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Project Report

POOLED DISTRIBUTION AND  
WAREHOUSING OPPORTUNITIES  
IN SMALLER RETAIL MARKETS  
-- KINGSTON: A PILOT  
COMMUNITY

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Prepared for

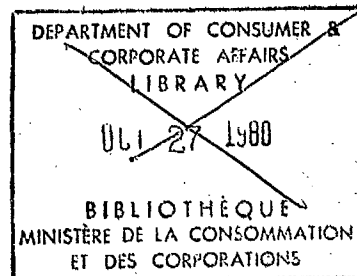
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The views presented in this paper are  
those of the author and do not necessa-  
rily reflect the view of positions of  
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## INTRODUCTION

In this report, we evaluate opportunities for pooled distribution and warehousing of food products in smaller retail markets.

We described the current system for food distribution in an earlier report: "An Overview of Food Distribution With Special Emphasis on Smaller Communities." In that report, we identified the food commodity groups which had pooling potential:

- ▶ Dry groceries
- ▶ Meat and poultry
- ▶ Selected dairy products
- ▶ Frozen food

In our previous report, we also selected Kingston as a pilot community. Kingston fulfilled our criteria for a smaller retail market:

- ▶ Population of 50,000 to 100,000 -- Kingston has 93,000 people.
- ▶ Representative socio-economic profile in terms of income levels, families and industry mix.
- ▶ Outside the shadow of a major metropolitan area -- Kingston is about 160 to 170 miles from Toronto or Montreal.

In order to evaluate each alternative distribution system, we identified a set of distribution cost elements. This includes a number of activities at each step in the distribution process. The cost elements are described in Chapter IV.

We also developed flows for each commodity group into Kingston. We identified where food was manufactured. We calculated shipping quantities for current and alternative systems. Flow volumes are set out in Chapter V.

The determination of the cost elements and the development of commodity flows provided a framework to evaluate distribution alternatives. In Chapters VI through IX, we present a description and evaluation of the alternatives for pooled distribution of food to Kingston retail stores. Each commodity group was evaluated separately based on a comparison of distribution costs with the present system.

We summarize the opportunities for pooled distribution of food in Kingston in Chapter X.

We have identified constraints to the implementation of these opportunities in Chapter XI. Here, we make recommendations as to what measures government and industry can take to facilitate implementation.

Detailed calculations of the cost values of cost elements for each distribution alternative are contained in the appendices.

## II

### FINDINGS

1. There is no single best system for distributing all food commodities. Each commodity group has its own best distribution system, due to unique handling characteristics and customer service requirements.

2. There are potential savings of \$570,000 per year available in Kingston from alternative distribution systems. This is equivalent to:

- ▶ 20% of distribution costs.
- ▶ .75% of (poolable) food costs at the retail store.
- ▶ \$22 per Kingston resident per year.

3. For distributing dry groceries to Kingston, pooled community warehousing by major manufacturers offers potential savings over the current system of \$180,000 per year.

4. For distributing meat and poultry to Kingston, consolidation by individual chain merchandisers, combined with cooperative consolidation by independent stores, offers savings of \$390,000 per year.

5. There are no alternatives which offer potential savings over the current systems for distributing butter, cheese and margarine, or frozen food.

6. Consolidation by individual chain stores is the best system for three out of four commodity groups investigated: meat and poultry; butter, cheese and margarine; and frozen food. For dry groceries, it is the second best system.

### III

#### OUR METHOD OF ANALYSIS

In this chapter, we discuss the methodology we used to develop cost functions and commodity flows.

We developed synthetic cost functions for the various cost elements based on industry standards, our own experience, and information from industry contacts made during the study. The purpose of developing synthetic cost functions was to ensure relative comparability of alternatives. Actual costs could have been sampled for certain segments. However, potential savings from pooling could then have become confused with potential savings from improved operating efficiencies.

In order to develop food distribution costs for Kingston, estimates of flow volumes were developed. Major sources of information were:

- ▶ Statistics Canada
- ▶ Financial Post Survey of Markets
- ▶ Canadian Grocer Magazine

Statistics were developed for the following components of the distribution system:

- ▶ Commodity groups
- ▶ Location, type and number of manufacturers
- ▶ Retail outlets
- ▶ Shipment volumes associated with the various alternatives

#### A. INVESTIGATION OF CURRENT SYSTEM AND IDENTIFICATION OF ALTERNATIVES

We prepared a description of the current systems for food distribution. During this phase, we contacted individuals representing the following aspects of the food distribution network:

- ▶ Retailers
- ▶ Chain store merchandisers



- ▶ Wholesalers
- ▶ Manufacturers
- ▶ Retailers' associations
- ▶ Manufacturers' associations

From these conversations, and from our files, we constructed a picture of how the current system works. We identified that there were distinct distribution patterns for various commodities. We eliminated commodities that were unsuitable for pooling by reason of a specialized distribution system.

We conducted a literature search for international experience in pooled distribution. We identified people doing research in related areas in five countries. We contacted these people. Our conclusion was that no previous work had been published, in the industrialized western countries, in the area of pooled distribution of food to smaller retail markets.

We scanned the current system for pooling opportunities. Pooling opportunities were selected on the basis that they would accomplish one of several things:

- ▶ Increase transport load factors.
- ▶ Shorten transport distances.
- ▶ Reduce or eliminate handling or storage activities.

We eliminated commodities that were unsuitable for pooling by reason of a specialized distribution system (baked goods, soft drinks, milk, ice cream and dairy specialties).

Some of the opportunities identified proved to be incompatible with some commodities due to:

- ▶ Perishability of products.
- ▶ Order sizes too large for capacity of storage areas in existing distribution facilities (e.g. combined shelf and backroom space in stores).
- ▶ Commodity volumes going to Kingston inadequate for proposed pooling method.

## B. IDENTIFICATION OF COST ELEMENTS

Each distribution system for manufactured food products moves the product from the manufacturer's plant warehouse to the retail store in a number of steps. A typical sequence from the current system for dry groceries is:

- ▶ Plant warehouse to distribution warehouse.
- ▶ Distribution warehouse to Kingston.
- ▶ Delivery to stores.

There are four typical cost elements associated with any distribution system:

- ▶ Transportation to move the product.
- ▶ Handling and storage at each distribution facility.
- ▶ Administration to control the system.

We identified a discrete sequence of cost elements for each distribution alternative. For each cost element, we derived cost functions. These functions were based on industry standards, our own experience and conversations with industry people during the project. We decided that no useful purpose would be served by time study samples from different segments of the industry. Potential savings from pooling could then become confused with potential savings from improved operating efficiencies.

Our cost functions serve the purpose of allowing a relative comparison of alternatives. The cost functions are expressed for various shipping units, e.g.:

- ▶ \$.10 per case
- ▶ \$1.00 per pallet
- ▶ \$200.00 per truckload
- ▶ \$5.00 per order

We decided to use the case as the basic unit of measurement. The case is the basic selling unit in the industry. It is also the basic handling unit. For other units such as pallets, case equivalents were calculated for each commodity.

## C. ESTIMATION OF FLOWS

### 1. Kingston food sales by commodity

We selected 1979 as our base year. Kingston's retail food store sales for 1979 were taken from the Financial Post Survey of Markets, 1980.

To classify sales by commodity group, we used Ontario provincial percentages. These were found in Statistics Canada's Retail Commodity Survey, 1974, Catalogue 63-526, Occasional. By applying the percentages to Kingston retail food store sales, we secured Kingston's retail food store sales by commodity.

We had to translate commodity sales from dollars to cases. This required calculation of a 1979 average value per case for each commodity. We took a representative commodity survey in a Toronto food store for three of the four commodity groups: dry groceries; butter, cheese and margarine; and frozen foods. Information collected on surveyed products included:

- ▶ Retail price
- ▶ Gross weight including container
- ▶ Pack quantity per case

This permitted calculation of an average value and weight per case for each commodity group.

Flows of meat and poultry were calculated differently since there were only a few commodities in the group. Pack quantities were obtained from discussions with the industry. Weight of meat and poultry consumed in Kingston were derived from the average weekly amounts consumed by a Canadian family. These figures were obtained from Statistics Canada's Urban Family Food Expenditure Study, 1976, Catalogue 62-545, Occasional.

### 2. Source and number of manufacturers

Kingston is mainly supplied from central distribution warehouses in Toronto. These warehouses supply most of South-Central Ontario. Therefore, food consumed in Kingston is largely the same as food consumed in Toronto, and is made in the same places: Toronto, South-Western Ontario and Montreal.

We had to identify the relative importance of those manufacturing regions to Ontario markets. This was accomplished by consulting industry people and Statistics Canada. "Value of shipments of goods of own manufacturers" by region were obtained from Statistics Canada's Manufacturing Industries of Canada: Sub-Provincial Areas, 1976, Catalogue 31-209.

In aggregating the Statistics Canada figures, we had to define our regions. Toronto was taken to include the "statistical areas" of Toronto and Oshawa, including the regional municipalities of York, Durham, Peel and Halton. South-Western Ontario was taken to include the area west of Toronto, including as far north-west as Bruce county, and as far north-east as Grey county. Toronto and South-Western Ontario, as defined above, included over 90% of "value of shipments of goods of own manufacture" in Ontario.

Montreal was taken to include the "statistical area" of Montreal. Montreal figures were generally weighted at 50% of the other two regions. This expressed the assumption that a shipment of food is twice as likely to be supplied locally. This assumption was made because Ontario is generally relatively self-sufficient in food production and consumption. It does not rely heavily on shipments from Quebec to supply its population.

A supplementary reference was used to check assumptions about food flows from Montreal to Ontario: Statistics Canada's Interprovincial Shipping Patterns by Commodity, 1974, Catalogue 31-522, Occasional. This was a survey of the larger manufacturers in all provinces. They were asked to identify the destination province on shipments of goods of their own manufacture. This is not totally usable, as some information was withheld for competitive reasons. However, it provides an indication of inter-provincial shipping patterns of food commodities.

In order to estimate individual shipment volumes, we had to identify approximately how many manufacturers from each commodity group would be supplying Kingston. We also had to identify how many major manufacturers there are for each group. Some of the alternatives propose that the majors undertake pooled distribution.

To estimate these numbers, we took advantage of a variety of sources:

- ▶ Scott's Directories: Ontario (12th Edition); and Quebec (8th Edition).
- ▶ Canadian Key Business Directory, 1980.
- ▶ Statistics Canada employment statistics from the most recent editions of the following catalogues:
  - 31-209 (1976)
  - 32-209 (1977)
  - 32-221 (1977)
  - 32-227 (1978)

- ▶ Discussions with industry representatives, including manufacturers, buyers for chains and wholesalers, association representatives and store operators.
- ▶ Financial Post Survey of Markets, 1980.

The number of plants for our commodity groups of poolable products was derived from Scott's Directories. Generally, it was assumed that 80% of the product volume was supplied by 20% of the manufacturers. Where possible, this was verified by checking employment statistics at the major manufacturers' plants. It was assumed that the major manufacturers should also employ 80% of the work force, if they supplied 80% of the product volume. Some adjustments were made to the assumptions based on the available employment statistics and discussions with industry representatives.

### 3. Retail outlets in Kingston

Retail food stores were split into two categories: chains; and independent and other food stores. We defined chains to include voluntary groups such as I.G.A. The voluntary group operates similarly to a franchise. Most significant aspects of the store operation are specified in a contract. This includes supply arrangements. The voluntary group store is in a captive supplier situation, the same as the conventional chain store. Conventional chain stores are defined as follows by Statistics Canada: four or more stores under single ownership.

The most recent survey of Kingston retail stores was from the 1971 Census of Canada. Therefore, we had to calculate the proportions of sales by chains and independents from 1979 provincial averages. Then we took Ontario sales of chains (including groups), and independents (including all other food stores), and calculated average sales per store in Ontario for the two groups. By dividing total Kingston group sales by average sales per store (in Ontario) for each group, we calculated the number of chains and the number of independents in Kingston. This yielded a total of 150 retail food stores in Kingston, an increase of 40 since 1971. The 1979 provincial statistics were obtained from Canadian Grocer Magazine (February, 1980).

Statistics Canada categorizes food stores by type of store, irrespective of ownership (chain or independent). Most food is retailed through stores classified into two groups: combination stores (which includes most chains) or grocery, confectionery and sundries stores. Definitions are as follows:

- ▶ Combination store: sells groceries with at least 20%, but less than 60% fresh meat.
- ▶ Grocery, confectionery and sundries: sells groceries, with less than 20% fresh meat.

We projected the percentage increase in Kingston's store numbers for each food store category. This increase was significantly greater than the population growth in the city. This is due to boundary changes in the Kingston Census Metropolitan area since 1971.

Once the system components had been established, annual flows could be expressed for a variety of different segments, e.g.:

- ▶ Dry groceries: major manufacturers ship to chain stores.
- ▶ Meat and poultry: all manufacturers ship to all stores.

More specific statistics could also be computed such as volumes moving from a single manufacturer, or to a single store.

#### 4. Shipment volumes for distribution alternatives

Each alternative distribution system involves a segment of food products moving between manufacturers and Kingston retail stores. A system is further defined by the arrangements for moving the food -- what steps occur. For example, pooled transport by major manufacturers to chain stores involves the following steps.

- ▶ Food is picked up from the several manufacturers in a group.
- ▶ Food is transported to Kingston.
- ▶ Food is pooled with other manufacturers groups' food products, and delivery is made to Kingston stores.

To derive the shipment volumes moving through each step, the supply frequency is required. This permits calculation of the following shipment volumes from the above example:

- ▶ Pick up volumes from each manufacturer.
- ▶ Transport volumes to Kingston.
- ▶ Delivery loads in trucks.
- ▶ Delivery volumes to each store.

Since each alternative selected a particular segment for pooling, there was also a residual segment. Shipment volumes were also computed for the residual segment.

Once shipment volumes were determined, distribution costs could be calculated. First, a total shipment cost was calculated. Most elements had a fixed cost per shipment. Therefore, per case costs would then have to be computed by dividing total shipment cost by number of cases.

#### D. CALCULATION OF COSTS OF DISTRIBUTION ALTERNATIVES

Each alternative involves a unique series of distribution steps, and a corresponding unique sequence of cost elements. Cost element values were summed to yield per case distribution costs for each proposed alternative. Cost elements were also summed to compute per case distribution costs for residual products.

Annual case flows of pooled and residual products were multiplied by the respective per case distribution costs to give total annual costs for each segment. Totalling annual costs for the pooled and residual segments yielded total annual costs of an alternative system. Dividing total annual costs by total cases in the commodity group yielded the per case cost of the alternative. Annual and unit costs of alternatives were compared with the current system. Savings (or losses) through pooling were computed. Savings (losses) were further categorized by source of manufacturer.

Savings were compared to overall food distribution costs and to the Kingston family's annual food bill. We examined the effect of Kingston's location on distribution costs. Locational factors affecting food distribution in other smaller communities were discussed. Other smaller communities in Canada were identified.

#### E. BARRIERS AND CONSTRAINTS

For alternative systems offering potential savings, we identified potential barriers and constraints to implementation. The potential savings were limited to meat and poultry and dry groceries. We presented our findings for these two commodity groups to selected industry representatives. We also contacted representatives of some government departments working in these areas.

In these discussions, we identified barriers and constraints to implementation. We solicited suggestions for overcoming these barriers and constraints. In Chapter XI, we present our analysis of our findings. Appendix F contains a list of people contacted during the course of the study.

## IV

### DESCRIPTION OF COST ELEMENTS

There are four types of cost elements in the food distribution system:

- ▶ Transport - including driver labour and fixed and operating costs of a truck or tractor-trailer.
- ▶ Handling - including direct labour, fixed and operating costs for equipment, and handling facility overhead.
- ▶ Storage - including fixed and operating costs of buildings, plus administrative overhead.
- ▶ Administration - including inventory control, order processing and accounting.

Cost elements are further described in the order in which they occur in the distribution process.

#### A. PLANT WAREHOUSE TO KINGSTON

##### 1. At the plant warehouse

The distribution system begins in the plant warehouse where the food has been deposited after coming off the packaging line. Orders are sent into the plant warehouse.

Generally, orders are for pallet load quantities. A forklift operator selects a pallet from the storage racks and moves it to the loading area. The pallet is loaded into a trailer.

##### 2. Pick-up

Pick-up is a local transport cost. Cost factors are driver's time and vehicle fixed and operating costs.

##### 3. Transport to public warehouse or freight forwarder

In the current system for dry groceries and frozen products distribution, distribution warehouses will not accept trailer loads of slow-moving food products from smaller manufacturers. As a result, smaller manufacturers from outside Toronto ship trailer load quantities to Toronto public warehouses.



#### 4. Temporary storage or consolidation

Food may be stored temporarily at a Toronto public warehouse as in the current systems for distributing dry groceries and frozen products. Food may also be consolidated at a freight terminal for forwarding to destination city.

##### a) Receive and put away

- ▶ Public warehouse: Pallets are unloaded from trailers and placed in storage slots.
- ▶ Consolidation terminal: Pallets are unloaded from trucks. They are dropped on the floor, or sorted by destination city.

##### b) Storage

- ▶ Public warehouse: Storage charges are assessed monthly for each pallet position. Costs depend on average number of cases on a pallet.

##### c) Order fill and marshall or sort and marshall

- ▶ Public warehouse: The public warehouse supplies manufacturers' products to the distribution warehouse. Orders are sent into the warehouse. Cases are selected from storage and placed on a pallet. The pallet is moved to the loading dock.
- ▶ Consolidation terminal: At the consolidation terminal, shipments are sorted by destination city. If delivery is to be made directly from the consolidation point, individual store orders must also be marshalled.

##### d) Load

- ▶ Cases may be loaded onto trailers or trucks in pallet loads or one by one. Pallets are much less expensive to handle.

#### 5. Transport to distribution warehouse

Costs involved are driver labour and vehicle fixed and operating costs. Transport is by trailer load for direct shipments, or by truck load from public warehouses.

6. At the distribution warehouse

a) Receive and put away

Pallets are off-loaded and moved into storage slots.

b) Store

Storage costs are assessed based on the number of pallet positions occupied. Per case costs depend on average number of cases on a pallet.

c) Order fill and marshall

Kingston is served on regularly scheduled delivery days. On these days, store orders are sent into the warehouse. Cases are picked from slots onto pallets. Pallets are moved to the loading area.

d) Load

Each chain has several stores in Kingston. Stores are loaded in stop order on a trailer or truck. Independents are served by a truck, which is loaded in stop order at the wholesaler's distribution warehouse.

7. Transport to Kingston

Transport to Kingston is by truck or trailer. Costs involved are driver labour and vehicle fixed and operating costs.

B. BREAK BULK STORAGE AND DELIVERY IN KINGSTON

1. Break bulk and storage

a) Receive and put away/sort

- ▶ Community warehouse: Pallets are unloaded from the trailer and moved into storage racks.
- ▶ Community depot: Cases are unloaded from the trailer onto the floor.

b) Storage

- ▶ Community warehouse: Charges are per pallet position per month per case. Costs depend on the average number of cases on a pallet.

c) Order fill and marshall or sort and marshall

- ▶ Community warehouse: Retailers' orders are selected from storage racks and piled on fresh pallets. Pallets are moved to loading doors.
- ▶ Community depot: Retailers' orders are sorted on the floor and piled on fresh pallets. Pallets are moved to loading area.

d) Load

Orders are loaded in stop order on delivery trucks.

2. Delivery

a) Vehicle and driver

Driver makes deliveries to stores. Costs involved are driver labour and vehicle fixed and operating costs.

b) Receive at store

Food is off-loaded from the truck into temporary storage, or directly into the aisles.

C. ADMINISTRATIVE COSTS

1. At the plant warehouse

- ▶ Orders are received.
- ▶ Deliveries are scheduled.
- ▶ Picking and loading schedules are produced.
- ▶ Freight documentation is produced.
- ▶ Carriers' freight bills are validated and paid.

2. Temporary storage or consolidation

Administrative charges for public warehousing are rolled into storage and handling costs. Administrative activities occurring at a consolidation terminal include:

- ▶ Deliveries are scheduled from food manufacturers.

- ▶ Corresponding deliveries are arranged to stores.
- ▶ Handling staff schedules are produced (casual labour may be required to cope with volume fluctuations).
- ▶ Freight documentation is produced.
- ▶ Carriers' freight bills are validated and paid (unless consolidation is performed by a carrier, in which case the carrier cuts his own bills).
- ▶ A cost-sharing formula must be agreed upon to allocate to consolidation participants, handling, transport and delivery charges incurred by freight terminals. Charges must then be regularly pro-rated at the terminal and billed to respective manufacturers. Collection is made on bills.

### 3. Distribution warehouse

#### a) Inventory control

- ▶ Stock is recorded.
- ▶ Goods are allocated to storage slots.
- ▶ Picking slot replenishment is scheduled.
- ▶ Replenishment orders are produced.

#### b) Order processing

- ▶ Retailer orders are received.
- ▶ Picking schedules are produced.
- ▶ Delivery and loading schedules are invariable.
- ▶ Outside carriers are not generally used to serve Kingston from distribution warehouses. Therefore, there is no freight bill preparation and payment.
- ▶ For some pooling alternatives, orders may continue to flow through the distribution warehouses. The warehouse would be responsible for splitting the order into pooled and non-pooled freight. All Kingston store requirements from major manufacturers would be combined into a number of pooled orders. A pooled order would be forwarded to each participating major manufacturer.

4. Community warehouse or depot or local carrier

a) Inventory control (warehouse only)

- ▶ Incoming stock is recorded.
- ▶ Goods are allocated to storage slots.
- ▶ Picking slot replenishment is scheduled.
- ▶ Replenishment orders are produced.

b) Order processing

The community warehouse operates as follows:

- ▶ Picking schedules are produced.
- ▶ Delivery documentation is produced.
- ▶ Warehouse and pooled delivery costs are allocated to manufacturers. To avoid disputes, delivery costs should be totally predictable. Therefore, deliveries would be on a regular schedule as they are now from the distribution warehouses.

The depot or local carrier operates as follows:

- ▶ Handling staff schedules are produced (casual labour may be required to cope with volume fluctuations).
- ▶ Delivery documentation is produced.
- ▶ Handling and pooled delivery costs are allocated to manufacturers.

5. Retail store

- ▶ Incoming stock is recorded.
- ▶ Goods are allocated to shelves.
- ▶ Replenishment orders are produced.

V

COMMODITY FLOWS:  
MANUFACTURING PLANTS TO KINGSTON STORES

A. TYPES OF RETAIL OUTLETS IN KINGSTON

The table below shows food store sales by type of retail outlet.

EXHIBIT V-1. Kingston food store sales by type of outlet

	\$ (000's)
Kingston 1979 food store sales <sup>1</sup>	90,100
Grocery and combination stores - 93.7% <sup>2</sup> 84,420 M	
Chains (including voluntary groups) <sup>3</sup> 90.6% of grocery and combination stores = 85% of food store sales	76,590
Independents and all other food stores = 15% of food store sales	13,520 =====
Estimated no. of stores in Kingston:	
Chains - \$76,590    \$1,660 M per store <sup>3</sup>	46
Independents and all other food stores \$13,520    \$130 M per store <sup>3</sup>	<u>104</u>
Total stores	150

<sup>1</sup>Financial Post Survey of Markets, 1980.

<sup>2</sup>Statistics Canada, Retail Commodity Survey, 1974.

<sup>3</sup>Canadian Grocer Magazine, February, 1980.

Grocery and combination stores accounted for 93.7% of food store sales in Ontario in the 1974 Retail Commodity Survey performed by Statistics Canada.

From this group, 1979 Statistics for Ontario, compiled by Canadian Grocer Magazine, showed that chain (including voluntary groups) stores accounted for 90.6% of group sales. This equates to about 85% of all

food store sales. The remaining 15% of food store sales is accounted for by (unaffiliated) independents and other (i.e. mostly specialty) food stores.

Canadian Grocer also compiled Store Count Statistics for Ontario. From Store Counts, average store sales can be derived: \$1,660,000 for chains (including voluntary groups), and \$130,000 for independents. It is assumed that average annual sales per store for "All Other Food Stores" would be the same as it was for independent food stores. It should be noted that the average chain store sells almost 13 times as much as the average independent on an annual basis.

Based on the average store sales figures for each group, it is estimated that there are 46 chain stores and 104 independent and other stores, for a total of 150 food stores in Kingston. Kingston's stores can be further described by Statistics Canada's classification system. Estimates for 1979 are shown on Exhibit V-2. These classifications are used to examine the distribution network for each commodity group. For example, while all food stores generally sell some dry grocery products, a lot of corner grocery stores do not sell fresh meat.

#### B. SALES BY COMMODITY GROUP

Exhibit V-3 shows Kingston's 1979 sales by retail food stores for each commodity group. The percentages are Ontario provincial averages. They were obtained from Statistics Canada's Retail Commodity Survey, 1974.

Kingston's estimated 1979 retail food store sales were obtained from the Financial Post Survey of Markets, 1980. Sales of food items have been estimated at 85% of food store sales. In the commodity survey, 87% of combination food store sales (which includes most chain stores) was accounted for by food items. Only 66% of grocery store sales were food items. It is assumed that in "All Other Food Stores", the percent of food sold is closer to the 87% experienced in chain stores. Therefore, a weighted average 85% of food store sales are food items.

Of the food items, fruit and vegetables are outside the scope of this study. Fresh fish has its own distribution system and does not fit with any commodity group. This eliminates about 10% of food items.

Baked goods and soft drinks, accounting for another 9% of food sales by food stores, were previously eliminated from further consideration.

Dairy includes 15% of food sales. About half of this is perishable and localized: eggs and milk. Ice cream, representing another 1% of food, requires a very low temperature environment. Special care must be exercised to ensure that it is moved quickly between transport and storage areas, as spoilage can quickly occur at warmer temperatures.

EXHIBIT V-2. Retail food stores in Kingston

Type of Food Store	1971 <sup>1</sup>	1979 Est. (1971 + 36%) <sup>2</sup>
Combination stores <sup>3</sup>	24	33
Grocery stores	18	<u>24</u>
Sub-total		<u>57</u>
Estimated chain stores		<u>46</u>
Balance - Independent grocers		11
Grocery confectionery and sundry	36	49
Meat markets	4	6
All other food stores <sup>4</sup>	28	<u>38</u>
Sub-total - Independent retailers		<u>104</u>
Total food stores	110	150

<sup>1</sup>Source: Statistics Canada, Census of Retail Trade, 1971.

<sup>2</sup>We have previously estimated that there are a total of 150 retail food stores in Kingston, compared to 110 in 1971, an increase of 36%.

<sup>3</sup>Grocery stores with 20-60% fresh meat.

<sup>4</sup>This includes, e.g. bakeries, fruit and vegetable stores, candy and nut shops, delicatessens, etc.



EXHIBIT V-3. Kingston retail food store sales by commodity group,  
1979

Item	All Commodities		Pooling Opportunities	
	\$(000)	% of Food	\$(000)	% of Food
Food store sales	90,100	117.6		
Food (85% of food store sales)	76,590	100.0		
Dry groceries	28,030	36.6	28,030	36.6
Meat and poultry (incl. frozen)	19,380	25.3	19,380	25.3
Dairy (incl. margarine)	11,490	15.0		
▶ Milk	3,980	5.2		
▶ Eggs	1,610	2.1		
▶ Ice cream - ice milk	920	1.2		
▶ Other dairy specialties	920	1.2		
▶ Butter, cheese & margarine <sup>1</sup>	4,060	5.3	4,060	5.3
Frozen (not incl. meat, poultry, or ice cream - ice milk; incl. fish)	3,140	4.1	3,140	4.1
Baked	4,290	5.6		
Soft drinks	2,760	3.6		
Other	7,510	9.8		
▶ Fresh fruit and vegetables	6,970	9.1		
▶ Fresh fish	540	0.7		
All food		100.0	54,610	71.3

Sources:

Percentage shares are Ontario averages taken from Statistics Canada, Retail Commodity Survey, 1974, Catalogue 63-526, Occasional.

Kingston's total estimated 1979 retail food store sales are taken from The Financial Post Survey of Markets, 1980.

<sup>1</sup> Margarine is included with dairy because it is generally distributed with butter and cheese.

Ice cream is considered unsuitable for pooling. Dairy specialties such as yoghurt and cottage cheese are generally distributed with milk. They account for about 1% of food.

The remaining "dairy" products include butter, cheese and margarine which account for about 5% of food sales.

About 70% of food products are considered suitable for pooling:

► Dry groceries	36.6% of food	\$28,030,000
► Meat and poultry	25.3% of food	19,380,000
► Butter, cheese, marg.	5.3% of food	4,060,000
► Frozen (not including meat, poultry of ice cream - ice milk	4.1% of food	3,140,000
Total	71.3% of food	\$54,610,000

### C. PHYSICAL FLOWS OF COMMODITY GROUPS

After identifying retail sales by commodity group, we calculated physical equivalents in cases. We took retail store commodity surveys for dry groceries; butter, cheese and margarine; and frozen food. For meat and poultry, we used annual Canadian consumption statistics.

We then developed more specific statistics regarding the location, type and number of manufacturers for each commodity group.

#### 1. Dry groceries

##### a) Case flows

The retail commodity survey (Exhibit V-4) showed that:

- The average retail value of a case of dry groceries is \$21.00.
- The average gross weight of a case of dry groceries is 29 lb.

The retail value per case was deflated by 5% to \$20 to reflect 1979 price levels. This facilitates a comparison with 1979 dry groceries sales by retail food stores.

The following calculations can be made for dry groceries sold in Kingston food stores in 1979:

EXHIBIT V-4. Calculation of average weight, retail value of case of dry groceries

Selection of Items From Consumer Price Index Food Basket - March, 1980								
Item	Manufacturer	Brand	Size	Gross Packaged Weight <sup>1</sup> (oz.)	Retail Price	Units Per Case	Weight Per Case (lb.)	\$ Per Case
Prepared breakfast cereal	Kellogg-Salada	Kellogg's Corn Flakes	525 g	18.5	1.24	24	27.7	29.76
Rice	Dainty	Royal Long Grain Rice	2 lb.	32	1.19	12	24	14.28
Canned peaches	Canadian Cannery	Aylmer Clingstone Sliced Peaches	14 fl.oz.	18	.83	24	27	19.92
Canned corn	Green Giant	Niblets Fancy Cream Corn	14 oz.	18.5	.59	24	28	14.16
Canned baked beans	Green Giant	Clark Beans With Pork	19 oz.	25.3	.78	24	38	18.72
Vegetable oil	Unico	Vegetable Oil	500 ml	28	1.29	24	42	30.96
Salad dressing	Kraft	Thousand Islands Dressing	250 ml	18	.81	12	13.5	9.72
Canned meat dinner	Green Giant	Clark's Irish Stew	24 oz.	30	1.83	12	22.5	21.47
Sugar	Redpath	Special Fine Granulated	2 kg	70.4	1.80	10	44	18.00
Coffee	General Foods	Maxwell House Regular Grind	1 lb.	21	4.69	12	15.8	56.28
Canned soup	Campbell's	Condensed Chicken Noodle	284 ml	13	.40	48	39	19.20
Ketchup	Heinz	Tomato ketchup	20 fl.oz.	32	1.19	24	48	28.56
Pickles	Multifoods Ltd.	Bick's Dill Pickles	32 fl.oz.	30	1.33	12	22.5	15.96
Evaporated milk	Carnation		385 ml	16	.50	48	48	24.00
Cake mix	General Mills	Betty Crocker	510 g	18	1.06	12	13.5	12.72
Baby food	Gerber	Strained Vegetables and Beef	4.75 fl.oz.	8	.29	24	12	6.96
Jam	Kellogg-Salada	Sheriff Good Morning Marmalade	24 fl.oz.	44	1.55	12	33	18.60
Spaghetti	Catelli	Creamette Brand	907 g	32	1.29	18	36	23.22
Peanut butter	Kraft	Smooth	500 g	28	1.51	12	21	18.12
Apple sauce	Bright's	Canada Fancy Sweetened	14 fl.oz.	18	.55	24	27	13.20
Total							582.5	413.81
Average per case							29	21

Survey was completed at Dominion Store, Yonge-Eglinton Centre, Toronto.

<sup>1</sup> Packages were weighed on store's produce scale. In some cases, the gross packaged weight registered the same as the net weight.

Annual \$ sales (000)	\$ 28,030
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Average value per case	20
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Annual sales in cases (000)	1,400
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Average weekly sales in cases

Dry grocery sales by type of retail outlet are as follows:

Chains

85% of 1,400,000	\$1,190,000
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Weekly sales	22,880
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Average weekly sales per store (46 stores)	500
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Independents and other food stores

15% of 1,400,000	\$ 210,000
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Weekly sales	4,040
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Average weekly sales per store (104 stores)	40
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b) Location of manufacturers

Most food consumed in Ontario is manufactured in Toronto, South-Western Ontario and Montreal. Value of shipments from all food and beverage manufacturing plants in these areas amounted to \$8.3 billion in 1976. Each region accounted for relatively equal proportions:

Toronto	36%
South-Western Ontario	30%
Montreal	33%

Toronto and South-Western Ontario accounted for 93% of Ontario's food and beverage shipments between them.

Statistics on interprovincial flows are extremely difficult to accurately isolate. Where possible, food products will be marketed locally to avoid heavy transportation costs. Therefore, it is assumed that food shipments to Ontario markets are twice as likely to originate from domestic sources. This can vary somewhat for different sectors of the industry.

Dry groceries is the most difficult commodity group to isolate. Therefore, a residual value of food and beverage shipments is used. Two groups were subtracted (S.I.C. codes in parenthesis): meat and poultry (101) and dairy (104).

Resulting regional proportions of shipments by value were:

Toronto	36%
South-Western Ontario	31%
Montreal	33%

These proportions are identical to those for food and beverage manufacturing as a whole.

Virtually all of these shipments currently go through Toronto distribution warehouses. It is assumed that shipments from Ontario plants are twice as likely to be destined for Ontario markets. Therefore, volume of flows of dry groceries into Toronto distribution warehouses or public warehouses can be estimated as follows:

From Toronto	40%
From South-Western Ontario	40%
From Montreal	20%

c) Type and numbers of manufacturers

The Financial Post Survey of Markets list manufacturing plants by province. Six dry grocery commodity groups were identified including 685 plants. Most of these are located in the Toronto, South-Western Ontario or Montreal regions.

<u>Product Group</u>	<u>No. of Plants</u>	
	<u>Ont.</u>	<u>P.Q.</u>
Fruit and vegetable canners and preservers	190	52
Biscuit manufacturers	37	13
Flour and breakfast cereal products	43	7
Vegetable oil mills	11	0
Sugar refineries	15	6
Miscellaneous food	<u>243</u>	<u>146</u>
Totals	<u>539</u> ===	<u>146</u> ===

Some plants are part of multi-plant firms, duplicating what other plants produce. Many plants are operated by competing firms, duplicating what their competitors produce.

For any given item or group of items, food stores would generally be supplied from one plant operated by a supplier. Further, most stores stock a limited range of brands of any one item. Therefore, it is assumed that the average store receives food from a little less than half the plants in Ontario and Quebec, or an estimated 300 plants.

Of these 300 plants, it is assumed that 20%, or 60 plants, are the major manufacturers and that they supply 80% of dry groceries sold in food stores. It is further assumed that:

- ▶ The major manufacturers are relatively proportionately distributed by region.
- ▶ The major manufacturers in South-Western Ontario and Montreal currently ship directly to the central distribution warehouses operated by chains and wholesalers in Toronto.
- ▶ The balance of smaller manufacturers located outside Toronto ship to public warehouses. From public warehouses, dry groceries are shipped by truck to distribution warehouses.

d) Summary of dry groceries flows

Exhibit V-5 depicts flows of dry groceries. Annual and weekly volumes for different segments of the dry groceries distribution network are shown.

It is assumed that all food stores carry dry groceries.

These statistics are used to calculate shipment volumes for the distribution alternatives.

