Olana Cement Based Construction Materials

Business Plan

Owner: Alemu Tola

Adama, Ethiopia

March, 2016

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1. Business Plan Summary

Business Name	Olana Cement Based Construction Materials Manufacturing.
Project owner	Alemu Tola
Type of Establishment	Manufacturing company
Nationality	Ethiopian
Legal form	Sole proprietorship
Project location	Oromia regional state, Adama Town
Premises required	10,000M^2
Product Type	Manufacturing Breaks, Floor tiles and Terrazzo tiles.
Target Market	The company is intended to sell the products for construction companies and individual contractors in Adama Town.
Demand projection	
Investment capital and sources of Financial	11.4 million Birr of total investment out of which 30% from promoter's equity and 70% from long term bank loan.
Financial viability	The project is highly attractive with NPV value of 38.2 million, IRR36.5% both at 15% discount rate and a payback period of a years and three months.

2. The Future

a. Vision statement

"Being number one choice for contractors in supplying innovative breaks and tiles in Ethiopia"

b. Mission statement

Providing quality breaks and tiles for the construction sector at an affordable price

c. Goals/objectives

The business has the following basic goals in the coming five years.

- Generating ... amount of profit on average each year
- Having ....market share

d. Action plan

Milestone	Date of expected completion	Person responsible
Owning land	Feb, 2016	Owner
Building construction	July 2016	Owner & contractor x
Licensing	August 2016	

## 3. Business details

a. Location

Location of the proposed unit should preferably in the vicinity of the major sites of construction as well as sources of raw materials. The plant will be located in Oromiya regional state, Adama Town, close proximity to the capital city of the country where it constitutes the major sites of construction. Besides, there are a lot of cities around Addis Ababa so this location will be the ideal place.

b. Products/services

The company will produce the following range of products

i. Cement blocks and hollow blocks

The hollow (open & closed cavity) blocks are made with normal weight aggregate and are known as normal weight units. The hollow load bearing blocks are made of standard sizes, standard dimensions, length, breadth and thickness and the weight per unit for solid cement blocks and hollow cement blocks are as given below:
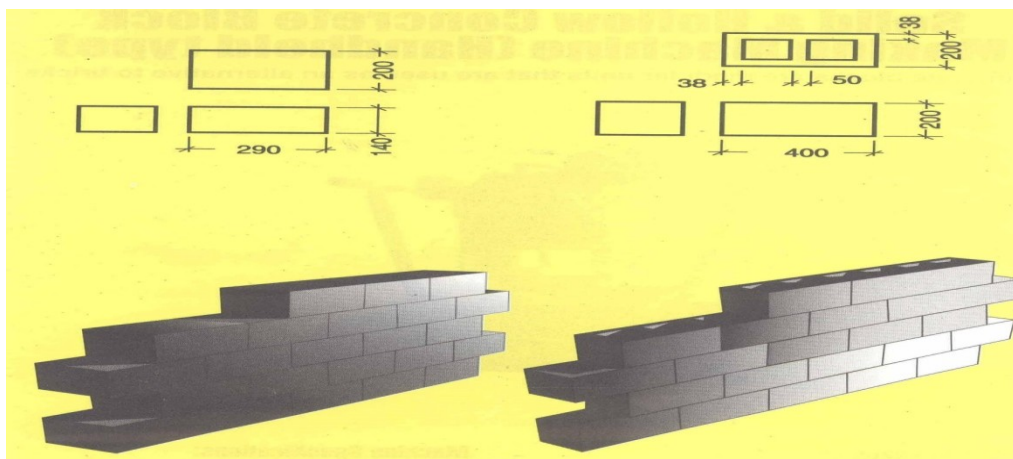
Solid Block Specifications:		Hollow Block Specifications:	
Length	290 mm	Length	400 mm
Width	200 mm	Width	200 mm
Height	140 mm	Height	200 mm
Weight: 16 kg		**Weight: 16 kg**	

ii. Paver Blocks

The paving blocks of different sizes and shape find application in pavements, footpaths, gardens, passengers waiting halls, bus stops, industry and other public places. The Paver blocks are made both in natural cement colour and different bright colours. As per the application they are made both in plain geometrical designs & interlocking.
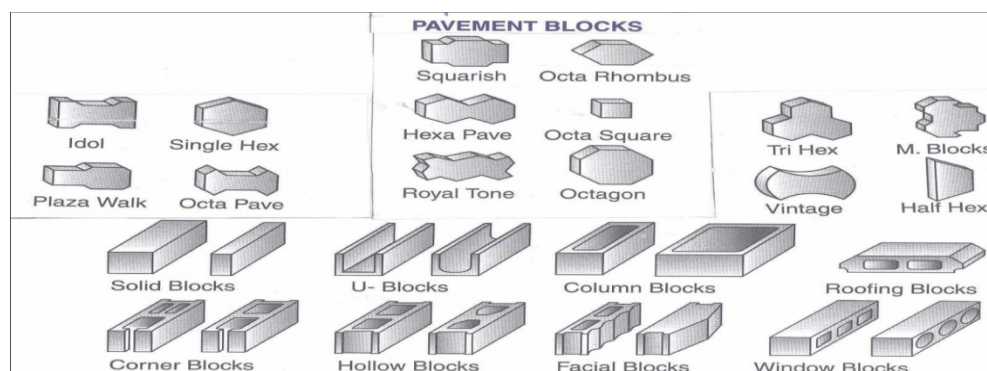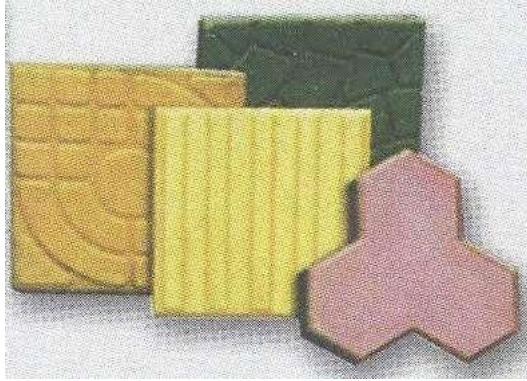

iii. Cement tiles and Mosaic flooring tiles

Cement tiles proposed to be manufactured can broadly be classified in the following categories:

Plain Cement Tiles: In the manufacture of plan cement tiles no pigment or stone chips, marble chips & others are used.

