseas smelter.

2.4.3 Available Vat Leached Tailings at Matundasi Site

To mitigate instances of delay in the constant supply of fresh ores for the new plant, use of the available stock of Vat leached tailings of about 14,000 tonnes is available at the Matundasi site. This feed is already crushed and milled but not cycloned to separate the -74 microns (undersize) from the +74 microns size fraction (oversize). The +74 micron sized tailings will be milled again to liberate the contained minerals (Au, Cu and Ag) and processed to produce Au, Cu and Ag concentrates for sale.

2.4.4 Purchased Tailings from the SSM Leached Materials

Currently, there are more than 100 VAT leaching plants in Chunya and Songwe Districts which are within a radius of 50 km from the Matundasi site. Laboratory tests from some selected VAT plants showed some leached tailings to contain grades in excess of 0.5 g/t, which are not economically viable to leach by VAT plants. Other low grade Tailings owners having these tailings do not have capacity to recover gold in them.

MADC wish to take the opportunity using the new modern and efficient concentrate production plant to mill and produce concentrates of Au, Cu and Ag by allowing owners to process their tailings at our Matundasi site after entering into an agreement to meet operating costs of producing concentrates. They will then be getting paid a portion of the final selling price less operational costs of processing the tailings. A concept to process Vat leached tailings or low-grade tailings from SSM/clients will be as follows:

a) Take samples of tailings from clients and carry out assays of Au, Cu, and Ag to determine contents. To be strategic, only materials in excess of 1,000 metric tons to provide a two-day production would be considered as minimum to allow for plant stabilization in the process of producing concentrates;

b) Work out operating costs of processing these tailings to check if the recovered concentrates can pay for the costs of power, reagents, labour and others and be able to produce a margin of profit guided by the graphs presented under Figure 2.2(a) and Figure 2.2(b)

c) Enter into an agreement with the owner/client to process the materials to produce concentrates, with MADC recovering operational costs and retain 30% of the gold contained in the concentrates;

To make this scheme workable, MADC will provide space for the SSM/client to stock their transported tailings at Matundasi site for processing. To have a smooth understanding between the two parties, samples of produced concentrates will be sent GST Laboratory in Dodoma to determine contents of Au to allow for payment of the 70% to the owner/client through Client's Bank account after recovering MADC operational costs.

The tests for few samples of the VAT leached tailings collected in the area indicated grades ranging from 0.37 to 0.9 g/t as shown under 2.3 supported with Laboratory assay report.

Table 2:2. Laboratory Report of Samples Collected from VAT Leaching Plants in Chunya District

S/N	Sample IDs	Sample descriptions(owner &location)	Au (ppm)	Cu (ppm)
1	MADC-1B	NDETE-IYAMBA (MWAKWIMBA)	**0.90**	**164.52**
2	MADC-2B	PAULO (SAZA)	**0.30**	**139.07**
3	MADC-3B	SIFAEL (SAZA)	**0.30**	**42.21**
4	MADC-4B	SAMONGE (SAZA)	**0.37**	**29.62**
5	MADC-5B	KAMSUMALI(SAZA)	**0.77**	**1135.78**
6	MADC-6B	ADOLFU(MAKONGOLOSI)	**0.37**	**142.69**
7	MADC-7B	RAMADHANI (SAZA)	**0.57**	**74.76**


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Flotation tests from various samples at Matundasi indicated the lowest grades to be leached to be 0.5 g/t. This means for samples above 0.5 g/t can make another source of feed material to the new 500 tpd plant from these Vat plants through direct feed or as blending materials for high grade ores.

2.5 Estimates of Gold Content in the Available Tailing Stocks at Matundasi

MADC has stockpiled more than 14,000 tonnes of leached tailings at the Matundasi site. Sampling undertaken for a total of 5 composite samples from different piles provided the following results of sieve tests and gold content shown in Table 2.3 below;

Table 2:3. Lab Results of Samples from Vat Leached Tailings at Matundasi Si

SAMPLE P1				
Sieve size in (µm)	Percent (%)	Gold (ppm)	% Recovery	Weighted Av. Grade
630	26.769	2.16	13.40%	13.32
-230	11.754			
-100	7.508			
-100	10.585	3.6	22.40%	8.54
-74	16.431	2.88	17.90%	8.47
-31	6.338	3.6	22.40%	5.11
- 75 + Pan	20.615	3.84	23.90%	18.92
TOTAL	100	16.08	100.00%	54.36
Average Grade of Sample P1				2.87

SAMPLE P2				
Sieve size in (µm)	Percent (%)	Gold (ppm)	% Recovery	Weighted Av. Grade
630	17.075	1.44	13.00%	13.32
-230	11.896			
-100	9.027			
-100	12.806	3.6	32.60%	8.54
-94	20.294	1.68	15.20%	8.47
-31	8.258	1.68	15.20%	5.11
- 75 + Pan	20.644	2.64	23.90%	18.92
TOTAL	100	11.04	100.00%	54.36
Average Grade of Sample P2				2.03

SAMPLE P4				
Sieve size in (µm)	Percent (%)	Gold (ppm)	% Recovery	Weighted Av. Grade
630	19.301	1.44	11.50%	13.32
-230	10.852			
-100	8.3758			
-100	13.328	2.16	17.30%	8.54
-94	24.326	1.92	15.40%	8.47
-31	6.628	1.68	13.50%	5.11
- 75 + Pan	17.188	5.28	42.30%	18.92
TOTAL	100	12.48	100.00%	54.36
Average Grade of Sample P4				2.33

SAMPLE P3				
Sieve size in (µm)	Percent (%)	Gold (ppm)	% Recovery	Weighted Av. Grade
630	19.765	1.68	13.00%	13.32
-230	11.882			
-100	8.588			
-100	13.588	1.92	14.80%	8.54
-94	20.824	2.64	20.40%	8.47
-31	7.529	2.4	18.50%	5.11
- 75 + Pan	17.824	4.32	33.30%	18.92
TOTAL	100	12.96	100.00%	54.36
Average Grade of Sample P3				2.44

SAMPLE P5				
Sieve size in (µm)	Percent (%)	Gold (ppm)	% Recovery	Weighted Av. Grade
630	25.858	1.44	7.10%	13.32
-230	11.253			
-100	8.3798			
-100	13.647	5.52	27.40%	8.54
-94	26.816	8.88	44.00%	8.47
-31	11.492	1.92	9.50%	5.11
- 75 + Pan	2.554	2.4	11.90%	18.92
TOTAL	100	20.16	100.00%	54.36
Average Grade of Sample P5				4.07

P1	P2	P3	P4	P5
2.87	2.03	2.44	2.33	4.07
Average gold grade in Tailings				2.748

The calculation of average grade per sample is a weighted average. This then provides an average grade for the 14,000 tonnes of tailings to be 2.748 g/t. Overall, when cumulative total is undertaken, the following results for the 14,000 tonnes of tailings available at Matundasi is obtained: -

Table 2:4: Summary of Results of the Leached VAT Tailings at Matundasi Site

Sieve size in [µm]	P1	P2	P3	P4	P5	Average	% cum. Pass
630	13.4%	13.0%	13.0%	11.5%	7.1%	11.6%	11.6%
-630 + 400							
-400 + 300							
-300 + 200	22.4%	32.6%	14.8%	17.3%	27.4%	22.9%	34.5%
-200 + 106	17.9%	15.2%	20.4%	15.4%	44.0%	22.6%	57.1%
- 106 + 75	22.4%	15.2%	18.5%	13.5%	9.5%	15.8%	72.9%
- 75 + Pan	23.9%	23.9%	33.3%	42.3%	11.9%	27.1%	100.0%
Total	100%	100%	100%	100%	100%	100%	100%

It is concluded that 72.9% of the gold in the existing tailings are above +75 microns, which is good news because once they are re-grinded to the level of -75 microns, for the 14,000 tonnes available at Matundasi, 2.748 g/t could be recovered from these tailings.

- Assuming that processing recoveries will be 80%, then amount of gold to be recovered will be 80% x 14,000 tonnes x 2.748 = 30,777.6 kg.

- For the price of TZS140 million per Kg (as of September 2023), then approximately TZS 4.3089 billion or USD 1.724 million (Exch. rate of TZS 2,500/USD) will be realized as revenues from the existing piles of tailings available.

- For this stock of feed material at Matundasi, a total of US$ 1,723,546 will be realized for a production of (14,000 tonnes/500 tpd)/ 50% availability) = 56 days or approximately two months of production at Matundasi.

- **These revenues have not taken into account the values of Cu and Ag that will form a portion of the Concentrates that will be produced. It is therefore, assumed the revenues from Cu and Ag will help to mitigate instances of costing that has not been accounted for in the overall production cycle.**

2.6 Estimates of Gold Content in the Fresh Ores at Matundasi and Mkwajuni Sites

For Matundasi and Mkwajuni ores, findings in Table 2.5 show that the following categories of ore grades are obtained at the two sites.

Table 2:5: Ore Grade for Matundasi and Mkwajuni Fresh Ore Stockpiles

Stockpile Name	Grade Type	Values of Gold (g/t)
MADC-H	High grade	> or = 5.0
MADC-M	Medium grade	> 2.0 to 5.0
MADC-LOW	Low grade	> 1.0 to 2.0
MADC-MG	Marginal ore	> 0.3 to 1.0

- In order to have effective operational efficiencies and optimum recoveries of metals in the ores, blending of the various ore grades shown above is important.

- Blending establishes constant and reliable dozing parameters of the reagents over a period of time and also helps to ensure the concentrate grades meet or exceed the required market requirement of 75 g/t for gold, 5.0% for copper and 100 g/t for silver. This is a requirement as per signed sales contract agreement with Zhaoyuan Hwatang Trading Company Ltd of Shandong Province in China, an import agent for Shandong Guoda Gold Smelter, where concentrates from Matundasi plant will be sold.

2.7 Selection of the Au, Cu and Ag Concentrate Production Plant

A search for the Processing plant equipment for production of concentrates was surveyed from several heavy equipment manufacturers and finally found Henan Fote Heavy Machinery Co. Ltd of 168 St. Hi-Tech Zone of ZhengZhou, China to be the best of all. Technical discussions with MADC engineers for the 500 tpd plant for an average daily production of more than 10 tonnes of Concentrates per day was made and the two parties managed to design a production process flowsheet. Thereafter, the parties entered into a contract agreement to supply a set of equipment and machinery. This supply of plant machinery has been concluded after conclusion of the concentrate sales agreement with the Zhaoyuan Hwatang Trading Company Ltd of China on 19th December 2023.

A processing plant flow sheet and list of equipment to be procured is shown under Figure 2:5 and Table 2.6 below.