2. Meat and poultry

a) Case flows

The weight of an average case of meat and poultry is calculated in Exhibit V-6. Average weekly consumption of a Canadian family is taken from Statistics Canada's Urban Family Food Expenditure Study, 1976. Weight per case is derived from discussions with industry officials. Weight per case of beef is a weighted average. Beef shipments were estimated to include 75% beef quarters of 150 lb. with 75% or 113 lb. saleable cuts. The remainder was assumed to be pre-butchered in 60 lb. boxes.

EXHIBIT V-5. Statistical summary of Kingston dry groceries distribution  
by type of manufacturer

	No. of Cases		
	Chains 85% 46 Stores	Independents 15% 39 Stores	All Stores 100% 85 Stores
1) ALL MANUFACTURERS			
Annual	1,190,000	210,000	1,400,000
Weekly	22,880	4,040	26,920
Weekly average per store	500	40	180
2) 60 MAJOR MANUFACTURERS SUPPLY 80% OF DRY GROCERIES			
All manufacturers to all stores			
Annual	952,000	168,000	1,120,000
Weekly	18,310	3,230	21,540
All manufacturers to single store			
Annual	20,700	1,620	7,470
Weekly	400	31	140
Single manufacturer to all stores			
Annual	15,878	2,800	18,670
Weekly	310	50	360
Single manufacturer to single store			
Annual	350	27	120
Weekly	7	<1	2
3) 240 MINOR MANUFACTURERS SUPPLY 20% OF DRY GROCERIES			
All manufacturers to all stores			
Annual	238,000	42,000	280,000
Weekly	4,570	810	5,380
All manufacturers to single store			
Annual	5,170	400	1,870
Weekly	100	8	36
Single manufacturer to all stores			
Annual	990	175	1,170
Weekly	20	4	22
Single manufacturer to single store			
Annual	22	2	8
Weekly	<1	<1	<1

EXHIBIT V-6. Calculation of case flows of meat and poultry

Commodity	Average Weekly Consumption of Canadian Family (Retail Weight)	Kingston Annual Consumption (lbs) <sup>1</sup>	lb/Case (Retail) Weight	No. of Cases
Beef	3.548	5,765,500	100	57,660
Pork	1.818	2,954,250	60	49,240
Other meat <sup>2</sup>	1.273	2,068,625	25	82,750
Poultry	1.798	2,921,750	45	64,930
Total		13,710,125		254,580

<sup>1</sup>Weekly family consumption x 52 weeks/year ÷ 2.96 persons per family surveyed x 92,500 people in Kingston

<sup>2</sup>Including processed meats.

Some revisions should be made to calculate shipping weight of meat and poultry:

- ▶ 75% of beef weighs 33% more, since it travels as dressed quarters.
- ▶ Pork loses about 10% through shrinkage during distribution. Therefore, shipping weight adjustments to beef and pork, lbs. per family per week are:

$$\begin{aligned}
 \text{Beef:} & \quad (3.548 \times .25) \\
 & \quad + (3.548 \times .75 \times 1.33) \\
 & \quad = (.887 + 3.539) \\
 & \quad = 4.426
 \end{aligned}$$

$$\text{Pork:} \quad 1.818 \times 1.1 = 2.000$$

Revised  
lb/Family/Week

Beef	4.426
Pork	2.000
Other	1.273
Meat	<u>1.798</u>
	9.497



x 52 weeks/year  
÷ 2.96 persons per family surveyed  
x 92,500 people in Kingston  
= 15,432,625 lb/year in Kingston

Shipping weight of an average case of meat and poultry can be calculated as follows:

$$15,432,625 \text{ lb.} \div 254,580 \text{ cases} = 60 \text{ lb./case}$$

Average retail value of a case can be calculated from the meat and poultry sales derived previously:

$$\$19,380,000 \div 254,580 \text{ cases} = \$76/\text{case}$$

b) Location

Meat accounts for almost 85% of meat and poultry sales. About 95% of per capita meat consumption in Canada is accounted for by beef and pork. Beef represents about 2/3 of this and pork the remaining 1/3.<sup>1</sup>

Ontario is largely self-sufficient in beef production. Some processed pork is sporadically imported from Quebec. However, the merchandisers surveyed had no regular arrangements for purchasing pork from Quebec.

Ontario is also self-sufficient in poultry production.

Therefore, it will be assumed that Kingston's meat and poultry needs are supplied from Ontario processors.

Value of shipments from Ontario's meat and poultry manufacturing plants amounted to \$1.6 billion in 1976. Over 90% of this was produced in Toronto and South-Western Ontario, with Toronto accounting for about 60% of this. Flow volumes of meat and poultry to Kingston stores can be estimated as follows:

From Toronto	60%
From South-Western Ontario	40%

<sup>1</sup>Food in Canada magazine, Volume 39, No. 7 (July/August, 1979). These statistics are corroborated by: Statistics Canada, Urban Family Food Expenditures, 1976, Catalogue 62-545, Table 17 "Detailed Average Weekly Food Quantity", a survey of family buying patterns.

c) Type and numbers of manufacturers

The most recent count available from Statistics Canada shows 11,589 production and related workers engaged in meat and poultry production. Most recent counts and estimates from individual plants show that the largest nine plants employ 7172 workers or 62% of the industry's workers. The top two plants employ over 4000 workers or almost 40% of industry employment.

There were 17 other Ontario plants operated by businesses listed in the Canadian Key Business Directory for a total of 26 major plants. An official from the Federal Meat Inspection Office in Toronto estimated that 20-30 plants accounted for 80% of the market. Assuming that the same number would account for 80% of employment, the 26 plants should employ about 9270 people. This means the smaller 17 of the major plants would employ about 2100 people or an average of about 120. A survey of about half of them revealed this to be approximately correct.

Two of the top nine producers in the Toronto area ship direct to store with their own trucks. This accounts for about 25% of the employment. It will be assumed this amounts to 25% of volume. This is equivalent to over 30% of major producer volume.

It will be assumed that the remaining majors use common carriers to deliver their product.

Almost all of the meat and poultry in Ontario comes from the 148 federally inspected processing plants. This would be particularly true for Kingston which has no small local producers. In addition to the 26 major plants there are 122 smaller federally inspected meat and poultry plants. It is assumed that they supply the other 20% of meat and poultry consumed in Kingston.

d) Summary of meat and poultry flows

The majority of chain stores are "combination stores" which means at least 20% of their sales are fresh meat and poultry by definition. However, many independent grocers sell no fresh meat and poultry.

We estimate the number of independent grocers selling meat and poultry products as follows:

Grocery stores	11
Meat markets	6
All other: 25% of 87 <sup>1</sup> stores	<u>22</u>
Total	39

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<sup>1</sup>This would include delicatessens, fresh fruit and vegetable markets, etc.

EXHIBIT V-7. Major Ontario meat packers and poultry processors (300 or more plant employees)

Company	Division/Activities	Location	Plant Employees
Canada Packers	- Meat packing - Poultry processing	Toronto Walkerton	2328 300
Swift	Swift Eastern Ltd. - Pork slaughtering & processed meats - Turkeys	Toronto Hanover	400 307
J.M. Schneider	Meat and poultry production	Kitchener	2080
F.W. Fearman	Meat products	Burlington	480 <sup>1</sup>
Burns Foods	Meat packing division	Kitchener	480
Maple Lodge Farms	Poultry processing	Norval (near Brampton)	477
Lever Bros.	Shopsy's Foods - Processed meats	Toronto	320 <sup>1</sup>
Total			7172

<sup>1</sup>Plant employees were estimated as 80% of company employment as reported in Scott's Directory, 12th Edition.

Sources: Company sources or Scott's Directory, Ontario, 12th Edition.

EXHIBIT V-8. Statistical summary of Kingston meat and poultry distribution by type of manufacturer

	No. of Cases		
	Chains 85% 46 Stores	Independents 15% 39 Stores	All Stores 100% 85 Stores
1) ALL MANUFACTURERS			
Annual	216,390	38,190	254,580
Weekly	4,160	730	4,900
Weekly average per store	90	19	58
2) 26 MAJOR MANUFACTURERS SUPPLY 80% OF MEAT AND POULTRY			
All manufacturers to all stores			
Annual	173,110	30,550	203,660
Weekly	3,330	590	3,920
All manufacturers to single store			
Annual	3,760	780	2,400
Weekly	72	15	46
Single manufacturer to all stores			
Annual	6,660	1,180	7,830
Weekly	130	23	150
Single manufacturer to single store			
Annual	145	30	92
Weekly	2.8	<1	1.8
3) 122 SMALLER PLANTS SUPPLY 20% OF MEAT AND POULTRY			
All manufacturers to all stores			
Annual	43,280	7,640	50,920
Weekly	830	150	980
All manufacturers to single store			
Annual	840	200	600
Weekly	18	3.8	12
Single manufacturer to all stores			
Annual	350	60	420
Weekly	6.8	1.2	8.0
Single manufacturer to single store			
Annual	7.6	1.5	4.9
Weekly	<1	<1	<1

There are 46 chains and 39 independents for a total of 85 stores selling meat and poultry in Kingston. As previously stated, most of the product goes direct to stores from the plant warehouses.

The accompanying exhibits depict flows of meat and poultry. Annual and weekly volumes for different segments of the meat and poultry distribution network are shown.

These statistics are used to calculate shipment volumes for the distribution alternatives.

### 3. Dairy

#### a) Case flows

Annual value, weight and number of cases of dairy products suitable for pooling are shown below.

EXHIBIT V-9. Calculation of case flows of butter, cheese and margarine

Product Sub-Group	Annual Sales %      \$000	Retail Value \$ Per Case	No. of Cases (000)	Weight Per Case (lb.)	Total Weight (000 lb)
Butter	30.2      1230	90	13.7	50	685
Cheese	44.6      1818	25	72.7	9	654
Margarine	25.2      1026	23	44.6	24	1070
Total	100.0      4074		131.0		2409

Average weight per case = 19 lb.  
Average retail value per case = \$31

Weights and retail values were derived from the super-market survey shown on Exhibit V-10.

Typically dairy products are distributed with fresh fruit and produce. The bulk of all fresh fruit and produce is marketed through the Ontario Food Terminal (O.F.T.) in Toronto.

As Exhibit V-11 indicates, fresh fruit and vegetable prices averaged \$.74 per pound in a May survey taken in a Toronto

EXHIBIT V-10. Computation of average weight, retail value of case of dairy products

Product	Manu- facturer	Brand	Net Contents	Gross Packaged Weight <sup>1</sup> (oz)	Retail Price	Units Per Case	Weight Per Case (lb)	Retail Value Per Case	
								1980	Less 5% to Adjust to 1979 Prices
Butter	Gay Lea	Creamery Butter	1 lb.	16	1.89	50	50	94.50	90.00
Cheese	Millbank	Cheddar Mild		16	2.71	12	12	32.52	
	Black Diamond	Medium Cheddar	12 oz.	12	2.02	12	9	24.24	
	Kraft	Cheese Slices	1 lb.	16	2.09	12	12	25.08	
	Holland	Baby Holland Gouda	10 oz.	10	2.45	12	8	29.40	
	Anco Food Products	Gouda & Camembert	6 oz.	6	1.55	12	4.5	18.60	
	Kraft	Mozzarella Cheese Slices	340 g.	12	2.33	12	9	27.96	
Sub-Group Total							54.5	157.80	
Sub-Group Average							9	26.30	25.00
Margarine	Monarch	Soft Margarine	1 lb.	16	0.99	24	24	23.76	23.00

Survey was completed at Dominion Store, Yonge-Eglinton Centre, Toronto.

<sup>1</sup> Packages were weighed on store's produce scale. In some cases, gross packaged weight registered the same as net weight.

EXHIBIT V-11. Survey of fruit and vegetable prices -- Dominion Store, Yonge-Eglinton Centre, Toronto

Fruit or Vegetable	Price Per Unit	Weight	Price Per lb.	Can Be Canadian Grown	Description	Origin Country
Oranges	1.98/bag	5 lb.	.40		Florida Oranges - U.S.A.	U.S.A.
Grapefruit	3/.89	2 $\frac{1}{4}$ lb.	.40		Florida	U.S.A.
Apples	1.88/bag	3 $\frac{1}{4}$ lb.	.58	X	Ontario Grown Red Delicious	Ontario
Pears			.98	X	Can. No. 1 - Bosc. Pears	U.S.A.
Potatoes	3 lb/.99		.33	X	Can. No. 1	U.S.A.
Carrots	.68	1 lb.	.68	X	Fresh Bunch Carrots	U.S.A.
Cucumbers	2/.89	1 lb.	.89	X	Can. No. 1	U.S.A.
Lettuce	.88	1 $\frac{1}{4}$ lb.	.70	X	Can. No. 1	U.S.A.
Tomatoes	.99	14 oz.	1.14	X	Can. No. 1	U.S.A.
Cabbage	.79/head	2 lb.	.40	X	Can. No. 1 Green Cabbage	U.S.A.
Celery	.89/bunch	1 5/8 lb.	.55	X	Can. No. 1	U.S.A.
Bananas			.39		Chiquita	Ecuador
Total			8.91			
Average			.743			

supermarket. The brief Ontario season brings prices down 25% to 50%. This could have the effect of lowering the average retail price by about 10% over the year. However, it will be assumed that packaging adds 5% back onto the shipping weight. The price is deflated another 5% to 67¢ per pound to reflect 1979 prices.

Weight of product moving into Kingston during 1979 is calculated as follows:

► Sales volume (000)	\$6,970
► No. of pounds at 67¢/lb. (000)	10,400
► No. of cases at 45 lb./case (000)	231

To prevent distortion in the calculations, refrigerated products will be expressed as equivalent cases of dairy products.

EXHIBIT V-12. Combined case flows of selected dairy products and produce

	Dairy	Fresh Fruit & Produce	Total
No. of cases	131,000	231,000	362,000
No. of pounds	2,409,000	10,395,000	12,804,000
Pounds/case	19	45	35
Produce ÷ dairy		2.4	
No. of equivalent dairy cases	131,000	554,400	685,400

b) Location of manufacturers

Quebec is Canada's largest dairy producing province. As a result, some of Quebec's dairy products come into Ontario. Statistics Canada's survey of value of dairy shipments from manufacturers showed the following regional proportions:

► Toronto	17%
► South-Western Ontario	21%



- ▶ Balance Ontario 26%  
(Estimated 75% is Eastern Ontario)
- ▶ Montreal 35%

The shipment statistics underline the localized nature of dairy production. It can be seen that Toronto, South-Western Ontario Eastern Ontario are about equal shippers when the effect of Northern Ontario is removed.

It is again assumed that shipments from Ontario plants are twice as likely to be destined for Ontario markets. As a result, derived flow volumes from each of the four sources is about equal. Volumes of poolable refrigerated products moving into Toronto distribution warehouses can be estimated as follows:

From Toronto	25%
From South-Western Ontario	25%
From Eastern Ontario	25%
From Montreal	25%

Toronto and Montreal shares of dairy shipping volumes are a little lower than the regions. However, the concentration of margarine manufacturing in these centres compensates for this.

c) Type and number of manufacturers

For a variety of reasons, a few large suppliers hold a large share of the market for butter, cheese and margarine. The major factors are:

- ▶ Low profit margin in butter. Smaller producers have difficulty competing.
- ▶ High brand-name recognition in margarine and processed cheese.
- ▶ Central cheese cutting and packaging by some chains. They buy in bulk from larger processors.

There are many specialty cheese producers in Ontario and Quebec. However, Statistics Canada's 1974 Consumer Survey showed that 2/3 of cheese (by weight) purchased by the average family was either cheddar or processed cheese. In addition, many of the cheese producers are not actually the final processors. They ship it on to the major plants for final processing.

It is estimated that 10% of plants, or 19 plants, produce 80% of the product. Due to duplicate plants, there are about 10-12 significant

manufacturers of dairy and related products suitable for pooling (as defined above).

Of this group, three manufacturers are also the three major meat packers in the province: Canada Packers, Schneider's and Swift.

The balance of poolable refrigerated products comes from smaller plants in Ontario and the Montreal area. We have identified a total of 179 plants in these areas. This leaves 160 smaller plants to supply the remaining 20% of food consumed in Kingston.

To facilitate comparison of different distribution systems, it will be assumed that these firms are about evenly dispersed among the different regions, in proportion to production.

d) Summary of butter, cheese and margarine flows

Similarly to dry groceries, virtually all food stores stock poolable dairy products, particularly butter and margarine. It will be assumed that only half of "other food stores" or 19 Kingston stores do not stock dairy products. This leaves 131 stores in Kingston which stock dairy products, 46 (all) chain stores, and 85 independents.

Exhibit V-13 depicts flows of poolable dairy products (produce is not included). Annual and weekly volumes for different segments of the distribution network are shown.

These statistics are used to calculate shipment volumes for the distribution alternatives.

Exhibit V-14 shows flows of refrigerated products in equivalent dairy cases for the current system with produce handled.

4. Frozen products

a) Case flows

Kingston's annual retail sales, weight and number of cases of frozen foods are shown in Exhibit V-15.

Weights and retail values were derived from the supermarket survey shown in Exhibit V-16.

b) Location of manufacturers

Fish represents 25.9% of frozen products by value, and 13.5% by weight. Most frozen fish originates in processing plants in the Maritimes. Theoretically, there could be an opportunity for pooled distribution from the Maritimes. However, total annual consumption in

EXHIBIT V-13. Statistical summary of Kingston dairy distribution by type of manufacturer

	No. of Cases		
	Chains 85% 46 Stores	Independents 15% 85 Stores	All Stores 100% 131 Stores
1) ALL MANUFACTURERS			
Annual	111,350	19,650	131,000
Weekly	2,140	380	2,520
Weekly average per store	50	4.5	19
2) 19 MAJOR MANUFACTURERS SUPPLY 80% OF GOODS			
All manufacturers to all stores			
Annual	89,080	15,720	104,800
Weekly	1,710	300	2,020
All manufacturers to single store			
Annual	1,940	180	800
Weekly	40	3.6	15
Single manufacturer to all stores			
Annual	4,690	830	5,520
Weekly	90	16	110
Single manufacturer to single store			
Annual	100	9.7	40
Weekly	2	<1	<1
3) 160 MINOR MANUFACTURERS SUPPLY 20% OF GOODS			
All manufacturers to all stores			
Annual	22,270	3,930	26,200
Weekly	430	80	500
All manufacturers to single store			
Annual	480	50	200
Weekly	9.3	<1	3.8
Single manufacturer to all stores			
Annual	140	25	160
Weekly	2.7	<1	3.1
Single manufacturer to single store			
Annual	2.7	<1	<1
Weekly	<1	<1	<1

EXHIBIT V-14. Current system -- annual case flows of refrigerated products in equivalent dairy cases

Origin	To Chains	To Independents	Total
Toronto	499,080	88,070	587,150
S.W. Ontario	27,840	4,910	32,750
E. Ontario	27,840	4,910	32,750
Montreal	27,840	4,910	32,750
Total	582,600	102,800	685,400

EXHIBIT V-15. Calculation of case flows of frozen food

Product	Annual Sales		\$ / Case	No. of Cases (000)	Weight Per Case (lb.)	Total Weight (000 lb.)	%
	%	\$000					
Fish	25.9	815	26	31.4	12	376	13.5
Fruits & veg.	28.8	905	16	56.6	24	1357	48.9
Juice concentrates	17.8	560	24	23.3	24	560	20.2
All other	27.3	859	16	53.7	9	483	17.4
Total	100.0	3140		165.0		2776	100.0

Average weight per case = 17 lb.  
Average retail value per case = \$19

EXHIBIT V-16. Computation of average weight, retail value of case of frozen products.

Product Type	Manufacturer	Brand	Net Contents	Gross Packaged Weight <sup>1</sup> (oz)	Retail Price	Units Per Case	Weight Per Case (lb.)	Retail Value Per Case	
								1980	Less 5% to Adjust to 1979 Prices
Fish	National Sea	Fillets	1 lb.	16	1.99	12	12	23.88	
	National Sea	Highliner Fish Sticks	14 oz.	14	2.68	12	10.5	32.16	
	National Sea	Highliner Bluefish Fillets - Bonded	14 oz.	14	1.75	12	10.5	21.00	
	National Sea	Highliner Ocean Perch Fillets	16 oz.	16	2.18	12	12	26.16	
	National Sea	Highliner Turbot Fish Sticks	16 oz.	16	2.18	12	12	26.16	
Sub-Group Total							69	164.76	
Sub-Group Average							12	27.46	26.00
Fruits & Vegetables	Green Giant	Very Young Sweet Peas	2 lb.	32	1.34	12	24	16.08	
	McCains	Superfries	2 lb.	32	1.09	12	24	13.08	
	Valdes (Mexico)	Rio Frozen Strawberries	15 oz.	15	0.75	24	22.5	18.00	
	Bar-Well Foods (Distributor)	Arctic Gardens Mixed Vegetables	2 lb.	32	1.69	12	24	20.28	
	Canada Packers	York Tiny Cut Carrots	2 lb.	32	1.85	12	24	22.20	
	Canada Packers	York Whole Kernel Corn	2 lb.	32	0.99	12	24	11.88	
Sub-Group Total							142.5	101.52	
Sub-Group Average							24	16.92	16.00
Juice Concentrates	Minutemaids	Orange	12.5 fl.oz.	16	1.09	24	24	26.16	
	Welch's	Grape	12 fl.oz.	16	1.19	24	24	28.96	
	Gen. Foods	Awake Orange	12 fl.oz.	16	1.09	24	24	26.16	
	Canada Packers	York Apple	12.5 fl.oz.	16	0.94	24	24	22.56	
	Honey Dew	Fruit Punch	12.5 fl.oz.	16	0.97	24	24	23.28	
Sub-Group Total							20	126.72	
Sub-Group Average							24	25.34	25.34
Other	Canada Packers	York Beef Pie	8 oz.	8	0.69	24	12	16.56	
	Campbell Soup	Pepperidge Farm Choc. Layer Cake	13 oz.	13	1.43	12	9.75	17.16	
	Green Giant	Boil'n Bag Beef Stew	9 oz.	9	1.58	12	6.75	18.96	
	Kellogg-Salada	Eggo Bran Waffles	400 g.	14.1	1.05	12	10.6	12.60	
	Stouffer	Lasagna	10.5 oz.	10.5	1.85	12	7.9	22.20	
Sub-Group Total							56.75	99.42	
Sub-Group Average							9	16.57	16.00

Survey was completed at Dominion Store, Yonge-Eglinton Centre, Toronto.

<sup>1</sup>Packages were weighed on store's produce scale. In some cases, the gross packaged weight registered the same as the net weight.

Kingston amounts to 376,000 lb. At 45,000 lbs. per trailer, this represents 8.4 trailer loads per year. Therefore, pooled distribution to Kingston by fish processors is impractical.

For the purposes of this study, all frozen fish distribution originates in freezer warehouses in Toronto.

The balance of frozen food includes fruit and vegetable products and specialties.

Frozen fruit and vegetable processors locate huge factories in areas where the crops are grown. There are factories scattered throughout Canada which sell to the Ontario market.

Statistics Canada conducted a survey in 1974 -- Inter-provincial Shipping Patterns By Commodity. The survey showed that only half of the frozen fruit and vegetable shipments destined for Ontario originated in Ontario. This is in contrast to the food and beverage industry, as a whole, or even the related canning and preserving industry group.

EXHIBIT V-17. Interprovincial flows of frozen food compared to other commodities

Industry Group	S.I.C.	Total Shipments Destined For Ontario	Ontario Shipments Supplied From Ontario	
		\$(000)	\$(000)	%
Frozen fruit and vegetable processors	1032	62,005	26,899	43
Fruit and vegetable canners and preservers	1031	227,821	199,520	88
Food and beverage industries		4,913,103	4,069,609	83

Frozen fruit and vegetable processing includes about 69% frozen food sales by weight. Of this amount, 57% of shipments from Canadian producers to the Ontario market originated out of province according to the above table.

The remaining frozen food group is "all other" which accounts for 17.4% of frozen food sales by weight. This includes frozen food specialties such as baked goods and pre-cooked meals. It will be assumed that origin of manufacture for these products is similar to dry groceries:

- ▶ 40% originate in South-Western Ontario.
- ▶ 40% originate in Toronto.
- ▶ 20% originate in Montreal.

Flows of frozen products are summarized as follows.

EXHIBIT V-18. Frozen food flows by processing location

Product Group	Weight (000 lbs.)	Processed In Ontario		Processed Out Of Province	
		(000 lbs.)	%	(000 lbs.)	%
Fish	376	0	0	376	100
Fruit & vegetable products	1917	824	43	1099	57
Other	483	386	80	97	20
Total	2776	1210	44	1572	56

It is assumed that most of Ontario production is split between South-Western Ontario and Toronto:

- ▶ Toronto 605,000 lbs. 35,590 cases
- ▶ South-Western Ontario 605,000 lbs. 35,590 cases

The annual trailer loads for Kingston from either of these locations can be calculated as follows:

$$605,000 \text{ lbs.} \div 45,000 \text{ lbs./trailer} = 13.4 \text{ trailers}$$

This is equivalent to one trailer load per month. Therefore, any form of pooled distribution by frozen food manufacturers to Kingston stores is impractical.

c) Summary of frozen product flows

Frozen product flows are summarized on Exhibit V-19.

EXHIBIT V-19. Statistical summary of Kingston frozen food distribution  
by type of manufacturer

	No. of Cases		
	Chains 85% 46 Stores	Independents 15% 52 Stores	All Stores 100% 98 Stores
1) ALL MANUFACTURERS			
Annual	140,250	24,750	165,000
Weekly	2,700	480	3,170
Weekly average per store	58	9.2	32
2) MAJOR MANUFACTURERS SUPPLY 80% OF FROZEN FOOD			
All manufacturers to all stores			
Annual	112,200	19,800	132,000
Weekly	2,160	380	2,540
All manufacturers to single store			
Annual			
Weekly			
Single manufacturer to all stores			
Annual			
Weekly			
Single manufacturer to single store			
Annual			
Weekly			
3) MINOR MANUFACTURERS SUPPLY 20% OF FROZEN FOOD			
All manufacturers to all stores			
Annual	28,050	4,950	33,000
Weekly	540	100	630
All manufacturers to single store			
Annual			
Weekly			
Single manufacturer to all stores			
Annual			
Weekly			
Single manufacturer to single store			
Annual			
Weekly			



It is assumed that about half of the independents, or 52 stores, stock frozen food products. This implies average sales of 9.2 cases per store per week. This is about 160 lbs. of frozen food, which is below the 200 lb. minimum freight charge levied by most carriers. This is an indication that the frozen food volume moving to Kingston independents is low.

## VI

### DRY GROCERIES: DESCRIPTION OF CURRENT SYSTEM AND POOLING ALTERNATIVES

In this chapter, we describe and evaluate the following opportunities for pooled distribution of dry groceries:

- ▶ Pooled transport by major manufacturers to pooled community depot; pooled delivery to chain stores.
- ▶ Pooled transport by major manufacturers to pooled community depot; pooled delivery to all stores.
- ▶ Consolidation of shipments from major manufacturers at Toronto and Montreal terminals; direct drop shipment to Kingston chain stores.
- ▶ Direct transport by major manufacturers to Kingston depot; pooled delivery to stores.
- ▶ Direct transport by major manufacturers to Kingston pooled community warehouse; pooled delivery to stores.

We have evaluated these alternatives and the current system. To carry out this evaluation, we developed cost estimates for each of the alternative systems. For each cost estimate, we developed specific cost functions. Our assumptions relating to these cost functions are presented in Appendix A. All costs were evaluated on a per case basis. Annual costs were derived from per case costs. Comparative costs and potential savings (losses) resulting from alternatives were calculated. Per case costs, annual costs and a comparative cost summary are presented in Exhibits VI-1 to VI-9.

#### A. DESCRIPTION OF CURRENT SYSTEM

In the current system, dry groceries are distributed to Kingston via central distribution warehouses in Toronto. The Toronto distribution warehouses are operated by chain merchandisers who supply chain stores; and wholesalers who supply independent grocers. Chain merchandisers and wholesalers order in trailer load quantities from manufacturers.

Food moves in trailer load quantities from the manufacturer's plant warehouse to the distribution warehouses.

EXHIBIT VI-1. Dry groceries: current system

	Toronto		S.W. Ontario				Montreal			
	All Direct		Direct		Via Pub. Whse.		Direct		Via Pub. Whse.	
	Chains	Indep.	Chains	Indep.	Chains	Indep.	Chains	Indep.	Chains	Indep.
<b>A. Plant Warehouse to Kingston</b>										
1. At the Plant Warehouse	.030	.030	.030	.030	.030	.030	.030	.030	.030	.030
2. Pick-up										
3. Transport to Consolidation Point					.147	.147			.499	.499
4. Temporary Storage or Consolidation										
a. Receive and put away/sort					.022	.022			.022	.022
b. Store					.100	.100			.100	.100
c. Order fill and marshall					.021	.021			.021	.021
d. Load					.010	.010			.010	.010
5. Transport to Distribution Whse.	.067	.067	.147	.147	.107	.107	.499	.499	.107	.107
6. At the Distribution Warehouse										
a. Receive and put away	.022	.022	.022	.022	.022	.022	.022	.022	.022	.022
b. Store	.060	.060	.060	.060	.060	.060	.060	.060	.060	.060
c. Order fill and marshall	.089	.089	.089	.089	.089	.089	.089	.089	.089	.089
d. Load	.026	.027	.026	.027	.026	.027	.026	.027	.026	.027
7. Transport to Kingston	.303	.476	.303	.476	.303	.476	.303	.476	.303	.476
Sub-total	.597	.771	.677	.851	.937	1.111	1.029	1.203	1.289	1.463
<b>B. Break-Bulk, Storage and Delivery in Kingston</b>										
1. Break Bulk or Storage										
a. Receive										
b. Store										
c. Order fill and marshall										
d. Load										
2. Delivery										
a. Vehicle and driver	.090	.187	.090	.187	.090	.187	.090	.187	.090	.187
b. Receive at store	.030	.056	.030	.056	.030	.056	.030	.056	.030	.056
Sub-total	.120	.243	.120	.243	.120	.243	.120	.243	.120	.243
<b>C. Administration and Overhead</b>										
	.023	.128	.023	.128	.030	.135	.023	.128	.030	.135
Total	.740	1.142	.820	1.222	1.087	1.489	1.172	1.574	1.439	1.841

EXHIBIT VI-2. Dry groceries: alternative - pooled transport by major manufacturers to Kingston chain stores

	Toronto		S.W. Ontario		Montreal	
	Pooled	Non-Pooled Chains Indep.	Pooled	Non-Pooled Chains Indep.	Pooled	Non-Pooled Chains Indep.
<b>A. Plant Warehouse to Kingston</b>						
1. At the Plant Warehouse	.101	.030	.101	.030	.101	.030
2. Pick-up	.054		.108		.054	
3. Transport to Consolidation Point				.147		.499
4. Temporary Storage or Consolidation						
a. Receive and put away/sort				.022		.022
b. Store				.100		.100
c. Order fill and marshall				.021		.021
d. Load				.010		.010
5. Transport to Distribution Whse.		.067		.107		.107
6. At the Distribution Warehouse						
a. Receive and put away		.022		.022		.022
b. Store		.060		.060		.060
c. Order fill and marshall		.089		.089		.089
d. Load		.026		.026		.026
7. Transport to Kingston	.293	.303	.470	.303	.310	.303
Sub-total	.448	.597	.679	.937	.465	1.289
<b>B. Break-Bulk, Storage and Delivery in Kingston</b>						
1. Break-Bulk or Storage						
a. Receive	.009		.009		.009	
b. Store						
c. Order fill/sort and marshall	.120		.120		.120	
d. Load	.027		.027		.027	
2. Delivery						
a. Vehicle and driver	.092	.090	.092	.090	.092	.090
b. Receive at store	.035	.030	.035	.030	.035	.030
Sub-total	.283	.120	.283	.120	.283	.120
<b>C. Administration and overhead</b>						
	.083	.023	.083	.030	.683	.030
Total	.814	.740	1.045	1.087	.831	1.439

EXHIBIT VI-3. Dry groceries: alternative - pooled transport by major manufacturers to Kingston stores

	Toronto			S.W. Ontario			Montreal		
	Pooled	Non-Pooled Chains	Indep.	Pooled	Non-Pooled Chains	Indep.	Pooled	Non-Pooled Chains	Indep.
<b>A. Plant Warehouse to Kingston</b>									
1. At the Plant Warehouse	.101	.030	.030	.101	.030	.030	.101	.030	.030
2. Pick-up	.054			.108			.054		
3. Transport to Consolidation Point					.147	.147		.499	.499
4. Temporary Storage or Consolidation									
a. Receive and put away/sort					.022	.022		.022	.022
b. Store					.100	.100		.100	.100
c. Order fill and marshall					.021	.021		.021	.021
d. Load					.010	.010		.010	.010
5. Transport to Distribution Whse.		.067	.067		.107	.107		.107	.107
6. At the Distribution Warehouse									
a. Receive and put away		.022	.022		.022	.022		.022	.022
b. Store		.060	.060		.060	.060		.060	.060
c. Order fill and marshall		.089	.089		.089	.089		.089	.089
d. Load		.026	.027		.026	.027		.026	.027
7. Transport to Kingston	.252	.303	.651	.405	.303	.651	.267	.303	.651
Sub-total	.407	.597	.946	.614	.937	1.286	.422	1.289	1.638
<b>B. Break-Bulk, Storage and Delivery in Kingston</b>									
1. Break-Bulk or Storage									
a. Receive	.009			.009			.009		
b. Store									
c. Order fill/sort and marshall	.120			.120			.120		
d. Load	.027			.027			.027		
2. Delivery									
a. Vehicle and driver	.128	.090	.264	.128	.090	.264	.128	.090	.264
b. Receive at store	.050	.030	.077	.050	.030	.077	.050	.030	.077
Sub-total	.334	.120	.341	.334	.120	.341	.334	.120	.341
<b>C. Administration and overhead</b>									
	.191	.023	.212	.191	.030	.219	.191	.030	.219
Total	.932	.740	1.499	1.139	1.087	1.846	.947	1.439	2.198

EXHIBIT VI-4. Dry groceries: alternative - consolidation at Toronto and Montreal terminals for Kingston chain stores

	Toronto		S.W. Ontario		Montreal	
	Pooled	Non-Pooled Chains    Indep.	Pooled	Non-Pooled Chains    Indep.	Pooled	Non-Pooled Chains    Indep.
A. Plant Warehouse to Kingston						
1. At the Plant Warehouse	.101	.030	.101	.030	.101	.030
2. Pick-up						
3. Transport to Consolidation Point	.107		.246	.147	.107	.499
4. Temporary Storage or Consolidation						
a. Receive and put away/sort	.009		.009	.022	.009	.022
b. Store				.100		.100
c. Order fill and marshall	.120		.120	.021	.120	.021
d. Load	.026		.026	.010	.026	.010
5. Transport to Distribution Whse.		.067		.107		.107
6. At the Distribution Warehouse						
a. Receive and put away		.022		.022		.022
b. Store		.060		.060		.060
c. Order fill and marshall		.089		.089		.089
d. Load		.026		.026		.026
7. Transport to Kingston	<u>.293</u>	<u>.303</u>	<u>.293</u>	<u>.363</u>	<u>.310</u>	<u>.303</u>
Sub-total	.656	.597	.795	.937	.673	1.289
B. Break-Bulk, Storage and Delivery in Kingston						
1. Break-Bulk or Storage						
a. Receive						
b. Store						
c. Order fill/sort and marshall						
d. Load						
2. Delivery						
a. Vehicle and driver	.095	.090	.095	.090	.095	.090
b. Receive at store	<u>.033</u>	<u>.030</u>	<u>.033</u>	<u>.030</u>	<u>.033</u>	<u>.030</u>
Sub-total	.128	.120	.128	.120	.128	.120
C. Administration and overhead						
	<u>.077</u>	<u>.023</u>	<u>.077</u>	<u>.030</u>	<u>.077</u>	<u>.030</u>
Total	.861	.740	1.000	1.087	.878	1.439

