
FEASIBILITY STUDY FOR A POULTRY ABATTOIR IN FRONTENAC COUNTY

FINAL REPORT

Presented to:
POULTRY ABATTOIR REVIEW COMMITTEE
ATTENTION: DAVID HAHN
C/O COUNTY OF FRONTENAC
2069, BATTERSEA ROAD
GLENBURNIE, ONTARIO, K0H 1S0

By:



878, avenue Dollard (Outremont)
Montréal (QC) Canada H2V 3G7
☎ (514) 274-2641 ☐ (514) 274-4247
grysole@expansionstrategies.ca
www.expansionstrategies.ca

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1.0 INTRODUCTION

1.1 CONTEXT

In 2009 Frontenac County adopted the first integrated Community Sustainability Plan which contained a fifty-year vision for the area. In this document there were forty initiatives identified, one of which was the development of a poultry abattoir located in the County.

Following up on that point, Local 316 of the National Farmers Union engaged a consulting firm to examine the feasibility of such a project and mandated it to come up with some recommendation as how to achieve those ends.

The object of this study, therefore, is to establish if there is a place where an abattoir could be established that is not much farther than a one hour drive from the majority of the users and secondly, if there are a sufficient number of birds to put this abattoir on a profitable basis.

1.2 SCOPE OF WORK

The Community Sustainable Plan indicated that consumers in the region would prefer buying locally raised chickens even if they were a little bit more expensive. In order to promote an increase production the National Farmer Union Local 316 ordered a Business Plan for an additional abattoir in the region.

Since there were no readily available statistics showing the numbers of birds that would be available for slaughter, one had to be developed that could be used as a base for an eventual Business Plan. Therefore, the Consultants undertook a primary survey, which would establish the actual situation, as well as indicate the propensity of farmers to use abattoirs in the region in the future.

1.3 AREA OF STUDY

The primary target market is the farms located in the counties Frontenac and Lennox & Addington and farms bordering Frontenac County in Lanark, Leeds & Grenville and tangentially Hastings. This area counts over 3,000 farms. (see map and table 1.1)

AREA OF STUDY

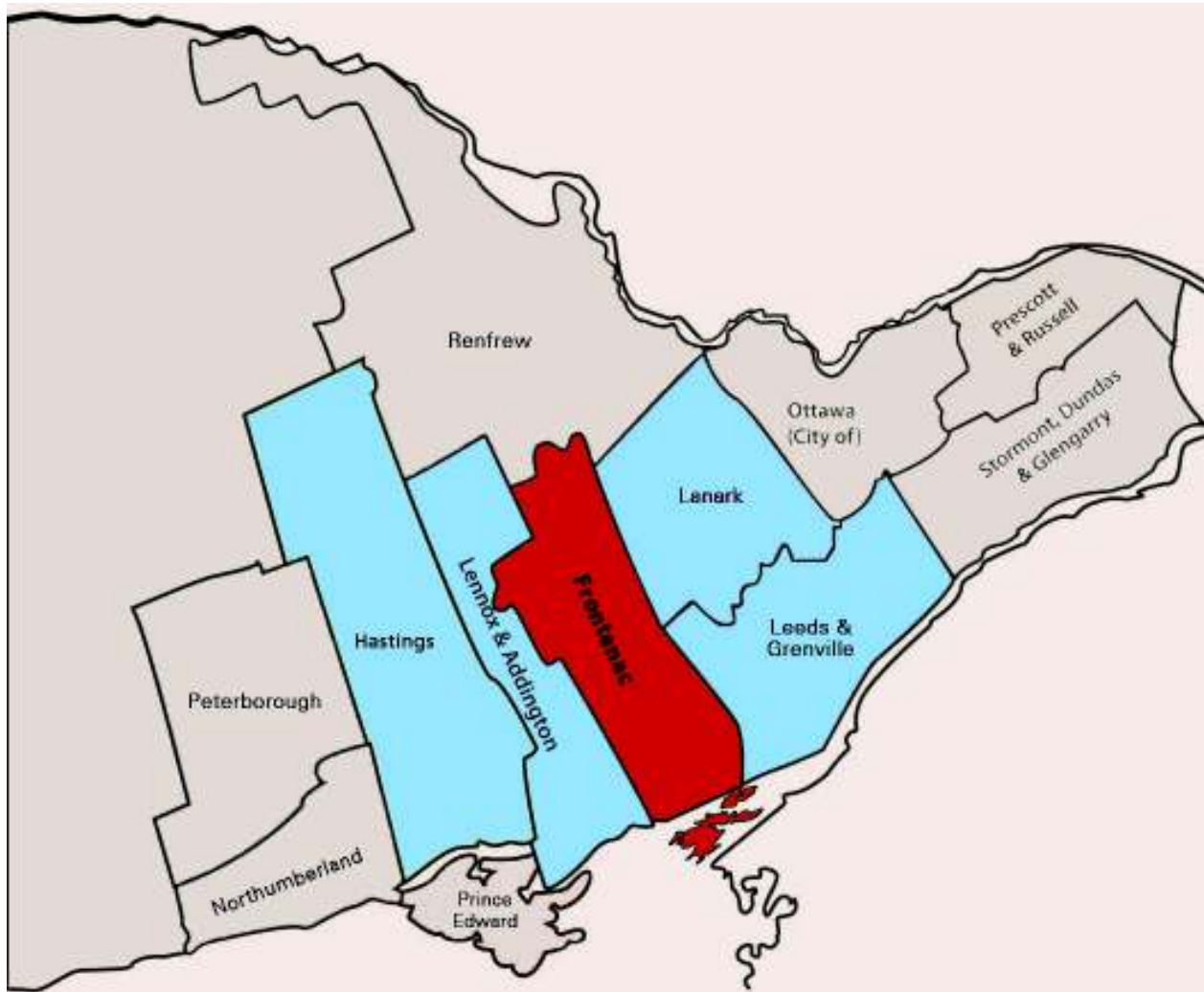


TABLE 1.1
SELECTED DATA ON FARMS IN FRONTENAC AND SURROUNDING COUNTIES

	Frontenac	Lennox & Addington	Lanark	Leeds & Grenville	Total
Farms - number					
In 2001	733	726	1,053	1,492	4,004
In 2006	672	617	874	1,303	3,466
Categories of revenues, number of farms, 2006					
Under \$10,000	311	267	412	553	1,543
\$10,000 to \$24,999	168	146	213	284	811
\$25,000 to \$49,999	70	64	71	143	348
\$50,000 to \$99,999	34	42	70	97	243
\$100,000 to \$249,999	55	46	71	128	300
\$250,000 and over	34	52	37	98	221
Total	672	617	874	1,303	3,466

Source: OMAFRA, Census of Agriculture 2006

2.0 MARKET SITUATION

2.1 REGULATIONS ON BIRD MARKETING AT FARMER'S GATES

2.1.1 Rules for Chicken

According to Chicken Farmers of Ontario Regulation No. 2228 - 2008, effective January 01, 2009 a person may apply on an annual basis to be registered as an exempt grower by filing a Form 300. Such a registration will terminate on December 31st each year, unless earlier terminated by the Board.

No more than 300 chickens may be produced by the exempt grower each year;

No more than 300 chickens shall be marketed each year and only chicken produced at the premises may be marketed. Such chickens shall be marketed only at the premises and the buyer can only purchase the chickens for their personal use.

All chickens shall have been marketed on or before December 31, in each year.

2.1.2 Rules for Turkey

The regulation covering the slaughter of out of quota turkeys is Turkey Farmers of Ontario General Regulation 2011, under Exemption Sec. 3, according to which a farmer is entitled to slaughter up 50 birds per annum, which he can sell anywhere such as at a Farmer's gate, Farmer's Market Stand, at a Store or to Individual Customers.

2.1.3 Rules for other birds

There are no rules covering the sale for other birds.

2.2 SURVEY OF CHICKEN FARMERS

2.2.1 Survey methodology

In order to improve the validity of our conclusions, the Consultants attempted to reach as many farmers as possible. To achieve this, the National Farmers Union supplied the Consultant with two lists of names; in addition, the NFU supplied a list containing the number of day-old chicks sold by the feed stores in the area, which information the Consultant used to verify the results of the personal interviews with the farmers.

List One contained 73 names from which 28 were selected as prime candidates, i.e. farmers who indicated that they are already engaged in production of birds. An additional 10 names were chosen who might be likely candidates for future expansion.

List Two contained 64 names from which 28 names were selected in random fashion.

In total, out of 137 names 66 names were selected for interviewing purposes, plus 7 farmers sent in questionnaires.

These additional 7 farmers were as a result of the National Farmers Union posting on its website a copy of the questionnaire used in the survey and asking its members to fill it out and return it to the Consultants.

Additional information was gathered for the survey by contacting OMAFRA on specific aspects of the questionnaire, as well as the Chicken Farmers of Ontario and the Turkey Farmers of Ontario.

