111. PROFILE ON THE PRODUCTION OF AGGREGATES

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I. SUMMARY

This profile envisages the establishment of a plant for the production of crushed stone aggregates with a capacity of 323,195 m^3 per annum. Aggregates are used in road making, construction of building, dams, runways, etc.

The demand for aggregates is entirely met through local production. The present (2012) demand for aggregates is estimated at 323,759 m^3. The demand for aggregates is projected to reach 521,417 m^3 and 839,747 m^3 by the year 2017 and 2022, respectively.

The principal raw material required by the envisaged plant is basalt rock which is locally available.

The total investment cost of the project including working capital is estimated at Birr 15.56 million. From the total investment cost the highest share (Birr 13.35 million or 85.78%) is accounted by fixed investment cost followed by pre operation cost (Birr 1.71 million or 11.02%) and initial working capital (Birr 498.51 thousand or 3.20%). From the total investment cost Birr 9.94 million or 63.90% is required in foreign currency.

The project is financially viable with an internal rate of return (IRR) of 34.62% and a net present value (NPV) of Birr 38.32 million, discounted at 10%.

The project can create employment for 35 persons. The project will create backward linkage with the mining sub sector and forward linkage with the construction sub sector and also generate income for the Government in terms of tax revenue and payroll tax.

II. PRODUCT DESCRIPTION AND APPLICATION

Coarse/Crushed aggregates are stones with low wear-tear and water absorbing capacity characteristics which are mined, crushed and asserted by size. Crushed stones are used in road making, construction of building, dams, runways, etc.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past supply and Present Demand

There is no available data that indicates aggregate production in Addis Ababa. However, at national level during the period 2002--2006 annual average production of gravel was 371,292 m^3 (see Table 3.1).

Table 3.1

ANNUAL PRODUCTION OF GRAVEL AT NATIONAL LEVEL

Year	Production M^3
2002	50,329
2003	94,956
2004	104,134
2005	733,752
2006	212,120
2007	203,789
2008	667,795
2009	652,482
2010	622,275

Source:-*CSA's Report on Large and Medium Scale Manufacturing and Electricity Survey.*

In order to estimate the current level of demand for aggregate in Addis Ababa, the following assumptions are used.

- The average production during the latest three years (2008 – 2010) approximates present level of production at national level; and
- Due to high level of construction activity 50% of annual aggregate production is supplied to Addis Ababa.

Accordingly, based on the above assumptions the present level of demand for aggregate in Addis Ababa is estimated at 323,759 m^3.

2. Projected Demand

The rapid development of high-rise buildings, housing complexes, malls, governmental and nongovernmental buildings and road construction has created high demand for aggregate. The demand for aggregate is directly related with the growth in the construction sector which in turn depends on the overall economic development of the country.

According to the government's "Growth and Transformation Plan" during the period 2010 – 2015 the GDP of the country is expected to grow at a minimum average annual growth rate of 11.2%. Accordingly, based on the above discussion and in order to be conservative a growth rate of 10% which is slightly lower than the expected growth rate of the country's GDP during the GTP period (2011 – 2015) is used.

Based on the above assumption and using the estimated present demand as a base the projected demand for aggregate is shown in Table 3.2.

Table 3.1

PROJECTED DEMAND FOR AGGREGATE (m^3)

Year	Projected Demand
2013	356,135
2014	391,748
2015	430,923
2016	474,015
2017	521,417
2018	573,558
2019	630,914
2020	694,005
2021	763,406
2022	839,747
2023	923,721
2024	1,016,093
2025	1,117,703

3. Pricing and Distribution

The current price of aggregate around Addis Ababa at quarrying site is Birr 125/m^3. Accordingly, a factory-gate price of Birr 100/m^3 is considered for the product of the envisaged plant. With regard to distribution, the plant can sell its product directly to users including private house builders and contractors or to retailers that purchase from production site using their own means of transportation.