EXHIBIT VI-5. Dry groceries: alternative - consolidation at Toronto and Montreal terminals for all Kingston stores

	Toronto			S.W. Ontario			Montreal		
	Pooled	Non-Pooled Chains	Indep.	Pooled	Non-Pooled Chains	Indep.	Pooled	Non-Pooled Chains	Indep.
<b>A. Plant Warehouse to Kingston</b>									
1. At the Plant Warehouse	.101	.030	.030	.101	.030	.030	.101	.030	.030
2. Pick-up									
3. Transport to Consolidation Point	.107			.208	.147	.147	.107	.499	.499
4. Temporary Storage or Consolidation									
a. Receive and put away/sort	.070			.070	.022	.022	.070	.022	.022
b. Store					.100	.100		.100	.100
c. Order fill and marshall					.021	.021		.021	.021
d. Load	.026			.026	.010	.010	.026	.010	.010
5. Transport to Distribution Whse.		.067	.067		.107	.107		.107	.107
6. At the Distribution Warehouse									
a. Receive and put away		.022	.022		.022	.022		.022	.022
b. Store		.060	.060		.060	.060		.060	.060
c. Order fill and marshall		.089	.089		.089	.089		.089	.089
d. Load		.026	.027		.026	.027		.026	.027
7. Transport to Kingston	.252	.303	.651	.252	.303	.651	.267	.303	.651
Sub-total	.556	.597	.830	.657	.937	1.185	.571	1.289	1.537
<b>B. Break-Bulk, Storage and Delivery in Kingston</b>									
1. Break-Bulk or Storage									
a. Receive	.009			.009			.009		
b. Store									
c. Order fill/sort and marshall	.120			.120			.120		
d. Load	.027			.027			.027		
2. Delivery									
a. Vehicle and driver	.119	.090	.264	.119	.090	.264	.119	.090	.264
b. Receive at store	.046	.030	.077	.046	.030	.077	.046	.030	.077
Sub-total	.321	.120	.341	.321	.120	.341	.321	.120	.341
<b>C. Administration and overhead</b>									
	.187	.023	.212	.187	.030	.219	.187	.030	.219
Total	1.064	.740	1.499	1.165	1.087	1.846	1.079	1.439	2.097

EXHIBIT VI-6. Dry groceries: alternative - direct haul to Kingston community warehouse, pooled delivery to stores

		Toronto			S.W. Ontario			Montreal	
	Pooled	Non-Pooled		Pooled	Non-Pooled		Pooled	Non-Pooled	
		Chains	Indep.		Chains	Indep.		Chains	Indep.
A. Plant Warehouse to Kingston									
1. At the Plant Warehouse	.030	.030	.030	.030	.030	.030	.030	.030	.030
2. Pick-up									
3. Transport to Consolidation Point					.147	.147		.499	.499
4. Temporary Storage or Consolidation									
a. Receive and put away/sort					.022	.022		.022	.022
b. Store					.100	.100		.100	.100
c. Order fill and marshall					.021	.021		.021	.021
d. Load					.010	.010		.010	.010
5. Transport to Distribution Whse.		.067	.067		.107	.107		.107	.107
6. At the Distribution Warehouse									
a. Receive and put away		.022	.022		.022	.022		.022	.022
b. Store		.060	.060		.060	.060		.060	.060
c. Order fill and marshall		.089	.089		.089	.089		.089	.089
d. Load		.026	.027		.026	.027		.026	.027
7. Transport to Kingston	.242	.303	.651	.389	.303	.651	.257	.303	.651
Sub-total	.272	.597	.946	.419	.937	1.286	.287	1.289	1.638
B. Break-Bulk, Storage and Delivery in Kingston									
1. Break-Bulk or Storage									
a. Receive	.022			.022			.022		
b. Store	.100			.100			.100		
c. Order fill/sort and marshall	.089			.089			.089		
d. Load	.027			.027			.027		
2. Delivery									
a. Vehicle and driver	.099	.090	.264	.099	.090	.264	.099	.090	.264
b. Receive at store	.036	.030	.077	.036	.030	.077	.036	.030	.077
Sub-total	.373	.120	.341	.373	.120	.341	.373	.120	.341
C. Administration and overhead									
	.039	.023	.212	.039	.030	.219	.039	.030	.219
Total	.684	.740	1.499	.831	1.087	1.846	.699	1.439	2.198



EXHIBIT VI-7. Dry groceries current system: total annual costs of distribution systems

Costs and Case Flows by Source of Manufacturer	Chains			Independents			All Stores
	Direct Supply From Manufacturer	Supply From Public Warehouse	Total	Direct Supply From Manufacturer	Supply From Public Warehouse	Total	
(Annual Costs and Case Flows in 000's)							
<u>Toronto mfgs.</u>							
Cost per case	.740		.740	1.142		1.142	.800
Cases per year	476		476	84		84	560
Annual costs	352		352	96		96	448
<u>S.W. Ontario mfgs.</u>							
Cost per case	.820	1.087	.872	1.222	1.489	1.274	.932
Cases per year	381	95	476	67	17	84	560
Annual costs	312	103	415	82	25	107	522
<u>Montreal mfgs.</u>							
Cost per case	1.172	1.439	1.227	1.574	1.841	1.643	1.289
Cases per year	190	48	238	34	8	42	280
Annual costs	223	69	292	54	15	69	361

EXHIBIT VI-8. Dry groceries: total annual costs of alternative distribution systems

Costs and Case Flows By Source Of Manufacture	Non-Pooled			Pooled				
	Consolidation at Individual Central Distribution Warehouses; Drop Delivery			Pooled Transport by Major Manufacturers to Pooled Community Depot; Pooled Delivery		Consolidation by Forwarder		Pooled Community Warehouse All Stores
	Chains	Indep.	Total	Chains	All Stores	Drop Shipment to Stores	Haul to Pooled Comm. Depot; Pooled Del.	
						Chains	All Stores	
(Annual Costs and Case Flows in 000's)								
Toronto manufacturers								
Cost per case	.740	1.499		.814	.932	.861	1.064	.684
Cases per year	95	17	112	381	448	381	448	448
Pooled costs				310	418	328	477	306
+ Non-pooled costs				70	95	70	95	95
Total costs	70	25	95	380	513	398	572	401
S.W. Ont. manufacturers								
Cost per case	1.087	1.846		1.045	1.139	1.000	1.165	.831
Cases per year	95	17	112	381	448	381	448	448
Pooled costs				398	510	381	522	372
+ Non-pooled costs				103	134	103	134	134
Total costs	103	31	134	501	644	484	656	506
E. Ont. manufacturers								
Cost per case								
Cases per year								
Pooled costs								
+ Non-pooled costs								
Total costs								
Montreal manufacturers								
Cost per case	1.439	2.097		.831	.937	.878	1.079	.699
Cases per year	48	8	56	190	224	190	224	224
Pooled costs				158	212	167	242	157
+ Non-pooled costs				69	86	69	86	86
Total costs	69	17	86	227	298	236	328	243

EXHIBIT VI-9. Dry groceries: comparative costs of current and alternative distribution systems

Source of Manufacturer/Item		Current System		Alternatives				
		Chains	All Stores	Pooled Transport by Major Manufacturers		Consolidation by Freight Forwarder		Pooled Comm. Whse.
				Chains	All Stores	Chains	All Stores	All Stores
(Annual Costs and Case Flows in 000's)								
Toronto	Costs	352	448	380	513	398	572	401
	Cases	476	560	476	560	476	560	560
	Cost Per Case	.740	.800	.798	.916	.836	1.021	.716
S.W. Ont.	Costs	415	522	501	644	484	656	506
	Cases	476	560	476	560	476	560	560
	Cost Per Case	.872	.932	1.053	1.150	1.017	1.171	.904
E. Ont.	Costs							
	Cases							
	Cost Per Case							
Montreal	Costs	292	361	227	298	236	328	243
	Cases	238	280	238	280	238	280	280
	Cost Per Case	1.227	1.289	.954	1.064	.992	1.171	.868
Total	Costs	1059	1331	1108	1455	1118	1556	1150
	Cases	1190	1400	1190	1400	1190	1400	1400
	Cost Per Case	.890	.951	.931	1.039	.939	1.111	.821
Current system costs				1059	1331	1059	1331	1331
Savings (loss) with pooling				(49)	(124)	(59)	(225)	181
Savings (loss) per case <sup>1</sup>				(.041)	(.089)	(.050)	(.161)	.129

Some food manufactured outside Toronto moves in trailer load quantities from the manufacturer's plant warehouse to a public warehouse in Toronto. From the public warehouse, it is released in smaller quantities to the distribution warehouses.

1. Chain stores

Chain stores place their dry groceries orders several times a week through a chain distribution warehouse in Toronto. Several store orders are loaded on a trailer at the distribution warehouse. The trailer is hauled to Kingston where drops are made to Kingston stores.

2. Independent stores

Independents typically order all their dry groceries once a week through one principal wholesaler in Toronto. A number of store orders are loaded on a truck. The truck is hauled to the Kingston area where drops are made to stores in and around Kingston.

B. DESCRIPTION OF ALTERNATIVE SYSTEMS

1. Pooled transport by major manufacturers to Kingston stores

a) Pooled transport by major manufacturers to Kingston pooled community depot; pooled delivery to chain stores

Each chain store continues to place their dry groceries order through the chain distribution centre. Orders are sorted into pooled and non-pooled items. Non-pooled items are supplied from the warehouse in the current manner. Pooled items are sorted by manufacturer. A Kingston order is sent by each chain merchandiser to each participating major manufacturer.

Each participating major manufacturer combines orders from all chain merchandisers into a single Kingston order. A tractor-trailer makes pick ups from several manufacturers. The trailer is hauled directly to a Kingston pooled community depot. Several trailers arrive simultaneously at the depot from several manufacturers' pooling groups.

Trailers are unloaded at the depot. Cases are sorted by store, then products for each store are collected at a designated loading door. When all the freight has been sorted, delivery trucks are loaded in stop order. Deliveries are made to the chain stores.

b) Pooled transport by major manufacturers to Kingston  
pooled community depot; pooled delivery to all stores

Operation of this alternative is almost the same as the previous alternative: pooled transport by major manufacturers to chain stores. There are two additional dimensions:

- ▶ Independent stores are served by the pooling schemes and receive pooled deliveries from the depot.
- ▶ Since the independents order all their dry groceries from wholesalers, the wholesalers become involved. They perform the same function for the independents as the chain merchandisers do for the chain stores.

All procedures are the same. Quantity of freight moving increases a little. The number of deliveries increase, while the average size of a pooled product store delivery order declines.

The flow of goods is basically the same. The product is picked up from several manufacturers by tractor-trailer. The pooled transport load is hauled to the community depot. Several pooled transport loads arrive at the depot on the same day. All the freight is sorted to loading doors where orders are marshalled for each store. Delivery trucks are loaded in stop order.

2. Consolidation of shipments from major manufacturers at terminals  
in Toronto and Montreal

a) Consolidation of shipments from major manufacturers at  
Toronto and Montreal; drop shipment to Kingston chain  
stores

The order flow is similar to the system outlined for pooled transport by major manufacturers. Each chain store continues to place their dry groceries order through the chain distribution centre. Orders are sorted into pooled and non-pooled items. Non-pooled items are supplied from the warehouse in the current manner. Pooled items are sorted by manufacturer. A Kingston order is sent by each chain merchandiser to each participating major manufacturer.

Each participating major manufacturer combines orders from all chain merchandisers into a single Kingston order. The Kingston order is picked from the warehouse and moved to the loading area on designated delivery days. The freight is loaded onto a truck and hauled to a terminal for consolidation.

- ▶ Ontario manufacturers ship to Toronto terminal.
- ▶ Montreal manufacturers ship to Montreal terminal.

Trucks are unloaded at the forwarding terminal. Cases are sorted by store. Products for each store are collected at a designated loading door. When all the freight has been sorted, several delivery trailers are loaded in stop order. Drop shipments are made to Kingston stores.

- b) Consolidation of major manufacturers' freight at Toronto and Montreal; haul to Kingston pooled community depot; pooled delivery to all stores

Operation of this alternative is similar to the previous consolidation scheme involving the chains. Independent stores are now served. As a result, wholesalers also become involved.

There is an additional step in this consolidation scheme compared to the previous one. Freight moves in truck loads from the plant warehouse to terminals in Toronto and Montreal. There is no sorting done at the terminal. Freight is cross-docked into trailers and hauled to a Kingston pooled community depot. Here it is sorted by store. Several trucks are located in stop order. Deliveries are made to stores.

- 3. Haul from each major manufacturer to pooled community depot; pooled delivery to all stores

Chain stores continue to place orders through chain distribution centres. Independents continue to order through wholesalers. Orders are sorted into pooled and non-pooled items. Non-pooled items are supplied from the central distribution warehouses in Toronto in the current manner. Pooled items are sorted by manufacturer. A Kingston order is sent by each chain merchandiser and each wholesaler to each participating manufacturer.

Each participating manufacturer combines orders from all chain merchandisers and wholesalers into a single Kingston order. The order is assembled and loaded onto a truck. The truck is hauled to a Kingston pooled community depot on scheduled delivery days.

Trucks are unloaded at the depot. Freight is sorted by delivery route and marshalled at several loading doors. Freight is loaded onto trucks and delivered to Kingston stores.

- 4. Haul from each major manufacturer to Kingston pooled community warehouse; pooled delivery to all stores

The pooled community warehouse is Kingston's distribution centre for goods made by the major manufacturers. The warehouse orders in trailer load quantities from the major manufacturers.

Food moves in trailers from the major manufacturer's plant warehouse to the pooled community warehouse.

Retailers place their dry groceries orders through the Kingston warehouses. Orders are sorted into pooled items (carried in the warehouse) and non-pooled items. The non-pooled items are recorded on a new order, which is forwarded to the chain merchandiser or wholesaler who supplies the store's other needs.

The pooled items are assembled in the community warehouse on regularly scheduled delivery days. Several trucks handle deliveries.

### C. EVALUATION OF CURRENT SYSTEM

In the current system, it costs \$.95 to distribute a case of dry groceries to a Kingston retail store. Costs can be further described by source of manufacture and type of retail outlet:

<u>Source</u>	<u>Chains</u>	<u>Type of Retail Outlet</u>		<u>All Stores</u>
		<u>Independents</u>		
From Toronto	.74	1.14		.80
From S.W. Ontario	.87	1.27		.93
From Montreal	1.23	1.64		1.29
All sources	.89	1.30		.95

Cost per case distributed is lower to chain stores than to independents due to economies of scale. Average distribution cost per case to all stores is heavily weighted toward the chains, as they account for 85% of food sales.

Distribution costs are lowest for food manufactured in Toronto near to the distribution warehouses. Costs are much greater for food manufactured in Montreal, because it must travel to Toronto, and then to Kingston. Cost of distributing food manufactured in South-Western Ontario is a little more than for Toronto. This is mainly due to the additional transportation cost.

#### D. EVALUATION OF INDIVIDUAL ALTERNATIVES

##### 1. Pooled transport by major manufacturers

##### a) Pooled transport by major manufacturers to Kingston chain stores

The analysis showed that pooled transport by major manufacturers to chain stores costs \$.93 per case or about \$.04 per case more than the current system.

The table below compares this alternative with the current system by source of manufacture:

<u>Source</u>	<u>Current</u>	<u>Alternative</u>
From Toronto	.74	.80
From S.W. Ontario	.87	1.05
From Montreal	1.23	.95
All sources	.89	.93

The table shows that:

- It is more costly for Toronto and South-Western Ontario manufacturers.
- It is less costly for Montreal manufacturers. Savings on food manufactured in Montreal results mainly from reduced transport costs.

Savings of about \$.28 per case or \$67,000 could result from a pooling arrangement by Montreal manufacturers. Montreal manufacturers could pool freight by themselves. Current long distance transport costs are \$.80 per case for dry groceries moving from Montreal to Kingston via Toronto. Pooled transport would reduce these costs by \$.49 to \$.31 per case. The gain on transport is partially offset by higher handling costs at the plant warehouse, the pick up costs for the pooling arrangement, and increased administrative cost.

The handling costs rise from \$.03 to \$.10 per case at the plant warehouse. The manufacturer is now making up small orders for the distribution warehouses. Pick up costs add \$.05 per case to distribution costs. Administrative costs rise from \$.02 to \$.08 per case. Every store order now generates two orders at the distribution warehouse instead of the current one. The distribution warehouse identifies non-pooled products and supplies them from the warehouse. In addition,



the pooled product store orders are 150 cases, compared to current store order sizes of 250 cases. Administrative costs multiply and order sizes are smaller.

b) Pooled transport by major manufacturers to Kingston stores

The analysis of pooled transport by major manufacturers to Kingston stores showed a similar result to pooled transport to chain stores. Cost of pooled transport to all stores is \$1.04 per case compared to \$.95 for the current system.

The table below compares this alternative with the current system by source of manufacture:

<u>Source</u>	<u>Current</u>	<u>Alternative</u>
From Toronto	.80	.92
From S.W. Ontario	.93	1.15
From Montreal	1.29	1.06
All sources	.95	1.04

Savings achievable exclusively through pooling by Montreal manufacturers are \$.23 a case, or about \$64,000 annually in Kingston.

Savings arise through the reduction in long distance transport costs from current levels to \$.27 per case. Long distance transport costs to chain stores fall by \$.53 from \$.80 per case. Long distance transport costs for independents fall by \$.71 from a current level of \$.98 per case.

Savings are partially offset by the increased costs incurred by wholesalers to deliver non-pooled freight to independents. Costs increase from \$1.84 to \$2.10 per case. It was assumed that wholesaler load factors in mid-Eastern Ontario could decline by 20% with the loss of major manufacturers' Kingston freight.

Additional factors offsetting the cost savings are higher costs for handling at the plant warehouse, pick ups at the plant warehouse (previously unnecessary) and administration. These costs increase mainly due to the smaller lot sizes. Store orders average 50 cases compared to 135 cases in the current system.

2. Consolidation of shipments from major manufacturers at Toronto and Montreal

a) Consolidation of shipments from major manufacturers at Toronto and Montreal; drop shipment to Kingston chain stores

Our analysis showed that consolidation of shipments by major manufacturers for chain stores costs \$1.06 per case, compared to \$.90 in the current system.

The table below compares this alternative with the current system by source of manufacture:

<u>Source</u>	<u>Current</u>	<u>Alternative</u>
From Toronto	.74	.84
From S.W. Ontario	.87	1.02
From Montreal	1.23	.99
All sources	.89	.94

The table shows that:

- ▶ There is no advantage for Toronto or South-Western Ontario manufacturers in this alternative.
- ▶ Montreal manufacturers could potentially benefit by this alternative.

If Montreal's major manufacturers participated exclusively, savings on dry groceries manufactured in Montreal would be \$.14 a case, or about \$57,000 annually. Savings are derived from the reduction in transport costs from \$.80 to \$.31 per case, the same as in pooled transport.

There are partially offsetting cost increases:

- ▶ Handling at the plant warehouse increases from \$.03 to \$.10 per case.
- ▶ Transport to consolidation point costs \$.11 per case.
- ▶ Administration increases from \$.02 to \$.08 per case.

These cost increases are due mainly to small lot sizes, as explained with respect to previous alternatives. The average store order declines from 250 cases to 130 cases.

b) Consolidation of shipments from major manufacturers at Toronto and Montreal terminals; haul to Kingston depot; pooled delivery to stores

Freight consolidated in Toronto and Montreal is recombined in Kingston to minimize the number of deliveries being made to independents. The analysis shows that distribution by this system costs \$1.11 per case compared to \$.96 in the current system, a loss of \$.15 per case.

The table below compares this alternative with the current system by source of manufacture:

<u>Source</u>	<u>Current</u>	<u>Alternative</u>
From Toronto	.80	1.02
From S.W. Ontario	.93	1.17
From Montreal	1.29	1.17
All sources	.95	1.11

About \$.12 per case or \$34,000 annually could be saved through exclusive consolidation by Montreal manufacturers. Savings are due to a reduction in long distance transport costs to \$.27 per case as in pooled transport to all stores. Chain stores cost declines \$.53 from \$.80 per case, and independent store costs drop \$.71 from \$.98 per case.

Cost reductions are partially offset by:

- ▶ Increased cost of delivering non-pooled freight -- from \$1.84 to \$2.10 per case.
- ▶ Increased costs for handling at the plant warehouse -- from \$.03 to \$.10 per case.
- ▶ Pick up cost of \$.11 per case.
- ▶ Increased administration costs -- from current levels of \$.02 for the chains and \$.13 for the independents to \$.19 per case for all stores.

As previously discussed, increases are largely due to smaller load factors.

For this alternative, there are additional extra costs. Freight is pooled in Toronto and Montreal for long distance transport. Then it is re-pooled in Kingston for delivery. This is to save both Quebec and Ontario manufacturers from making separate expensive low

quantity deliveries to independents. However, it does result in extra handling costs of about \$.10 a case. This covers receive, sort and reload at the consolidation terminal.

3. Direct haul to Kingston depot; pooled delivery to stores

This alternative involves direct haul from the manufacturer's plant warehouse to a Kingston depot, coupled with pooled delivery to stores. The preliminary analysis showed that this option costs \$.98 per case, or about \$.03 per case more than the current system.

The table below compares this alternative with the current system by source of manufacture:

<u>Source</u>	<u>Current</u>	<u>Alternative</u>
From Toronto	.80	.87
From S.W. Ontario	.93	1.08
From Montreal	1.29	1.02
All sources	.95	.98

This system is largely a theoretical one. The present variety of items offered on retailers' shelves and the limited backroom storage space in the stores would inhibit application of this system. Certain items turn very quickly. Chain stores would require a case of these items almost every delivery. This is currently twice a week on average. The calculations below demonstrate the effect of reducing delivery frequency to once every three weeks.

There are about 5000 SKU's of dry groceries in a typical grocery store. Each chain store uses 20,700 cases per year of dry groceries from the majors who represent 20% of manufacturers. Assuming they supply 20% of the SKU's, this covers 1000 SKU's, or an average of 21 cases of each SKU per year. A classification of SKU's by volume sold would probably show:

- ▶ 80% of the volume is in 20% of the SKU's:
  - 80% of 20,700 cases is 16,560
  - 20% of SKU's is 200
  - No. of cases/SKU/year is 83
  - No. of cases/SKU/week is 1.5
  - No. of cases per trailer load delivery to community depot (15 to 16 deliveries per year) is 5.4

Therefore, chains are now receiving single cases of fast-moving items on each delivery from the distribution warehouse. Under the proposed system, a store would receive 5 to 6 cases per delivery. Therefore, on 80% of the volume, the store would receive five times their shelf-stocking requirements. As this alternative is unworkable, it will not be further discussed. Costs are not included in cost summaries.

#### 4. Pooled community warehouse

The pooled community warehouse would perform the same function as the chain or wholesale warehouse, but at the community level. The community warehouse would stock products made by major manufacturers. Products produced by minor manufacturers would be supplied by the chain or wholesaler distribution warehouses.

This option is the only one which offers overall savings. The analysis showed that this alternative costs \$.82 per case, or about \$.13 per case less than the current system. An annual savings of about \$180,000 would be available with this system.

The table below compares this alternative with the current system by source of manufacture:

<u>Source</u>	<u>Current</u>	<u>Alternative</u>
From Toronto	.80	.72
From S.W. Ontario	.93	.90
From Montreal	1.29	.87
All sources	.95	.82

The savings are all made on the Montreal manufactured food. Distribution costs for food manufactured in Toronto and South-Western Ontario are about the same for current and alternative systems.

Long distance transport costs are reduced to \$.24 per case on Montreal freight, a savings of \$.56 for the chains and \$.74 for the independents. Overall savings arise because transport savings are not cancelled by losses on Toronto and South-Western Ontario shipments.

In the other alternatives, transport savings were also achieved. However, local transport and special handling costs were incurred to secure these savings in the process of consolidation or pooling. In pooled community warehousing, each manufacturer ships trailer loads directly to the community warehouse. Freight is temporarily stored at the warehouse then delivered to stores. The current

system involves the same two distribution steps: manufacturer to distribution warehouse and distribution warehouse to store. Shipment sizes are therefore similar for pooled community warehousing and the current system. As a result, unit distribution costs are also similar.

## VII

### MEAT AND POULTRY: DESCRIPTION AND EVALUATION OF CURRENT AND ALTERNATIVE DISTRIBUTION SYSTEMS

In this chapter, we describe and evaluate the following opportunities for pooled distribution of meat and poultry:

- ▶ Pooled transport by major manufacturers; consolidation by minor manufacturers; pooled delivery from pooled community depot.
- ▶ Direct haul by major manufacturers; consolidation by minor manufacturers; pooled delivery from pooled community depot.
- ▶ Consolidation of all manufacturers' freight at Toronto terminal; drop delivery to stores.
- ▶ Consolidation by individual chains at Toronto chain distribution warehouse; drop delivery to chain stores/consolidation of all manufacturers' freight by independents at Toronto terminal; drop delivery to stores.

We have evaluated these alternatives and the current system. To carry out this evaluation, we developed cost estimates for each of the alternative systems. For each cost estimate, cost elements described in Chapter IV were examined. For each cost element, we developed specific cost functions. Our assumptions relating to these cost functions are presented in Appendix A. All costs were evaluated on a per case basis. Annual costs were derived from per case costs. Comparative costs and potential savings (losses) resulting from alternatives were calculated. Per case costs, annual costs and a comparative cost summary are presented in Exhibits VII-1 to VII-7.

#### A. DESCRIPTION OF CURRENT SYSTEM

The majority of meat and poultry is distributed "direct to store" rather than via a central distribution warehouse. Shipments are delivered by a common carrier or the manufacturer's trucks. The common carrier may handle the entire movement or it may be a secondary carrier who just handles the delivery. Chain stores and independents are served on the same delivery runs.

A few chains also distribute some meat and poultry products via central meat distribution warehouses in Toronto.

EXHIBIT VII-1. Meat and poultry : current distribution systems

	Toronto				South-Western Ontario			
	Via Carrier Toronto Terminal	Haul to Local Carrier	Via Chain Dist. Whse.	Direct Del. Via Own Trucks	Via Carrier Toronto Terminal	Haul to Local Carrier	Via Chain Dist. Whse.	Direct Del. Via Own Trucks
A. Plant Warehouse to Kingston								
1. At the Plant Warehouse	.333	.329	.117	.289	.333	.329	.117	.289
2. Pick-up	.178				.356			
3. Transport to Carrier Terminal					.528			
4. Temporary Storage or Consolidation								
a. Receive	.036				.036			
b. Store								
c. Sort and marshall	.156				.156			
d. Load	.039				.039			
5. Transport to Distribution Warehouse			.225				.528	
6. At the Distribution Warehouse								
a. Receive			.036				.036	
b. Store			.100				.100	
c. Sort and marshall			.156				.156	
d. Load			.039				.039	
7. Transport to Kingston	<u>1.485</u>	<u>1.485</u>	<u>1.485</u>	<u>1.485</u>	<u>1.485</u>	<u>2.385</u>	<u>1.485</u>	<u>2.385</u>
Sub-total	2.227	1.814	2.158	1.774	3.013	2.714	2.461	2.674
B. Break-Bulk, Storage and Delivery in Kingston								
1. Break-Bulk or Storage								
a. Receive		.039				.039		
b. Store								
c. Sort and marshall		.156				.156		
d. Load		.039				.039		
2. Delivery								
a. Truck and driver	.602	.577	.485	.602	.602	.577	.485	.602
b. Receive at store	<u>.189</u>	<u>.189</u>	<u>.158</u>	<u>.189</u>	<u>.189</u>	<u>.189</u>	<u>.158</u>	<u>.189</u>
Sub-total	.791	1.000	.643	.791	.791	1.000	.643	.791
C. Administration	<u>.980</u>	<u>1.078</u>	<u>.508</u>	<u>.625</u>	<u>.980</u>	<u>1.078</u>	<u>.508</u>	<u>.625</u>
Total	3.998	3.892	3.309	3.190	4.784	4.792	3.612	4.090



EXHIBIT VII-2. Meat and poultry: alternative distribution systems involving consolidations by major and minor manufacturers

	Toronto					South-Western Ontario				
	Pooled Transport by Major Mfgs. to Local Depot Pooled Del.	Direct Haul by Major Mfgs. to Local Depot Pooled Del.	Consol. by Minor Mfgs. For All Stores	Consol. by Toronto Forwarder of All Freight For All Stores		Pooled Transport by Major Mfgs. to Local Depot Pooled Del.	Direct Haul by Major Mfgs. to Local Depot Pooled Del.	Consol. by Minor Mfgs. For All Stores	Consol. by Toronto Forwarder of All Freight For All Stores	
				Major Mfgr.	Minor Mfgr.				Major Mfgr.	Minor Mfgr.
A. Plant Warehouse to Kingston										
1. At the Plant Warehouse	.334	.329	.451	.333	.451	.334	.329	.451	.333	.451
2. Pick-up	.166		1.042	.178	1.042	.332		2.084	.356	1.084
3. Transport to Carrier Terminal			.194					.722	.528	.528
4. Temporary Storage or Consolidation										
a. Receive	.033		.046	.035	.035	.033		.046	.035	.035
b. Store										
c. Sort and marshall	.075		.075	.156	.156	.075		.075	.156	.156
d. Load	.033		.036	.035	.035	.033		.036	.035	.035
5. Transport to Distribution Whse.										
6. At the Distribution Warehouse										
a. Receive										
b. Store										
c. Sort and marshall										
d. Load										
7. Transport to Kingston	.726	1.485	.950	.622	.622	1.166	2.385	.950	.622	.622
Sub-total	1.367	1.814	2.794	1.445	2.301	1.973	2.714	4.364	2.065	3.871
B. Break-Bulk, Storage and Delivery in Kingston										
1. Break-Bulk or Storage										
a. Receive	.039	.039	.036			.039	.039	.036		
b. Store										
c. Sort and marshall	.156	.156	.156	.156	.156	.156	.156	.156	.408	.408
d. Load	.036	.036	.036	.036	.036	.036	.036	.036	.098	.098
2. Delivery										
a. Truck and driver	.293	.293	.293	.408	.408	.293	.293	.293	.408	.408
b. Receive at store	.098	.098	.098	.098	.098	.098	.098	.098	.098	.098
Sub-total	.622	.622	.619	.506	.506	.622	.622	.619	.506	.506
C. Administration										
	1.078	1.078	1.176	1.176	1.176	1.078	1.078	1.176	1.176	1.176
Total	3.067	3.514	4.589	3.041	3.983	3.673	4.414	6.159	3.747	5.553

EXHIBIT VII-3. Meat and poultry: alternative distribution systems involving separate consolidations for chains and independents

	Toronto			South-Western Ontario		
	Consolidation by Each Chain Distribution Warehouse	Consolidation by Toronto Forwarder For Independent Stores		Consolidation by Each Chain Distribution Warehouse	Consolidation by Toronto Forwarder For Independent Stores	
		Major Mfgs.	Minor Mfgs.		Major Mfgs.	Minor Mfgs.
A. Plant Warehouse to Kingston						
1. At the Plant Warehouse	.117	.333	.451	.117	.333	.451
2. Pick-up		.178	1.042		.356	2.084
3. Transport to Carrier Terminal		.194	.194		.722	.722
4. Temporary Storage or Consolidation						
a. Receive		.046	.046		.046	.046
b. Store						
c. Sort and marshall		.156	.156		.156	.156
d. Load		.036	.036		.036	.036
5. Transport to Distribution Whse.	.225			.528		
6. At the Distribution Warehouse						
a. Receive	.036			.036		
b. Store	.100			.100		
c. Sort and marshall	.156			.156		
d. Load	.036			.036		
7. Transport to Kingston	<u>.825</u>	<u>1.193</u>	<u>1.193</u>	<u>.825</u>	<u>1.193</u>	<u>1.193</u>
Sub-total	1.495	2.136	3.118	1.798	2.842	4.688
B. Break-Bulk, Storage and Delivery in Kingston						
1. Break-Bulk or Storage						
a. Receive						
b. Store						
c. Sort and marshall						
d. Load						
2. Delivery						
a. Truck and driver	.242	.752	.752	.242	.752	.752
b. Receive at store	<u>.075</u>	<u>.165</u>	<u>.165</u>	<u>.075</u>	<u>.165</u>	<u>.165</u>
Sub-total	.317	.917	.917	.317	.917	.917
C. Administration						
	<u>.174</u>	<u>1.176</u>	<u>1.176</u>	<u>.174</u>	<u>1.176</u>	<u>1.176</u>
Total	1.986	4.229	5.211	2.289	4.935	6.781

EXHIBIT VII-4. Meat and poultry: current system - annual costs of distribution systems

Costs and Case Flows by Source of Manufacturer	Via Common Carrier With Toronto Terminal	Haul From Manufacturer to Local Depot	Consolidation at Chain Distribution Warehouse	Direct Delivery Via Manufacturer's Truck	Total
(Annual Costs and Case Flows in 000's)					
<u>Toronto mfgs.</u>					
Cost per case	3.998	3.892	3.309	3.190	3.62
Cases per year	53	31	11	58	153
Annual costs	212	121	36	185	564
<u>S.W. Ontario mfgs.</u>					
Cost per case	4.784	4.792	3.612	3.630	4.66
Cases per year	58	33	11	0	102
Annual costs	277	158	40		475
<u>All sources</u>					
Cost per case	4.89	2.79	76	185	1027
Cases per year	111	64	22	58	255
Annual costs	4.41	4.36	3.45	3.19	4.04

EXHIBIT VII-5. Meat and poultry: total annual costs of alternative distribution systems

Costs and Case Flows by Source of Manufacture	Systems Involving Consol. by Major & Minor Mfgrs.					Separate Consolidations for Chains & Independents		
	Consol. of Minor Mfgrs. Shipments By Toronto Forwarder	Pooled Transport by Major Mfgrs. to Pooled Comm. Dep.	Direct Haul by Major Mfgrs. to Pooled Community Depot	Consolidation at Toronto Terminal by Manufacturers		Consolidation of All Manufacturers' Shipments For Independents		Consolidation by Individual Chains
	All Stores	All Stores	All Stores	Minor Mfgrs.	Major/ Mfgrs.	Minors Independents	Majors Independents	Chains
				All Stores	All Stores			
(Annual Costs and Case Flows in 000's)								
<u>Toronto mfgrs.</u>								
Cost per case	4.589	3.067	3.514	3.983	3.041	5.211	4.229	1.986
Cases per year	31	122	122	31	122	5	18	130
Annual costs	142	374	429	123	371	26	76	258
<u>S.W. Ontario mfgrs.</u>								
Cost per case	6.159	3.673	4.414	5.553	3.747	6.781	4.935	2.289
Cases per year	20	82	82	20	82	3	12	87
Annual costs	129	301	362	111	307	20	59	199
<u>System totals</u>								
Annual costs	271	675	791	233	678	46	135	457
Cases per year	51	204	204	51	204	8	30	217
Cost per case	5.31	3.31	3.88	4.57	3.32	5.75	4.50	2.11

EXHIBIT VII-6. Meat and poultry: total annual costs of combined alternative distribution systems

Source - Subsystem	Combined Systems For All Stores						Separate Consol. for Chains & Indep.		
	Pooled Transport by Major Mfgs./ Consolidation by Minor Mfgs.		Direct Haul by Major Mfgs./ Consolidation by Minor Mfgs.		Combined Consolidation by Major and Minor Manufacturers in Toronto		Consolidation by Individual Chains/ Consolidation by Independents		
	Cases (000)	Costs (\$000)	Cases (000)	Costs (\$000)	Cases (000)	Costs (\$000)	Cases (000)	Costs (\$000)	
<u>Toronto</u>							<u>Toronto</u>		
Majors	122	374	122	429	122	371	Chains	130	258
Minors	31	142	31	142	31	123	Indep. - Majors	18	76
							- Minors	5	26
Total	153	516	153	571	153	494	Total	153	360
<u>S.W. Ontario</u>							<u>S.W. Ontario</u>		
Majors	82	301	82	362	82	307	Chains	87	199
Minors	20	129	20	129	20	111	Indep. - Majors	12	59
							- Minors	3	20
Total	102	430	102	491	102	418	Total	102	278
<u>All sources</u>							<u>All sources</u>		
Majors	204	675	204	791	204	678	Chains	217	457
Minors	51	271	51	271	51	234	Indep. - Majors	30	135
							- Minors	3	20
Total	255	946	255	1062	255	912	Total	255	638

EXHIBIT VII-7. Meat and poultry: comparative costs of current system and combined alternative systems

Source of Manufacture/ Item	Current System  All Stores	Alternatives			
		Pooled Transport by Major Mfgs./Consol. by Minor Mfgs.	Direct Haul by Major Mfgs./Consol. by Minor Mfgs.	Combined Consol. by Major and Minor Mfgs. in Toronto	Consol. by Each Chain Dist. Whse. / Consol. by All Indep.
		All Stores	All Stores	All Stores	All Stores
(Annual Costs and Case Flows in 000's)					
Toronto					
Costs	55	516	571	494	360
Cases	15	153	153	153	153
Cost per case	3.62	3.37	3.73	3.23	2.35
S.W. Ontario					
Costs	475	430	491	418	278
Cases	102	102	102	102	102
Cost per case	4.65	4.22	4.81	4.10	2.73
Total					
Costs	1029	946	1062	912	638
Cases	255	255	255	255	255
Cost per case	4.04	3.71	4.16	3.58	2.50
Current system costs		1029	1029	1029	1029
Savings (loss) with pooling		83	(33)	117	389
Savings (loss) per case		.33	(.12)	.46	1.54

With the exception of the products handled by the chain distribution warehouses, individual store orders for meat and poultry are filled at the manufacturing plant warehouse. Orders are placed several times per week. The order may be placed by the store directly with the manufacturer. Alternatively, some chain store orders may be phoned in by the stores to the chain's central buying office. The buyer then selects which suppliers will fill the order. The independents generally deal strictly with the manufacturer.