Plain Colour Tiles: The tiles have a plain colour wearing surface.

5

Terrazzo Tiles (Chequered Tiles): Are also known as Mosaic Flooring Tiles. The wearing surface is composed of stone chips in a matrix of ordinary or coloured Portland cement mixed with or without pigments and the surface is mechanically ground to achieve the smoothness.

The tiles are made in various sizes depending upon their use and usage conditions. The details of the recommended sizes are as under:

Cement Flooring Tiles	Cement Terrazzo Tiles
200 x 200 x 20 (mm)	200 x 200 x 22 (mm)
250 x 250 x 22 (mm)	250 x 250 x 22 (mm)
300 x 300 x 25 (mm)	300 x 300 x 25 (mm)

At the beginning of the project the company plans to produce only cement tiles. After five years of operation the company plans to produce Cement Terrazzo Tiles and Paver tiles. The three products the company plans to produce at the beginning are Hallow Blocks, Cement floor and Roof tiles.

4. **The market**

   a. Target Market

   The target market for our business are all construction projects like building construction in both in public and private sector, road construction, bridges. The unit will do to replacement

of red bricks by cement bricks both on cost considerations as well as on advantages associated with the use of cement bricks i.e. less consumption of cement in the construction for wall construction and plastering.

b. Demand projection

The demand for concrete blocks and pipes is derived from building construction. The demand the country's requirement for concrete blocks is met through domestic production. The quantity of production of the products during the period 1998 - 2005 is shown in the following Table. During the period under reference, the supply of concrete blocks which constitutes only domestic production, exhibited considerable fluctuations and averaged at 10.48 million. With an average increment rate of 8.1%/year

Supply of Concrete Blocks and Pipes ('000 Pcs)

Year	Domestic Production Concrete & Hallow Blocks
1998	9,044
1999	9,568
2000	9,763
2001	10,039
2002	9,639
2003	9,810
2004	10,400
2005	15,639
Average	**10,488**

Source: *CSA, Statistical Abstract, various years*

Since the consumption of the products is associated with the construction sector, a rate of growth of 10%, which corresponds to the estimated growth rate of the sector.

Based on this fact the projected demand for the product is presented in the following table.

Table Projected Demand for Concrete Blocks ('000 PCS)

Year	Projected Demand Concrete Blocks
2016	29,922.8
2017	32,915.1
2018	36,206.6
2019	39,827.2
2020	43,809.9

Mosaic tiles

The country's requirement of mosaic tiles is supplied through import. The quantity of the product imported annually during the period 2002 - 2011 is presented in the following Table

Table IMPORT OF MOSAIC TILES (TONS)

Year	Import
2002	2
2003	26
2004	95
2005	239
2006	62
2007	372
2008	131
2009	427
2010	771
2011	509

Source: *Ethiopian Revenue and Customs Authority.*

As can be seen from the above Table import of mosaic tiles fluctuates from year to year. However, a general growth trend can be observed. The yearly average quantity imported during the period 2003-2005 was around 120 tons. But during the period 2006 - 2008 and 2009 - 2011 the average amount annually supplied to the market has

increased to about 188 tonnes and 569 tons, respectively. So the increment trend is very high.

In estimating the present demand for the product it is assumed that the recent three years average (2008 – 2011) is a reasonable approximate of current level of demand. Accordingly, current (2015) demand for mosaic tiles is estimated at about 757 tons.

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 mosaic tiles is shown in the following Table.

Table FORECASTED DEMAND (TONS)

Year	Projected Demand
2015	757
2016	833
2017	916
2018	1,008
2019	1,109
2020	1,220
2021	1,342
2022	1,476
2023	1,623
2024	1,786
2025	1,964

c. Competitors analysis

The cement products proposed to be manufacture by the unit constituent the basic building blocks for any construction activity. The main competition will be from the red clay bricks or the cement products produced at different of locations. And there are also a lot of small

scale hollow block manufacturers. The main competitors' strength and weakness is stated below.

It is envisaged that the proposed project shall be able to supply the hollow blocks and tiles for the construction activities related to different government construction project and other construction projects at economical prices due to lower cost of transport of finished goods from the manufacturing unit to the construction sites.

Competitor	Strengths	Weaknesses
XYZ	Production of tailor made goods	Weak financial capacity
ABC	[*What are your competitor's main strengths?*]	[*What are your competitor's main weaknesses?*]

d. S.W.O.T. Analysis

The following table stipulates the SWOT analysis, i.e. strength, weakness, Opportunity and Threats in the context of Olana.

Strengths	Weaknesses
• Competent management • Clear Business Strategy • Strategic Marketing and Sells plan • Strong Financial systems	• Shortage of capital • New experience
Opportunities	Threats
• Conducive government policy • Country development • Availability bank loan	• Unorganized youth labourer

e. Advertising & sales

The main marketing strategy begins as a provide quality, unique and full package services; deliver to the needs of potential customers, that will fill the needs of them. We are planning our marketing strategy so that we ensure excellence product with affordable price.

Our promotion channels include print ads in the form of business card, brochures, fliers and banners that keep the Olana name, phone and address of the company in front of the customer.

We will give advertising in different newspaper and magazine in our country. In addition, we intend to participate in business workshop and related exhibition.

On the other hand, Word of Mouth - By giving first-time customers great service and a fair price, the word is sure to spread.

All marketing decisions with regard to specific media choices, frequency, size, and expenditures will be conducted on an on-going basis with careful considerations of returns generated.

5. **Technical Analysis**

   a. Main Resources

   The main resources for the production of cement-based products include the following:

   - Land and building

The location of our plant will be in Adama and it is found in the first grade of urban areas. For manufacturing company the land lease price is presented in the following table.

Area of activity	Grade of Town	Plot grade	Price (Birr/m^2/year)
Manufacturing	1St	2	6.50
		3	6.53
	2nd	2	6.53
		3	4.70
	3rd	2	4.70
		3	4.00

So, the lease prices four this project will be 6.53 birr/m^2/year.