B. PLANT CAPACITY AND PRODUCTION PROGRAMME

1. Plant Capacity

Based on the demand projection indicated earlier, the proposed plant will have a capacity to produce 323,195 m^3 of crushed stones of various sizes per annum.

2. Production Programme

The plant will produce 80% of its capacity during the first year, 90% in the second year and full capacity in the third year and then after. The plant will operate 300 days in a year and one shift of 8 hours per day.

IV. RAW MATERIALS AND UTILITIES

A. RAW MATERIALS

The raw material used to produce aggregate is basalt rock which is locally available. The annual raw material requirement at full operation capacity of the plant and the corresponding cost estimates are shown in Table 4.1.

Table 4.1

ANNUAL CONSUMPTION OF RAW MATERIALS AND COST

Sr. No.	Description	Qty	Cost ('000 Birr)		
			FC	LC	Total
1	Royalty (3% of gross sales)			1,211.98	1,211.98
2	Explosives	lup-sum	238.00		238.00
	Total		**238.00**	**1,211.98**	**1,449.98**

B. UTILITIES

Utilities required by the plant include electricity, water and fuel oil. The total cost of utilities is estimated at Birr 527,000 (see Table 4.2).

Table 4.2

ANNUAL CONSUMPTION OF UTILITIES

Sr. No.	Items	Qty.	Cost Birr
1	Electricity (kWh)	150,000	87,000
2	Water (m^3)	500	5,000
3	Heavy Fuel Oil (lt)	30,000	435,000
	Total		**527,000**

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Production Process

The quarry for the stone deposit is prepared by open cut mining. The rock is dug or blasted using explosives and the blasted rock is transported for crushing. Then, the crushed stone is sized and

those crushed stones which do not pass through sieve are again crushed and sized. The sized crushed stones are stored in open air for use.

2. Environmental Impact

Production process of aggregates includes open cut mining, crushing and sizing. These unit operations can be performed in a controlled manner. Hence, it is environmental friendly.

B. ENGINEERING

1. Machinery and Equipment

Total cost of machinery and equipment is Birr 10,441,000, of which Birr 9,944,000 is required in foreign currency. The required plant machinery and equipment and the corresponding cost are indicated in Table 5.1.

Table 5.1

MACHINERY AND EQUIPMENT REQUIREMENT AND COST

Sr. No.	Item	Qty. (No.)	Total Cost ('000 Birr)		
			FC	LC	Total
1.	Bull Dozer	1	2,373		2,373
2.	Excavator	1	1,582		1,582
3.	Loader	1	1,695		1,695
4.	Dump truck	2	791		1,582
5.	Compressor and power tools	1	1,130		1,130
6.	Crushing plant	1	1,695		1,695
	F.O.B		**9,944**		**9,944**
7.	Bank Insurance & communication			497.2	497.2
	Grand Total		**9,944**	**497.2**	**10,441**

2. Land, Building and Civil Works

The total area required for the envisaged plant including provision for open space is estimated to be 30,000 m^2, out of which 300 m^2 is a built-up area. The total cost of land, building and civil works is estimated at Birr 960,000.

According to the Federal Legislation on the Lease Holding of Urban Land (Proclamation No 721/2004) in principle, urban land permit by lease is on auction or negotiation basis, however, the time and condition of applying the proclamation shall be determined by the concerned regional or city government depending on the level of development.

The legislation has also set the maximum on lease period and the payment of lease prices. The lease period ranges from 99 years for education, cultural research health, sport, NGO , religious and residential area to 80 years for industry and 70 years for trade while the lease payment period ranges from 10 years to 60 years based on the towns grade and type of investment.

Moreover, advance payment of lease based on the type of investment ranges from 5% to 10%.The lease price is payable after the grace period annually. For those that pay the entire amount of the lease will receive 0.5% discount from the total lease value and those that pay in installments will be charged interest based on the prevailing interest rate of banks. Moreover, based on the type of investment, two to seven years grace period shall also be provided.