1. Consolidation at carrier's Toronto terminal; drop shipment to Kingston stores

Freight is picked up from several manufacturers, and hauled to a Toronto terminal. Kingston freight is sorted to a Kingston or Eastern Ontario loading door. Store orders are loaded in stop order on a truck.

Drop shipments are made to several stores.

2. Direct haul to local carrier terminal; local carrier delivers to Kingston stores

Freight for Kingston is hauled directly from the manufacturer to a local carrier terminal by a common carrier or the manufacturer's own transport. Kingston freight is sorted into a number of local delivery routes, each located at a loading door. Store orders for each delivery route are loaded in stop order on a truck.

Deliveries are made to Kingston stores.

3. Direct delivery via own trucks

The manufacturer sorts orders for Eastern Ontario to a loading door. Several loading doors may be required if the manufacturer is big enough. Store orders are loaded in stop order onto the manufacturer's delivery truck.

Drop shipments are made to Kingston and other parts of Eastern Ontario.

Only two manufacturers were found to operate delivery routes to Eastern Ontario stores from their plant warehouses. Both were among the largest ten processors, and located in Toronto.

4. Consolidation by individual chains at Toronto meat distribution warehouses; drop shipment to Kingston chain stores

Store orders for meat and poultry products stocked by the central chain warehouse are placed with the warehouse. Several store orders are loaded on a trailer at the distribution warehouse. The trailer is hauled to the Kingston area where drops are made to stores in and around Kingston.

## B. DESCRIPTION OF DISTRIBUTION ALTERNATIVES

### 1. Pooled transport by major manufacturers; consolidation by minor manufacturers; pooled delivery from pooled community depot

#### a) Pooled transport by major manufacturers to pooled community depot; pooled delivery with minor manufacturers' freight

Retailers place orders three times per week, as in the current system. Retailers' orders are filled directly by major manufacturers as in the current system. The manufacturers form into groups of four.

A driver starts out from the first manufacturer, picks up from two others and drops the trailer at the last manufacturer's dock. Here he picks up an empty trailer and returns to his starting point.

A crude sort occurs on the fourth manufacturer's dock. Freight is sorted three ways by destination. The freight is reloaded, with Kingston in the nose of the trailer. Another driver hauls the trailer to Kingston, making drops at two other depots en route.

At the depot, the trailers from the various pooling groups are unloaded. Twice a week, trailer loads of minor manufacturers' freight also arrive at the depot. The freight is unloaded from the vehicles and sorted to delivery routes. Trucks are loaded in delivery stop order. Deliveries are made to stores.

#### b) Consolidation of minor manufacturers' freight at Toronto terminal; haul to pooled community depot; pooled delivery with major manufacturers' freight

If the major manufacturers cooperated to pool freight, the minor manufacturers' distribution costs would be very high if they continued to employ current distribution systems. To avoid these high costs, they could consolidate their freight at a Toronto terminal.

At the terminal, freight would be loaded in a trailer, and hauled to the pooled community depot in Kingston. Here, it would be unloaded and pooled with the major manufacturers' freight, for store deliveries.

### 2. Direct haul by major manufacturers; consolidation by minor manufacturers; pooled delivery from pooled community depot

Retailers place orders three times per week, as in the current system. Retailers' orders continue to be filled directly by the manufacturers. Kingston orders are loaded in the nose of trailers on specified



delivery days. Orders for three other communities are also loaded on the rear of the trailer. Each manufacturer ships directly to Eastern Ontario. Drop-offs are made to three local depots or local carriers, en route.

A number of trailers arrive at the Kingston depot each specified delivery day. Twice a week, trailer loads of minor manufacturers' freight also arrive at the depot. The freight is unloaded from the vehicles, and sorted to delivery routes. Trucks are loaded in stop order. Deliveries are made to stores.

- a) Direct haul by major manufacturers to pooled community depot; pooled delivery with minor manufacturers' freight

This alternative operates almost the same as one of the current systems, "Direct haul to local carrier - Delivery by local carrier." Transport loads are also 200 cases, and delivery frequency of three times per week is maintained.

The difference is that all major manufacturers use this system, and they all ship to a single Kingston depot. Pooling of deliveries from major and minor manufacturers raises the average store delivery to 19.3 cases as in "pooled transport", the previous alternative. Delivery costs are the same as for pooled transport: 20 delivery stops, 390 cases per delivery load.

- b) Consolidation of minor manufacturers' freight at Toronto terminal; haul to pooled community depot; pooled delivery with major manufacturers' freight

The operation of this complimentary sub-system is the same as in the previous alternative: "Pooled transport by major manufacturers; consolidation by minor manufacturers."

Freight is picked up from the minor manufacturers, and transported to a consolidation terminal. At the terminal, freight is loaded in a trailer, and hauled to the pooled community depot in Kingston. Here it is unloaded and pooled with the major manufacturers' freight for store deliveries.

- 3. Consolidation of all manufacturers' freight at Toronto terminal; drop delivery to stores

Retailers continue to order directly from the manufacturers, three times per week, as in the current system. Kingston orders are picked up with other freight, and hauled to a consolidation terminal. At the consolidation terminal, freight is sorted into delivery routes. Kingston freight is loaded in delivery stop order on small trailers. Trailers are hauled in tandem to Kingston. One trailer is delivered by a local carrier. The transport driver delivers the other one.

4. Separate consolidation and delivery for chains and independents

a) Consolidation by individual chains at chain distribution warehouses; drop delivery to stores

Some chains are currently consolidating selected meat and poultry products at their warehouse, and handling their own distribution. In this alternative, we propose that all meat and poultry shipments to chain stores be handled in this manner.

This is not strictly a pooling alternative. There is no voluntary pooling of shipments required in this scheme. The system would be initiated simply by changing the industry buying and selling arrangements. Orders placed by each chain with each manufacturer are for trailer load quantities. Shipments are routed from the manufacturer to the chain distribution warehouse instead of to individual stores.

Food moves in trailer load quantities from the manufacturer's plant warehouse to the chain distribution warehouses.

Store orders are placed with the warehouse. Several store orders are loaded on a trailer at the distribution warehouse. The trailer is hauled to the Kingston area where drops are made to stores in and around Kingston.

b) Independent stores consolidate shipments from all manufacturers at Toronto terminal; haul to Kingston; drop delivery to stores

If all the freight for chain stores was moving through chain distribution warehouses, the cost of serving the independent stores could rise substantially. To avoid high costs, the independents could consolidate their freight at a Toronto terminal.

Since the independents only represent 15% of the freight, delivery frequency would be reduced to two times per week. On delivery days, freight would be picked up from manufacturers and hauled to the consolidation terminal. Here it would be divided into delivery routes. Kingston freight is loaded in delivery stop order on two small trailers. Trailers are hauled in tandem to Kingston. One trailer is delivered by a local carrier. The transport driver delivers the other one.

C. EVALUATION OF CURRENT SYSTEMS

The average cost of distributing a case of meat and poultry to Kingston is \$4.04 with the current systems. Costs can be further described by source of manufacture and system of distribution (Exhibit VII-8).

EXHIBIT VII-8. Distribution cost per case for current systems

Source of Manufacture	Common Carrier	Haul to Local Carrier; Local Carrier Delivers	Via Chain Dist. Whse.	Direct Delivery Via Own Truck	All Systems
Toronto	4.00	3.89	3.31	3.19	3.63
S.W. Ont.	4.78	4.79	3.61	-	4.66
All sources	4.41	4.36	3.45	3.19	4.04

The table shows that it costs approximately \$.70 per case more to distribute from South-Western Ontario than from Toronto. This difference ranges from as low as \$.30 per case for distribution by the chains, to as high as \$.90 per case for "Haul to local carrier; local carrier delivers." The overall average difference between Toronto and South-Western Ontario comes out to about \$1.00 per case. This large difference is artificially created because the lowest cost system -- "Direct delivery via own trucks" -- only takes place from Toronto.

The higher distribution costs for South-Western Ontario freight are due to the extra distance and higher pick-up costs. The higher pick-up costs result from the greater dispersion of manufacturing plants, compared to in the Toronto area.

1. Common carrier distribution

The total cost of distribution by common carrier is \$4.41 per case. This is approximately the same as "Haul to local carrier; local carrier delivers." Common carrier distribution costs are substantially more than "Consolidation by chain warehouse", or "Direct delivery via own trucks."

"Direct delivery by own trucks" is less costly than common carrier distribution because administrative costs and handling costs are lower. However, most manufacturers are not large enough to perform their own distribution to Kingston. There are only a few large manufacturers who can achieve adequate load factors in transport and delivery to make this system economical. It would cost most manufacturers more to perform their own deliveries than to use common carrier.

Common carrier distribution is more costly than distribution by individual chains by about \$1.00 per case. This difference can be approximately divided among four factors:

- ▶ \$.50 due to administration.
- ▶ \$.15 due to pick-up in South-Western Ontario.
- ▶ \$.15 due to local delivery.
- ▶ \$.20 due to handling costs at the plant warehouse.

The administrative costs are high for distribution by common carrier. This is true for almost any system involving direct distribution from the manufacturer. Order sizes are very small and consequently order costs per case are very high.

Freight shipped via common carrier moves in less-than-truckload quantities. Pick-up costs from the manufacturer's plant are about \$.36 per case in South-Western Ontario. The impact of this difference is about \$.15 on every case distributed. Shipments from manufacturers to chain distribution warehouses move in trailer loads. This eliminates the need for a pick-up by a local pick-up and delivery (p. & d.) driver.

Local delivery costs are higher for common carriers than chains because average delivery sizes are smaller. This is due to two reasons:

- ▶ Some stores served by common carrier are very small.
- ▶ Some deliveries include only one manufacturer's goods. The chains may have the entire meat order for the day, or the entire poultry order. This depends on which segment of meat and poultry a chain has decided to handle itself.

Handling costs at the plant warehouse are higher because order sizes are a lot smaller with direct distribution. Small orders result in high order picking costs per case. Costs of picking a small order are almost the same as picking a large order.

## 2. Direct haul from manufacturer to local carrier; carrier delivers

Direct haul from manufacturer to local carrier costs \$4.36 per case of meat and poultry distributed. This is similar to the cost for common carrier distribution. Cost factors are also similar between the two systems.

The main difference between common carrier distribution and direct haul to local carrier is where the costs are incurred. Handling costs occur at the carrier's Toronto terminal when a carrier does the distribution. If freight is hauled directly to a local carrier, the handling costs are incurred in the community.

Direct haul to the local carrier is slightly less costly than common carrier distribution from Toronto because there is no pick-up involved from the manufacturer. This is partially offset by higher transport costs for freight originating from South-Western Ontario. Freight from South-Western Ontario travels in truck load quantities through to Kingston with this option. A common carrier achieves trailer load quantities as far as Toronto.

The costs of "Direct haul to local carrier; local carrier delivers" are about \$1.00 per case higher than "Delivery by own trucks" and "Consolidation by chains." The cost factors accounting for the difference compared to chain consolidation are:

- ▶ Higher administrative costs.
- ▶ Higher local delivery costs.

These factors were previously discussed with respect to common carrier distribution. As also previously stated, delivery by own trucks is only a viable alternative for a few manufacturers.

3. Consolidation by individual chains at central distribution warehouses in Toronto; delivery drops to stores

Consolidation of meat and poultry by individual chains at Toronto distribution warehouses, and delivery to Kingston stores costs \$3.45 per case. This is the lowest cost system of the three which serve both Toronto and South-Western Ontario manufacturers. This is due to lower cost administration, local delivery, and handling at the plant warehouse. In addition there are no pick-up costs. These factors were previously discussed with respect to common carrier distribution.

Consolidation by the chains has the lowest distribution cost differential between Toronto and South-Western Ontario shipments. This is because there are no local pick-up costs because freight is shipped in trailer loads. Pick-up costs can be expensive in South-Western Ontario due to the dispersion of manufacturing plant locations.

4. Direct delivery via manufacturer's own truck

Direct delivery of meat and poultry by the manufacturer costs \$3.19 per case from Toronto. This is the lowest cost distribution system for Toronto shipments, costing a little less than consolidation at the chain distribution warehouse. As previously discussed, the administrative and handling costs are lower than "Common carrier distribution" and "Direct haul to local carrier." This results in a lower distribution cost per case than these two systems.

This system has the lowest handling costs of any system. The freight is handled once at the plant warehouse, and once at the retail store. There is no handling in between. Consolidation by the chains has somewhat lower administrative costs. The lower handling costs in "private truck distribution" is cancelled out by the lower administrative cost in "chain consolidation", so the system costs are about the same.

Only a few manufacturers are large enough to load a truck with deliveries for Kingston and vicinity. Delivering from their own trucks is not an alternative for most manufacturers. However, the costs shown in this system approximate the costs that a large manufacturer could be incurring. Therefore, any alternative system would have to at least maintain distribution costs at this level to enable the large manufacturers to participate.

#### D. COMPARATIVE EVALUATION OF INDIVIDUAL ALTERNATIVES WITH CURRENT SYSTEM

##### 1. Pooled transport by major manufacturers to pooled community depot; pooled delivery with minor manufacturers' freight

In this alternative, "Pooled transport by major manufacturers" is combined with "Consolidation by minor manufacturers." The cost per case of meat and poultry distributed is \$3.71 which results in a savings of \$.33 per case over the current system, or \$83,000 annually in Kingston. The comparative costs per case are presented in Exhibit VII-9.

EXHIBIT VII-9. Comparative distribution costs per case for pooled transport/pooled delivery vs. current system

Source of Manu- facture				Pooled Transport by Majors/ Consolidation by Minors		Total System
	Current System			Pooled Transport By Major Mfgs.	Consolidation By Minor Mfgs.	
	Range					
	Low	High	Average			
Toronto	3.19	4.00	3.62	3.07	4.59	3.37
S.W. Ont.	3.61	4.79	4.66	3.67	6.16	4.22
Combined sources	3.45	4.41	4.04	3.31	5.31	3.71

The table shows that:

- ▶ The savings accruing from the alternative system result from "Pooled transport by major manufacturers."
- ▶ "Pooled transport by major manufacturers", by itself, costs slightly less than the lowest cost current system which is "Consolidation by individual chains." It is significantly lower cost than the highest cost current system.
- ▶ Consolidation by minor manufacturers is significantly more expensive than any of the current systems. It raises the overall average distribution cost from \$3.31 to \$3.71 per case for this alternative.

The savings accruing from "Pooled transport by the majors" combined with "Consolidation by the minors", result from the major manufacturers' pooling transport. These savings from pooled transport can be mainly attributed to two factors:

- ▶ Higher load factors on the transport runs. Freight is hauled in trailer loads instead of truck loads.
- ▶ Larger store orders. The average delivery is 19.3 cases compared to 8 cases in the current system.

Trailer load quantities result from the manufacturers pooling shipments for Kingston and other points in Eastern Ontario. To make up a trailer load, each of the four manufacturers in a pooling group also ships freight for two other areas of similar size to Kingston. Drop-offs are also made to depots (or carriers) in these areas. Currently, these same manufacturers might be shipping on different days to Kingston. They might be using different carriers. A single manufacturer may also be using more than one carrier for the section of Eastern Ontario around Kingston. This currently restricts transport volumes to truck load quantities.

The larger store orders means the average store is receiving one shipment in place of two or three shipments in the current system. The combined freight from the major manufacturers doubles store delivery volumes from 8 to 15 cases. When the minor manufacturers' freight is added, store delivery size increases to 19.3 cases.

The cost per case of distributing the minor manufacturers' freight is \$5.31 per case or \$2.00 per case higher than the cost of distributing the major manufacturers' freight. The contributing factors are:

- ▶ Higher cost for pick-up and handling at plant warehouse. This is due to the smaller volumes being assembled and picked up.

- ▶ Cost of delivering freight to consolidation point.
- ▶ Responsibility for freight changes hands an extra time at the consolidation point.

2. Direct haul by major manufacturers to pooled community depot; pooled delivery with minor manufacturers' freight

This alternative involves pooled delivery of all freight from the community depot, as in the previous alternative. The major manufacturers' freight is hauled directly from each plant. The minor manufacturers plant is (again) consolidated in Toronto, then shipped to Kingston. The cost per case of meat and poultry distributed is \$4.16, which is \$.12 per case costlier than the current system. The comparative costs per case are presented in Exhibit VII-10.

EXHIBIT VII-10. Comparative distribution cost per case for direct haul/pooled delivery vs. current system

Source of Manu- facture	Current Systems			Direct Haul to Community Depot		
	Range			Direct Haul By Major Mfgs.	Consolidation By Minor Mfgs.	Total System
	Low	High	Average			
Toronto	3.19	4.00	3.62	3.51	4.59	3.73
S.W. Ont.	3.61	4.79	4.66	4.41	6.16	4.81
Combined sources	3.45	4.41	4.04	3.88	5.31	4.16

The table shows that:

- ▶ By itself, "Direct haul by the major manufacturers; pooled delivery" yields a cost per case slightly lower than the current system average -- \$3.88 vs. \$4.04.
- ▶ With the consolidated freight from the minor manufacturers, this alternative becomes uneconomical.

Savings are insufficient from "Direct haul by major manufacturers; pooled delivery" to produce an overall saving for the combined system. This alternative is similar to the current system: "Direct haul to local carrier; local carrier delivers." The only difference is that delivery costs



are about \$.40 per case less due to pooling. Administrative costs remain at the same relatively high level. Transport loads are truck loads, not trailer loads.

The reasons for the high cost of distributing minor manufacturers' freight were discussed with respect to the previous alternative.

3. Consolidation of all manufacturers' freight at Toronto terminal; drop delivery to stores

"Consolidation of all manufacturers' freight at a Toronto terminal; drop delivery" is the second lowest cost alternative. The cost per case of meat and poultry distributed is \$3.58 which represents a saving of \$.46 per case over the current system, or \$147,000 annually in Kingston. The comparative costs per case are presented in Exhibit VII-11.

EXHIBIT VII-11. Comparative distribution cost per case for consolidation by manufacturers vs. current system

Source of Manu- facture	Current System			Consolidation at Toronto Terminal; Drop Delivery		
	Low	High	Average	Major Mfgs.	Minor Mfgs.	Total System
Toronto	3.19	4.00	3.63	3.04	3.98	3.23
S.W. Ont.	3.51	4.79	4.64	3.75	5.55	4.10
Combined sources	3.35	4.41	4.04	3.32	4.57	3.58

The table shows that:

- ▶ This alternative offers savings of \$.83 per case over the highest cost current system. However, it is still \$.23 per case more costly than the lowest cost current system.
- ▶ Consolidation by the major manufacturers alone costs about the same as the lowest cost current system.

Savings of up to \$.83 per case are available with this alternative over common carrier haul. Savings are created by higher load factors on transport runs (about \$.80 per case) and larger store delivery orders (about \$.30 per case). Transport is in trailer loads instead of truck loads. All manufacturers' goods are combined in each store delivery.

Cost savings on transport and delivery are offset by an increase of about \$.20 per case in administrative costs over common carrier administrative costs. This increase is due to additional administrative charges for consolidation and for local delivery. The local delivery charge arises because the loaded trailers are turned over to a local agent for delivery.

Consolidation by all manufacturers is more costly than consolidation by individual chains, or direct delivery via own trucks. This is due to two major reasons:

- ▶ Higher costs experienced by the minor manufacturers pulls the cost up.
- ▶ Higher administrative costs offsets improved load factors when the manufacturers do the consolidation.

At \$3.58 per case, "Consolidation by all manufacturers" is \$.13 per case less costly than the \$3.71 per case cost for "Pooled transport by major manufacturers/consolidation by minor manufacturers." This is because, in the present option, minor manufacturers' freight is combined with the major manufacturers' freight at the time of pick-up. When combined with the pooled transport option, the minor manufacturers' freight was not combined with the major manufacturers' freight until delivery. Higher costs were incurred to handle the minor manufacturers' freight separately, up to that point.

#### 4. Separate consolidations by chains and independents

The basis of this alternative is that each individual chain consolidates all meat and poultry shipments at a central distribution warehouse in Toronto. From Toronto, they make drop delivery shipments to Kingston stores. The independents consolidate all their shipments at a Toronto freight terminal. From here they transport it in trailers to Kingston. Trailers are delivered by local drivers. This is the lowest cost alternative. At a cost of \$2.50 per case, it is \$1.54 per case less costly than the current system, for a saving of \$389,000 annually in Kingston. The comparative costs per case are presented in Exhibit VII-12.

The table shows that:

- ▶ Consolidation of all meat and poultry by an individual chain is \$1.34 per case less costly than the partial consolidation currently being performed by some chains.
- ▶ The major savings are from the chains. The cost of serving the independents pulls the overall system cost up.

EXHIBIT VII-12. Comparative distribution costs per case for separate consolidations by chains and independents vs. current system

Source of Manu- facture	Current Systems		Separate Consolidations By Chains & Independents		
	Consolidation By Chains	Average	Chains	Independents	Total System
Toronto	3.31	3.62	1.99	4.43	2.35
S.W. Ont.	3.61	4.66	2.29	5.27	2.73
Combined sources	3.45	4.04	2.11	4.76	2.50

Consolidation of all meat and poultry by each chain is less costly than partial consolidation in the current system for several reasons:

- ▶ Transport costs are \$.66 per case less, dropping from \$1.49 to \$.83 per case.
- ▶ Delivery costs are \$.32 per case lower, dropping from \$.64 to \$.32 per case.
- ▶ Administrative costs are \$.34 per case lower, dropping from \$.51 to \$.17 per case.

Transport and delivery costs are lower because store order volumes triple, from 10 to 30 cases per order. This means delivery volumes automatically triple. The delivery driver only has to make 12 stops to deliver a full truck load. These 12 stops can be completed within a single driver's shift. Therefore, the transport cost is calculated based on a full truck load.

Administrative costs per case drop to one-third of the former level in inverse proportion to the tripling of delivery order size. Costs are the same, but they are spread over three times the number of cases.

Costs of serving the independents are high because a completely separate distribution system must be set up for 15% of the freight. Delivery costs are \$.92 per case because only 365 cases are being delivered by two tractor trailers. Two delivery vehicles are necessary to deliver to the 39 independent stores before the end of the day. Two trailers can be hauled in tandem on a single transport trip.

If two trucks were used instead, two separate transport trips would be required. If two trucks were used, the Toronto-Kingston trip costs would be \$1.62 per case, making the overall cost per case even higher. Local delivery costs would be lower as trucks are less expensive to operate. Overall distribution cost would be somewhat higher.

## VIII

### BUTTER, CHEESE AND MARGARINE: DESCRIPTION AND EVALUATION OF CURRENT SYSTEM AND POOLING ALTERNATIVES

In this chapter, we describe and evaluate the following opportunities for pooled distribution of butter, cheese and margarine (also referred to as selected dairy products):

- ▶ Pooled transport by major manufacturers to pooled community depot; pooled delivery to chain stores.
- ▶ Pooled transport by major manufacturers to pooled community depot; pooled delivery to all stores.
- ▶ Direct haul by major manufacturers to pooled community depot; pooled delivery to all stores.

We have evaluated these alternatives and the current system. To carry out this evaluation, we developed cost estimates for each of the alternative systems. For each cost estimate, cost elements described in Chapter IV were examined. For each cost element, we developed specific cost functions. Our assumptions relating to these cost functions are presented in Appendix A. All costs were evaluated on a per case basis. Annual costs were derived from per case costs. Comparative costs and potential savings (losses) resulting from alternatives were calculated. Per case costs, annual costs, and a comparative cost summary are presented in Exhibits VIII-1 to VIII-6.

#### A. DESCRIPTION OF CURRENT SYSTEM

In the current system, butter, cheese and margarine are distributed to Kingston via central refrigerated distribution warehouses in Toronto. The system operates similarly to, but parallel to, the system for dry groceries. Chains are supplied from chain distribution warehouses, and independents are supplied from wholesaler distribution warehouses.

Butter, cheese and margarine move in trailer load quantities from the manufacturer's plant warehouse to the central distribution warehouses.

Butter, cheese and margarine are typically distributed with produce. Most produce is marketed through the Ontario Food Terminal in Toronto. From here it moves in trailer load quantities to the central refrigerated distribution warehouse.

EXHIBIT VIII-1. Selected dairy products (butter, cheese and margarine): Current system via Toronto distribution warehouses

	Toronto		S.W. Ontario		E. Ontario		Montreal	
	Chains	Indep.	Chains	Indep.	Chains	Indep.	Chains	Indep.
<b>A. Plant Warehouse to Kingston</b>								
1. At the Plant Warehouse	.038	.038	.038	.038	.038	.038	.038	.038
2. Pick-up								
3. Transport to Carrier Terminal								
4. Temporary Storage or Consolidation								
a. Receive								
b. Store								
c. Sort and marshall								
d. Load								
5. Transport to Distribution Whse.	.062	.062	.110	.110	.138	.138	.374	.374
6. At the Distribution Warehouse								
a. Receive	.027	.027	.027	.027	.027	.027	.027	.027
b. Store	.100	.100	.100	.100	.100	.100	.100	.100
c. Sort and marshall	.122	.140	.122	.140	.122	.140	.122	.140
d. Load	.034	.035	.034	.035	.034	.035	.034	.035
7. Transport to Kingston	.371	.861	.371	.861	.371	.861	.371	.861
Sub-total	.754	1.263	.802	1.311	.830	1.339	1.066	1.575
<b>B. Break-Bulk, Storage and Delivery in Kingston</b>								
1. Break-Bulk or Storage								
a. Receive								
b. Store								
c. Sort and marshall								
d. Load								
2. Delivery								
a. Truck and driver	.120	.348	.120	.348	.120	.348	.120	.348
b. Receive at store	.049	.087	.049	.087	.049	.087	.049	.087
Sub-total	.169	.435	.169	.435	.169	.435	.169	.435
<b>C. Administration</b>								
	.065	.219	.065	.219	.065	.219	.065	.219
Total	.988	1.917	1.036	1.965	1.064	1.993	1.300	2.229

EXHIBIT VIII-2. Selected dairy products (butter, cheese and margarine): Alternative - pooled transport by major manufacturers to Kingston stores

	<u>Toronto</u> <u>Pooled</u>	<u>S.W. Ontario</u> <u>Pooled</u>	<u>E. Ontario</u> <u>Pooled</u>	<u>Montreal</u> <u>Pooled</u>
A. Plant Warehouse to Kingston				
1. At the Plant Warehouse	.151	.151	.151	.151
2. Pick-up	.221	.442	.442	.221
3. Transport to Carrier Terminal				
4. Temporary Storage or Consolidation				
a. Receive				
b. Store				
c. Sort and marshall				
d. Load				
5. Transport to Distribution Whse.				
6. At the Distribution Warehouse				
a. Receive				
b. Store				
c. Sort and marshall				
d. Load				
7. Transport to Kingston	<u>1.080</u>	<u>1.735</u>	<u>.556</u>	<u>1.145</u>
Sub-total	1.452	2.328	1.149	1.517
B. Break-Bulk, Storage and Delivery in Kingston				
1. Break-Bulk or Storage				
a. Receive	.016	.016	.016	.016
b. Store				
c. Sort and marshall	.156	.156	.156	.156
d. Load	.038	.038	.038	.038
2. Delivery				
a. Truck and driver	.478	.478	.478	.478
b. Receive at store	<u>.189</u>	<u>.189</u>	<u>.189</u>	<u>.189</u>
Sub-total	.877	.877	.877	.877
C. Administration	<u>.271</u>	<u>.271</u>	<u>.271</u>	<u>.271</u>
Total	2.600	3.476	2.297	2.665

EXHIBIT VIII-3. Selected dairy products (butter, cheese and margarine): Alternative - direct haul to Kingston depot; pooled delivery to stores

	<u>Toronto</u> <u>Pooled</u>	<u>S.W. Ontario</u> <u>Pooled</u>	<u>E. Ontario</u> <u>Pooled</u>	<u>Montreal</u> <u>Pooled</u>
<b>A. Plant Warehouse to Kingston</b>				
1. At the Plant Warehouse	.151	.151	.151	.151
2. Pick-up				
3. Transport to Carrier Terminal				
4. Temporary Storage or Consolidation				
a. Receive				
b. Store				
c. Sort and marshall				
d. Load				
5. Transport to Distribution Whse.				
6. At the Distribution Warehouse				
a. Receive				
b. Store				
c. Sort and marshall				
d. Load				
7. Transport to Kingston	<u>5.400</u>	<u>8.672</u>	<u>2.782</u>	<u>5.727</u>
Sub-total	5.551	8.823	2.933	5.878
<b>B. Break-Bulk, Storage and Delivery in Kingston</b>				
1. Break-Bulk or Storage				
a. Receive	.035	.035	.035	.035
b. Store				
c. Sort and marshall	.156	.156	.156	.156
d. Load	.038	.038	.038	.038
2. Delivery				
a. Truck and driver	.478	.478	.478	.478
b. Receive at store	<u>.189</u>	<u>.189</u>	<u>.189</u>	<u>.189</u>
Sub-total	.896	.896	.896	.896
<b>C. Administration</b>	<u>.271</u>	<u>.271</u>	<u>.271</u>	<u>.271</u>
<b>Total</b>	6.718	9.839	4.100	7.045

EXHIBIT VIII-4. Selected dairy products (butter, cheese and margarine): Alternative - pooled transport by major manufacturers to Kingston chain stores

	<u>Toronto</u> <u>Pooled</u>	<u>S.W. Ontario</u> <u>Pooled</u>	<u>E. Ontario</u> <u>Pooled</u>	<u>Montreal</u> <u>Pooled</u>
A. Plant Warehouse to Kingston				
1. At the Plant Warehouse	.158	.158	.158	.158
2. Pick-up	.266	.532	.532	.266
3. Transport to Carrier Terminal				
4. Temporary Storage or Consolidation				
a. Receive				
b. Store				
c. Sort and marshall				
d. Load				
5. Transport to Distribution Whse.				
6. At the Distribution Warehouse				
a. Receive				
b. Store				
c. Sort and marshall				
d. Load				
7. Transport to Kingston	<u>1.320</u>	<u>2.120</u>	<u>.680</u>	<u>1.400</u>
Sub-total	1.744	2.810	1.370	1.824
B. Break-Bulk, Storage and Delivery in Kingston				
1. Break-Bulk or Storage				
a. Receive	.020	.020	.020	.020
b. Store				
c. Sort and marshall	.156	.156	.156	.156
d. Load	.034	.034	.034	.034
2. Delivery				
a. Truck and driver	.282	.282	.282	.282
b. Receive at store	<u>.096</u>	<u>.096</u>	<u>.096</u>	<u>.096</u>
Sub-total	.588	.588	.588	.588
C. Administration	<u>.205</u>	<u>.205</u>	<u>.205</u>	<u>.205</u>
Total	2.537	3.603	2.163	2.617



EXHIBIT VIII-5. Selected dairy products (butter, cheese and margarine): Total annual costs of current and alternative distribution systems

Costs and Case Flows by Source of Manufacture	Current System		Alternative Systems					
	Consolidation at Individual Central Distrib. Warehouses; Drop Delivery		Non-Pooled			Pooled - Major Manufacturers		
			From Minor Manufacturers Via Central Distribution Warehouses			Pooled Transport by Major Manufacturers to Community Depot; Pooled Delivery		Direct Haul to Community Depot; Pooled Del.
	Chains	Indep.	Chains	Indep.	All Stores	Chains	All Stores	All Stores
(Annual Costs and Case Flows in 000's)								
Toronto mfgs.								
Cost per case	.988	1.917	.988	1.917		2.537	2.600	6.718
Cases per year	28	5	6	1	7	22	26	26
Pooled costs						56	68	175
+ Non-pooled costs						6	9	9
Total costs	28	10	6	2	8	62	77	184
S.W. Ont. mfgs.								
Cost per case	1.036	1.965	1.036	1.965		3.603	3.476	9.839
Cases per year	28	5	6	1	7	22	26	26
Pooled costs						79	90	256
+ Non-pooled costs						6	9	9
Total costs	29	10	6	2	8	85	99	265
E. Ont. mfgs.								
Cost per case	1.064	1.993	1.064	1.993		2.163	2.297	4.100
Cases per year	28	5	6	1	7	22	26	26
Pooled costs						48	60	107
+ Non-pooled costs						6	9	9
Total costs	30	10	6	2	8	54	69	116
Montreal mfgs.								
Cost per case	1.300	2.229	1.300	2.229		2.617	2.665	7.045
Cases per year	28	5	6	1	7	22	26	26
Pooled costs						58	69	183
+ Non-pooled costs						6	11	11
Total costs	36	11	8	2	10	64	80	194

EXHIBIT VIII-6. Selected dairy products (butter, cheese and margarine): Comparative costs of current system and distribution alternatives

Source of Manufacture/Item	Current System			Alternatives		
	Chains	Indep.	All Stores	Pooled Transport by Major Manufacturers		Direct Haul; Pooled Delivery
				Chains	All Stores	All Stores
(Annual Costs and Case Flows in 000's)						
<u>Toronto</u>						
Costs	28	10	38	62	77	184
Cases	28	5	33	28	33	33
Cost per case	.99	1.92	1.15	2.21	2.33	5.58
<u>S.W. Ontario</u>						
Costs	29	10	39	85	99	265
Cases	28	5	33	28	33	33
Cost per case	1.04	1.97	1.18	3.04	3.00	8.03
<u>E. Ontario</u>						
Costs	30	10	40	54	69	116
Cases	28	5	33	28	33	33
Cost per case	1.06	1.99	1.21	1.93	2.09	3.52
<u>Montreal</u>						
Costs	36	11	47	64	80	194
Cases	28	5	33	28	33	33
Cost per case	1.30	2.23	1.42	2.29	2.42	5.88
<u>Total</u>						
Costs	123	41	164	265	325	759
Cases	112	20	132	112	132	132
Cost per case	1.10	2.05	1.24	2.37	2.46	5.75
Current system costs				123	164	164
Savings (loss) with pooling				(142)	(161)	(595)
Savings (loss) per case				(1.27)	(1.22)	(4.51)

As produce is highly perishable, it must be distributed to stores several times a week. The produce determines the frequency of refrigerated product distribution.

