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FEASIBILITY STUDY  
KILBORN ENGINEERING - Dec. 1982

SCHEDULE "A"

KILBORN ENGINEERING (B.C.) LTD.  
FEASIBILITY STUDY

KAMAD SILVER CO. LTD.

HOMESTAKE PROPERTY

KAMLOOPS, B. C.

FEASIBILITY STUDY

SUBMITTED BY:

KILBORN ENGINEERING (B. C.) LTD.  
101 - 1199 West Pender Street  
Vancouver, B.C.  
V6E 2R1

DECEMBER, 1982

KAMAD SILVER CO. LTD.

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FEASIBILITY STUDY

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## 1.0 INTRODUCTION

## 1.0 INTRODUCTION

This Report has been commissioned by Kamad Silver Co. Ltd., Vancouver, British Columbia. It comprises a review of mineral reserves of the Homestake Deposit, a Preliminary Mine Development Plan, a Mining Plan, Surface Mine Facilities, and processing the ore at the Dekalb Mill. Two concentrates will be produced, one will be a bulk sulfide concentrate containing the silver, gold, copper, lead and zinc values and the other will be a barite concentrate for marketing to the oil drilling industry. The Report has been prepared by Kilborn Engineering (B. C.) Ltd., and is based on site visits to the property, information from suppliers and independent contractors, and information supplied by Kamad Silver Co. Ltd.

This Report may be used by Kamad Silver for any legitimate purpose; but may not be excerpted or condensed without the written consent of Kilborn.

### 1.1 THE PROPERTY

The property is situated in the Kamloops Mining District of British Columbia in TWP 25, R13 W6 at 51°-10' north latitude 119°-48' west longitude. Its location is 54 road miles northeast of Kamloops, British Columbia, a City of 65,000 population.

The property consists of a contiguous group of 6 Crown Grant claims and 15 claims located under the modified grid system.

Present claim holdings include the following:

#### (a) Crown Grant Claims

<u>Name</u>	<u>Lease No.</u>
Homestake	L827
Maple Leaf	L828
Troublesome	L829
Argentum	L830
Silver Star No. 1	L4567 & L4568
Silver Star Fraction	L4566

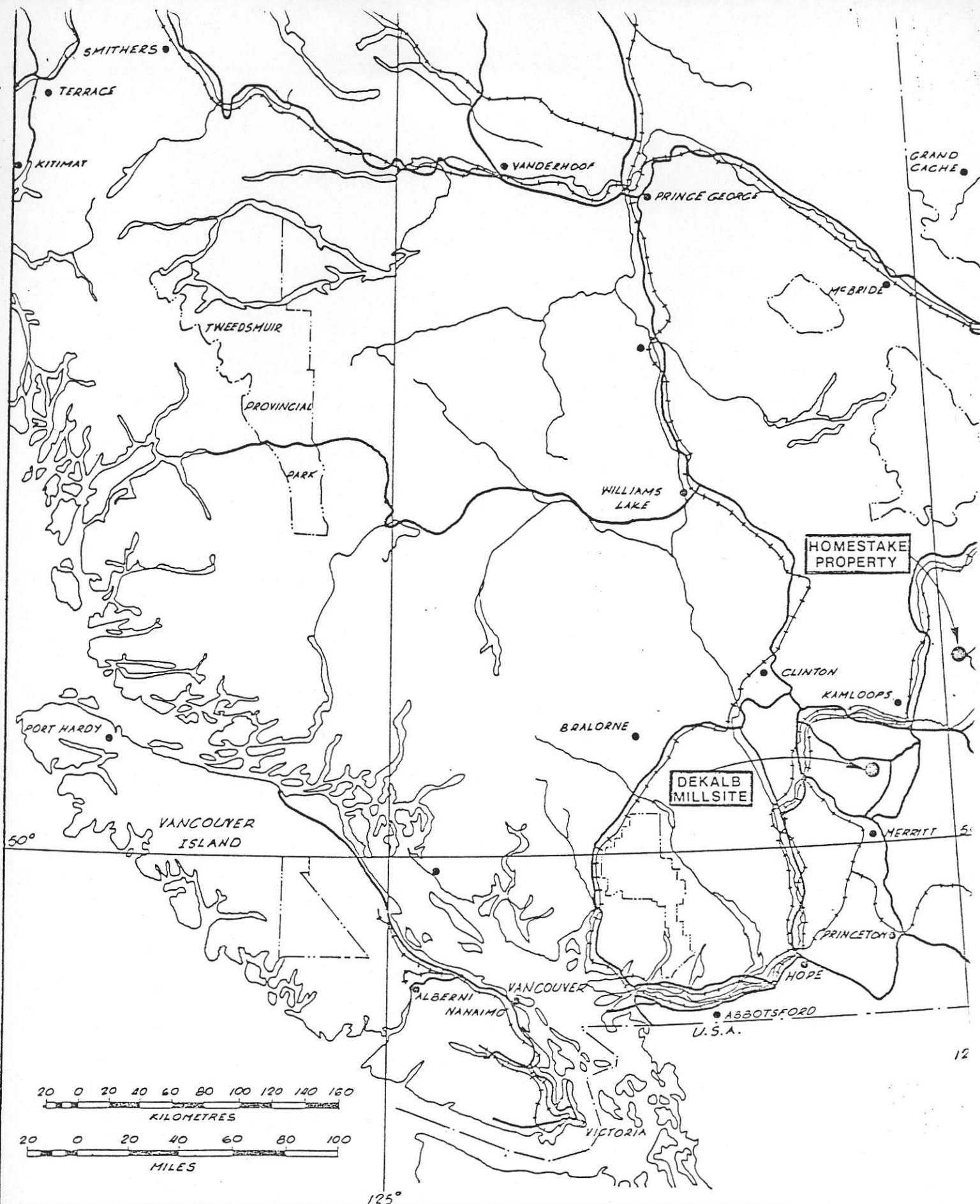
(b) Located Claims

<u>Name</u>	<u>Record No.</u>	<u>Date of Issue</u>
Kamad 1	2685	June 27, 1980
Kamad 2	2686	June 27, 1980
Kamad 3	2687	June 27, 1980
Kamad 4	2688	June 27, 1980
Kamad 5	2689	June 27, 1980
Kamad 6	2690	June 27, 1980
Kamad 7	2691	June 27, 1980
Kamad 8	2692	June 27, 1980
Kamad 9 Fraction	2693	June 27, 1980
Kamad 10 Fraction	2694	June 27, 1980
Kamad 11	3941	February 8, 1980
Kamad 12 Fraction	3942	February 8, 1980
Rift 4	2383	February 5, 1980
Rift 5	2384	February 5, 1980
Rift 6	2385	February 5, 1980
Rift 9	2388	February 5, 1980
Rift 10	2389	February 5, 1980

The Claims are registered in the Kamloops Mining Division of British Columbia.

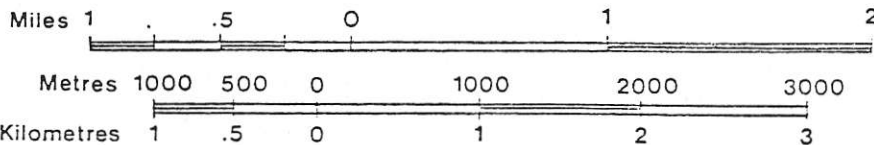
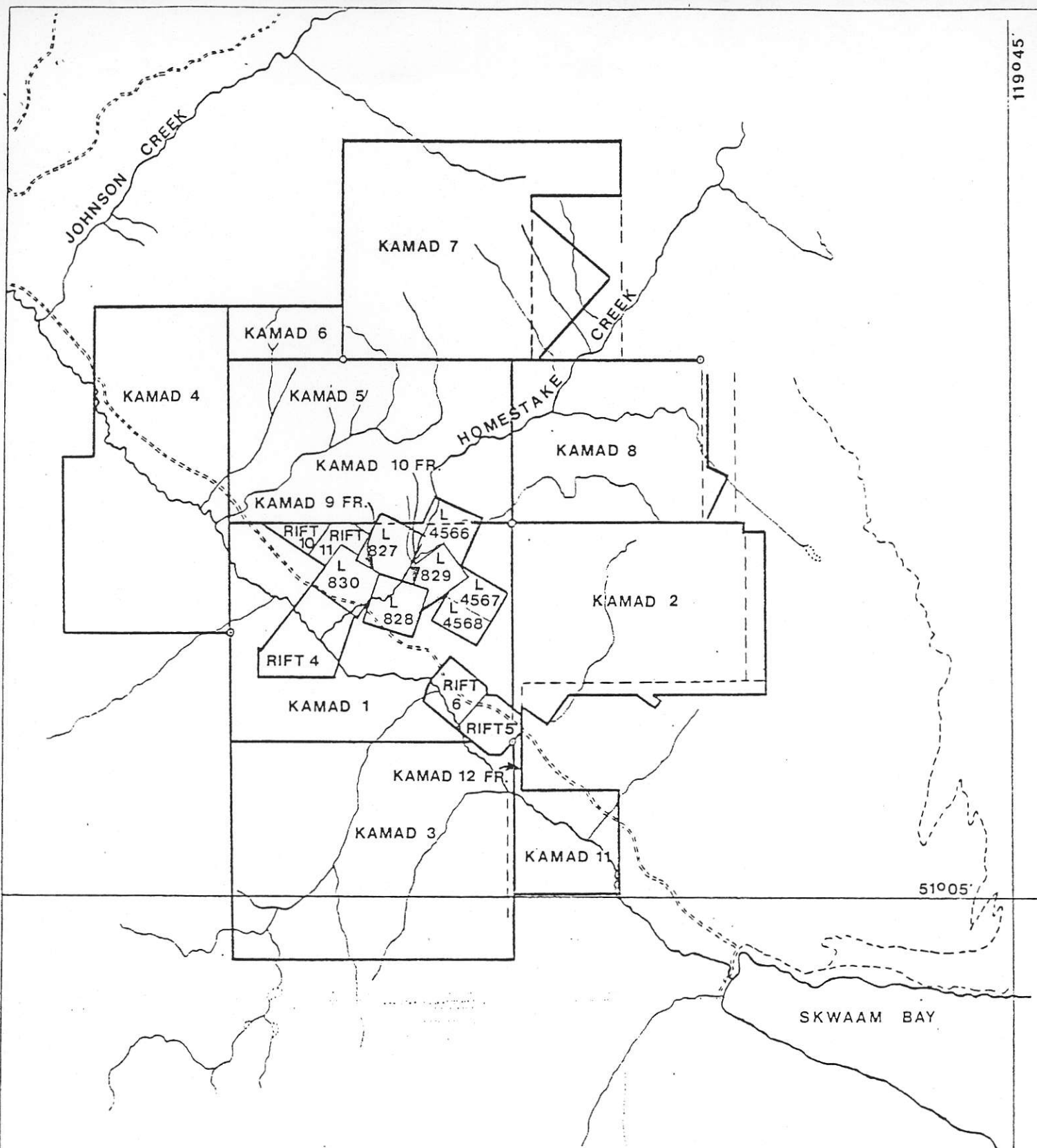
1.2 ACCESS

The property is located west of Adams Lake, 19 miles from the community of Barriere. Year-round access is provided by No. 5 Highway from Kamloops to Louis Creek, a distance of 37 miles, thence by gravel road for approximately 17 miles toward Skwaam Bay. From this point, a 0.3 mile sinuous road leads up the north side of Sinmax Creek Valley to the portal at the 1750 foot level; this road continues an additional 1.2 miles to the 2250 foot level portal. Both elevations are distances above sea level.



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TITLE: HOMESTAKE PROPERTY LOCATION MAP		SECTION:	
KILBORN ENGINEERING (B.C.) LTD.		AREA NO:	
CLIENT: KAMAD SILVER CO. LTD.	PROJECT NO: 7560-16	DRAWING NO:	
		REV. NO	



TITLE: HOMESTAKE PROPERTY - CLAIM MAP		SECTION:	
KILBORN ENGINEERING (B.C.) LTD.		AREA NO:	REV. NO
CLIENT: KAMAD SILVER CO. LTD.	PROJECT NO: 7560	DRAWING NO: 100-10-E2	
APPROVED:	DATE:		

### 1.3 TOPOGRAPHY AND CLIMATE

Sinmax Creek flows southeast on the floor of a 'U' shaped valley at approximately 1400 feet above sea level. The valley floor rises gently to 1700 feet above sea level and then more steeply to an elevation of 3000 feet. Peaks in the area rise to approximately 4000 feet. Numerous freshets and creeks are evident on the slopes. Overburden is generally minimal on the slopes, increasing to at least 100 feet in places along the toe of the slopes.

The Sinmax Valley is a semiarid area. Irrigation is practiced by farmers in the valley. Winter temperatures are normally minus 10° to minus 5° Celsius, however minus 35° temperatures have been experienced. Summer highs reach in excess of 30° Celsius. The nearest recording station is Barriere, British Columbia (Reference: Environment Canada, Canadian Normals, Precipitation, Temperature, 1941-1971). Recorded precipitation averages 17.5 inches per year.

Water is available from Adams Lake, approximately 4 miles east, or from a well drilled on a nearby farm.

Electrical power in the valley provides rural electrification which is not adequate and would require upgrading if used for a mining operation.

### 1.4 HISTORY

The property has been mined intermittently since the turn of the century. Until 1929, the operation consisted of the recovery of high grade silver ore. In 1935, a mill of 50 tons per day capacity operated for a short period of time.

The existing development consists of approximately 3000 feet of drifting and crosscutting from an adit at the 2250 foot elevation, 1900 feet of crosscutting on the 1750 foot elevation, and approximately 1900 feet of raising above the 2250 foot level and 445 feet of raising from the 1750 foot level to the 2250 foot level.



## 2.0 SUMMARY

## 2.0 SUMMARY

The gross receipts for sulphide concentrate were calculated from a recent (August 1981) smelter contract, issued by a smelter in southern British Columbia. Recent discussions with representatives from this smelter have indicated that current specifications may be more stringent than those in the contract. Until negotiations with various smelters have been carried out, the gross receipts shown (for the sulphide concentrate) may be considered only as a guide.

The gross receipts shown for barite concentrate were calculated using a selling price as supplied by Kamad Silver. No detailed investigations were done by Kilborn to verify the selling price, or to verify the capacity of the market to absorb this tonnage of barite, as marketing of barite was not included in the scope of this Study.

### 2.1 MINERAL RESERVES

The in place mineral reserve of drill indicated quality is:

<u>Vein</u>	<u>Tons</u>	<u><sup>Gold</sup> Au oz/ton</u>	<u><sup>Silver</sup> Ag oz/ton</u>	<u><sup>Lead</sup> Pb %</u>	<u><sup>Zinc</sup> Zn %</u>	<u><sup>Copper</sup> Cu %</u>	<u>BaSO<sub>4</sub> %</u>
300	100,500	.023	8.53	1.74	2.89	.42	24.9
400	51,300	.008	5.95	.84	1.54	.22	27.5
500	123,900	.015	5.32	1.01	1.89	.20	50.1
<u>TOTAL</u>	<u>275,700</u>	<u>.017</u>	<u>6.61</u>	<u>1.24</u>	<u>2.19</u>	<u>.28</u>	<u>36.7</u>
	=====	=====	=====	=====	=====	=====	=====

Mining reserve with dilution of 15 percent and mining recovery of 80 percent is:

<u>Tons</u>	<u>Au oz/ton</u>	<u>Ag oz/ton</u>	<u>Pb %</u>	<u>Zn %</u>	<u>Cu %</u>	<u>BaSO<sub>4</sub> %</u>
253,600	.015	5.75	1.08	1.90	.24	31.9
=====	=====	=====	=====	=====	=====	=====

## 2.2 CAPITAL REQUIREMENTS

Capital requirements to bring the mine into production at 8400 tons per month, acquire the Dekalb Mining Corporation assets and remodel the mill are as follows:

Dekalb Purchase	\$ 1,700,000
Mine Surface Facilities	708,400
Mine Development	1,533,800
Mill Modifications	844,200
Engineering	250,000
Contingencies	333,600
	<hr/>
TOTAL	\$ 5,370,000
	=====

## 2.3 OPERATING COSTS

The operating costs at full production will be:

Administration including ore haulage	\$ 13.43
Mining	30.75
Milling	17.55
Contingency	6.19
	<hr/>
TOTAL	\$ 67.92
	=====

## 2.4 GROSS RECEIPTS

The income per ton ore treated is estimated to be as follows:

Silver Bearing Sulphide Concentrate	-	\$ 59.72 ton ore
Barite Concentrate	-	\$ 38.38 ton ore
Total Receipts	-	\$ 98.10 ton ore

TABLE 2-1

## CASH FLOW (\$1000)

Item	Year 1												Year 2				Year 3				Year 4	
	1	2	3	4	5	6	7	8	9	10	11	12	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd
Development																						
Surface Plant																						
Modification																						
Production	-	-	1400	1100	3500	5100	7800	8100	8400	8400	8400	8400	25200	25200	25200	25200	25200	25200	25200	25200	25200	8400
Production	-	-	-	-	1800	8400	8400	8400	8400	8400	8400	8400	25200	25200	25200	25200	25200	25200	25200	25200	25200	8400
Expile	-	-	1400	2500	4200	900	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Expts	-	-	-	-	-	177	824	824	824	824	824	824	2472	2472	2472	2472	2472	2472	2472	2472	2472	1628
Expenditures:																						
Purchase	1700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Plant	180	180	180	168	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Development	250	250	260	260	260	254	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Modification	94	250	250	250	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Engineering	75	75	50	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Agencies	60	75	74	74	26	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ations	-	-	-	-	163	264	571	571	571	571	571	571	1712	1712	1712	1712	1712	1712	1712	1712	1712	571
Expenditures	-	-	-	-	449	543	571	571	571	571	571	571	1712	1712	1712	1712	1712	1712	1712	1712	1712	571
Monthly Cash Flow	(2359)	( 830)	( 814)	( 802)	( 449)	( 366)	253	253	253	253	253	253	760	760	760	760	760	760	760	760	760	1057
Cumulative Cash Flow	(2359)	(3189)	(4003)	(4805)	(5254)	(5620)	(5367)	(5114)	(4861)	(4608)	(4355)	(4102)	(3342)	(2582)	(1822)	(1062)	(302)	458	1218	1978	2738	3795

## 2.5 CASH FLOW PROJECTION

The following Table 2-1 gives the cash flow projection for the Project. The payback period is 21 months after start of milling, assuming no interest on capital. Projected cash flow after return of investment, not considering taxes, is \$3,795,000.