However, the Federal Legislation on the Lease Holding of Urban Land apart from setting the maximum has conferred on regional and city governments the power to issue regulations on the exact terms based on the development level of each region.

In Addis Ababa, the City's Land Administration and Development Authority is directly responsible in dealing with matters concerning land. However, regarding the manufacturing sector, industrial zone preparation is one of the strategic intervention measures adopted by the City Administration for the promotion of the sector and all manufacturing projects are assumed to be located in the developed industrial zones.

Regarding land allocation of industrial zones if the land requirement of the project is below 5,000 m^2, the land lease request is evaluated and decided upon by the Industrial Zone Development and Coordination Committee of the City's Investment Authority. However, if the land request is above 5,000 m^2, the request is evaluated by the City's Investment Authority and passed with recommendation to the Land Development and Administration Authority for decision, while the lease price is the same for both cases.

Moreover, the Addis Ababa City Administration has recently adopted a new land lease floor price for plots in the city. The new prices will be used as a benchmark for plots that are going to be auctioned by the city government or transferred under the new "Urban Lands Lease Holding Proclamation."

The new regulation classified the city into three zones. The first Zone is Central Market District Zone, which is classified in five levels and the floor land lease price ranges from Birr 1,686 to Birr 894 per m^2. The rate for Central Market District Zone will be applicable in most areas of the city that are considered to be main business areas that entertain high level of business activities.

The second zone, Transitional Zone, will also have five levels and the floor land lease price ranges from Birr 1,035 to Birr 555 per m^2 .This zone includes places that are surrounding the city and are occupied by mainly residential units and industries.

The last and the third zone, Expansion Zone, is classified into four levels and covers areas that are considered to be in the outskirts of the city, where the city is expected to expand in the future. The floor land lease price in the Expansion Zone ranges from Birr 355 to Birr 191 per m^2 (see Table 5.2).

Table 5.2

NEW LAND LEASE FLOOR PRICE FOR PLOTS IN ADDIS ABABA

Zone	Level	Floor Price/m^2
Central Market District	1st	1686
	2nd	1535
	3rd	1323
	4th	1085
	5th	894
Transitional zone	1st	1035
	2nd	935
	3rd	809
	4th	685
	5th	555
Expansion zone	1st	355
	2nd	299
	3rd	217
	4th	191

Accordingly, in order to estimate the land lease cost of the project profiles it is assumed that all new manufacturing projects will be located in industrial zones located in expansion zones. Therefore, for the profile a land lease rate of Birr 266 per m^2 which is equivalent to the average floor price of plots located in expansion zone is adopted.

On the other hand, some of the investment incentives arranged by the Addis Ababa City Administration on lease payment for industrial projects are granting longer grace period and extending the lease payment period. The criterions are creation of job opportunity, foreign exchange saving, investment capital and land utilization tendency etc. Accordingly, Table 5.3 shows incentives for lease payment.

Table 5.3

INCENTIVES FOR LEASE PAYMENT OF INDUSTRIAL PROJECTS

Scored Point	Grace Period	Payment Completion Period	Down Payment
Above 75%	5 Years	30 Years	10%
From 50 - 75%	5 Years	28 Years	10%
From 25 - 49%	4 Years	25 Years	10%

For the purpose of this project profile, the average i.e. five years grace period, 28 years payment completion period and 10% down payment is used. The period of lease for industry is 60 years.

Accordingly, the total lease cost, for a period of 60 years at a land lease rate of Birr 266 per m^2 is estimated at Birr 7,980,000 of which 10% or Birr 798,000 will be paid in advance. The remaining Birr 7,182,000 will be paid in equal installments with in 28 years i.e. Birr 256,500 annually.

VI. HUMANRESOURCE AND TRAINING REQUIREMENT

A. HUMANRESOURCE REQUIREMENT

The total manpower requirement for the envisaged project will be 35 persons. Details of labor force & annual salary requirement are as indicated in Table 6.1.