1. Chain stores

Chain stores place their refrigerated products orders several times a week through a chain distribution warehouse in Toronto. Several store orders are loaded on a truck at the distribution warehouse. The truck is hauled to the Kingston area where drops are made to stores in and around Kingston.

2. Independent stores

Independents typically order all their refrigerated products several times a week through one principal wholesaler in Toronto. A number of store orders are loaded in a truck. The truck serves a portion of Eastern Ontario, including Kingston. Drops are made to stores in Kingston and other Eastern Ontario communities.

B. DESCRIPTION OF POOLING ALTERNATIVES

1a. Pooled transport by major manufacturers to Kingston pooled community depot; pooled delivery to Kingston chain stores

Retailers place orders through Kingston pooled community depot. The depot places a combined Kingston order with each major manufacturer. Delivery frequency is reduced from three to two times per week to improve load factors.

A truck makes pick ups from several manufacturers. The truck is hauled directly to the Kingston pooled community depot. Several trucks arrive simultaneously at the depot from several pooling groups.

Freight is unloaded and sorted by delivery route to several loading doors. Delivery trucks are loaded in stop order. Deliveries are made to Kingston chain stores.

1b. Pooled transport by major manufacturers to Kingston pooled community depot; pooled delivery to all stores

Operation of this alternative is almost the same as the previous alternative: pooled transport by major manufacturers to chain stores. There are two additional dimensions:

- ▶ Independent stores are served by the pooling schemes and receive pooled deliveries from the depot.

- ▶ Since the independents order all their dry groceries from wholesalers, the wholesalers become involved. They perform the same function for the independents as the chain merchandisers do for the chain stores.

All procedures are the same. Quantity of freight moving increases marginally. The number of deliveries increase, while the average size of a pooled product store delivery order declines.

The flow of goods is basically the same. The product is picked up from several manufacturers by truck. The pooled truck load is hauled to the community depot. Several pooled truck loads arrive at the depot on the same day. All the freight is sorted to loading doors where orders are marshalled for each store. Delivery trucks are loaded in stop order.

2. Direct haul by major manufacturers to Kingston pooled community depot; pooled delivery to all stores

Retailers place orders through Kingston pooled community depot. The depot places a combined Kingston order with each major manufacturer twice a week.

Each manufacturer ships directly to the community depot by truck on two specified delivery days each week. Freight is unloaded at the depot, and sorted by delivery route to several loading doors. Delivery trucks are loaded in stop order. Deliveries are made to Kingston stores.

C. EVALUATION OF CURRENT SYSTEM

In the current system, butter, cheese and margarine are distributed with produce. However, costs have been computed per equivalent case of selected dairy products to ensure comparability. The average cost of distributing a case of selected dairy products to Kingston is \$1.26 per case. Costs can be further described by source of manufacture and type of store as shown in Exhibit VIII-7.

The table shows that:

- ▶ There is little difference in per case costs among the three Ontario producing regions.
- ▶ The cost of serving independents is about double the cost of serving chain stores.

EXHIBIT VIII-7. Distribution cost per case for current system

Source of Manufacture	Distribution Via Central Distribution Warehouses in Toronto		Total
	Chains	Independents (Via Wholesalers)	
Toronto	.99	1.92	1.15
S.W. Ontario	1.04	1.97	1.18
E. Ontario	1.06	1.99	1.21
Montreal	1.30	2.23	1.42
All sources	1.10	2.05	1.24

The similarity of costs among Ontario producing regions is due to two reasons. Cases are small and therefore unit transport costs for trailer load are small. Transport from other Ontario producing regions to Toronto is in trailer load quantities. Secondly, it was assumed that all product moved direct to the distribution warehouses. Public warehousing costs were not incurred.

Independents are about twice as costly to serve as chains. We assumed that almost all stores stock some kind of butter, cheese and margarine. This means that the average store delivery is small -- about 23 cases or 440 lbs. However, due to time constraints, only about 15 stops can be made in a day, for a load of about 350 cases or 7000 lbs. Therefore, transport costs to Kingston are high for routes which serve the independents: \$.86 per case compared to \$.37 per case for chain stores. Delivery costs are \$.44 per case for the independents compared to \$.17 per case for the chains.

D. COMPARATIVE EVALUATION OF INDIVIDUAL ALTERNATIVES WITH CURRENT SYSTEM

1. Pooled transport by major manufacturers to pooled community depot; pooled delivery to chain stores

In this alternative, the major manufacturers in each region form into a pooling group. Each group would haul to a Kingston depot where freight would be combined into delivery routes to serve the chain stores. The cost per case of selected dairy products is \$2.23, \$1.13 more than the current system for chain stores. The comparative costs per case are presented in Exhibit VIII-8.

EXHIBIT VIII-8. Comparative distribution costs per case for pooled transport to chains vs. current system for chains

Source of Manufacture	Current System	Pooled Transport		Total
		Pooled	Non-Pooled	
Toronto	.99	2.54	.99	2.21
S.W. Ontario	1.04	3.60	1.04	3.04
E. Ontario	1.06	2.16	1.06	1.93
Montreal	1.30	2.62	1.30	2.29
All sources	1.10	2.74	1.10	2.37

In this system, the non-pooled freight costs less to distribute than the pooled freight. This is because we assumed that the chains would continue to deliver produce to Kingston, themselves. Non-pooled butter, cheese and margarine would continue to be delivered with the produce. Load factors could be maintained by decreasing delivery frequency, or increasing the delivery route territory.

As Exhibit VIII-8 shows, pooled transport by the major manufacturers, exclusive of non-pooled freight, costs \$2.57 per case. This is \$1.37 more than the current system. The reason is that the transport to Kingston costs are greater from all regions with this option. This is because the production is divided among the four regions. Each region's pooling group has a volume of only 225 cases per delivery day which is only 4500 lbs., or 25% of a truck load.

Eastern Ontario freight presently goes into Toronto in trailer loads and back to Kingston in truck loads, a total distance of 290 miles. This is less expensive per case than shipping quarter truck loads from "Eastern Ontario" to Kingston, an assumed distance of 85 miles.

Delivery frequency was reduced from three to two times per week with this option. A further reduction to once a week would improve load factors to 450 cases. This would cut transport costs in half, an average reduction of \$.97 per case over the four different transport routes.

Delivery costs would be reduced almost in half by about \$.19 per case. Potential savings could be \$1.16 on local and long distance transport. Other costs would also be improved by approximately 33%. This would reduce the cost of pooled freight from \$2.74 per case to \$1.44 per case. This remains \$.24 per case more expensive than the current system.

2. Pooled transport by major manufacturers to Kingston pooled community depot; pooled delivery to stores

In this alternative, the major manufacturers also form pooling groups and ship to a community depot. All stores are served from the depot instead of exclusively from the chains. The distribution cost per case of selected dairy products is \$2.46, \$1.22 more than the current system. The comparative costs per case are presented in Exhibit VIII-9.

EXHIBIT VIII-9. Comparative distribution cost per case for pooled transport to all stores vs. current system

Source of Manufacture	Current System			Pooled Transport		
	Chains	Indep.	All Stores	Pooled	Non-Pooled	Total
Toronto	.99	1.92	1.15	2.60	1.15	2.33
S.W. Ontario	1.04	1.97	1.18	3.48	1.18	3.00
E. Ontario	1.06	1.99	1.21	2.30	1.21	2.09
Montreal	1.30	2.23	1.42	2.67	1.42	2.42
All sources	1.10	2.05	1.24	2.81	1.24	2.46

As in the previous alternative, the unit cost of the non-pooled freight is lower than the pooled freight. The cost of \$2.81 per case for the pooled freight is close to the \$2.74 per case for pooled transport to the chain stores. When the independents are also served, the transport volumes improve -- 15% more freight is added to every load. However, the addition of the independents also lowers average delivery quantities. These two factors approximately offset one another.

We can examine the effect of further reducing delivery to once a week. Transport costs could be cut in half. This would lower the average transport trip cost by \$.57 per case. Delivery cost could be cut almost in half, or by a little less than \$.44. If other costs were reduced by 33%, then total distribution costs for the pooled freight could be reduced to between \$1.50 and \$1.55 per case. This remains \$.26 to \$.31 per case more expensive than the current system.

3. Direct haul to Kingston pooled community depot; pooled delivery to stores

In this alternative, each major manufacturer hauls his own freight to the Kingston pooled community depot. Freight is combined and deliveries

made to stores. The cost per case of selected dairy products is \$5.75, \$4.51 per case more than the current system. The high costs are due to high transport costs for the freight being shipped direct from the major manufacturers.

The average transport cost is \$5.64 per case from the major manufacturers to Kingston, ranging from \$2.78 to \$8.67. The overall average cost per case for the pooled freight alone is \$6.83 per case. The "system average" has been reduced to \$5.75 per case because of the lower cost of the non-pooled freight.

The cost of moving pooled freight at \$6.83 per case is  $5\frac{1}{2}$  times greater than the current system cost. This demonstrates that, for this commodity group, direct shipments from the manufacturers to small communities are unfeasible.



## IX

### FROZEN FOOD: DESCRIPTION AND EVALUATION OF CURRENT SYSTEM AND POOLING ALTERNATIVES

We previously established in Chapter V that any pooling scheme involving frozen food manufacturers is unfeasible. This is due to the comparatively low volumes of frozen food being retailed, and the dispersed nature of manufacturing.

In this chapter, we describe and evaluate the following opportunities for pooled distribution of frozen food:

- ▶ Pooled transport by chain merchandisers to chain stores.
- ▶ Pooled transport by chain merchandisers and wholesalers to all stores.

We have evaluated these alternatives and the current system. To carry out this evaluation, we developed cost estimates for each of the alternative systems. For each cost estimate, cost elements described in Chapter IV were examined. For each cost element, we developed specific cost functions. Our assumptions relating to these cost functions are presented in Appendix A. All costs were evaluated on a per case basis. Annual costs were derived from per case costs. Comparative costs and potential savings (losses) resulting from alternatives were calculated. Per case costs, annual costs and a comparative cost summary are presented in Exhibits IX-1 and IX-2.

#### A. DESCRIPTION OF CURRENT SYSTEM

In the current system, frozen products are distributed to Kingston from central freezer distribution warehouses in Toronto. The system operates similarly to, but parallel to, the systems previously described for refrigerated products and dry groceries. However, although each chain and each wholesaler operates a freezer storage area, they do not each have their own separate warehouse. A number of chains maintain a dedicated freezer storage area in a huge freezer warehouse in the suburbs of Metropolitan Toronto.

Most frozen food is ordered in trailer load quantities. It is shipped in trailers from the manufacturer's plant warehouse to the chain or wholesaler frozen distribution warehouse or dedicated freezer storage area.

## EXHIBIT IX-1. Frozen food: current and alternative distribution systems

	Current				Pooled Transport to Chains		Pooled Transport to All Stores	
	Chains		Independents		Toronto	Outside Toronto	Toronto	Outside Toronto
	Toronto	Outside Toronto	Toronto	Outside Toronto				
A. Plant Warehouse to Kingston								
1. At the Plant Warehouse	.038	.038	.038	.038	.038	.038	.038	.038
2. Pick-up								
3. Transport to Consolidation Point					.100	.100	.124	.124
4. Temporary Storage or Consolidation								
a. Receive and put away/sort					.034	.034	.034	.034
b. Store								
c. Order fill and marshall					.156	.156	.156	.156
d. Load					.035	.034	.035	.035
5. Transport to Distribution Whse.		.339		.339		.339		.339
6. At the Distribution Warehouse								
a. Receive and put away	.027	.027	.027	.027	.027	.027	.027	.027
b. Store	.200	.200	.200	.200	.200	.200	.200	.200
c. Order fill and marshall	.115	.115	.163	.163	.115	.115	.128	.128
d. Load	.035	.035	.037	.037	.035	.035	.036	.036
7. Transport to Kingston	<u>.413</u>	<u>.413</u>	<u>.990</u>	<u>.990</u>	<u>.367</u>	<u>.367</u>	<u>.464</u>	<u>.464</u>
Sub-total	.828	1.167	1.455	1.794	1.103	1.442	1.244	1.583
B. Break-Bulk, Storage and Delivery in Kingston								
1. Break-Bulk or Storage								
a. Receive								
b. Store								
c. Order fill/sort and marshall								
d. Load								
2. Delivery								
a. Vehicle and driver	.134	.134	.312	.312	.120	.120	.166	.166
b. Receive at store	<u>.055</u>	<u>.055</u>	<u>.116</u>	<u>.116</u>	<u>.055</u>	<u>.055</u>	<u>.072</u>	<u>.072</u>
Sub-total	.189	.189	.428	.428	.175	.175	.238	.238
C. Administration and overhead	<u>.088</u>	<u>.088</u>	<u>.336</u>	<u>.336</u>	<u>.097</u>	<u>.097</u>	<u>.174</u>	<u>.174</u>
Total	1.105	1.444	2.219	2.558	1.375	1.714	1.655	1.995

EXHIBIT IX-2. Frozen food: comparative costs of distribution alternatives

	Current			Pooled Transport	
	Chains	Indep.	All Stores	Chains	All Stores
(Annual Costs and Case Flows in 000's)					
<u>Toronto</u>					
Costs	69	24	93	85	121
Cases	62	11	73	62	73
Cost per case	1.105	2.219	1.274	1.375	1.656
<u>Montreal</u>					
Costs	114	36	150	135	186
Cases	79	14	93	79	93
Cost per case	1.444	2.558	1.613	1.714	1.995
<u>Total</u>					
Costs	183	60	243	220	307
Cases	141	25	166	141	166
Cost per case	1.30	2.40	1.46	1.56	1.85
Current system costs			183		243
Savings (loss) with pooling			(37)		(64)
Savings (loss) per case			(.26)		(.39)

Provided proper temperature control is maintained, frozen products have a reasonably long shelf life. Therefore, they are typically supplied to stores only once or twice a week, or less.

1. Chain stores

Chain stores place their frozen food orders several times a week through a chain distribution office in Toronto. Several store orders are loaded on a trailer at the distribution warehouse or freezer storage area. The trailer is hauled to the Kingston area where drops are made to stores in and around Kingston.

2. Independent stores

Independents typically order all their frozen food through one principal wholesaler in Toronto. A number of store orders are loaded on a truck. The truck serves Kingston and a large portion of Eastern Ontario. Delivery frequency is once every one to two weeks.

B. DESCRIPTION OF POOLING ALTERNATIVES

1. Pooled transport by chain merchandisers to chain stores

Each chain store continues to place their frozen food orders through the chain distribution centre. The distribution centre continues to be supplied by trailer loads of product from each manufacturer.

A Kingston shipping day is designated once a week. On that day, one or more trucks make pick-ups from each of the participating chains' warehouses. The truck drops the goods off at one of the Toronto chain warehouses, which is the designated consolidation point for Kingston freight. Here the freight is sorted into delivery routes. Freight is loaded in stop order on trucks. Trucks are hauled to Kingston where drop-offs are made to chain stores.

2. Pooled transport by chain merchandisers and wholesalers to all stores

Chains and independents continue to place orders through Toronto distribution centres in the current manner. The distribution centres continue to be supplied by trailer loads of product from each manufacturer.

The operation of this alternative proceeds as with the previous alternative. Several trucks make pick-ups from the wholesalers and chains, bringing freight into the consolidation point. Freight is sorted into several delivery routes. Freight is loaded in stop order on several trucks. Trucks are hauled to Kingston where drop-offs are made to all Kingston stores.

### C. EVALUATION OF CURRENT SYSTEM

The values of the cost elements for the current and alternative systems are presented in Exhibit IX-1. Exhibit IX-2 summarizes annual costs of current and alternative systems. Potential losses through pooling are calculated. The evaluation was made on the basis of costs contained in these tables.

The average cost of distributing a case of frozen food to Kingston is \$1.46 per case with the current system. Costs can be further described by source of manufacture and type of store in Exhibit IX-3.

EXHIBIT IX-3. Distribution cost per case for current system

Source of Manufacture	Consolidation by Individual Chain Dist. Warehouse; <u>Drop Delivery</u> Chains	Consolidation by Wholesaler Dist. Whse.; <u>Drop Delivery</u> Independents	<u>Total System</u> All Stores
Toronto	1.11	2.22	1.27
Outside Toronto <sup>1</sup>	1.44	2.56	1.61
Total	1.30	2.40	1.46

<sup>1</sup> As frozen food manufacturing is very dispersed, Montreal is used to represent the origin of food manufactured outside Toronto. This permits distribution costs to be approximated for food manufactured outside Toronto.

The cost of serving the independents is about double the cost of serving the chains. This difference exists despite the fact that chains are serviced once a week on average, and independents, closer to once every two weeks, as their volume of frozen food is low. Trucks serving independents can only deliver 20 stops or 5100 lbs. within a working day. This is about 25% of a truck load by weight. Chain delivery trucks can deliver two to three times this amount within a working day, due to fewer stops with larger delivery quantities.

D. COMPARATIVE EVALUATION OF INDIVIDUAL ALTERNATIVES WITH CURRENT SYSTEM

1. Pooled transport by chain merchandisers to chain stores

In this alternative, the chains combine all their freight via a central consolidation point in Toronto. The cost per case of frozen food distributed is \$1.56. This is \$.26 per case more costly than the current system for chain store distribution. The comparative costs per case are presented in Exhibit IX-4.

EXHIBIT IX-4. Comparative distribution costs per case for pooled transport by chains vs. current system

Source of Manufacture	Current System For Chains; Individual Consolidations	Pooled Transport by Chains
Toronto	1.11	1.38
Outside Toronto	1.44	1.71
Total	1.30	1.56

The table shows that there is no advantage to pooled distribution by chain stores. Increased costs with this alternative include:

- ▶ \$.10 for pick-up and transport to consolidation point.
- ▶ \$.225 for handling at consolidation point.

The benefits only partially offset the costs:

- ▶ Improvement of \$.046 in transport costs from Toronto to Kingston -- from \$.413 to \$.367.
- ▶ Improvement of \$.012 in local delivery costs -- from \$.189 to \$.175.

We looked at various alternatives for transport to Kingston. However, due to the infrequent service, the options are limited. If a trailer was dropped there, it would be out of circulation for a week. A driver could haul a tandem trailer unit to Kingston. He could deliver one and have the other trailer delivered by a local driver. However, assuming no time was lost over the current system, the most a driver

deliver would be the same 810 cases. Therefore, the other driver could also deliver a maximum of 810 cases. Thus, transport to Kingston cost could be dropped by \$.098 per case to \$.269. However, this does not account for increased delivery cost resulting from using tractor-trailers, or increased administrative costs resulting from using a local delivery driver. Therefore, a disbenefit of at least \$.16 per case remains with this alternative.

Taking all freight on a trailer to a local depot would cost \$.16 per case for the trip. This would be a full trailer of 45,000 lbs. This would still be \$.06 per case more costly than the current system. Additional trans-shipment costs and administrative costs would further increase the cost margin.

2. Pooled transport by chain merchandisers and wholesalers to all stores

In this alternative, chains and wholesalers consolidate Kingston freight in Toronto. They operate a single delivery service, once a week to Kingston. The cost per case of frozen food distributed is \$1.85. This is \$.29 per case more costly than the current system average. The comparative costs per case are shown in Exhibit IX-5.

EXHIBIT IX-5. Comparative distribution costs per case for pooled transport by chains and wholesalers vs. current system

Source of Manufacture	Current System; Consolidation by Individual Chains and Wholesalers	Pooled Transport by Chains and Wholesalers
Toronto	1.27	1.66
Outside Toronto	1.61	2.00
Total	1.46	1.85

Increased costs with this alternative include:

- ▶ \$.225 for handling at consolidation point.
- ▶ \$.124 for pick-up and transport to the consolidation point.

The benefits only partially offset the costs:

- ▶ Transport costs are \$.464 per case, compared to a weighted average of \$.50 per case for the current system, a saving of \$.036 per case.
- ▶ Lower costs for independents -- \$1.85 per case distributed vs. \$2.40 in the current system.

There are a number of methods of operating transport to Kingston. We assumed trucks would be used for transport and delivery. Three other methods were discussed with respect to pooled transport by chain merchandisers. As discussed for that alternative, the maximum further improvement that could be realized from transport savings would be something less than \$.20 per case. This would be insufficient to offset the \$.29 per case difference between this alternative and the current system.



X

SUMMARY EVALUATION OF POOLING ALTERNATIVES  
FOR FOOD DISTRIBUTION

There is no single distribution system which is the best for every commodity group. Each commodity group has its optimum distribution system. For dry groceries, and meat and poultry, alternative systems offer substantial savings over the current systems. These savings potentially amount to 20% of distribution costs on poolable food, or over \$½ million in the Kingston community. Alternative systems offer no cost savings for the butter, cheese and margarine group and the frozen product group. The comparative costs of current and alternative distribution systems are summarized by commodity group in Exhibit X-1.

A. THERE IS NO SINGLE DISTRIBUTION SYSTEM WHICH IS THE BEST  
FOR EVERY COMMODITY GROUP

1. Lowest cost distribution systems

Exhibit X-2 selects the lowest cost distribution system for each commodity group.

The table shows that:

- ▶ Total savings from alternatives for dry groceries and meat and poultry are \$572,000 annually in Kingston:
  - Pooled community warehousing saves \$.13 per case or \$181,000 annually in Kingston over the current system for dry groceries.
  - Consolidation by individual chains saves \$1.54 per case or \$381,000 annually in Kingston over the current system for meat and poultry.
- ▶ Consolidation by individual chains is the best option for three out of the four commodity groups. For dry groceries, it is the second best option.

It should be noted that it is not meaningful to compare the distribution cost per case between commodity groups. The main reason is that case weights vary substantially. Transport costs at vehicle capacity are directly equivalent to weight. Case weights vary as follows:

EXHIBIT X-1. Summary of costs of current and alternative distribution systems

Food Commodity Group/ Annual Case Flows		Current System Costs		Alternatives									
				Pooled Comm. Whse.	Consol. by Indiv. Chains/ Separate Distrib. for Indiv.	Pooled Transport by Major Manufacturers		Consolidation by Manufacturers		Direct Haul to Community Depot; Pooled Delivery		Pooled Transport by All Chains	Pooled Transport by All Chains & Wholesalers
		Chains	All Stores	All Stores	All Stores	Chains	All Stores	Chains	All Stores	Chains	All Stores	Chains	All Stores
<u>Dry groceries</u>													
Chains - 1,190,000	Cost per case	.89	.95	.82	.95	.93	1.04	.94	1.11				
All stores - 1,400,000	Annual costs (000)	1059	1331	1150	1331	1108	1455	1118	1556				
<u>Meat and poultry</u>													
Chains - 217,000	Cost per case		4.04		2.50		3.71		3.58	4.19			
All stores - 255,000	Annual costs (000)		1029		638		946		912	1068			
<u>Butter, cheese &amp; margarine</u>													
Chains - 112,000	Cost per case	1.10	1.24		1.24	2.37	2.46			5.75			
All stores - 132,000	Annual costs (000)	123	164		164	265	325			759			
<u>Frozen</u>													
Chains 201,000	Cost per case	1.30	1.46		1.46							1.56	1.85
All stores 237,000	Annual costs (000)	183	243		243							220	307
<u>All poolable products</u>													
Chains 1,659,000	Cost per case		1.42		1.22								
All stores 1,952,000	Annual costs (000)		2769		2376								

EXHIBIT X-2. Summary of lowest cost distribution systems

Commodity Group	Lowest Cost Distribution System	\$ Per Case		Savings	
		Lowest Cost System	Current System	\$ Per Case	\$ Per Year
Dry groceries	Pooled community warehousing	.82	.95	.13	181,000
Meat & poultry	Consolidation by individual chains/separate distribution for independents	2.50	4.04	1.54	391,000
Dairy	"	1.26	1.26	0	0
Frozen	"	1.46	1.46	0	0
All commodities		1.13	1.42	.29	572,000

► Dry groceries	29 lbs.
► Meat and poultry	60 lbs.
► Butter, cheese and margarine	19 lbs.
► Frozen food	17 lbs.

Other major factors affecting comparability are temperature control requirements and delivery frequency.

A case of meat and poultry is costly to distribute because it is two to three times as heavy as a case of other food products. In addition, administrative costs are high in the current system because store orders are filled directly from each manufacturer's plant warehouse. In addition, meat and poultry is traditionally distributed two to five times per week, compared to one to three times for the other products. The refrigeration requirements add extra costs not required for dry groceries.

For butter, cheese and margarine, and frozen products, the distribution cost per case is higher than dry groceries. This is despite the lower case weight. The higher cost is mainly due to thinner volume. We calculated approximately 40.6 million lbs. of dry groceries are moving to Kingston annually, compared to 2.5 million lbs. for butter, cheese and margarine, and 4.0 million lbs. for frozen. The volume of dry groceries is 16 times greater than the volume of butter, cheese and margarine, and 10 times greater than the volume of frozen products. Costs to distribute smaller volumes are higher at all steps in the distribution network.

2. Consolidation by individual chains is the best option for three out of four commodity groups

Consolidation by individual chains is the lowest cost distribution system for meat and poultry, selected dairy products and frozen food. It is the second lowest cost system for dry groceries. The system of consolidation by individual chains is relatively efficient. Food moves in full trailer- or truck-loads from the plant warehouse to the chain distribution warehouse. From the distribution warehouse, it moves in partial trailer- or truck-loads to the retail store.

Exhibit X-3 is a comparison of consolidation by individual chains with the lowest cost other alternative for each commodity group. The comparison focuses on the major cost element categories: transportation, storage, handling and administration.

EXHIBIT X-3. Comparison of cost elements of consolidation by individual chains and lowest cost other alternative  
(food manufactured in Toronto)

Cost Elements	Commodity Groups/Alternatives							
	Dry Groceries		Meat & Poultry		Butter, Cheese & Margarine		Frozen	
	Consol. by Individ. Chain	Pooled Community Warehouse Operated by Major	Consol. by Individ. Chain	Consol. by Major Mfgs.	Consol. by Individ. Chain	Pooled Transport by Major Mfgs.	Consol. by Individ. Chain	Pooled Transport by Chains
	(Cost Per Case)							
Transport to Kingston	.303	.242	.815	.622	.371	1.320	.413	.367
Delivery transport	.090	.099	.242	.408	.120	.282	.134	.120
Other transportation	.067	0	.225	.178	.062	.266	0	.100
Sub-total transportation	.460	.341	1.292	1.208	.553	1.868	.547	.587
Storage	.060	.100	.100	0	.100	0	.200	.200
Handling	.197	.204	.420	.657	.270	.464	.270	.491
Administration	.023	.039	.174	1.176	.065	.205	.088	.097
Total	.740	.684	1.986	3.041	.988	2.537	1.105	1.375

a) Advantages of consolidation by individual chains

i) Handling. Handling costs are less with consolidation by individual chains for all commodity groups. Food is only re-handled at one place between the plant warehouse and the retail store. Orders move out of plant warehouses and into distribution warehouses on pallets. Store order quantities are also relatively large. This keeps order filling costs down at the plant warehouse. It lowers costs at the retail store by simplifying receiving. Each store receives a single order for all products within a commodity group.

Distribution warehouses are highly mechanized and, in some cases, automated. This permits high labour productivity despite the size of the warehouses.

ii) Administration. Administration costs are less with consolidation by individual chains for all commodity groups. Each order from the plant warehouse is for a trailer- or truck-load quantity. Each store order includes all product requirements within a commodity group.

Purchase orders, store orders, inventory control and accounting is highly computerized. This keeps the cost of the administrative functions down.

iii) Delivery transport. Local delivery costs are less with consolidation by individual chains for three out of four commodity groups. Costs are less because all the store's product requirements in a given commodity group are delivered at one time. This minimizes the number of stops that must be made. Delivery cost increases with number of stops.

Within a small community, there is little cost difference between serving all, or a portion of the community. It is not expensive for chains to cover the entire community on each delivery run. Therefore, alternatives which create smaller delivery runs through pooled deliveries offer little, if any, cost savings.

In a small community, the driving time between stops is minimal because distances are small and traffic congestion almost non-existent. Stop time is usually the more significant element of delivery time.

Some chains also deliver other communities on Kingston delivery runs. There is little extra driving time since they are along the main highway (MacDonald-Cartier Freeway).

b) Disadvantages of consolidation

Long distance transport costs are greater with consolidation by individual chains for three out of four commodity groups. The table shows comparative costs for Toronto freight. Differences are more pronounced for freight originating in other parts of Ontario or Montreal since transport costs are directly proportional to trip mileage. Each chain's store delivery run goes out to Kingston from Toronto, makes deliveries and returns to Toronto. Load sizes are limited by the number of stores in an area, and the number of stores that can be delivered in the available delivery time. Delivery time is what is left after subtracting transport time.

B. SAVINGS OF \$572,000 PER YEAR IN KINGSTON FROM DISTRIBUTION ALTERNATIVES FOR DRY GROCERIES, AND MEAT AND POULTRY

1. Dry groceries

a) Savings of \$181,000 per year from pooled community warehousing for dry groceries

Pooled community warehousing of dry groceries could save \$181,000 per year. This breaks down as follows:

- ▶ \$118,000 on food manufactured in Montreal.
- ▶ \$47,000 on food manufactured in Toronto.
- ▶ \$16,000 on food manufactured in South-Western Ontario.

Most savings arise from long distance transport cost economies, principally on food manufactured in Montreal.

In Exhibit X-3, we compared pooled community warehousing of major manufacturers' dry groceries with consolidation by individual chains, the current system for distributing dry groceries to chain stores. This table shows that the \$.06 per case saving on long distance transport from Toronto is maintained in the \$.06 per case overall cost advantage. The other cost elements are about the same for both systems. The pooled community warehousing system involves two distribution steps similar to the individual chain consolidation system:

- ▶ Food moves in trailer loads from the plant warehouse to the community warehouse.

- The majority of a store's product requirements in a commodity group are supplied on a single delivery. Therefore, economies of handling, administration and local delivery can be maintained.

b) Savings on food manufactured in Montreal

Pooled community warehousing is the only distribution alternative for dry groceries which offers overall savings. However, the other alternatives all offer savings, exclusively for dry groceries originating in Montreal. The opportunities for savings on Montreal freight are shown in Exhibit X-4.

Cost savings from pooled community warehousing on Montreal freight amount to \$118,000, or 65% of the potential savings from this alternative. The next highest annual savings for Montreal freight is \$67,000, from: "Pooled transport to pooled community depot, pooled delivery to chain stores."

For savings to be realized, a small "no-frills" depot operation would have to be effected. Only 20% of dry groceries originate in Montreal. Any depot overheads would have to be absorbed by this segment of dry groceries.

The labour rate of \$15.00 used for handling implicitly includes "normal" depot overhead. Total annual handling charges at the depot for Montreal freight would be as follows:

$$(\$ .009 + \$ .120 + \$ .027) \text{ per case} \times 238,000 \text{ cases} = \$37,130$$

Labour with fringe benefits would be at least half of this. That leaves about \$18,000 annual to rent space and equipment, cover administration costs and hire a supervisor. These could offset the savings from pooled transport.

The margin for depot operation would be similarly small for "Pooled transport to all stores, and consolidation by major manufacturers for all stores", if only Montreal-manufactured goods were involved.

Consolidation by major manufacturers to chain stores does not involve a depot. Therefore, this option is not vulnerable to depot operating problems. There would not be similar problems with an urban pooling or consolidation terminal. Such a terminal could already be in use as a consolidation point -- for example, by a freight forwarder or a common carrier.



EXHIBIT X-4. Cost savings available exclusively on Montreal dry groceries

Alternative	Altern.	\$ Per Case		Annual Savings
		Current	Savings	
Pooled transport to chain stores	.95	1.23	.28	67,000
Pooled transport to all stores	1.06	1.29	.23	64,000
Consolidation by major manufacturers for chains	.99	1.23	.24	57,000
Consolidation by major manufacturers for all stores	1.17	1.29	.12	34,000
Pooled community warehousing	.87	1.29	.42	118,000

## 2. Meat and poultry

For meat and poultry distribution, there are three alternatives which offer overall savings over the current system. "Consolidation by chains/separate consolidation for independents" is the lowest cost alternative as identified above. In addition, "Pooled transport by major manufacturers/consolidation by minor manufacturers" and "Consolidation by all manufacturers" are lower cost alternatives for meat and poultry distribution.

EXHIBIT X-5. Summary of cost-saving alternatives for the distribution of meat and poultry

Alternative	\$ Per Case		Savings	
	Altern. System Cost	Current System Cost	\$ Per Case	\$ Per Year
Consolidation by individual chains/consolidation by independents	2.50	4.04	1.54	391,000
Consolidation by all manufacturers	3.58	4.04	.46	117,000
Pooled transport by major manufacturers/consolidation by minors	3.71	4.04	.33	83,000

The table shows that:

- ▶ "Consolidation by individual chains/separate consolidation by independents" offers potential savings of \$1.54/case or \$391,000 annually, more than three times more savings than the next best alternative.
- ▶ "Consolidation by all manufacturers" is the next best alternative with a reduction in distribution costs of \$.46 per case or \$117,000 annually in Kingston.
- ▶ "Pooled transport by major manufacturers/consolidation by minor manufacturers" offers a potential saving of \$.33 per case, or \$83,000 annually.

a) Savings of \$391,000 per year from consolidation by individual chains for meat and poultry

Consolidation by individual chains, as previously discussed, offers:

- ▶ Lower handling costs.
- ▶ Lower administrative costs.
- ▶ Lower delivery transport costs.

The administrative costs for meat and poultry are particularly sensitive to improved lot sizes. Average store order sizes are currently small with direct to store distribution, resulting in administrative costs ranging from \$.78 to \$1.08 per case. We calculated distribution of all meat and poultry by chains could reduce costs to \$.17 per case.

Transport to Kingston costs also decline as a chain can achieve better load factors than the average major manufacturer.

b) Other cost saving alternatives

Cost savings from both "Consolidation by all manufacturers" and "pooled transport by the major manufacturers" are achieved in transport to Kingston and local delivery. Freight moves to Kingston in trailers instead of the present trucks. With pooled delivery, each store receives all their products on one stop.

Savings are not of the same magnitude as for consolidation by individual chains because there are no administrative cost advantages to these two systems. The paper flow is the same or slightly greater than the current system. The economies are achieved with the physical flows of the goods.

C. IMPACT OF 20% SAVING ON FOOD DISTRIBUTION COSTS

1. Kingston's food bill reduced by over \$½ million

Savings of over \$½ million per year are potentially available from the best alternative systems for dry groceries and meat and poultry (Exhibit X-6).

The table shows that a comparatively small saving of \$.13 per case on dry groceries can lead to annual savings of \$181,000. By contrast, a saving of \$1.54 per case in meat and poultry is equivalent to \$391,000 annually. This is because there are 5½ times more cases of dry groceries

EXHIBIT X-6. Potential savings from distribution alternatives

Alternative	Per Case Costs (\$)			Annual Costs (\$000)			
	Altern. System	Current System	Savings	Altern. System	Current System	Savings	
						\$	%
Dry groceries - pooled community warehousing	.82	.95	.13	1150	1311	181	14
Meat & poultry - consolidation by chains and indep.	2.50	4.04	1.54	638	1029	391	38
Total potential savings				1788	2359	572	20

moving: 1,400,000 annually compared to 255,000 for meat and poultry. Therefore, every 1¢ reduction on a case of dry groceries saves  $5\frac{1}{2}$  times more than a 1¢ reduction on a case of meat and poultry.

If potential savings are realized, the food bill of the average Kingston family could be reduced by \$21.64 per year on an annual food bill of \$2,898, a reduction of .75%. This is equivalent to a saving of \$.42 on a weekly food bill of \$55.73. Exhibit X-7 examines the impact of food distribution costs on Kingston family food expenditures.