## 2.6 COMMENTS

The schedule is contingent on receipt of government permits and approvals without any delays.

### 3.0 GEOLOGY AND MINERAL RESERVES

### 3.0 GEOLOGY AND MINERAL RESERVES

#### 3.1 GEOLOGY

The rock units in the area of the Homestake Deposit are members of the Adams Lake Series of the Shuswap Terrain.

Within the immediate mine area, the rocks vary from a moderately competent quartz schist to a highly incompetent quartz-sericite-talc schist. In some areas, stringers and lenses of quartz comprise up to 30 percent of the country rock.

The schistosity strikes northwest and dips from 15 to 45° to the northeast.

#### 3.2 MINERALIZATION

There are three tabular mineralized zones which are subparallel to the schistosity. These zones have a strike of north 40° west and dip from 15° to 35° to the northeast. Mineralization within the zones consists of sphalerite, galena, chalcopyrite, tetrahedrite, barite and minor amounts of proustite. The mineralization within the zones occurs in lenses and disseminations.

The three zones, in vertically descending order, are the 300, 400 and 500 zones. The 300 and 400 zones occur as a single zone near the centre of the deposit. Elsewhere, they are separated by up to 40 feet of schist. The 500 zone, which is approximately 120 feet below the 400 zone, consists of two distinct horizons in most of the eastern portion of the deposit. These horizons are separated by 10 to 15 feet of schist. The 500 zone appears as one horizon in the western portion of the deposit.

## 3.3

MINERAL RESERVES

The mineral reserves have been calculated based on information received from Kamad Silver. The method used in the calculation of these reserves was the polygon method. Polygons were measured on a horizontal plane. Drill intersections were converted to vertical thicknesses. The polygons which are included in the reserves, are shown on Drawing Nos. 200-05-F1, 200-05-F2 and 200-05-F3. Around the periphery of the deposit, the polygons are assumed to extend a distance equal to the width of the zone at the nearest known intersection.

The mineral reserves were calculated using a factor of 10 cubic feet per ton. Britton Research carried out Specific Gravity Tests on the metallurgical samples. The Specific Gravity of the sample approximating the grade of the ore reserves is 3.29, which converts to a tonnage factor of 9.74. Using a tonnage factor of 10 gives a small safety factor.

The nature of the mineral occurrences in the Homestake Deposit are such that lenses cannot be developed to the proven category without completely developing the zones for mining.

For the information of the reader, the following definitions from 'Performance Standards for Professional Engineers Advising on and Reporting on Mineral Properties', published by the Association of Professional Engineers of the Province of Ontario, 1969 are:

- (1) 'Ore is a natural aggregate of one or more minerals which, at a specified time and place, may be mined and sold at a profit, or from which some part may be profitably separated.
- (2) 'Proven Ore or Measured Ore is that material for which tonnage is computed from dimensions revealed in outcrops or trenches or underground workings and/or drill holes and for which the grade is computed from the results of adequate sampling. The sites for inspection, sampling, and measurement are so spaced and the geological character so well defined that the size, shape, and



mineral content are established. The computed tonnage and grade are judged to be accurate within limits which must be stated. It must be stated whether the tonnage and grade of 'proven' or 'measured' ore is in situ or extractable, with dilution factors shown, and reasons for the use of these dilution factors clearly explained.

- (3) Probable Ore or Drill Indicated Ore is that material for which tonnage and grade are computed partly from specific measurements, samples, or production data, and partly from projection for a reasonable distance on geologic evidence. The sites available for inspection, measurement, and sampling are too widely or otherwise inappropriately spaced to outline the material completely or to establish its grade throughout.
- (4) Possible Ore or Inferred Ore is that material for which quantitative estimates are based largely on broad knowledge of the geologic character of the deposit and for which there are few, if any, samples or measurements. The estimates are based on an assumed continuity or repetition for which there are reasonable geological indications; these indications may include comparison with deposits of similar type. Bodies that are completely concealed may be included if there is specific evidence of their presence.'

Considering the above definitions, the in-place undiluted 'drill indicated' mineral reserves are as follows:

<u>Item</u>	<u>Location</u>			<u>Total</u>
	<u>300 Vein</u>	<u>400 Vein</u>	<u>500 Vein</u>	
Tons	100,500	51,300	123,900	275,700
Gold oz/t	0.023	0.008	0.015	0.017
Silver oz/t	8.53	5.95	5.32	6.61
Lead %	1.74	0.84	1.01	1.24
Zinc %	2.89	1.54	1.89	2.19
Copper %	0.42	0.22	0.20	0.28
Barite %	24.9	27.5	50.1	36.7

Dilution from mining will be in the order of 15 percent at no grade. Mining recovery is estimated to be 80 percent of the deposit. Therefore, the mining reserve is as follows:

Quantity	-	253,600 Tons
Gold	-	0.015 Ounces Troy per Ton
Silver	-	5.75 Ounces Troy per Ton
Lead	-	1.08 Percent
Zinc	-	1.90 Percent
Copper	-	.24 Percent
Barite	-	31.91 Percent

Table 3-1 lists the quantity and grade of the blocks considered within the reserve.

TABLE 3-1

DRILL INDICATED RESERVES  
(In-Place Undiluted)

<u>Vein</u>	<u>Polygon</u>	<u>Volume</u>	<u>Tons</u>	<u>Au Oz/t</u>	<u>Ag Oz/t</u>	<u>Pb %</u>	<u>Zn %</u>	<u>Cu %</u>	<u>BaSO<sub>4</sub> %</u>
300	A	80,000	8,000	.016	3.09	.82	1.43	.19	9.5
	B	177,650	17,800	.007	4.58	.92	1.55	.13	41.0
	C	268,800	26,900	.022	11.87	2.13	3.68	.70	46.8
	D	55,250	5,500	.032	1.28	1.31	2.47	.08	TR
	E	30,600	3,100	.072	7.00	7.62	10.59	1.14	TR
	F	135,600	13,600	.059	12.87	3.19	6.26	.56	TR
	G	154,200	15,400	.017	12.25	1.06	.94	.44	13.0
	H	63,840	6,400	.001	4.50	.57	.83	.10	26.1
	I	18,000	1,800	.014	2.39	.34	.64	.06	19.0
	J	20,000	2,000	TR	2.89	TR	TR	TR	19.8
TOTAL			<u>100,500</u>	<u>.023</u>	<u>8.53</u>	<u>1.74</u>	<u>2.89</u>	<u>.42</u>	<u>24.9</u>
400	A	49,150	4,900	.020	5.59	.78	1.63	.17	46.7
	B	227,650	22,800	.006	3.52	.84	1.89	.14	31.8
	C	60,200	6,000	.015	8.39	1.15	1.68	.46	TR
	D	6,130	600	TR	4.76	.84	.92	.16	TR
	E	90,500	9,000	.003	7.06	.76	.71	.15	32.5
	F	79,900	8,000	.010	10.10	.75	1.37	.36	20.5
TOTAL			<u>51,300</u>	<u>.008</u>	<u>5.95</u>	<u>.84</u>	<u>1.54</u>	<u>.22</u>	<u>27.5</u>
500	A	250,300	25,000	.010	3.21	.93	1.83	.16	33.0
	B	165,920	16,600	.011	5.69	.80	1.51	.19	57.3
	C	499,910	50,000	.010	4.46	.88	1.81	.18	51.5
	D	92,320	9,200	.013	5.88	.76	1.10	.19	48.7
	E	201,360	20,100	.038	8.96	1.69	2.69	.28	70.2
	F	29,760	3,000	TR	8.98	1.42	2.87	.28	TR
TOTAL			<u>123,900</u>	<u>.015</u>	<u>5.32</u>	<u>1.01</u>	<u>1.89</u>	<u>.20</u>	<u>50.1</u>
TOTAL PROBABLE RESERVES			<u>275,700</u>	<u>.017</u>	<u>6.61</u>	<u>1.24</u>	<u>2.19</u>	<u>.28</u>	<u>36.7</u>

#### 4.0 MINE SURFACE PLANT

#### 4.0 MINE SURFACE PLANT

The mine surface facilities will consist primarily of a mine office/changehouse building, maintenance shop and power/compressor house. The design of these facilities will be based on minimum on-site construction work and maximum portability. The mine surface facilities will be located near the 1750 level portal. Facilities at the upper portal will be limited to a small utility storage building.

##### 4.1 MINE OFFICE/CHANGEHOUSE (Drawing No. 400-10-F1)

The office/changehouse will be a transportable factory manufactured structure. The building will be 68 feet in length by 36 feet in width and will contain the following:

- (a) Male changehouse facilities for 35 men;
- (b) Female changehouse facilities for 6 women;
- (c) First Aid Room;
- (d) Mine Rescue Room;
- (e) Lamp Room;
- (f) Offices for the following:
  - Surveyors;
  - Geologist;
  - Clerk;
  - Mine Superintendent;
  - Shift Bosses.

The building will consist of 3 prefabricated 12 foot by 68 foot sections which will be connected on site. The building location is shown on Drawing No. 100-10-F3.

#### 4.2      MAINTENANCE SHOP      (Drawing No. 400-10-F2)

The maintenance shop will be 60 feet by 24 feet in plan dimensions with a 12 foot wall. The building will be a double skin insulated metal clad steel frame structure designed and fabricated for ease of erection on site. It will be erected on a concrete slab. A pre-fabricated 10 foot by 20 foot structure will be supplied for an office and parts storage.

#### 4.3      COMPRESSOR AND POWER HOUSE

The compressor and power house will be a single skin, metal clad steel frame structure of 40 feet by 40 feet in plan dimensions with a 12 foot wall. The building will house the following:

- (a) Three (3) diesel-powered air compressors which currently are located at the Dekalb Mill. The compressors are IR 600 Gyro Flow, IR 900 Gyro Flow, Atlas Copco AR 3L, and have a total capacity of 2100 cfm.
- (b) Two (2) diesel-electric generators, Model D379 with a generating capacity of 350 kilowatts each.

These units will be set on timbers. No concrete foundations will be required.

#### 4.4      ORE HANDLING

The ore will be stockpiled and loaded, with a front-end loader, into trucks as required. The loader is currently available from the equipment at the Dekalb Mill site.

## 4.5

SITE SERVICES

The Site Services required are mine yard lighting, sewage treatment, fire protection and water supply. Watchman Services for the property are provided by a neighbouring farmer who lives in the valley within sight of the property.

Potable water will be provided by a well. Water from the well will be pumped to a head tank located on the hillside, above the mine portal. This tank also will serve for fire fighting reserve.

Sewage treatment facilities will consist of a prefabricated treatment plant which will service the changehouse and office facilities.

## 4.6

2250 PORTAL SERVICES

A 10 foot by 20 foot combined parts storage and lunchroom will be provided for men working from the 2250 level. This will be a transportable, factory built structure.

## 5.0 THE MINE



## 5.0 THE MINE

### 5.1 MINING PLAN

Two adits provide access to the deposits. The upper adit is the 2250 foot level, and the lower adit is the 1750 foot level. The majority of the existing development is on and above the 2250 foot level. There is one raise which has been driven between the two levels and now is partially caved. The 1750 foot level will serve as the main haulage level. The existing raise between the levels will be rehabilitated and divided into two compartments, for use as a ventilation raise (second exit from the mine) and ore pass for material mined on and above the 2250 foot level.

Preproduction development will consist of enlarging the 1750 foot level for truck haulage, rehabilitating and enlarging the 2250 foot level, rehabilitating the 1750 to 2250 raise and development to prepare three stopes for start of mining. Accelerated development will be continued until there are 4 stopes available for mining.

The mining method will be a short-hole, open-stope and rib pillar method with mining advancing up the dip of the deposit. Ore will be removed by slushing down dip to the loading level where the ore will be removed from the bottom of the stope with 2 cubic yard LHD units and hauled to the ore pass.

The zones will be mined in the following sequence. The uppermost ore, the 300 zone, will be mined prior to mining the 400 zone and the 500 zone. If the 300 zone does not overlay the other zones they can be mined at any time.

### 5.2 STOPING METHOD (Drawing No. 200-05-F14)

The ore bodies will be mined by an open-stope and pillar method. Stopes will be 36 feet along strike 160 to 200 feet up the dip. Rib pillars will be 12 feet wide. The stope development sequence will be as follows:

- (a) At the bottom of the stope block a 10 foot high by 12 foot wide ore removal drift will be driven on the hanging wall of the zone.
- (b) A drawpoint will be driven to the footwall of the zone for ore loading.
- (c) A slot raise will be driven from the drawpoint crosscut to the hanging wall contact of the zone.
- (d) A slusher hoist station will be excavated as shown on the drawing and a 25 horsepower three-drum slusher will be installed.
- (e) Near the centreline of the stope, a 5 foot high by 8 feet wide stope raise will be driven along the hanging wall contact of the zone to the top of the stope block.
- (f) The stope raise will join the hanging wall drift for the next group of stopes.

The mining sequence, once the stope development is complete, will depend on the ore thickness. For ore under 12 feet in thickness, mining will be as follows. Starting at the bottom of the stope, the bottom of the raise will be slashed to the footwall of the ore zone. Concurrent with this slashing the ore will be breasted to the pillar lines, using airleg drills and horizontal holes. The stope back will be supported with a 4 foot by 4 foot rock bolt pattern incorporating wire mesh, if required.

For ore over 12 feet in thickness, mining will incorporate two stages. The first stage will be to mine out an 8 foot upper lift similar to the mining of the narrower thickness stopes. The stope back will be supported with rock bolts as previously outlined. The second stage will be to bench out the remaining ore in the floor of the stope. The benching method will depend on the thickness of the remaining ore.

In both mining cases the ore will be scraped downdip to a loading point utilizing 25 horsepower three-drum electric slushers. The ore will be removed from the drawpoint at the bottom of the stope by a 2 cubic yard LHD unit which will transfer it to an ore pass.

### 5.3 PREPRODUCTION DEVELOPMENT

Preproduction development will consist of the items listed on Table 5-1.

#### 5.3.1 1750 Foot Level

The existing adit will be enlarged to 10 feet in height by 14 feet in width, to permit the use of trucks which currently are part of the Dekalb inventory. Enlarging will be undertaken by slashing both walls as indicated in Sketch No. 5-1. The walls will be supported with rock bolts and sealed with shotcrete to retard deterioration by exposure to the atmosphere. Where warranted, sets will be installed for additional ground support. The crosscut will be extended 280 feet to the 500 zone and a hanging wall drift will be driven on the 500 zone.

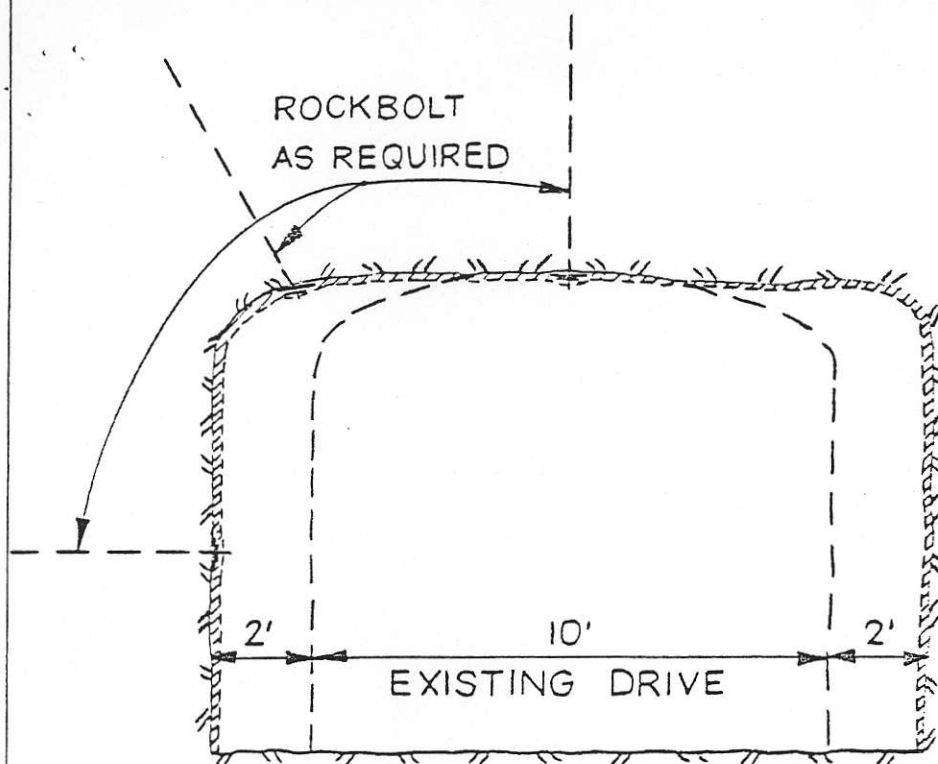
#### 5.3.2 2250 Foot Level

The existing workings will be rehabilitated as required. Headings which are to be used will be enlarged to 9 feet high by 12 feet wide to permit the use of 2-cubic yard scooptrams. The ground will be supported by rock bolts and sets as conditions require. The enlarging will consist of the 2203 drift, 2203 E crosscut and the 2240 drift, as shown on Drawing No. 200-05-F12, for a total of 1040 feet.

From the 2250 foot level, three stopes will be developed.