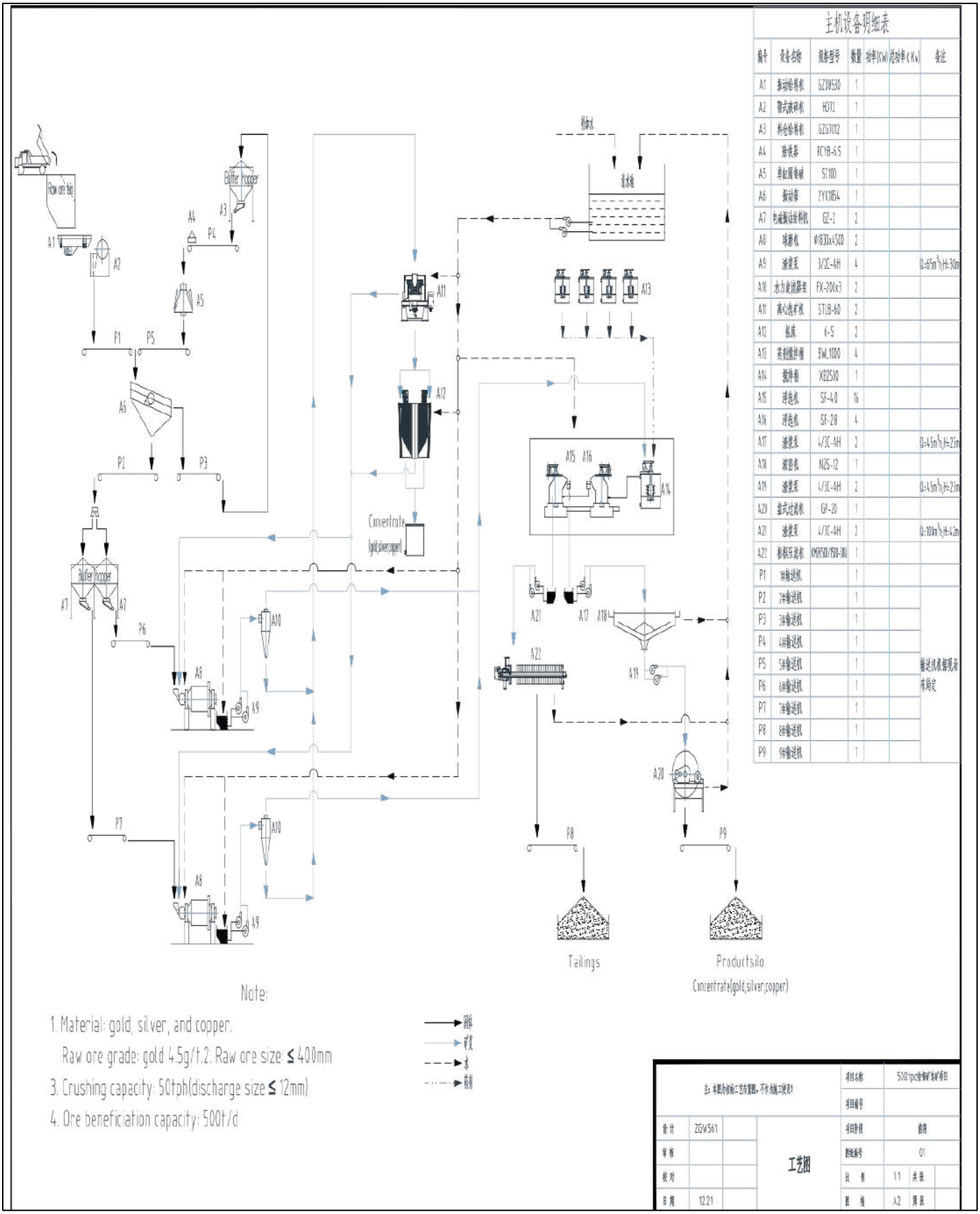


Figure 2:5 : Concentrate Production Plant Flow sheet

Table 2:6: Concentrate Production Plant Equipment List

1. 序号&规格 Model&Specification		2. 功率 Power (KW)	3. 数量 Qty (SET)	4. 单价 Unit price (USD)	5. 总计 Total price (USD)
Vibrating feeder	GZD850X3000	3*2	1	9,545	9,545
German type jaw crusher	HD72	55	1	26,667	26,667
Vibrating screen	2YK1854	22	1	19,242	19,242
Vibrating feeder	GZG7012	0.55*2	1	4,242	4,242
De-ironing separator	RCYB-6.5	/	1	2,273	2,273
Single cylinder cone crusher	SC100-F2	90	1	74,848	74,848
Electromagnetic vibrating feeder	GZ-2	0.15	2	818	1,636
Ball mill	Φ1.83X4.5m	180	2	78,484	156,968
Hydro-cyclone	FX200X3	/	2	6,666	13,332
Centrifugal separator	STLB-60	2.2-6	1	18,181	18,181
Shaking table	6-S	1.1	2	2,273	4,546
Mixer	XB-2500	7.5	1	11,818	11,818
Flotation machine	SF-2.8	11+1.1	4	6,364	25,456
Flotation machine	SF-4.0	15+1.5	16	7,575	121,200
High efficient thickener	NZS-12	5.2	1	45,455	45,455
Disc vacuum filter	GP-20	1.5-3	1	51,894	51,894
Filter press	XMZK500/1500-30U	/	1	68,939	68,939
Belt conveyor	1# B650X23m	11	1	7,858	7,858
Belt conveyor	2# B650X15m	5.5	1	5,125	5,125
Belt conveyor	3# B650X20m	7.5	1	6,833	6,833

Belt conveyor	4# B500X35m	15	1	8,644	8,644
Belt conveyor	5# B500X20m	5.5	1	4,939	4,939
Belt conveyor	6# B500X15m	4	2	3,705	7,410
Belt conveyor	7# B500X10m	3	1	2,469	2,469
Belt conveyor	8# B500X15m	4	1	3,704	3,704
Belt conveyor	9# B500X(15+20)m	4+5.5	1	8,644	8,644
Slurry pump	3/2C-AH 65 ㎥/h 30m	18.5	4	4,606	18,424
Slurry pump	4/3C-AH,45 ㎥/h 23m	18.5	4	4,772	19,088
Slurry pump	4/3C-AH 108 ㎥/h 42m	37	2	5,455	10,910
Electric control system	/	/	1	24,936	24,936
Total E-xw China factory price					785,227
Total sea freight to Dar es Salaam port					44,000
Special discount+advertisement subsidy					-232,527
Final CIF Dar es Salaam port price					596,700

TOTAL AMOUNT: Five hundred ninety-six thousand and seven hundred

3 CHAPTER THREE: MARKET FEASIBILITY

3.1 Demand for Gold in the World Market

Gold is among the preferred storage of value since ancient times. It is considered a good alternative to currencies. Since its value is determined by market forces (demand and supply) it is therefore less susceptible to deliberate policy manipulation by one or few countries. It is a safe haven asset whose value appreciates with geo-political uncertainties. Countries with the highest volume of gold hoard are: The U.S; Germany (Germany's managed by Deutsche Bundesbank); Italy (managed by Banca d'Italia); France (managed by Banque de France); Russia (administered by Central Bank of Russia); China (under the People's Bank of China), and Switzerland (managed by The Swiss National Bank who manages Switzerland's gold reserves), which are held both domestically and abroad. It is estimated that the value of gold ever mined by 2020 was worth about USD 12.24 trillion.

As a storage of value, theoretically therefore, the demand (price) of Gold can be affected by interest rates and inflation rates in large economies as well as other global economic conditions. Demand for use of Gold for Jewellery is significant. Gold also has industrial uses attributed to advances in technology in electronics and healthcare. Given the fact that the demand drivers are strengthening, gold is expected to appreciate in value over a long period to come.

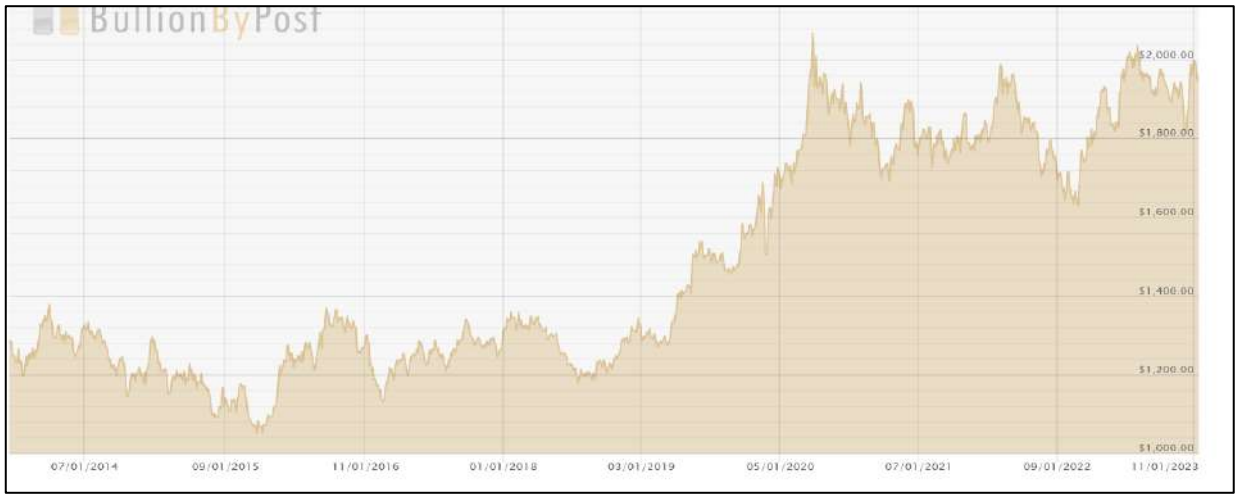


Figure 3:1: World Gold Price Trend 2014 – 2023.

Source: https://www.bullionbypost.com/gold-price/10-year-gold-price-chart-usd/

3.2 Demand for Copper in the World Market

Copper is the best non-precious metal conductor of electricity, consequently it is used in power cables, generators, motors and transformers. It is also used extensively in the manufacture of electronics and electrical components used in homes and buildings, industrial machineries, vehicles, pipes, as well as for decorative and coins. Demand for copper has been growing steadily in the past ten years 2010 – 2020.

According an online source citing Data Bridge Market Research, the Copper market was worth $304.79 billion in 2022. It is forecasted to grow at a compounded annual growth rate (CAGR) of 5.1%, thus the market will reach $453.76 billion by 2030. Therefore, on the demand side the rise in urbanization and infrastructure development, the growing electrical and electronics industries including the momentous decarbonization of the atmosphere, the green energies, helped push the demand curve outward. On the supply side, technological advancements in copper mining, extraction, and refining techniques have helped the industry grow.