Distribution of poolable food currently costs the Kingston family \$104.77 per year, or 5.1% of total poolable food costs of \$2,066 per year. The potential savings are based on distribution representing 5.1% of food sales. If distribution costs were higher, then potential savings could be higher. Corroborating evidence about distribution and food costs come from two sources.

The Food Prices Review Board surveyed operating costs in the Canadian food industry. They found that transportation/warehousing costs represented about  $3\frac{1}{2}\%$  of sales for the processor, and about  $1\frac{1}{2}\%$  of sales for the distributor. This represents a total of about 5% of retail sales volume. Survey results are presented in Exhibit X-8.

The statistics for distributors are corroborated by a similar survey from the U.S. conducted by Cornell University. They surveyed chain store distributors. Their survey was divided into three classes. Total warehousing and transportation expense ranged from 0.40% of sales for smaller chains to 1.68% of sales for larger chains. The mean percent for the three U.S. groups of chain stores is 1.28%. This is comparable to the 1.4% which the Food Prices Review Board found.

The conclusion is that distribution costs, as a proportion of food costs, have been reasonably estimated at 5.1%. Potential savings of \$21.64 per family per year in Kingston are therefore a reasonable expectation.

#### D. POTENTIAL FOR FOOD POOLING IN OTHER CANADIAN SMALLER COMMUNITIES

##### 1. Uniqueness of Kingston

##### a) Location between Toronto and Montreal

Kingston is particularly unique due to its location half-way between Canada's two major food production centres, Toronto and Montreal. This situation created most of the savings from pooled community warehousing of dry groceries. Dry groceries currently travel from Montreal

EXHIBIT X-7. Impact of food distribution costs on Kingston family food expenditures at retail food stores

		Kingston Community (\$)	Kingston Per Family <sup>1</sup> (\$)
All food	Annual expenditure	76,590,000	2898
Poolable food	Annual expenditure	54,609,000	2066
	Current distribution costs	2,769,000	104.77
Dry groceries	Annual expenditure	28,030,000	1060
	<u>Distribution costs:</u>		
	Current	1,331,000	50.36
	Pooled community whse.	1,150,000	43.51
	Savings	181,000	6.85
Meat and poultry	Annual expenditure	19,380,000	733
	<u>Distribution costs:</u>		
	Current	1,029,000	38.94
	Consol. by each chain merchandiser	638,000	24.14
	Savings	391,000	14.84
	Total savings from alternatives	572,000	21.64
	Weekly food bill	1,472,880	55.73
	Weekly savings	11,000	.42

<sup>1</sup> 3.5 persons per family - Source: 1971 Census of Canada.

EXHIBIT X-8. Food Prices Review Board survey of operating costs in the Canadian food industry

	<u>1973</u>	<u>1974</u>
62 processors (representing about 60% of sales by Canadian food processors)		
▶ Sales (\$ million)	6802.6	7919.2
▶ Transport/warehousing (\$ million)	253.6	273.2
(%)	3.7	3.4
16 distributors (representing over 70% of retail food store sales)		
▶ Sales (\$ million)	6817.3	8132.3
▶ Transport/warehousing (\$ million)	92.4	110.9
(%)	1.4	1.4

Source: Food Company Profits and Food Prices II, Canadian Food Prices Review Board, 1976, Table 13.

past Kingston to Toronto, then back to Kingston. Much of the savings from pooled community warehousing derive from the elimination of those 330 extra miles for the Kingston-Toronto return trip. Of the other Canadian smaller communities of 50,000 to 100,000 people, only Peterborough and Hull lie between Toronto and Montreal. Hull is attached to Ottawa. Peterborough is closer to Toronto and not on the main highway between the two major centres.

b) Distance to major population centres

Kingston is 165 miles from Toronto where most food is shipped from. However, there are other Canadian smaller communities which are much further away from major supply centres. Long distance transport costs will increase directly with distance. However, all other costs will remain relatively the same. Therefore, in more isolated communities, the economies of distribution alternatives will change. Long distance transport savings through consolidations by manufacturers or several chains may outweigh extra handling and administrative costs incurred.

We previously identified that individual chain consolidation was the lowest cost system in Kingston for meat and poultry, selected dairy products and frozen food. Cost advantages mainly derived from cost economies in administration, handling and local delivery transport. With increasing distance from the distribution centre, these advantages will be overcome by higher long distance transport costs.

Pooled community warehousing for dry groceries will tend to save more money for communities further away from the distribution centres. However, the magnitude of savings will be a lot less for communities not located between two major manufacturing centres. Savings will also be reduced for communities located closer to major distribution centres than Kingston is.

In addition, there are different methods of serving communities farther away from major production centres. For example, rail cars are used to service Western Canada. Service may be provided by boxcar or trailer-on-flatcar (TOFC or piggyback). Few, if any, manufacturers make direct deliveries with their own trucks to Western Canada. With the long distances involved, transport cost savings through pooling by manufacturers could offset increases in any other distribution costs.

There are also regional differences in the product mix for meat and poultry. In other parts of the country, more frozen product is retailed. Delivery service would not be required as frequently. For a similar sized community, existing load factors would therefore be greater on transport and delivery runs. Potential savings through individual chain consolidation could be somewhat less.



3. Potential savings of \$8 million in Canada's smaller communities

Exhibit X-9 is a list of other smaller communities of 50,000 to 100,000 people in Canada. In each community, there will be pooling opportunities, such as we have discovered for Kingston. Similar cost savings could also be available for dry groceries and meat and poultry.

There are 18 smaller communities in Canada, including Kingston. Twelve of these, or two-thirds, are located in Ontario or Quebec. Food distribution to the other 11 communities in central Canada would be similar to Kingston. It would be almost exclusively by road. It would be largely from central chain or wholesaler distribution warehouses in Toronto or Montreal. A lot of meat and poultry would be delivered fresh, and direct to store.

The other six smaller communities are scattered across Canada: from Sydney, Nova Scotia in the east, to Prince George, B.C. in the west. Distribution systems for these communities would be more different from Kingston's. There would be long rail trips involved. There are also a number of wholesaler cooperatives in the west which already do consolidations.

Each of the 17 other small communities will also have unique pooled distribution opportunities. These would have to be identified and evaluated. However, if similar savings were found, the potential savings for Canada's smaller communities would amount to \$7.8 million. This would be spread over 360,000 families in these communities.

EXHIBIT X-9. Canadian cities of CMA's of 50,000 to 100,000 population.

Community	1979 Population (000's)
Sydney, Nova Scotia*	86.6
Moncton, New Brunswick*	81.8
Hull, Quebec	58.9
St. Jean, Quebec*	52.0
Shawnigan, Quebec*	52.6
Trois Rivieres, Quebec*	98.2
Sault Ste. Marie, Ontario*	81.5
Brantford, Ontario*	83.4
Kingston, Ontario*	92.5
Sarnia, Ontario*	82.1
North Bay, Ontario	52.5
Peterborough, Ontario*	65.6
Barrie, Ontario*	55.2
Guelph, Ontario*	74.2
Lethbridge, Alberta	51.2
Kelowna, British Columbia	57.6
Prince George, British Columbia	64.5
Kamloops	63.5
18 Communities	1253.9
Canada's Population	23,681.0

\* Census Metropolitan Area (CMA)

+ Metropolitan Area

1.25 million of Canada's 23.68 million people, or 5.3% of the country's population, live in the 18 smaller communities of 50,000 to 100,000 people.

Source: Financial Post Survey of Markets, 1980.

## XI

### BARRIERS AND CONSTRAINTS

#### A. CONSOLIDATION OF MEAT AND POULTRY BY INDIVIDUAL CHAINS

##### 1. Institutional and technical constraints

Some chains have overcome the constraints to individual chain consolidation of meat and poultry products. Steinbergs of Montreal, Loblaw's of Toronto, and Oshawa Grocers are doing centralized distribution of some products. Each of these chains serves most of Southern Ontario from a single distribution centre in Toronto. This is a completely parallel system to the ones in place for dry groceries, frozen products, and butter, cheese and margarine. They channel all or some of the meat and poultry products through these warehouses.

The trend to central consolidation in meat and poultry may also involve changes in the location of food manufacturing. For example, Steinbergs have established centralized cutting in their Toronto and Montreal distribution warehouses. Thus, the distributor becomes the final processor in this situation. Dressed meat carcasses or "wholesale" cuts are shipped from the processor to the chain meat cutting and distribution centres. Here the meat is cut into "retail" cuts which are shipped to the store.

Where meat is supplied directly to the store, there is also a trend to supplying retail cuts instead of carcasses or quarters. In beef, this type of product is called "boxed beef".

There are potential distribution cost savings associated with any centralization of the cutting process. Excess inedible scrap is not transported. More saleable weight of meat can be carried in a truck. The distribution costs for the associated rendering business are also reduced. The renderer obtains his waste at one location instead of operating a pick-up route.

However, centralized cutting by the chains, and boxed beef, are not strictly distribution issues. For example, the meat cuts available to the consumer are then determined by what was shipped from a warehouse the previous day. The range of consumer choice may be reduced.

##### 2. Sharing the benefits

Presently most meats are sold based on a delivery price to the store door. With central consolidation by individual chains, meat would be sold directly to the chain distribution centre. The manufacturer would quote a delivered price for a trailer load of meat or poultry. There would

be a shift in the distribution cost burden; the manufacturer would no longer be performing the local delivery function. The manufacturer's order taking function would be greatly simplified. He would be selecting pallet loads instead of case loads. By contrast, the chain merchandiser would incur distribution costs. He would be keeping the product on his dock for a short period of time. He would be performing order taking, and also local delivery.

This shift in the incidence of the distribution cost burden would be reflected somewhat in the newly negotiated prices. However, each manufacturer will experience different savings and distribution costs. For example, the manufacturer may still have to send a truck into the area to service other customers. Therefore, he may not experience a proportionate reduction in line haul costs. Ultimately, delivered prices to the chain distribution centres will have to be negotiated between individual manufacturers and individual chains.

Each chain will also project different costs in their meat distribution operation. The decision of whether to go ahead with centralized distribution will be affected by their network of stores, and their method of consolidation. For example, one chain might have extra warehouse space currently available to do the consolidation. The opportunity cost to them of that space is \$0. Another chain might be contemplating building a completely new facility. The construction costs of a refrigerated depot or warehouse are currently very high. Thus, the final decision on central consolidation will involve unique cost considerations and negotiations for every chain. Consequently, if central consolidation is undertaken, the delivered price to the stores will also be different for every chain. This is a matter for each chain to decide themselves.

### 3. Potential scheduling problems

Fresh meat and poultry must be delivered within approximately 24 hours of leaving the processing plant warehouse. Consolidation by the chains introduces an additional step in the process. The product would now move from the plant warehouse to the consolidation point to the store, instead of directly to the store. The chain consolidation centre will be required to compress the consolidation operation into a very short time span. This includes scheduling the receiving, performing the dock work, and scheduling the delivery departures.

The main problem would be scheduling receiving from a variety of different meat and poultry processors. The details would have to be worked out by each individual chain with its suppliers.

#### 4. Other constraints

There are no legal constraints to consolidation of meat and poultry by chain merchandisers. This is the same method of distribution employed for most other commodities currently.

There are no competitive barriers to consolidation by individual chains. Each chain would perform the consolidation on its own, without collaboration with other distributors.

### B. CONSOLIDATION OF MEAT AND POULTRY FOR INDEPENDENT STORES

#### 1. Institutional and technical constraints

If the majority of the chains undertake centralized consolidation and distribution, the cost of direct delivery from manufacturers to independents would become very high. Some consolidation of meat and poultry shipments for independent retail stores could therefore be organized to keep distribution costs down. Many independent grocery stores are owner operated. The owners may be working long hours daily simply to operate their businesses. They would be unlikely to have the time to organize a co-operative distribution scheme. The most likely organizer for such a scheme would be a third party entrepreneur. This would likely be a wholesaler or carrier who currently specializes in refrigerated products distribution.

Such an entrepreneur would have to approach several manufacturers. A price from each manufacturer f.o.b. a Toronto consolidation point, would be negotiated. Delivered prices to Kingston would then be computed by the entrepreneur. The final price would include a profit for the consolidator.

The feasibility would mainly be determined by the volume that the entrepreneur could develop through the Toronto consolidation point. It would also depend on whether the manufacturer foresaw savings and delivery cost -- could he pull his truck out of the area?

The success of this scheme would depend largely on the skill of the entrepreneur. He would have to identify the origin of the meat and poultry going to Kingston independents. He would then have to secure a high proportion of this business.

#### 2. Other constraints

There are no legal barriers to consolidation of meat and poultry for independent stores. A potential illegal variation of these scheme would

occur if the independents ran their own truck with products for all stores on it. This arrangement is illegal under the Public Commercial Vehicles Act of Ontario. It would be necessary for a licensed carrier to perform the operation. Alternatively, a specialized wholesaler could be the consolidator if he bought the goods from the manufacturers and resold them to the retailers.

There are no competitive barriers for consolidation for independent stores. There would be no collaboration by the independents.

### C. POOLED COMMUNITY WAREHOUSING FOR DRY GROCERIES

This system's savings result mainly from Kingston's unique location between Toronto and Montreal. This in itself constitutes a constraint. A community warehouse supply scheme for Kingston would constitute a special arrangement within each chain's otherwise integrated distribution network in Southern Ontario. A chain might be unwilling to alter its systems to accommodate this scheme if it felt it was not duplicatable elsewhere in Ontario or in other provinces.

#### 1. Institutional and technical constraints

##### a) Finding a warehouse operator

If a community warehouse was established in Kingston, it would have to be operated by a third party entrepreneur. It would not be possible for it to be jointly operated by manufacturers. They would then have to share sales volume statistics with each other in order to develop a plan to operate the warehouse. This would be a potential violation of competition legislation. Furthermore, the manufacturers themselves would not be willing to share this information.

Similarly, it could be proposed that the food chains organize a community warehouse. However, the same constraints would prohibit them sharing sales volume information with their competitors.

The most probable alternative is that a third party entrepreneur could establish the public warehouse for dry groceries in Kingston. He would concentrate his efforts on selling space to Montreal area manufacturers first. The Montreal manufacturers would have to negotiate with the chains to sell their product f.o.b. Kingston retail stores, instead of f.o.b. the distribution warehouse as it is currently sold.

##### b) Sharing the benefits

Kingston is currently one of several Eastern Ontario communities served by most chains from Toronto distribution warehouses.

If a community warehouse were established only for Kingston, the chains might still have to operate almost the same number of trucks down to the Eastern Ontario area. The establishment of the warehouse might simply mean that the trucks are less full. This would partially depend on the catchment area of the warehouse.

An additional consideration for the chains is that the store ordering system would have to be modified for Kingston stores. On Kingston orders, the computer at the distribution centre would have to separate out all products that were stored in the community warehouse. A number of separate orders would have to be generated for these products and passed on to the appropriate manufacturers. Then the chains would have to decide how infrequently they could go to Kingston, and still keep the other products in stock.

The Montreal manufacturers would benefit from reduced long-distance transport costs if they could ship directly to Kingston. They would have to absorb partially off-setting public warehousing costs, remote inventory control costs and delivery costs.

The success of the public warehouse would depend on:

- ▶ The skill of the entrepreneur in interesting the manufacturers.
- ▶ The outcome of negotiations between manufacturers and chain stores.

The first constraint hinges on identifying a potential public warehouse operator, and sufficient space in the Kingston area.

The second constraint would depend on how the individual chains and manufacturers evaluate their costs, including the opportunity costs for changing their systems. The overall success would depend on whether there are enough contracts approved for the warehouse operator to feel that it is worthwhile to proceed with the project. This also depends on his degree of risk acceptance, and his desired profit margin.

The operator might decide to increase his chances of success by increasing the scope of his market. This could be achieved by:

- ▶ Increasing the catchment area of the warehouse.
- ▶ Expanding the product range and operating a full range public warehouse.

Increasing the catchment area would provide a more attractive service for manufacturers to offer chains. Chains might be able to reduce delivery operations throughout a complete section of Eastern Ontario. Savings by chains might be more achievable in this case.

If a full range public warehouse were contemplated, a complete feasibility study would have to be undertaken in Kingston.

## 2. Other constraints

There are no legal constraints to the operation of a public warehouse for dry groceries. Dry groceries are currently being stored in many such warehouses in communities throughout Canada.

There are no competitive restrictions to the operation of a public warehouse. As long as it does not involve competitors sharing operating statistics with each other, the scheme is not a problem.

## D. CONSOLIDATION OF MEAT AND POULTRY BY ALL MANUFACTURERS

### 1. Institutional and technical constraints

The manufacturers would not likely attempt to organize themselves to perform a cooperative distribution scheme for Kingston stores. As previously discussed, this would require sharing sales volume information which would entail potential violations of competition legislation. They would, furthermore, not want to share this information among themselves.

Thus, a third party entrepreneur would be the most likely organizer for consolidation scheme for delivery to Kingston. He would likely be a carrier or wholesaler who currently specializes in refrigerated product distribution.

A carrier would develop some costs for performing the consolidation and delivery, and prepare a proposal for the manufacturers. Each manufacturer could decide if the consolidator's quoted prices offered him savings over his current operation. The carrier would go ahead once he achieves significant volumes to fill his trailer. The manufacturer would have to decide if the costs associated with Kingston deliveries could be eliminated.

The wholesaler could alternatively undertake the consolidation. This implies the shift in buying and selling relationships as well as distribution methods. Technically, the wholesaler would sell the product to the stores. However, shipments would most likely be presold by the suppliers. The loads would pass straight through the wholesaler's depot or warehouse, and onto a Kingston trailer. Thus, the wholesaler would be offering essentially the same service as the carrier. Each manufacturer would have to decide if there was enough incentive for him to participate.



The success of this scheme would depend largely on the skill of the entrepreneur. He would need to persuade enough major manufacturers to achieve daily or almost daily service to Kingston. This will enable him to match the service some manufacturers are now giving to their best customers.

2. Other constraints

There are no legal barriers to consolidation of meat and poultry for all stores. The potential illegal variation would occur if one of the manufacturers ran their own truck with products from other manufacturers on it. A similar potentially illegal arrangement would occur if one of the stores wanted to run their own truck with products for other stores.

There are no competitive barriers to consolidation for all stores, as described above. There would be no collaboration by the manufacturers or by the stores.

E. POOLED TRANSPORT OF MEAT AND POULTRY BY MAJOR MANUFACTURERS

1. Legal constraints

It is not legal for one manufacturer to carry goods for other manufacturers under the Public Commercial Vehicles Act of Ontario. There are also problems with ownership of freight while it is in transit. There would also be a potential violation of competition legislation if the competing manufacturers got together to plan a joint distribution scheme. A potential violation of the competition legislation could occur whether they wanted to run their own truck, or whether they simply wanted to negotiate a special rate with a specialized refrigerated carrier. The manufacturers are, in any case, reluctant to share information, as previously discussed.

The most likely operator of a pooled transport scheme would be a third party entrepreneur. It would most likely be a specialized refrigerated carrier that was in a position to offer the service.

2. Institutional and technical constraints

A specialized refrigerated carrier would have to identify groups of major manufacturers that were in the same geographical area. He would have to approach them with a proposal regarding pick-up and direct delivery to Kingston stores. He would have to arrange somewhere to do a rearrangement of the load in stop order at, or after, the last pick-up stop. He would have to arrange to pick-up enough to fill a trailer. However, he would need to have a method to cope with overflow

on any given day. For example, chains are always having sales in meat and poultry products. The volume of sale products required at the store increases dramatically from normal order volumes.

The manufacturers would have to be able to see savings through the service being offered. This would either be from deleting delivery routes or reducing their freight bills from carriers. The proposal by the carrier would be worth different amounts to different manufacturers. The carrier would also need to build a profit into his proposal.

There would be potential dispatching problems for the operator as well. A driver in South-Western Ontario could not likely pick-up from four manufacturers and make delivery in Kingston on the same day. Therefore, a second driver and tractor would be required to cover this distance.

Success of this scheme would depend largely on the skill of the carrier. He would need the right mix and geographic concentration of suppliers before he could be assured of a profitable venture.

### 3. Other constraints

If this scheme was operated as proposed above, there would be no legal or competitive barriers.

APPENDIX A  
FUNCTIONS FOR COST ELEMENTS

## Appendix A

### FUNCTIONS FOR COST ELEMENTS

This appendix outlines the functions used to calculate the value of cost elements. Calculations of cost element values for distribution alternatives are shown in the appendices which follow. Functions were initially developed for the distribution of non-perishable freight, in non-temperature controlled environments. These functions were applied to dry groceries.

In section E, cost functions developed for the distribution of freight requiring refrigeration are presented.

#### A. TRANSPORT COST ELEMENTS

Transport cost elements include long distance or inter-city movements, and local or intra-city movements. Tractor-trailers or trucks may be used.

##### 1. Long distance

Long distance cost elements include the following:

- ▶ Transport to public warehouse, forwarder or carrier Toronto terminal (for movements originating outside Toronto).
- ▶ Transport to distribution warehouse (for movements originating outside Toronto).
- ▶ Transport to Kingston.

Long distance movement costs are calculated based on mileage. The cost of operating a tractor-trailer is \$1.10 per mile as shown in Exhibit A-1. The cost of operating a truck is \$.70 per mile as shown in Exhibit A-2.

Long distance trip costs are calculated in Exhibit A-3 for the five transport movements involved in the distribution of dry groceries. It was assumed that the average distance from the South-Western Ontario region to Toronto was 100 miles, one-way.

The maximum load for a tractor-trailer is assumed to be about 45,000 lbs. The maximum load for a truck is assumed to be about 24,000 lbs.

EXHIBIT A-1. Cost of tractor-trailer operation (100,000 miles per year).

	<u>Cost Per Mile</u>
<u>Tractor Costs</u>	
Maintenance lease plus insurance: $\$28,890 + \$.263/\text{mile}^1$ (includes fuel)	\$0.552
Assume tractor runs + 100,000 miles per year	
<u>Trailer Costs (Two Trailers)</u>	
Maintenance lease: $17,690 + \$.042/\text{mile}^1$	
Assume trailers run 100,000 miles between them	0.219
<u>Labour</u>	
\$15 per hour including benefits x 8 hours = \$120/trip	
Assume average trip 350 miles	<u>0.343</u>
Total	\$1.114
Assume	<u>\$1.10</u>

<sup>1</sup>1979 quotation from Brazeau Transport + 5% for 1980.

EXHIBIT A-2. Cost of truck operation (long-distance use), 100,000 miles per year

	<u>Cost Per Mile</u>
<u>Maintenance Lease</u>	
With insurance \$18,343 + 5.6¢/kilometer <sup>1</sup> - cost per mile	\$0.273
<u>Fuel (Through Ryder Truck Rental)<sup>1</sup></u>	
100,000 miles at 8 mpg x \$1.00 per gal. = \$12,500	0.125
<u>Labour</u>	
\$15.00 per hour including benefits x 8 hours = \$120/trip	
Assume average trip 350 miles	<u>0.343</u>
Total	\$0.741
Assume	\$0.75 =====

<sup>1</sup>1980 quotation from Ryder Truck Rental.

### EXHIBIT A-3. Long distance transport trip costs

	Return Mileage	Truck Costs	Tractor-Trip Costs
Cost per mile		\$0.75	\$1.10
<u>Lane</u>			
S.W. Ontario - Toronto	200	150.00	220.00
Montreal - Toronto	680	510.00	748.00
Toronto - Kingston	330	247.50	363.00
S.W. Ontario - Kingston	530	397.50	583.00
Montreal - Kingston	350	262.50	385.00

#### 2. Local transport costs

Local transport costs cover the following movements when they are intra-city or intra-regional:

- ▶ Pick up.
- ▶ Intra-city moves between distribution facilities:
  - Transport to public warehouse, forwarder or carrier terminal.
  - Transport to distribution warehouse
- ▶ Delivery - truck and driver.

Costs were established based on the estimated cost to hire a vehicle and driver for local cartage work:

- ▶ \$20.00 per hour for man and truck.
- ▶ \$27.00 per hour for man and tractor-trailer.

Cost functions for each of the local cost elements involved a number of components:

- ▶ Trip costs:
  - Driving time
  - Driver's personal time

- ▶ Stop costs
  - Parking
  - Paperwork
- ▶ Loading or unloading. (Note that this refers to costs of vehicles and driver. "Handling" costs incurred by the warehouse or store are calculated separately.)

Assumptions about some components varied from alternative to alternative. For example, the trip portion of a delivery run would be shorter for a truck covering Kingston than for one covering half of Eastern Ontario.

For trip costs, a driver's personal time allowance of 15 minutes was included in each calculation. The balance of time covered the driving. Driving time was estimated to reflect the size of the area covered, and the potential congestion involved.

"Fixed" stop costs were based on the following estimates:

- ▶ 5 minutes per stop for paperwork.
- ▶ 3 minutes per stop for parking.

Loading or unloading costs were based on handling times. The local transport portion of loading or unloading cost represents the cost of tying up a vehicle and driver during loading or unloading. Handling costs and handling times are discussed in the next section.

The cost function for local transport costs is as follows:

$$\left[ \frac{\text{Trip Time} + \text{Stop Time}}{\text{No. of Cases}} + \frac{\text{Variable Handling}}{\text{Time Per Case}} \right] \text{ Minutes} \\
 \times \left( \frac{\text{Cartage Rate Per Hour For Man and Vehicle}}{60 \text{ Minutes}} \right)$$

- ▶ Trip Time = Driver personal time allowance + driving time  
= 15 min. + driving time
- ▶ Stop Time = (Parking + paperwork) x number of stops  
= 8 min. x number of stops
- ▶ Variable handling time based on handling unit (case or pallet)



► Cartage rates:

- \$27.00 per hour for man and tractor-trailer.
- \$20.00 per hour for man and truck.

More specific assumptions for the various local transport cost elements are discussed below.

a) Pick-up costs

The following types of pick-ups occur in the distribution alternatives:

- Pick-up from several manufacturers by carrier or jointly operated pooled transport service.
- Pick-up from several distribution warehouses by carrier or jointly operated pooled transport service.

Intra-urban trip times for pick-up routes varied between about 1 and 4 hours depending on the estimated proximity of pick-up locations and the number of pick-ups.

Pick-up costs in South-Western or Eastern Ontario regions were estimated to be twice the pick-up costs in urban areas. This is due to the much greater distances involved. Manufacturer locations are spread throughout various towns and cities in these regions.

b) Intra-city moves between distribution facilities

Driving time between warehouses in urban areas was estimated to involve approximately a 2 to 2½ hour return trip. This includes an allowance for delays typically associated with accessing large distribution warehouses.

c) Delivery - truck and driver

Generally, it was assumed that it would require one hour to complete a delivery route within the Kingston area. Where routes covered a larger area, driving time was increased up to two hours. It was assumed that delivery routes servicing strictly independents are longer than routes servicing chains. Delivery routes to independents cover more stores. They also tend to penetrate more into rural areas where food sales are insufficient to justify locating chain stores.

Delivery load factors are restricted by the amount of available time in the delivery area, as well as by the size of the vehicle. Where deliveries are made by a local driver, the size of vehicle is generally the only limiting factor. Where delivery runs are made from Toronto, time may be more crucial. On a delivery run from Toronto, the long distance transport leg (which is costed separately) takes seven hours out of the working day. Drivers work long days, however, it was assumed that 12 hours would represent the maximum driver shift.

Taking seven hours out of the shift for long distance travel, five hours remains for local delivery time. Driving time between stops and drivers breaks consume 1.5 to 2 hours of this amount. Only about three hours remain to deliver the entire load.

As discussed previously, each stop requires eight minutes plus unloading time. The unloading time will be the same at every stop, as we have calculated average store delivery quantities for each alternative. Therefore, the maximum load that can be delivered is calculated as follows:

1. 
$$\frac{(12 \text{ hours} - \text{transport time} - \text{trip time})}{(8 \text{ minutes} + \text{unloading time at store})} = \text{maximum stops}$$
2. maximum stops x cases per stop = maximum load

Where time-restricted maximum load was less than load capacity of the vehicle, then maximum load was the load factor used.

## B. HANDLING COST ELEMENTS

Handling cost elements are as follows:

- ▶ Receive
- ▶ Put away
- ▶ Order fill and marshall
- ▶ Load
- ▶ Sort
- ▶ Marshall

Exhibit A-4 identifies which activities may occur at the various distribution facilities. Exhibit A-5 identifies cost functions that we have developed for the handling cost elements. Note that costs per case are based on the 60 cases per pallet assumed for dry groceries. The cases per pallet will vary by commodity group, and therefore, so will the cost functions.

EXHIBIT A-4. Handling cost elements at distribution facilities

Distribution Facilities	Cost Elements				
	Receive	Put Away	Order Fill & Marshall	Sort & Marshall	Load
Plant warehouse			X		X
Public warehouse	X	X	X		X
Freight forwarder	X		X	X	X
Carrier terminal	X			X	X
Distribution warehouse	X	X	X		X
Pooled community depot	X		X	X	X
Pooled community warehouse	X	X	X		X
Retail store	X				

EXHIBIT A-5. Cost standards for physical handling of dry groceries

Time Element	Handling Unit	Time Standard	No. of Cases Per Pallet	Cost Per Shipment (Labour: \$15/hr.)
1. Receive	Pallet	5 min. + 2 min. per pallet	60	\$1.25 + .50 per pallet
	Case	5 min. + .1 min. per case		\$1.25 + .025 per case
2. Put away	Pallet	3 min. per pallet	60	\$.013 per case
	Case			
3. Order fill & marshall	Case	3.3 cases per min. + 3 min. per pallet	60	\$.089 per case
	Pallet	Select: 2 min. per pallet + travel time: 3 min. per pallet	60	\$.021 per case
4. Load	Pallet	5 min. + 2 min. per pallet	60	\$1.25 + .025 per pallet
	Case	5 min. + .1 min. per case		\$1.25 + .025 per case
5. Sort	Case	250 cases per hr.	-	\$.06 per case
6. Marshall	Case	250 cases per hr.	-	\$.06 per case
	Pallet	3 min. per pallet	60	\$.013 per case

### C. STORAGE COST ELEMENTS

Storage costs were assumed to be \$3.00 per pallet position per month. Storage costs are incurred at three stages in the system:

- ▶ Public warehouse.
- ▶ Distribution warehouse.
- ▶ Kingston pooled community warehouse

#### 1. Public warehouse

Average turns per year is 6. Average charge per pallet:

▶ 2 months at \$3.00/pallet/month = \$6.00

▶ Assume pallet in - pallet out:

∴ average 60 cases/pallet

Storage cost is  $\$6.00 \div 60 = \$0.10$  per case

#### 2. Distribution warehouse

Assume 20 inventory turns per year. Average cost per pallet is:

▶  $\$3.00/\text{mo.} \times 12 \text{ mos.} \div 20 \text{ turns/year} = \$1.80/\text{pallet}$

Assume pallet averages 50% full, or 30 cases.

▶ Storage cost is  $\$1.80/\text{case} \div 30 \text{ cases} = \$0.06/\text{case}$ .

#### 3. Kingston pooled community warehouse

Assume average turns per year is 6, as in public warehouse; therefore cost is also \$0.10 per case.

### D. ADMINISTRATIVE COST ELEMENTS

There are a variety of administrative costs associated with a distribution system. Components of administrative cost were discussed in Chapter II. The best basis for allocation is per order.

We have assumed that the administrative costs associated with making up a normal order are \$4.00 per order. This is based on an assessment of 16 minutes of administrative time at \$15.00 per hour. The \$15.00 per hour covers basic labour plus out-of-pocket expenses associated with processing the order, e.g.:

- ▶ Order picking/bill of lading forms.
- ▶ Accounting/billing forms.
- ▶ Data processing costs.
- ▶ Associated cost control report forms.

In addition there are administrative costs incurred at the retail store. We have estimated these costs as follows:

4 minutes per order at \$15.00 per hour = \$1.00 per order

This includes checking stock, making up the order, and verifying invoices.

There are also more specialized administrative costs associated with some of the alternatives. Freight may be shipped to a Toronto terminal, a local carrier, or a pooled community depot for consolidation. We have estimated consolidation costs as follows:

2 minutes per order at \$15.00 per hour = \$.50 per order

This applies to consolidation of orders which have already been filled and addressed.

On some consolidations, order filling may also take place, as in a number of the alternatives. Here, a bulk order is shipped from the manufacturer(s) to the consolidation point. At the consolidation point, orders are broken out and aggregated by store. Store orders are then assembled into delivery runs. In these cases, administrative costs of \$4.00 per order are assessed since full order-processing activities are involved.

Administrative cost elements are summarized in Exhibit A-6.

EXHIBIT A-6. Administrative cost elements

Administrative Activity	Admin. Cost Incurred By	Admin. Time Allocated Per Order (Min.)	Admin. Cost Per Hour (Incl. Out-Of-Pocket Expenses)	Cost Per Order
Order processing	Plant whse. Distrib. whse. Public whse. Pooled commun. whse. Forwarder	16	15.00	4.00
	Retail store	4	15.00	1.00
Consolidation	Forwarder Pooled commun. whse. Local carrier Distrib. whse.	2	15.00	.50

E. COST FUNCTIONS FOR DISTRIBUTION OF REFRIGERATED PRODUCTS

1. Transport cost elements

a) Long distance transport costs

Common carrier rates for temperature controlled transport are 20% higher than those for ordinary transport. This was established by a comparative sample of rates for highway service between several Southern Ontario city pairs (see Exhibit A-7). Transport cost per mile for perishable food commodities has been raised by 20% to reflect the established differential; to \$0.92 per mile for trucks, and \$1.32 per mile for tractor-trailers.

Accordingly, long distance transport trip costs for perishable products are calculated in Exhibit A-8.

EXHIBIT A-7. Comparison of transport tariffs for dry groceries and refrigerated goods

From	To	Minimum Weight	Dry	Refrigerated	Tariff Reference Number	
					Dry	Refrigerated
Toronto	Hamilton	40K	\$ .51	\$ .59	1085	1930-1940
Toronto	Kingston	40K	.75 <sup>1</sup>	.97	1095	1930-1940
Toronto	London	40K	.78	.87	1060	1930-1940
Toronto	Windsor		.94	1.26	1060	1930-1940
Toronto	Sarnia		.90	.97	1130	1930-1940
Totals			\$3.88	\$4.66		

<sup>1</sup> Drop off charge of \$42.50 added  
11¢/cwt. to published 40,000 lb rate

Rate Differential:

$$(4.66 - 3.88) \div 3.88 = 20\%$$

Therefore, transport with temperature control costs 20% more than ordinary transport.

Source: Ontario Foodstuffs Tariff No. 6C. Issued and Filed with the Ontario Highway Transport Board by Canadian Transport Tariff Bureau Association, Toronto, Canada.  
Rates in effect as of February, 1980.



EXHIBIT A-8. Long distance transport costs for refrigerated products.

	Return Mileage	Truck Costs	Tractor-Trailer Costs
Cost per mile		\$ .90	\$ 1.32
<u>LANE</u>			
S.W. Ontario - Toronto	200	180.00	264.00
E. Ontario - Toronto	250	225.00	330.00
Montreal - Toronto	680	612.00	897.60
Toronto - Kingston	330	297.00	435.60
S.W. Ontario - Kingston	530	477.00	699.60
E. Ontario - Kingston	170	153.00	224.40
Montreal - Kingston	350	315.00	462.00

b) Local transport costs

Local costs are calculated by adding 20% to the local cartage rates applied for dry groceries:

- ▶ Man and tractor-trailer \$32.40/hr
- ▶ Man and straight truck \$24.00/hr

The cost function for local transport costs is unchanged except for variable handling time (driver's time) per case. This increases by 30% to .130 minutes per case. The 30% increase was applied to all handling costs.

There were no additional assumptions made regarding pick-ups or deliveries, specifically for refrigerated products.

2. Handling cost elements

Handling times are significantly slower for refrigerated goods. The cold environment and the lower temperature of the cases slows down workers' movements. More frequent breaks are required to keep workers warm. We estimated that handling of refrigerated products is 30% slower than handling of regular freight.

