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**DESIGN ANALYSIS FOR  
THE CENTRAL WHOLESALE  
MARKET IN AMMAN**

**BY:**

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**Agricultural Marketing Development Project  
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**SIGMA ONE CORPORATION**

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## 1. BACKGROUND

The present report corresponds to the work done by the Consultant between November 24 and December 19 of 1990 in the city of Amman.

The original Scope of Work (Annex 1) included the task of assisting AMO to design a longer term study on operational efficiency of private commission agents and others operating in the existing Amman Wholesale Market. But given the urgency and complexity of the assistance to the Municipality in designing the new market, AMO and AMDP leaders agreed that the consultant's Scope of Work would be amended to eliminate that task, permitting him to focus all his efforts on assisting the municipality in the design of the new market.

In order to facilitate coordination of the consultant's work with the municipality, a first meeting was held on Monday, November 26 in the Municipality with the participation of:

Sultan Khlaifat	: Under Secretary of Amman Municipality
Bahjat Abdullah	: Design Department, Amman Municipality
Mohammad Kafawien	: Director of the Central Market
Jamil Zureikat	: AMO
Akef Zu'bi	: AMO
Kelly Harrison	: Agricultural Marketing Development (AMD) Project
Hernan Cardoso	: Marketing Consultant AMD Project

Conclusions of the meeting were :

- The assistance of AMO through a market specialist is welcomed.
  - The Municipality is still in the early stages of the design process and the assistance comes at an opportune time.
  - The municipality has established a team, composed of two engineers and one architect to design the new market. The consultant will work with that team.
  - The consultant will have the total support for his work from all offices of the municipality related to his work.
  - The work will start on November 27 and will continue for three weeks.
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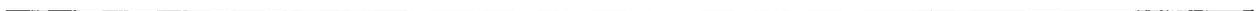
It was agreed that Mr. Cardoso would have a work place in the Municipality offices and would work with the architect, Fadi Bunni, on the project design.

Municipality officials emphasized the following points :

- The new wholesale central market for the city of Amman is not simply an idea. The decision has been firmly taken to build a new market. The municipality wishes to complete the design and begin construction as soon as possible due to the urgent need.
  - The taxes that commission agents collect and pay to the market administration (2 percent from the seller and 2 percent from the buyer) represent as much as 10 percent of the Municipality's total revenue.
  - The Municipality will build the market from its own financial resources.
  - The project will be built in stages.
  - The Municipality has approved a budget to begin construction of the new market in 1991, probably in the first semester.
  - The land assigned for the new market is 148 dunums, and is about one third of a bigger tract of land owned by the Municipality.
  - The new market design should respond to the realities of the market structure and be consistent with the expected evolution of the city and its agricultural marketing system.
  - Municipality officers expect to provide commercial space for agricultural input dealers, since those businesses are presently located near the market.
  - It is understood that the agricultural exporter activity is highly specialized and quite different from other buyers in the market. Exporters need and want to have their own facilities for final preparation and loading of products for export. At the same time a new marketing tendency is to handle products for export directly from the farms. Besides that, exporter space requirements could be quite large and the place for the market is relatively limited. For those reasons the Municipality does not plan to provide special facilities for exporters (sorting, packing, cooling, etc.) inside the market.
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- It is the idea of the Central Market Director to have a special place in the new market for farmers to sell their products directly to retailers.

Some Preliminary Notes, and a Schematic Guideline were presented by the consultant as a basis for this meeting. (See Annexes 2 and 3)



**2. PRESENT STATUS OF THE PROJECT DESIGN**

The first work session was held in the Municipality's offices on Tuesday November 27. Participants included:

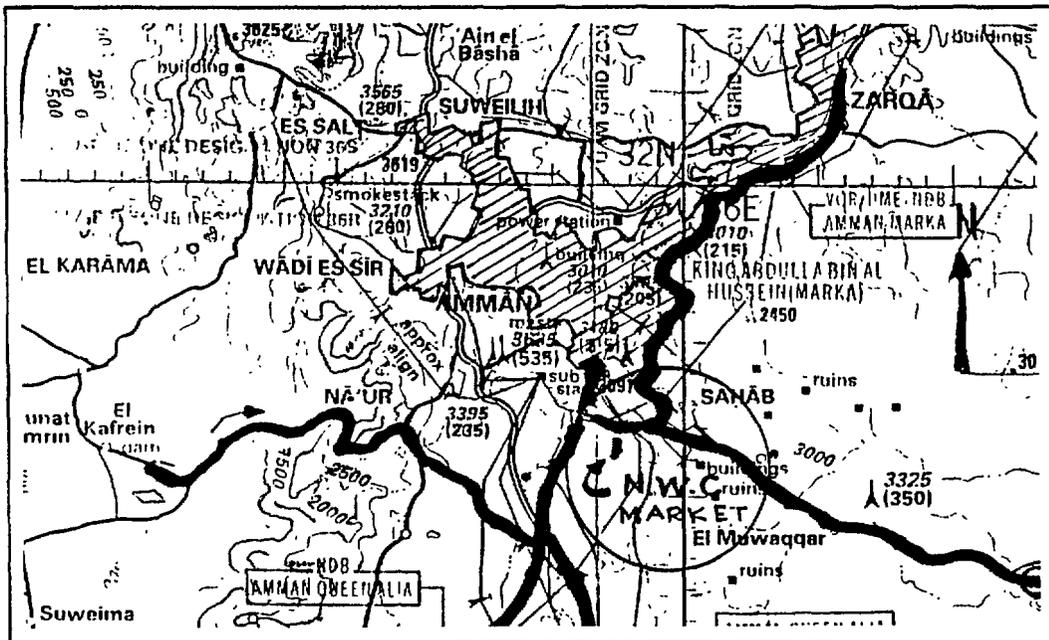
- Fadi Bunni : Municipal architect in charge of design
- Salah Tarawneh : AMO
- Kelly Harrison : AMD Project
- Bahjat Abdullah : Municipality designing department.
- Hernan Cardoso : AMD Project Consultant.

The proposed location of the new market was the first point of discussion. The following observations were made.

**2.1. Location**

The new market area is located in the southern part of the city near Sahab. It is about one kilometer south of the road to Azrak and approximately 4.5 kilometers east of the road that comes from Aqaba to Amman.

**MAP # 1 : Location of the New Wholesale Market**



The market site is about one third of a total area owned by the municipality. It has an extension of 148 dunums (148.000 sq.meters).

The design and construction of the access road system will be the responsibility of the Municipality.

The access roads are not yet built. They are unpaved trails without traffic signals. It is, in fact, difficult to identify the exact boundaries of the proposed new market site.

The area is just barely the minimum recommendable size for the new market. That makes it all the more important to properly design a market that will efficiently use the available space yet fulfill the city's market requirements for the next 25 to 30 years.

## **2.2. Relationship of the Market to City Planning**

The proposed market location is adequate. The proposed site could be a bit too close to the center of the city. In a positive sense the proposed site will be more easily accepted by the people. The disadvantage of the site is that a rapidly growing city could again engulf the new market within 10 years or less, creating congestion and inefficiencies.

The area has a tendency to be used by some agroindustrial facilities. That is considered to be a favorable point.

The Municipality has a general master plan for its urban development. Nevertheless, it was not clear for the consultant that this high level Planning Department of the Municipality has realistic information and understanding of the new wholesale market project. Effective coordination among all sections of the Municipality about the project is strongly recommended in order to get the right relationship between the project and overall city planning.

Administrators can not forget that the volume of products, trucks, and the economic activity of the new market will impact the life of the entire city very significantly, not only for now but in the future.

## **2.3. Topography**

The proposed site has about a 3 percent slope on its longest side, (17 meters difference in levels in about 600 meters length). But it is as much as 10% in some parts. (See Map 2 in Annex 5.)

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This is an important factor to recognize since it has implications for the cost of construction, the concept of "one unit place" that the market implies and the ease of physically moving products through the market.

Each day thousands of workers must handle thousands of tons of perishable products transported in and out by hundreds of trucks and other vehicles.

The ground is not smooth, neither in terms of shape nor in its topography. This is a controversial factor, since large earth moving works could be required to prepare the site for construction.

Its important to realize that markets need a common and almost regular place to be held. Extreme different levels, or separated partial locations may interfere with effective and efficient market operation.

The present market illustrates this point. What is called the "upper yard" has much less natural value as a market place, even though it is near the main yard.

Buyers and sellers want and need to be close to each other in order to see and feel the pulse of the market. If this important point is not taken into account, many places inside the market will be dead space, and many square meters of construction and millions of Jordanian Dinars may be wasted.