A). Plot and built up area

Total land requirement	10,000m^2
Constructed area for Shade	1500 m^2
External shade for work in process inventory	3500 m^2
Parking, green area, recreational place, waste disposal, road	5000m^2

Land Lease Cost: Land on lease @ Birr. 6.53 /m2 per annum

- Plant and machinery
  - Hydraulically operated stationary block making machine with
  - Moulds
  - Hydraulic press (Cap. 150 kg/ sq. cm) with pressure gauge

- o Hydraulic double piston pump with 5 HP motor combined with safety valve, capable of feeding 4 to 5 presses, ram vibrator 1.5 HP, mould vibrator 2 HP
- o Levelling (grinding) machine complete with all attachments grinding capacity 4 tiles at a time (5 HP)
- o Semi polishing machine with 2 HP motor for sample polishing for testing
- o Mould with 1 set of extra mould
- o Pallets
- o Tipping borrows
- Raw materials like
  - o Portland cement
  - o Stone aggregates
  - o Natural sand
  - o Stone crush
  - o Synthetic and natural pigments
- Supplies

It is estimated that 300,000 KWH power connections will be required for the production unit including the power requirement for production machines and general purpose lighting. The cost of the power has been calculated on the basis of birr 0.65/kwh.

Utilities

S.n	Description	Consumption/year	Measurement	Cost(Birr)	Total Cost
1	Electricity (kWh)	300,000	kWh	0.65	195,000
2	Water (M3)	130,000	m³	11	1,430,000
3	Fuel Oil (litters)	56,250	Litter	20	1,125,000
4	Lubricating oil (kg)	As reqd.	As reqd.	-	200,000
Total Annual Cost					**2,950,000**

- Skilled and unskilled manpower

b. Production Capacity

For the purpose of financial analysis product mix has been taken into consideration on the basis of single shift working for 300 days in a year. 300 days of production has been taken for the manufacture of each item mentioned below. 90% of installed machine capacity has been taken as the production capacity or feasible normal capacity of the plant. The capacity of the machine is producing 10,000 units/ day i.e. 3,000,000 unites/year. So 90% will be the normal capacity of the

company i.e. 9,000 unites/day and 27000, 000 unites/ year for the three products. Depends on the market demand of the three products the percentage usage of this capacity will be 60, 25 and 15 percent for Blocks, Floor tiles and cement tiles respectively. The product mix along with quantity of each item of production per annum is given below.

Sno	Product	Deamination	Number of unites per annum
1	Hollow blocks	390 x 190 x 140	0.7*3,000,000=1,890,000
2	Floor tiles	390 x 190x 190	0.2*3,000,000=540,000
3	Terrazzo Tiles	300 x 300 x 22	.15*3,000,000=270,000

c. Process of manufacture

i. Cement blocks

The manufacturing process of cement blocks mainly involves mixing and casting of blocks. The mix in respect of cement aggregate and sand should be suitably proportioned to gain required strength of block conforming to the standards. The coarse, fine & medium grade materials should preferably be mixed in the ratio of 40:20:40 for obtaining better interlocking of grains. Vibration & pressing action together helps in better dispersion of mixture and compaction. The amount of water required for the mixture varies depending upon the grading of aggregated & capacity of press machine.
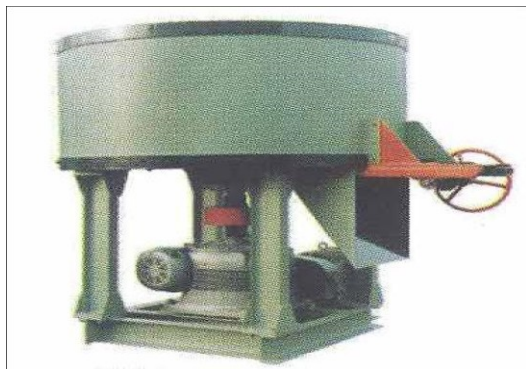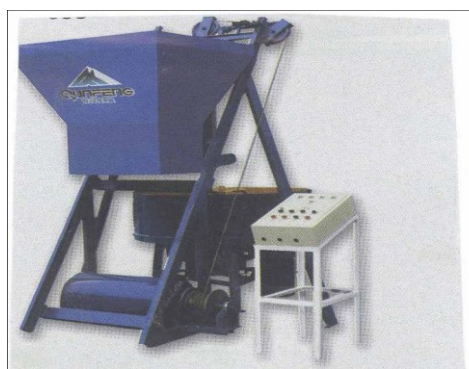
PAN MIXER   **SKIP LOADER**

VIBRO-HYDRAULIC PRESS

Batching equipment is used for proportioning the ingredient accurately. Mixer is used for homogenous mixing and blocks are shaped in a vibrio compactor. Material handling is carried out with the help of shovel loader, screw & belt conveyer and forklift etc. The blocks after formation are stacked on pallets and carefully shifted to shed in a humid atmosphere to develop initial strength in 24-36 hours. The blocks are stacked & sprayed with the water. The spraying of water must be continued intermittently for a period of three weeks for complete curing. The blocks are then allowed to dry for four week before dispatch.

THE SKETCH MAP FOR
SIMPLE BLOCK PRODUCTION LINE

1. Cement Silo
2. Batching Machine
3. Screw Conveyor
4. Cement Scale
5. Mixer
6. Belt Conveyor
7. Block Making Machine
8. Pallets Feeder
9. Green Block Conveyor
10. PLC Contorl Unit
11. Hydraulic Unit
12. Stacker
13. Forklift
14. Curing Room
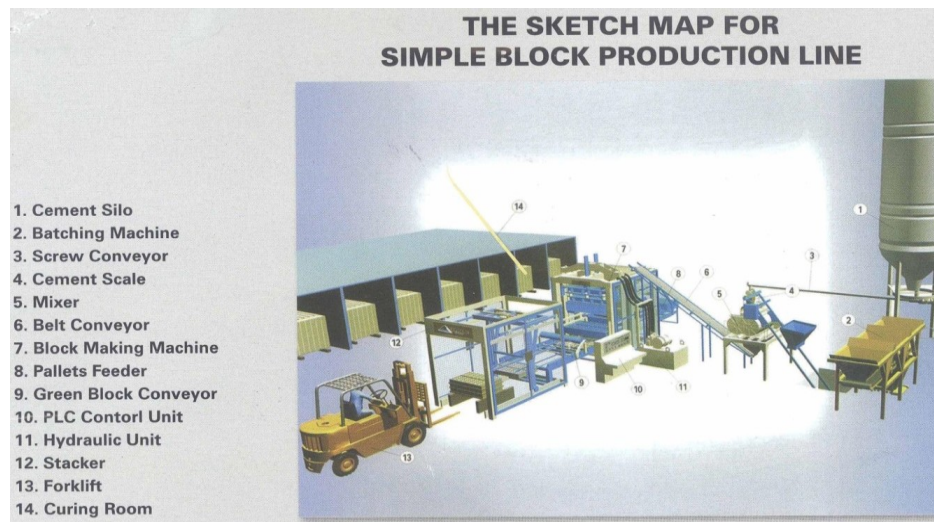
As stated above, keeping in view the size of the demand for these products in the market, a semi-automatic process has been recommended in the project.