Finally, a list was produced by a board member of the Farmers Union indicating the number of day-old chicks that were sold by the feed stores to the farmers within the region.

In the following tables we are showing two sets of numbers: one, reflecting the present situation and which are based on information obtained from interviewing farmers who are at present raising poultry on their farm whose number is 28 (N=28); and two, reflecting the future producers made up of the present producers (28) and including those who intend to raise chickens in case a new abattoir is established in the region (12) and whose number thus comes to 40 (N=40).

Breakdown of the list of names of producing farmers and potential producers of poultry in the region:

TABLE 2.1
METHODOLOGY -1

Number of Names Total	Selected No. of Names	Farmers interviewed	Unable to reach
144	73	47	26

Source: Survey Expansion Strategies Inc.

Breakdown of Farmers Interviewed:

TABLE 2.2
METHODOLOGY -2

Total no. of respondents	Current Producers	New Producers	No answers
47	28	12	7

Source: Survey Expansion Strategies Inc.

The questionnaire was designed to measure the poultry production and supply once a more conveniently located abattoir was established.

2.2.2 Survey Results

The following three tables are based on information gathered from 28 farmers actually engaged in bird production at the time of the questioning.

TABLE 2.3
WHAT IS YOUR EXPECTED PRODUCTION OF POULTRY IN 2011 ?

Description	Total Chicken	Total Turkey	Total Ducks	Total Others*
Production	4,035	333	82	882
Slaughtered by farmer	591	20	50	80
Slaughtered at an abattoir	3,444	313	32	802

Source: Survey Expansion Strategies Inc.

*Layers, Geese, Guinea Hens etc.

At present 15% of chickens, 3% of turkeys, 33% of ducks and 10% of others are slaughtered by the farmers for their own consumption. Birds slaughtered anywhere else than a licensed abattoir cannot be sold to the public legally.

TABLE 2.4

HOW MANY BIRDS DO YOU EXPECT TO HAVE SLAUGHTERED IN EACH QUARTER IN 2011 ?

Season	Chickens	Turkeys	Ducks	Others
Jan - March	115 - 3%	0	0	100 - 11%
April - June	520 - 13%	0	0	0
July - September	1,965 - 49%	100 - 30%	5 - 7%	700 - 79%
Oct - Dec	1,435 - 35%	233 - 70%	74 - 93%	82 - 10%
Total	4,035 – 100%	333– 100%	79 – 100%	882 – 100%

Source: Survey Expansion Strategies Inc.

Most of the slaughtering takes place in the third and fourth quarter. The layers, as a rule are given to the abattoir, who disposes of them.

TABLE 2.5

HOW DO YOU EXPECT TO SELL YOUR BIRDS THIS YEAR (2011)

Fresh Birds			
Whole chicken	1,145	Whole turkey	163
Cut up chicken	20	Cut up turkey	5
Whole duck	31	Others	21
Frozen Birds			
Whole chicken	2,254	Whole turkey	165
Cut up chicken	310	Cut up turkey	0
Whole duck	36	Others	21

Source: Survey Expansion Strategies Inc.

The preferred way of selling chickens is Whole Frozen Chicken. Turkey and ducks are sold in about equal portions of Fresh Bird to Frozen.

The tables following include information that is based on answers from both present and future producers.

TABLE 2.6
IF THERE WERE IN FRONTENAC A LICENSED ABATTOIR WOULD YOU USE IT ?

Level of interest	Number	Percentage Total N = 47
Definitely	33	70 %
Likely	3	6%
Probably	4	9%
Not interested	7	15 %
Total	47	100 %

Source: Survey Expansion Strategies Inc.

Of all the farmers who have chickens on their farm only 15% would not be interest at all in using the new abattoir.

TABLE 2.7
IF THERE WERE A LICENSED ABATTOIR IN FRONTENAC COUNTY HOW MANY BIRDS WOULD YOU BRING ON A YEARLY BASIS ?

Birds	Future situation N = 40	2011 situation N = 28
Chickens	7,365	4,035
Turkeys	726	333
Ducks	269	79
Others	525	882

Source: Survey Expansion Strategies Inc.

Responses to this question indicate an increase of 83% in the production of chickens, 118% in the production of turkeys and over 240% in the production of ducks that would be brought to the slaughter house. The number of farmers who raised layers was not sufficiently large to allow the Consultants to draw any clear conclusion at this stage and needs to be investigated further. The number of chickens produced per farm would increase from an average of 144 chickens in 2011 to 184 chickens in the projected future, the average increase in turkeys would rise from 12 to 18 and those of ducks would rise from 3 ducks on average to 7 per farm.

TABLE 2.8

IF THERE WERE AN INSPECTED ABATTOIR IN FRONTENAC COUNTY HOW WOULD YOU EXPECT TO SELL YOUR POULTRY ?

Description	Chicken	Turkeys	Ducks	Others
Fresh - whole	1,600	187	55	70
Fresh - cut up	95	10	10	5
Frozen – whole	4,750	535	162	145
Frozen - cut up	820	5	22	5

Source: Survey Expansion Strategies Inc.

Over 76% of the chickens, 75% of the turkey, 75% of the ducks and 64% of Other birds expect to be sold in a frozen state.

TABLE 2.9

HOW WOULD YOU TRANSPORT YOUR BIRDS TO THE ABATTOIR ?

	Number of farmers	Number of birds per cage
In crates	18	6 to 8 birds
By truck or van	10	10 to 25
Undecided	11	-
Slaughter at home	1	-
Not producing chickens	7	-
Total	47	-

Source: Survey Expansion Strategies Inc.

None of the farmers were comfortable to put an inordinate number of birds in cages as that puts the birds under too much stress, as well as they heat up. Both of those cases could cause even death of the birds.

TABLE 2.10

HOW MANY BIRDS PER TRIP ON AVERAGE ?

Number of Birds per trip	20 - 24	25 - 74	75 - 99	100 - 299	300	Don't know	No birds
Number of farmers	2	18	3	9	1	7	7

Source: Survey Expansion Strategies Inc.

As to how many birds do the farmers take to the abattoir depends on a number of factors: How they have to travel, how many birds are per cage and how far they would have to go.

TABLE 2.11

WHAT SERVICES WOULD YOU LIKE TO FIND AT THE ABATTOIR ?

Services	Number of farmers	Number of respondents	Percentage
Scheduling appointments	31	33	94%
Cut up birds	29	40	73%
Customized packaging	21	40	53%
Blast freezing	18	40	45%
Conventional freezing	26	40	65%
Weighing	33	40	83%
Pricing & Labelling	27	40	68%

Source: Survey Expansion Strategies Inc.

Note that the question was not phrased “what services you would use”, but “what services you would like to see at the new abattoir”. This explains the fact that the numbers do not match with how many farmers are actually using specific services such as cutting up of a bird.

2.3 FARMER’S SUPPLY FOR A NEW ABATTOIR

There is no readily available statistical data on the number of birds produced by the individual farmers save the number of licenses given for quota and out-of-quota chickens and turkeys. Thus, all data about supplies is based on primary research conducted by the Consultants or provided by the Client and developed as hypotheses based on the information obtained from farmers, associations and government departments interviewed.

As indicated, end user pressure is on the chicken farmers to increase the number of birds made available at the farm gate and in order to achieve that end the consultants developed a number of scenarios.

The primary supplier of poultry is the farmer who made an application and received a license for out-of-quota chickens (300), and who is also allowed 50 turkeys per farm per annum. All other birds, such as ducks etc. do not require any kind licensing.

According to the offices of the Chicken Farmers of Ontario (CFO) there were about 2000 out-of-quota licenses issued in Ontario in 2009, of which approximately 10% (200) were located in the region under our consideration.

According to the Turkey Farmers of Ontario (TFO), Ontario produces 100,000 birds outside of the quota system of which 10% (10,000) comes from the four counties.

All of the conclusions in the report are based on information such as the survey by the Consultant, number of day-old chicks sold in the counties, obtained from the National Farmers Union or data received from OMAFRA, CFO AND TFO.

2.3.1 Evaluation of Present Volume of Birds

Based on the results of the survey there were 4,035 chickens and 333 turkeys, produced by 28 farmers in 2011 (Table 2.7) averaging 144 chickens and just over 12 turkeys per farm. By extending this average to 200 farms we arrive at a total of 28,800 chickens and 2,400 turkeys. According to the list supplied by the NFU there were some 34,700 day old chicks sold in the four counties, with a ratio of 10:1 of chickens to turkeys indicating that our survey sample reflected the reality of birds produced. The survey also indicated that some ducks were produced which may represent an estimated volume of 350 ducks in the region.

2.3.2 Evaluation of Present Potential

Based on the CFO and TFO figures there are approximately 200 farmers engaged in poultry farming in the four counties under our consideration, who may raise up to 300 chickens and 50 turkeys each year for a total of 60,000 chickens and 10,000 Turkeys.

Since there is no quota for other birds, the potential is not included.