#### **2.4. Access Roads**

The shortest distance to the main highway to Azrak, using present roads, is about 1.300 meters. The proposed new access roads will provide a closer more direct route of about 700 meters.

A map of the area was requested and provided by city officials.

With respect to access roads, besides the basic recommendation that they be built to support such specialized traffic in terms of frequency, weight and direction, it is necessary to advise that intersection points between market access roads and main highways must to be carefully planned.

A minimum 2 lanes in each direction is required to connect the market with the main highways linking the market to production areas and to the city. Those access roads must be considered as part of the construction project. Otherwise, traffic congestion could create chaos in the new market area with serious implications for the city's food supply process.

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A complete and effective traffic signal system should be designed and implemented in ample anticipation of the starting of the new market. It should be easy to understand by tired and sleepy truck drivers who come far from the country side, rushing to quickly get a good place for their products.

It is understood that vehicles leaving the market for the city on the Azrak road have to cross that main road. The interchange must be carefully planned. It should be recognized that flows are heavily concentrated in time, and that vehicles are frequently heavily loaded. As a consequence traffic will be slow and heavy.

After an explanation about the architectural project design developed by the municipality during its first month of work on the idea, some very preliminary considerations were made about the proposed design of the market.

### **2.5. Infrastructure**

As of this time the proposed site has no basic infrastructure services. However, the site is not far from existing services so there should be no difficulty and relatively little cost to extend the services to the proposed site.

Special care has to be taken to provide ample electricity to the site. A special survey is suggested, before undertaking the allocation of power to the area.

It was agreed that cold storage will not be provided by the market. Instead commission agents or other users who wish to have cold stores will be permitted to build them inside their warehouses as long as they follow market guidelines. That means that the electricity system should be designed to accommodate that eventuality.

Telephones are also crucial to the market. A capacity of about 500 lines will be necessary.

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### **3. THE ORIGINAL PROJECT DESIGN OF THE MUNICIPALITY.**

Map 3 in Annex 5 is a copy of the Municipality's preliminary market design. Following are observations about that design:

The early design was relatively simplistic with one entrance and a single exit at the other end of the market. That concept is not consistent with the expected operation of the market, in terms of the movements and flow of products and services. For instance, there was no provision for trucks to return to an area of the market which had already been passed without going out of the market and coming in again.

No basic information about the operation of the market, had been taken into account.

Merchants typically do not like the type of store design used in that proposal - with both front and back doors. Merchandisers who need to keep careful control of their own businesses, cannot watch two open at the same time. Experience in other countries has indicated that the merchants will typically keep one of the doors closed. That would, of course, defeat the purpose of the proposed design and make the market operate much less efficiently.

One major concern was to have a large number of commission agent spaces. But the efficiency of a market cannot be measured by the number of merchandisers. It is related to the ease, efficiency and rapidity of movement of products among the participants in the market.

The market is likely to grow, not because of the number of Commission Agents, but because of the ability of the existing number of agents to handle a bigger amount of products every day. Some increase in the number of commission agents may be expected, but that number can not be and will not be more than about 10 percent above the present number. It is not easy to become a commission agent from one day to the next, and some may be leaving.

With respect to the topographical characteristics of the site, the entrance for trucks in the original design had a 10 percent slope. That would be a major problem. Dr. Kamel Mahadyn, who acts as special Advisor to the Municipality and is a very well known architect at the University of Jordan, expressed the

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view that the original design was "impossible" because it was incompatible with the topographical characteristics of the site.

It was considered important to go inside the present market to observe its operation in detail and to consider the real facts about its operation, as a basis for designing the new market. The following objectives were considered:

- to describe the marketing process that takes place inside of the present wholesale market,
  - to identify the different groups of participants in the market,
  - to know their functions, space requirements and methods of operation,
  - to understand the present administrative functions,
  - to explore other considerations useful for the new market design.
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#### **4. OPERATION OF THE PRESENT MARKET.**

##### **4.1. Characteristics of the Amman Wholesale Market**

The present central wholesale market of Amman, serves the following functions :

- It daily receives about 900 trucks with 1.500 tons of approximately 100 different kinds of fruits and vegetables produced in Jordan.
  - Products come to the market mainly in small to medium size trucks (small trucks and pick ups) between 1 and 3 tons each, but some big trucks (8 to 20 tons) are also seen as suppliers trucks, especially for imported goods such as apples, grapes and potatoes.
  - It is the main buying point for about 1.600 retailers in the city of Amman, including supermarkets, green grocers, hotels and restaurants in addition to many wholesale buyers.
  - It also regularly supplies products to deficit regions all over the Kingdom, especially cities and rural areas in Southern Jordan.
  - It is the distribution center for imported fresh produce, e.g. potatoes, apples, grapes, carrots, onions and others, mostly through the AMPCO stores in the market.
  - It is a point of supply of products for exporters, especially to the Gulf states. Products are purchased in the market and transported to exporter's workshops where they are loaded into refrigerated trucks with 12 to 20 tons of capacity. When export markets are totally active, this is a major function of the market.
  - It is the most important agricultural market of the Kingdom with 34 to 50 percent of all Jordanian fruits and vegetables marketed there.
  - It is therefore the single most important location for price formation for most fruits and vegetables in Jordan, reflecting demand and supply conditions in Jordan as well as in Gulf markets and to some extent other international markets.
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**4.2. Products**

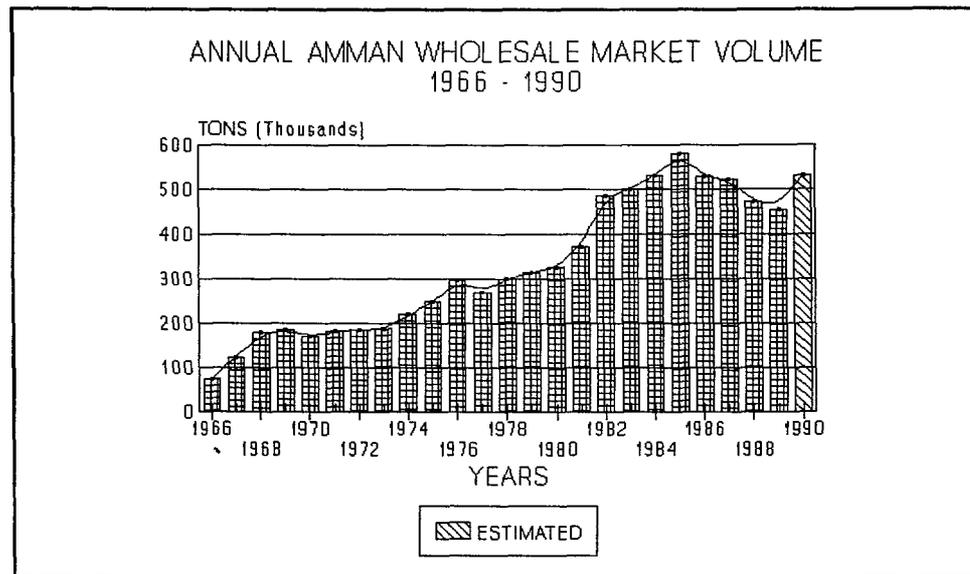
*4.2.1. Kind of Products by Groups*

Annex 4 shows a complete list of products marketed through the Amman Wholesale Market. There are 62 different types of vegetables and 42 different fruits. The list is divided into groups in accordance with the nature of product (leaves, roots, size, etc.) and the handling characteristics.

It is strongly recommended that the new market design consider the implications of that grouping, since the market and the commission agents have their own tendency to specialize by type of product. Special services and conditions may be required, such as water sources to cool leafy vegetables. Different groups of products have different inventory rotation speed, and some, such as onions and potatoes need short term storage facilities. These facts should be taken into account at the time of detailed designing of the facilities and for administrative purposes when the new places are being assigned to commission agents and wholesalers.

*4.2.2. Tons of Products per Day, Month and Year*

Figure 1 shows the total annual volume of products entering the present market since 1966, when the present market started operation.



**Figure 1**

There has been a steady increase in volume except in the period from 1986 to 1989. (See Table 1 in Annex 5.)

June and July as shown in Figure 2 are the months of maximum volume in the market. Volume during June and July of 1990 was over 60,000 tons per month. The average tons per day during these months exceeded 2,000 tons. Watermelons, which are a high volume and high weight product are the major product during that season.