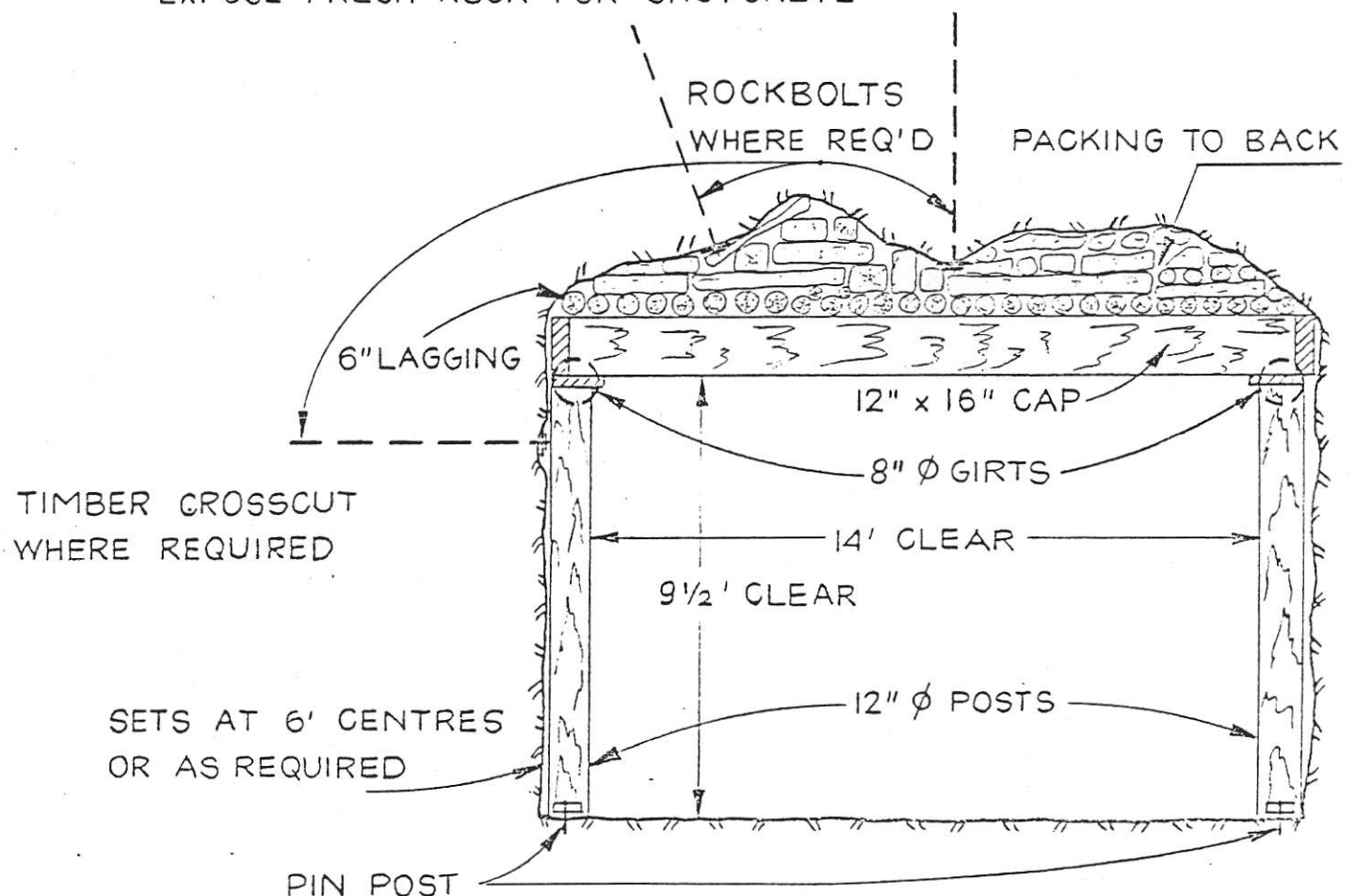
#### 5.3.3 1750 - 2250 Level Raise

The 1750 foot raise, which currently is caved, will be rehabilitated as a combination ventilation raise and ore pass. After the top of the raise has been reached on the 2250 foot level, rehabilitation will be started, working from the top down. The raise will be timbered into two compartments, as shown on Sketch No. 5-2.



SHOTCRETE WALLS AND BACK WHERE REQUIRED - 1" TO 2" THICK - SHOTCRETE TO PREVENT AIR OR MOISTURE AFFECTING ROCK (NO SCREEN USED)

NOTE: SLASH BOTH WALLS IN ORDER TO EXPOSE FRESH ROCK FOR SHOTCRETE



TITLE: HOMESTAKE PROPERTY  
2250 LEVEL CROSSCUT REHABILITATION

SECTION:

KILBORN ENGINEERING (B.C.) LTD.

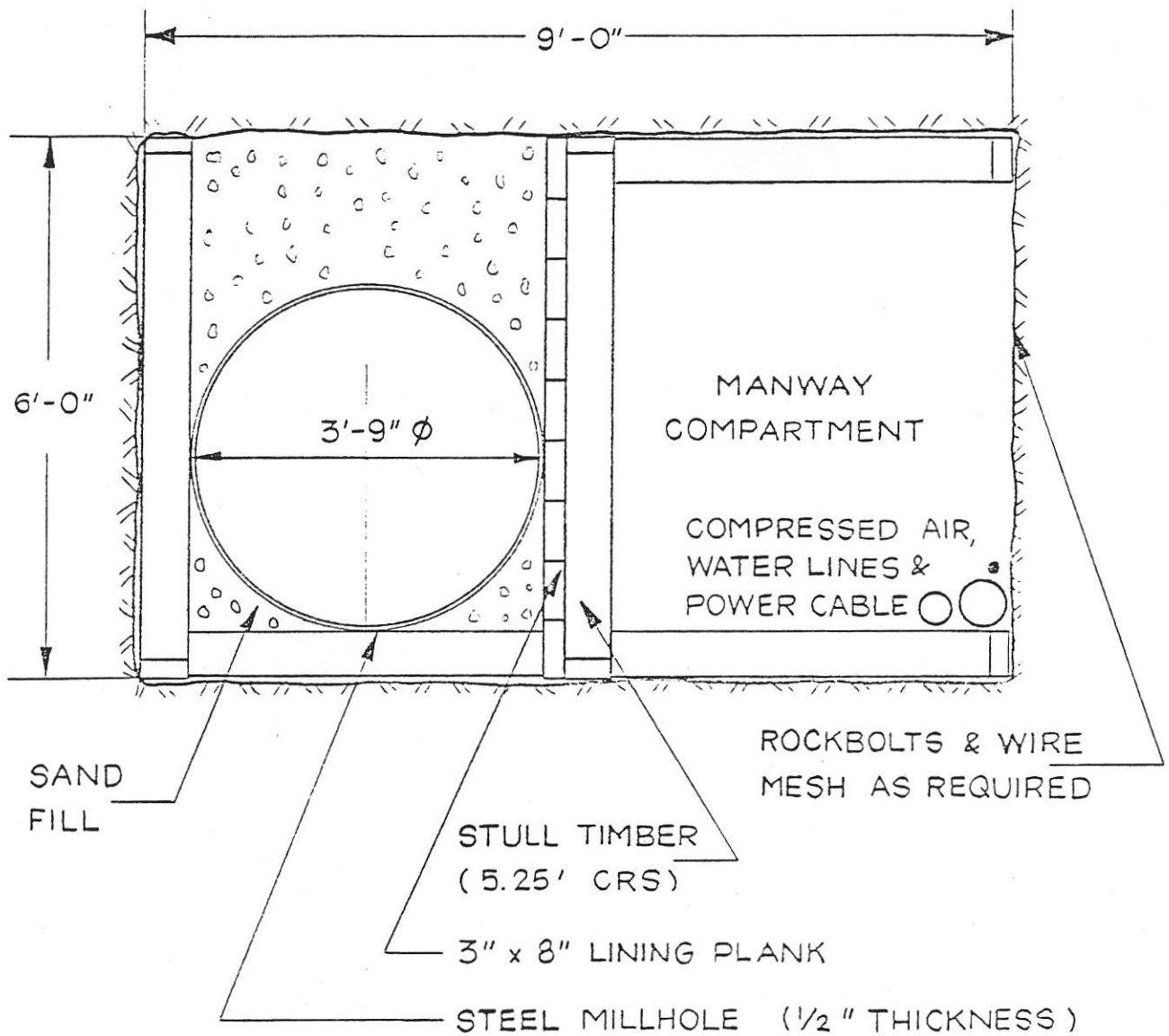
AREA NO:

REV. NO

CLIENT: KAMAD SILVER CO. LTD. PROJECT NO: 7560-16

DRAWING NO:

01 E 1



CROSS SECTION OF SERVICE RAISE

(NOT TO SCALE)

TITLE: HOMESTAKE PROPERTY 1750 LEVEL RAISE REHABILITATION		SECTION:	
KILBORN ENGINEERING (B.C.) LTD.		AREA NO:	REV. NO
CLIENT: KAMAD SILVER CO. LTD.	PROJECT NO: 7560-16	DRAWING NO:	
APPROVED:		51/ 5-2	

The timber will be installed from the top to the bottom of the raise to support the ground, and the cave material will be removed on the 1750 foot level. After the raise is supported, a steel orepass will be installed in one compartment and a chute will be erected at the bottom of the orepass from which trucks can be loaded.

Stations, for future levels, will be started from the raise as rehabilitation progresses downward so that development may proceed at a future date without damaging the raise system.

#### 5.4 VENTILATION

The mine ventilation requirements have been estimated on the basis of the following:

- (a) Working Places (Stopes, Raises, Drifts);
- (b) Total Shift Personnel;
- (c) Diesel Equipment.

The ventilation requirements total 60,000 cubic feet per minute of ventilation air. The main ventilation circuit will be air inflow through the 1750 foot adit, up through the 1750 foot raise and stope workings and out the 2250 foot level. Main ventilation will be provided by a 100 horsepower fan which is part of the Dekalb inventory. Ventilation of the headings and working places which are not on the main ventilation circuit will be by auxiliary fans in bulkheads, with or without ducting as conditions dictate.

Mine air heating will be installed as required. The intent is to use a direct-fired propane mine air heater, located with the main ventilation fan at the portal of the 1750 foot level.

## 5.5

MINE SERVICES

The major Services to the mine will consist of compressed air, water and electrical power. These Services will be brought into the mine workings through the 1750 foot level adit and up through the 1750 foot raise to the 2250 foot level.

Compressed air capacity will be 2100 cubic feet per minute, supplied by 3 diesel powered compressors. It will be brought to the working areas by a 6 inch diameter pipeline installed in the 1750 foot adit and 1750 foot raise.

Water requirements will be supplied through a 2 inch diameter line paralleling the airline.

Electrical power requirements within the mine are estimated to be 207 kilowatts. This load will consist of:

Ventilation	-	100 Horsepower (75 kilowatts);
Pumping	-	25 Horsepower (19 kilowatts);
Slushers	-	100 Horsepower (75 kilowatts);
Miscellaneous	-	50 Horsepower (38 kilowatts).

Power will be brought to the workings and distributed at 600 volts. The material required for power distribution in the mine is in the Dekalb inventory.

## 5.6

ONGOING DEVELOPMENT

Ongoing development during production will consist of the works outlined in Table 5-2.

There will be one two-man raise crew and one two-man drift crew to complete this work. Total development required per day is estimated to be 14 feet.

TABLE 5-2DEVELOPMENT DURING OPERATIONSStope Development

<u>Type</u>	<u>Size</u>	<u>Quantity</u>
Drifts	9' x 12'	780'
Drawpoints	9' x 9'	420'
Slot Raises	5' x 8'	210'
Manway Raises	5' x 8'	210'
Slusher Stations	8' x 10'	210'
Stope Raises	5' x 8'	3080'
Orepass Raise	5' x 8'	200'
		<hr/>
TOTAL LINEAL ADVANCE		5110'
		====



## 5.7 EQUIPMENT

The following is a list of mining equipment required for the development and operation of the mine:

Items marked with \* are available from Dekalb inventory.

### 5.7.1 Mining Equipment

<u>Item</u>	<u>Source</u>	<u>Quantity</u>
Airleg Drill	*	12
Stoper	*	12
Compressors	*	2,100 cfm cap.
Fan	*	100,000 cfm cap.
Fan	*	40,000 cfm cap.
Slusher Hoist	Purchase	4
Scraper	Purchase	4
Sheave Block	Purchase	12
Chain Block	Purchase	4
2 yd <sup>3</sup> LHD	*	4
Hat Lamp	*	40
Utility Hoist	Purchase	3
Pick-Up Truck	*	2
Chain Saw	*	2
Fuel Tank	*	
Freshwater Pump	*	
Wilden Pump	*	4
Mine Rescue Equipment	*	
Pipe Cutter and Stand	*	
Fire Extinguishers	Purchase	
Bit Grinder	*	
First Aid Equipment	Purchase	
Survey Equipment	*	
Hand Tools	*	

5.7.2 Shop Equipment

<u>Item</u>	<u>Source</u>
Jacks	*
Torch	*
Oxygen-Acetylene Carrier	*
Tire Remover	*
Fire Extinguishers	*
Vices	*
Heaters	*

5.7.3 Office Equipment

The office equipment will come from the Dekalb inventory.

5.8 PERSONNEL REQUIREMENTS

Supervisory and Technical Personnel will be kept to a minimum.

Requirements are as follows:

- Mine Superintendent;
- Shift Bosses (2 required);
- Geologist;
- Surveyor;
- Survey Helper/Sampler;
- Clerk.

The Mine Production Crew will consist of 31 people. They are distributed as follows:

- (a) Four development miners are required to make up 2 crews. The crews will be required in order to provide 14 feet of daily development advance.
- (b) Sixteen stope miners will be required to operate 4 stopes with 2 man crews working on a 2 shift basis. Approximately 90,000 tons of stope muck are required from stoping; the balance will

be from development. This is equivalent to 360 tons per day, or 22.5 tons per man shift stoping - an acceptable figure.

- (c) Four L.H.D. operators will be required to muck 403 tons per day of ore and a small amount of waste. Although the production of only 101 tons per machine shift is low, the operators will experience higher than average delays on this type of mining and will also look after all nipping in the mine.
- (d) Two truck drivers will be required, one on each shift. Including waste, approximately 425 tons of rock must be hauled daily over 2000 feet.

Cycle time per 12 ton load is calculated to be:

i) Load (mostly from chute, some L.H.D.)	-	3 minutes
ii) Haul 2000 feet at 4 mph average	-	6 minutes
iii) Dump	-	1 minute
iv) Return	-	6 minutes
TOTAL PER TRIP	-	<u>16 minutes</u> ==

Trips per day =  $425 \div 12 = 35$  trips

Time required =  $35 \times 16 \text{ minutes} \div 60 \text{ min/hr} = 9.3$  hours

On a 2 shift operation, approximately 13.5 hours per day will be available. The 4.2 hours remaining will be occupied by delays, nipping, etc.

- (e) In addition, 2 spare miners, one timberman and 2 labourers will be required to look after regular construction, maintenance, ventilation, clean-up, etc.

The Maintenance and Surface Operations crew will consist of 6 people. At least one of the mechanics will work on night shift.

- (a) Four mechanical people will be required to look after the diesel mobile equipment as well as to sharpen bits, weld and provide

other normal mechanical services.

(b) In addition, one electrician and one labourer will be employed.

## 5.9 SUPPLIES AND CONTRACTED SERVICES

Operating supplies required are shown in detail in Section 12.0 - Operating Cost. It may be noted that 50 percent of the total cost of operating supplies is consumed by two items - explosives and diesel oil costs. It may be possible to considerably lower both of these items in the future. If mining conditions permit, ammonium nitrate - fuel oil explosive mixtures may be used in place of water gel explosives. Also, if hydroelectric power becomes available, then diesel oil consumption will drop. However, in order to assure the costs are conservative, neither of the possibilities have been considered.

Certain services, normally performed by mine staff members, will be contracted in order to reduce operating costs. These services include:

- Accounting;
- Secretarial;
- Routine Mining Engineering.

In addition to the above functions, that are normally performed by the mine staff, other services to be contracted include environmental work and diamond drilling.

Ore handling remains the major contracted service.

6.0 MILL

## 6.0 MILL

### 6.1 INTRODUCTION

Kamad Silver has an option to purchase the assets of Dekalb Mining Corporation. The Dekalb Mill, located in the Highland Valley 51 miles southwest of Kamloops, will be modified to treat 300 dry short tons of ore per day, operating 7 days per week. Allowing for normal operation interruptions, the annual throughput will be 100,800 tons. The mill will be capable of producing two separate concentrates; a bulk sulphide concentrate containing gold, silver, lead, zinc and copper values, and a barite concentrate.

Laboratory testwork results have indicated that the ore can be treated by conventional mineral processing techniques to produce these two concentrates.

For the purpose of this Study, a conventional flowsheet has been developed. The building and most of the major equipment in the Dekalb Mill, including the Crushing Plant, are suitable for the proposed flowsheet.

A market survey of barite based drilling muds indicated that the following characteristics of the barite concentrate produced are required:

- (a) Particle Size:
  - 95 percent or more of minus 325 mesh (44 microns);
  - a maximum of 3 percent plus 200 mesh (74 microns).
- (b) Specific Gravity - 4.2 or higher.
- (c) Water Soluble Salts - maximum content of 0.1 percent.
- (d) Barium Sulphate Content - minimum 90 percent.
- (e) Moisture Content - maximum 2 percent.

## 6.2

REVIEW OF METALLURGICAL TESTWORK

The mill design is based on the test results derived from the reports entitled "Preliminary Flotation Study - Cordilleran Engineering - Homestake Property, Barriere, B.C." dated January 14, 1981 and "Kamad Silver Preliminary Flotation Study II" dated March 13, 1981. Testwork recorded in both reports were carried out by Kamloops Research and Assay Laboratory Ltd. and Met Engineers Ltd.

The plant will be designed to produce bulk sulphide and barite concentrate. The test results indicate that an estimated 300 ppm of mercury can be expected in the bulk sulphide concentrate; possibly making it difficult to market.

Previous testwork carried out by Britton Research Limited in 1973 shows that the barite concentrate with 97 percent barium sulphate, at 34.4 percent plus 325 mesh contains 0.33 percent water soluble salts. If the water soluble salts are interlocked with the barite, regrinding the sulphide tailings prior to barite flotation may upgrade the barite to saleable grade. However, water soluble salts were not in the recent testwork although the ore was ground much finer, consequently it is not certain if the barite concentrate was of marketable grade.