2.3.3 Estimate of Future Volume of Birds

In questioning the farmers interviewed on future production, the survey established that should a more conveniently located abattoir be established in the counties a substantial increase in production both in chickens and turkeys would be achieved.

1. There would be an 83% increase in chickens and a 118% increase in turkeys by farms already in production; in absolute numbers, present production would go from

4035 to 7365 in chickens and the number of turkeys would increased from 333 to 726.

2. There were 12 farmers who were not in the poultry raising business who indicated that they would enter this field if such an abattoir were built, representing an approximate 50% growth in the number of poultry raising farms.

The extended numbers are arrived at by increasing CFO number for producing farms, from 200, by 50% to 300. This addition represents farmers who are new to the poultry raising business.

Our survey indicates with the increases shown, the farmers would reached an average production of 184 chickens and 18 turkeys per farm.

Although other birds were present in the survey, they were too insignificant or too inconsistent in number to be worthwhile to include in the count but will be accounted for under "Other sources of Business", section 2.5 in the report.

It should be noted that in the survey, the additional number of farmers came from farms not normally engaged in poultry production, thus representing a completely new addition to this market.

Thus, the estimated future volume of birds is 55,200 chickens and approximately 5,400 turkeys and 1,500 ducks.

2.3.4 Estimate of Future Potential

Taking into consideration a 50% increase in the number of farms that would be engaged in poultry production, we conclude that 300 farms would have the potential to produce a maximum of 90,000 chickens and 15,000 turkeys.

TABLE 2.12

SUMMARY OF MARKET POTENTIAL FOR A NEW SLAUGHTERHOUSE IN FRONTENAC

Numbers	Evaluation of Present Volume	Evaluation of Present Potential	Estimate of Future Volume	Estimate of Future Potential
Farms	200	200	300	300
Chickens	28,800	60,000	55,200	90,000
Turkeys	2,400	10,000	5,400	15,000
Ducks	79	Not included	2100	Not included
Others	882	Not included	3,938	Not included
Birds total	32,802	70,000	66,638	105,000

Source: Survey Expansion Strategies Inc.

In conclusion, the future volume provides the opportunity for a new abattoir to process approximately 55,000 birds to start with, based on the fact that 83% of the farmers who participated in the survey indicated they would definitely use the new abattoir.

2.4 PERCEPTIONS ABOUT MARKETING RULES AND OTHER FACTORS

A number of farmers interviewed were under the impression that they could sell their outside of quota chickens and turkeys at Farmers' Markets. Chickens slaughtered under the exemption rules **cannot** be sold at Farmer's markets, all other birds (turkeys, ducks, etc.) are allowed to be sold.

One of the major complaints of present day poultry farmers is that the existing abattoirs serving the region are too distant from their farms which tend to cause hardship on the transported bird population and may even have dire consequences for them. The farmers feel that chickens crammed into a cage tend to suffer great stress due to crowding and heat and if the journey is too long could even cause death to the birds. Anecdotal information gathered in conversations with farmers indicated that they have a set of priorities that they would like to see observed:

- a) Quality of the work
- b) Distance to the abattoir - ideal time under one hour one way.
- c) Price charged per bird
- d) Services offered

This order of importance reflects the farmer's need to maintain his image vis-à-vis his own clientele.

2.5 OTHER SOURCES OF BUSINESS FOR A SLAUGHTERHOUSE

At present the operating abattoirs in this sector need to have additional sources from which to augment their income. These sources can be:

- a) Accepting Layers;
- b) Selling day-old chicks;
- c) Include services offered to handle other meat products;
- d) Raising their own flock;
- e) Accepting chickens from licensed quota farmers;
- f) Working a short week.

2.6 BUSINESS CASES

2.6.1 Business case 1: Dan, Dan the Chicken Man.

Dan Waito has been in the chicken slaughter business for over 25 years but is quitting the business because he feels that the government regulations are killing his business.

According to the Orillia Packet & Times, the company is a small slaughtering operation putting through 600 – 700 chickens per day three days of the week for six months of the year. This means that he was processing between 43,000 and 50,000 chickens per annum. Dan however maintains that his numbers are lower.

He services about 300 customers who are also small time chicken farmers, and who bring on average 150 to 160 chickens to him per year, although he claims' that in a good year he might process between 38,000 and 42,000 chickens tops.

To augment the company's income, he is also in the business of selling day-old chicks, giving a discount on the price of slaughter to farmers who buy his stock.

He works with a staff of six people which allows him to run his operations smoothly.

2.6.2 Business case 2: Ferme Bourgeois, Mirabel, Quebec

This family operation has been slaughtering birds since 1948. Family owned, it is a farm and a slaughterhouse that raises game birds (wild turkey) and provide the services to local farmers for sales at farm's gate.

The yearly production is approximately 50,000 birds. Of that total, 30,000 birds are from his farm and 20,000 from farmers from the area. The plant operates from June to December with a team of 7 people. Ferme Bourgeois intends to stay at that size which fits his mission to serve the local population in an ecological way.

The new regulations for small abattoirs in the Province are forcing Ferme Bourgeois to consider building a new facility since the present one cannot be modified in accordance with the new rules.

3.0 COMPETITION AND PROPOSED SITE

3.1 SLAUGHTERHOUSES IN THE REGION

At present there are three abattoirs that are servicing the counties Frontenac, Lennox and Addington, Lanark and Leeds & Grenville:

- J.R. Meats in Foxboro in the Western Part,
- Berube Poultry in Mountain (referred to sometimes as Kemptville) and
- Custom Meat Cutting in Chesterville in the East. (see map).

3.2 PRICES

Prices paid by some of the farmers at the different abattoirs in 2010:

TABLE 3.1
PRICES TO SLAUGHTER BIRDS

	J. R. Meats	Berube Poultry	Custom Meat Cutting
	Foxboro	Mountain	Chesterville
Chickens	\$ 3.25 - \$ 4.00 (2010) \$4.25 + \$1.25 - \$1.50 for extra services (2011)	\$ 2.75 – \$ 3.50 (3.75 for 2011)	\$ 2.75 - \$ 4.30
Turkey	\$6.00 for 20-lb bird plus \$1.00 for each additional 5 lbs. \$8.75 (2011)	\$5.00 for 20 lb bird plus additional fees for larger birds	\$5.00 for 20-lb bird plus \$1.00 for each additional 5 lbs.

Source: Survey Expansion Strategies Inc.

3.3 PROPOSED SITE

The Client has been in contact with a promoter who is in the process of acquiring a slaughterhouse located in Sharbot Lake. The map on the following page indicates the zone which is within one-hour drive to the Sharbot Lake Plant and the existing competing slaughterhouses in the region. The distances are in Table 3.2. The said promoter intends also to run at this plant a pork processing operation to make sausages.