ii. Paver Blocks

The process flowchart for the manufacture of cement blocks and paver blocks is as given below:

PROCESS FLOW CHART

```
   ┌────────┐      ┌──────────────┐      ┌──────────────────────┐
   │  SAND  │      │  AGGREGATE   │      │   PORTLAND CEMENT    │
   └────────┘      └──────────────┘      └──────────────────────┘
         ↘              ↓                    ↙
        ┌──────────────────────────────────────┐
        │   PROPORTIONING AN D BATCHING         │
        └──────────────────────────────────────┘
                         ↓
   ┌────────┐      ┌──────────────┐
   │ WATER  │ ───→ │    MIXER     │
   └────────┘      └──────────────┘
                         ↓
        ┌──────────────────────┐      ┌──────────────┐
        │    VIBRO-PRESSING     │ ←─── │  MIXER FOR   │
        └──────────────────────┘      │   COLOUR     │
                         ↓            └──────────────┘
   ┌──────────────────────────────────┐
   │   STACKING OF GREEN MATERIAL     │
   └──────────────────────────────────┘
                         ↓
        ┌──────────────┐
        │   CURING     │
        └──────────────┘
                         ↓
   ┌──────────────┐      ┌──────────────────────┐
   │   DRYING     │ ───→ │  FINISHED PRODUCT    │
   └──────────────┘      └──────────────────────┘
```
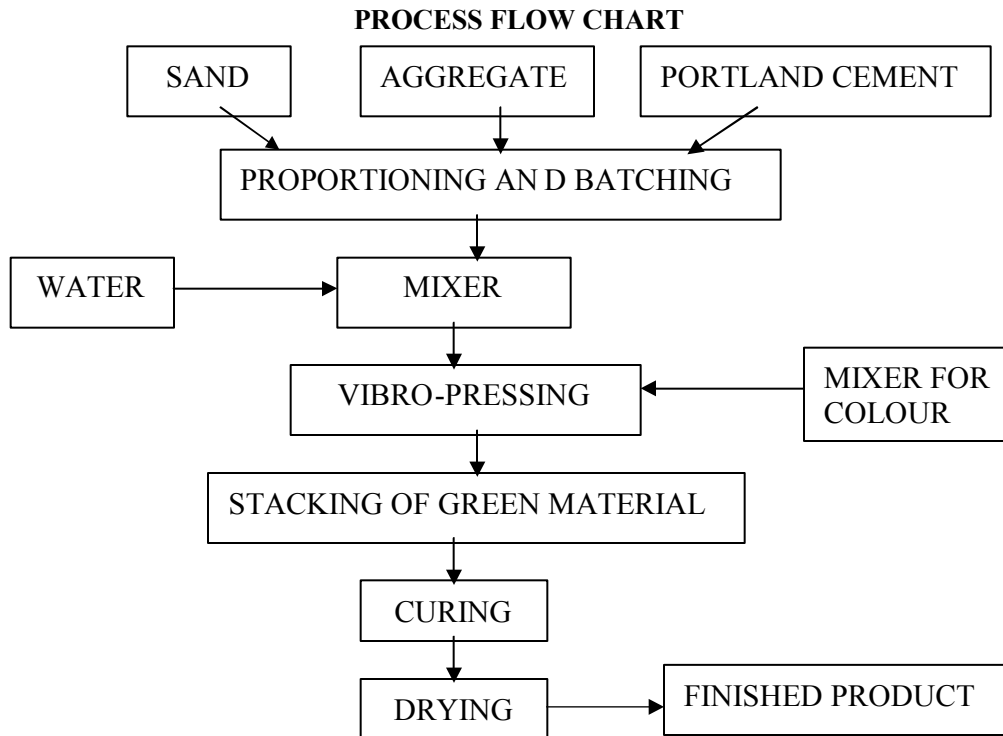
iii. Cement floor and roof tiles