The flowsheet of the process is based on data in the above mentioned report. However, the tests have not been repeated to confirm the results. In order to confirm the test results, and develop revised processes to reduce the mercury content in the bulk sulphide concentrate and the soluble salt content in the barite concentrate, it is recommended that more test work be carried out to ensure that a marketable barite concentrate can be produced.

The following Table 6-1 shows the projected metallurgy of the bulk sulphide and barite concentrates, based on the metallurgical test results and the average grade of the total probable reserves:

TABLE 6-1PROJECTED MILL FEED AND PRODUCTS

<u>Material</u>	<u>Annual Tonnage</u>	<u>Au (Oz/Ton)</u>	<u>Ag (Oz/Ton)</u>	<u>Pb (%)</u>	<u>Zn (%)</u>	<u>Cu (%)</u>	<u>BaSO<sub>4</sub> (%)<sup>4</sup></u>
Ore	100,800	0.015	5.75	1.08	1.90	0.24	31.9
Sulphide Concentrate	6,310	0.14	82.7	11.9	27.3	2.7	5.0
Barite Concentrate	28,428	-	-	-	-	-	93.0

Metal Recovery

## Sulphide Concentrate

Gold	58 percent
Silver	90 percent
Lead	69 percent
Zinc	90 percent
Copper	70 percent

## Barite Concentrate

Barium Sulphate	82 percent
-----------------	------------



### 6.3 PROCESS DESIGN CRITERIA

#### 6.3.1 Crushing Plant

Capacity	100,800 tons per year
	50 tons per hour
Operating Hours Per Day (5 Days per Week)	8
Product Size	minus 3/8 inch

#### 6.3.2 Concentrator

Capacity	100,800 tons per year
	12.5 tons per hour
Designed Availability	95 percent
Operating Days Per Year	355
Operating Hours Per Day	24
Ore Grades	0.24 percent copper
	1.08 percent lead
	1.90 percent zinc
	31.9 percent barite
	5.75 ounces per ton silver
	0.015 ounces per ton gold

#### 6.3.3 Sulphide Concentrate

2.6 percent copper
10.9 percent lead
27.5 percent zinc
3.5 percent BaSO <sub>4</sub>
61 ounces per ton silver
0.13 ounces per ton gold

#### 6.3.4 Barite Concentrate

93 percent barite	
Annual Production of Sulphide Concentrate	6,310 tons
Annual Production of Barite Concentrate	28,428 tons

6.3.5 GrindingPrimary Grinding

Feed Rate	12.5 tons per hour
Feed Size	minus 3/8 inch
Discharge	76 percent - 200 mesh
Calculated Horsepower	281
Installed Horsepower	300
Ball Mill Size	7.5 feet diameter x 10 feet
Work Index	10 kilowatt hours per ton

6.3.6 Barite Regrinding

Regrind Ball Mill Size	4 feet diameter x 6 feet
Calculated Horsepower	88
Installed Horsepower	100

6.3.7 Flotation

Sulphide Conditioning Time:	
Theoretical	5.0 minutes
Installed	15.0 minutes
Sulphide Rougher Time:	
Theoretical	16.8 minutes
Installed	22.3 minutes
Sulphide Scavenger Time:	
Theoretical	4.8 minutes
Installed	9.5 minutes
Sulphide First Cleaning Time:	
Theoretical	19.2 minutes
Installed	21.0 minutes
Sulphide Second Cleaning Time:	
Theoretical	14.4 minutes
Installed	15.8 minutes
Sulphide Third Cleaning Time:	
Theoretical	9.6 minutes
Installed	15.8 minutes

## Sulphide Fourth Cleaning Time:

Theoretical	9.6 minutes
Installed	16.2 minutes

## Barite Conditioning Time:

Theoretical	7.2 minutes
Installed	13.6 minutes

## Barite Rougher Time:

Theoretical	14.4 minutes
Installed	19.8 minutes

## Barite Scavenger Time:

Theoretical	4.8 minutes
Installed	9.8 minutes

## Barite First Cleaning Time:

Theoretical	12.0 minutes
Installed	12.8 minutes

## Barite Second Cleaning Time:

Theoretical	7.2 minutes
Installed	7.8 minutes

## Barite Third Cleaning Time:

Theoretical	7.2 minutes
Installed	7.3 minutes

6.3.8 Thickening and Filtration

## Sulphide Concentrate Thickening Area:

Theoretical	6.0 ft <sup>2</sup> per ton per day
Installed	8.2 ft <sup>2</sup> per ton per day

## Sulphide Concentrate Filter Unit Area:

Theoretical	4 ft <sup>2</sup> per ton per day
Installed	9.1 ft <sup>2</sup> per ton per day

## Barite Concentrate Thickening Unit Area:

Theoretical	6.0 ft <sup>2</sup> per ton per day
Installed	7.3 ft <sup>2</sup> per ton per day

## Barite Concentrate Filter Unit Area:

Theoretical	5 ft <sup>2</sup> per ton per day
Installed	5.4 ft <sup>2</sup> per ton per day

## 6.4 PROCESS DESCRIPTION

### 6.4.1 Crushing

Run-of-mine ore will be stored in the 150 ton coarse ore bin. The ore will be withdrawn from the bin by a 36 inch wide conveyor belt discharging to a grizzly with 3 inch openings. The oversize will be fed to a 20 inch by 36 inch jaw crusher, set at  $1\frac{1}{2}$  inches. The product, combined with the grizzly undersize, will be conveyed to a 4 foot by 10 foot vibrating double deck screen, with  $\frac{3}{8}$  inch openings in the bottom deck, in closed circuit with a 4 foot short-head cone crusher. The screen undersize will be conveyed to a 1000 ton fine ore bin. An electro-magnet will be installed ahead of the screen to remove most of the tramp metal.

### 6.4.2 Grinding

Fine ore will be fed from the bin by means of an 18 inch wide belt conveyor to a  $7\frac{1}{2}$  foot diameter by 10 foot long ball mill operating in closed circuit with a 15 inch cyclone. The cyclone overflow, regulated at 76 percent minus 200 mesh, will gravitate to the flotation area. Duplicate cyclones and cyclone feed pumps will be provided. Soda ash will be added in the mill to control the pH of the pulp.

### 6.4.3 Sulphide Flotation

The cyclone overflow will be fed to a sulphide conditioner where the pulp will be mixed with reagents including collectors, frother, modifiers and gangue depressant. From the conditioner, the pulp will flow to a sulphide rougher-scavenger tank, comprising 10 units of Denver No. 21 Sub A flotation cells. The rougher concentrate will be upgraded in four stages of cleaning in a bank of 9 units of Denver No. 18 Sub A flotation cells. The concentrates and the tailings in the cleaning stages will be counter-current and with the final concentrate pumped to the sulphide concentrate thickener. The tailings from the first stage of cleaning combined with the rougher tailings will be fed to the scavenger cells. The scavenger concentrate will be returned

to the grinding circuit, while the tailings will gravitate to the barite regrind circuit.

#### 6.4.4 Barite Flotation

The sulphide scavenger tailings will be reground to 80 percent minus 270 mesh, in a 4 foot diameter by 6 foot long ball mill in closed circuit with a 10 inch cyclone. The cyclone overflow will be mixed with barite flotation reagent in a 7 foot diameter by 7 foot high conditioner. After conditioning, the pulp will be fed to a barite rougher-scavenger tank, consisting of 10 units of Denver No. 21 Sub A flotation cells. The rougher concentrate will be upgraded in three stages of cleaning comprising 11 units of Denver No. 18 Sub A flotation cells, with the final concentrate fed to the barite thickeners. The tailings from the first cleaning stage will be combined with the rougher tailings to feed the scavenger cells. The scavenger concentrate will be returned to the barite regrind circuit, while the tailings combined with the overflow from the thickener will be pumped to the tailings impoundment area.

#### 6.4.5 Dewatering

The sulphide concentrate will be fed to a 14 foot diameter by 8 foot thickener. The thickener underflow will be filtered by a 6 foot diameter disc filter. The filter cake, with a 12 percent moisture content, will be stored on the sulphide concentrate pad. The filtrate will be returned to the thickener.

The barite concentrate will gravitate to a 28 foot diameter by 12 foot thickener. The thickener underflow will be filtered by a 6 foot diameter disc filter. The filter cake, with 12 percent moisture, will be stored on the barite concentrate pad. The filtrate will be returned to the barite thickener.

The overflow from both thickeners will be combined with the mill tailings and pumped to the tailings impoundment area.

## 6.5

TAILINGS DISPOSAL

The tailings produced by the processing plant will be pumped to the existing tailings impoundment area.

The decant water from tailings storage area will be returned to the mill for re-use in the processing plant.

## 7.0 ADMINISTRATION

## 7.0 ADMINISTRATION

### 7.1 ORGANIZATION AND PERSONNEL

The Mining Department and the Milling Department will report separately to a Mine Manager. The Mine Manager will reside in Kamloops, British Columbia, so he will be available to go to either the mine or the mill, as required. A telephone answering service in Kamloops will be advised daily of the Mine Manager's schedule, and will record messages for him. It is probable that the Mine Manager will perform his routine administrative work in the existing Mine Manager's office in the Dekalb Mill.

Central office functions will be kept to a minimum by:

- (a) Contracting of Services - Accounting, Engineering, Secretarial.
- (b) Contracting of Work - Ore Haulage, Road Maintenance.
- (c) Assigning the Following Functions as Departmental Responsibilities:
  - i) Safety - Supervision and Records;
  - ii) First Aid and Mine Rescue;
  - iii) Employee Relations and Personnel;
  - iv) Purchasing and Warehousing;
  - v) Maintenance;
  - vi) Security.

Table 7-1 is the Organization Chart for the Administration. It is indicated that the Mine Manager will take direct charge of contracted services and contracted work.

The Mine Manager will be the only employee classed as 'Administration'.

### 7.2 SERVICES AND SUPPLIES

#### 7.2.1 Secretarial

A secretarial service in Kamloops will be retained to process the Mine Manager's correspondence and files.



### 7.2.2 Accounting

An accounting firm in Kamloops will be retained to handle all the accounting work for the operations. This work will include:

- (a) Payroll and Issue of Cheques;
- (b) Accounts Receivable and Deposit of Receipts;
- (c) Accounts Payable and Issue of Cheques;
- (d) Financial Statements;

Corporate accounting may be integrated with the foregoing, if convenient. Auditing will be a separate function.

### 7.2.3 Engineering

Mining Engineering will be carried out, as required, using the services of a semiretired consulting engineer residing in the Kamloops area or the services of an established engineering firm. Assuming that the position of Mine Superintendent is held by a qualified mining engineer, outside Mining Engineering Services are estimated to be required for one week per month.

Metallurgical Consulting Services will be used on an ongoing basis, probably for 2 days per month.

Environmental Engineering Services will be retained to carry out the monitoring of waste discharges, at the intervals as specified by legislation.

### 7.2.4 Contracted Work

A Contract will be let for trucking the ore from the mine to the Dekalb Mill, a distance of 105 miles.

The ore will be dumped into the receiving bin at the Dekalb Mill. This bin arrangement is capable of receiving 'rear dump' trucks only, and there will be no attendant on duty at the dump.

Truck loads should be weighed at a supervised location, if possible, for payment purposes. However, the weight recorded in the mill could be used as a monthly check, if a satisfactory truck weighing system cannot be set up. Before the Contract is let, a procedure, that can be audited, will be established for recording the tonnage of ore hauled.

As part of the ore haulage Contract, delivery of samples from the mine to the mill will be included.

8.0 INCOME

## 8.0 INCOME

### 8.1 INCOME SUMMARY

Income from the Homestake property will be from the sale of concentrates produced by treatment of ore in the modified Dekalb Mill.

Production per month will be:

Sulfide Concentrate	-	525.83 tons
Barite Concentrate	-	2369.00 tons

from treating 8400 tons of ore.

Income from concentrates, based on \$10.00 U.S. per ounce for silver and barite concentrate of \$136.08 per ton, would be as follows:

Sulfide Concentrate	\$ 501,612 per month	-	\$ 59.72 per ton ore
Barite Concentrate	\$ 322,368 per month	-	38.38 per ton ore
TOTAL	\$ 823,980 per month =====	-	\$ 98.10 per ton ore =====

It is assumed this income will be received approximately 30 days after production of the concentrates.

### 8.2 SULFIDE CONCENTRATE NET SMELTER RETURN

#### Sulphide Concentrate

It is assumed that the sulphide concentrate will be sold as lead concentrate, based on Cominco open contract.

#### Metal Prices

Canadian \$ 0.26518 per pound of lead	(Northern Miner, Average
Canadian \$ 0.3875 per pound of zinc	for Nov. 23 to Nov. 29,
Canadian \$ 0.69 per pound of copper	1982, 5 days of Quotes)

Canadian \$ 9.8784 per ounce of silver  
 Canadian \$ 12.348 per ounce of silver (Selected)  
 Canadian \$543.312 per ounce of gold

Lead Payment Per Ton of Concentrate

$(11.9 - 0.1 (2.7 - 0.75)) 0.92 \times \text{C\$ } (0.26518 - 0.1) \times 20$  C\$ 33.024

Zinc Payment Per Ton of Concentrate

$(27.3 \times 20 - 20) \times 0.6 \times \text{C\$ } (0.3875 - 0.15)$  C\$ 74.955

Silver Payment Per Ton of Concentrate

At C\$ 9.8784 per ounce (US \$ 8 per ounce)  
 $(82.7 - 0.2 \times 2.7) 0.93 \times \text{C\$ } 9.8784 \times 0.97$  C\$ 732.1528

At C\$ 12.348 per ounce (US \$ 10 per ounce) C\$ 915.1910

Gold Payment Per Ton of Concentrate

$(0.14 - 0.03) \times 0.98 \times 543.312$  C\$ 58.5690

Total Payment Per Ton of Concentrate

Silver at C\$ 9.8784 per ounce (US \$8.00) C\$ 911.8360  
 C\$ 12.3480 per ounce (US \$10.00) C\$ 1094.8742

Deduction Per Ton of Concentrate

Treatment Charge C\$ 85.0000  
 Arsenic and Antimony  $(1.62 + 0.18 - 0.5) \times 1.75$  C\$ 2.2750  
 Alumina  $0.9 (2.34 - 0.5)$  C\$ 1.6560  
 Moisture  $0.4 \times 2 + 1 \times 2$  (12 percent moisture) C\$ 2.8000  
 Labour Rate  $(1707 - 1567) \times 0.08$  C\$ 11.2000  
 Truck Receipt Charge C\$ 6.0000

TOTAL DEDUCTION C\$ 108.931  
 =====

Concentrate Trucking to Smelter

Per Ton of Concentrate

C\$ 32.00

Net Smelter Return Per Ton of Sulphide Concentrate

At C\$ 9.8784 per ounce of silver (US \$8.00)

C\$ 770.905

At C\$ 12.348 per ounce of silver (US \$10.00)

C\$ 953.9432

## 8.3

BARITE SALES

Barite will be sold through a drill-mud supply company who will receive the material at the mill in bulk form. Net receipts to Kamad are estimated to be \$136.08 per ton of concentrate.

## 9.0 SOCIOECONOMIC CONSIDERATIONS

## 9.0 SOCIOECONOMIC CONSIDERATIONS

### 9.1 SOCIAL IMPACT

It is anticipated that the workforce of 44 persons required at the mine site will be available from the nearby established communities of Louis Creek, Barriere and possibly Kamloops, British Columbia. The workforce of 31 persons required at the mill site will be available from the established communities of Logan Lake and Ashcroft.

The Kamad Silver Project will provide employment for a small but regular workforce. Employment at the mining and milling operations will enable many employees to learn new, specialized skills.

### 9.2 LAND USE

#### 9.2.1 Mine Site Area

The existing cleared and levelled area adjacent to the 1750 foot mine portal will be utilized to locate the required surface plant and office structures. The waste rock produced by the mine development work will be utilized to enlarge the plant site area and for surfacing material. Drawing No. 100-10-F3 shows the surface plan of the required mine site buildings and installations.

#### 9.2.2 Mill Site Area

No additional site clearing or surface installations are required at the Dekalb mill-site area.

### 9.3 MINE WASTE ROCK MANAGEMENT AND MILL TAILINGS DISPOSAL

#### 9.3.1 Mine Waste Rock

The waste rock produced by the 1750 foot level mine development work will be utilized to enlarge the plant site area adjacent to the 1750



foot level portal. Waste rock from the 2250 foot level development work will be placed adjacent to the upper mine portal to provide a suitable service area.

9.3.2 Mill Tailings Disposal

The existing Dekalb mill tailings storage area is adequate to accommodate the tailings produced by the processing of the known Homestake mine ore.

9.4 WASTE WATER MANAGEMENT

The limited mine discharge water from the 1750 and 2250 foot levels will be collected and discharged to the surface drainage system. If required, the mine drainage will be treated before discharge.

10.0 SCHEDULES

## 10.0 SCHEDULES

The mine development schedule is included as Drawing No. 200-26-F1.

Once government permits have been obtained, the mine development is the critical item in the implementation at the project.

The critical item at the start of the project is the enlarging and support of the 1750 level adit. All development and stoping has been scheduled on a 3 shift per day basis until there are 4 developed stopes, at which time mine operations will revert to 2 shifts per day, 5 days per week.

11.0 CAPITAL COST

## 11.0 CAPITAL COST

### 11.1 SUMMARY

Capital costs are listed below by major items but do not include money spent prior to the date of this Report or money required to obtain approvals and financing:

<u>Description</u>	<u>Capital Cost</u>
Dekalb Purchase	\$ 1,700,000
Mine Surface Facilities	708,400
Mine Development	1,533,800
Mill Modification	844,200
Engineering	250,000
Contingency	333,600
	<hr/>
TOTAL	\$ 5,370,000 =====

### 11.2 BASIS OF ESTIMATE

#### 11.2.1 General

The capital cost estimate is based upon fourth quarter 1982 material, equipment and installation rates.