Each variable handling time in the cost functions was increased by 30%. For loading and receiving, we had provided a five minute allowance for paperwork for regular freight. This was left unchanged. The cost standards for physical handling of refrigerated goods are contained in Exhibit A-9.

We assumed the following case quantities would constitute full pallet loads for the respective refrigerated commodity groups:

- ▶ Meat and poultry - 20 cases per pallet      1,200 lbs
- ▶ Butter, cheese and margarine - 60 cases per pallet      1,140 lbs
- ▶ Frozen food - 60 cases per pallet      1,020 lbs

### 3. Storage cost elements

The current and alternative systems for refrigerated commodity groups involved storage at central distribution warehouses in Toronto. There were no other storages involved.

We surveyed public refrigerated warehouse rates to establish storage costs. There is a current shortage of public refrigerated storage space and rates are being driven up. Therefore, rates chosen were at the lower end of the scale.

For refrigerated merchandize, monthly rates currently range from \$0.50 to \$0.70 per cwt. We used \$0.50 per cwt. This results in a change of \$6.00 per pallet per month for a pallet weight of 1,200 lbs:

$$\$0.50/\text{cwt}/\text{mo.} \times \frac{1,200 \text{ lbs/pallet}}{100 \text{ lbs/cwt}} = \$6.00/\text{pallet}/\text{mo.}$$

The per case monthly storage cost for meat and poultry is \$6.00 per pallet  $\div$  20 cases per pallet = \$0.30 per case. A pallet of dairy or frozen products weighs somewhat less than 1,200 lbs. However, the smaller cases are usually subject to a minimum of at least \$0.10 per case per month. This is equivalent to \$6.00 per pallet per month for a pallet load of 60 cases. Therefore, for frozen and dairy products, we used \$0.10 per case per month for a storage charge.

Storage costs assessed were based on assumptions about turnover. For meat and poultry, we assumed a minimum turnover of once every one to two weeks, or three times a month. Therefore, storage costs are:

$$\$0.30/\text{case}/\text{mo.} \div 3 \text{ turns per month} = \$0.10 \text{ per case}$$

For butter, cheese and margarine, we assumed an average of one turn per month:

EXHIBIT A-9. Cost standards for physical handling of refrigerated goods<sup>1</sup>

Time Element	Handling Unit	Time Standard	Cost Standard @ \$15.00/hr
Receive	Pallet	5 min. + 2.6 min./pallet	\$1.25 + \$0.65/pallet
	Case	5 min. + .13 min./case	\$1.25 + \$0.033/case
Put away	Pallet	3.9 min./pallet	\$.975/pallet
Order fill & marshall	Pallet	6.5 min./pallet	\$1.625/pallet
	Case to pallet	2.54 cases/min. + 3.9 min./pallet	\$0.098/case + \$0.975/pallet
Load	Pallet	5 min. + 2.6 min./pallet	\$1.25 + \$0.65/pallet
	Case	5 min. + .13 min./case	\$1.25 + \$0.033/case
Sort	Case	192 cases/hr.	\$0.078/case
Marshall	Case	192 cases/hr.	\$0.078/case
Sort & Marshall	Case	96 cases/hr.	\$0.156/case

<sup>1</sup>It is assumed that handling cases of refrigerated goods is 30% slower than dry groceries so standards have been adjusted accordingly.

$$\$0.10/\text{case}/\text{mo.} \div 1 \text{ turn}/\text{mo.} = \$0.10/\text{case}$$

For frozen products, we assumed an average of six turns per year or .5 turns per month:

$$\$0.10/\text{case}/\text{mo.} \div .5 \text{ turns per mo.} = \$0.20 \text{ per case}$$

4. Administrative cost elements

There were no changes in the cost functions used to calculate administrative costs.

APPENDIX B

DERIVATION OF FLOWS FOR DRY GROCERIES  
DISTRIBUTION ALTERNATIVES

## Appendix B

### DERIVATION OF FLOWS FOR DRY GROCERIES DISTRIBUTION ALTERNATIVES

In Chapter V, flows for dry groceries were derived. The statistical summary of flows is repeated here as Exhibit B-1. Cost element values are calculated in Exhibits B-2 to B-6.

#### A. POOLED TRANSPORT BY MAJOR MANUFACTURERS TO KINGSTON CHAIN STORES

Each major manufacturer supplies the equivalent of 310 cases of dry groceries per week to all Kingston's chain stores. Every four weeks, each major manufacturer could ship a trailer load for immediate distribution.

However, stores currently rely on receiving dry groceries shipments at least once a week. Assume that service is provided once a week by groups of four manufacturers. Assume that it is arranged that one-third of all manufacturers ship on each of three designated days of the week to spread out the delivery load. Each designated day, 20 manufacturers, or five groups of four, would ship to Kingston. The total moving into Kingston on each of the three days would be approximately 6,200 cases, 1,240 from each group of four.

Each store would get about 130 cases per delivery. Each truck would make about five stops per trip from the depot.

#### B. POOLED TRANSPORT BY MAJOR MANUFACTURERS TO KINGSTON STORES

Each major manufacturer supplies the equivalent of 360 cases of dry groceries per week to all Kingston stores. Assume that service is provided once a week, as in alternative 1a.

There are five groups with four manufacturers in each group, shipping each of three designated delivery days. The total moving into Kingston each day would be approximately 7,200 cases, 1,440 from each group of four.

Each of the 150 stores would get about 50 cases. Each truck would make about 12 stops per trip from the depot.

EXHIBIT B-1. Statistical summary of Kingston dry groceries distribution  
by type of manufacturer

	No. of Cases		
	Chains	Independents	All Stores
	85% 46 Stores	15% 39 Stores	100% 85 Stores
1) ALL MANUFACTURERS			
Annual	1,190,000	210,000	1,400,000
Weekly	22,880	4,040	26,920
Weekly average per store	500	40	180
2) 60 MAJOR MANUFACTURERS SUPPLY 80% OF DRY GROCERIES			
All manufacturers to all stores			
Annual	952,000	168,000	1,120,000
Weekly	18,310	3,230	21,540
All manufacturers to single store			
Annual	20,700	1,620	7,470
Weekly	400	31	140
Single manufacturer to all stores			
Annual	15,878	2,800	18,670
Weekly	310	50	360
Single manufacturer to single store			
Annual	350	27	120
Weekly	7	<1	2
3) 240 MINOR MANUFACTURERS SUPPLY 20% OF DRY GROCERIES			
All manufacturers to all stores			
Annual	238,000	42,000	280,000
Weekly	4,570	810	5,380
All manufacturers to single store			
Annual	5,170	400	1,870
Weekly	100	8	36
Single manufacturer to all stores			
Annual	990	175	1,170
Weekly	20	4	22
Single manufacturer to single store			
Annual	22	2	8
Weekly	<1	<1	<1

EXHIBIT B-2. Long distance transport costs per case for dry groceries

	South-West Ontario to Toronto	Montreal to Toronto	Toronto to Kingston	South-West Ontario to Kingston	Montreal to Kingston	Eastern Ontario to Kingston	Eastern Ontario to Toronto
<u>TRIP COSTS</u>							
Tractor-trailer cost	220.00	748.00	363.00	583.00	385.00	N.A.	N.A.
Truck cost	150.00	510.00	247.50	397.50	262.50	N.A.	N.A.

Cost Elements	Alternatives	Tractor- Trailer (T.T.) or Truck	No. of Cases	<u>COST PER CASE</u>		
Transport to public warehouse or forwarder	CV, NP	T.T.	1500	.147	.499	
	2a	Truck	610	.246		
	2b	Truck	720	.208		
Transport to distribution whse.	CD	T.T.	1500	.147	.499	
Transport to Kingston	CV, CD - Chains	T.T.	1200		.303	
	NP - Chains					
	1a	T.T.	1240		.293	.470
	2a	T.T.	1240		.293	.310
	1b, 2b	T.T.	1440		.252	.405
	3	T.T.	1200		.303	.486
	4	T.T.	1500		.242	.389
	CV, CD - Indep.	Truck	520		.476	
	NP - Indep.	Truck	380		.651	

Key to Current and Alternative Systems:

- 1a - Pooled transport by major manufacturers to chain stores
- 1b - Pooled transport by major manufacturers to all stores
- 2a - Consolidation at Toronto terminal; delivery to chains
- 2b - Consolidation at Toronto terminal; delivery to all stores
- 3 - Direct haul to pooled community depot; delivery to all stores
- 4 - Pooled community warehouse; delivery to all stores
- NP - Non-pooled freight
- CD - Current system - freight moves direct from manufacturer to central distribution warehouse
- CV - Current system - freight moves from manufacturer to temporary storage in public warehouse



EXHIBIT B-3. Local transport cost calculations for dry groceries

Cost Element	Alternatives	Trip Time -Fixed  (Min.) A	Stop Time Per Stop Parking & Paperwork  (Min.) B	No. of Stops  C	Stop Time -Fixed  (Min.) BxC = D	Sub- Total -Fixed  (Min.) A+D = E	No. of Cases  F	"Fixed" Time Per Case  (Min.) E-F = G	Variable Handling Time (min) (Driver's Time) Per Case  H	Total Delivery Time Per Case  (Min.) G+H	Rate Per Hour	Cost Per Case
Tractor-trailer rate											27.00	
Truck rate											20.00	
<u>Cost Elements</u>												
Pick-up Tor., Mtl.	1a, 1b - Tor. & Mtl.	75	.8	4	32	107	1200	.089	.033	.122	27.00	.054
	1a, 1b - S.W. Ont.									.244	27.00	.108
Transport to public whse. or freight forwarder	2a, 2b	165	8	1	68	173	600	.288	.033	.321	20.00	.107
Transport to dist. warehouse	Non-pooled from public warehouse											
	C - Toronto	165	8	1	8	173	1500	.115	.033	.148	27.00	.067
Delivery vehicle and driver	C - Chains Non-pooled to chains	75	8	5.8	46.4	121.4	1200	.101	.100	.201	27.00	.090
	C- Indep.	135	8	13	104	239	520	.460	.100	.560	20.00	.187
	1a	75	8	5	40	115	650	.177	.100	.270	20.00	.092
	2a	75	8	7.6	61	136	1200	.113	.100	.213	27.00	.095
	1b	75	8	12	96	171	600	.285	.100	.385	20.00	.128
	2b	75	8	10	80	155	600	.258	.100	.358	20.00	.119
	3	75	8	7	56	131	600	.218	.100	.318	20.00	.106
	4	75	8	5.5	44	119	600	.198	.100	.298	20.00	.099
	Non-pooled to indep.	135	8	16	128	263	380	.692	.100	.792	20.00	.264

Key to Current and Alternative Systems:

- C - Current
- 1a - Pooled transport by major manufacturers to chain stores
- 1b - Pooled transport by major manufacturers to all stores
- 2a - Consolidation at Toronto and Montreal terminals; delivery to chains
- 2b - Consolidation at Toronto and Montreal terminals; delivery to all stores
- 3 - Direct haul to pooled community depot; delivery to all stores
- 4 - Pooled community warehouse; delivery to all stores
- NP - Non-pooled freight

EXHIBIT B-4. Dry groceries: handling costs of alternatives by facility type

Facility Type	Alternatives	Time Element	Handling Unit	Variable Cost Per Shipment	Average No. of Cases Per Shipment	Average No. of Pallets Per Shipment	Average Cost Per Shipment	Average Cost Per Case
Plant warehouse	C, NP, 3, 4	Order fill and marshall	Pallet					\$.021
		Load trailer	Pallet	\$1.25 + .50/pallet	1500	25	13.75	.009
		Total						.030
	1a, 1b, 2a, 2b	Order fill and marshall	Case					.089
		Load trailer	Pallet	\$1.25 + .50/pallet	310	5	3.75	.012
		Total						.101
Public warehouse or forwarder	C, NP	Rec. trailer	Pallet	\$1.25 + .50/pallet	1500	25	13.75	.009
		Load truck	Pallet	\$1.25 + .50/pallet	600	10	6.25	.012
	2a, 2b	Rec truck	Pallet	\$1.25 + .50/pallet	600-720	10-12	-	.010
		Load trailer	Cases	\$1.25 + .25/case	1200-1500	20-25	-	.026
Wholesaler or chain distribution warehouse	C + NP - Chains	Rec or load trailer	Pallets	\$1.25 + .50/pallet	1200-1500	20-25	-	.009
Chain distribution warehouse	C + NP - Chains	Load trailer	Cases	\$1.25 + .025/case	1200	0	13.75	.026
Wholesaler distribution warehouse	C + NP - Indep.	Load truck	Cases	\$1.25 + .025/pallet	600		16.25	.027
Community depot or warehouse	1a, 1b, 2b, 3, 4	Rec trailer	Pallets	\$1.25 + .50/pallet	1200-1500	20-25	-	.009
		Load truck	Cases	\$1.25 + .025/case	600-700	-	-	.027
Retail store	C + NP - Chains	Rec trailer	Cases	\$1.25 + .025/case	250	-	7.50	.030
	C - Indep.	Rec truck	Cases	\$1.25 + .025/case	40	-	2.25	.056
	1a	Rec truck	Cases	\$1.25 + .025/case	130	-	4.50	.035
	1b	Rec truck	Cases	\$1.25 + .025/case	50	-	2.50	.050
	2a	Rec trailer	Cases	\$1.25 + .025/case	160	-	5.25	.033
	2b	Rec truck	Cases	\$1.25 + .025/case	60	-	2.75	.046
	3	Rec truck	Cases	\$1.25 + .025/case	85	-	3.38	.040
	4	Rec truck	Cases	\$1.25 + .025/case	110	-	4.00	.036
	NP - Indep.	Rec truck	Cases	\$1.25 + .025/case	24	-	1.85	.077

## Key to Current and Alternative Systems:

- C - Current
- 1a - Pooled transport by major manufacturers to chain stores
- 1b - Pooled transport by major manufacturers to all stores
- 2a - Consolidation at Toronto and Montreal terminals; delivery to chains
- 2b - Consolidation at Toronto and Montreal terminals; delivery to all stores
- 3 - Direct haul to pooled community depot; delivery to all stores
- 4 - Pooled community warehouse; delivery to all stores
- NP - Non-pooled freight

EXHIBIT B-5. Administrative cost calculation for dry groceries - current system

Cost Element & Location	Cost Per Order	Major Manufacturers Direct From Manufacturer To Distribution Warehouse				Minor Manufacturers Via Public Warehouse			
		Chains		Independents		Chains		Independents	
		Cases Per Order	Cost Per Case	Cases Per Order	Cost Per Case	Cases Per Order	Cost Per Case	Cases Per Order	Cost Per Case
1. <u>Order processing</u>									
Plant warehouse	4.00	1500	.003	1500	.003	1500	.003	1500	.003
Public warehouse	4.00								
Forwarder	4.00					600	.007	600	.007
Distribution warehouse	4.00	250	.016	40	.100	250	.016	40	.100
Pooled community warehouse/depot	4.00								
Retail store	1.00	250	.004	40	.025	250	.004	40	.025
2. <u>Consolidation</u>									
Forwarder	.50								
Distribution warehouse	.50								
Local carrier	.50								
Pooled community depot	.50								
Total administrative costs			.023		.128		.030		.135

EXHIBIT B-6. Administrative cost calculation for dry groceries - alternatives

Cost Element & Location		Consolidation at Toronto and Montreal Terminals										Non-Pooled to Independents (Alternatives Involv. Indep.)							
		Pooled Transport By Major Manufacturers To Pooled Community Depot; Pooled Delivery						Direct Drop Shipment To Stores		Community Depot Pooled Delivery		Direct Haul To Pooled Community Depot; Pooled Del.		Pooled Community Warehouse		Originating In Toronto		Originating From Outside Toronto	
		Chains		All Stores		Chains		All Stores		All Stores		All Stores		Indep.		Indep.			
		Cases Per Order	Cost Per Case	Cases Per Order	Cost Per Case	Cases Per Order	Cost Per Case	Cases Per Order	Cost Per Case	Cases Per Order	Cost Per Case	Cases Per Order	Cost Per Case	Cases Per Order	Cost Per Case	Cases Per Order	Cost Per Case		
1. <u>Order processing</u>																			
Plant warehouse	4.00	310	.013	360	.011	610	.007	720	.006	1200	.003	1500	.003	1500	.003	1500	.003		
Public warehouse	4.00															600	.007		
Forwarder	4.00					130	.031												
Distribution warehouse	4.00	130	.031	50	.080	130	.031	50	.080	85	.047			24	.167	24	.167		
Pooled community warehouse/depot	4.00	130	.031	50	.080			50	.080	85	.047	140	.029						
Retail store	1.00	130	.008	50	.020	130	.008	50	.020	85	.012	140	.007	24	.042	24	.042		
2. <u>Consolidation</u>																			
Forwarder	.50							720	.001										
Distribution warehouse	.50																		
Local carrier	.50																		
Pooled community depot	.50																		
Total administrative costs			.083		.191		.077		.187		.109		.039		.212		.219		

C. CONSOLIDATION OF SHIPMENTS FROM MAJOR MANUFACTURERS;  
DROP SHIPMENT TO KINGSTON CHAIN STORES

One objective of consolidation is to deliver trailer loads to Kingston. Another objective is to maximize shipment sizes from manufacturers to the consolidation point. Each major manufacturer supplies the equivalent of a truck load (610 cases) to Kingston every two weeks. Each manufacturer could ship to the consolidation point once every two weeks. However, service to stores is currently being provided twice a week. Therefore, to maintain service, there should be at least four groups of manufacturers doing consolidations. However, manufacturer groupings for consolidation depend on geographical location.

We have previously estimated that there are 60 major manufacturers of dry groceries. We have also estimated dry groceries flows for Kingston are as follows: 40% from Toronto, 40% from South-Western Ontario and 20% from Montreal. We will assume major manufacturers are similarly distributed: 24% in Toronto, 24% in South-Western Ontario and 12% in Montreal.

Therefore, manufacturers could be divided into five groups of 12, one in Montreal, two each in Toronto and South-Western Ontario. Each group would ship once every two weeks. Therefore, Kingston chains would average  $2\frac{1}{2}$  deliveries per week from the major manufacturers, for an average delivery quantity of 160 cases. With six manufacturers feeding truck loads of 610 cases to the consolidation point, then trailer loads of 1,220 cases can be made up for delivery.

D. CONSOLIDATION OF SHIPMENTS FROM MAJOR MANUFACTURERS AT  
TORONTO AND MONTREAL: HAUL TO KINGSTON DEPOT; POOLED  
DELIVERY TO STORES

Each major manufacturer can ship out about one truck load of Kingston freight every two weeks. Since there are 150 stores in Kingston, it is impractical to drop-ship from trailers. Therefore, freight must be unloaded, sorted and reloaded into delivery trucks at a Kingston depot.

Assume that as in the previous alternative there are also five groups of 12 manufacturers involved. Each group is shipping once every two weeks. Each manufacturer would ship 720 cases per load. Each trailer would haul 1,440 cases. Each store would get 60 cases. Therefore, each delivery truck would take out about ten steps. There would be 15 truck loads to deliver on each delivery day.

E. DIRECT HAUL TO KINGSTON DEPOT; POOLED DELIVERY TO STORES

Kingston receives 21,540 cases of dry groceries per week from the major manufacturers. We have assumed that these major manufacturers include 60 manufacturers. If stores could absorb a three to four week supply at one time, each manufacturer could send a trailer load every three to four weeks approximately. Total of 930 loads per year are required  $\div$  60 manufacturers = 15 trailer loads per manufacturer per year. Supply frequency required would be every three and a half weeks.

Assume that each major manufacturer is on approximately a three week shipping cycle. Within a three week period, assume six delivery days are required. Each delivery day, 10 manufacturers would ship trailer loads to the Kingston depot: 10 manufacturers x 1200 cases/load = 12,000 cases. Average storage delivery is about 80 cases for Kingston's 150 stores.

F. DIRECT HAUL TO KINGSTON COMMUNITY WAREHOUSE; POOLED DELIVERY

With pooled community warehousing, each store can be served with about the same frequency that it is now.

▶ 46 chain stores get two deliveries/week	92 deliveries
▶ 104 independents and other food stores get one delivery/week	<u>104 deliveries</u>
▶ Total deliveries	196 deliveries

Total cases per week in Kingston from major manufacturers = 21,540.

- ▶ Average number of cases per delivery = 110.
- ▶ Average number of deliveries/truck =  $600 \div 110 = 5.5$ .

Deliveries could be spread over five days of the week to minimize demand on local delivery labour and equipment. In this case, three or four delivery trucks would be required. Each would make about two delivery runs per day.

G. NON-POOLED SHIPMENTS TO CHAIN STORES

It was assumed that chains would continue to serve Kingston in trailer load quantities by reducing service to as infrequently as once every three weeks. This represents 11 trailer loads every three weeks, with an average of about four stores per trailer.

#### H. NON-POOLED SHIPMENTS TO INDEPENDENTS

For any pooling alternatives involving independents, there will be a small volume (20%) of non-pooled freight. Weekly volume of freight moving from minor manufacturers to independents is only 10 cases per week. This is just over one truck load per week for 104 stores. Furthermore, there are a number of wholesalers involved in supplying this market.

Assume there are about five wholesalers supplying Kingston, and that service is supplied a minimum of once every three weeks. Volume supplied would drop 20% to about 480 cases per delivery truck. Each truck would serve twenty stores. Each store would get about 24 cases.

APPENDIX C

MEAT AND POULTRY: CALCULATION OF CASE FLOWS AND  
COST ELEMENT VALUES FOR CURRENT AND ALTERNATIVE  
DISTRIBUTION SYSTEMS



## Appendix C

### MEAT AND POULTRY: CALCULATION OF CASE FLOWS AND COST ELEMENT VALUES FOR CURRENT AND ALTERNATIVE DISTRIBUTION SYSTEMS

Case flows for meat and poultry were derived in Chapter V. Case flows for current and alternative systems are based on the flows developed in Chapter V. The table summarizing the flows has been repeated here (Exhibit C-1). Cost element values derived from case flows, for each system, are presented in Exhibits C-2 to C-6.

#### A. CURRENT SYSTEM

We have made a number of assumptions regarding case flows in the current system (Exhibit C-7).

In Chapter V, we determined that 60% or 153,000 of the 255,000 cases of meat and poultry originates in Toronto. All 58,000 cases delivered by "manufacturers' own trucks" originates in Toronto. This leaves 197,000 cases. Of the remainder, 95,000 cases or 48%, are from Toronto and 102,000 or 52% are from South-Western Ontario. The balance of freight moving via the other three systems was allocated proportionately between the two locations. See Exhibit C-8.

Most distribution is currently "direct to store." To estimate order sizes, we made the following assumptions. Each store deals regularly with at least three major manufacturers. The major manufacturers ship 46 cases per week to the average store. Deliveries occur three times per week. Therefore, the average order size is:

$$\begin{aligned} &46 \text{ cases per week} \div 3 \text{ suppliers per store} \div 3 \text{ delivery days} \\ &= 5.1 \text{ cases per store order} \end{aligned}$$

Manufacturers ship out batches of individual store orders. Within about 12 hours, they are delivered to the stores by one of three systems. The average store order is about 5.1 cases or 300 lbs. However, some stores receive orders from different manufacturers on the same delivery. Based on industry sources, we have assumed an average store delivery of 8 cases or 480 lbs. for any of the "direct" distribution systems.

#### 1. Distribution via common carrier; Toronto freight terminal

Carrier consolidates freight at Toronto terminal. Carrier performs deliveries from Toronto. The carrier picks up from a number

EXHIBIT C-1. Statistical summary of Kingston meat and poultry distribution by type of manufacturer

	No. of Cases		
	Chains	Independents	All Stores
	85% 46 Stores	15% 39 Stores	100% 85 Stores
1) ALL MANUFACTURERS			
Annual	216,390	38,190	254,580
Weekly	4,160	730	4,900
Weekly average per store	90	19	58
2) 26 MAJOR MANUFACTURERS SUPPLY 80% OF MEAT AND POULTRY			
All manufacturers to all stores			
Annual	173,110	30,550	203,660
Weekly	3,330	590	3,920
All manufacturers to single store			
Annual	3,760	780	2,400
Weekly	72	15	46
Single manufacturer to all stores			
Annual	6,660	1,180	7,830
Weekly	130	23	150
Single manufacturer to single store			
Annual	145	30	92
Weekly	2.8	<1	1.8
3) 122 SMALLER PLANTS SUPPLY 20% OF MEAT AND POULTRY			
All manufacturers to all stores			
Annual	43,280	7,640	50,920
Weekly	830	150	980
All manufacturers to single store			
Annual	840	200	600
Weekly	18	3.8	12
Single manufacturer to all stores			
Annual	350	60	420
Weekly	6.8	1.2	8.0
Single manufacturer to single store			
Annual	7.6	1.5	4.9
Weekly	<1	<1	<1

EXHIBIT C-2. Long distance transport costs per case for meat and poultry.

	South-West Ontario to Toronto	Montreal to Toronto	Toronto to Kingston	South-West Ontario to Kingston	Montreal to Kingston	Eastern Ontario to Kingston	Eastern Ontario to Toronto
<u>TRIP COSTS</u>							
Tractor-trailer cost	264.00	897.60	435.60	699.60	462.00	224.40	330.00
Truck cost	180.00	612.00	297.00	477.00	315.00	153.00	225.00

Cost Elements	Alternatives	Tractor- Trailer (T.T.) or Truck	No. of Cases	<u>COST PER CASE</u>	
Transport to carrier, dist. whse. or consol. terminal	- Dist. by common carrier - Consol. by chain dist. whse. - Consol. by mfgs.	T.T.	500	.528	
Transport to Kingston	- Dist. by common carrier - Haul to local carrier - Haul to local depot - (Current) consol. by chain dist. whse.	Truck	200		1.485 2.385
	Pooled transport by major manufacturers	T.T.	600	.726	1.166
	Consol. at Toronto terminal for all stores	T.T.	700	.622	
	Consol. at Toronto terminal for indep.	T.T.	365	1.193	
	(Alternative) consol. by chain dist. whse.	Truck	360	.825	
	Consol. at Toronto terminal by minor manufacturers for all stores	T.T.	490	.950	

EXHIBIT C-3. Local transport cost calculation for meat and poultry

Cost Element	Alternatives	Trip Time - Fixed	Stop Time Per Stop Parking & Paperwork	No. of Stops	Stop Time - Fixed	Sub-Total - Fixed	No. of Cases	"Fixed" Time Per Case	Variable Handling Time (min) (Driver's Time) Per Case	Total Delivery Time Per Case	Rate Per Hour TT = \$32.40 Truck = \$24.00	Cost Per Case
		(Min.)	(Min.)		(Min.)	(Min.)		(Min.)		(Min.)		
		A	B	C	BxC = D	A+D = E	F	E-F = G	H	G+H		
Pick up	Dist. by common carrier, consol. for indep.											
	- Toronto	75	8	3	24	99	500	.198	.130	.328	32.40	.178
	- S.W. Ontario									.656	32.40	.356
	Pooled transport											
	- Toronto	75	8	4	32	107	600	.178	.130	.308	32.40	.166
	- S.W. Ontario									.616	32.40	.332
	Consol. by minor mfrs.											
	- Toronto	10	8	1	8	18	10	1.800	.130	1.93	32.40	1.042
	- S.W. Ontario									2.86	32.40	2.084
Delivery to forwarding terminal	Consol. by mfrs. for indep.	15	8	1	8	23	100	.230	.130	.360	32.40	.194
Transport to distribution warehouse	Consol. by chain distribution whse. from Toronto	165	8	1	68	173	500	.346	.130	.476	32.40	.257
Delivery vehicle and driver	Current system:											
	- Common carrier	75	8	25	200	275	200	1.375	.130	1.505	24.00	.602
	- Own trucks	75	8	30	240	315	240	1.313	.130	1.443	24.00	.577
	- Via local carrier	105	8	20	160	265	200	1.325	.130	1.455	24.00	.485
	- Chains											
	Alternatives:											
	- Delivery from pooled community depot	75	8	20	160	235	300	.602	.130	.733	24.00	.293
	- Consol. by chain dist. whse.	75	8	12	96	171	360	.475	.130	.605	24.00	.242
	- Consol. of all mfrs. shipments for all stores	75	8	18	144	219	350	.626	.130	.756	32.40	.408
	- Consol. of all mfrs. shipments for independents	75	8	19.5	156	231	183	1.262	.130	1.392	32.40	.752

EXHIBIT C-4. Meat and poultry: handling costs of alternatives by facility type

Facility Type	Alternatives	Time Element	Handling Unit	Variable Cost Per Shipment	Average No. of Cases Per Shipment	Average No. of Pallets Per Shipment	Average Cost Per Shipment	Average Cost Per Case
Plant warehouse	Current - via common carrier; and alternative - consolidation by forwarder for major manufacturers	Order fill and marshall	Case to pallet	\$ .098/case + .975/pallet	5	1	1.465	\$.293
		Load	Case	\$1.25 + .033/case	170		6.860	.040
		Total						.333
	Current and alternative - consolidation by individual chain warehouses	Order fill and marshall	Pallet	\$1.625/pallet	500	25		.081
		Load	Case	\$1.25 + .033/case	500		17.75	.035
		Total						.117
	Current - haul to local carrier; and alternative - haul to pooled community depot	Order fill and marshall	Case to pallet	\$ .098/case + .975/pallet	5	1	1.465	.293
		Load	Case	\$1.25 + .033/case	400		14.45	.035
		Total						.329
	Current - via own trucks	Order fill and marshall	Case to pallet	\$ .098/case + .975/pallet	6.4	1	1.602	.250
		Load	Case	\$1.25 + .033/case	200		7.85	.039
		Total						.289
	Pooled transport - at each pick-up stop	Order fill and marshall	Case to pallet	\$ .098 + .975/pallet	5	1	1.465	.293
		Load	Cases	\$1.25 + .033/case	150		6.20	.041
		Total						.334
	Pooled transport - at last pick-up stop: unload, sort by destination and reload	Unload	Cases	\$ .033/case				.033
		Sort	Cases	\$ .075/case				.075
		Reload	Cases	\$ .033/case				.033
	Minor manufacturers	Order fill and marshall	Case	\$ .098/case + .975/pallet	5	1	1.465	.293
		Load	Cases	\$1.25 + .033/case	10		1.580	.158
		Total						.451
Carrier Toronto terminal	Current - via common carrier	Receive	Case	\$1.25 + .033/case	500		17.75	.036
		Load	Case	\$1.25 + .033/case	200		7.85	.039
		Sort and marshall	Case	\$ .156/case				.156
Chain distribution whse.	Current and alternative - consolidation by individual chain distribution warehouse	Receive	Case	\$1.25 + .033/case	500		17.75	.036
		Sort and marshall	Case	\$ .156/case				.156
	Current - consolidation by chains	Load	Case	\$1.25 + .033/case	200		7.85	.039
	Alternative - consolidation by chains	Load	Case	\$1.25 + .033/case	360		13.13	.036
Consolidation terminal	Consolidation by all manufacturers for all stores	Unload	Case	\$1.25 + .033/case	600		21.05	.035
		Sort and marshall	Case	\$ .156/case				.156
		Load	Case	\$1.25 + .033/case	700		24.35	.035
		Total						.226

## EXHIBIT C-4 (cont'd.)

Facility Type	Alternatives	Time Element	Handling Unit	Variable Cost Per Shipment	Average No. of Cases Per Shipment	Average No. of Pallets Per Shipment	Average Cost Per Shipment	Average Cost Per Case
Consolidation terminal (cont'd.)	Consolidation of shipments from all manufacturers to all stores	Unload	Case	\$1.25 + .033/case	100			\$.046
	Consolidation of shipments from minor manufacturers to all stores	Load	Case	\$1.25 + .033/case	365			.036
Local depot/ local carrier terminal	Current - haul to local carrier; and alternatives - pooled transport or direct haul to pooled community depot	Receive	Case	\$1.25 + .033/case	200		7.85	.039
		Sort and marshall	Case	\$.156/case				.156
	Current - haul to local carrier	Load	Case	\$1.25 + .033/case	200		7.85	.039
	Pooled transport or direct haul by major manufacturers, combined with consolidated freight from minor manufacturers	Load	Case	\$1.25 + .033/case	390		14.12	.036
	Consolidated freight from minor manufacturers	Receive	Case	\$1.25 + .033/case	490		17.42	.036
Retail store	Current: - Common carrier - Local delivery agent - Direct delivery; own trucks	Receive	Case	\$1.25 + .033/case	8		1.514	.189
		Receive	Case	\$1.25 + .033/case	10		1.58	.158
		Receive	Case	\$1.25 + .033/case	30		2.24	.075
	Alternatives: - Consolidation by individual chains - Pooled transport or direct haul by major manufacturers combined with consolidated freight from minor manufacturers - delivery from pooled community depot - Consolidation by all manufacturers for all stores	Receive	Case	\$1.25 + .033/case	19.3		1.888	.098
		Receive	Case	\$1.25 + .033/case	9.5		1.564	.165
		Receive	Case	\$1.25 + .033/case				

EXHIBIT C-5. Administrative cost calculation for meat and poultry - current system

Cost Element & Location	Cost Per Order	Current System							
		Direct To Store (Own Trucks)		Via Primary Carrier		Haul To Local Carrier Who Performs Delivery		Via Chain Distribution Warehouse	
		Cases Per Order	Cost Per Case	Cases Per Order	Cost Per Case	Cases Per Order	Cost Per Case	Cases Per Order	Cost Per Case
1. <u>Order processing</u>									
Plant warehouse	4.00	8	.500	5.1	.784	5.1	.784	500	.008
Public warehouse	4.00								
Forwarder	4.00								
Distribution warehouse	4.00							10	.400
Pooled community warehouse/depot	4.00								
Retail store	1.00	8	.125	5.1	.196	5.1	.196	10	.100
2. <u>Consolidation</u>									
Forwarder	.50								
Distribution warehouse	.50								
Local carrier	.50					5.1	.098		
Pooled community depot	.50								
Total administrative costs			.625		.980		1.078		.508

EXHIBIT C-6. Administrative cost calculation for meat and poultry - alternatives

Cost Element & Location	Cost Per Order	Alternatives									
		Pooled Transport By Major Manufacturers To Local Depot; Pooled Delivery		Direct Haul By Major Manufacturers To Local Depot; Pooled Delivery		Consolidation by Individual Chains		Consolidation at Toronto Terminal of Shipments From All Manufacturers For Independents		Consolidation at Toronto Terminal of Shipments From All Manufacturers For All Stores	
		Cases Per Order	Cost Per Case	Cases Per Order	Cost Per Case	Cases Per Order	Cost Per Case	Cases Per Order	Cost Per Case	Cases Per Order	Cost Per Case
1. <u>Order processing</u>											
Plant warehouse	4.00	5.1	.784	5.1	.784	500	.008	5.1	.784	5.1	.784
Public warehouse	4.00										
Forwarder	4.00										
Distribution warehouse	4.00					30	.133				
Pooled community warehouse/depot	4.00										
Retail store	1.00	5.1	.196	5.1	.196	30	.033	5.1	.196	5.1	.196
2. <u>Consolidation</u>											
Forwarder	.50							5.1	.098	5.1	.098
Distribution warehouse	.50										
Local carrier	.50							5.1	.098		
Pooled community depot	.50	5.1	.098	5.1	.098					5.1	.098
Total administrative costs			1.078		1.078		.174		1.176		1.176



EXHIBIT C-7. Case flows in the current system.