B. TRAINING REQUIREMENT

Training by the machinery supplier should be given for two technical staff for two weeks during erection & commissioning, such training is estimated to cost Birr 15,000.

Table 6.1

HUMANRESOURCE REQUIREMENT AND ANNUAL LABOUR COST

Sr. No.	Description	Req. No.	Salary per Month (Birr)	Annual Salary (Birr)
1	Manger	1	5,000	60,000
2	Engineer	1	3,500	42,000
3	Commercial staff	2	2,500	60,000
4	Administration and finance staff	6	2,000	144,000
5	Technical staff	2	1,500	36,000
6	Skilled workers	8	1,200	115,200
7	Unskilled workers	15	800	144,000
	Sub-Total	**35**		**601,200**
	Benefits (15%)			90,180
	Grand Total			**691,380**

VII. FINANCIAL ANALYSIS

The financial analysis of the aggregates project is based on the data presented in the previous chapters and the following assumptions:-

Construction period	1 year
Source of finance	30 % equity & 70% loan
Tax holidays	5 years
Bank interest	10%
Discount cash flow	10%
Accounts receivable	30 days
Raw material local	30 days
Work in progress	5 days
Finished products	30 days
Cash in hand	5 days
Accounts payable	30 days
Repair and maintenance	5% of machinery cost

A. TOTAL INITIAL INVESTMENT COST

The total investment cost of the project including working capital is estimated at Birr 15.56 million (see Table 7.1). From the total investment cost the highest share (Birr 13.35 million or 85.78%) is accounted by fixed investment cost followed by pre operation cost (Birr 1.71 million or 11.02%) and initial working capital (Birr 498.51 thousand or 3.20%). From the total investment cost Birr 9.94 million or 63.90% is required in foreign currency.

Table 7.1

INITIAL INVESTMENT COST ('000 Birr)

Sr. No	Cost Items	Local Cost	Foreign Cost	Total Cost	% Share
1	**Fixed investment**				
1.1	Land Lease	798.00		798.00	5.13
1.2	Building and civil work	960.00		960.00	6.17
1.3	Machinery and equipment	497.00	9,944.00	10,441.00	67.09
1.4	Vehicles	900.00		900.00	5.78
1.5	Office furniture and equipment	250.00		250.00	1.61
	Sub total	**3,405.00**	**9,944.00**	**13,349.00**	**85.78**
2	**Pre operating cost ***				
2.1	Pre operating cost	697.05		697.05	4.48
2.2	Interest during construction	1,018.12		1,018.12	6.54
	Sub total	**1,715.17**		**1,715.17**	**11.02**
3	**Working capital ****	**498.51**		**498.51**	**3.20**
	Grand Total	**5,618.68**	**9,944.00**	**15,562.68**	**100**

* *N.B Pre operating cost include project implementation cost such as installation, startup, commissioning, project engineering, project management etc and capitalized interest during construction.*

** *The total working capital required at full capacity operation is Birr 2.10 million. However, only the initial working capital of Birr 498.51 thousand during the first year of production is assumed to be funded through external sources. During the remaining years the working capital requirement will be financed by funds to be generated internally (for detail working capital requirement see Appendix 7.A.1).*

B. PRODUCTION COST

The annual production cost at full operation capacity is estimated at Birr 7.34 million (see Table 7.2). Depreciation account for 33.66% of the production cost. The other major components of the production cost are the cost of raw material, financial cost and labor, which account for 19.75%, 13.35, and 8.19%, respectively. The remaining 25.05% is the share of marketing and distribution, repair and maintenance, labor overhead and administration cost. For detail production cost see Appendix 7.A.2.