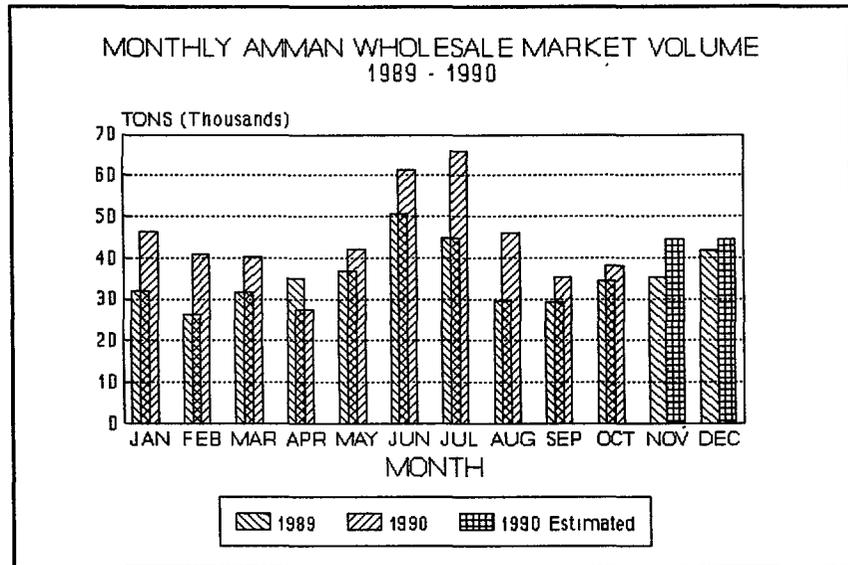


Figure 2

Figure 3 shows the number of trucks arriving between 6 a.m. and 3 p.m. as well as the number arriving between 3 p.m. and 6 a.m. the following day. Care must be taken when interpreting the statistics on daily truck arrivals because trucks arriving between 3 p.m. and midnight of one day are recorded as arrivals for the next day.

On most days about 60 percent of the daily volume arrives between 3 p.m. and

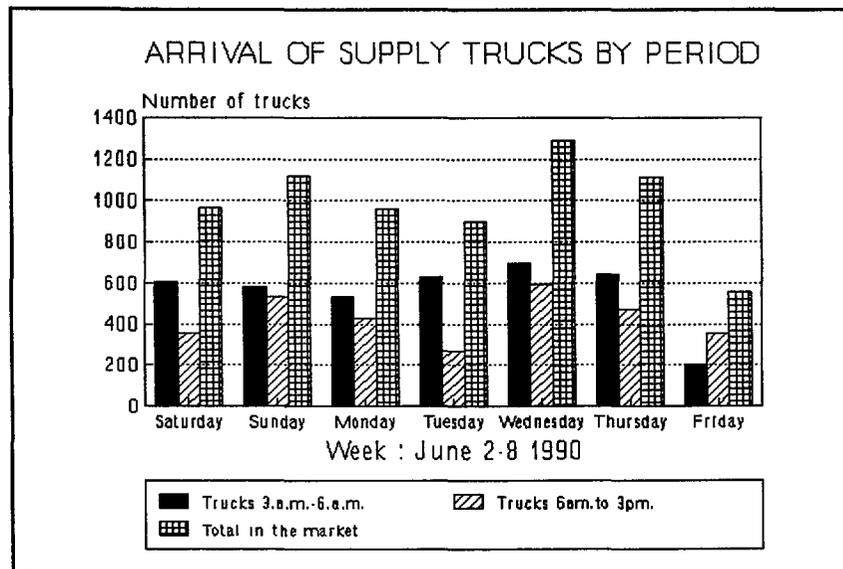


Figure 3

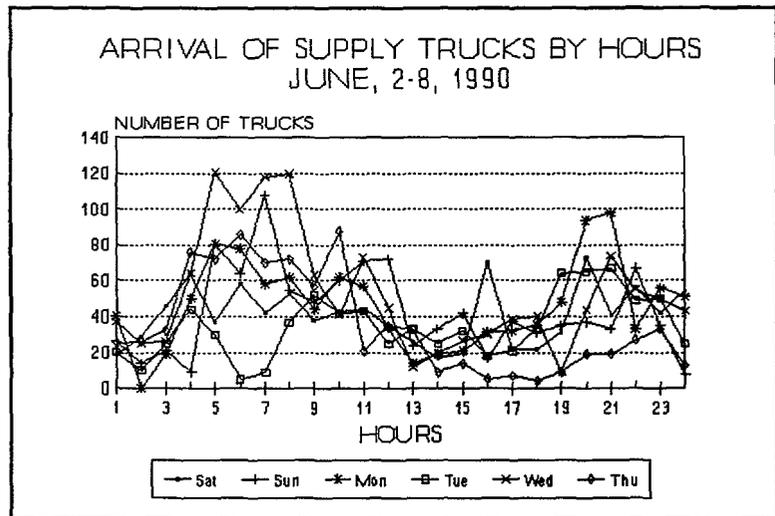
6 a.m. when sales are not permitted. About 40 percent arrives between 6 a.m. and 3 p.m. when sales are in progress. (See Table 3 in Annex 5.)

**4.3. Market Schedule**

The present wholesale market in Amman is basically open 24 hours a day, seven days a week.

It is important to determine if this is a policy to be continued in the new market.

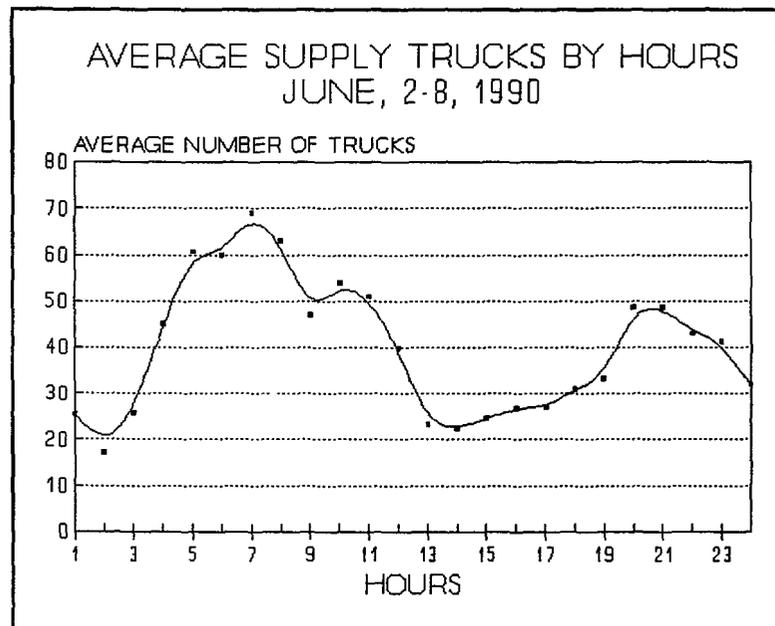
There is a concentration of product arrivals in the evenings from 6 to 10 p.m., and again in the early morning from 4 to 10 a.m., but trucks arrive throughout the day and night.



**Figure 4**

Commission agents are permitted to begin selling between 5 and 6 a.m. The largest concentration of retail and export buyers are in the market at that time.

The sales pace is intensive until about 9 a.m. Most of the products have been unloaded onto the pavement in front of commission agents' stores during the night. Commission agents who located in the corners of the market and who do not therefore have open space in front of their stores are permitted to have their product consignments unloaded onto the pavement in the central area, some 50 meters from their stores.



**Figure 5**

Sales are made through auctioneers who work for commission agents. Auctioneers record sales in a notebook for subsequent accounting. Large volume commission agents have as many as 4 to 5 auctioneers or sellers.

On most days the courtyard is completely full of products, buyers, sellers and three wheel hand carts taking the products outside the market to waiting pickups that will transport the product to retail stores. The market simply cannot physically accept additional deliveries during the intensive selling period between 6 and 9 a.m. As soon as the courtyard clears, the market management permits additional waiting trucks to enter the market and there is a new round of auction (directly from trucks). Sales start at about 10 a.m. and continue until 2 to 4 p.m. Most of those sales are made directly from the truck to exporters who re-direct the full truckload to their workshops located outside the market.

At 4 to 5 p.m. the process starts all over again as products begin to arrive and are unloaded onto the courtyard for sale the following morning.

Is it logical that the same schedule will be convenient for market participants in the new market? The administration will have to carefully analyze this issue in order to introduce the best alternative in the indispensable operational rules of the new market.

It is logical to expect that even in a large new market, with adequate sales space, market participants are likely to prefer relatively long sales periods. Even if the market is not open 24 hours per day with the same long sales period, 16 to 18 hours a day is likely. Because of the volume of supplies in the market, and the relatively short distances (less of 150 kilometers), farmers will prefer to make frequent small deliveries rather than infrequent large volume deliveries.

There is another factor that may force longer sales hours. Since each truckload may have to be sold in small lots (5-20 boxes) for the local market, there is the need of a large number of transactions. That implies a high number of clerks for each Commission agent. This suggests that Commission agents are likely to ask farmers to spread the arrivals of their shipments over a longer period.