Construction costs at the mine site are based on supply and erection by manufacturer for the prefabricated buildings and other work being undertaken by local contracting firms.

Underground development costs are based on the work being undertaken by Kamad employee and supervised by Kamad staff which will be hired.

Mill modifications costs are based on undertaking the work with the personnel who will operate the mill.

Local contractors will be engaged to supplement the work force as required.

### 11.2.2 Design and Construction

The capital costs are based upon the mine drawings, process flowsheets and plant complex drawings included in this Feasibility Report; and equipment lists, general arrangement drawings and flowsheets supplied by Dekalb Mining Corporation.

### 11.2.3 Taxes, Duties and Freight

Taxes have been included on materials incorporated into the permanent structural/civil or building portions of the estimate. Federal sales tax on process equipment and material is not included in the estimate, as current regulations allow for tax exemption under qualification and certification of the end use of the equipment.

All federal government import duties, tariffs and levies have been included where applicable.

The cost of freight, transportation and delivery charges of permanent material and process equipment are included with the applicable specific item of capital cost.

### 11.2.4 Engineering and Site Services

Included in this estimate is the cost of engineering, procurement and site services for surface construction. It has been assumed that piping modification and electric modifications in the mill will be field run and that minimal design drawings will be supplied.

### 11.2.5 Contingency

This includes a specific provision for unforeseeable elements of cost within the defined Scope of Work for this Project. This value is based on previous experience, relating estimates and actual costs.

### 11.3 ITEMS EXCLUDED FROM THE ESTIMATE

The following items have not been included in the estimate:

- (a) Previous Project Costs;
- (b) Royalties;
- (c) Owner's Administration Expense;
- (d) Working Capital;
- (e) Feasibility Reports;
- (f) Environmental Studies and Submissions;
- (g) Spare parts - assumed to be from Dekalb Inventory;
- (h) Interest on borrowed capital.

### 11.4 ESTIMATE DETAILS

The estimate details are given on the following pages:

# KILBORN

## PROJECT ESTIMATE

TYPE \_\_\_\_\_

SHEET No 1 OF 1

ESTIMATE No \_\_\_\_\_

DATE Dec 1982

PROJECT HOMESTAKE

PROJ. No 7560

DIV. No 16

ESTIMATOR \_\_\_\_\_ CHECKED \_\_\_\_\_

AREA Project Summary

AREA No \_\_\_\_\_

EXTENSIONS \_\_\_\_\_ APPROVED \_\_\_\_\_

CLIENT: KAMAD SILVER Co. Ltd

ACCOUNT CODE	DESCRIPTION	TYPE	QUANTITY	UNIT	LABOUR				MATERIAL				TOTAL COST			
					UNIT MH	TOTAL MH	RATE MH	COST	UNIT COST	COST	UNIT COST	COST				
	<u>Project Summary</u>															
100	SITE AND GENERAL							118200		206200						324400
220	CHANGEHOUSE / OFFICE							118300		1118300						136600
230	POWER / COMPRESSOR HOUSE							44400		63400						107800
240	MAINTENANCE SHOP							29000		76800						105800
B10	MINE INDIRECT ACCOUNT											33800				33800
	MINE SURFACE FACILITIES							209900		464700			33800			708400
250	MINE DEVELOPMENT							630260		618540			285000			1533800
300	CONCENTRATOR MODIFICATIONS							309250		494750						804000
B10	CONCENTRATOR INDIRECT ACCOUNT											40200				40200
	CONCENTRATOR							309250		494750			40200			844700
900	ENGINEERING AND CONSTRUCTION SERVICES											250000				250000
950	CONTINGENCY											333600				333600



CLIENT: KAMAD SILVER CO. LTD

PROJ. No. 7560

TYPE \_\_\_\_\_

ESTIMATOR \_\_\_\_\_ CHECKED \_\_\_\_\_

— SHEET No 1 OF 1

AREA No 100

EXTENSIONS \_\_\_\_\_ APPROVED \_\_\_\_\_

ESTIMATE NO. \_\_\_\_\_

DATE DEC 1982

ACCOUNT CODE	DESCRIPTION	TYPE	QUANTITY	UNIT	LABOUR			MATERIAL			TOTAL COST		
					UNIT MH	TOTAL MH	RATE MH	COST	UNIT COST	COST	UNIT COST	COST	TOTAL COST
	<u>SUMMARY</u>												
110	SITE PREPARATION							9000		10000			19000
112	ROADS AND DRAINAGE							25200		54300			79500
120	WATER SUPPLY							30100		46500			76600
125	SEWAGE DISPOSAL							17500		30500			48000
130	FUEL STORAGE							30900		24400			55300
140	FIRE PROTECTION							15000		85000			100000
150	COMMUNICATION							40000		60000			100000
160	SURFACE MOBILE EQUIPMENT							-		26000			26000

# KILBORN

NT: KAMAD SILVER Co. LTD.

PROJECT HOMESTAKE  
FEASIBILITY STUDY  
 AREA SITE AND GENERAL

PROJ No. 7560  
 DIV. No. 16  
 AREA No. 100

ESTIMATOR \_\_\_\_\_ CHECKED \_\_\_\_\_  
 EXTENSIONS \_\_\_\_\_ APPROVED \_\_\_\_\_

PROJECT ESTIMATE

TYPE \_\_\_\_\_  
 SHEET No. 1 OF 5  
 ESTIMATE No. \_\_\_\_\_  
 DATE DEC 1982

COUNT CODE	DESCRIPTION	TYPE	QUANTITY	UNIT	LABOUR			COST	MATERIAL			COST	TOTAL COST		
					UNIT MH	TOTAL MH	RATE MH		UNIT COST	COST	UNIT COST	COST			
110	<u>SITE PREPARATION</u>														
	- AN ALLOWANCE FOR LEVELING AND BULK EXCAVATION		Sum					9000		10000				19000	
	TOTAL SITE PREPARATION							9000		10000				19000	
112	<u>ROADS AND DRAINAGE</u>														
	UPGRADING OF ROAD FROM HIWAY TO 1750 PORTAL - GRADING AND GRAVEL TOPPING		1600	FT.				6500		13000				19500	
	UPGRADING OF ROAD FROM 1750 PORTAL TO 2250 LEVEL PORTAL - GRADING AND GRAVELLING (4 WHEEL DRIVE QUALITY)		6500	FT.				12600		32300				44900	
	DRAINAGE DITCH FROM 1750 PORTAL		1500	FT.				4200		6400				10600	
	SETTLING POND - MINE PORTAL		220	YD <sup>3</sup>				1900		2000				1500	
	TOTAL ROADS AND DRAINAGE							25200		54300				79500	

# KILBORN

## PROJECT ESTIMATE

CLIENT: KAMAD SILVER CO. LTD.

PROJECT: HOMESTAKE

PROJ. No. 7560

TYPE: \_\_\_\_\_

DIV. No. 16

ESTIMATOR: \_\_\_\_\_ CHECKED: \_\_\_\_\_ SHEET No. 2 OF 5

AREA: SITE AND GENERAL

AREA No. 100

EXTENSIONS: \_\_\_\_\_ APPROVED: \_\_\_\_\_ ESTIMATE No. \_\_\_\_\_

DATE: DEC 1982

ACCOUNT CODE	DESCRIPTION	TYPE	QUANTITY	UNIT	LABOUR				MATERIAL				TOTAL COST			
					UNIT MH	TOTAL MH	RATE MH	COST	UNIT COST	COST	UNIT COST	COST				
120	<u>WATER SUPPLY</u>															
	WATER WELL INCLUDING PURCHASE AND INSTALL PUMP AND MOTOR (WELL EXISTING)		Sum					1000		2000					3000	
	ELECTRIC POWER SERVICE		Sum					3300		2800					6100	
	PIPELINE -		Sum					5500		7000					12500	
	WATER TANK AND FINE WATER STORAGE		1	No.				7500		19000					26500	
	PIPING VALVES AND FITTINGS INCLUDING FLORINATION		Sum					12800		15700					28500	
	TOTAL - PLANT WATER SUPPLY							30100		46500					76600	
125	<u>SEWAGE DISPOSAL</u>															
	SEWAGE TREATMENT PLANT - PREFABRICATED		1	No.				7500		20000					27500	
	EXCAVATION AND BACKFILL - PLANT AND PIPELINES		Sum					3500		5500					9000	
	PIPING VALVES AND FITTINGS		Sum					4000		3000					7000	
	DISPOSAL FIELD		Sum					2500		2000					4500	
	TOTAL - SEWAGE DISPOSAL							17500		30500					48000	

# KILBORN

## PROJECT ESTIMATE

TYPE \_\_\_\_\_

SHEET No. 3 OF 5

ESTIMATE No. \_\_\_\_\_

DATE DEC 1982

PROJECT HOMESTAKE

PROJ. No. 7560

DIV. No. 10

AREA No. 100

ESTIMATOR \_\_\_\_\_ CHECKED \_\_\_\_\_

EXTENSIONS \_\_\_\_\_ APPROVED \_\_\_\_\_

AREA SITE AND GENERAL

AGENT KAMAD SILVER CO. LTD.

ACCOUNT CODE	DESCRIPTION	TYPE	QUANTITY	UNIT	LABOUR				MATERIAL				TOTAL COST			
					UNIT MH	TOTAL MH	RATE MH	COST	UNIT COST	COST	UNIT COST	COST				
130	FUEL STORAGE															
	DIESEL FUEL TANK (TANK EXISTING)		1	No				4500								4500
	PUMP C/W MOTOR		1	No				1400		3200						4600
	PIPING AND VALVES - DISTRIBUTION		Sum					4000		3500						7500
	INSULATION AND HEAT TRACING		Sum					2600		1700						4300
	ELECTRICAL POWER SERVICE		Sum					2200		2100						4900
	INSTRUMENTATION		Sum					1400		3800						5200
	PROPANE STORAGE TANK		2	No				3300		Rental						3300
	VAPORIZER SYSTEM		1	No				800		Rental						800
	EXCAVATION, BACKFILL AND GRAVEL FOUNDATION FOR STORAGE TANKS		Sum					1100		1400						2500
	CONTAINMENT DYKE AROUND DIESEL STORAGE TANK		Sum					3700		4400						8100
	PIPING, VALVES AND FITTINGS PROPANE DISTRIBUTION		Sum					5300		4300						9600



# KILBORN

PROJECT ESTIMATE

TYPE \_\_\_\_\_

SHEET No. 4 OF 5

ESTIMATE No. \_\_\_\_\_

DATE DEC 1982

PROJECT HOMESTEAD

PROJ No. 7560

DIV. No. \_\_\_\_\_

ESTIMATOR \_\_\_\_\_ CHECKED \_\_\_\_\_

AREA SITE AND GENERAL

AREA No. 100

EXTENSIONS \_\_\_\_\_ APPROVED \_\_\_\_\_

CLIENT: KAMAD Silver Co. Ltd

ACCOUNT CODE	DESCRIPTION	TYPE	QUANTITY	UNIT	LABOUR				MATERIAL				TOTAL COST			
					UNIT MH	TOTAL MH	RATE MH	COST	UNIT COST	COST	UNIT COST	COST				
140	FIRE PROTECTION															
	PORTABLE FIRE PROTECTION EQUIPMENT		Sum					1500		8500					10000	
	TOTAL - FIRE PROTECTION							1500		8500					10000	
150	COMMUNICATIONS															
	Allow for extending telephone from main highway		Sum					4000		6000					10000	
	total - Communications							4000		6000					10000	

# KILBORN

PROJECT ESTIMATE

TYPE \_\_\_\_\_

PROJECT HOMESTAKE

PROJ. No. 7560

SHEET No. 5 OF 5

CLIENT KAMAD SILVER CO. LTD.

DIV. No. 16

ESTIMATOR \_\_\_\_\_ CHECKED \_\_\_\_\_

AREA SITE AND GENERAL

AREA No. 100

EXTENSIONS \_\_\_\_\_ APPROVED \_\_\_\_\_

ESTIMATE No. \_\_\_\_\_

DATE DEC 1982

ACCOUNT CODE	DESCRIPTION	TYPE	QUANTITY	UNIT	LABOUR				MATERIAL				TOTAL COST			
					UNIT MH	TOTAL MH	RATE MH	COST	UNIT COST	COST	UNIT COST	COST				
160	SURFACE MOBILE EQUIPMENT															
	PICKUP TRUCK (FROM DEKALB)		2	No.				-		-						
	AMBULANCE (PICKUP CONVERSION)		1	No.				-		6000						6000
	VAN - TO HAUL MEN TO 2250 L.		1	No.				-		20000						20000
	LOADER (FROM DEKALB)		1	No.				-		-						-
	total - SURFACE MOBILE EQUIPMENT							-		26000						26000

KILBORN

CLIENT: KAMAD SILVER CO. LTD

PROJECT: HOMESTAKE  
AREA: OFFICE / CHANGEHOUSE

PROJ No 7560  
DIV No 16  
AREA No 220

ESTIMATOR \_\_\_\_\_ CHECKED \_\_\_\_\_  
EXTENSIONS \_\_\_\_\_ APPROVED \_\_\_\_\_

PROJECT ESTIMATE  
TYPE \_\_\_\_\_  
SHEET No 1 OF 1  
ESTIMATE No \_\_\_\_\_  
DATE DEC 1982

ACCOUNT CODE	DESCRIPTION	TYPE	QUANTITY	UNIT	LABOUR				MATERIAL				TOTAL COST			
					UNIT MH	TOTAL MH	RATE MH	COST	UNIT COST	COST	UNIT COST	COST				
	CHANGEHOUSE / OFFICE															
	FACTORY BUILT MODULAR OFFICE /															
	CHANGEHOUSE C/W 36' x 68'															
	- WET & DRY LOCKERS															
	- LPG. HEAT															
	- WASHROOM FACILITIES															
	PURCHASE, TRANSPORT AND INSTALLATION		1	EA				12500		121000					121500	
	SITE PREPARATION		Sum					2300		3200					5500	
	UTILITY SERVICES		Sum					5500		4100					9600	
	OVERHEAD POWER, LPG. WATER SEWER ETC.															
	OFFICE FURNITURE AND EQUIPMENT									By OWNER						

# KILBORN

ENT: KAMAD SILVER CO LTD

PROJECT HOMESTAKE

PROJ No 7560

DIV No 16

AREA POWER / COMPRESSOR HOUSE

AREA No 230

PROJECT ESTIMATE

TYPE \_\_\_\_\_

ESTIMATOR \_\_\_\_\_ CHECKED \_\_\_\_\_ SHEET No 1 OF 1

EXTENSIONS \_\_\_\_\_ APPROVED \_\_\_\_\_ ESTIMATE No \_\_\_\_\_

DATE DEC 1982

COUNT CODE	DESCRIPTION	TYPE	QUANTITY	UNIT	LABOUR			MATERIAL				TOTAL COST																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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	PREFABRICATED STEEL FRAME BUILDING 40' LONG X 40' WIDE PURCHASE, DELIVERY AND ERECTION		1	EA																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								</



# KILBORN

CLIENT: KAMAR SILVER CO. LTD

PROJECT: HOMESTEAKE

PROJ No 7560

PROJECT ESTIMATE

TYPE \_\_\_\_\_

DIV. No 16

ESTIMATOR \_\_\_\_\_ CHECKED \_\_\_\_\_ SHEET No 1 OF 1

AREA: MAINTENANCE SHOP

AREA No 240

EXTENSIONS \_\_\_\_\_ APPROVED \_\_\_\_\_ ESTIMATE No \_\_\_\_\_

DATE: DEC 1982

ACCOUNT CODE	DESCRIPTION	TYPE	QUANTITY	UNIT	LABOUR				MATERIAL				TOTAL COST			
					UNIT MH	TOTAL MH	RATE MH	COST	UNIT COST	COST	UNIT COST	COST				
	MAINTENANCE SHOP															
	PREFABRICATED STEEL FRAME BUILDING															
	50' LONG X 40' WIDE															
	1 - PURCHASE (TAX INCLUDED)		1	EA						42300					42300	
	1 - DELIVERY		1	EA						INCLUDED						
	1 - ERECTION		1	EA				3000							3000	
	SITE LEVELING		Sum					1400		2000					3400	
	CONCRETE FLOOR		40	YD <sup>3</sup>				5200		2080					14000	
	FACTORY BUILT OFFICE & WAREHOUSE		1	EA				1400		9000					10400	
	10' LONG X 20' WIDE															
	- PURCHASE, TRANSPORT AND INSTALL (TAX INCLUDED)															
	ELECTRICAL SERVICES - SHOP		Sum					2800		1700					1500	
	OVERHEAD POWER SERVICE TO SHOP		Sum					2600		1200					3800	
	LIGHTING - SHOP		Sum					6600		5800					12400	
	HEATING - SHOP		Sum					2300		6000					12000	
	WORKSHOP TOOLS AND BENCHES									FROM DEKALB						

# KILBORN

ENT: KAMAD SILVER LIMITED

PROJECT HOMESTAKE

PROJ No 7560

DIV No 16

AREA MINE DEVELOPMENT - SUMMARY

AREA No 250

ESTIMATOR \_\_\_\_\_ CHECKED \_\_\_\_\_

EXTENSIONS \_\_\_\_\_ APPROVED \_\_\_\_\_

PROJECT ESTIMATE

TYPE \_\_\_\_\_

SHEET No 1 OF 7

ESTIMATE No \_\_\_\_\_

DATE \_\_\_\_\_

COUNT CODE	DESCRIPTION	TYPE	QUANTITY	UNIT	LABOUR				MATERIAL				OTHER				TOTAL COST			
					UNIT MH	TOTAL MH	RATE MH	COST	UNIT COST	COST	UNIT COST	COST	UNIT COST	COST	UNIT COST	COST				
	LEVEL REHABILITATION 1750 LEVEL							125700		167060		161400					454160			
	LEVEL REHABILITATION 2250 LEVEL							39730		34840							73570			
	REHABILITATE 1750 RAISE - INSTALL ORE PASS							40380		99080							139460			
	STOPE DEVELOPMENT							94000		65560		6000					165560			
	MINE EQUIPMENT,							21700		126000							147700			
	SUPERVISION DURING DEVELOPMENT							157500		-							157500			
	MAINTENANCE AND SURVEY OPERATIONS							114450		-							114450			
	ADMINISTRATION DURING DEVELOPMENT PERIOD							37800		7200		117600					162600			
	OPERATING AND MAINTENANCE SUPPLIES DURING DEVELOPMENT PERIOD							-		123800							123800			

CLIENT: KAMAD SILVER, LTD.