Table 7.2

ANNUAL PRODUCTION COST AT FULL CAPACITY (YEAR THREE)

Items	**Cost (000 Birr)**	**%**
Raw Material and Inputs	1,450	19.75
Utilities	527	7.18
Maintenance and repair	522	7.11
Labor direct	601	8.19
Labor overheads	90	1.23
Administration Costs	200	2.72
Land lease cost	0	0.00
Cost of marketing and distribution	500	6.81
Total Operating Costs	**3,890**	**52.99**
Depreciation	2,471	33.66
Cost of Finance	980	13.35
Total Production Cost	**7,341**	**100.00**

C. FINANCIAL EVALUATION

1. Profitability

Based on the projected profit and loss statement, the project will generate a profit throughout its operation life. Annual net profit after tax ranges from Birr 5.14 million to Birr 7.23 million during the life of the project. Moreover, at the end of the project life the accumulated net cash

flow amounts to Birr 68.85 million. For profit and loss statement and cash flow projection see Appendix 7.A.3 and 7.A.4, respectively.

2. Ratios

In financial analysis financial ratios and efficiency ratios are used as an index or yardstick for evaluating the financial position of a firm. It is also an indicator for the strength and weakness of the firm or a project. Using the year-end balance sheet figures and other relevant data, the most important ratios such as return on sales which is computed by dividing net income by revenue, return on assets (operating income divided by assets), return on equity (net profit divided by equity) and return on total investment (net profit plus interest divided by total investment) has been carried out over the period of the project life and all the results are found to be satisfactory.

3. Break-even Analysis

The break-even analysis establishes a relationship between operation costs and revenues. It indicates the level at which costs and revenue are in equilibrium. To this end, the break-even point for capacity utilization and sales value estimated by using income statement projection are computed as followed.

$$\text{Break Even Sales Value} = \frac{\text{Fixed Cost + Financial Cost}}{\text{Variable Margin ratio (\%)}} = \text{Birr } 6{,}108{,}480$$

$$\text{Break Even Capacity utilization} = \frac{\text{Break even Sales Value}}{\text{Sales revenue}} \times 100 = 26.64\ \%$$

4. Pay-back Period

The pay- back period, also called pay- off period is defined as the period required for recovering the original investment outlay through the accumulated net cash flows earned by the project. Accordingly, based on the projected cash flow it is estimated that the project's initial investment will be fully recovered within 2 years.

5. Internal Rate of Return

The internal rate of return (IRR) is the annualized effective compounded return rate that can be earned on the invested capital, i.e., the yield on the investment. Put another way, the internal rate of return for an investment is the discount rate that makes the net present value of the investment's income stream total to zero. It is an indicator of the efficiency or quality of an investment. A project is a good investment proposition if its IRR is greater than the rate of return that could be earned by alternate investments or putting the money in a bank account. Accordingly, the IRR of this project is computed to be 34.62% indicating the viability of the project.

6. Net Present Value

Net present value (NPV) is defined as the total present (discounted) value of a time series of cash flows. NPV aggregates cash flows that occur during different periods of time during the life of a project in to a common measuring unit i.e. present value. It is a standard method for using the time value of money to appraise long-term projects. NPV is an indicator of how much value an investment or project adds to the capital invested. In principle, a project is accepted if the NPV is non-negative.

Accordingly, the net present value of the project at 10% discount rate is found to be Birr 38.32 million which is acceptable. For detail discounted cash flow see Appendix 7.A.5.

D. ECONOMIC AND SOCIAL BENEFITS

The project can create employment for 35 persons. The project will generate Birr 19.45 million in terms of tax revenue. The project will create backward linkage with the mining sub sector and forward linkage with the construction sub sector and also generate income for the Government in terms of payroll tax.