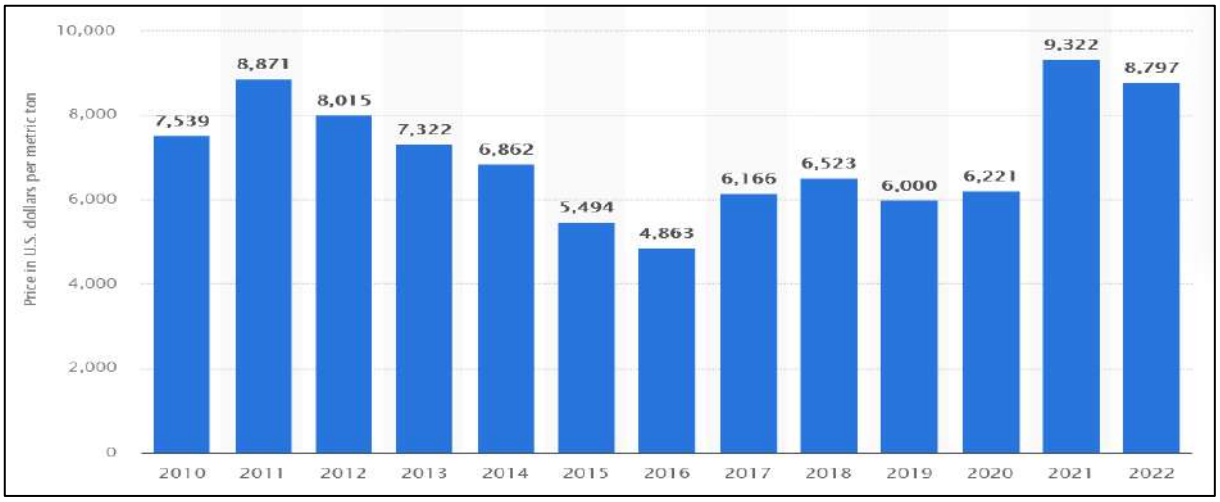


Figure 3:2: World Copper Price Trend 2010 – 2022.

3.3 Demand for Silver in the World Market

The global market demand drivers for Silver (Ag) are due to its diverse applications in many industries, storage of value and jewellery as explained below: -

- Jewellery: Since time in memorial, Silver has been used itself or alloyed with other metals to strengthen it for jewellery purposes;
- Currency- Historically it had been used as a store of value (currency) along with Gold;
- Electronics - Due to its good conductivity, it is used in many electronics and related items including batteries, switches, electrically conductive coatings, etc;
- Medical applications - Silver compounds are used in some medical applications, such as wound dressings and coatings for medical devices, due to their antibacterial properties; there are prospects for the use of Silver for body implants.
- Reflective items – Due to high light reflective index Silver is used in mirrors, in telescopes, microscopes, etc.
- Solar panels - Good conductivity and thermal stability has made silver a good input into solar panels.
- Water purification- Silver nanoparticles are used in water filters and purifiers because of their antimicrobial properties.

According to the Silver Institute, it is estimated that in 2024 some 1,204.9 million ounces equivalent to USD 27.5 billion (USD22.81/oz) were sold. [2] There are three key sectors that are driving global silver demand. These are industrial sector, jewellery and silverware, which accounted for nearly three-quarters of the world's demand for silver in 2022. In its report, the Institute estimated that between 2014 and 2023 consumption for Silver increased by 42% due to high industrialization rate, particularly in China and India. Global supply fell short of demand by about 4,000 tons hence the pressure on prices. Further, the Silver Institute experts forecast that demand is bound to double between 2024 and 2033. Major suppliers in the World are Mexico, Peru, and China.

[2] https://www.silverinstitute.org/important-silver-demand-drivers-to-effectively-double-rate-of-growth-over-next-decade/

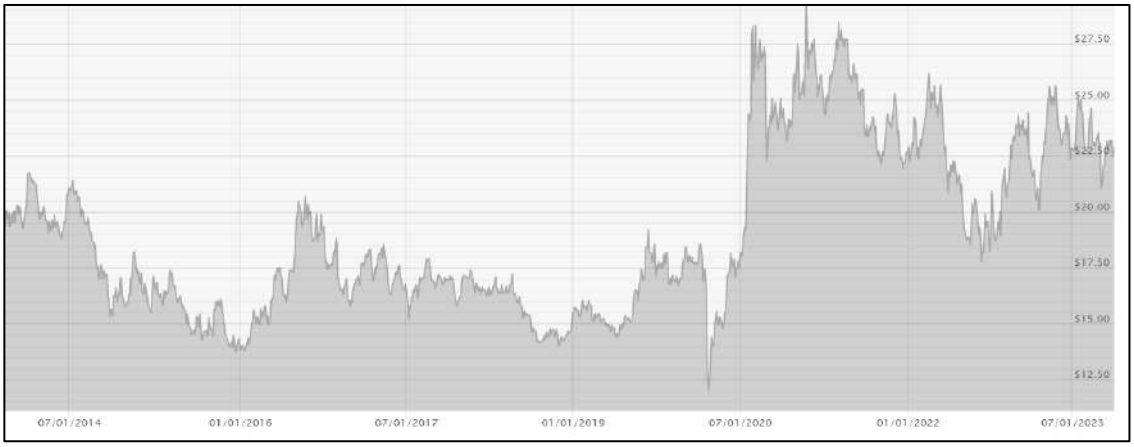


***Figure 3:3**: World Silver Market Price Trend 2014 – 2023*

Source: https://www.bullionbypost.com/silver-price/10-year-silver-price/

3.4 Market for MADC Concentrates of Au, Cu and Ag

Prior to commencing production of Concentrates at Matundasi, search for markets of the concentrates was conducted in the period of 1st August 2023 to 11th August 2023 and in the period of 10th – 22nd December 2023. Two survey trips were made to the Peoples Republic of China in the provinces of Henan and Shandong where gold, copper and silver smelters are operating.

The first market survey enabled the MADC management to meet with the management of Zhaoyuan Hwatang Trading company Limited (ZHTC) of 113 Block A, Wenquan Road, Zhaoyuan, Yantai, Shandong, R.P. China who trade as agents for the Shandong Guoda Gold Stock Company Ltd (SGGSC) of Yantai City who owns a smelter for Cu, Au and Ag. SGGSC do not engage on importation of concentrates and has assigned ZHTC to undertake the importation of concentrates into China on their behalf.

The ZHTC is able to purchase concentrates that contains Au grades above 75 g/t, Cu grades above 5 % and Ag grades above 100 %. They have signed a 5-year contract with MADC to import concentrate quantities above 240 tonnes per month increasing to 540 metric tons of dry weight concentrates within a period of 12 months.

Concentrate samples of 10 kg were shipped to the smelter and was qualified for purchase by the smelter. The 10-kg concentrate samples were prepared by Nesch Mintech Tanzania Ltd Laboratory, of Plot 27 Block E Mkuyuni Industrial Area, Butimba, Nyamagana in Mwanza, Tanzania in August 2023 and were resampled and permitted for export by the Geological Survey of Tanzania Laboratory in October 2023. Copies of Laboratory reports for Mintech, GST and SGGSC have been attached as Appendix no. 1.

The second market survey was undertaken in the period of 10th to 22nd December 2023 by MADC management team when they toured and met the management of Lingbao Gold Group Company Ltd of the City of Lingbao, Henan Province in the P. R. China. The purpose of the second market survey was to obtain sufficient assurance of the market of the MADC produced concentrates on instances where the earlier market at Shandong is constrained by anything unforeseeable in the future. Lingbao Gold Group Co. Ltd assured MADC management to be ready to purchase concentrates in excess of 2,000 metric tons per month, subject to receiving concentrate samples for laboratory analysis. This provided MADC with long term future market assurance and confidence with a possibility of expanding the concentrate market within a short-period of 5 years. Samples of concentrates is to be sent to Lingbao Gold Group Company Ltd for recovery tests same as was done for the Shandong smelter.

4 CHAPTER FOUR: FINANCIAL FEASIBILITY

4.1 Main Assumptions

Preamble:
Tanzania has been listed among the five high growth economies in Sub Saharan Africa. It has well managed macroeconomic fundamentals built on liberalised economy, less intervention in capital and other markets, a diversified export portfolio that reduces the impact of commodity market volatility, there is strong pursuit to attract foreign direct investment (FDI) and a stable political system.

Policy, Legal and Regulatory Framework:
It is expected that the analysis undertaken assumes no changes to the following policy and legal instruments now in place to significantly cause negative effects on the performance of the company during the period of analysis: The Mineral Policy of Tanzania 2009; The Mining Act of 2010; The Written Laws (Miscellaneous Amendments) No.2 Act, 2019; The Written Laws (Miscellaneous Amendments) Act, 2017 and The Mining (Mineral Rights) (Amendment) Regulations, 2020.

Financial Modelling:
The analysis adopted a Static Model for the financial analysis because all MADC mineral sales will be quoted in USD. The project is relatively small in size, the period of the loan is 4 years and the currency of analysis is US Dollar. Any Tanzania Shilling depreciation will work in favour of MADC as the company makes some purchases in local currency.

Below are key economic indicators of the macro and micro economy of Tanzania whose movements are likely to influence medium and long-term project financial viability.

Table 4:1: Some key assumptions on financial analysis

	ECONOMIC VARIABLE	INDICATOR	SOURCE OF DATA
1	Average (GDP) economic growth of Tanzania for the past 5 years	• 7.0% in 2018; • 7.0% in 2019; • 4.8% in 2020; • 4.9% in 2021 and, • 4.7% in 2022.	National Bureau of Statistics (Economic Survey 2022)
2	Foreign exchange – TZS/USD	TZS 2330/USD	Estimate based on Bank of Tanzania (BoT) mean rate in September 2023
3	Ruling discount rate in 2023	10%	Bank of Tanzania
4	Average inflation rate for the past 5 years	5.3%-2017; 3.5%-2018; 3.4%-2019; 3.4%-2020; 3.7%-2021;	Bank of Tanzania
5	World Gold price	TZS 124,066,881/Kg	Price (Chunya Published Price 22k purity) in July 2023
6	World Silver price	$716.00/Kg	https://www.kitco.com/silver-price-today-usa/index.html
7	World Copper price	Lows = $8,005.60/Kg	S & P Website
8	Plant capacity utilization	80% (2024), 85% (2025), 90% (2026-2031)	Supplying company in China

4.2 Investment in Fixed Assets

4.2.1 Existing Investment

The principals of MADC have invested significant number of resources from 2007. To date, the book value of the investment as of 2022 is USD 4.1 million, however, the asset register added some more items raising the figure to USD 4.6 million. (NOTE at the time of preparing this feasibility a qualified valuer has been engaged to determine the most reliable current value of the assets). The Company investment comprises of land, developed and undeveloped mines, real estate for accommodation and office, water supply system, elution ore processing plant, Vat leaching infrastructure, power lines and distribution, transport equipment, services centre and furniture and fittings. In its long-term plan (5-10 years) the Company will continue to invest about USD 3.67 million.