PRIMARY MARKET AREA FOR THE SHARBOT LAKE SLAUGHTERHOUSE

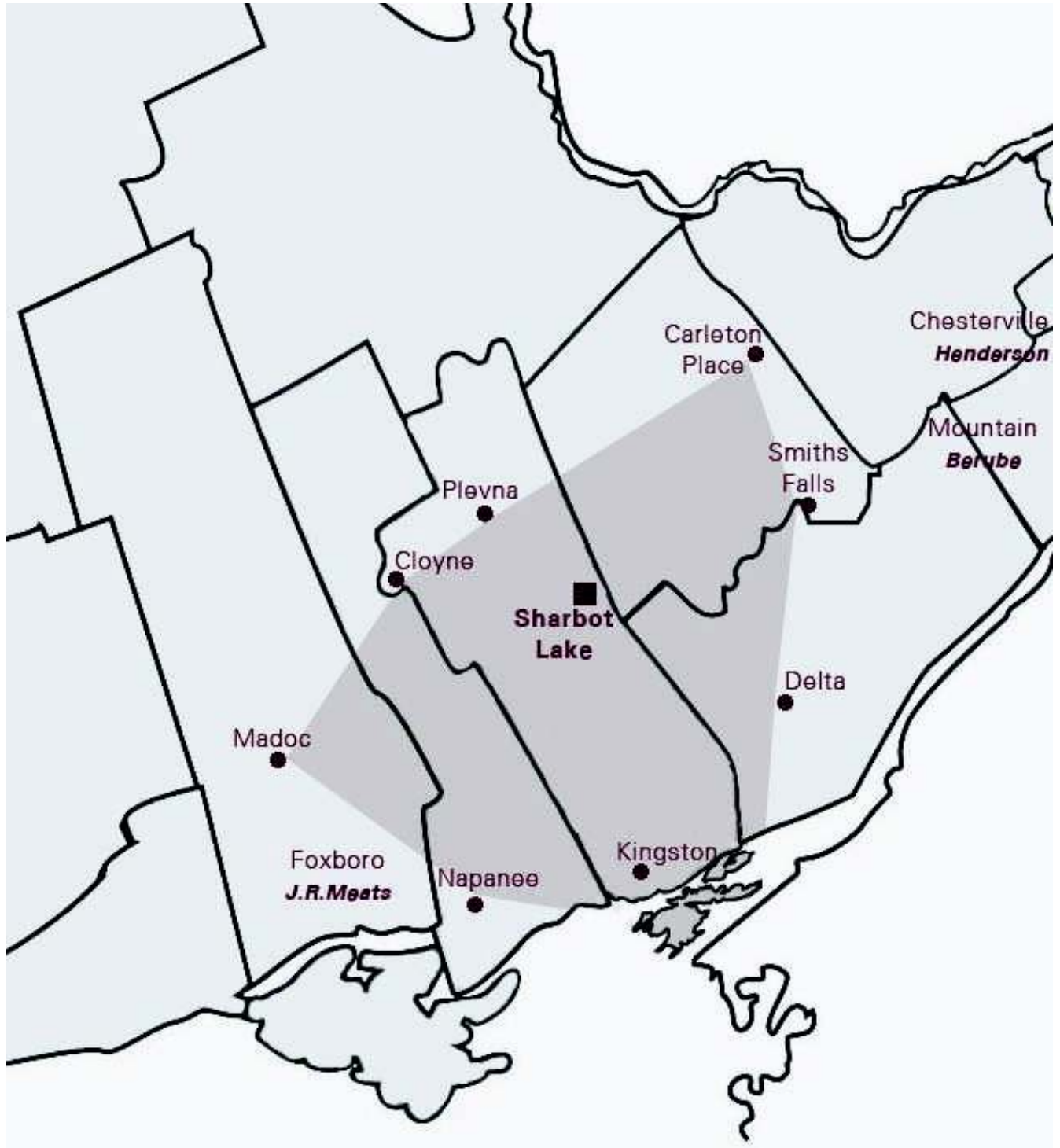


TABLE 3.2
DISTANCE AND TRAVEL TIME FROM SHARBOT LAKE TO SELECTED PLACES

County	To	Minutes	km
Lanark	Smith Falls	54	60
Lanark	Carleton Place	60	70
Leeds & Grenville	Delta	58	65
Frontenac	Elginburg	56	65
Frontenac	Plevna	42	45
Lennox & Addington	Napanee	75	90
Lennox & Addington	Cloyne	54	65
Hastings	Madoc	70	80

Source: Expansion Strategies Inc.

4.0 POTENTIAL ABATTOIR LOCATIONS AND LAYOUT SCENARIOS

4.1 DESCRIPTION OF SHARBOT LAKE SITE

This existing facility is for sale and is not currently in operation. It is equipped to operate as a pork abattoir - from receiving live hogs to delivering refrigerated or frozen meat at the store section of the building.

The main structure is made of steel, dome-shaped, prefabricated and insulated. It covers an area of approximately 2640 sq. ft. (square feet) divided into two main areas:

- Receiving area and kill room, covering: 880 sq. ft. (approx.)
- Office and meat processing area, covering: 1760 sq. ft. (approx.)

This area includes offices, change rooms and WC, dry storage room, a hanging room, cold room, cutting room, waste room, meat processing area, freezer and a meat shop with refrigerated counters.

Solid wastes are kept in a refrigerated waste room, and liquid waste is collected in an underground storage tank, to be pumped out later.

The prospective buyer of the property would contemplate dropping the abattoir function concentrated in the two main rooms of “Receiving” of live hogs and the “Kill Room” together covering an area of 880 sq. ft., and operating a five (5) day/week pork processing facility only, concentrated in the balance of the building (1760 sq. ft.), while receiving fresh pork slaughtered at another location in the building.

The buyer would contemplate adding a new chicken abattoir activity in the space liberated by the cancellation of the pork abattoir functions. The new activity would be physically segregated from future meat processing activities.

The following page illustrates the various aspects of the existing facility.



SHARBOT LAKE FACILITY



AUXILIARY STORAGE SHED



KILL ROOM



HANGING ROOM



PROCESSING ROOM



MEAT SHOP



ENTRANCE TO HOG RECEIVING AREA



REFERIGERATION CONDENSERS

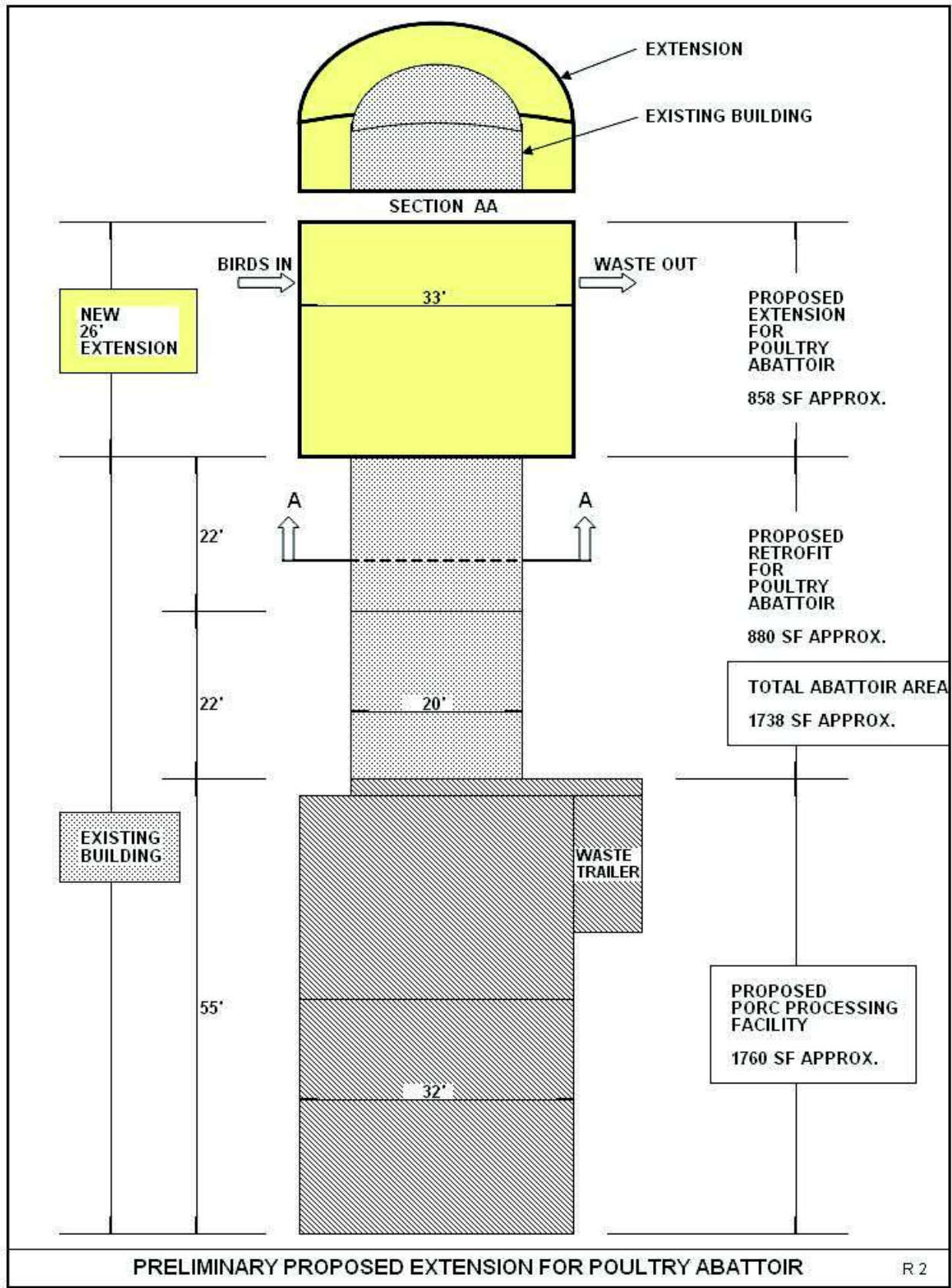
4.2 PROPOSED EXTENSION

In order to house all the required functions of a proposed chicken abattoir, the existing Sharbot Lake Site could be expanded in the following manner:

- A new prefabricated dome-shaped steel structure could be erected at the back of the site, having a width of 33 feet and a depth of 26 feet. This would leave enough space from the tree line for adequate vehicular circulation in the back of the building. The area covered by this extension would be equivalent to 858 sq. ft.
- The existing area recovered from the existing building, to be retrofitted for chicken abattoir activities would be 880 SF (approx.)
- The total area proposed for a new chicken abattoir would be 1738 sq. ft.

Refer to the following schematic that depicts the proposed extension.

This is the minimum size that could be envisaged for a small abattoir which would house all the required functions, except for dry storage rooms and shop area which could be shared with the existing facilities.



4.3 PROCESS FLOW DIAGRAM

The process flow diagram seen on the following page, displays the required functions for the proposed chicken abattoir.

Clean and dirty processes are segregated and their respective process flows do not cross each other.

Throughout schematics in this report, clean areas will be shown in “green” colour, process areas in “yellow” and dirty areas in “brown”.