Appendix 7.A

FINANCIAL ANALYSES SUPPORTING TABLES

Appendix 7.A.1
NET WORKING CAPITAL (in 000 Birr)

Items	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Total inventory	290.00	326.25	362.50	362.50	362.50	362.50	362.50	362.50	362.50	362.50
Accounts receivable	267.69	295.95	324.20	324.20	345.58	345.58	345.58	345.58	345.58	345.58
Cash-in-hand	15.70	17.67	19.63	19.63	23.19	23.19	23.19	23.19	23.19	23.19
CURRENT ASSETS	**573.39**	**639.86**	**706.33**	**706.33**	**731.26**	**731.26**	**731.26**	**731.26**	**731.26**	**731.26**
Accounts payable	74.88	84.24	93.60	93.60	93.60	93.60	93.60	93.60	93.60	93.60
CURRENT LIABILITIES	**74.88**	**84.24**	**93.60**	**93.60**	**93.60**	**93.60**	**93.60**	**93.60**	**93.60**	**93.60**
TOTAL WORKING CAPITAL	**498.51**	**555.62**	**612.72**	**612.72**	**637.66**	**637.66**	**637.66**	**637.66**	**637.66**	**637.66**

Appendix 7.A.2
PRODUCTION COST (in 000 Birr)

Item	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Raw Material and Inputs	1,160	1,305	1,450	1,450	1,450	1,450	1,450	1,450	1,450	1,450
Utilities	422	474	527	527	527	527	527	527	527	527
Maintenance and repair	418	470	522	522	522	522	522	522	522	522
Labour direct	481	541	601	601	601	601	601	601	601	601
Labour overheads	72	81	90	90	90	90	90	90	90	90
Administration Costs	160	180	200	200	200	200	200	200	200	200
Land lease cost	0	0	0	0	257	257	257	257	257	257
Cost of marketing and distribution	500	500	500	500	500	500	500	500	500	500
Total Operating Costs	**3,212**	**3,551**	**3,890**	**3,890**	**4,147**	**4,147**	**4,147**	**4,147**	**4,147**	**4,147**
Depreciation	2,471	2,471	2,471	2,471	2,471	63	63	63	63	63
Cost of Finance	0	1,120	980	840	700	560	420	280	140	0
Total Production Cost	**5,683**	**7,142**	**7,341**	**7,201**	**7,318**	**4,770**	**4,630**	**4,490**	**4,350**	**4,210**

Appendix 7.A.3
INCOME STATEMENT (in 000 Birr)

Item	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Sales revenue	11,635	13,090	14,544	14,544	14,544	14,544	14,544	14,544	14,544	14,544
Less variable costs	2,712	3,051	3,390	3,390	3,390	3,390	3,390	3,390	3,390	3,390
VARIABLE MARGIN	**8,923**	**10,038**	**11,154**	**11,154**	**11,154**	**11,154**	**11,154**	**11,154**	**11,154**	**11,154**
in % of sales revenue	76.69	76.69	76.69	76.69	76.69	76.69	76.69	76.69	76.69	76.69
Less fixed costs	2,971	2,971	2,971	2,971	3,228	820	820	820	820	820
OPERATIONAL MARGIN	**5,952**	**7,067**	**8,183**	**8,183**	**7,926**	**10,334**	**10,334**	**10,334**	**10,334**	**10,334**
in % of sales revenue	51.15	53.99	56.26	56.26	54.50	71.05	71.05	71.05	71.05	71.05
Financial costs		1,120	980	840	700	560	420	280	140	0
GROSS PROFIT	**5,952**	**5,947**	**7,203**	**7,343**	**7,226**	**9,774**	**9,914**	**10,054**	**10,194**	**10,334**
in % of sales revenue	51.15	45.43	49.52	50.49	49.68	67.20	68.16	69.13	70.09	71.05
Income (corporate) tax	0	0	0	2,203	2,168	2,932	2,974	3,016	3,058	3,100
NET PROFIT	**5,952**	**5,947**	**7,203**	**5,140**	**5,058**	**6,842**	**6,940**	**7,038**	**7,136**	**7,234**
in % of sales revenue	51.15	45.43	49.52	35.34	34.78	47.04	47.71	48.39	49.06	49.74

Appendix 7.A.4
CASH FLOW FOR FINANCIAL MANAGEMENT (in 000 Birr)