Finally, exporters, who buy mostly by the truckload, may wish to purchase their supplies later in the day after retailers have completed their purchases and cleared the market.

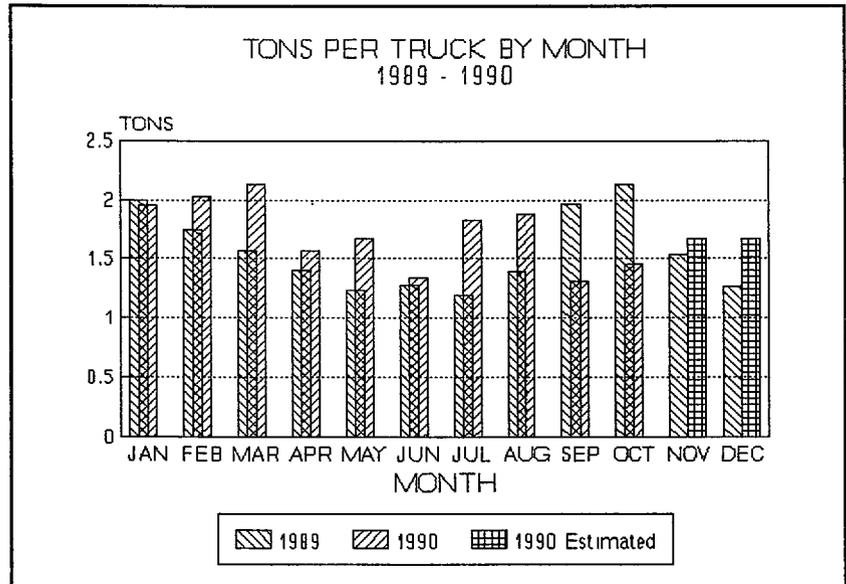
The new design has to be flexible enough to efficiently facilitate those different aspects of the market, including different sizes of trucks working in the same infrastructure.

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**4.4. Supplier Trucks**

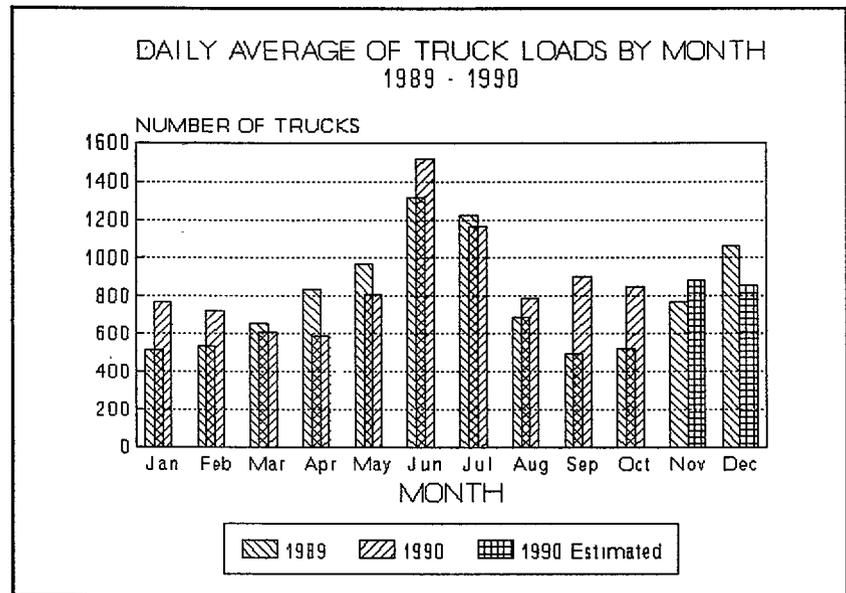
Suppliers trucks most commonly used are small Toyota trucks, with a capacity of 1 to 3 tons depending on the product and the use of its capacity.

The average size of deliveries per truck in 1989 was 1.46 tons (Figure 6).



**Figure 6**

The average number of trucks arriving in the market per day during 1989 was of 811. For January to October 1990, the average was 871 trucks per day. Daily average goes from 1.200 to 1.600 trucks/day during June and July. (See Figure 7)



**Figure 7**

Big trucks were also identified inside the market :

5 axles and about 17 meters long,  
3 axles and between 9 to 12 meters long, and  
2 axles with 6 to 10 tons and about 9 meters long.

Large trucks are most frequently used to transport imported products such as potatoes or apples. Sometimes, as in the case of grapes, products are sold directly from the truck. Bananas from the West bank usually arrive in larger 2 to 3 axle trucks.

There are no available statistics about the number of these types of trucks. But, the number of them was significant during the several times and hours that the work group visited the market. An increase in the number of large trucks may be expected in the future.

For planning purposes it is assumed that an average of 1,000 trucks will be arriving each day during the first year. But the new market will need the capacity to handle between 1,500 and 1,800 truckloads during certain high volume days of the year. Roadways inside the market must be designed to allow easy traffic of at least that quantity of supply trucks, in addition to other vehicles.

#### **4.5. Delivery Trucks**

Pickups of 1 ton are the regular delivery trucks.

Since there is no entrance control for them at the present market, there are no reliable statistics on the number of such trucks serving the market. But their number is proportional to the number of buyers. (They are estimated by the consultant to number about 2,000 per day). The main problem for these delivery pickups at present is the difficulty of getting close to the place where the buyer purchases his products. During the peak hours empty pickups are not permitted to enter the market. A common practice is for buyers to pile up purchases in some place, to be picked up at a time when the pickup is permitted entry. Another alternative is for the retailer to pay one of the three wheel cart operators to pick up his purchases and transport them outside the market to a waiting pickup, parked around the market some 200 to 400 meters away.

Delivery trucks are a necessary part of the market operation. The new market design must make provision for the easiest and shortest way to get delivery trucks close to the buyer's purchases. The less movement and handling, the more efficient the process - not only because of the cost of handling but

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because product quality is deteriorated each time the cartons are picked up and set down.

#### **4.6. Basic Statistics for the New Market**

As a basis for sizing the market it is assumed that the market will be handling the following volume of product as of 1991:

550,000	metric tons per year, which means
45,850	metric tons per month and
1,530	metric tons per day, which is equivalent to
1,000	small trucks (Dynas) per day. (And on some days the number of trucks may exceed 1,800.)

It is assumed that the market will continue to function as the major price making and distribution center for fresh produce in the Kingdom. At present it is also the major assembly center for exports to Gulf states. The increase in volume flowing through the market will depend on the increase in local consumption and the volume of exports. Local consumption can be expected to increase by about 3 percent per year depending on the rate of population growth in the area of influence of the Amman's wholesale market (Table 4, Annex 5). It is more difficult to predict the volume of exports which will flow through the market.

Products destined for Europe and other sophisticated markets will not flow through the Amman Wholesale Market. They will go directly from farms to nearby packing houses for direct shipment to export markets. At some point in the future, exporters to the Gulf states can also be expected to adopt that mode of operation. The compelling reasons for that tendency are the need to move perishable products to export markets as quickly as possible with minimum physical handling and under constant refrigeration.

The movement of export products through the Amman Wholesale Market implies at least one additional day and at least 2 additional physical handlings for each box or sack of product destined for export. Even exporters to the Gulf states will eventually recognize the implied cost of current practices and begin procuring products at the farm or in assembly markets near production areas, e.g. Arda.

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It should be noted that, **export activities impact the Amman Wholesale Market in a different way** than the local market. It presently serves as the major assembly center for exporters. From 10 to 20 small truckloads of product may be purchased in the market to be transferred to the exporter's workshop where it is loaded into only one big refrigerated truck.

The **local market distribution function** means that all the supplies coming from the farms, have to be unloaded, and inspected almost box by box by potential buyers. The local buyer is purchasing small quantities (a few boxes) of any given product in order to achieve the assortment of products required for his retail business on any given day. That assortment must be transferred efficiently to the retailers pickup or small truck for shipment to his store.

Of course, the infrastructure has to be designed to efficiently accommodate both the exporter assembly and the local distribution functions, since both are presently important for the market of Amman.

#### **4.7. Entrance and Parking for Trucks**

Since there is limited space in the present market, transporters lose much time each day waiting to enter the market or to get out. Many streets and empty land parcels around the market are dedicated to parking, loading and unloading areas.

At the entrance to the present market there is a control point. An entry form is completed in triplicate for each truckload of product. The truck drivers must leave their drivers license as guarantee and control of delivery and tax payment. The main purpose for collecting the information on the entry forms is to enforce collection of the tax. Truck drivers have to come back with the evidence of the Commission Agent's acceptance of the product in order to get their driver license back.