Minimum required manpower for each function is shown under the column “staff”. Based on the input data shown for the annual/ monthly/ and daily volume, the process time per chicken is 1.3 minutes/ person, which is quite fast if one considers the “Evisceration” function, where a process time of more than two (2) minutes is considered more appropriate. Hence, two (2) persons have been allocated for “Evisceration,” which provides a time of 2.6 minutes/ chicken/ for each of two persons.

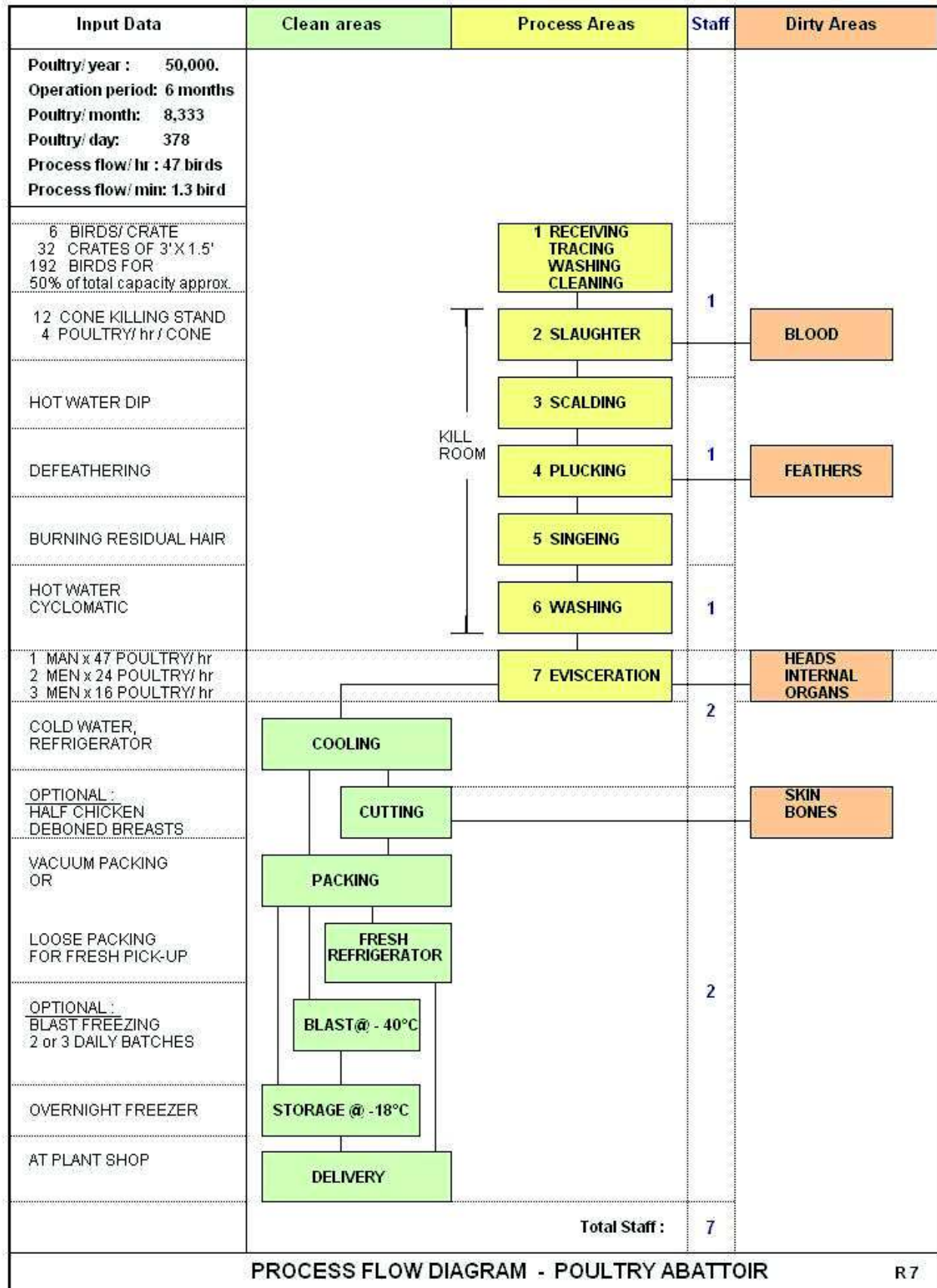
Similarly two (2) persons have been allocated for the functions of cutting and packing and what follows in loading the products into refrigerators (for fresh poultry), or Blast Freezer (for the production of blast frozen poultry within two (2) hours), and later storage in the storage freezer kept at -18°C. At this stage of the study, cutting is considered a partial or an optional task; hence the personnel assigned to this task will also be involved in packing and storing activities.

One (1) person will be responsible for receiving the poultry, placing it in cages and properly filling up the order form and tracing client data. Later, the same person will be responsible for slaughtering the poultry, removing liquid waste and washing and cleaning cages.

One (1) person will be responsible for scalding and plucking functions and the associated removal of wastes.

One (1) person will be responsible for singeing and washing functions.

The total required manpower for this process will be: seven (7)



4.4 MERITS OF CONTINUOUS FLOW VERSUS BATCH TYPE OPERATING SYSTEMS

It is important to present the merits of two kinds of abattoir operation systems, to help prospective abattoir management to decide on a preferred method of running their daily business.

This feasibility study is based on the continuous flow system which offers distinct advantages for initial capital investment, hydro costs and quality control.

The following **Table 4.1** defines both systems and lists the advantages and disadvantages inherent to each:

Table 4.1
CONTINUOUS FLOW VERSUS BATCH FLOW

ITEM	CONTINUOUS FLOW	BATCH FLOW
<p>1. Definition</p>	<p>Birds are handled through the process steps on a one-to-one basis; except for the initial steps of Slaughtering, Scalding, Plucking and Washing, where more than one bird is handled at the same time, based on the size and model of the equipment used to carry out the operation at each work station.</p> <p>Each worker is assigned to the same specific task, which is carried out from the start of the workday to its end.</p>	<p>Process steps are divided into two major activities on a typical workday:</p> <p><u>1. Activity # 1:</u> Receiving, Slaughtering, Scalding, Plucking, Singeing, Washing Evisceration, and Cooling; handled by a group of workers.</p> <p><u>2. Activity # 2:</u> Once Activity #1 is complete, the same group of workers move onto the tasks of Cutting, Packing, Blast-freezing, Storage and Delivering.</p>
<p>2. Learning curve</p>	<p>Easier to measure the quality of the product delivered by each worker as they are assigned to same daily tasks.</p> <p>Easier to implement and monitor quality continual improvement programs.</p> <p>More likely to produce better-quality product. Better Scalding and Singeing, with minimal broken limbs.</p>	<p>More difficult to assign individual tasks and monitor the quality of the final product as the group of workers move from Activity #1 to Activity #2.</p>
<p>3. Number of workers</p>	<p>Requires 25% to 30% more workers.</p> <p>Workers are considered <i>variable</i></p>	<p>Requires fewer workers.</p>

	assets, and their number may vary, as production volume increases or decreases.	
4. Floor space	<p>Requires minimum floor space because the same constant flow rate of birds is handled during each hour of the day.</p> <p>Physical floor space can be expanded in the future up the vertical axis of the building, to suit business's future increased turnover.</p>	<p>Requires more floor space to accommodate the layout of the common bird-hanging conveyor belt for a greater number of birds to be handled at the same time.</p> <p>Requires more floor space, to accommodate the "cooling" of a greater number of birds in the batch.</p> <p>Floor space is considered to be a <i>fixed asset</i>, which cannot be reduced if there is a downturn in the business cycle.</p>
5. Quality of layout & environment	<p>Receiving Area, Kill Room and Evisceration activities are handled in environmentally controlled separate rooms with doors.</p> <p>Product is exposed to room air for a very short period of time.</p> <p>Lower risk of contamination or development of undesired bacteria.</p>	<p>Receiving area, Kill-Room and Evisceration activities are handled in more or less the same room (or in interconnected rooms with no doors), to allow the movement of the common bird hanging conveyor.</p> <p>Higher risk of contamination or development of undesired bacteria.</p>
6. Contamination Control	<p>Movement of workers from 'unclean' areas to 'clean' areas is restricted.</p> <p>Eliminates the risk of contamination, hence provides a better quality product.</p>	<p>Workers have to move from 'unclean' Activity # 1 areas to 'clean' Activity # 2 areas of the abattoir.</p> <p>Workers have to wash and change garments before entering clean areas, to avoid contamination.</p>
7. Bird hanging conveyor belt	<p>Minimal size; since the conveyor belt is applied to the evisceration work-bench only.</p>	<p>Maximal size; to handle the majority of birds involved in the batch, from Kill-Room to Evisceration.</p>
8. Cooling Refrigerator	<p>Minimal size; to suit to the continuous flow rate.</p>	<p>Maximal size, to suit the batch volume.</p>