PROJECT HOMESTAKE

PROJ. No. 7560

DIV. No. 16

AREA No. 250

PROJECT ESTIMATE

TYPE \_\_\_\_\_

ESTIMATOR \_\_\_\_\_ CHECKED \_\_\_\_\_ SHEET No. 2 OF 7

EXTENSIONS \_\_\_\_\_ APPROVED \_\_\_\_\_ ESTIMATE NO. \_\_\_\_\_

DATE \_\_\_\_\_

AREA LEVEL REHABILITATION - 1750 LEVEL

ACCOUNT CODE	DESCRIPTION	TYPE	QUANTITY	UNIT	LABOUR				MATERIAL		CONTRACTED		TOTAL COST
					UNIT MH	TOTAL MH	RATE MH	COST	UNIT COST	COST	UNIT COST	COST	
	<u>SLASH AND MUCK 1900 FT. ON LEVEL</u>												
	- INCREASE WIDTH BY 4 FT.												
	30 DAYS x 6 MEN (50' DAY BREAKING)					1824	24.51	44800					
	- L.H.D. & TRUCK HOURS = 50 DAYS x 12 HRS =		600	HRS					14.14	8480			
	- EXPLOSIVES, DRILLING, ETC.		76,000	FT <sup>3</sup>					0.20	15200			68500
	<u>SHOTCRETE 540 FT. OF ABOVE</u>		10,400	FT <sup>3</sup>							8.77	161400	161400
	<u>TIMBER 540 FT. OF ABOVE</u>		540	FT					120	64800			
	POSTS - 12" Ø x 10' x 2 = 108 B.F. @ 340' / MH = 6372												
	CAP 12" Ø x 16" = 256 B.F. @ 410' / MH = 11264												
	LOGGING 6" x 16" x 6' = 576 B.F. @ 415' / L = 23904												
	PICKING ALLOW 500 B.F. @ 310' / L = 15500												
	PIPS 6 x 4" = 24.00												
	ROCKNUTS (13" Ø) SHANK (1.5") WASH (0.5") = 5' x 1.5" = 79.00												
	TOTAL PER 6 FT. SET = 673.00												
	TOTAL PER FOOT = 112' x 6' / 114' = 120.00												
	<u>LABOUR - 14 MAN HOUR PER SET = 2.3 per FOOT</u>					1242	24.51	30520					95320
	<u>CROSSCUT 280' TO 500 VEIN (10' x 14')</u>												
	<u>+ DRIEF 200 FT - TOTAL 480 FT</u>												
	<u>LABOUR - (9" / 3 MAN SH) 480' x 39' = 1200 MH</u>					1280	28.78	36800					36800
	<u>TIMBER 50% - 2.3 MH x 480' / FT = 552 MH</u>					552	24.51	13560					13560
	<u>L.H.D. &amp; TRUCK HRS = 6' x 53 SHIFTS = 315 HRS</u>		315	HRS					14.14	4480			4480
	<u>TIMBER COST = (FOR 480 / 2 = 240 FT)</u>		240	FT					120.00	28800			28800
	<u>ROCK BOLTS - Allow. 1 per foot</u>		480	bolts					5.70	2730			2730
	<u>SCREEN - Allowance</u>									1000			1000
	<u>EXPLOSIVES</u>		480	FT					63.38	30420			30420
	<u>DRILLING COSTS</u>		480	FT					12.81	6150			6150
	<u>OTHER</u>		480	FT					10.00	4800			4800

KILBORN

CLIENT: KAMAD SILVER LTD

PROJECT HOMESTEAK  
AREA REHABILITATE 2250 LEVEL

PROJ. No 7560  
DIV. No. 16  
AREA No 250

ESTIMATOR \_\_\_\_\_ CHECKED \_\_\_\_\_  
EXTENSIONS \_\_\_\_\_ APPROVED \_\_\_\_\_

PROJECT ESTIMATE  
TYPE \_\_\_\_\_  
SHEET No 3 OF 7  
ESTIMATE No \_\_\_\_\_  
DATE \_\_\_\_\_

ACCOUNT CODE	DESCRIPTION	TYPE	QUANTITY	UNIT	LABOUR				MATERIAL				TOTAL COST			
					UNIT MH	TOTAL MH	RATE MH	COST	UNIT COST	COST	UNIT COST	COST				
	SLASH 1040' TO 12' WIDE (4' SLASH)		38,000	ft <sup>2</sup>		\$0.70 per c.f.		26600	0.90	15200						
	Rock Bolt ABOVE (1 per foot)		1,040	bolts		incl.			518	5490						47290
	REHABILITATE 300 VEIN H.W. DR.															
	2.0 MAN SHIFTS (NORM) + 80 Scoopman Hours		80	Hours		160	24.57	3930	14.14	1130						11240
	Rock bolts (Allowance)		200	bolts					528	1060						
	TIMBER (Allowance)		12	mbf.					430	5160						
	GRAVEL ROADBED - IN PLACE (1040' x 12' x 3') ÷ 27 =		1400	yd <sup>3</sup>		\$3.00 / yd		4200	2.00	2800						7000
	MISCELLANEOUS, (EXPLOSIVE MAGAZINES, TOILETS, STORAGE, ETC.) - ALLOWANCE		SUM					4000		4000						4000



# KILBORN

AGENT: KAMAD SILVER CO. LTD.

PROJECT HOMESTAKE

PROJ NO 7560

DIV. No. 16

ESTIMATOR \_\_\_\_\_ CHECKED \_\_\_\_\_

PROJECT ESTIMATE

TYPE \_\_\_\_\_

SHEET No 4 OF 7

EXTENSIONS \_\_\_\_\_ APPROVED

ESTIMATE NO. \_\_\_\_\_

DATE \_\_\_\_\_

AREA CLEAN OUT AND REHABILITATE 1750 RAISE

COUNT CODE	DESCRIPTION	TYPE	QUANTITY	UNIT	LABOUR				MATERIAL				TOTAL COST			
					UNIT MH	TOTAL MH	RATE MH	COST	UNIT COST	COST	UNIT COST	COST	COST	COST		
	<u>CLEAN OUT AND REMOVE BROKEN ROCK FROM RAISE - ASSUME 20% FULL</u> <u>- 8' x 10' x 4.17' x 60% ÷ 27 = 795 YD<sup>3</sup> = 400 SCOOPS</u> <u>40 SCOOPS PER MAN SHIFT = 10 M.S. (60 MIN MAX)</u>  <u>COST PER L.H.D. HD = FUEL (3.91) + TIRES (1.72) + MISC (8.44) = \$4.14</u>					80	24.57	1970	14.14	1130					3100	
	<u>REHABILITATE AND TIMBER AT TOP OF RAISE (ALLOW)</u>					120	24.57	2950		1200					4150	
	<u>SCALE, ROCKBOLT, INSTALL TIMBER IN RAISE</u> <u>- 2 MAN CREW - REHABILITATE 10 FT. / SHIFT</u> <u>MAN SHIFTS = 4.17 ÷ 10 ÷ 2 = .90 M.S. x 114 MFS</u> <u>ROCKBOLTS - 2 PER FOOT = 4.17' x 2 = 8.34</u> <u>TIMBER = 300 bf / 32" = 113.6 f / ft @ 130" / mbf</u> <u>= 113.6 f x 4.17 ft = 50 mbf</u>		894	each		720	24.57	17690		5.28	4720				43910	
			50	mbf					430.00	21500						
	<u>BUILD CHUTE - AIR OPERATED</u>		504			80	24.57	1970	3800	3800					5770	
	<u>INSTALL STEEL MILLHOLE (#109 / ft. FOR SURE)</u> <u>- 2 MAN CREW - INSTALL 20 FT. / SHIFT</u> <u>MAN SHIFTS = 4.17' ÷ 20' x 2 men x 8 hrs =</u> <u>TIMBER (12' x 3' x 4.17) = 1.6 mbf</u> <u>GRAVEL = 4.17' x (4 1/2' x 4 1/2' - π x 2<sup>2</sup>) ÷ 27 = 127</u>		447	ft.				1200	109	45720					66620	
			16	mbf		358	24.57	8800		430	6880					
			127	yd <sup>3</sup>					10	1270						
	<u>EXCAVATE 3 FURTHER LEVEL STATIONS</u> <u>3 x 10' x 10' x 20' =</u>		6000	ft <sup>3</sup>		100/c.f.		6000	0.81	4860					10860	

CLIENT: KAMAO SILVER LTD

PROJECT HONGSTAKE

AREA STONE DEVELOPMENT

PROJ No 7560  
DIV. No 16  
AREA No 250

TYPE \_\_\_\_\_  
SHEET No. 5 OF 7  
ESTIMATE No. \_\_\_\_\_  
DATE \_\_\_\_\_

[illegible]

CLIENT: KAMAD SILVER LTD

PROJECT HOMESTAKE

PROJ. No. 7560

PROJECT ESTIMATE

TYPE \_\_\_\_\_

DIV. No. 16

ESTIMATOR \_\_\_\_\_ CHECKED \_\_\_\_\_ SHEET No 6 OF 7

AREA MINE EQUIPMENT, SUPERVISION DURWC  
DEVELOPMENT.

AREA No 250

EXTENSIONS \_\_\_\_\_ APPROVED \_\_\_\_\_ ESTIMATE NO. \_\_\_\_\_

DATE \_\_\_\_\_

[illegible]

# KILBORN

CLIENT: \_\_\_\_\_

PROJECT: \_\_\_\_\_

AREA: \_\_\_\_\_

PROJ No 7560

DIV No 16

AREA No 250

PROJECT ESTIMATE

TYPE \_\_\_\_\_

ESTIMATOR \_\_\_\_\_ CHECKED \_\_\_\_\_ SHEET No 7 OF 7

EXTENSIONS \_\_\_\_\_ APPROVED \_\_\_\_\_ ESTIMATE No \_\_\_\_\_

DATE \_\_\_\_\_

OVERHEAD COSTS - SIX MONTH PERIOD

ACCOUNT CODE	DESCRIPTION	TYPE	QUANTITY	UNIT	LABOUR			COST	MATERIAL		OTHER		TOTAL COST
					UNIT MH	TOTAL MH	RATE MH		UNIT COST	COST	UNIT COST	COST	
	<u>ADMINISTRATION</u>												
	MANAGERS SALARY - \$6,300 x 6 MOS.							378000					378000
	CONTRACTED FUNCTIONS - 3,800 x 6 MOS.											22800	22800
	CONSULTING SERVICES 3500 x 6 MOS.											21000	21000
	COMMUNICATIONS 1,900 x 6 MOS.											11400	11400
	FREIGHT COSTS 1,200 x 6 MOS.									7200			7200
	TRAVEL COSTS 1,000 x 6 MOS.											6000	6000
	RECRUITMENT 1,900 x 6 MOS.											11400	11400
	INSURANCE 7,500 x 6 MOS.											45000	45000
								378000		7200		117600	162600
	<u>TOTAL ADMINISTRATION</u>												
	<u>OPERATING SUPPLIES (BALANCE INCL. IN UNIT)</u>												
	DIESEL OIL - COMPRESSOR & GENERATOR		26,000	GAL					1.70	44200			
	PROPANE		21,200	GAL					1.14	24200			
	MISCELLANEOUS SUPPLIES (ESTIMATE)									20000			
	<u>TOTAL OPERATING SUPPLIES</u>									88400			88400
	<u>MAINTENANCE MATERIALS</u>												
	ELECTR. GENERATORS. \$1,400 x 6 MOS.									8400			8400
	AIR COMPRESSORS 1,200 x 6 MOS.									7200			7200
	PUMPS 200 x 6 MOS.									1200			1200
	BUILDINGS 400 x 6 MOS.									2400			2400
	SMALL VEHICLES \$1,100 x 6 MOS.									6600			6600
	ELECTRICAL MISCELLANEOUS 800 x 6 MOS.									4800			4800
	MECHANICAL MISCELLANEOUS 600 x 6 MOS.									4800			4800
	<u>TOTAL MAINTENANCE MATERIALS</u>									35400			35400



# KILBORN

CLIENT: KAMAD SILVER CO. LTD

PROJECT: Homestake

AREA: Concentrator

PROJ No 7560

DIV No 16

AREA No 300

PROJECT ESTIMATE

TYPE \_\_\_\_\_

ESTIMATOR \_\_\_\_\_ CHECKED \_\_\_\_\_ SHEET No 1 OF 6

EXTENSIONS \_\_\_\_\_ APPROVED \_\_\_\_\_ ESTIMATE IN \$ \_\_\_\_\_

DATE Dec 1982

ACCOUNT CODE	DESCRIPTION	TYPE	QUANTITY	UNIT	LABOUR				MATERIAL				TOTAL COST			
					UNIT MH	TOTAL MH	RATE MH	COST	UNIT COST	COST	UNIT COST	COST				
	<u>MODIFICATIONS TO EXISTING DEKALIS MILL</u>															
	<u>SULPHIDE CIRCUIT</u>															
1	<u>INSTALL EXISTING 15" DIA CYCLONE</u>		1	No				18.00							18.00	
	<u>- NEW SUPPORT STEEL</u>		1	No				14.00		22.00					36.00	
2	<u>INSTALL EXISTING CYCLONE FEED PUMP</u>															
	<u>AND MOTOR - STAND BY SERVICE</u>		1	No				21.00							21.00	
	<u>- NEW CONCRETE PUMP FOUNDATION</u>		1	No				14.00		16.00					30.00	
3	<u>MODIFY EXISTING GRINDING CIRCUIT</u>															
	<u>PIPING, VALVES AND FITTINGS - STAND-BY</u>		Sum													
	<u>PUMP AND CYCLONE</u>		Sum					95.00		6.00					155.00	
4	<u>MODIFY EXISTING FLOTATION CIRCUIT</u>															
	<u>PIPING, VALVES AND FITTINGS</u>		Sum					115.00		98.00					213.00	
5	<u>THICKENER TANK - 14' DIA x 8' M S</u>															
	<u>C/W WEIR - NO LINING</u>		1	No				12.00		136.00					178.00	
	<u>- SUPPORT STEEL</u>		Sum					26.00		75.00					101.00	
	<u>- CONCRETE FOUNDATIONS</u>		Sum					42.00		43.00					85.00	
6	<u>THICKENER MECHANISM C/W DRIVE AND</u>															
	<u>1.5 HP MOTOR - 14' DIA</u>		1	No				49.00		185.00					234.00	

# KILBORN

CLIENT: KAMAD SILVER CO. LTD.

PROJECT: HOMESTRIKE

PROJ No 7560

PROJECT ESTIMATE

TYPE \_\_\_\_\_

DIV. No 16

ESTIMATOR \_\_\_\_\_ CHECKED \_\_\_\_\_ SHEET No 3 OF 6

AREA: CONCENTRATOR

AREA No 300

EXTENSIONS \_\_\_\_\_ APPROVED \_\_\_\_\_ ESTIMATE NO \_\_\_\_\_

DATE DEC 1982

ACCOUNT CODE	DESCRIPTION	TYPE	QUANTITY	UNIT	LABOUR				MATERIAL				TOTAL COST			
					UNIT MH	TOTAL MH	RATE MH	COST	UNIT COST	COST	UNIT COST	COST				
	<u>SULPHIDE CIRCUIT - CONTINUED</u>															
14	<u>CONCRETE FOUNDATIONS FOR 1-TANK AND TWO PUMPS</u>		<u>SUM</u>					<u>2800</u>		<u>3100</u>					<u>5900</u>	
15	<u>MODIFY EXISTING THICKENING CIRCUIT</u>		<u>SUM</u>					<u>8500</u>		<u>3500</u>					<u>12000</u>	
	<u>PIPING VALVES AND FITTINGS</u>		<u>SUM</u>					<u>12500</u>		<u>6500</u>					<u>19000</u>	
	<u>- NEW PIPING VALVES AND FITTINGS</u>		<u>SUM</u>													
	<u>BARITE CIRCUIT</u>															
1	<u>INSTALL EXISTING REGRIND MILL</u>															
	<u>4'DIA x 6' LONG</u>		<u>1</u>	<u>No.</u>				<u>7800</u>							<u>7800</u>	
	<u>- NEW MOTOR 100 HP.</u>		<u>1</u>	<u>No.</u>				<u>1200</u>		<u>9800</u>					<u>11000</u>	
	<u>- NEW DRIVE BELTS, GUARD ETC.</u>		<u>1</u>	<u>No.</u>				<u>1100</u>		<u>3600</u>					<u>4700</u>	
	<u>- CONCRETE FOUNDATION</u>		<u>SUM</u>					<u>4900</u>		<u>6800</u>					<u>11700</u>	
2	<u>FEED AND DISCHARGE CHUTES</u>		<u>2</u>	<u>No.</u>				<u>2100</u>		<u>3800</u>					<u>5900</u>	
3	<u>PUMP BOX - REGRIND MILL - NO LINING</u>		<u>1</u>	<u>No.</u>				<u>1300</u>		<u>4500</u>					<u>6000</u>	
4	<u>PUMP - REGRIND CYCLONE FEED C/W</u>															
	<u>75 HP MOTOR</u>		<u>1</u>	<u>No.</u>				<u>1800</u>		<u>1400</u>					<u>6200</u>	

# KILBORN

CLIENT: KAMAD SILVER CO. LTD.