4.3 Proposed Sources of Investment Funds

The estimated USD 4.6 million investment made thus came from three major sources; contribution by sister companies PSG and KEGS and personal investments by Directors. The company is pursuing an expansion strategy that will have several benefits including: lowering production costs; improving gold recovery rate; recovery of commercially viable residual minerals (copper and silver); scaled up sales volume through export of concentrates instead of pure gold only. The expansion will cost an estimated USD 2,205,000 covering gold extraction plant purchase, shipment, installation and commissioning (USD 700.000), construction of a foundation for the plant (USD 180,000), power substation (USD 425,000); construction of tailings dam (USD 450,000) and working capital (USD 450,000). MADC is seeking a loan of USD 1,305,000 to cover part of the investment above. MADC sister companies (PSG and KEGS) will also contribute to the funding of the expansion plan as Table 4.2(a) and Table 2.4(b) Below indicates.

Table 4:2(a): Sources of Finance for MADC Expansion Project (Jan – July 2024)

INVESTOR/SHAREHOLDER	VALUE OF INVESTMENT MADE		PROPOSED EXPANSION TRANSACTION		TOTAL INVESTMENT	
	Percent	Value	Percent	Value	Percent	Value
PaulSam Geo-engineering Co. Ltd (PSG)	30.0%	$1,366,017	50%	$450,000	26.9%	1,816,017
Kimani Exploration and Geotechnical services Ltd (KEGS)	30.0%	$1,366,017	50%	$450,000	26.9%	1,816,017
Shareholder's Contribution	40.0%	$1,821,356			26.9%	1,821,356
Requested Loan				$1,305,000	19.3%	1,305,000
TOTAL	**100%**	**4,553,390**	**100%**	**2,205,000**	**100%**	**$6,758,390**

Table 4.2(b provides a breakdown of the capital investment with major types of equipment and facilities for expansion that will be procured and constructed at Matundasi area to enable production of more than 500 tonnes of concentrates per month to be achieved.

Table 4:2(b): Breakdown of Capital Investment for MADC Expansion Project (Jan – July 2024)

PLANNED AND ONGOING INVESTMENTS	KEGS	PSG	Bank Loan	TOTAL
Purchase, shipment, duties, clearing, transport to Chunya			596,700	596,700
Construction of plant foundation at Matundasi (approx. …..m²)			180,000	180,000
Construction of a 1,800KW power sub-station (transformer, automatic voltage regulator, changeover switches, and Purchase of 1,800 Kw standby generator)			425,000	425,000
Processing plant land transport, installation and commissioning			103,300	103,300
Tailings dam construction (on going)	100,000	350,000		450,000
Working Capital (utilities, labour, maintenance, support services, etc.) inc. ROM Mining by Contractor	350,000	100,000		450,000
TOTAL INVESTMENT COST	450,000	450,000	1,305,000	2,205,000
PERCENT	20.4%	20.4%	59.2%	100.0%

4.4 THE LOAN AND SERVICING PLAN

4.4.1 Purpose and Proposed Terms of the Loan

MADC has opted to seek for a loan to leverage its own funds to implement the expansion project due to its economic attractiveness as the financial and market analyses will testify. The loan of USD 1,305,000 is expected to be contracted at the following terms: -

- Currency – dollar denominated as it will directly be used to purchase, ship, install and commission the Concentrate Production plant;
- Interest applied in the analyses in 10% p.a. to be repaid on quarterly basis;
- Principal will attract a grace period of 1 year (12 months), thereafter repayments will be made quarterly;
- The loan will be liquidated in year 5;

4.4.2 Loan Servicing Plan

Based on the projected profits and cash flows, the business will be able to service the loan without affecting the optimal level of operations. Important indicators on the MADC's ability to service, are presented in Sub Section 4.7 below while Table 4.3 below summarises the repayment schedule.

Table 4:3: A summary of loan repayment schedule

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	TOTAL
Opening loan balance	1,305,000	1,305,000	978,750	652,500	326,250	-	1,305,000
Interest charged	130,500	118,266	97,875	65,250	32,625	-	444,516
Interest paid	130,500	118,266	97,875	65,250	32,625	-	444,516
Principal repaid	-	326,250	326,250	326,250	326,250	-	1,305,000
Total loan servicing instalment	97,875	444,516	424,125	391,500	358,875	-	889,031
Closing balance	1,305,000	444,516	652,500	326,250	-	-	

The analysis shows that the operations will result in cash flows that will adequately cover the debt servicing burden. The debt servicing coverage ratio range from is above 4 throughout the period of analysis.

4.5 PROJECT OPERATING COSTS

4.5.1 Mining Costs

There are two options to obtain ores from the Mkwajuni mine. Either by purchasing equipment and trucks to excavate the mine or subcontract to a company with a set of fleet of equipment to undertake the job, while MADC remains with the planning, design and supervision works.

Equipment needed whether for MADC or contractor for ensuring a minimum of 500 tpd is supplied at Matundasi plant are shown in the Table below:

Table 4:4: Mining Equipment Required for Mkwajuni and Matundasi Mines

S/N	EQUIPMENT TYPE	NO OF UNITS	UNIT PRICE (USD)	TOTAL COSTS (USD)
1	Excavator Model CAT320DL	2	170,000	340,000
2	Bulldozers Model CATD8H or similar	2	320,000	640,000
3	Wheelloaders CAT960	2	170,000	340,000
4	Mine Dump trucks (20-t) – Howo	3	130,000	260,000
5	Haulage Trucks (30-t) – Howo/Shacman	6	160,000	320,000
6	Blasthole rigs – PRD	2	100,000	200,000
	TOTAL COSTS ON EQUIPMENT			**2,100,000**

This capital cost needed for purchasing equipment is excluded from this study because the option of securing a Contractor with these equipment is relatively more attractive. The Contractor will be paid based on Cost per tonne of supplying ore at Matundasi plant site. The following basic assumptions are made:

- Mining cost of ore at Mkwajuni and Matundasi site for open pit mining is approximately $25.0 per ton (includes drilling, blasting, loading and haulage within the mine, stockpiling and waste removal)
- 30-tonne truck hire per day = TZS 1,000,000
- Fuel consumption per day = 200 ltrs
- Trips per day from Mkwajuni to Matundasi = 4 trips/day
- Total ROM transported per day = 6 trucks x 4 trips/day x 30 tons = 720 tpd
- Total cost of transporting ore from Mkwajuni to Matundasi = (6 trucks x TZS1,000,000/2500) + (6 trucks x 200 ltrs x Tsh 3,100/2500/ltr) + (6 trucks x TZS 50,000/2500 drivers allowance) = $2400 + $1,488 + $120 = $4,008/day;

  Total Haulage cost per month = $4,008 x 30 = $120,240 per month

- Haulage Cost per tonne = 4,008/720 = $5.56/ton or crudely $6.0/t. Add 20% profit to contractor = $7.2/tonne

- Cost of Mining and Haulage of Ore from Mkwajuni per tonne = $25.0 + $7.2 = $32.20/tonne

Monthly Mining and Haulage Cost to the contractor = TZS 720 x 30-days x $32.20 = $695,520/month

4.5.2 Processing Costs for Feeding 500 TPD and Producing a Minimum of 10 TPD Concentrates

4.5.2.1 Reagents Consumption and Associated Costs

Types of reagents that will be used to produce Concentrates are PAX, SIPX, Lime Powder, Pine Oil and Carbonate. Specific uses are shown under Table 4.5

Table 4:5: Types of Reagents that will be used for Flotation

Reagent name	Application
PAX (Potassium Amyl Xanthate)	Collecting gold
SIPX (Sodium Isopropyl Xanthate)	Collecting copper
Lime Powder	pH Modifier and froth stabilization
Pine Oil	Bubbles stabilization
Carbonate	Froth stabilization (If necessary)

When these reagents are used for a plant feed of 500 TPD, the following quantities will be consumed per day as shown under Table 4.6. Consumptions are derived from a similar operating concentrate production plant in Tanzania.

Table 4:6: Reagent Types and Quantities Consumed per Day

Basis; 500T/day					
Reagent name/consumption	**PAX**	**SIPX**	**LIME POWDER**	**PINE OIL**	**CARBONATE**
Price (USD/kg)	5.2	4.4	20.0	6.8	3.5
Price (USD/tonne)	0.0	0.0	0.0	0.0	0.0
Daily consumption (kg)	150.0	50.0	150.0	10.0	2.0
Monthly consumption (kg)	3,900.0	1,300.0	3,900.0	260.0	52.0
Quarterly consumption (kg)	11,700.0	3,900.0	11,700.0	780.0	156.0
Yearly consumption (kg)	39,000.0	13,000.0	39,000.0	2,600.0	520.0
Yearly consumption (tons)	39.0	13.0	39.0	2.6	0.5
Yearly Cost (USD)	202,800	57,200	780,000	17,680	1,820

Based on these data, Yearly costs of Chemicals is $202,800 + 57,200 +780,000 + 17,680 + 1,820 = $1,059,500/year.