<p>9. Blast Freezer</p>	<p>Projected to be of minimal size, to suit of up to (1) running cycle in late morning and (2) cycles in the afternoon.</p> <p>Guarantees same-day delivery.</p> <p>Better quality control is achieved when smaller loads and handled in short blast freezing cycles.</p>	<p>To be of a larger size and capacity, to accommodate afternoon batch volume, and to avoid overtime work which in turn would avoid the spreading of bird deliveries to the next day.</p> <p>Harder to achieve quality control with larger loads, which would require longer freezing cycles.</p>
<p>10. Hydro costs</p>	<p>Lower operating costs in relation with preceding items 6, 7, 8 & 9.</p>	<p>Higher energy and maintenance costs in relation with preceding articles 6, 7, 8 & 9.</p>
<p>SUMMARY</p>		
<p>11. Construct ion Cost</p>	<p>Lower initial capital investment. [Ref. items : 4, 7, 8, 9]</p>	<p>Higher initial capital investment. [Ref. items : 4, 7, 8, 9]</p>
<p>12. Operating Cost</p>	<p>Higher operating costs. [Ref. item 3] Lower operating costs. [Ref. items 6, 10]</p>	<p>Lower operating costs. [Ref. item 3]. Higher operating costs. [Ref. items 6, 10]</p>
<p>13. Quality Control</p>	<p>Higher quality product. [Ref. items 1, 2, 5, 6, 9]</p>	<p>Lower quality product. [Ref. items 1, 2, 5, 6, 9]</p>

4.5 PROPOSED FLOOR LAYOUT – SHARBOT LAKE SITE

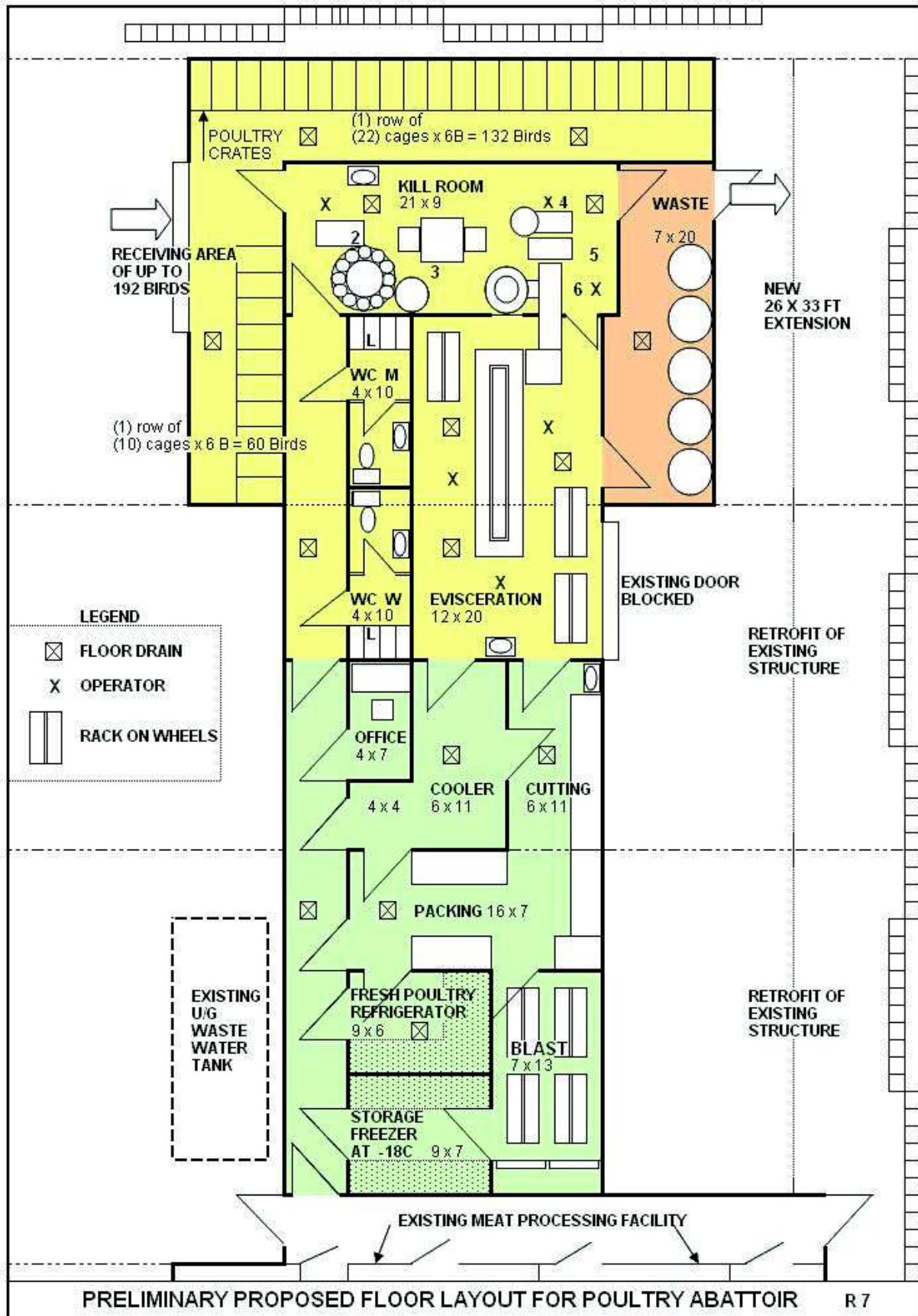
The following page shows a preliminary floor layout which makes use of the following areas:

- Existing 20' x 22' Kill Room block area; retrofitted for packing, refrigerator and freezers.
- Existing 20' x 22' live hog receiving block area; retrofitted for office, WC, poultry cooling room, cutting room and part of evisceration room.
- New extension 26' x 33' subdivided for receiving area; kill room, waste room, WC, and part of evisceration room.

Room sizes have been optimized to obtain an abattoir of the *smallest size possible*, and yet meet the requirements of workability of each individual function.

In this scenario, the existing “kill cage” for hogs has been dismantled and removed, to allow the layout of an “ L “ shaped cutting room communicating with the packing room. Additional space for these two rooms would facilitate the move of wheel-mounted racks of poultry from cooler room to packing room to blast freezer and back to evisceration room. It would also provide additional space for the installation in cutting and packing rooms of a motorized cutting saw, a vacuum packer and a hot tub for positive sealing of products.

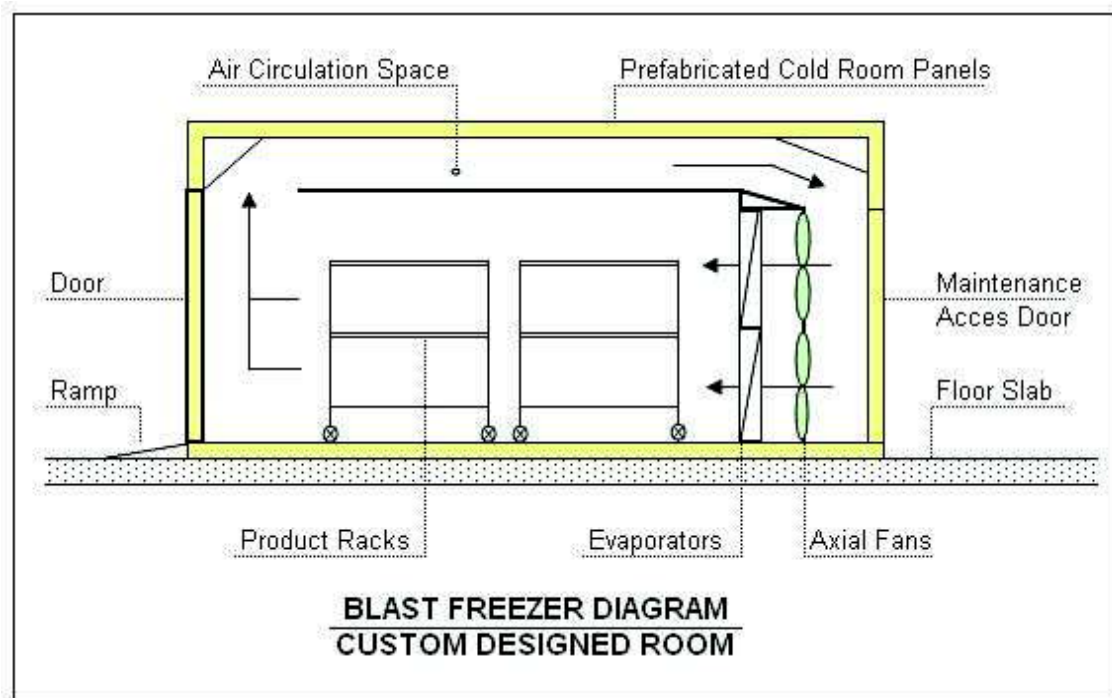
As business picks up and Market Potential as shown on **Table 2.12** becomes sustainable, it would be possible to expand the Process Area up the vertical axis of the building.