PROJECT: Home Stake

AREA: Concentrator

PROJ No. 7560

DIV No. 16

AREA No. 300

PROJECT ESTIMATE

TYPE \_\_\_\_\_

ESTIMATOR \_\_\_\_\_ CHECKED \_\_\_\_\_ SHEET No. 4 OF 6

EXTENSIONS \_\_\_\_\_ APPROVED \_\_\_\_\_ ESTIMATE No. \_\_\_\_\_

DATE DEC 1982

ACCOUNT CODE	DESCRIPTION	TYPE	QUANTITY	UNIT	LABOUR				MATERIAL				TOTAL COST			
					UNIT MH	TOTAL MH	RATE MH	COST	UNIT COST	COST	UNIT COST	COST				
	<u>Barite Circuit - CONTINUED</u>															
5.	<u>Cyclone - 10" dia REGRIND c/w OVER AND UNDERFLOW LAUNDERS</u>		<u>2</u>	<u>No.</u>				<u>3700</u>		<u>11500</u>					<u>15200</u>	
6.	<u>Concrete Foundations FOR Pump Box and pump</u>		<u>2</u>	<u>No.</u>				<u>2100</u>		<u>1400</u>					<u>3500</u>	
7.	<u>Flotation cell - DISMANTLE AND RELOCATE EXISTING c/w DRIVE</u>		<u>1</u>	<u>No.</u>				<u>3100</u>							<u>3100</u>	
	<u>- LAUNDER MODIFICATION</u>		<u>Sum</u>					<u>1100</u>		<u>700</u>					<u>1800</u>	
	<u>- Support steel</u>		<u>Sum</u>					<u>1600</u>		<u>1200</u>					<u>2800</u>	
	<u>- New motors and agitator mechanisms</u>		<u>Sum</u>					<u>5500</u>		<u>18000</u>					<u>23500</u>	
8.	<u>Relocate existing pump boxes</u>		<u>5</u>	<u>No.</u>				<u>9600</u>							<u>9600</u>	
9.	<u>Pump - Flotation circuit - c/w drive and motor - NEW</u>		<u>5</u>	<u>No.</u>				<u>9000</u>		<u>19700</u>					<u>28700</u>	
10.	<u>Foundations FOR PUMP BOXES AND NEW PUMPS</u>		<u>10</u>	<u>No.</u>				<u>10700</u>		<u>13300</u>					<u>24000</u>	
11.	<u>Pump box - Barite tailings</u>		<u>1</u>	<u>No.</u>				<u>1600</u>		<u>5200</u>					<u>6800</u>	
12.	<u>Pump - Barite tailings c/w drive and motor 4" x 3"</u>		<u>1</u>	<u>No.</u>				<u>1800</u>		<u>4600</u>					<u>6400</u>	

# KILBORN

CLIENT: KAMAD SILVER CO. LTD

PROJECT: HOMESTAKE

PROJ No 7560

PROJECT ESTIMATE

TYPE \_\_\_\_\_

DIV No 16

ESTIMATOR \_\_\_\_\_ CHECKED \_\_\_\_\_ SHEET No 5 OF 6

AREA: CONCENTRATOR

AREA No 300

EXTENSIONS \_\_\_\_\_ APPROVED \_\_\_\_\_ ESTIMATE No \_\_\_\_\_

DATE DEC 1982

ACCOUNT CODE	DESCRIPTION	TYPE	QUANTITY	UNIT	LABOUR				MATERIAL				TOTAL COST			
					UNIT MH	TOTAL MH	RATE MH	COST	UNIT COST	COST	UNIT COST	COST				
	<u>BARITE CIRCUIT - CONTINUED</u>															
13.	<u>Pump - THICKENER UNDER FLOW 2" x 2"</u> <u>c/w DRIVE AND MOTOR</u>		<u>1</u>	<u>No</u>				<u>18.00</u>		<u>32.00</u>						<u>56.00</u>
14.	<u>Pump - BARITE FILTER FEED c/w DRIVE</u> <u>AND MOTOR</u>		<u>1</u>	<u>No</u>				<u>18.00</u>		<u>39.00</u>						<u>57.00</u>
15.	<u>DISC FILTER 6' DIA x 8 DISC c/w DRIVE</u>		<u>1</u>	<u>No</u>				<u>58.00</u>		<u>88.50.00</u>						<u>943.00</u>
	<u>- MODIFY EXISTING PLATFORM</u>		<u>SUM</u>					<u>3.50.00</u>								<u>3.50.00</u>
	<u>- NEW SUPPORT STEEL</u>		<u>SUM</u>					<u>3.30.00</u>		<u>66.00</u>						<u>99.00</u>
	<u>- CONCRETE FOUNDATIONS</u>		<u>SUM</u>					<u>24.00</u>		<u>37.00</u>						<u>61.00</u>
	<u>- DISCHARGE CHUTE</u>		<u>1</u>	<u>No</u>				<u>12.00</u>		<u>28.00</u>						<u>40.00</u>
16.	<u>FILTRATE RECEIVER 2' DIA x 3'</u>		<u>1</u>	<u>No</u>				<u>11.00</u>		<u>26.00</u>						<u>37.00</u>
17.	<u>Pump - FILTRATE c/w DRIVE AND MOTOR</u>		<u>1</u>	<u>No</u>				<u>18.00</u>		<u>31.00</u>						<u>49.00</u>
18.	<u>VACUUM PUMP c/w DRIVE AND MOTOR</u> <u>50 HP</u>		<u>1</u>	<u>No</u>				<u>22.00</u>		<u>187.00</u>						<u>215.00</u>
	<u>- SUPPORT STEEL</u>		<u>1</u>	<u>No</u>				<u>13.00</u>		<u>29.00</u>						<u>42.00</u>
19.	<u>Sump pump - VERTICAL. BARITE AREA</u> <u>c/w DRIVE</u>		<u>1</u>	<u>No</u>				<u>21.00</u>		<u>35.00</u>						<u>109.00</u>
	<u>- SUPPORT STEEL</u>		<u>1</u>	<u>No</u>				<u>13.00</u>		<u>15.00</u>						<u>28.00</u>



# KILBORN

CLIENT: KAMAD SILVER CO. LTD

PROJECT: Home stake

PROJ. No. 7560

DIV. No. 16

AREA: CONCENTRATOR

AREA No. 300

ESTIMATOR \_\_\_\_\_ CHECKED \_\_\_\_\_ SHEET No. 6 OF 6

EXTENSIONS \_\_\_\_\_ APPROVED \_\_\_\_\_ ESTIMATE No. \_\_\_\_\_

PROJECT ESTIMATE

TYPE \_\_\_\_\_

DATE DEC 1982

ACCOUNT CODE	DESCRIPTION	TYPE	QUANTITY	UNIT	LABOUR				MATERIAL				TOTAL COST
					UNIT MH	TOTAL MH	RATE MH	COST	UNIT COST	COST	UNIT COST	COST	
	<u>Barite Circuit - CONTINUED</u>												
20	<u>MODIFY EXISTING BARITE CIRCUIT</u>												
	<u>PIPING, VALVES AND FITTINGS</u>		<u>SUM</u>					<u>12 500</u>		<u>11 000</u>			<u>23 500</u>
	<u>- NEW PIPING, VALVES AND FITTINGS</u>		<u>SUM</u>					<u>22 000</u>		<u>19 000</u>			<u>41 000</u>
	<u>Common to Sulphide and Barite Circuits</u>												
1	<u>ALLOWANCE FOR MODIFICATIONS TO</u>												
	<u>EXISTING REAGENT HANDLING SYSTEM</u>		<u>SUM</u>					<u>5 500</u>		<u>2 500</u>			<u>8 000</u>
2	<u>ELECTRICAL POWER SERVICE</u>												
	<u>- MODIFICATIONS TO EXISTING AND</u>												
	<u>SERVICE TO NEW EQUIPMENT</u>		<u>SUM</u>					<u>55 000</u>		<u>48 000</u>			<u>103 000</u>
3	<u>INSTRUMENTATION - MODIFICATIONS TO</u>												
	<u>EXISTING AND NEW EQUIPMENT</u>		<u>SUM</u>					<u>16 500</u>		<u>12 500</u>			<u>29 000</u>
4	<u>MONORAILS AND HOISTS</u>		<u>SUM</u>					<u>1 500</u>		<u>2 500</u>			<u>4 000</u>
5	<u>ANCHOR BOLTS AND CROUT</u>		<u>SUM</u>					<u>3 500</u>		<u>2 000</u>			<u>5 500</u>
6	<u>Atomic Adsorption Equipment - USED</u>		<u>SUM</u>					<u>-</u>		<u>20 000</u>			<u>20 000</u>
7	<u>EQUIPMENT ACCESS PLATFORMS, GRATING</u>												
	<u>AND HAND RAIL</u>		<u>SUM</u>					<u>5 500</u>		<u>12 500</u>			<u>18 000</u>

12.0 OPERATING COST

## 12.0 OPERATING COST

### 12.1 SUMMARY

The projected operating cost per short ton is \$67.92. The cost does not include shipping of concentrate or smelter charges which are considered in the net smelter return calculation (Section 8.0).

The operating cost is summarized as follows:

<u>Description</u>	<u>Monthly Cost</u>	<u>Cost per Ton</u>
Administration (Including Ore Haulage)	\$ 112,800	\$ 13.43
Mining	258,400	30.75
Milling	147,400	17.55
Contingency on Operations (10%)	51,900	6.19
	<hr/>	<hr/>
TOTAL OPERATING COST	\$ 570,500 =====	\$ 67.92 =====

### 12.2 BASIS OF ESTIMATE

The estimate is based on mining, transportation, and milling methods described elsewhere in this Report.

#### 12.2.1 Labour Rates

Labour rates are based on a Labour Contract currently in force at a nearby mining operation. The rates have been modified to allow for experience from recent operations at the site and at other similar operations.

Fringe benefits included are outlined below in Table 12-1.

TABLE 12-1PAYROLL BURDEN

<u>Item</u>	<u>Percent</u>
Unemployment Insurance	1.1
Canada Pension Plan	1.0
Workers' Compensation	8.6
Pension and Life Insurance	4.0
Vacation with Pay	4.9
Statutory Holidays	4.6
Unscheduled Overtime	2.3
	<hr/>
TOTAL PAYROLL BURDEN	26.5
	====

12.2.2 Material Costs

Material costs are based on budget quotations received from suppliers and are valid for December, 1982.

12.2.3 Transportation Costs

Transportation costs are based on budget quotations and are valid for December, 1982.

12.2.4 Electrical Energy Costs

Electrical energy costs are based on British Columbia Hydro costs at the mill site and on diesel power generation at the mine site. Fuel costs for diesel power generation are valid for December, 1982.

12.3 ADMINISTRATION COSTS

Administration costs are summarized as follows:



<u>Item</u>	<u>Monthly Cost</u>
Mine Manager's Salary	\$ 6,300
Contracted Functions	3,800
Consulting Services	3,500
Communications	1,900
Ore Haulage	84,000
Material Freight Charges	1,200
Travel Costs	1,000
Road Maintenance	1,700
Recruitment	1,900
Insurance	7,500
	<hr/>
TOTAL ADMINISTRATION COSTS	\$ 112,800
	=====

Cost per Ton - \$ 13.43

12.3.1 Mine Manager's Salary

<u>Item</u>	<u>Annual Cost</u>
Base Salary	\$ 60,000
Payroll Burden at 26.5 Percent	15,900
	<hr/>
TOTAL ANNUAL COST	\$ 75,900
	=====

Total Monthly Cost = \$ 6,300

12.3.2 Contracted Functions

<u>Item</u>		<u>Annual Cost</u>
Accounting	- \$600.00 per Week	\$ 31,200
Secretarial	- \$200.00 per Week	10,400
Watchman	- \$300.00 per Month	3,600
		<hr/>
TOTAL ANNUAL COST		\$ 45,200
		=====

Total Monthly Cost = \$ 3,800

12.3.3 Consulting Services

<u>Item</u>	<u>Annual Cost</u>
Mining Engineering (5 Days per Month at \$250.00 per Day)	\$ 15,000
Metallurgical Consulting (2 Days per Month at \$450.00 per Day)	10,800
Environmental Consulting (3 Days per Month at \$450.00 per Day)	16,200
	<hr/>
TOTAL ANNUAL COST	\$ 42,000
	=====
Total Monthly Cost = \$ 3,500	

12.3.4 Communications

<u>Item</u>	<u>Monthly Cost</u>
Telephone Rental at the Mine Site	\$ 100
Telephone Rental at the Mill Site	50
Telephone Rental at the Manager's Home	50
Long Distance Calls	500
Telex Rental	900
Telex Charges	200
Courier Services	100
	<hr/>
TOTAL	\$ 1,900
TOTAL ANNUAL COST (\$1900 x 12)	\$ 22,800
	=====
Total Monthly Cost = \$ 1,900	

12.3.5 Ore Haulage

Ore haulage from the mine to the mill costs  
\$10.00 per ton.

TOTAL ANNUAL COST	\$ 1,008,000
	=====
Total Monthly Costs = \$ 84,000	

12.3.6 Material Freight Costs

Delivery costs of supplies and services  
are estimated to be \$1200 per Month.

TOTAL ANNUAL COST (\$1200 x 12)	\$ 14,400
	=====

Total Monthly Cost = \$ 1,200

12.3.7 Travel Costs

<u>Item</u>	<u>Annual Cost</u>
Manager's Automobile	
Rental - \$320.00 x 12 Months = \$ 3,840	
20,000 Miles at \$0.22 per Mile = 4,400	
	\$ 8,240
Air Travel	
(15 Return Flights Vancouver to Kamloops)	
\$151.20 x 15	2,260
Travel (Hotel and Expenses)	
Estimate 15 Days at \$100.00	1,500
	=====
TOTAL ANNUAL COST	\$ 12,000
	=====

Total Monthly Cost = \$ 1,000

12.3.8 Road Maintenance

A local contractor has estimated that the following costs would be  
involved to maintain 8 miles of road at the mill site:

192 Hours at \$52.00	\$ 9,984
152 Hours at \$48.00	7,296
Crushed Gravel	2,700
	=====
TOTAL ANNUAL COST	\$ 20,000
	=====

Total Monthly Cost = \$ 1,700

12.3.9 Recruitment

<u>Assumptions</u>	<u>Annual Cost</u>
One Staff Move per Year	\$ 10,000
One Recruiting Fee per Year	2,500
Ten Hourly Recruits per Year	10,000
	<hr/>
TOTAL ANNUAL COST	\$ 22,500
	=====
Total Monthly Cost = \$ 1,900	

12.3.10 Insurance

A value of \$6,000,000 was estimated for those items that might be destroyed by fire. The insurance premium was placed at 1.5 percent per year of the insured value.

TOTAL ANNUAL COST - \$ 90,000  
=====

Total Monthly Cost = \$ 7,500

12.4 MINING COSTS

Mining costs include all operations at the mine site. These costs are as follows:

<u>Item</u>	<u>Monthly Cost</u>	<u>Cost per Ton</u>
Supervision and Technical Salaries	\$ 26,200	\$ 3.12
Mine Production Crew Salaries	130,600	15.54
Maintenance and Surface Operations Crew Salaries	19,100	2.27
Mine Operating Supplies	63,700	7.58
Mine Maintenance Materials	18,800	2.24
	<hr/>	<hr/>
TOTAL MONTHLY COST	\$ 258,400	-
	=====	
TOTAL COST PER TON	-	\$ 30.77
		=====

12.4.1 Supervision and Technical Salaries

<u>Position</u>	<u>Number</u>	<u>Salary</u>	<u>Annual Cost</u>
Mine Superintendent	1	\$ 50,000	\$ 50,000
Shift Boss	2	38,000	76,000
Geologist	1	40,000	40,000
Surveyor	1	35,000	35,000
Survey Helper	1	24,000	24,000
Clerk	1	24,000	24,000
	<u>—</u>		
Subtotal	7		\$ 249,000
Payroll Burden at 26.5 Percent			66,000
			<u>          </u>
TOTAL ANNUAL COST			\$ 315,000
			=====

Total Monthly Cost = \$ 26,200

Cost per Ton Mined = \$ 3.12

12.4.2 Mine Production Crew Salaries

<u>Position</u>	<u>Number</u>	<u>Hourly Rate</u>	<u>Annual Salary</u>	<u>Annual Bonus</u>	<u>( % ) Bonus</u>	<u>Annual Cost</u>
Development Miner	4	\$ 13.00	\$ 27,040	\$ 20,280	(75%)	\$ 189,2
Stope Miner	16	13.00	27,040	13,520	(50%)	648,9
L.H.D. Operator	4	12.50	26,000	13,000	(50%)	156,0
Truck Driver (U/G)	2	12.50	26,000	7,800	(30%)	67,6
Spare Miner	2	13.00	27,040	13,520	(50%)	81,1
Timberman	1	14.00	29,120	9,610	(33%)	38,7
Labourer	2	11.00	22,880	5,720	(25%)	57,2
	<u>—</u>					
Subtotal	31					\$ 1,238,8
Payroll Burden at 26.5 Percent						328,3
						<u>          </u>
TOTAL ANNUAL COST						\$ 1,567,2
						=====

Total Monthly Cost = \$ 130,600

Cost Per Ton Mined = \$ 15.54

### 12.4.3 Maintenance and Surface Operations Crew Salaries

<u>Position</u>	<u>Number</u>	<u>Hourly Rate</u>	<u>Annual Salary</u>	<u>Annual Cost</u>
Mechanics Leader	1	\$ 18.00	\$ 37,400	\$ 37,400
Mechanics	3	14.00	29,120	87,360
Electrician	1	14.00	29,120	29,120
Labourer - Changehouse	1	13.00	27,040	27,040
Subtotal	6			\$ 180,920
Payroll Burden at 26.5 Percent				47,980
TOTAL ANNUAL COST				\$ 228,900 =====

Total Monthly Cost = \$ 19,100

Cost per Ton Mined = \$ 2.27

### 12.4.4 Mine Operating Supplies (Summary - Annual Cost)

<u>Item</u>	<u>Annual Cost</u>
Drill Steel and Bits	\$ 35,000
Explosives	219,300
Timber	50,000
Rock Bolts	47,600
Diesel Oil Costs	146,900
Propane - Mine Air Heating	49,300
Tires	15,700
Diamond Drilling	69,000
Pipe	32,900
Small Tools	38,900
General Consumables	60,000
TOTAL ANNUAL COST	\$ 764,600 =====

Total Monthly Cost = \$ 63,700

Cost per Ton Mined = \$ 7.58

12.4.5 Drill Steel and Bits

Cost per Foot Drilled, Bits (1-3/8" Diameter Bits = \$25.25 ÷ 375 Feet)	\$ 0.067
Cost per Foot Drilled, Drill Steel (\$38.55 ÷ 900 Feet)	0.043

TOTAL COST PER FOOT DRILLED	\$ 0.11
	=====

## Annual Footage Drilled:

(a) Drift and Subdrift (2000' x 37 Holes)	74,000 Feet
(b) Raise (2400' x 23 Holes)	55,000 Feet
(c) Stoping (90,000 t/y at 0.60 t/f Drilled)	149,000 Feet
(d) Rock Bolts (5600 Bolts at 6')	34,000 Feet
(e) Miscellaneous (Add 2% to Above)	6,000 Feet

TOTAL	318,000 Feet
	=====

TOTAL ANNUAL COST (\$0.11 x 318,000 Feet)	\$ 35,000
	=====

12.4.6 Explosives

(a) Thirty-four (34) 10 foot holes blasted per round (advance equals 9.5 ft)	
Footage loaded per round (34 holes x 8.5 ft)	= 289 Feet
Explosive cost (water gel) (\$318.55 per 221 lb)	= \$ 1.44 per lb
Cost per round (\$1.44 x 289 ft x 0.47 lb per ft)	= \$ 195.60

Detonators (Nonelectric) -	\$ 1.81 Each
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Primers -	0.44 Each
-----------	-----------

Subtotal	\$ 2.25
----------	---------

Cost (34 holes x \$2.25)	= \$ 76.50
--------------------------	------------

TOTAL COST PER ROUND	= \$ 272.10
----------------------	-------------

TOTAL COST PER YEAR (2000 ft x \$272.10 ÷ 9.5)	= \$ 57,300
	=====

(b) Raise

Twenty (20) 8 foot holes blasted per  
round (advance 7.5 ft)

Footage loaded per round (20 holes x 6.5 ft) = 130 Feet

Explosive cost per round (1.44 x 130 x 0.47) = \$ 87.98

Detonators and primers (20 holes x 2.25) = \$ 45.00

TOTAL COST PER ROUND = \$ 132.98

TOTAL COST PER YEAR (2400 ft x 132.98 ÷ 7.5) = \$ 42,600  
=====

(c) Stoping

Average explosive factor equals 0.75 pound per ton broken. Use  
50 percent water gel and 50 percent AN-FO.