Shipments are subject to quality inspection by AMO representatives. The total average time for control and inspection is about 3 to 5 minutes for each truck. However, AMO inspectors are not always present for quality control inspection, which means that the time required to fill out the form is only 30 seconds to one minute at the entrance. Information in such cases is given by drivers to the Administration delegate who fills out the form.

Since this control function will be continued in the new market, the design of the new market must provide for a location for the function to be carried out efficiently. Drivers must return to the entry point to pick up their drivers license before leaving.

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On the other hand, space for inspection will be needed. If quality inspections are to be made regularly, there could be a backup of loaded trucks at the entrance. Adequate parking space at the entrance must be provided to avoid unnecessary congestion and delays at the entrance to the new market.

Since the information taken at the entrance is relatively extensive and statistically useful it may be advisable to install a computer system for efficient entry and manipulation of the information.

Empty trucks and personal vehicles need not be controlled at the entrance to the new market.

#### **4.8. Commission Agents**

Commission agents (C.A.) are major participants in the market. Their numbers, according to reports provided by the wholesale market administration has been as follows :

1966 .....	37
1978 .....	56
1966 .....	69
1990 .....	73

The 73 C.A. currently occupy 79 commercial units, with 4 new spaces now under construction.

According to the law, commission agents receive the merchandise from producers, to be sold on behalf of farmers through auction. They charge a commission rate that ranges from 3 to 5 percent of the sales price.

The C.A. are responsible for collecting market use fees from sellers (2%) and buyers (2%) on behalf of the market management.

The study entitled Performance Evaluation of Fruit and Vegetable Wholesale Markets in Jordan, done by AMO in 1989, found a certain degree of economic concentration among the C.A. The AMO study identifies different levels or sizes of commission agents:

5 large Commission Agents;

They sell about 200 of the 1,000 truckloads arriving in the market on any given day, handling about 40 trucks each per day.

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13 large to medium commission agents;

The five larger C.A. in this category sell from 30 and 39 truckloads a day, and the 8 smaller ones sell 20 to 29 truckloads a day.

25 medium commission agents;

These C.A. sell between 10 to 19 truckloads per day.

30 small size C.A. selling less than ten truckloads a day.

Several of the commission agents are also exporters, and 11 were reported to also be farmers in addition to serving as C.A..

When the time comes to distribute space in the new market, it will be necessary to have accurate statistics on volume handled by each commission agent, in order to assign or offer them the space they really will need.

The activity of commission agents is not, and cannot be only auction sales, since there are other functions that take place in the market. In general, they do not take title to the product. But in some cases the commission agent becomes a wholesaler by purchasing products for his own account to be exported or sold to retailers. This mode of operation is particularly prevalent for products that are not sold immediately, such as apples, onions, seeds, peaches and similar products.

Not all commission agents execute the same functions. Some have a certain specialization as auctioneers, and others as exporters or distributors of products that can be held for sale over several days. Basic infrastructure has to be flexible enough to provide the facilities required by each to efficiently perform the necessary marketing services.

The activity of AMPCO is also important in the market, as a suppliers of imported products such as potatoes and apples. Nevertheless, they do not store products in the market, but in facilities outside the market.

Commission agents are not encouraged to keep big supplies of products in long term storage inside the market, since they must pay the tax to the municipality for all products entering the market. Commission agents prefer to store products outside but near the market.

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**4.9. Buyers**

Amman's retailers represent the largest group of buyers in the wholesale market. The nature of perishable products, the lack of refrigerated storage and the small size of the retail stores forces them to make purchases several times a week. AMO's studies show that between 78 and 87 percent of all retailers buy fruits and vegetables twice a week or more often.

Other buyers include hotels, restaurants, institutions such as hospitals and the army, re-sellers inside the market and traders distributing outside the market. Exporters and wholesalers of other cities in the kingdom are also important.

Since there are about 1,600 retailers in Amman, we estimate the total number of buyers in the wholesale market to be about 2000 per day.

Buyers presently consider the time and cost of buying as big problems. They have to move products outside the market for transportation, or wait as much as two hours to be able to get their pickup close to the product to be transported.

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## **5. THE NEW MARKET DESIGN**

In order to obtain accurate and direct knowledge of the market, as an indispensable basis for the new design, intensive work was done, with the Architect Fadi Bunni and AMO's professionals including:

- deep and detailed observation of the present market place at different times and days;
- visits to the proposed new wholesale market site;
- interviews with the wholesale market manager and his main employees, commission agents, truck drivers, retailers, re-sellers, and other participants in the market;
- gathering and analysis of the statistics that were available.

Design work was done jointly with Architect Fadi Bunni, who this consultant considered to be highly professional, capable and dedicated.

### **5.1. Market Master Plan**

Starting from the general topographical plan of the new market site, four main criteria were considered:

- 1) To develop a central wholesale market facility which participants consider to be a single market, where all supply and demand representatives can easily and quickly get a sense of the quantity, movement and price of products in the market at any given time.
  - 2) To achieve a viable global system of internal roads and traffic ways, that allows easy access and transit of different types of trucks and cars functioning in the market.
  - 3) To make the new infrastructure simple and effective according to the real needs of all the participants in the market, thinking not only of today's needs but for the future and in accordance with Jordanian attitudes and behavior in the market.
  - 4) Making most efficient use of the site while leaving some free space for future developments as needed.
-

Map 4 in Annex 5 shows the proposed overall layout of the new market. The proposed design addresses the above design objectives while accommodating to the topographical characteristics of the site. In fact, the proposed layout uses the natural slope of the tract to achieve the above objectives. If the proposed master plan for the new central wholesale market is considered acceptable to the Authorities of the Municipality, much more detailed work will be needed. Small adjustments may be necessary in some aspects. That will be done as part of the detailed design work.

## **5.2. Services to be Provided**

### *5.2.1. Commercial Store Units for Commission Agents*

A modular system was adopted in order to permit each commission agent to have the space he needs according to the size of his business and his economic capacity and function. It does so while maximizing the efficiency of construction and flexibility in use.

Taking advantage of the site's topography, there will be the option of two kinds of stores:

- TYPE A : One level basic modular unit ( Figure 8 )
- TYPE B : Two level store modular unit. (Figure 10).

#### TYPE A MODULAR UNIT:

Each of this type modular unit has 56 sq.meters, 32 of which are enclosed within secure walls and doors and 24 sq.meters as covered display and sidewalk space. Inside area will be 6 meters high allowing an additional mezzanine of at least 16 sq.meters. The decision to build a mezzanine floor will be up to the commission agent.

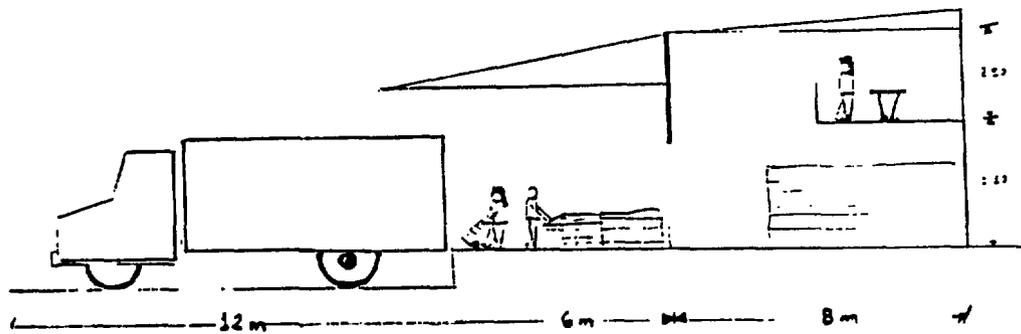
The parking area in front of each modular unit is 12 meters deep. It allows trucks as long as 18 meters to park in front of the unit, since the road width in front of the building is an additional 16 meters. (Figure 8).

The total number of such modular units is 200 assuming each is 4 meters wide, or 160 if each is 5 meters wide. The modular system will allow the market to offer different store sizes as follows (See Figure 9).