Monthly Cost of Reagents is $88,292

4.5.2.2 Utilities

Other Costs related with producing 10 tonnes of Concentrates per day include:

- Electricity Costs which is 1,000 Kwh x 24 hrs/day x $0.094/Kwh = $2,256 per day
  Cost of Power per Month = $2,256 x 24days/month = $54,144/month

- Water supply costs from constructed water dams and boreholes (pipings repairs, pumps, motors, etc.) = $ 10,000/month

Total Cost of Utilities = $64,144

4.5.2.3 Processing Plant Consumables, Fuel and Lubricants

Other Consumables include the following:

a) Ball mill Steel Balls:

- Ball mill charges for 500 tpd will be 10.0%/day x 500 tpd x 24 days = 1,200 kgs
- Cost of steel balls is TZS5000/kg. For milling 500tpd, consumption will be:
  =TZS5, 000 x 1,200 kgs = TZS 6,000,000/= per month = $2,400/month

b) Fuel, Oils and Lubricants:

- Fuel and oils for the wheeloader for feeding the hoppers and earthworks at plant area;
  - ⇒ Fuel consumption for the wheeloader per day of 24 hrs is 200 litres x TZS 3,100/2500/usd x 24 days = $5,952 per month;

- Fuel and oils for the 1.5 MW generator to be purchased is 500 litres per day.
  - ⇒ Fuel consumption for the 1.5 MW generator per day of 24 hrs is 500 litres x TZS 3,100/2500/usd x 24 days = $14,880 per month
  - ⇒ Oils is taken as 10% of the fuel consumption = $1,488
    Total cost for generator = $14,880 + $1,488 = $16,368 per month

- Lubricants for the processing plant include;
  - ⇒ Oils and other lubricants (grease, heavy oils, etc., for the ball mill, crushers and all moving/rotating parts including the wheelloader for plant feeding).
  - ⇒ Consumption of grease of 40 kgs/day x TZS 5000/kgs/2500/usd x 24 days = $1,920/month
  - ⇒ Consumption of Oils includes hydraulic oils/gear oils, etc., 60 ltrs/day x TZS 9,000/lts/2500/usd x 24 days = $5,184 per month;

Consumables, Fuel and Lubricants per month = $2,400+$5,184+$5,952+$16,368 = $ 29,904

4.5.2.4 Wear Parts (Crusher jaws, Mill liners, Bolts, etc.)

The Capital cost of the entire milling and flotation plant equipment is US$ 725,000 inclusive of purchase, shipping, foundations and commissioning as per attached invoice from the manufacturer Henan Fote Heavy Equipment Co. Ltd of China. This new plant is assumed to have a depreciation life of 10 years, attracting a yearly depreciation of $72,500. This needs replacement of wear parts to ensure smooth production over the 12-months period. These wear parts include crusher jaws, cone crusher plates, conveyor parts, non-electrical parts, etc.

Monthly estimates is 10% of the yearly depreciation = $7,250

4.5.2.5 Plant Electrical Parts Repairs

- Electrical parts and automations that includes a new transformer and other heavy current control panels will cost approximately (Transformer and other parts of TZS 100 mill Extension service lines and other automations of TZS 300 million) = TZS 400 mill/2500/Usd = $ 160,000;
- This new infrastructure is assumed to have a depreciation life of 5 years attracting a yearly depreciation of $32,000.

Maintenance and repair costs is estimated to be 10% of this yearly depreciation to take care of electrical repairs = $3,200/month.

Monthly Costs for Concentrate Production Based on a 500 tpd feed, with 70% availability to produce a minimum of 10-tonnes/day of Au, Cu, and Ag Concentrates is summarized in Table 4.7 below.

Table 4:7: Concentrate Production Costs per Month

S/N	Processing Plant Section	Monthly Cost (USD)
1	Chemicals and Reagents	88,292
2	Utilities	64,144
3	Consumables, Fuel and Lubricants	29,904
4	Plant Wear Parts (Crusher Haws, Mill Liners, Bolts, etc.)	7,250
5	Plant Electrical Repairs	3,200
	Processing Plant Monthly Costs	$192,790
	Minimum Total Concentrate Production per month	240 t
	Unit Cost of Producing One-tonne of Concentrates	**$804/t**

- **TOTAL PRODUCTION COST (MINING AND PROCESSING) OF CONCENTRATES PER MONTH = $695,520 + 192,790 = $ 888,310 PER MONTH**
- **OVERALL COST OF PRODUCING A METRIC TONNE OF CONCENTRATE = $3,701.3**

4.6 Revenues Projection

The business will generate revenue from two business lines, sales of gold bullion and sales of concentrates of Au, Cu and Ag, which is the major line, transported to the Shandong Smelter in Shandong Province in the P. R. of China. The information below provides information on the anticipated level and the basis for the generation of revenues.

4.6.1 Gold and Concentrates Production Projection

4.6.1.1 Concentrates Recovery/Yield Rates

Table 4.7 below shows that for Matundasi and Mkwajuni ores, the marginal ore (MADC MG) has a value of gold of > 0.3 to 1.0 grams/ton while the high grade (MADC H) contains ≥ 5grams/ton.

Table 4:8: Ore Grades of Stockpiles at Matundasi Plant Site for Concentrate Production

Stockpile Name	Grade Type	Values of Gold (g/t)
MADC-H	High grade	> or = 5.0
MADC-M	Medium grade	> 2.0 to 5.0
MADC-LOW	Low grade	> 1.0 to 2.0
MADC-MG	Marginal ore	> 0.3 to 1.0

In order to have uniform/constant plant operating efficiency, which ensures optimum recoveries of the metals contained in the ores, blending of the various ore grades is important.

Blending establishes dozing parameters of the reagents and helps to ensure the concentrate grades are maintained or exceed the market requirement of 75 g/t for gold, 5.0% for copper and 100 g/t for silver. This is a contractual demand of the Shandong smelter in China, where concentrates from Matundasi plant will be sold.

However, it should be noted that when the concentrates grades are too low (40 g/t – 60 g/t), quantities for shipment will be large attracting higher logistical costs in terms of shipping and handling of large number of loaded containers to the Shandong smelter for same metal contents as compared to higher concentrate grades when they are produced. But, on the other hand, production of concentrates with higher grades, attracts longer processing time due to added cleaner stages that will also attract and consume more energy and reagents as they pass through the rougher, scavenger and cleaner cells.

Optimization therefore, will be undertaken to ensure that the contractual grade of 75 g/t of gold concentrates determines the optimum operating efficiency through a good mix of reagents in the process plant conditions.

During one of the laboratory tests, when blending of the ores was undertaken, the following simulation results were obtained for quantities of Au, Cu and Ag for the 500 tpd feed of material (See Table 4.9below).

Table 4:9: Potential Yield of Concentrates for MADC Ore Samples

Sample ID	Qty	Feeding data		Concentrate data		Tailing data		prod/day
		Au (g/t)	Cu (%)	Au (g/t)	Cu (%)	Au (g/t)	Cu (%)	Tons
MADC-H	50.0	8.25	0.45	126.00	7.12	1.52	0.11	20.10
MADC-LOW	50.0							
MADC-M	300.0							
MADC-MG	100.0							

- This shows that it is possible to produce concentrates in excess of the 20 tpd.
- This is more than the crude estimates planned in this study of 10 tpd in our mine plan. However, with favourable high grades at Matundasi and Mkwajuni sites, production in excess of 20 tpd is a likely scenario, though the current plan will still remain at 10 tpd concentrate production.

4.6.2 Projected Number of Containers with Concentrates per Month

For planning purposes, the following concentrate composition is set and will be used in our costing of the proposed project.

Table 4:10: **Basis for Estimation of Concentrates Produced**

Feed/day (T)	Prod. /day (T)	Y (%)-Au	Y (%)-Cu	R (%)-Au	R (%)-Cu
500.0	10.0	2.90	4.22	74.83	85.58
		2.84	3.44	73.26	87.73
		3.26	3.36	79.31	83.43
		4.32	5.04	85.98	86.52
		2.60	4.04	71.15	83.81
		3.26	6.95	81.52	84.75
		2.99	4.41	73.71	78.03
		2.72	3.68	77.73	75.86
		3.41	3.22	76.63	80.20
		3.36	4.16	82.57	79.88

Raw data		Concentrate Raw data		Tails data	
Au (ppm)	Cu (%)	Au (ppm)	Cu (%)	Au (ppm)	Cu (%)
3.77	0.49	97.33	9.89	0.98	0.07
3.90	0.45	100.43	11.38	1.07	0.06
4.11	0.49	100.02	12.12	0.88	0.08
4.66	0.51	92.61	8.77	0.68	0.07
3.33	0.44	91.34	9.08	0.99	0.07
3.65	0.55	91.27	6.65	0.70	0.09
4.00	0.44	98.54	7.85	1.08	0.10
3.47	0.44	99.04	9.07	0.79	0.11
3.98	0.41	89.58	10.18	0.96	0.08
4.08	0.45	100.30	8.55	0.74	0.09

- For One 20-ft container, the capacity is 24-tonnes. For a maximum moisture content of 10%, the 10 tpd concentrates will have an excess of 1.0 tonne of water;
- For 24-days of operating the plant, a total of 240 tonnes + 24 tonnes of moisture providing 264 tonnes will have been produced for one month;

No. of 20-ft containers to be shipped/Month, will be 264/24 = 11 Containers.

4.6.3 Sales Projection of Concentrates Per Month

For each of the 10 tpd concentrates, values of minerals contained is estimated to be;

- 75 g/t of Au x 10 tpd x 24 days/month = 18.0 kgs of Au;
- 5.0% Cu x 10tpd x 24 days/month = 120 tonnes of 10% Cu = 12 tonnes of Cu;
- 100 g/t Ag x 10tpd x 24 days/month = 24.0 kgs of Ag;

Take note that the Selling price of contained metals with Hwatang Trading Co. Ltd at the Shandong Guoda Gold smelter is based on the LME spot price averaged per week with the following percentages:

→ 91% for Au of 75 g/t or above

→ 60% for Cu (5%-10%); 70% for Cu (10%-15%); 80% for Cu (15%-20%); 85% for Cu (20%-25%)

→ 80% for Ag (100g/t-200g/t);

The prices and sales generated per month is estimated as follows:

- Gold price in China as of 23 August 2023 is $1900 per troy ounce or $61,000 per Kg;
- For 18.0 kgs Au, the sales will be $61,000 x 18.0 = $1,098,000;
- Copper price in Shandong China per ton is $9,000 per ton;
  For 12 tons of Copper x $9,000 x 60% = $64,800
- Silver price in China is $750 per kgs. Hence for 24 kgs x $750 x 80% = $14,400

Total Sales per month therefore is $1,098,000 + 64,800 + 14,400 = 1,177,200 per month

Assuming cost of smelting is 5% of the value. The smelting Cost will therefore be $58,860.

Net Sales per month therefore, will be $1,177,200 - $ 58,860 = $1,118,340

4.6.4 Revenue from Existing Stock of Tailings at Matundasi

Potential revenue generation from the existing stocks of tailings at Matundasi is estimated at US$ 2,305,200. However, these stocks are for 2-3 months only, they will be processed during the commissioning stage of the newly acquired flotation plant. Once the stock is finished, the monthly revenue generation thereafter, will be raised from the mineral contents of the ROM and other ore sources identified within the Chunya and Songwe District area.

With reference from Section 2.6 above, it is concluded that 72.9% of the gold in the existing tailings are above +75 microns, which when re-grinded to the level of -75 microns, for the 14,000 tonnes available at Matundasi, 2.748 g/t could be recovered from these tailings.

- For processing recoveries of 80%, then amount of gold to be recovered will be 80% x 14,000 tonnes x 2.748 = 30,777.6 kg.