The process flowchart for the manufacturing of plain and coloured mosaic tiles is given below:

```
┌────────┐   ┌──────────────┐   ┌──────────┐                    ┌──────────────────┐
│  SAND  │   │  AGGREGATE   │   │  CEMENT  │                    │ MARBLE CHIPS,    │
└────────┘   └──────────────┘   └──────────┘                    │ POWDER           │
        ┌──────────────────────────────────────┐               └──────────────────┘
        │     PROPORTIONING AND BATCHING        │
        └──────────────────────────────────────┘
┌────────┐        ┌──────────────────────────┐   ┌──────────┐        ┌──────────┐
│ WATER  │───────▶│          MIXER           │   │ WHITE    │        │ COLOURS  │
└────────┘        └──────────────────────────┘   │ CEMENT   │        └──────────┘
                    ┌────────────────────┐        └──────────┘   ┌──────────────┐
                    │   VIBRO-PRESSING    │◀── TOP LAYER MIX ──  │ MIXER FOR    │
                    └────────────────────┘                       │ TOP LAYER    │
                                                                 └──────────────┘
                    ┌────────────────────┐
                    │      SETTING        │
                    └────────────────────┘
                    ┌────────────────────┐
                    │      CURING         │
                    └────────────────────┘
                    ┌────────────────────┐
                    │ TOP-LAYER GRINDING  │
                    └────────────────────┘        ┌──────────────────┐
                    ┌────────────────────┐        │   POLISHING      │
                    │  FILLING & REPAIR   │───────▶└──────────────────┘
                    └────────────────────┘        ┌──────────────────┐
                                                  │ FINISHED PRODUCT │
                                                  └──────────────────┘
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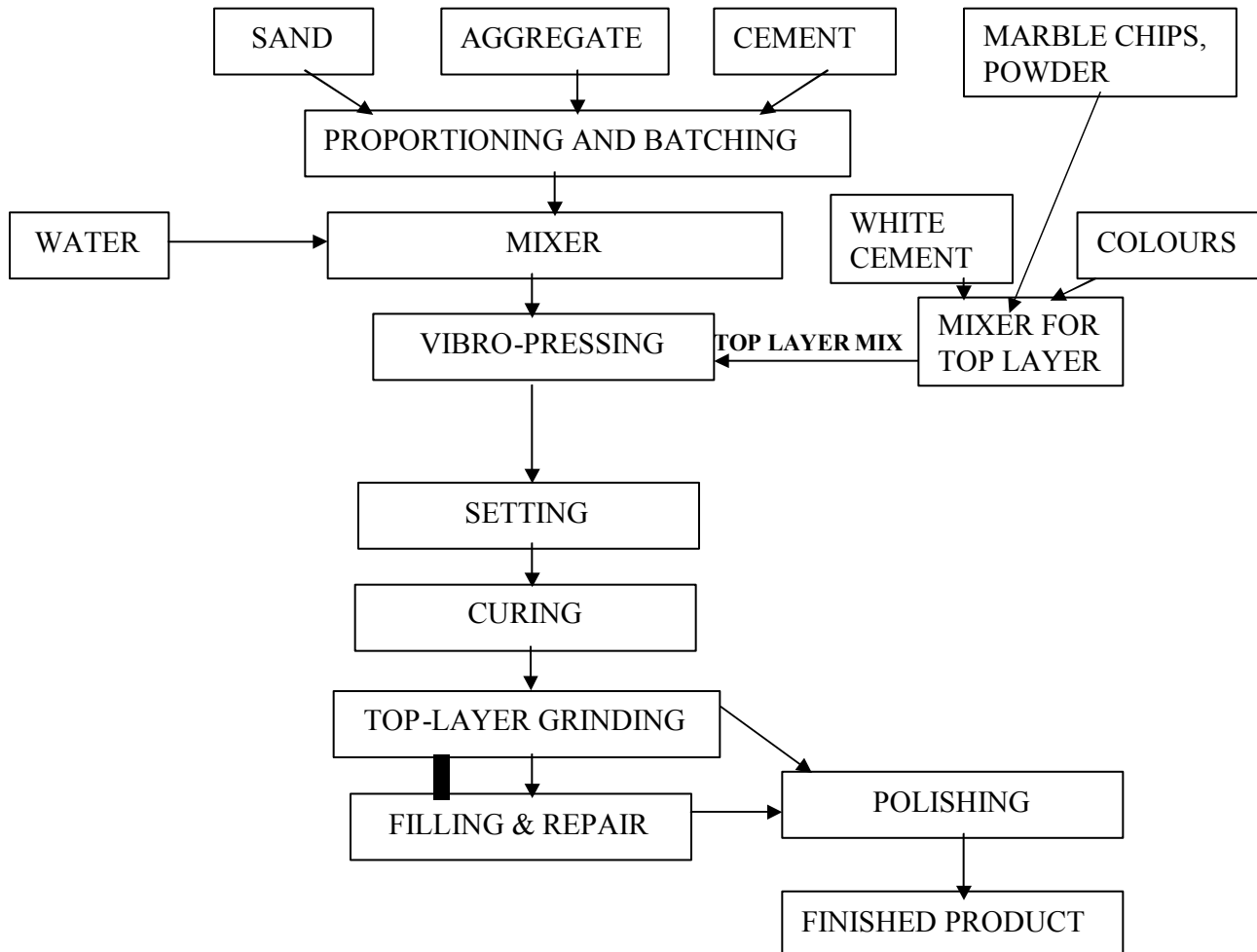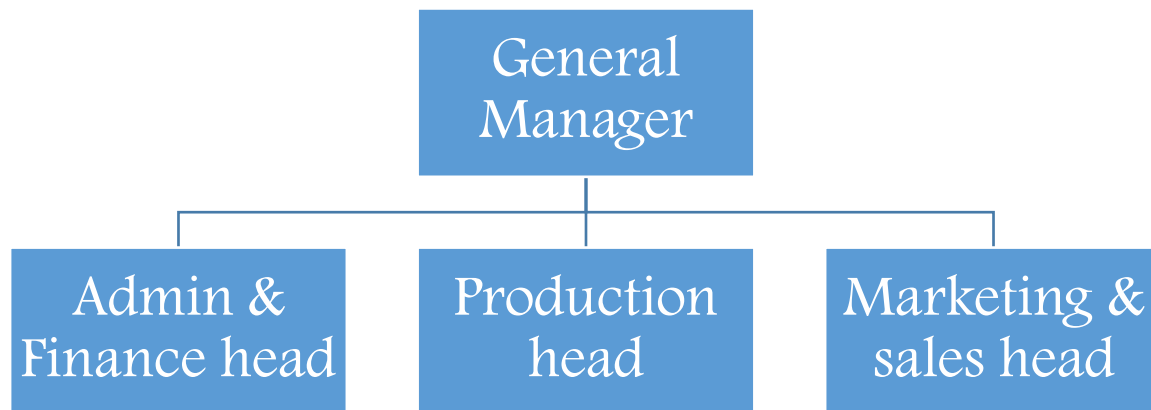
d.   Plant Layout

The following diagram shows the layout arrangement of the factory.

PLANT LAY OUT
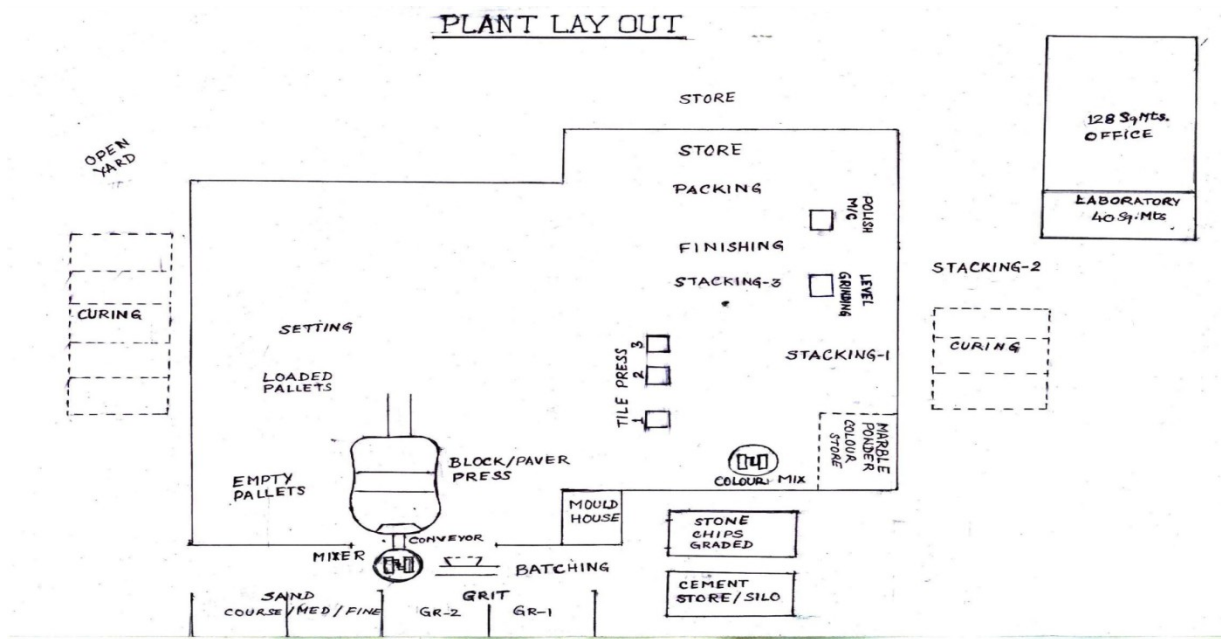
6. Organization and Management

a.   Organisation chart

The Organization structure below shows the working relationship in Olana Factory. The CEO of the factory will be the owner Mr. Alemu Tola. The General Manager will be accounted to the owner. Under each division heads there are employees who will undertake day to day activities.