4.6 ADVANTAGES OF BLAST FREEZING

Given the difficulties of retrofitting in constrained spaces, it would be advisable to consider the building of a custom-designed blast freezer. New or used blast freezing equipment would be more expensive and access would become a challenge for installation (or for removal) without breaking the outside wall.

The schematic below displays the main components of the system, in which high volume cold air at -40°C is circulated by axial fans, to freeze the product in a relatively short time. It is expected to blast freeze a batch of 1500 lbs of fresh poultry within a period of approximately two (2) hours. Frozen poultry is later kept in a freezer at -18°C .



For the daily turnover contemplated in this study, conventional freezing might require more than 24 hours.

4.7 NEW SITE

Should, for any given reason in the future, the existing Sharbot Lake site stop being the preferred location for putting up a small poultry abattoir, it would be possible to apply the previously expanded concept development principles to a new suitable site at a convenient location closer to Highway 401 in the County of Frontenac, which would have the following additional characteristics:

- 2000 sq. ft. for floor space, to include a lobby and a dry storage room.
- Sufficient land size of at least (2) acres, to take into account municipal setbacks and accesses for vehicular movement.

4.8 CONSIDERATIONS REGARDING MOBILE ABATTOIRS

The merits of mobile abattoirs have been considered in this report and some of the cases addressed in Alberta, Nova Scotia and the United States have been reviewed. Some of the advantages and disadvantages are listed hereafter;

- **Advantages:**

The operation requires one person.

It suits the needs of consumers for humanely raised and slaughtered animals which are subjected to a minimum of stress as compared with conventional pre-slaughter involving stressful handling, loading, transport, mixing and crowding.

- **Disadvantages:**

An inspector must be present before the operation can begin.

The initial cost of the mobile unit is in the range of \$ 200K, in addition to the pulling flatbed truck. The unit must be approved by Provincial authorities, which could be a lengthy process.

Difficulty of having enough poultry to slaughter in one stop/ one day, and yet be in charge of all the process tasks from killing, scalding, plucking, singeing, washing evisceration and cooling. The average process flow would be 50 chicken/ farm/day. The logistics of lining up client appointments well ahead of time, to guarantee an uninterrupted workload for weeks to come, for a full day stop at each location; could become a challenge, hence, the difficulty of making the operation viable by a single individual or a group.

Farmers must have their own facilities to keep poultry in refrigerators or conventional freezers.

Farmers have to handle the disposal of animal waste following environmentally acceptable methods or by arranging the pick-up by specialized disposal companies.

Given the above, it appears that a mobile unit would be more suitable for more remote areas of the country, where selective slaughtering is required and where the presence of an inspector is not a prerequisite, if the slaughtered animals would be consumed by local farmers and not sold to others. Furthermore, it would be difficult to apply the economic model of “high volume” / “low cost” to the mobile slaughtering concept.

5.0 FINANCIAL ANALYSIS

All costs and prices in the financial analysis are in current dollars (2011).

5.1 CONSTRUCTION BUDGET - SHARBOT SITE

The cost schedule in following **Table 5.2** has been developed based on the following input conditions:

- Article 2, Market Situation.
- Article 4.3, Process Flow Diagram.
- Article 4.5, Preferred Floor Plan scenario.
- OMAFRA Guidelines for small abattoirs.
- Exclusion of repair costs that might be incurred in the existing (contemplated pork processing) portion of the building.
- Exclusion of inflation costs if the project is undertaken at an undetermined time in the future.
- Harmonized Sales Tax (HST) is not included.

It has to be noted that the concept development presented in this report has been done for the sole purpose of establishing the feasibility of an abattoir of the *smallest size possible*, and hence estimating its most realistic capital investment budget. This document should not be used for obtaining competitive bids from prospective construction contractors, nor equipment suppliers, before proceeding to the preparation of detailed engineering documents, based on exact sizes, capacities, choice of materials and new or used equipment available on the market at that point in time.

The margins of costing in the construction industry take into account the level of progress in the process of project development. Margins are set at 30% at the outset, to be gradually lowered to 5% when the final design concept has been translated into detailed engineering drawings and specifications, ready for competitive bidding to select eligible contractors to execute the work.

Margins provide contingency sums for the following cases:

- Program changes.
- Market condition fluctuations in the construction industry

Table 5.1 summarizes the norms for margin allowances in the construction industry:

TABLE 5.1

**COSTING MARGINS IN THE CONSTRUCTION INDUSTRY FOR
OWNERS, DEVELOPPERS, FINANCIAL INSTITUTIONS, ESTIMATORS**

	PROGRESS LEVEL	ENGINEERING LEVEL	CLASS OF ESTIMATE	MARGIN (+) OR (-)
1	CONCEPTUAL	FEASIBILITY STUDIES	D	30%
2	BUDGETARY	CONCEPT DEVELOPMENT AND PRELIMINARY DESIGN	C	20%
3	CONTROL	80% OF WORKING DRAWINGS AND SPECIFICATIONS	B	10%
4	FINAL DESIGN	100% OF WORKING DRAWINGS AND SPECIFICATIONS READY FOR THE BIDDING PROCESS	A	5%
5	CONSTRUCTION CONTINGENCY	NEW BUILDING RETROFIT OF AN EXISTING BLDG.		+ 3% TO 5% +5% TO 6%
6	GENERAL CONTRACTOR PREMIUMS	GENERAL CONDITIONS OVERHEAD AND PROFIT		+5% +3%

Table 5.2

CONSTRUCTION BUDGET (SHARBOT LAKE, 1738 Sq. ft.)		Budget \$	Total \$
Architecture, Structure, internal retrofit			
	Prefabricated steel extension, slab on grade, retrofit of existing areas	74,500	
Sub-total			74,500
Plumbing			
	New floor drains, sinks, WCs, hot & cold water outlets	40,500	
Sub-total			40,500
HVAC			
	Air conditioning of Kill Room, office, corridor	5,052	
	Ventilation of ceiling space, receiving area, WCs	6,408	
Sub-total			11,460
Electrical			
	Lighting and services, power distribution, upgrade of electrical entrance	24,856	
Sub-total			24,856
Process Fit-up			
	Prefabricated cold rooms panels + air-cooled refrigeration compressors and condensers for the following rooms: Waste, Evisceration, Cooler, Cutting, Packing, Fresh Fridge, Blast and Storage Freezer at -18C	119,100	
	Process equipment and furnishings for: kill room, Evisceration, Waste, bird crates, work benches, portable product racks, bins, etc.	49,150	
Sub-total			168,250
Subtotal for Extension and Retrofit of Existing Areas			319,566
Contingencies, Design Fees and Contractor Overhead & Profit			
	Contingency 30%	95,870	
	Design 7%	29,081	
	Contractor General Conditions 5%	22,226	
	Contractor Overhead and Profit 3%	14,002	
			161,178
Grand Total (excluding HST)			480,744
Cost per square foot for 1738 Sq. ft. of expansion			277

5.2 CONSTRUCTION BUDGET - NEW SITE

The construction budget in **Table 5.3** for a new site has based on article 4.7 input conditions.

Table 5.3

CONSTRUCTION BUDGET (NEW SITE, 2000 Sq. ft.)		Budget \$	Total \$
Architecture, Structure, internal partitions			
	Land cost, (2) acres minimum (87,120 SF)	87,120	
	Prefabricated steel structure shell & slab on grade	100,000	
	Paved accesses, landscaping, fencing, signage	170,240	
	Architectural internal fit-up, partitions and hardware	30,150	
Sub-total			387,510
Plumbing			
	New floor drains, sinks, WCs, hot & cold water outlets	40,500	
	Liquid waste pump-out, potable water well	20,000	
Sub-total			60,500
HVAC			
	Air conditioning of Kill Room, office, corridor & lobby	6,252	
	Ventilation of ceiling space, receiving area, WCs, dry storage room	7,680	
Sub-total			13,932
Electrical			
	Lighting and services, power distribution, upgrade of electrical entrance	28,000	
Sub-total			28,000
Process Fit-up			
	Prefabricated cold rooms panels + air-cooled refectionation compressors and condensers for the following rooms: Waste, Evisceration, Cooler, Cutting, Packing, Fresh Fridge, Blast and Storage Freezer at -18C	119,100	
	Process equipment and furnishings for: kill room, Evisceration, Waste, bird crates, work benches, portable product racks, bins, etc.	49,150	
Sub-total			168,250
Subtotal			658,192
Contingencies, Design Fees and Contractor Overhead & Profit			
	Contingency 30%	197,458	
	Design 7%	59,895	
	Contractor general conditions 5%	45,777	
	Contractor overhead and profit 3%	28,840	
			331,970
Grand Total (excluding HST)			990,162
Average cost per square foot of 2000 Sq. ft. of building including a property of 2 acres			495