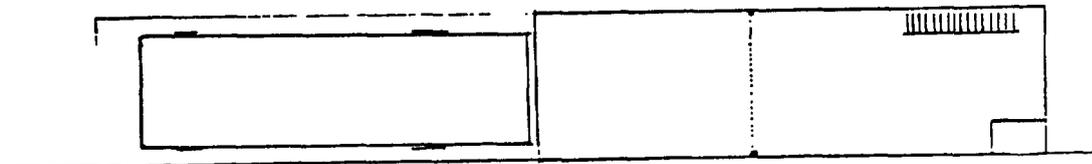
1 Modular unit	:	56 sq.meters
2 " units	:	112 sq.meters
3 " "	:	168 sq.meters
4 " "	:	224 sq.meters

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**FIG.8 :COMMERCIAL STORE UNIT  
FOR COMMISSION AGENT - TYPE A**

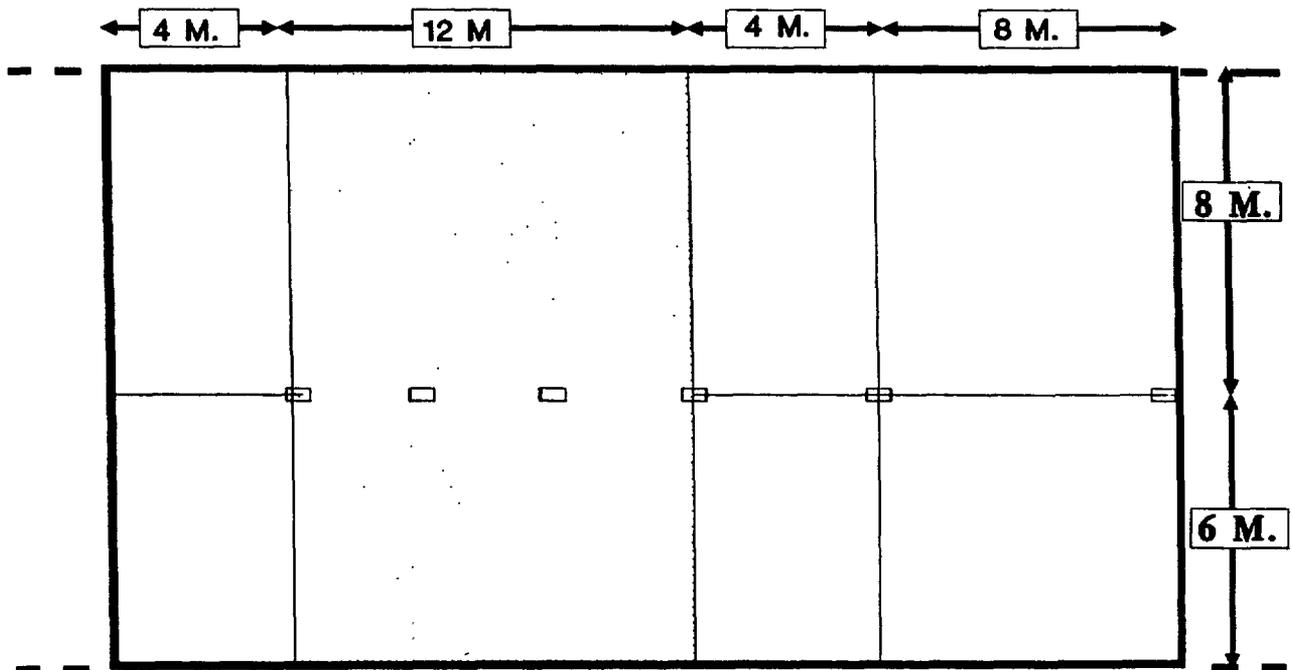


optional internal distribution.



Areas. Interior	32 m <sup>2</sup>
Display	24 m <sup>2</sup>
TOTAL	56 m <sup>2</sup>

**FIG.9 : SAMPLE SECTION OF STORE'S BUILDING**



- 1 Unit :  $14 * 4 = 56$  Sq.m.
- 2 Units :  $14 * 8 = 112$  Sq.m.
- 3 Units :  $14 * 12 = 168$  Sq.m.
- 4 Units :  $14 * 16 = 224$  Sq.m.

- Own Optional Design for Interior Space
- Option of Individual Cold Storage or Other Services
- Size According with each One's Bussiness Size

Larger commission agents will need more than one modular unit. The following is an estimate of the number of commission agents requiring 1, 2, 3 or 4 modular units.

30 C.A.	require	1	Modular Unit
25 C.A.	require	1 to 2	Modular Units
13 C.A.	require	2 to 3	Modular Units
5 C.A.	require	4	Modular Units.

Based on that estimate a total of about 120 modular units would be required.

**TYPE B STORE MODULAR UNIT: (Figure 10)**

This is basically a two level store option, especially for those Commission agents who, because of the nature of products handled, need an additional special storage or handling area.

It is expected that Commission agents and institutions specializing in apples, potatoes, onions, and similar products, will prefer this type of two level store.

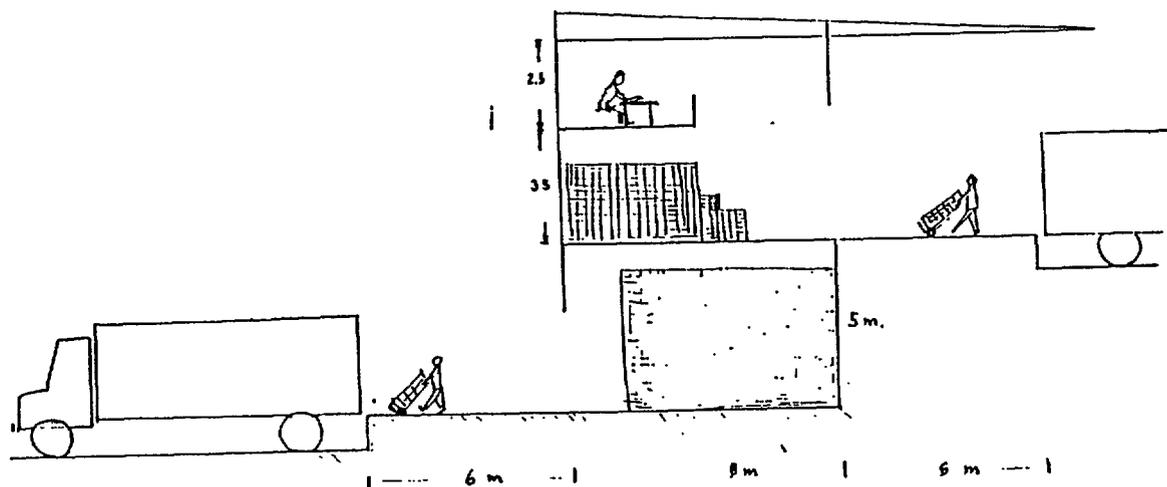
Design will allow for the lower level of this type of store to be used by businesses specializing in ripening and sale of bananas or other uses required by the market. (Buildings # 5 and 6 in the master plan map). There will be 44 of these units in the lower level.

Buildings 7 and 8 in the master plan map, whose lower level faces the external side of the market on the major access road, will be rented to agricultural input distributors.

All stores (both Type A and B) will be provided with central system of water, sewage, electricity and telephones, in such way, that individual commission agents can make their own decisions about the use of space within the store. They may consider private W.C. service, small kitchen service, their own cold storage rooms, etc., according to each's desire and need. It is suggested that prior approval by the market management be required for any construction within the store, in order to keep common basic standards.

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**FIG.10 :COMMERCIAL STORE UNIT FOR COMMISSION AGENT AND STORAGE OR BANANAS - TYPE B**



- Lower level options :
- Agricultural Inputs stores (outside)
  - Banana ripening. (inside).
  - Own storage place of 1<sup>st</sup> Level Comm. Agent.

### *5.2.2. Auction Market Place*

These buildings are basically an open and covered platform for the auction market. (Figure 11).

They will be built with the same length and directly in front of the modular store buildings with a width of 14 meters. Products can be efficiently unloaded, temporarily stored, sold by auction and re-loaded from the platform to delivery trucks. Buyers may walk along side walk lanes in front of the products as they are able to do in the present market.

The auction platform can be used for the different types of sales arrangements presently used in the wholesale market; i.e. auction of unloaded products, auction by the box from trucks and special full truck auction sales to exporters.

During supply arrival periods (from 4 p.m. to 5 a.m. the next day) the platform can receive products from both sides for sale the next market day. (Figure 12).

Once sales begin (5 a.m. to 6 a.m.) the area between the two parallel platforms would be used only for buyers' trucks. Meanwhile, the external sides of each platform can continue to receive supplies for sale, either directly from the truck or unloaded onto the platform. As shown in Figure 13, a constant flow of products will be possible during all sales hours (5 a.m. to 4 p.m.), allowing both supply trucks and delivery trucks to have access to the platform throughout the selling period.

This design and method of operation maximizes the flexibility of the market space and permits optimum adaptability to seasonal variations in market volume and product mix. It is suggested that space be rented on a monthly basis in order to permit commission agents the opportunity to increase or decrease auction sales space in response to seasonal variations.