```
                    ┌─────────────────┐
                    │    General      │
                    │    Manager      │
                    └────────┬────────┘
         ┌───────────────────┼───────────────────┐
┌────────┴────────┐ ┌────────┴────────┐ ┌────────┴────────┐
│    Admin &      │ │   Production    │ │   Marketing &   │
│   Finance head  │ │      head       │ │    sales head   │
└─────────────────┘ └─────────────────┘ └─────────────────┘
```

b. Management & ownership

Olana Factory is formed as a sole proprietorship owned by Ato Alemu Tola. The general manager of the company is Ato Challa Mebratu. The overall profile of the owner and the general manager of the company are summarized in the following table.

Alemu Tola	- Owner - Has worked as business man for the past 30 years - Has an oil producing plant at Adama town where he established as a start up and now with annual turnover above ………. Million birr. - Has completed 12th grade
Challa Mebratu	- General manager - Has worked as a manager in different business organizations for the past ten years - Has completed his BA degree in Management from ……….University - Has completed his Masters of Business Administration (MBA) from ……… University

- Key personnel

7. The Finance

a. Assumptions

The following assumptions are taken in to consideration throughout the financial analysis. All finance are expressed in terms of Birr, and fractions are rounded to the next digit.

Particulars	Measure
Rate of Interest (Bank)	8.5%
Source of finance	70% Loan 30% Equity
Discount rate	15%
Accounts receivable	30 days
Account payable	30 days
Raw material local	30 days
Raw material abroad	90 days
Work in process inventory	35 days
Cash on hand	5 days
Depreciation (Building)	SLM* 20 years
Depreciation (Machinery)	SLM 10 years
Depreciation(furniture & fixtures)	SLM 20 years
Tax	30%
Tax holidays	3 years
Repayment period of Debt	8 years
Construction period	1 year.
Capacity Utilization	90%
Working Capital Cycle	1 month
Spare Parts and Maintenance	5% of plant & machinery

b. Start-up costs for [YEAR]

Sno	Description	Amount
1	Machinery	3,455,335
2	Land & Construction Cost	5,720,000.00
3	Miscellaneous Fixed Assets	250,000.00
4	Pre-operating Expenses	205,000
5	Training Expense	34553
6	Working Capital	1,721,676.78
	Total	11,386,565

Detail breakdown

Fixed investment cost

A. Cost of land and construction

sno	Descriptions	Cost/m2 (Birr)	Area /m2	Total Cons cost
1	Land	18	10,000	720,000
2	Shade	1,500	2,500	3,750,000
4	Site Preparation for FG inventory	500	2,500	1,250,000
				5,720,000

Cost of machinery and Equipment for Cement concrete

Sno	Descriptions	Measurement	Amount	Unit Price	
1	Hydraulically operated stationary block making machine (M1)	No	1	340,000	340,000
2	200 x 200 x 400 (mm) cavity block ram & mould (M2)	No	1		9,600
3	150 x 200 x 400 (mm) cavity block ram & mould (M3)	Dozen	Dozen		9,600
4	100 x 200 x 400 (mm) cavity block ram & mould (M4)	Dozen	Dozen		9,000
5	200 x 200 x 400 (mm) solid block ram & mould (M5)	Dozen	Dozen		8,700
6	150 x 200 x 400 (mm) solid block ram & mould (M6)	Dozen	Dozen		8,700
7	100 x 200 x 400 (mm) solid block ram & mould (M7)	Dozen	Dozen		8,700
8	Paver block mould (M8)	Dozen	Dozen		100,000
9	Pallet stacker (M9)	No	1		220,000
10	Pan mixer of 500 kg. capacity with 15 HP motor (M10)	No	1		140,000
11	Mix conveyor with 2 HP motor (M11)	No	1		674,078
12	Platform electronic weighing scale 500kg capacity (M12)	No	1		24,000
13	Water dosing pump with 2 HP motor (M13)	No	1		17,000
14	Wheel barrows with pneumatic wheels (M14)	No	4	600	2,400
15	Pallet truck 1500 kg. capacity (M15)	No	2	8,000	16,000

16	Pallet truck capacity 500 kg. with pneumatic wheels (M16)	No	2	16,000	32,000
17	Pallets size 900 x 650 x 250 (mm) (M17)	No	500	500	250,000
18	Skip loader (M18)	No	1	13,000	13,000
19	Color mixer 100 kg. capacity 7 HP (M19)	No	1	24,000	24,000
Sub Total B					**1,906,778**

Cement concrete tiles and mosaic flooring tiles section

Sno	Descriptions	Measurement	Amount	Unit Price	Total price
20	Hydraulic press (Cap 150 kg/sq cm) with pressure gauge (M20)	No	3	79800	239400
21	Hydraulic double piston pump with 5 HP motor combined with safety valve, capable of feeding 4 to 5 presses, ram vibrator 1.5 HP, mould vibrator 2 HP (M21)	No	1	56500	56,500
22	Levelling (grinding) machine complete with all attachments grinding capacity 4 tiles at a time (5 HP) (M22)	No	1	130,000	130,000
23	Semi polishing machine with 2 HP motor for sample polishing for testing (M23)	No	1set	62,000	62,000
24	Mould with 1 set of extra mould (M24)		1set	86,000	86,000
25	Pallets (M25)	No	250	500	125000
26	Tipping borrows (M26)		LS		12,000
Sub Total C					**710,900**

Miscellaneous Fixed Assets & Expenditures

Sno	Description	Measurement	Amount	Unit Price	Total price
1	Furniture & office equipment	LS			1,000,000
2	Laboratory equipments	LS			200,000
3	Raw material moving Vehicles	No	2	85000	170,000
4	Double pickup Vehicles	No	1	735000	735,000
Sub Total D					**2,105,000**