Water Gel Cost - \$ 1.44 per lb

AN-FO Cost - \$ 61.87 per 221 lb (\$0.28 per lb)

Average Cost - (\$1.44 + \$0.28) ÷ 2 = \$0.86 per lb

Explosive Cost - 90,000 tons mined x 0.75 lb per ton x \$0.86  
equals \$58,100

Detonators and  
Primers

(6.2 tons/hole) - \$2.25 x 90,000 ÷ 6.2 = \$32,700

TOTAL STOPPING - \$ 90,800

Drift Cost - 57,300

Raise Cost - 42,600

TOTAL - \$ 190,700

Add 15% for  
secondary blasting,  
detonating cord,  
electric caps,  
loading sticks,  
magazine rental,  
etc.

- \$ 28,600

TOTAL ANNUAL COST - \$ 219,300  
=====



12.4.7 Timber

A cost of \$50,000 has been allowed for timber.

12.4.8 Rock Bolts and Accessories

Rock bolts estimated are:

Drifts and Subdrifts (2000 ft at one bolt per 2 ft)	-	1000 Bolts
Raises (2400 ft at one bolt per 1.5 ft)	-	1600 Bolts
Stoping (Bolting on a 4 ft x 4 ft pattern) (Allow 30 tons per bolt)		
Bolts Required (30,000 ÷ 30)	-	<u>3000 Bolts</u>
TOTAL		5600 Bolts =====

Annual Cost:

5,600 5/8 inch x 6 foot rock bolts at \$3.77	-	\$ 21,100
6,000 1-3/8 inch diameter shells at \$1.18	-	7,100
6,000 1/4 inch x 4 inch x 4 inch washers at \$0.52	-	3,100
4,000 1/8 inch x 4 inch x 5 foot straps at \$3.29	-	13,200
14,000 square feet of wire mesh at \$0.22	-	<u>3,100</u>
TOTAL ANNUAL COST	-	\$ 47,600 =====

12.4.9 Diesel Oil Costs

Diesel oil costs are calculated as follows:

(a) J.D.T.-413 13-ton trucks operate 10 hours per day for 250 days at 3.2 gallons per hour	-	8,000 gal
(b) Two cubic yard LHD units each operate 12 hours per day for 250 days at 2.3 gallons per hour	-	13,800 gal

(c) Air compressors operate 18 hours per day for 250 days at 4.4 gallons per hour	-	19,800 gal
(d) Electric generator operates 24 hours per day for 250 days at 4.6 gallons per hour and 115 days at 1.7 gallons per hour	-	32,300 gal
(e) Miscellaneous mobile equipment, (loader, underground service truck, bulldozer, etc.); allow 50 gallons per day for 250 days	-	<u>12,500 gal</u>
TOTAL ANNUAL FUEL CONSUMPTION	-	86,400 gal
TOTAL ANNUAL COST (86,400 gallons at \$1.70 per gallon)	-	\$ 146,900 =====

#### 12.4.10 Propane Costs

Mine air heating will be required for 4 months per year for an average air temperature rise of 20°F. The annual propane consumption will be:

$$\frac{60,000 \text{ cfm} \times 4.3 \text{ months} \times 25 \text{ days} \times 24 \text{ hours} \times 60 \text{ minutes} \times 0.075 \text{ lb per ft}^3 \times 0.24 \text{ Btu per lb per degree F} \times 20^\circ \text{F}}{110,000 \text{ Btu per gallon}}$$

ANNUAL CONSUMPTION	-	31,000 Gallons
Mine dry heating, including hot water will consume an average of 540 gallons per month for 12 months	-	6,500 Gallons
The maintenance shop will require	-	4,000 Gallons
The residence will require	-	<u>800 Gallons</u>
TOTAL ANNUAL CONSUMPTION	-	42,300 Gallons =====
Cost at \$1.14 per gallon	-	\$ 48,200
Tank rentals (\$544.00 x 2)	-	<u>1,100</u>
TOTAL ANNUAL COST	-	\$ 49,300 =====

12.4.11 Tires

The tire life on the 13-ton mine truck will average 2700 hours. The annual cost:

$$(\$850 \times 4 \times 250 \text{ days} \times 10 \text{ hours}) \div 2700 - \$ 3,200$$

Two cubic yard LHD units will average 1800 hours per tire. The annual cost to operate 2 units is:

$$(\$790 \times 4 \times 2 \times 250 \text{ days} \times 12 \text{ hours}) \div 1800 - \$ 10,500$$

$$\text{Other mobile equipment (allowance)} - \$ 2,000$$

$$\text{TOTAL ANNUAL COST} \quad \$ 15,700$$

=====

12.4.12 Diamond Drilling

$$\text{Allow 3000 feet of contract diamond drilling per year at an overall cost of \$18.00 per foot} - \$ 54,000$$

$$\text{Allow a further 1500 feet of short hole drilling by mine crews at \$10.00 per foot} - 15,000$$

$$\text{TOTAL ANNUAL COST} - \$ 69,000$$

=====

12.4.13 Pipe

Consumption of pipe will be approximately the total length of drift and subdrift (2000 feet) and of raise (2400 feet):

$$4400 \text{ feet of 4 inch pipe at \$3.71} - \$ 16,300$$

$$4400 \text{ feet of 2 inch pipe at \$2.26} - 10,000$$

$$\text{Fittings (25 percent of above)} - 6,600$$

$$\text{TOTAL ANNUAL COST} - \$ 32,900$$

=====

12.4.14 Small Tools

Small tools and miners' gear will cost from \$3.50 to \$4.00 per man-shift.

Annual cost (\$3.70 x 31 men x 250 days)	-	\$ 28,900
For the mechanical crew, including shop tool replacement (allowance)	-	<u>10,000</u>
TOTAL ANNUAL COST	-	<u>\$ 38,900</u> =====

12.4.15 General Consumables

General consumables including engineering supplies, stationary, electrical replacements, lubricants, ventilation, and other costs, are estimated to be \$60,000 per year.

12.4.16 Mine Maintenance Materials

<u>Item</u>	<u>Annual Cost</u>
Rock Drills	\$ 41,300
Diesel Mobile Equipment	83,600
Electric Generators	16,400
Air Compressors	13,800
Pumps	2,500
Ventilation and Mine Air Heating	6,500
Slushers	22,900
Buildings	5,000
Small Vehicles	13,100
Electrical Miscellaneous	10,000
Mechanical Miscellaneous	<u>10,000</u>
TOTAL ANNUAL COST	<u>\$ 225,100</u> =====

Total Monthly Cost = \$ 18,800

Cost per Ton = \$ 2.24

(a) Rock Drills

Cost per foot drilled for drill maintenance, hose, and lubricants	-	\$ 0.13
Total footage drilled	-	318,000 Feet
TOTAL ANNUAL COST (\$0.13 x 318,000)	-	41,300

(b) Diesel Mobile Equipment

J.D.T. 413 13-Ton Trucks:

Hourly Cost (\$130,000 x 0.7) ÷ 10,000	-	\$ 9.10
Annual Cost (\$9.10 x 10 hours x 250 days)	-	\$ 22,700

Two 2 cubic yard LHD units:

Hourly Cost (\$106,000 x 0.8) ÷ 10,000	-	\$ 8.48
Annual Cost:		
(\$8.48 x 2 units x 12 hours x 250 days)	-	\$ 50,900

Miscellaneous mobile equipment (mine service vehicle, surface equipment) allowance	-	\$ 10,000
---	---	-----------

TOTAL ANNUAL COST		\$ 83,600 =====
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(c) Electric Generators

Allow \$45.00 per day for generator maintenance:

TOTAL ANNUAL COST (\$45.00 x 365 days)	-	\$ 16,400 =====
--	---	--------------------

(d) Air Compressors

Allow \$55.00 per day for compressor maintenance:

TOTAL ANNUAL COST (\$55.00 x 250 days)	-	\$ 13,800 =====
--	---	--------------------

(e) Pumps

Allow \$2500 per year for the cost of maintaining surface and underground pumps.

(f) Ventilation and Mine Air Heating

Annual cost of fan maintenance	-	\$ 5,000
Annual cost of mine air heater maintenance	-	<u>1,500</u>
TOTAL ANNUAL COST	-	\$ 6,500 =====

(g) Slushers

Slusher and scraper maintenance cost is normally \$0.023 per cubic foot handled.

Cubic feet of raise muck (2400 ft x 5 ft x 8 ft)	-	\$ 96,000 ft <sup>3</sup>
Cubic feet of stope muck (90,000 t x 10 ft <sup>3</sup> /t)	-	<u>900,000 ft<sup>3</sup></u>
TOTAL	-	\$ 996,000 ft <sup>3</sup> =====
Maintenance cost (\$0.023 x 996,000)	-	\$ 22,900

(h) Buildings

Allow \$5000 per year for building maintenance and repair.

(i) Small Vehicles

Allow 150 miles per day for a service truck and a flat deck truck. The operating cost will be \$0.35 per mile.

TOTAL ANNUAL COST (150 miles x 250 days x \$0.35)	-	\$ 13,100 =====
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(j) Electrical Miscellaneous

Allow \$10,000 per year.

(k) Mechanical Miscellaneous

Allow \$10,000 per year.

12.5 MILLING COSTS12.5.1 General

The following milling costs include all the operations and services required at the mill site:

<u>Item</u>	<u>Monthly Cost</u>	<u>Cost per Ton</u>
Supervision and Technical Salaries	\$ 18,900	\$ 2.25
Operating Labour	53,200	6.33
Maintenance Labour	18,400	2.19
Operating Supplies	17,000	2.03
Maintenance Materials	28,100	3.35
Power	11,800	1.40
TOTAL MONTHLY COST	\$ 147,400	-
	=====	
Total Cost per Ton		\$ 17.55
		=====

12.5.2 Supervision and Technical Salaries

<u>Position</u>	<u>Number</u>	<u>Salary</u>	<u>Annual Cost</u>
Mill Superintendent	1	\$ 50,000	\$ 50,000
General Foreman	1	38,000	38,000
Maintenance Foreman	1	35,000	35,000
Chief Assayer	1	32,000	32,000
Clerk	1	24,000	24,000
TOTAL	5		\$ 179,000
Payroll Burden at 26.5 Percent			47,400
TOTAL ANNUAL COST			\$ 226,400

Total Monthly Cost = \$ 18,900

Cost per Ton Milled = \$ 2.25

### 12.5.3 Mill Operating Labour

<u>Position</u>	<u>Number</u>	<u>Hourly Rate</u>	<u>Annual Salary</u>	<u>Annual Cost</u>
Crusher Operator	1	\$ 12.50	\$ 26,000	\$ 26,000
Crusher Helper	1	11.00	22,880	22,880
Grinding/Flotation Operator	4	13.50	28,080	112,320
Filter Operator	4	12.50	26,000	104,000
Helper	4	11.50	23,920	95,680
Day Gang	4	11.00	22,880	91,520
Assayer	2	12.50	26,000	52,000
TOTAL	20			\$ 504,400
Payroll Burden at 26.5 Percent				133,700
TOTAL ANNUAL COST				\$ 638,100 =====

Total Monthly Cost = \$ 53,200

Cost per Ton Milled = \$ 6.33

### 12.5.4 Maintenance Labour

<u>Position</u>	<u>Number</u>	<u>Hourly Rate</u>	<u>Annual Salary</u>	<u>Annual Cost</u>
3 Journeyman	6	\$ 14.00	\$ 29,120	\$ 174,720
TOTAL	6			\$ 174,720
Payroll Burden at 26.5 Percent				46,280
TOTAL ANNUAL COST				\$ 221,000 =====

Total Monthly Cost = \$ 18,400

Cost per Ton Milled = \$ 2.19



12.5.5 Mill Operating Supplies(a) Summary - Annual Cost

<u>Item</u>	<u>Annual Cost</u>
Reagents	\$ 111,700
Grinding Steel	58,200
Propane	9,600
Diesel Fuel	3,900
General Consumables	20,200
	<hr/>
TOTAL ANNUAL COST	\$ 203,600 =====

Total Monthly Cost = \$ 17,000

Cost per Ton Milled = \$ 2.03

(b) Reagents (Milling Rate: 100,800 Tons per Year)

<u>Item</u>	<u>Addition or Usage Rate (lb/ton)</u>	<u>Annual Consumption (lb)</u>	<u>Cost (¢/lb)</u>	<u>Annual Cost</u>
Soda Ash	0.60	60,500	\$ 0.16	\$ 9,600
Sodium Silicate	0.30	30,200	0.16	4,800
Copper Sulfate	0.20	20,200	0.43	8,600
Sodium Isopropyl Xanthate	0.15	15,100	0.82	12,300
Oleic Acid	1.50	151,200	0.40	60,500
Quebracho	0.05	5,000	0.25	1,300
Pine Oil	0.13	13,100	0.74	9,700
		<hr/>		<hr/>
TOTAL		295,300		\$ 106,800
Total Transportation Cost				4,900
				<hr/>
TOTAL ANNUAL REAGENT COST				\$ 111,700 =====

(c) Grinding Steel

<u>Item</u>	<u>Usage Ratio (lb/ton)</u>	<u>Annual Consumption (lb/year)</u>	<u>Cost (¢/lb)</u>	<u>Annual Cost</u>
Grinding Balls (3")	1.00	100,000	0.28	\$ 28,000
Grinding Balls (1")	0.20	20,000	0.30	6,000
Mill Liners	0.15	15,000	1.05	15,750
Miscellaneous	-	-	-	5,000
TOTAL		135,000		\$ 54,750
Total Transportation Cost				3,450
TOTAL ANNUAL GRINDING STEEL COSTS				\$ 58,200 =====

(d) Mill Heating

It is estimated that 8400 gallons of propane will be required.

TOTAL ANNUAL COST (8400 x 1.14) - \$ 9,600

(e) Diesel Fuel

Grader (400 hours at 2.1 gallons per hour)	-	840 gal
Front-End loader:		
(800 hours at 1.8 gallons per hour)	-	1,440 gal
TOTAL	-	2,280 gal =====
TOTAL ANNUAL COST (\$1.70 x 2280)	-	\$ 3,900 =====

(f) General Consumables

General consumables such as tires, small vehicle operation, tools, stationary, etc., are estimated to cost \$0.20 per ton milled.

TOTAL ANNUAL COST 100,800 x 0.20 - \$ 20,200

### 12.5.6 Mill Maintenance Supplies

Mill maintenance supplies normally cost four percent of the mill equipment replacement cost.

Annual Cost (\$7,500,000 x 4 percent)	-	\$ 300,000
Maintenance of surface equipment:		
Grader (400 hours at \$10.00)	-	4,000
Front-End loader (800 hours at \$10.00)	-	8,000
Miscellaneous mechanical maintenance	-	10,000
Miscellaneous electrical maintenance	-	10,000
Building maintenance	-	5,000
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TOTAL ANNUAL COST	-	\$ 337,000 =====
Total Monthly Cost =	\$ 28,100	
Cost per Ton	=	\$ 3.35

### 12.5.7 Power

Connected load in mill = 1284 horsepower (958 kilowatts)

Annual Consumption is:

958 kW x 90% Demand x 24 hours x 355 days x 0.8 Load Factor x 1.20  
(20% allowance for other equipment) = 7,052,000 kilowatt hours.

TOTAL ANNUAL COST = 7,052,000 x \$0.02 per kWh = \$141,000  
Total Monthly Cost = \$ 11,800  
Cost Per Ton = \$ 1.40