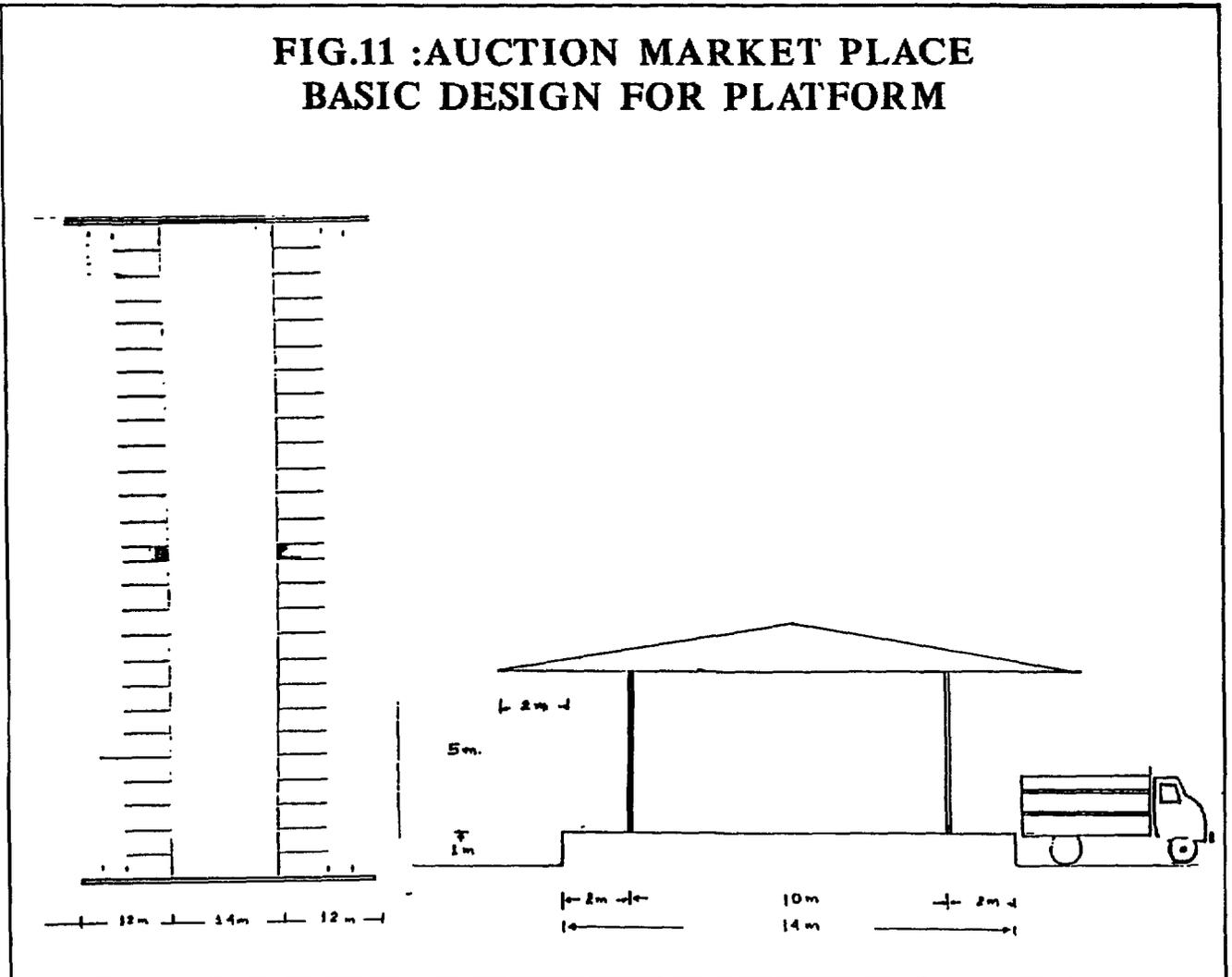
It is strongly recommended that ceiling design provide for adequate air movement in order to moderate temperatures, especially during summer. Internal floor slope of 1 to 2 percent will facilitate cleaning works. Direction of slope should be toward the central side to facilitate movement of products. Water drainage spouts are needed for areas where carrots and leafy produce will probably be concentrated.

### *5.2.3. Agricultural Input Stores*

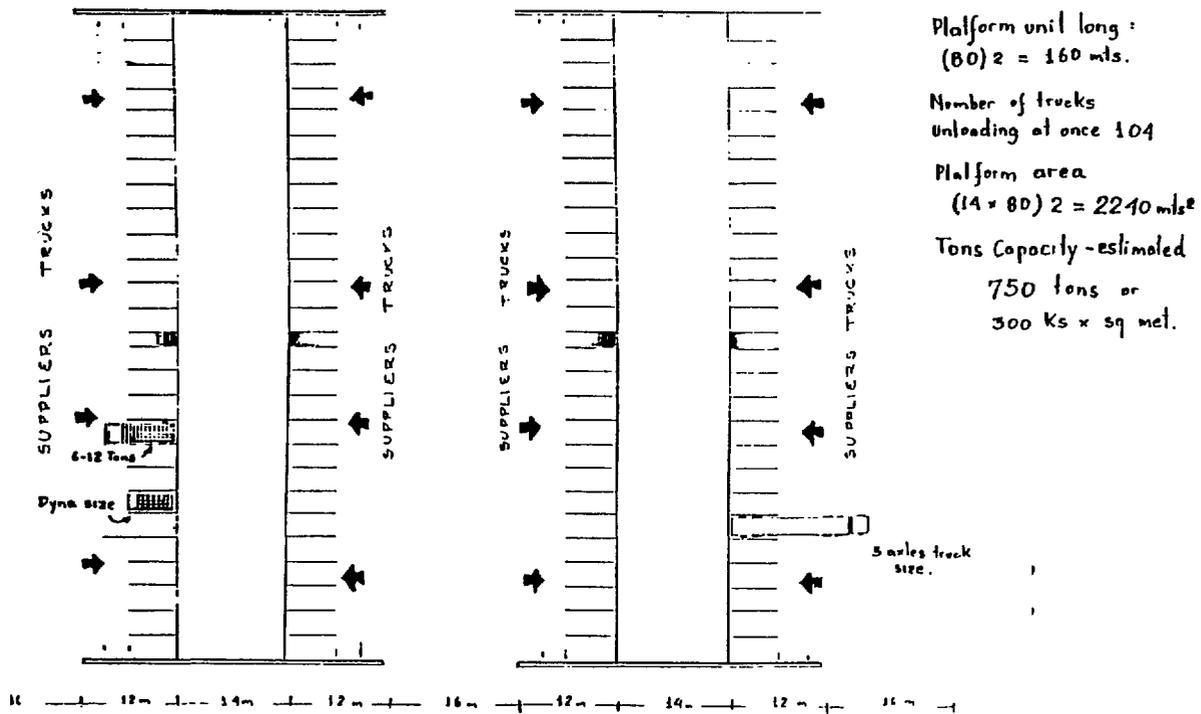
As part of the market but facing to the outside, there will be spaces especially devoted to agricultural input retailers. They will have the same modular sizes adopted and explained as Type A stores (32 sq.meters within walls plus 24 sq.meters as display and walking area). The Master Plan provides for 124 of these units.