Pre-Operating Expense

Sno	Description	Measurement	Amount	Unit Price	Total price
1	Registration and formation of the company	LS			15,000
2	Consultant fees while project preparation	LS			85,000
3	Salary, travel expense, legal expense etc	LS			105,000

Subtotal E	**205,000**
Total Fixed Cost A+B+C+D+E	**8,792,678.00**

c. Profit and loss forecast

The income prepared based on the company's revenue and cost. The detail for each part and the summary of income statement is stated below

Operating Revenue

The company plans to produce and sell three types of products. The demands for these services are forecasted based on detail analysis of the construction sector and the future of the country. The price and the number of units produced and considered to be constant in the normal operation of the company. The detail of this part is presented in the following table.

Operating Revenue

Sno	Type of Product	Specification	Measurement	Production/year	Unit selling Price	Total sales/year
1	Solid blocks	390 x 190 x 140	No	1,890,000	9.5	17,955,000
2	Floor tiles	390 x 190x 190	No	540,000	37.50	20,250,000
3	Terrazzo Tiles	225 x 112 x 80	No	270,000	37.50	10,125,000
	Total Operating Revenue			2,700,000		48,330,000
Les	Wastage 2% Operating Revenue					966,600
	Total Annual Revenue					**47,363,400**

Production Cost

The operation requires different inputs, like raw material, manpower, utilities e.t.c. and the cost of materials are assumed to be the same throughout the project life. The main reason is that we neglect the impact of inflation during operation, by assuming that, if the price of the inputs increase the company will increase the output price and this two will offset one another. The current costs are set by collecting data from different market sources and by taking the current market price of inputs.

Cost of raw materials

	Raw material requirement for All products				
Sn	Description	Measurement	Amount	Unit Price	Total price

o					
1	Cement	Quintal	54,000	289.00	15,606,000.00
2	Komche	Tones	36,000	175.00	6,300,000.00
3	Stone aggregate	Tones	5,424	1,330.00	7,213,920.00
4	Marble chips	Tones	252	1,870.00	471,240.00
5	Mineral colors	Lump-Sum	18	2,100.00	37,800.00
6	Sub Total				29,628,960.00
7	Handling loss@5%				1,481,448.00
	Total Material Cost				**31,110,408.00**

Salary and Wages

Sno	Position	Number of W	Monthly Salary	Salary per annum
1	Manager	1	6,750	81,000
2	Plant Supervisor	1	4,560	54,720
3	Marketing Executive & Accountant	1	2,200	26,400
4	Office's Manager	1	1,500	18,000
5	Machine Operators	1	3,580	42,960
6	Laboratory Technician	1	3,100	37,200
9	Unskilled Labor	15	1,200	216,000
Total salary		**21**		**476,280**

Utilities

S.n	Description	Consumption/ year	Measurement	Cost(Birr)	Total Cost
1	Electricity (kWh)	300,000	kWh	0.65	195,000
2	Water (M3)	85,000	m³	11	935,000
3	Other	Lump sum			90,000
Total Annual Cost					**1,220,000**

Interest cost

Year	Outstanding loan	Interest	Repayment	Balance
1	7970595	677501	996324.4143	6974271
2	6974271	592813	996324.4143	5977946

3	5977946	508125	996324.4143	4981622
4	4981622	423438	996324.4143	3985298
5	3985298	338750	996324.4143	2988973
6	2988973	254063	996324.4143	1992649
7	1992649	169375	996324.4143	996324
8	996324	84688	996324.4143	0

Depreciation cost

The calculation of depreciation is based on the straight line method. In order to calculate the residual value of the project at the end of the period we calculate the remaining life of the plant building and machineries. The calculation shown below,

$$\text{Depreciation} = \frac{Book\ Value}{Economic\ Life\ of\ the\ building, machineries\ldots}$$

year	Plant& Machinery@10%	Office Equipment @20%	Building @5%	Total Depreciation
1	345533	5000	187500	538033
2	345533	5000	187500	538033
3	345533	5000	187500	538033
4	345533	5000	187500	538033
5	345533	5000	187500	538033
6	345533	5000	187500	538033
7	345533	5000	187500	538033
8	345533	5000	187500	538033
9	345533	5000	187500	538033
10	345533	5000	187500	538033

Income Statement

Income Statement										
Operating years	1	2	3	4	5	6	7	8	9	10
Installed Capacity	3,000,000	3,000,000	3,000,000	3,000,000	3,000,000	3,000,000	3,000,000	3,000,000	3,000,000	3,000,000
Capacity Utilisation	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
PRODUCTION	2,700,000	2700000	2700000	2700000	2700000	2700000	2700000	2700000	2700000	2700000

Sales Revenue(SR)	47,363,400	47,363,400	47,363,400	47,363,400	47,363,400	47,363,400	47,363,400	47,363,400	47,363,400	47,363,400
Utilities	31,110,408	31,110,408	31,110,408	31,110,408	31,110,408	31,110,408	31,110,408	31,110,408	31,110,408	31,110,408
Sub Total	1,220,000	1220000	1220000	1220000	1220000	1220000	1220000	1220000	1220000	1220000
Wages & Salaries	32,330,408	32,330,408	32,330,408	32,330,408	32,330,408	32,330,408	32,330,408	32,330,408	32,330,408	32,330,408
Factory Overheads	557247.6	557247.6	557247.6	557247.6	557247.6	557247.6	557247.6	557247.6	557247.6	557247.6
General Overheads	205,000	205000	205000	205000	205000	205000	205000	205000	205000	205000