	Calculations	No. of Cases Via Each System (To Nearest 1000)
Total annual flows - all systems	217,000	255,000
85% of product is sold by chains	217,000	
▶ 10% of chain sales via chain distribution warehouses	<u>21,700</u>	22,000
Balance goes direct to store	233,000	
▶ 25% of direct distribution is via manufacturers' own trucks	58,300	58,000
▶ 20% is minor manufacturers' freight which goes via common carrier	46,600	
▶ The remainder of direct distribution is from the remaining major manufacturers	128,100	
- 50% of this goes via common carrier	64,100	
- 50% goes directly to a local carrier who delivers it	64,100	64,000
▶ Total moving by common carrier: 46,600 + 64,100 = 110,700	110,700	<u>111,000</u>
Total		255,000

EXHIBIT C-8. Case flows for current distribution systems for meat and poultry

Distribution System	From Toronto	From S.W. Ont.
Manufacturers' own trucks	58,000	
Common carrier	53,000	58,000
Local carrier delivery	31,000	33,000
Individual chain consolidation	11,000	11,000
Totals - All sources	153,000	102,000

of customers. Assume each major shipper is shipping at least three times the Kingston requirements with his carrier for a pick-up volume of 9000 lbs. A trailer load of about 30,000 lbs. could be collected and hauled into the Toronto depot, say 500 cases, from three shippers.

A truck goes out to Kingston and other terminals. A maximum of 25 steps can be accomplished within the available delivery time. Each store gets 8 cases. Transport and delivery loads are 200 cases.

2. Direct haul to local carrier terminal; delivery by local carrier

Each major manufacturer supplies 150 cases per week to Kingston. With service frequency of three times per week, the average drop quantity is 50 cases. We assume that the transport driver has time to drop off equivalent amounts at three intervening points between the manufacturer's plant and Kingston. Therefore, delivery loads are 200 cases.

There may be several manufacturers feeding a single local carrier. We assume the carrier runs several local delivery routes. An average route might be 30 stops, which means three routes would cover Kingston. Delivery loads are:  $30 \text{ stops} \times 8 \text{ cases per stop} = 240 \text{ cases}$ .

3. Consolidation by individual chains at central distribution warehouse; drop shipment to stores

Several chains are involved in meat distribution to varying degrees. It is assumed that, on average, a chain might supply one-third of its stores' meat and poultry requirements. This means an average of 30 cases per week, or 1800 lbs. With three times per week delivery service, the average store delivery is 10 cases or 600 lbs.

The chain meat truck would serve several other Eastern Ontario communities, along with Kingston. A maximum of about 20 delivery stops could be accomplished within available delivery time. Transport load factors are therefore 200 cases.

4. Direct delivery to store by manufacturer's trailer

We identified two large Toronto manufacturers who used this method. However, most manufacturers are not large enough to operate a truck to smaller communities two or three times a week.

Costs included for this system reflect that processors are larger. Costs would not be applicable to all major processors. It is assumed that the large major manufacturer can supply 20 cases per delivery day to the Kingston area, compared to 50 cases for the average major manufacturer. Average delivery sizes of eight cases are assumed. Delivery costs are equivalent to those experienced by common carriers.

## B. ALTERNATIVES

### 1. Pooled transport by major manufacturers; consolidation by minor manufacturers; pooled delivery from pooled community depot

#### a) Pooled transport by major manufacturers to pooled community depot; pooled delivery with minor manufacturers' freight

Four manufacturers pool transport of freight to Kingston. With delivery frequency of three times per week maintained, each manufacturer ships 50 cases for a total of 200 cases for Kingston. In addition, two other equivalent drops are made to local depots between Toronto and Kingston. This raises the transport load factor to 600 cases for the trip.

Each store receives 58 cases per week from all the manufacturers. Therefore delivery sizes are:

$$\begin{aligned} & 58 \text{ cases per store per week} \div 3 \text{ delivery days} \\ & = 19.3 \text{ cases per store delivery} \end{aligned}$$

A full delivery load of 390 cases would cover 20 stores. About four delivery runs would cover Kingston.

#### b) Consolidation of minor manufacturers' freight at Toronto terminal; haul to pooled community depot; pooled delivery with major manufacturers' freight

We assume that the average store order is five cases, as in the current system. For orders smaller than this, per case costs for pick-up and delivery and administration would be substantially higher. Since the minor manufacturers are smaller, we assume that only two shipments or 10 cases would be picked up to go to the Toronto consolidation point. The handling costs at the plant warehouse would be higher for the minor manufacturers. The pick-up cost would also be higher.

The carrier would combine the minor manufacturers' freight into his normal load. Transport loads from South-Western Ontario would be 500 cases. At the consolidation (or forwarding) point in Toronto, it is assumed that 100 cases are dropped. A drop charge has been calculated (\$.194 per case), and it is part of the transport to "forwarder" cost.

We assume delivery frequency would be reduced to twice a week since the major manufacturers' freight is being transported by alternative methods. Transport volumes of minor manufacturers' freight from the Toronto terminal to Kingston are:

$$\begin{aligned} & 980 \text{ cases per week} \div 2 \text{ delivery days} \\ & = 490 \text{ cases per delivery day} \end{aligned}$$

The trailer would be dropped at the Kingston depot. Here, freight would be unloaded and merged with freight from major manufacturers. It would be sorted to delivery runs. Freight would be loaded in stop order and delivered to stores. There are three delivery days from the depot to accommodate the major manufacturers. Therefore, the average store delivery is 19.3 cases, as calculated above. Delivery costs are the combined costs for delivering all freight.

2. Direct haul by major manufacturers; consolidation by minor manufacturers; pooled delivery from pooled community depot

a) Direct haul by major manufacturers to pooled community depot; pooled delivery with minor manufacturers' freight

This alternative operates almost the same as one of the current systems: "Direct haul to local carrier - delivery by local carrier." Transport loads are also 200 cases, and delivery frequency of three times per week is maintained.

The difference is that all major manufacturers use this system, and they all ship to a single Kingston depot. Pooling of deliveries from major and minor manufacturers raises the average store delivery to 19.3 cases, as in "pooled transport", the previous alternative. Delivery costs are the same as for pooled transport: 20 delivery stops, 390 cases, per delivery load.

b) Consolidation of minor manufacturers' freight at Toronto terminal; haul to pooled community depot; pooled delivery with major manufacturers' freight

The major manufacturers' freight is consolidated at a Toronto terminal twice a week. Trailer loads are hauled to the Kingston pooled community depot. Freight is pooled with major manufacturers' freight at the depot for delivery. The minor manufacturers' consolidation operates the same as in the previous alternative, "pooled transport." Case flows were developed for that alternative.

3. Consolidation of all manufacturers' freight at Toronto terminal; drop delivery to stores

a) Major manufacturers

Stores continue to order from manufacturers three times per week. Kingston orders are picked up with other freight and hauled to the forwarding terminal. Pick-up quantities are 150 cases, and transport loads to the forwarder are 600 cases.

At the forwarding terminal, freight is combined with freight from minor manufacturers. A total of 4900 cases per week are moving into Kingston. Full loads of 700 cases can be made up each trip. Loads are split into two trailers so deliveries can be completed more quickly. Each trailer hauls 350 cases.

Each pair of trailers are hauled in tandem to Kingston. The average store receives 58 cases of meat and poultry per week. Therefore, the average delivery is:

$$\begin{aligned} & 58 \text{ cases} \div 3 \text{ deliveries per week} \\ & = 19.3 \text{ cases} \end{aligned}$$

There are:  $350 \div 19.3 = \text{about } 18 \text{ deliveries on a trailer.}$

b) Minor manufacturers

Freight from the minor manufacturers' would be consolidated with the major manufacturers' freight in Toronto. It could be picked up and carried to the forwarding terminal on the same truck. We previously assumed that the minor manufacturers generally ship at least five cases, avoiding small, uneconomical orders. Total volume from the 122 minor manufacturers is only 980 cases per week to Kingston or about 200 shipments at five cases per shipment. We assumed that two shipments or ten cases would be picked up each stop. The following costs were calculated separately for freight from the minor manufacturers:

- ▶ Handling at the plant warehouse.
- ▶ Pick-up.

Upon pick-up, the freight is combined with major manufacturers' freight. It now moves through the steps outlined for the major manufacturers. Combined shipment volumes were calculated under "major manufacturers."

4. Separate consolidation and delivery for chains and independents

a) Consolidation by individual chains at chain distribution warehouses; drop delivery to stores

Currently, several chains are consolidating a portion of meat and poultry. If each one of the chains individually consolidated all their stores' meat and poultry, store delivery quantities (and store orders) would rise to 30 cases per chain store. Full truckloads could be assembled for the Kingston area. A truck could be filled with only 12 stops, for a 360 case load.

b) Independent stores consolidate shipments from all manufacturers at Toronto terminal; haul to Kingston; drop delivery to stores

There are 730 cases of meat and poultry per week moving to Kingston independents. With two times per week delivery, 365 cases would be moving each delivery day, or about 22,000 lbs. Freight is loaded into two trailers, each with half of Kingston. This facilitates quicker

delivery in Kingston. The trailers are hauled in tandem to Kingston, and turned over to two local drivers. Each driver handles 19 to 20 stops. There are 39 stores. Each store receives:

$$\begin{aligned} & 365 \text{ cases} \div 39 \text{ stores} \\ & = 9.5 \text{ cases} \end{aligned}$$

It is assumed that the average order size remains at 5.1 cases for the independents. This is the current average order size for direct-to-store deliveries. The delivery frequency would be reduced to two days per week to keep order sizes up. In addition, the independents would deal with less manufacturers than the chains.

The costs of pick-up and transport to the consolidation terminal were assumed to be the same as for the option involving consolidation for all stores. The freight destined for Kingston chain stores has been eliminated. However, this will not significantly affect the volume of freight moving from the manufacturers' plants to Toronto forwarding terminals. A drop charge of \$.194 per case has been assessed under "transport to forwarding terminal." This is the cost of dropping off 100 cases. Drop volume is reduced by about 85%, reflecting the non-participation of the chains.

Costs for minor manufacturers have again been calculated separately for two elements: handling at the plant warehouse; and pick-up. Shipment volumes are combined with the major manufacturers from this point. Therefore the unit distribution costs are the same as for the major manufacturers for the balance of the distribution system.

APPENDIX D

DERIVATION OF FLOWS FOR DISTRIBUTION ALTERNATIVES FOR  
BUTTER, CHEESE AND MARGARINE



## Appendix D

### DERIVATION OF FLOWS FOR DISTRIBUTION ALTERNATIVES FOR BUTTER, CHEESE AND MARGARINE

Basic flow volumes for butter, cheese and margarine were developed in Chapter V.

Cost element values calculated based on case flow volumes are contained in Exhibits D-1 to D-4.

#### A. CURRENT SYSTEM

In the current system, butter, cheese and margarine are distributed with produce. Case flows for the current system were calculated in terms of equivalent cases of butter, cheese and margarine. Basic flow volumes are shown in Exhibit D-5.

Products are distributed through refrigerated distribution warehouses in Toronto, operated by chains and wholesalers. Deliveries are made an average of three times a week to chain stores. Each store receives an average of 240 cases of refrigerated products a week, or 80 cases per delivery (1520 lbs.).

Independents are served an average of once a week (many do not stock produce), for an average delivery quantity of 23 cases (440 lbs.).

- ▶ Trailer loads from plant warehouse to distribution warehouse  
- 40 pallets, 2400 cases.
- ▶ Truck loads from chain distribution warehouse to Kingston  
- 24 pallets, 1440 cases, 18 stores.
- ▶ Truck loads from wholesaler distribution warehouse to Kingston  
- 9 pallets, 207 cases, 9 stops.

Deliveries are made an average of three times a week to chain stores. Each chain store receives 240 cases of refrigerated products a week, or 80 cases per delivery (1520 lbs.).

EXHIBIT D-1. Long distance transport costs per case for butter, cheese and margarine

				South-West Ontario to Toronto	Montreal to Toronto	Toronto to Kingston	South-West Ontario to Kingston	Montreal to Kingston	Eastern Ontario to Kingston	Eastern Ontario to Toronto
				TRIP COSTS						
Tractor-trailer cost				264.00	897.60	435.60	699.60	462.00	224.40	330.00
Truck cost				180.00	612.00	297.00	477.00	315.00	153.00	225.00
Cost Elements	Alternatives	Tractor- Trailer (T.T.) or Truck	No. of Cases	COST PER CASE						
Transport to distribution warehouse	Current - Chains	T.T.	2400	.110	.374					.138
	Current - Wholesaler									
Transport to Kingston	Current - Chains	Truck	800			.371				
	Current - Wholesaler	Truck				.861				
	Pooled transport to chains	Truck	225			1.320	2.120	1.400	.680	
	Pooled transport to all stores	Truck	275			1.080	1.735	1.145	.556	
	Direct transport to all stores	Truck	55			5.400	8.672	5.727	2.782	

EXHIBIT D-2. Local transport cost calculations for butter, cheese and margarine

Cost Element	Alternatives	Trip Time -Fixed  (Min.) A	Stop Time Per Stop Parking & Paperwork  (Min.) B	No. of Stops  C	Stop Time -Fixed  (Min.) B x C = D	Sub- Total -Fixed  (Min.) A + D = E	No. of Cases  F	"Fixed" Time Per Case  (Min.) E - F = G	Variable Handling Time (min) (Driver's Time) Per Case  H	Total Delivery Time Per Case  (Min.) G + H	Rate Per Hour TT = \$32.40 Truck = \$24.00	Cost Per Case
Pick up	Pooled transport to chains	100	8	5	40	140	225	.622	.043	.665	24.00	.266
	- Tor., Mtl.	100	8	5	40	140	225	.622	.043	.665	24.00	.266
	- S.W.Ont., E.Ont.											.532
	Pooled transport to all stores	100	8	5	40	140	.509	.043	.552	24.00	.221	
	- Tor., Mtl.	100	8	5	40	140	275	.509	.043	.552	24.00	.221
	- S.W.Ont., E.Ont.											.442
Transport to distribution warehouse	Current - Toronto	165	8	1	8	173	2400	.072	.043	.115	32.40	.062
Delivery vehicle and driver	Current - chains	105	8	10	80	185	800	.231	.130	.361	24.00	.120
	Current - indep.	135	8	15	120	255	345	.739	.130	.869	24.00	.348
	Pooled transport to chains	75	8	23	184	259	450	.576	.130	.706	24.00	.282
	Pooled transport to all stores Direct haul - pooled delivery to all stores	75	8	33	264	339	260	1.304	.130	1.434	24.00	.478

EXHIBIT D-3. Butter, cheese and margarine: handling costs of alternatives by facility types

Facility Type	Alternatives	Time Element	Handling Unit	Variable Cost Per Shipment	Average No. of Cases Per Shipment	Average No. of Pallets Per Shipment	Average Cost Per Shipment	Average Cost Per Case
Plant warehouse	Current	Order fill and marshall	Pallet					.027
		Load trailer	Pallet	\$1.25 + .65/pallet	2400	40	27.25	.011
		Total						.038
	Pooled transport to chains	Order fill and marshall	Case					.116
		Load trailer	Pallet	\$1.25 + .65/pallet	45	1	1.90	.042
		Total						.158
	Pooled transport to all stores Direct transport to all stores	Order fill and marshall	Case					.116
		Load trailer	Pallet	\$1.25 + .65/pallet	55	1	1.90	.035
		Total						.151
Chain or whole-sale distribution warehouse	Current	Receive	Pallet	\$1.25 + .65/pallet	2400	40	27.25	.011
Chain distribution warehouse	Current	Order fill and marshall	Case	\$0.98/case + .975/pallet	80	2	9.79	.122
		Load	Case	\$1.25 + .033/case	800	-	27.25	.034
Wholesale distribution warehouse	Current	Order fill and marshall	Case	\$0.998/case + .975/pallet	23	1	3.229	.140
		Load	Case	\$1.25 + .033/case	345	-	12.635	.035
Community depot	Pooled transport to chains	Rec truck	Pallet	\$1.25 + .65/pallet	225	5	4.50	.020
	Pooled transport to all stores	Rec truck	Pallet	\$1.25 + .65/pallet	275	5	4.50	.016
	Direct transport - pooled delivery	Rec truck	Pallet	\$1.25 + .65/pallet	55	1	1.90	.035
	Pooled transport to chains	Load truck	Case	\$1.25 + .033/case	855	-	29.47	.034
	Pooled transport to all stores	Load truck	Case	\$1.25 + .033/case	260	-	9.83	.038
	Direct transport - pooled delivery to all stores							
	All alternatives	Sort and marshall	Case	.156/case				.156
Retail store	Current - chain	Rec	Case	\$1.25 + .033/case	80		3.89	.049
	Current - independent	Rec truck	Case	\$1.25 + .033/case	23		2.009	.087
	Pooled transport to chains	Rec Truck	Case	\$1.25 + .033/case	20		1.910	.096
	Pooled transport to all stores	Rec truck	Case	\$1.25 + .033/case	8		1.514	.189
	Direct transport - pooled delivery to all stores							

EXHIBIT D-4. Administrative cost calculation for butter, cheese and margarine

Cost Element & Location	Cost Per Order	Current System				Alternatives					
		Via Central Distribution Warehouses				Pooled Transport By Major Manufacturers				Direct Transport To Pooled Community Depot; Pooled Delivery To Stores	
		Chains		Independents		Chains		All Stores		All Stores	
		Cases Per Order	Cost Per Case	Cases Per Order	Cost Per Case	Cases Per Order	Cost Per Case	Cases Per Order	Cost Per Case	Cases Per Order	Cost Per Case
1. <u>Order processing</u>											
Plant warehouse	4.00	2400	.002	2400	.002	45	.089	55	.073	55	.073
Public warehouse	4.00										
Forwarder	4.00										
Distribution warehouse	4.00	80	.050	23	.174	45	.089	55	.073	55	.073
Pooled community warehouse/depot	4.00										
Retail store	1.00	80	.013	23	.043	37	.027	8	.125	8	.125
2. <u>Consolidation</u>											
Forwarder	.50										
Distribution warehouse	.50										
Local carrier	.50										
Pooled community depot	.50										
Total administrative costs			.065		.219		.205		.271		.271

EXHIBIT D-5. Current system: annual case flows of refrigerated products in equivalent dairy cases

Origin	To Chains	To Independents	Total
Toronto	499,080	88,070	587,150
S.W. Ontario	27,840	4,910	32,750
E. Ontario	27,840	4,910	32,750
Montreal	27,840	4,910	32,750
Total	582,600	102,800	685,400

## B. ALTERNATIVES

### 1a. Pooled transport by major manufacturers to Kingston depot; pooled delivery to chain stores

Case volumes for butter, cheese and margarine were computed in Chapter V. The "statistical summary of Kingston dairy distribution" is used to calculate case volumes for each of the alternatives. The summary is repeated here as Exhibit D-6.

From the summary, volumes from major manufacturers to Kingston are:

▶ Weekly	1710
▶ Weekly per manufacturer	90
▶ Weekly per store	40

Dairy products could be delivered two times a week instead of three times. Therefore, average shipping volume would be 45 cases per manufacturer. There are about five manufacturers in each area of Ontario. Therefore, each area could pooled shipments. Transport quantities would be 225 cases.

Each store would get 20 cases per delivery. Two truck loads, each carrying 450 cases, and making 23 stops, could serve all Kingston's chain stores.

### 1b. Pooled transport by major manufacturers to Kingston depot; pooled delivery to all stores

Case volumes from major manufacturers to Kingston stores were computed as follows:

▶ Weekly	2020
▶ Weekly per manufacturer	110
▶ Weekly per store	15

With twice a week delivery, the average shipment would be 55 cases from each manufacturer. There would be a group of five manufacturers in each area. Transport quantities would be 275 cases.

Store deliveries would be performed as follows:

- ▶ Eight cases per store.
- ▶ Say four delivery vans with about 33 stops each, or 260 cases.

EXHIBIT D-6. Statistical summary of Kingston dairy distribution by type of manufacturer

	No. of Cases		
	Chains	Independents	All Stores
	85% 46 Stores	15% 85 Stores	100% 131 Stores
1) ALL MANUFACTURERS			
Annual	111,350	19,650	131,000
Weekly	2,140	380	2,520
Weekly average per store	50	4.5	19
2) 19 MAJOR MANUFACTURERS SUPPLY 80% OF GOODS			
All manufacturers to all stores			
Annual	89,080	15,720	104,800
Weekly	1,710	300	2,020
All manufacturers to single store			
Annual	1,940	180	800
Weekly	40	3.6	15
Single manufacturer to all stores			
Annual	4,690	830	5,520
Weekly	90	16	110
Single manufacturer to single store			
Annual	100	9.7	40
Weekly	2	<1	<1
3) 160 MINOR MANUFACTURERS SUPPLY 20% OF GOODS			
All manufacturers to all stores			
Annual	22,270	3,930	26,200
Weekly	430	80	500
All manufacturers to single store			
Annual	480	50	200
Weekly	9.3	<1	3.8
Single manufacturer to all stores			
Annual	140	25	160
Weekly	2.7	<1	3.1
Single manufacturer to single store			
Annual	2.7	<1	<1
Weekly	<1	<1	<1



2. Direct transport by major manufacturers to Kingston depot;  
pooled delivery to stores

As discussed above, with twice a week delivery, the average shipment from each manufacturer would be 55 cases.

Store deliveries would be performed as above:

- ▶ Eight cases per store.
- ▶ Say four delivery vans with about 33 stops each, or 260 cases.

APPENDIX E

DERIVATION OF FLOWS FOR FROZEN FOOD  
DISTRIBUTION ALTERNATIVES

## Appendix E

### DERIVATION OF FLOWS FOR FROZEN FOOD DISTRIBUTION ALTERNATIVES

#### A. CURRENT SYSTEM

Basic flow volumes for frozen food were developed in Chapter V. The statistical summary of Kingston frozen food distribution is repeated here as Exhibit E-1. Cost values for cost elements are contained in Exhibits E-2 to E-5.

For the purposes of this analysis, we have assumed that frozen food either originates in Toronto, or outside Toronto. For food originating outside Toronto, we have selected Montreal as a median point. Therefore, transport to distribution warehouse is the cost of bringing in food from Montreal. Food moves in trailers from "outside Toronto", and in trucks from inside Toronto, to the distribution warehouse.

##### 1. Chains

Typically, the chains distribute frozen food once a week to stores. Each store receives an average of 58 cases per delivery, or 990 lbs. A truck could get off about 12 deliveries in the Kingston area, or about 720 cases.

##### 2. Independents

Each of the 52 independents generally deal with only one frozen food supplier because of the small volume. Delivery service is provided once every one to two weeks. Estimated average delivery size is 15 cases (255 lbs.). A delivery driver can handle about 20 stops in a shift, for a load of 300 cases.

#### B. ALTERNATIVES

##### 1. Pooled distribution by chain merchandisers

There are about 10 chains in Kingston, each with four to five stores. Each chain receives frozen food from manufacturers across Canada. Individual stores continue to order through the chains. On scheduled days, two pick-up routes cover the Toronto area, picking up freight consigned to Kingston stores. Two trucks could cover all the chains. Each chain ships 270 cases per week. Pick-up loads are 1350 cases from the five stops. The trucks bring the freight in to a consolidation point designated for Kingston. The consolidation could probably be done at one of the chain's own warehouses.

EXHIBIT E-1. Statistical summary of Kingston frozen food distribution  
by type of manufacturer

	No. of Cases		
	Chains	Independents	All Stores
	85% 46 Stores	15% 52 Stores	100% 98 Stores
1) ALL MANUFACTURERS			
Annual	140,250	24,750	165,000
Weekly	2,700	480	3,170
Weekly average per store	58	9.2	32
2) MAJOR MANUFACTURERS SUPPLY 80% OF FROZEN FOOD			
All manufacturers to all stores			
Annual	112,200	19,800	132,000
Weekly	2,160	380	2,540
All manufacturers to single store			
Annual			
Weekly			
Single manufacturer to all stores			
Annual			
Weekly			
Single manufacturer to single store			
Annual			
Weekly			
3) MINOR MANUFACTURERS SUPPLY 20% OF FROZEN FOOD			
All manufacturers to all stores			
Annual	28,050	4,950	33,000
Weekly	540	100	630
All manufacturers to single store			
Annual			
Weekly			
Single manufacturer to all stores			
Annual			
Weekly			
Single manufacturer to single store			
Annual			
Weekly			

The freight would be unloaded and sorted to several routes, covering Kingston and vicinity. Each route could cover about 14 stops and deliver 810 cases.

2. Pooled distribution by chain merchandisers and wholesalers

We estimate that there are about six major frozen food wholesalers serving Kingston. As each independent deals primarily with one supplier, each wholesaler has about eight to nine main customers.

Service would be provided once a week under this option. Three trucks could pick up all the chains and wholesalers. With 3170 cases moving and an estimated potential of six chains and wholesalers, the average pick-up is 200 cases. Each pick-up route handles five to six stops, and an average of 1060 cases.

Store delivery quantity is calculated as follows:

$$3170 \text{ cases} \div 98 \text{ stores} = 32 \text{ cases per store}$$

Each truck can make 20 stops. Transport and delivery loads are 640 cases.

EXHIBIT E-2. Long distance transport costs per case for frozen food

		South-West Ontario to Toronto	Montreal to Toronto	Toronto to Kingston
<u>TRIP COSTS</u>				
	Tractor-trailer cost	264.00	897.60	435.60
	Truck cost	180.00	612.00	297.00
Cost Elements	Alternatives	Tractor- Trailer (T.T.) or Truck	No. of Cases	
<u>COST PER CASE</u>				
Transport to distribution warehouse	Current and alternatives	T.T.	2650	.339
Transport to Kingston	Current - Chains	Truck	720	.413
	Pooled transport - Chains	Truck	810	.367
	Current - Wholesalers	Truck	300	.990
	Pooled transport - All stores	Truck	640	.464

EXHIBIT E-3. Local transport cost calculation for frozen food

Cost Element	Alternatives	Trip Time -Fixed  (Min.)	Stop Time Per Stop Parking & Paperwork  (Min.)	No. of Stops  C	Stop Time -Fixed  (Min.) BxC = D	Sub- Total -Fixed  (Min.) A+D = E	No. of Cases  F	"Fixed" Time Per Case  (Min.) E-F = G	Variable Handling Time (min) (Driver's Time) Per Case  H	Total Delivery Time Per Case  (Min.) G+H	Rate Per Hour TT = \$32.40 Truck = \$24.00	Cost Per Case
Pick up and transport to consolidation warehouse	Pooled transport to chains	240	8	5	40	280	1350	.207	.043	.250	24.00	.100
	Pooled transport to all stores	240	8	5.3	42	282	1060	.266	.043	.309	24.00	.124
Transport to distribution warehouse	Current - Toronto	165	8	1	8	173	900	.192	.043	.235	24.00	.094
Delivery vehicle and driver	Current - Chains	105	8	12	96	201	720	.279	.130	.409	24.00	.134
	Pooled transport - Chains	75	8	14	112	187	810	.231	.130	.361	24.00	.120
	Current - Indep.	135	8	20	160	195	300	.650	.130	.780	24.00	.312
	Pooled transport - All stores	75	8	20	160	235	640	.367	.130	.497	24.00	.166

EXHIBIT E-4. Frozen food: handling costs of alternatives by facility type

Facility Type	Alternatives	Time Element	Handling Unit	Variable Cost Per Shipment	Average No. of Cases Per Shipment	Average No. of Pallets Per Shipment	Average Cost Per Shipment	Average Cost Per Case
Wholesaler/chain distribution warehouse	Pooled transport to all stores	Order fill and marshall	Case to pallet	\$.098/case + .975/pallet	32	1	4.111	.128
Consolidation point	Pooled transport to chains	Receive	Case	\$1.25 + .033/case	1330		45.14	.034
		Sort and marshall	Case	.156/case				.156
		Load	Case	\$1.25 + .033/case	810		27.98	.035
	Pooled transport to all stores	Receive	Case	\$1.25 + .033/case	1060		36.23	.034
		Sort and marshall	Case	.156/case				.156
		Load	Case	\$1.25 + .033/case	640		22.37	.035
Retail chain store	Current system, and pooled transport to chains	Receive		\$1.25 + .033/case	58		3.164	.055
All stores	Pooled transport to all stores	Receive		\$1.25 + .033/case	32		2.306	.072



EXHIBIT E-5. Administrative cost calculation for frozen products

Cost Element & Location	Cost Per Order	Current				Alternatives			
		Via Central Distribution Warehouses				Pooled Transport			
		Chains		Independents		By Chain Merchandisers Chains		By Chain Merchandisers & Wholesalers All Stores	
		Cases Per Order	Cost Per Case	Cases Per Order	Cost Per Case	Cases Per Order	Cost Per Case	Cases Per Order	Cost Per Case
1. <u>Order processing</u>									
Plant warehouse	4.00	2650	.002	2650	.002	2650	.002	2650	.002
Public warehouse	4.00								
Forwarder	4.00								
Distribution warehouse	4.00	58	.069	15	.267	58	.069	32	.125
Pooled community warehouse/depot	4.00								
Retail store	1.00	58	.017	15	.067	58	.017	32	.031
2. <u>Consolidation</u>									
Forwarder	.50								
Distribution warehouse	.50					58	.009	32	.016
Carrier	.50								
Pooled community depot	.50								
Total administrative costs			.088		.336		.097		.174

APPENDIX F

ORGANIZATIONS AND COMPANIES CONTACTED  
DURING STUDY

## Appendix F

### ORGANIZATIONS AND COMPANIES CONTACTED DURING STUDY

#### A. CANADA

##### 1. Industry associations, organizations and officials

- ▶ Retail Council of Canada
  - Mr. Alisdair McKichan, President
  - Mr. J.P. Carter, Vice-President, General Manager, Food Division
- ▶ Retail Merchants' Association of Canada
  - Mr. George E. Crompton, General Manager
- ▶ Meat Packers' Council of Canada
  - Mr. Bob Kelly, General Manager
  - Mr. David Adams, Secretary-Treasurer
- ▶ Ontario Dairy Council
  - Mr. Brian Kipping, President
- ▶ Ontario Poultry Processors' Association
  - Mr. Jock Appleton, Executive Vice-President
- ▶ Dairy Bureau of Canada
  - Mr. Murray Dodd, Vice-President, Advertising and Promotion
- ▶ Canadian Frozen Food Association
  - Mr. John O'Neill, Chairman, Handling and Distribution Committee
  - Mr. O'Neill is also Senior Vice-President, Trans Canada Freezers -- United States Cold Storage

- ▶ Canadian Federation of Retail Grocers
  - Mr. K.V. Gadd, President
- ▶ Fish and Seafood Association of Ontario
  - Mr. Gordon Baker, Secretary-Treasurer
  - Mr. Baker is also Manager, Fresh Fish and Live Lobster, National Sea Products
- ▶ Canadian Grocer Magazine
  - Mr. George H. Condon, Editor
- ▶ Ministry of Agriculture and Food, Ontario Veterinary Services Branch
  - Dr. Russell Craig, Director of Meat Inspection
- ▶ Agriculture Canada Food Production and Inspection Branch, Ontario Regional Office
  - Mr. Clemento, Inspector

## 2. Private industry

- ▶ Canada Packers
  - Mr. J. Krochak, National Production Manager
  - Mr. Dave Smith, Toronto Traffic Manager
- ▶ Maple Lodge Poultry Farms
  - Mr. Joe Azevedo, Dispatcher
- ▶ Schneider's Meats
  - Mr. John Lauer, Vice-President Operations
- ▶ Beatrice Foods
  - Mr. George Smith, Group Manager, Ontario
- ▶ Wilmot Dairy Division, Beatrice Foods
  - Mr. Wilmot, Manager

- ▶ Gay Lea Foods
  - Mr. B. McGrogan, Vice-President Operations
- ▶ Sealtest Dairies
  - Mr. T.D. Goman, Former Ottawa Distribution Manager
- ▶ Ault Foods
  - Mr. Steven Ault, Vice-President
- ▶ Canadian Bread Division, Corporate Foods
  - Mr. Brun, Traffic Manager
- ▶ Weston Bakeries
  - Mr. Kurt Nooner, Distribution Manager
- ▶ Canada Dry
  - Mr. Anderson, Vice-President Operations, Ontario
- ▶ Coca-Cola
  - Mr. Ray Davies, Traffic Department
- ▶ Becker Milk Company
  - Mr. G. Curnuck, Plant Manager, Toronto
- ▶ Mac's Milk
  - Mr. Ledrew, Buyer
- ▶ M. Loeb
  - Mr. C. Keys, Transportation Manager
- ▶ Dominion Stores
  - Mr. J. Svenson, Industrial Engineer
- ▶ RJR Foods
  - Mr. Tom Longworth, Director of Materials Management

- ▶ Oshawa Group
  - Mr. Dave Knudsen, Manager, Meat Merchandising
  - A Buyer, Frozen and Refrigerated Products
- ▶ Loblaws
  - Mr. C. Rambo, Vice-President Distribution
- ▶ Howell Warehousing
  - Mr. G. Moulton, Warehouse Manager

## B. INTERNATIONAL SOURCES

### 1. United States

- ▶ NCPDM - National Council for Physical Distribution Management  
Executive Director - George A. Gecowets  
222 West Adams St.  
Room 845  
Chicago, Illinois 60606  
(312) 655-0985
- ▶ FMI - Food Marketing Institute  
President - Robert O. Aders  
Suite 700  
1750 K. St. N.W.  
Washington, D.C. 20006  
(202) 452-8444  
(Formerly National Association of Food Chains)
- ▶ CFD - Cooperative Food Distributors  
President - Thomas K. Zaucha  
Suite 645S  
1800 M. St. N.W.  
Washington, D.C. 20036  
(202) 223-9464  
Talked to V.P. Research & Education, Doug Richardson
- ▶ Mr. Douglas Lambert  
(Referred by NCPDM - Mr. G.A. Gecowets)  
Associate Professor  
Michigan State University  
(517) 353-6381

- ▶ Dr. B.J. LaLonde  
(Referred by NCPDM - Mr. G.A. Gecowets)  
Professor of Logistics  
Ohio State University  
(614) 422-0331
- ▶ Mr. Dale Anderson (Retired)  
(Referred by Dr. B.A. LaLonde)  
U.S. Department of Agriculture  
Washington, D.C.  
(301) 292-1970
- ▶ Charles Hedges  
(Referred by Dale Anderson)  
U.S. Department of Transportation  
7th Street  
Washington, D.C.  
(202) 426-4441
- ▶ Jim Toothman and Wes Kreable  
(Referred by Dale Anderson)  
Pennsylvania State University
- ▶ Mr. Lewis F. Norwood  
Director of Affiliate Relations  
National American Retail Grocers of the U.S.  
Washington, D.C.
- ▶ Mr. Jerry Peck  
(Referred by Barbara McBride)  
President  
National American Wholesale Grocers' Association  
51 Madison Avenue  
New York, N.Y.
- ▶ Profs. G.M. Clark and P.C. Murman  
Ohio State University  
190 North Oval Mall  
Columbus, Ohio
- ▶ Prof. J.F. Robeson  
College of Administrative Science  
Ohio State University  
190 North Oval Mall  
Columbus, Ohio

- ▶ Profs. R. de Neufville, N.H.M. Wilson and L. Fuertes  
Centre for Transportation Studies  
Massachusetts Institute of Technology  
Boston, Mass.
- ▶ Mr. Clarence Adamy  
International Association of Chain Stores  
Washington, D.C.
- ▶ Mr. Jack L. Runyan  
Marketing Specialist  
Agricultural Marketing Service  
U.S. Department of Agriculture  
Beltsville, Maryland

2. Australia

- ▶ Prof. K.W. Ogden  
Senior Lecturer in Transport  
Monash University  
Wellington Road  
Clayton, Victoria  
Australia 3168

3. England

- ▶ Mr. L. Holderness  
Secretary  
Lorries & The Environment Committee  
215 Great Portland Street  
London, England
- ▶ Dr. Martin Christopher  
Editor-in-Chief  
International Journal of Physical Distribution and Materials  
Management  
Also Lecturer in Marketing Logistics  
Cranfield School of Management  
Cranfield, Bedfordshire  
England
- ▶ Institute of Grocery Distribution  
Letchmore Heath  
Watford, England

4. Sweden

- ▶ Prof. Jan Andersson  
National Swedish Road and Traffic Research Institute  
Fack; S-581 01  
Linköping  
Sweden