- For the price of TZS140 million per Kg (as of September 2023), then approximately TZS 4.3089 billion or USD 1.724 million (Exch.rate of Tzs 2,500/USD) will be realized as revenues from the existing piles of tailings available.

- For this stock of feed material at Matundasi, a total of US$ 1,723,546 will be realized for a production of (14,000 tonnes/500tpd)/50% availability) = 56 days or approximately two months of production at Matundasi.

- **These revenues have not taken into account the values of Cu and Ag that will form a portion of the Concentrates that will be produced. It is therefore, assumed the revenues from Cu and Ag will help to mitigate instances of costing that has not been accounted for in the overall production cycle.**

4.7 Profitability Analysis

The subsequent analysis compares revenue and costs streams to judge the financial viability of the investment in the flotation gold extraction technology preferably before June 2024. The presentation in this Section of the report is a summary of the detailed work done in Excel and presented as Annexes.

4.7.1 Projected Income Statements

This analysis has established that the investment in the mill and flotation plant will be profitable right from the first year, this is due to the fact that MADC has already stockpiled 14,000 metric tons of tailings from past operations and secondly that the project will benefit from revenue from Copper and Silver that are usually not possible to extract under current extraction methods. The third reason is that there is high global demand for the targeted products - Au, Ag ad Cu in the world market hence the high prices noted over the past 10 years.

The profit in the first year of operations will be $5,607,353 (that is 30% of sales), the figure will decrease to increase and stabilize at $4,959,376 (about 26%) of the annual revenue from year 3 onwards. The higher profit in the 1st year after expansion is due to presence of stockpile of ROM that has cost slightly lower than ROM that will be mined after the expansion. Table 4.10 provides the projected income statement of the MADC project.

Table 4:11: Projected annual income statements in USD

	Year 1	Year 2	Yrear 3	Year 4	Year 5	Year 6
Capacity Utilisation	73%	85%	85%	85%	85%	85%
GROSS SALES REVENUE	**18,597,432**	**19,278,000**	**19,278,000**	**19,278,000**	**19,278,000**	**19,278,000**
GOVERNMENT DEDUCTIONS						
Royalty @ 6% of sales	1,115,846	1,156,680	1,156,680	1,156,680	1,156,680	1,156,680
CIF @ 1% of sales	185,974	192,780	192,780	192,780	192,780	192,780
Service levy @ 0.3% of sales	55,792	57,834	57,834	57,834	57,834	57,834
NET SALES REVENUE	**17,239,819**	**17,870,706**	**17,870,706**	**17,870,706**	**17,870,706**	**17,870,706**
COST OF SALES:	7,697,586	9,024,756	9,024,756	9,024,756	9,024,756	9,024,756
GROSS PROFIT:	9,542,233	8,845,950	8,845,950	8,845,950	8,845,950	8,845,950
%age of turnover	51%	46%	46%	46%	46%	46%
OPERATING EXPENSES:						
Admin expenses	727,100	748,767	748,767	748,767	748,767	748,767
Salaries & Wages	1,695,540	1,695,540	1,693,020	1,693,020	1,693,020	1,693,020
OPERATING PROFIT:	7,119,593	6,401,643	6,404,163	6,404,163	6,404,163	6,404,163
%age of turnover	38%	33%	33%	33%	33%	33%
PAULSAM MGT FEES:						
Turnover Fees 3% Gross Sales	557,923	578,340	578,340	578,340	578,340	578,340
Performance Fees 5% Operating Profit	355,980	320,082	320,208	320,208	320,208	320,208
PROFIT AFTER GOVERNMENT DEDUCTION AND MANAGEMENT FEES	6,205,691	5,503,221	5,505,615	5,505,615	5,505,615	5,505,615
%age of turnover	33%	29%	29%	29%	29%	29%
FINANCIAL & CAPITAL CHARGES:						
Interest charged on term loan	130,500	118,266	97,875	65,250	32,625	-
Depreciation	467,838	425,579	450,069	437,824	431,702	503,640
NET PROFIT	5,607,353	4,959,376	4,957,671	5,002,541	5,041,289	5,001,975
Net Profit Margin	30%	26%	26%	26%	26%	26%
ACCUMULATED PROFIT	5,607,353	$10,566,729	$15,524,400	$20,526,941	$25,568,230	$30,570,204

4.7.2 Projected Balance Sheets

Building from a very positive projected income statements the business has strongly positive key business performance indicators as illustrated by data for years 1 and 3.

***Table 4:12**: Business KPIs from the projected balance sheets*

Balance Sheet KPI	Year 1	Year 3
Working Capital (USD) (Current Assets – Current Liabilities)	6,846,065	17,120,095
Current Ratio (Current Assets/Current Liabilities)	21.79	53.00
Quick Ratio (Current Assets- Inventory)/Current Liabilities)	17.79	53.63
Return on Assets (Net Income/Net Assets)	45%	71%
Debt to Asset ratio (Assets/Loan balance)	9.30	33.51
Debt to Equity ratio (Loan balance/Equity)	28%	14%
MADC's Net Worth (USD) (Net Assets – Term Loan – Current Liabilities)	10,834,779	21,538,161

Note the rise in MADC'S net worth from USD 10.8 million in year 1 to USD 21.5 million in year 3 attributed to high profitability. Encouraged by this profit, MADC plans to continue investing at Matundasi and Mkwajuni over the coming 5 years. The long-term business plan will be developed after the new plant operations have been optimised in year 3.

4.7.3 Projected Cashflows

After the expansion project, MADC will be able to generate enough cash to optimally run the business, while initial working capital will have to be contributed by sister companies, the tailings stock piled at Matundasi will be able to generate more cashflows that will improve the cash position. Cash withdrawals will be undertaken to ensure there is adequate working capital. The business will operate with positive net cash flows throughout the period of analysis. Assuming there are no withdrawals, cash will accumulate from USD 4.0 million to USD 21 million in year 6.

***Table 4:13**: Summary of Projected Cash Flows.*

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
CAPITAL INFLOWS:							
Equity	900,000	-					
Bank Loan	1,305,000	-					
OPERATIONS INFLOWS							
NET PROFIT		5,607,353	4,934,644	4,934,644	4,934,644	4,934,644	4,934,644
Add back: Depreciation		467,838	440,006	450,069	437,824	431,702	503,640
TOTAL INFLOWS	2,205,000	6,075,191	5,374,649	5,384,713	5,372,468	5,366,346	5,438,284
CAPITAL OUTFLOWS							
Investment in Fixed Assets	2,205,000		-	-	-	150,000	
Loan servicing		130,500	444,516	424,125	391,500	358,875	-
OPERATIONAL OUTFLOWS							
Changes in working capital		1,922,432	-	1,922,432	1,922,432	1,922,432	1,914,849
TOTAL OUTFLOWS	2,205,000	2,052,932	444,516	2,346,557	2,313,932	2,431,307	1,914,849

NET CASH FLOWS	-	4,022,259	4,930,134	3,038,156	3,058,536	2,935,038	3,523,435
ACCUMULATED CASH		4,022,259	8,952,392	11,990,548	15,049,084	17,984,122	21,507,558

4.7.4 Payback Period

Initially MADC investment was estimated at USD 4.1 million, further review of the assets suggest added some forgotten assets to make the total figure at USD 4,611,553. The expansion project will add some USD 2,205,000 making the total investment after expansion to amount to USD 6,816,553 million. To determine the payback period this figure has been compared with projected pre-tax profit and found to be covered in just 14 months. See **Error! Reference source not found.** below.

Table 4:14: Projected payback period

Capital Investment (V)	(6,816,553)						
Add back: Depreciation (W)		467,838	425,579	450,069	437,824	431,702	503,640
Net Profit + Depreciation (Z = K + W)		6,075,191	5,384,956	5,407,740	5,440,365	5,472,990	5,505,615
Payback period in months	Months		13.46	Appr. months	14		

4.7.5 Break-even Analysis

This business is characterized by high revenue turnover rate, transaction cycle for most goods shall be one month. Secondly, the business is characterized by high gross margin coupled with comparatively low fixed costs. The two factors interplay to lower the break-even sales to less than 30% of the capacity utilization. Note that capacity utilization in the first month is projected at 50%. The projected break-even sales is USD 5,621,248 that is equivalent to 29% of optimum sales 5,621,248 when converted into containers this is approximately 54 containers.

Table 4:15: Break Even Sales Based on Year 3 Optimum Capacity

Sales Revenue at optimum	19,278,000
Direct Costs	9,024,756
Contribution Margin	53%
Fixed Costs	2,989,731
Break Even Sales	5,621,248
Break Even Capacity Utilization	29%
Break-even Number of Containers	4.67 (Approximately 5 containers)

4.7.6 Discounted Cashflows (NPV and IRR)

The high profitability of the project is confirmed further by the high Net Present Value (NPV) and Internal Rate of Return (IRR). When the cash flows have been subjected to a discount rate of 10% (in USD currency) over a 6-year period of analysis, they yield an NPV of USD 5,621,248 and an IRR of 74%. The IRR is far above many investment portfolios, blue chip companies at the Dar es Salaam Stock Exchange have their return on investment less than 20% for some years now.

4.7.7 Other Important Business Ratios

Below is a summary of other important business performance ratios

4.7.7.1 Loan Repayment Metrics

Table 4.15 shows key indicators to show MADC's capacity to service the loan, using year 1, 3 and 6 data it will be noted that the business cashflows can allow loan servicing without jeopardizing the operations.

Table 4:16: Loan repayment metrics

Type of Metric		Year 1	Year 3	Year 6
Debt Servicing Coverage Ratio	C			
Loan Opening Balance (A)	A	1,305,000	978,750	-
Net Profit (B)	B	5,607,353	4,957,671	5,001,975
Debt Servicing Coverage Ratio	C=A/B	4	5	n.a.
Security Cover				
Net Fixed Assets	D	5,293,714	4,418,066	3,044,900
Security Cover	E= D / A	4	5	n.a.
Debt to Equity (Gearing) Ratio				
Total Corporate Equity (D)	F	5,511,553	5,511,553	5,511,553
Debt to Corporate Equity Ratio (A/D)	G = A/F	24%	18%	n.a.
Equity for expansion project transaction (H)	H	900,000	900,000	900,000
Debt to business expansion transaction Equity Ratio (I)	I = A/ H	145%	109%	0%

4.7.7.2 Business Activity Metrics

Business activity indicators assess how assets are able to generate revenue as well as profit.