5.3 OPERATING BUDGET – SHARBOT LAKE SITE
Table 5.4

Operating Budget		(Sharbot Lake Site Extension only)					R 7	
ITEMS	Details	Units	Unit Cost	Area Sq.ft.	Cost \$ / year	Total \$ / year	Cost / Sq. ft.	
General Exopenses								
Municipal Taxes	Assumed, to be validated				2,500			
School Taxes								
General insurance					1,500			
Sub-total						4,000		
Maintenance of Building Shell								
Doors and windows								
Metal siding						500		
Caulking								
Roof Maintenance								
Outdoor Maintenance								
Snow removal and maintenance of paved access roads						500		
Maintenance of landscaping						500		
Environmental								
Disposal of animal waste						3,000		
Disposal of liquid waste						3,000		
Hydro								
Heating and hot water			1	1,738	1,738			
Lighting, services, and process	(6) month operation		6	1,738	10,428			
Sub-total						12,166		
Management								
Manager for administration and marketing	By Owner of Sharbot Lake				included			
Manpower : (7) workers	6 months × 22 d/m × 8h/d @ \$ 14/hr				103,488			
Marketing Tools (15% of annual turnover)	50,000 chicken × \$5. average	250,000	15%		37,500			
Packing Products		50,000	0.10		5,000			
Other Products: cleaning agents, watse disposal bins, etc.					3,000			
Plumber, electrician, refrigeration technician (6 hre/m × 12 m/a × 45 \$/hre)	on call				3,240			
Repair costs					3,000			
Annual financial statement					1,000			
Sub-total						156,228		
GRAND TOTAL						179,894	103.51	

5.4 OPERATING BUDGET – NEW SITE

Table 5.5

Operating Budget		(New Site)				R 7	
ITEMS	Details	Units	Unit Cost	Area Sq.ft.	Cost \$ / year	Total \$ / year	Cost / Sq. ft.
General Expenses							
Municipal Taxes	Assumed, to be validated				5,000		
School Taxes							
General Building Insurance					1,500		
Sub-total						6,500	
Maintenance of Building Shell							
Doors and windows							
Metal siding						500	
Caulking							
Roof Maintenance							
Outdoor Maintenance							
Snow removal and maintenance of paved access roads						500	
Maintenance of landscaping						500	
Environmental							
Disposal of animal waste						3,000	
Disposal of liquid waste						3,000	
Hydro							
Heating and hot water			1	2,000	2,000		
Lighting, services, and process	(6) month operation		6	2,000	12,000		
Sub-total						14,000	
Management							
Manager for administration and marketing	By Owner				20,000		
Manpower : (7) workers	6 months x 22 d/m x 8h/d @ \$ 14/hr				103,488		
Marketing Tools (15% of annual turnover)		250,000	15%		37,500		
Packing Products		50,000	0.10		5,000		
Other Products: cleaning agents, waste disposal bins, etc.					3,000		
Plumber, electrician, refrigeration technician (6 hre/m x 12 m/a x 45 \$/hre)	on call				3,240		
Repair costs					3,000		
Annual report					1,000		
Sub-total						176,228	
GRAND TOTAL						204,228	102.11

5.5 REVENUES

5.5.1 Production Scenario

The base case is the following:

- Year one, the plant will operate 3-days/week during 26 weeks on one shift which represents a volume of approximately 25,000 birds.
- Year 2, the plant will operate 4-days/week during 26 weeks on one shift which represents a volume of approximately 30,000 birds.
- Year 3 and after, the plant will operate 5-days/week during 26 weeks on one shift which represents a volume of approximately 50,000 birds.

5.5.2 Estimation of Pricing

To establish the pricing structure for the new abattoir, two scenarios are used on the basis of a full scale production of 50,000 birds (45,000 chicken /5,000 turkeys):

The first scenario is based on a ratio of whole chicken versus cut-up chicken (75% / 25%) and fresh versus frozen (75% / 25%). For turkey the ration is 75% frozen and 25% fresh all whole turkey as follows:

TABLE 5.6
PRODUCTION SCENARIO AND PRICING

Type	Chicken (Number)	Price (\$)	Value (\$)
Whole - fresh	8,500	3,75	31,875
Whole - frozen	25,000	4,75	118,750
Cut-up - fresh	3,000	5,25	15,750
Cut-up frozen	8,500	6,25	53,125
Sub-total	45,000		219,500
	Turkeys (Number)	Price (\$)	Value(\$)
Whole - fresh	1,250	7.00	8,750
Whole - frozen	3,750	9,50	35,625
Sub-total	5,000		44,375

In this scenario the total revenue is \$263,875 for an average price per bird of \$5.28

The second scenario is the following:

- all birds have a based charge of \$4 for slaughtering = \$200,000
- 50% of all birds are charged an additional dollar for an additional service = \$25,000
- 50% of that second group are charged another dollar for full service = \$12,500

In this scenario, the total revenue is \$237,500\$ or an average price of \$4.75.

Therefore the financial analysis will use the average price of \$4.75/bird.

This takes into account the various services to be provided to the clients as indicated in Table 2.11.

5.5.3 Estimation of Revenues

TABLE 5.7
ESTIMATION OF REVENUES

Year	Number of birds	Revenues
1	25,000	118,750
2	30,000	142,500
3 and after	50,000	237,500

5.6 FINANCING

The financing of the project is based on the following scenarios:

- The owner will invest 20% of the capital cost in equity.
- The project can apply to regional /local government programs as a contribution to the economic development of the sector. Two cases are considered: 20% grant based on the capital cost and 40%. There are several Funding programs that could be considered for this project such as:

<http://www.omafra.gov.on.ca/english/rural/index.html>

<http://www.omafra.gov.on.ca/english/busdev/facts/progserv.htm>

<http://www.omafra.gov.on.ca/english/food/industry/funding-prog-index.htm>

Food business funding

<http://www4.agr.gc.ca/AAFC-AAC/display-afficher.do?id=1204137480722&lang=eng>

Federal Programs & Services

Meat Processing Information Bundle at:

<http://www.omafr.gov.on.ca/english/food/industry/bdb-start/new-fp-business.htm> -

Guide to Food Processing

http://www.omafr.gov.on.ca/english/food/industry/bdbstart/food_start_and_grow.html

- The balance of the capital cost to be financed with a loan over fifteen (15) years at 6%.

These scenarios are detailed in table 5.8.

TABLE 5.8
FINANCING SCENARIO FOR SHARBOT LAKE SITE

Equity Investment		Grant		Loan	Total
20%	\$ 96,149	0	-	\$ 384,595	\$ 480,744
20%	\$ 96,149	20%	\$ 96,149	\$ 288,446	\$ 480,744
20%	\$ 96,149	40%	\$ 192,298	\$ 192,298	\$ 480,744

5.7 PROFITABILITY

The table 5.9 present the profitability of the Sharbot Lake site for each of the financial scenario.

The operating cost has been adjusted for the years one and two when the production is on a 3days/week and on a 4days/week. Manpower and Marketing tools items have been prorated. No adjustments for other costs.

TABLE 5.9
PROFIT (LOSS) SITUATION FOR SHARBOT LAKE SITE

	Grant level	Year 1	Year 2	Year 3 +
Revenues		\$ 118,750	\$ 142,500	\$ 237,500
Operating Cost		\$ 109,400	\$ 123,499	\$ 179,894
Loan repayment	0	\$ 38,945	\$ 38,945	\$ 38,945
	20%	\$ 29, 209	\$ 29, 209	\$ 29, 209
	40%	\$ 19,473	\$ 19,473	\$ 19,473
Profit (loss)	0	\$ (29,595)	\$ (19,944)	\$ 18,661
	20%	\$ (19,859)	\$ (10,208)	\$ 28,397
	40%	\$ (10,123)	\$ (472)	\$ 38,133

5.8 BREAK-EVEN SITUATION

The break-even price is calculated according in the case of a plant operating at 3 days/week.

TABLE 5.10
BREAK-EVEN AVERAGE PRICE AT 25,000 BIRDS - SHARBOT LAKE SITE

Grant Level	0	20%	40%
Operating Cost + loan repayment	\$ 148,345	\$ 138,609	\$ 128,873
Break-even Price	\$ 5.93	\$ 5.54	\$ 5.15

6.0 CONCLUSIONS

6.1 VIABILITY

The feasibility study establishes the viability of the Sharbot Lake Site on the premise that this abattoir will be primarily designed to serve the farmers of the region. As mentioned in the section 2.5 such a facility can also be used to slaughter other birds for other markets. In particular, the Plant reopening will produce sausages and could consider the use of the new addition to supply chicken meat to extend his line of processed products. This will increase the profitability of the combined operations.

The parameters of this project are in line with the business cases presented in section 2.6.

6.2 ECONOMIC IMPACT

The project will bring the following benefits to the Frontenac County:

- Direct employment of seven (7) new jobs for 26 weeks at the plant with possibility for additional jobs depending on the other birds to be slaughtered and processed.
- Increased revenues for the farmers. After three years, the volume of sales at the farm level could reach approximately one million dollars.
- Response to the growing demand for locally grown poultry.
- A strong contribution to the National Farmers Union Local 316 to its objective of strengthening the local food system in the Kingston Area.
- An image building initiative to promote the Frontenac County development effort.