Item	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Scrap
TOTAL CASH INFLOW	**14,046**	**13,227**	**13,099**	**14,553**	**14,544**	**14,544**	**14,544**	**14,544**	**14,544**	**14,544**	**14,544**	**3,030**
Inflow funds	14,046	1,592	9	9	0	0	0	0	0	0	0	0
Inflow operation	0	11,635	13,090	14,544	14,544	14,544	14,544	14,544	14,544	14,544	14,544	0
Other income	0	0	0	0	0	0	0	0	0	0	0	3,030
TOTAL CASH OUTFLOW	**14,046**	**4,804**	**6,138**	**6,337**	**8,333**	**8,440**	**9,039**	**8,941**	**8,843**	**8,745**	**7,247**	**0**
Increase in fixed assets	14,046	0	0	0	0	0	0	0	0	0	0	0
Increase in current assets	0	573	66	66	0	25	0	0	0	0	0	0
Operating costs	0	2,712	3,051	3,390	3,390	3,647	3,647	3,647	3,647	3,647	3,647	0
Marketing and Distribution cost	0	500	500	500	500	500	500	500	500	500	500	0
Income tax	0	0	0	0	2,203	2,168	2,932	2,974	3,016	3,058	3,100	0
Financial costs	0	1,018	1,120	980	840	700	560	420	280	140	0	0
Loan repayment	0	0	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	0	0
SURPLUS (DEFICIT)	**0**	**8,423**	**6,961**	**8,217**	**6,211**	**6,104**	**5,505**	**5,603**	**5,701**	**5,799**	**7,297**	**3,030**
CUMULATIVE CASH BALANCE	**0**	**8,423**	**15,384**	**23,600**	**29,811**	**35,916**	**41,421**	**47,024**	**52,725**	**58,524**	**65,821**	**68,851**

Appendix 7.A.5
DISCOUNTED CASH FLOW (in 000 Birr)

Item	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Scrap
TOTAL CASH INFLOW	**0**	**11,635**	**13,090**	**14,544**	**14,544**	**14,544**	**14,544**	**14,544**	**14,544**	**14,544**	**14,544**	**3,030**
Inflow operation	0	11,635	13,090	14,544	14,544	14,544	14,544	14,544	14,544	14,544	14,544	0
Other income	0	0	0	0	0	0	0	0	0	0	0	3,030
TOTAL CASH OUTFLOW	**14,545**	**3,269**	**3,608**	**3,890**	**6,118**	**6,315**	**7,079**	**7,121**	**7,163**	**7,205**	**7,247**	**0**
Increase in fixed assets	14,046	0	0	0	0	0	0	0	0	0	0	0
Increase in net working capital	499	57	57	0	25	0	0	0	0	0	0	0
Operating costs	0	2,712	3,051	3,390	3,390	3,647	3,647	3,647	3,647	3,647	3,647	0
Marketing and Distribution cost	0	500	500	500	500	500	500	500	500	500	500	0
Income (corporate) tax		0	0	0	2,203	2,168	2,932	2,974	3,016	3,058	3,100	0
NET CASH FLOW	**-14,545**	**8,366**	**9,481**	**10,654**	**8,426**	**8,229**	**7,465**	**7,423**	**7,381**	**7,339**	**7,297**	**3,030**
CUMULATIVE NET CASH FLOW	**-14,545**	**-6,179**	**3,302**	**13,956**	**22,381**	**30,611**	**38,076**	**45,499**	**52,880**	**60,219**	**67,516**	**70,545**
Net present value	-14,545	7,605	7,836	8,004	5,755	5,110	4,214	3,809	3,443	3,112	2,813	1,168
Cumulative net present value	-14,545	-6,940	-896	8,900	14,655	19,765	23,979	27,788	31,231	34,344	37,157	38,325

NET PRESENT VALUE	38,325
INTERNAL RATE OF RETURN	34.62%
NORMAL PAYBACK	2 years