Table 4:17: Business Activity Indicators

Business Indicator		Year 1	Year 3	Year 6
Inventory Turnover Ratio				
Cost of Goods Sold	Q	7,697,586	9,024,756	9,024,756
Inventory Turnover Ratio (I /L)	R = M / K	5.8	5.4	5.4
Asset Turnover Ratio				
Total Assets Employed	S	12,139,779	21,538,161	35,203,216
Asset Turnover Ratio	T = S / M	65%	112%	183%
Return on Investment				
Capital Investment	U	6,816,553	6,816,553	6,816,553
Return on Investment	V = U / M	122%	137%	136%

Return on Equity				
Return on Corporate Equity	W1 = F / B	0.98	1.11	1.10
Return on equity for expansion project transaction (H)	W2 = H / B	16%	18%	18%

5 CHAPTER FIVE: HUMAN RESOURCE PLAN

5.1 Employment Size and Structure

At present MADC employs 184 workers with wide diverse in expertise though its core staff are experts in operations related to mining – geologists, mining engineers, chemical process engineers and lab technicians. The staff are organized under the departments of Operations, Finance and Administration as well as General Managers Office. Each department is subdivided into sections managed by a supervisor or manager as described in the foregoing report sections.

During the installation and commissioning of the plant, local Tanzanians will acquire new skills of operating and maintaining/servicing a plant for production of concentrates from their Chinese counterparts contracted to both install and train local staff.

5.2 Company Management

5.2.1 The Board of Directors

Good corporate management and governance require that the Board steer and maintain the company's profitability hence return on equity and business growth. MADC's Board is responsible for, among other things, setting the company's vision, mission, values and strategies; Recruiting or setting guidelines for recruitment of strategic personnel up to section managers; Oversees financial performance, approving budgets and large transactions; It also oversees compliance with laws and regulations; Another important role is representation of the company in various activities that demands corporate decisions. Members of MADC Board have vast experience in the mining industry, finance and marketing of minerals. As noted in 1.4.2 the Board members have immense knowledge on policies and laws that govern mining industry in the country and at international level.

5.2.2 The Office of the General Manager

The main functions of the management team members include: Coordination between junior managers and supervisors and the General Managers office, consolidation of section weekly/monthly work targets and performance, guiding supervisors and junior managers on planning, budgeting, work scheduling, performance evaluation, occupational safety, and liaison with the Human Resource Department on staff welfare. The General Manager safeguards the interest and assets of the company, such interests include communication with the Central and Local Governments, compliance and law enforcing agencies, the community and business partners including the clients.

5.2.3 MADC Management Team

The management of the company is entrusted to the General Manager, he is assisted by line managers for Mining, Processing, Engineering Services and Admin and Finance. Each line manager has a team of section heads that form part of the MADC management team.

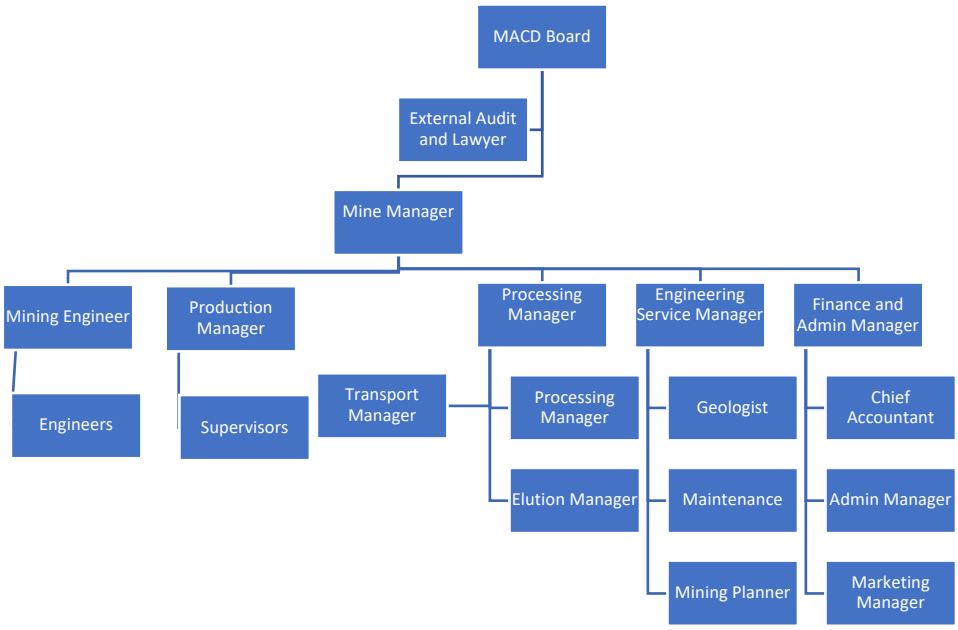
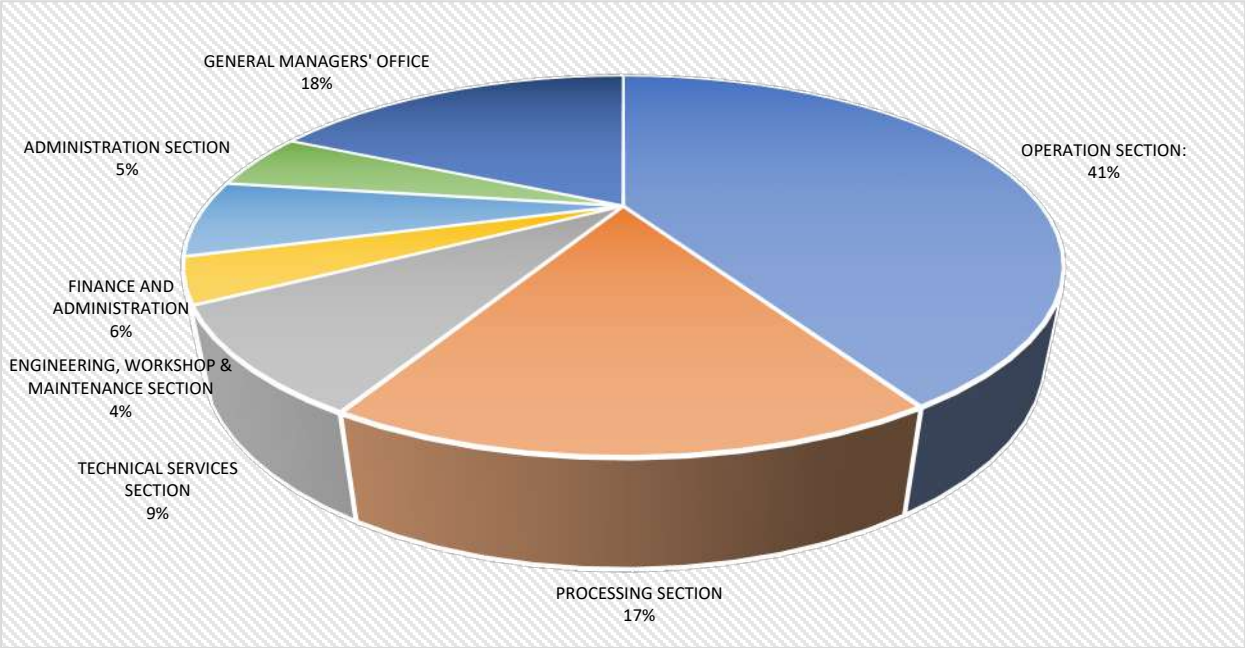


Figure 5:1: MADC organogram

5.2.4 Manpower Allocation

On implementing the expansion, most key positions will be manned by staff with experience drawn from current operations to reduce the learning curve. The flotation plant will be a new technology to existing employees, however, it is not a complex technology. Existing workforce with higher level of work concentration will be seconded to the floatation plant where they will get a six months (6 months) on-job training to be conducted by the supplier of the technology. Additional employees to be deployed at the flotation plant will be required to have at least a diploma certificate in mechanical, chemical or electrical engineering.

***Figure 5:2**. Manpower allocation*



5.3 MADC Payroll Size

MADC salary policy is to ensure it attracts and retains the best possible workers and therefore, offer salaries that are competitive in the industry. The cost of the lowest paid staff is $250 which still is higher than the minimum salary scale of a government worker. The 184 employees will cost the company a monthly a wage bill of $151,730 making a total annual manpower cost (payroll) around $1,820,760 that includes a Social welfare cost of $ 279,360 per annum. Table 5.1 summarises the manpower structure, size and bill.

Table 5:1: Manpower allocation by section and wage bill

DEPARTMENT/SECTION	NUMBER	PERCENT
Operations Section	76	41%
Processing Section	31	17%
Technical Services Section	16	9%
Engineering, Workshop & Maintenance Section	7	4%
Finance and Administration	12	7%
Administration Section	9	5%
General Managers' Office	33	18%
Total Labour Force	184	100%
Annual Wage Bill	3,641,520	

More detailed manpower plan is found in Annexure 2

5.4 Staff Welfare and Career Development Policy

5.4.1 Staff Welfare

At MADC and associated companies, staff welfare are of high priority, the company policies are well aligned with laws governing workers rights, the need to motivate and retain competent staff and compliance with statutory requirements.

Table 5:2. MADC and Associated Companies Staff Welfare

WELFARE ASPECT	MADC IMPLEMENTATION
Occupational Safety	MADC through supervisors and foremen ensures availability and use of personal protection equipment (PPE), these include protective clothing, helmets, footwear and gloves. For underground operations the following are readily accessible - Breathing apparatus, ventilators and self-rescuers. Further, the Company has invested in underground communication and monitoring systems, mining radios and telephones. All workers must bear an identification tag, etc. The entire mining area is properly marked to guide movements
Health Insurance and Health Services	The company contributes to Workers Compensation Fund (WCF), it had been in the process of subscribing to National Insurance Health Fund (NHIF), it will implement the newly passed Universal Health Coverage Bill of 2022 that guarantee every citizen access to health insurance.
Public health education sessions	Every 6 months MADC invites health specialists and counsellors to educate the workers on health risks associated with mining industry and particularly risk behaviours such as unprotected sex, alcoholism, drug addiction, etc.
Training workers for career development.	MADC through the HR Department has a rigorous inhouse workers training arrangements where experienced worker train the less experienced through both the theory and practice.

WELFARE ASPECT	MADC IMPLEMENTATION
Meals	The company serves afternoon meal to all workers in the field and the offices at the cost of the company. The menu has been drawn and approved by a District Nutritionist.
Bereavement condolence	Is offered for loss of staff's close relative – spouse, parents or children.
Non-Child Labour Policy	On hiring the company requires every employee to provide evidence of his/her age. For employees from local community a letter from the village government office may suffice.

5.4.2 Staff Career Development

The Company underscores the pivotal role skilled personnel play in enhancing productivity, it has been conducting on job training on continuous basis, and senior staff have participated in trainings outside the company. There is a plan to put in place a human resource development plan (HRDP) in the second half of 2025 whose implementation will start in 2026 when operating cash flows will have stabilised.