Land Lease	250,000.00	250000	250000	250000	250000	250000	250000	250000	250000	250000
Estimated Cost of Production	720,000	235080	235080	235080	235080	235080	235080	235080	235080	235080
Selling Expenses	34,062,656	33,577,736	33,577,736	33577735.6	33577735.6	33577735.6	33577735.6	33577735.6	33577735.6	33577735.6
Cost of Sales	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000
EBITDA	34,312,656	33,827,736	33,827,736	33,827,736	33,827,736	33,827,736	33,827,736	33,827,736	33,827,736	33,827,736
Interest	13,050,744	13,535,664	13,535,664	13,535,664	13,535,664	13,535,664	13,535,664	13,535,664	13,535,664	13,535,664
Depreciation	677,501	592,813	508,125	423,438	338,750	254,063	169,375	84,688	0	0
Profit Before Tax	538033.496	538033.496	538033.496	538033.496	538033.496	538033.496	538033.496	538033.496	538033.496	538033.496
Taxation @30%	11,835,210	12,404,818	12,489,505	12,574,193	12,658,881	12,743,568	12,828,256	12,912,943	12,997,631	12,997,631
Net Profit	**35505**	**3721445.3**	**37468**	**37722**	**3797664.1**	**3823070.4**	**3848476.7**	**3873882.99**	**38992**	**3899289.2**

	63.091	63	51.636	57.908	81	54	26	9		89.271	71

Expected cash flow

	Discounted Cash flow statement (Total Investment)											
	Construction Period						Operation Period					
Years	t=0	t=1	1	2	3	4	5	6	7	8	9	10
Cash Inflows												
Net Cash Accruals After Interest &tax			8,284,647	8,683,373	8,742,654	8,801,935	8,861,216	8,920,498	8,979,779	9,039,060	9,098,342	9,098,342
Less: Change in Working Capital			0	0	0	0	0	0	0	0	0	0
Add back financial Expenses			677,501	592,813	508,125	423,438	338,750	254,063	169,375	84,688	0	0
Terminal Cash in flow			0	0	0	0	0	0	0	0	0	
Total inflow			8,962,148	9,276,186	9,250,779	9,225,373	9,199,967	9,174,560	9,149,154	9,123,748	9,098,342	9,098,342
Cash Outflows												
Investment	11,386,565											
Total outflow	9,664,887.96	1,721,677										
Net Cashflow	-9,664,888	-1,721,677	8,962,148	9,276,186	9,250,779	9,225,373	9,199,967	9,174,560	9,149,154	9,123,748	9,098,342	9,098,342
IRR on Investment (26.1%)			0.885	0.783	0.693	0.613	0.54	0.48	0.425	0.376	0.33	0.295
NPV (15% Discount Rate)	38,251,287		7,931,501	7,263,253	6,410,790	5,655,154	4,967,982	4,403,789	3,888,391	3,430,529	3,002,453	2,684,011
Pay Back Period	1 years 3 months											

d. Break-even analysis

   1. Net present value criteria(NPV)

Is the **sum of the present value of all the cash flows** (positive or negative) expected to occur over the life of the project. Value obtained by discounting **(at a constant interest rate and separately for each year) the differences of all annual cash outflows and inflows** accruing throughout the life of a project.

NPV = PV of Cash Inflows - Initial Investment Cost

The projects NPV =Birr 38,251,287

   2. **Benefit-Cost Ratio (BCR)**

It is a measure relates the present value of benefits to the initial investment:

$$BCR = PVB(Present\ value\ of\ Benefit)\Big/ I(Investmetn) = 49,637,\frac{852}{11}, 386, 565 = 4.35$$

Hence the BCR>1 the project is acceptable

   3. **Internal Rate of Return (IRR)**

It is the discount rate at which the present value of cash inflows is equal to the present value of cash outflows. Or Discount rate that makes project's NPV zero.

$$IRR = i_1 + \left|\frac{NPVi_1}{NPVi_1 + NPVi_2}\right| * (i_2 - i_1)$$

◉   Where: $NPVi_1$ & $NPVi_2$ are the net present values obtained at the estimated discount rates i_1 & $i_2$respectively

Or

IRR	=	The Lower Discount Rate (Estimated)	+	The Difference between the Discount Rate	X	NPV at the Lower Discount Rate (Sum of the NPVs (i.e. PV and NV) at the two rates, sign ignored)

◉ The project is acceptable hence the IRR is greater than the discount rate (which is 36.5%>15%)

   4. **PAYBACK PERIOD (PBP)**

◉ The payback period is the length of time required to recover the initial cash outlay on a project.

⬤ When the annual cash inflow is a constant sum, the payback period is simply the initial outlay divided by the annual cash inflow.

$$PBP = initial\ outlay/annual\ cash\ inflow$$

But in our project case the cash inflow is not the same;

⬤ When the project's cash flows are not uniform, the payback period is computed as follows:

$$PBP = years\ before\ full\ recovery + \frac{Un-recovered\ cost}{Cash\ flow\ during\ the\ next\ year}$$

The payback period is 1 year and 3 months

8. Risk & Contingency

Risk management
[*List the potential risks (in order of likelihood) that could impact your business.*]

Risk	Likelihood	Impact	Strategy
[*Description of the risk and the potential impact to your business.*]	[*Highly Unlikely, Unlikely, Likely, Highly Likely*]	[*High, Medium, Low*]	[*What actions will you take to minimise/mitigate the potential risk to your business?*]
[*Description of the risk and the potential impact to your business.*]	[*Highly Unlikely, Unlikely, Likely, Highly Likely*]	[*High, Medium, Low*]	[*What actions will you take to minimise/mitigate the potential risk to your business?*]