6 CHAPTER SIX: PROJECT EXPANSION WORK PLAN

The planning of the expansion started in 2018, several activities have been implemented up to the point of submission of this report, importantly, the sourcing and design of the flotation technology and market assessment. Going forward, major project milestones are: submission of this Business Plan to the bank, purchase of the gold processing plant, installation and commissioning between January and May 2024.

As noted in the Methodology in 1.2 above, MADC Directors and Management implemented a number of consultancy works to provide a pre-feasibility data that led to the decision to undertake a full blown bankable Business Plan in August 2023. During the period MADC implemented the following activities: -

a. Geological exploration at Matundasi and Mkwajuni PMLs, this work is on going;
b. Collection of ore samples, testing, analysis and interpretation of results that guided decisions related to the investment;
c. Identification, contracting and supervision of Business Plan preparation process;
d. Valuation of the company assets;

Below in **Error! Reference source not found.** is a summary of major project milestones

Table 6:1: Major milestones

TIME	MILESTONE
December 2023 – February 2024	▪ Sign contracts with technology supplier and concentrate buyer in China ▪ Update the lending partner Bank ▪ Update the feasibility investment plan based on findings from China.
February 2024 – March 2024	▪ Conclude with the Bank ▪ Disburse funds to the plant supplier in China
March 2024 – May 2024	▪ Shipment and delivery of equipment and machinery from China to Dar es Salaam ▪ Receive, install and commission the gold processing plant
March 2024 - June 2024	▪ Recruitment and Training
June 2024 - December 2025	▪ Develop further the Real Estate and Landed Assets to support the expansion
June 2024 – June 2029	▪ Commercial operation of the plant

The detailed Work Plan is presented in Annexure 32

7 CHAPTER SEVEN: ENVIRONMENT, SOCIAL AND GOVERNANCE (ESG) CONSIDERATION

Globally, there is a rising concern over climate change and its impact on the economy and wellbeing of mankind such that the United Nations Sustainable Development Goals (SDGs) has put in place a framework for minimizing the contribution of day-to-day activities to emission of greenhouse gases. A set of indicators have been developed by governments and private sector to take into account GHGs emission when selecting technology and planning business practices. Environment, Social and Governance (ESG) indicators are currently integrated in the evaluation of business market potential for listed companies. Large asset managers that have ESG benchmarks include: Morgan Stanley Capital International): S&P Global; Dow Jones Sustainability Indices (DJSI); FTSE4Good Index Series; and Carbon Disclosure Project (CDP) Scores. Note that Bloomberg has added a Bloomberg Gender-Equality Index (GEI). Septically for mining are the FTSE 4 Good Mining Index; Carbon Disclosure Project (CDP) – Mining; Responsible Mining Index (RMI); and the International Council on Mining and Metals (ICMM) that has established a set of 10 principles for sustainable mining.

While in Tanzania and the target market (China) have not declared that ESG benchmarks count, MADC is aware of the necessity to observe them, .

Table 7:1: MADC implementation of ESG indicators

ESG INDICATOR	MADC PRACTICES
Environmental Indicators	
1. Water Management	1. One of the major driver of adopting the flotation plant is to eliminate the use of toxic substances in gold extraction process. Borax, Lime Oil, Pine Oil and Carbonate to be used are non-toxic (they are organic materials). 2. All the water that is used in gold production is collected in ponds/reservoirs and left for adequate period to render any chemical inactive. The water is recycled. 3. Rainwater will be harvested in two large dams under construction. Existing streams have been left intact. 4. Water absorption has been approved by the Songwe River Basin Authority
2. Energy Consumption	MADC experts participated in the design of the flotation plant in China and one of the key aspect considered was the minimization of energy consumption. All staff have been trained in energy saving techniques during operations.
3. Biodiversity Conservation	Field operations are being implemented adhering to principles of minimum disturbance to the ecosystem. The company is collaborating with Sokoine University of Agriculture (SUA) to promote reforestation in MADC's PMLs disturbed farmers, livestock keepers and small scale miners.
4. Community Engagement	Despite the low business volume MADC is actively engaged with surrounding communities, its contribution includes: 1. Training of small-scale miners (SSM)on good mining practices to enhance productivity and safety 2. Constructed one teacher's living house for Makala Secondary school at Matundasi ward in Chunya District; 3. Provides competitive gold market to SSM who use MADC elution plant. 4. Plan to construct a sports complex at Matundasi ward to accommodate a football pitch, volleyball, running tracks, etc., including a hotel that will be able to accommodate 50 guests

ESG INDICATOR	MADC PRACTICES
	or visitors. This will be used by the youths in the ward and other teams from within and outside Chunya District.
5. Tailings Management	The company strictly adheres to safe storage of tailings as required by the regulatory authorities that include NEMC and the Government Chemist Laboratory Agency (GCLA)

8 CHAPTER EIGHT: CONCLUSIONS AND RECOMMENDATIONS

8.1 CONCLUSIONS

8.1.1 Policy, Legal and Regulatory Framework

Tanzania has prioritized mining as one of the main sources of economic growth through forex generation, employment and tax base expansion. The Government has put in place a number of positive policies and regulations to attract and sustain investment,

8.1.2 MADC's Management Capacity

The project proponents who are the directors of MADC have deep knowledge of mining activities in Tanzania and the world in particular where they have more than 20 years of experience as experts in mining. Some of these countries include Tanzania and neighbouring countries of Malawi, Zambia and DRC. The top management team comprises all mining engineers namely Engineer Dr. Samuel Mafwenga, Engineer Paulo Gongo and Engineer Pili Kantinga. It is important to emphasize that this project is not new, it is building on the investment and operations already implemented at Matundasi.

8.1.3 Market Feasibility

It has been established in Chapter 3 that globally there is strong demand for Gold, Copper and Silver that will be exported by MADC in form of concentrates. Moreover, Tanzania and China have very long-term cordial business relationship hence there are no trading challenges anticipated. Containers of concentrates will be hauled from Matundasi using contracted trucks to the port of Dar es Salaam for onward sea freighting to China. The terms of trade including minimum order size, prices, currency, delivery mode, payment arrangements and communication protocols have been discussed and agreed between MADC and the importer.

8.1.4 Technical Feasibility

The current gold extraction process (VAT leaching and elution) has many disadvantages including: low gold recovery; does not capture other significant minerals notably Copper and Silver hence lowers the return on investment; uses a lot of toxic cyanide that poses risk to workers' health and environment; and it is expensive. On the other hand, the flotation technology will produce concentrates with commercially attractive recovery rates for Gold, Copper and Silver using non-toxic (organic) reagents including PAX, SIPX, Lime powder, Pine oil and Carbonate. Overall, this will reduce the cost of goods sold significantly. MADC has been closely involved in the design of the plant, the plant will be efficiently operated, serviced and maintained by local experts after the exit of the Chinese trainers and operators from the Chinese suppliers in June 2024.

8.1.5 Financial Viability

The analyses have indicated that ceteris paribus, the project is quite profitable just as other gold mining projects are performing in Tanzania. Due to a stockpile of 14,000metric tons of ROM at Matundasi that suffices 3 months production of concentrates, the project will register profit outright after commissioning the plant. The annual net profit is around USD 10 million, assuming no withdrawals, the project will have accumulated a profit of USD 58.4 million at the end of year 6. The Net Present Value (from discounted cash flows) is USD 15million, that gives an IRR of 71%.

8.1.6 Potential Project Risks and Mitigation

Potential risks of the MADC projects are those related with business environment, mining operational efficiency, policy, laws and regulations, markets and weather.

Table 8:1. Potential Project Risks and Mitigation

	POTENTIAL RISK	MITIGATION
1	Mining accidents and operational efficiency	▪ Strict adherence to OSHA and Mining Act 2017 and Regulations that guides safety and health of mining workers in the mines; ▪ Continuous training and awareness raising to all workers engaged with MADC operations on safety and health matters; ▪ Placement of warning signs and safety boards to various hazard areas and undertake continuous monitoring; ▪ Periodic inspections of hazard areas and reporting their existing statuses
2	Spill of toxic chemicals into the surrounding areas	▪ Adherence to conditions outlined in the environmental management plans of the mine and adherence to the Environmental Management Act, 2004 and related regulations; ▪ Adherence to all legal and regulatory commitments that guides consumer chemicals management, specifically the Industrial and Consumer Chemicals (management and control) Act, 2003 and related regulations.
3	Security at site	▪ Implementation of a security system with CCTV cameras and associated security checks in hotspot locations; ▪ Engagement of qualified and competent security personnel to oversee the entire security of the mining operations.
4	Unreliability of the buyer	▪ Secure alternative markets of the produced concentrates, especially the Lingbao Gold Smelter in Lingbao city as an alternative to the Shandong smelter. Willingness to purchase concentrates from MADC has been very much welcoming.
5	Policy. Laws and Regulatory changes	▪ All necessary licensing matters related with the production of concentrates for export need to be fulfilled; ▪ Ensuring all Primary Mining Licenses (PMLs) have their annual rents paid and renewed promptly by the Mining Commission; ▪ Keep legal register updated and ensure compliance to policies, laws and regulations guiding production of concentrates.

8.2 Recommendations

The study has revealed compelling results that the projects situates well with Tanzania's Vision 2025, Third 5 Year Development Plan. It has many benefits to the nation including generation of foreign exchange, creation of employment, development of local capacity to own and manage modern mining projects. The project is quite profitable comparable to industry standards and therefore is able to repay the loan without exerting serious cashflows stress. The conclusion is that MADC should earnestly pursue the project expansion.

ANNEXES

1: LETTER FROM ZHAOYUAN HWATANG TRADING CO. LTD
2: ESTIMATED VALUE OF INVESTMENTS AVAILABLE
3: LOAN PARAMETERS AND SERVICING SCHEDULE
4: DEPRECIATION AND AMORTIZATION ALLOWANCE
5: PROJECTED COST OF GOODS SOLD
6: MANPOWER PLAN AND COST FOR YEAR 1 TO 6
7: SALES PROJECTION
8: PROJECTED INCOME STATEMENTS
9: PROJECTED BALANCE SHEET FOR YEAR 1 TO 6
10: PROJECTED CASH FLOWS
11: KEY BUSINESS PERFORMANCE RATIOS
12: PROJECTED PROFIT & LOSS STATEMENTS
13: DISCOUNTED CASH FLOWS
14: GOVERNMENT PAYMENTS AND PUBLIC CONTRIBUTIONS
15: DETAILED PROJECT EXECUTION SCHEDULE