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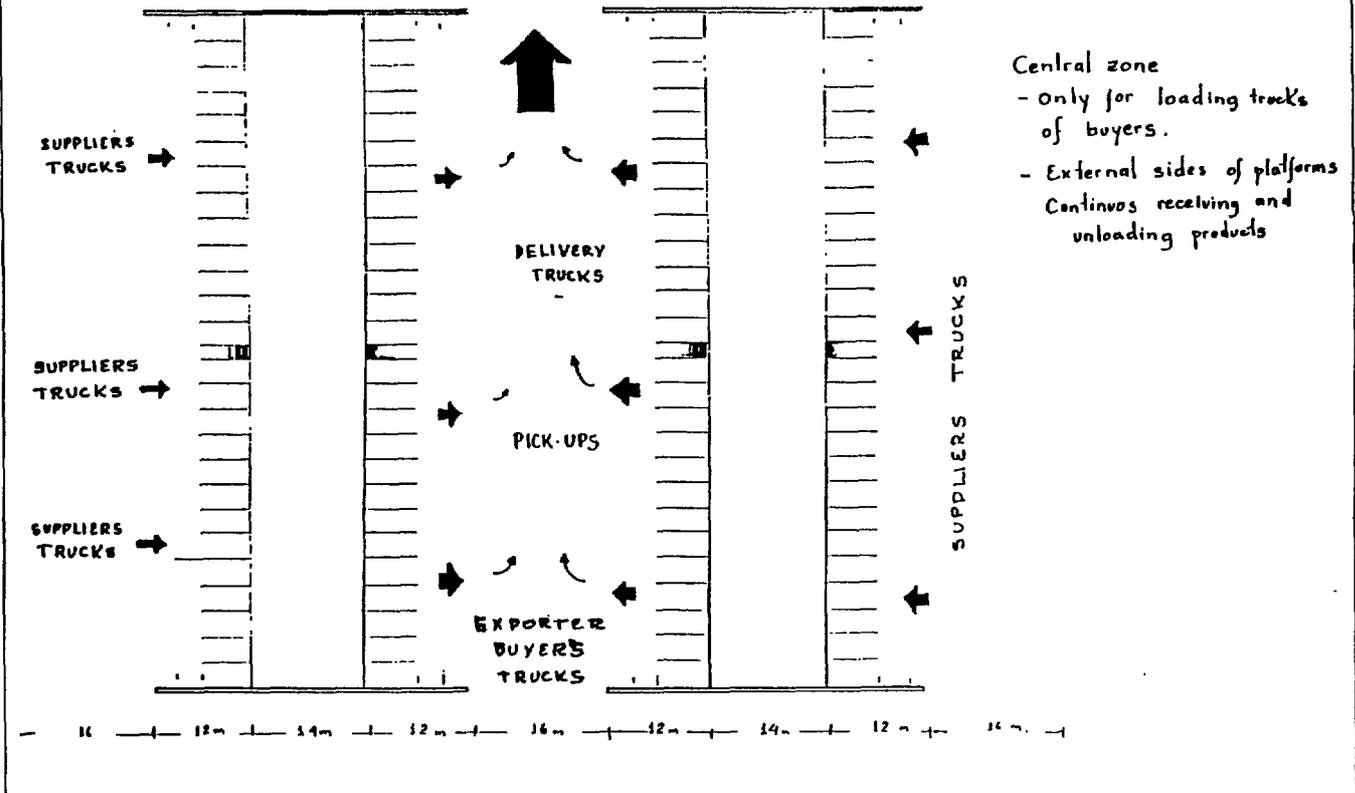
**FIG.11 :AUCTION MARKET PLACE  
BASIC DESIGN FOR PLATFORM**



**FIG.12 :PLATFORM OPERATION AT SUPPLY TIME  
( 4 p.m to 5 a.m next day )**



**FIG.13 :PLATFORM OPERATION AT SALES TIME  
( 5 a.m to 3 p.m )**



#### *5.2.4. Commercial Boulevard*

A commercial boulevard (shopping mall area) especially devoted to banks, drugstores, cafeterias, and other complementary services, is included in an area close to the administrative buildings and within easy walking distance of the main market area. It will serve as a pedestrian entrance and a connecting space between the inside market and the external services and stores.

#### *5.2.5. Entrance and Exit*

The entrance will have 4 lanes - two for loaded trucks and two for personal cars and empty trucks.

The two lanes for loaded trucks will be part of the inspection and control area. Parking and maneuvering space will be provided for up to 200 trucks at the same time. Administrative decisions about work shifts size and number of inspectors will directly affect the final design for this area. For the market to achieve both physical and economic (price formation) efficiency it is important that trucks not be significantly delayed at the entrance.

The exit will be three lanes parallel to the entrance with access to a parking area for empty trucks. There are both topographical and traffic related issues which must be considered in the final design.

Adjustments in the design of entrance-exit area may be needed.

As part of the entrance-exit area, certain buildings and services will be provided. They are:

- a) A building for administrative purposes, offices for tax control, inspection laboratory, and basic services for employees 24 hours a day.
  - b) Seven small stalls, one at each entrance lane, as check points.
  - c) Platform scale, inside of the market and connected with the entrance and exit ways, in such a way that both loaded and empty trucks may have easy access to it without leaving the market. The platform scales need their own small stall for control. It is recommended that the scale be at least 20 meters long with a capacity adequate to allow large and heavy tractor trailers. Nearness of the scales to the entrance will facilitate its administration and service.
-

### *5.2.6. Central Plaza and Pickup Loading Area*

A central plaza will serve as a transitional and circular point, facilitating the rotation of vehicles, and connecting the two wings of the market.

At the same time, this area will allow parking for about 100 pickups. Small retailers will be able to collect purchases which cannot be feasibly picked up at the auction platform. A corridor will allow retailers to assemble their purchases in one place close to their pickups. An hourly parking fee could assure that this place is used mainly as a pick up area, and not as parking space.

### *5.2.7. Administration and Service Buildings*

It was impossible during present work to formulate details regarding administration, support and complementary services for the market. Nevertheless, a space was assigned for administration and complementary services.

Four groups of activities or complementary services were identified:

a) Administrative and public offices including:

Market Administration, Agricultural Marketing Organizations offices for inspection and market information, Ministry of Agriculture, Customs office (Export/Import information service);

b) Cultural and Religious center:

As part of Jordanian culture, a mosque will be included. Complementary social and cultural activities may be considered.

c) Security and Health basic services:

Police station, designed according to their own specifications.

Basic Health services form part of this suggested unit also.

d) Communication Center:

Post office, P.O.Boxes, Fax service, long distance telephones, international market information services, etc..

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e) Commercial offices:

There will be a demand for office space, for different businesses which may not handle products directly but need to be close by, e.g. exporters, transport companies, and others.

f) Banks:

A survey of banks is suggested in order to determine the number wishing to rent offices in the market and to determine how much space will be needed. If not, at least three locations are recommended. Specifications for this area should be based on advice from the Central Bank of Jordan and from the banks themselves.

g) Restaurants, Cafeterias and W.C. Services:

Considering the cultural food habits of people who will be using the market, several adequate places for fast food will be provided.

At least one good restaurant location should be considered, perhaps with a good view of the market. This restaurant might become an interesting place for non-market related diners as well as a more sophisticated facility for business related dining by market participants.

With respect to W.C. services, it must be recognized that the transient population in the market will include some 5,000 to 7,000 people a day, including transporters, retailers, three wheel cart operators, employees of commission agents and others. It is strongly recommended that sufficient, well located toilets be provided. The design criteria should be to provide W.C. services within 50 meters of market participants. A modern market for the distribution of fruits and vegetables should provide a comfortable, clean and sanitary environment for buyers and sellers.

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## **6. TOTAL AREAS OF THE PROJECT**

Tables 5, 6 and 7 in Annex 5 summarize areas of buildings and platforms considered in the overall master plan. Numbers and letters identify them on the plan.

There are 10 commercial buildings. Four of them will be two floor levels (Type B Modular Stores).

Buildings allow 403 modular units with a total of 22,540 sq.meters of construction. 57 percent is internal area and 43 percent is display and walking space (Table 5). Table 6 shows areas by type of use of buildings.

There are eight auction platforms with a total length of 660 meters and 9,240 meters of construction (Table 7).

The following is a preliminary estimate of road and parking areas: approximately 2,200 linear meters of roads with an area of approximately 36,000 sq.meters; parking internal areas total about 32,000 sq.meters.

An approximation of the total project cost components can be obtained by determining construction costs for each type of facility and multiplying by the total construction areas. Time did not permit the consultant to carry out that estimation.

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## **7. VOLUME OF PRODUCE TO BE HANDLED.**

Under present conditions of operational efficiency by market participants, the proposed market project has the capacity to handle at least 1,109,120 tons of fresh fruits and vegetables per year (Table 8, Annex 5). Based on population and market volume projections presented in Table 4 Annex 5, the total proposed market should have the capacity to accommodate demands for the next 25 years.

Development of the Jordanian agricultural marketing system may make efficiency of the new infrastructure even higher.

Adequate administrative rules directed toward the correct and optimum use of the new market place will be required. Administrators have to become competent to use the new infrastructure as a factor of development of the wholesale market.

There is a golden popular rule to mention about market places: "Or all the people are in bed, or all the people are on the floor". In other words, all sellers of a particular product should be located in close proximity to each other. Under those circumstances buyers are happy because their purchases can be completed more quickly and efficiently; sellers are happy because they are given more or less equal access to potential buyers; everybody is better off because the price formation process is more efficient when information about supplies and prices can be instantaneously transmitted within a small contiguous area. Under conditions in the existing market some merchandisers may be getting special benefits because of the constraints of that physical facility. It should be expected that those merchandisers may resist the new market. But the municipality has the public responsibility to provide equal opportunities for all participants in a physically and economically efficient environment. The design and operation of a wholesale market should consider the interests of all market participants, including farmers, transporters, buyers, commission agents, cart operators and public servants. The benefits of a well operated market go to the whole community of producers, marketers and consumers, and it is an important factor for economic and agricultural development.

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**8. PROPOSAL FOR FIRST STAGE PROJECT CONSTRUCTION.**

The Municipality has wisely decided to build the new market by stages. The consultancy makes a proposal for the first stage project construction. The proposed construction plan takes into account the present needs of the city, with sufficient capacity to accommodate needs for the next several years.

Tables 9, 10 and 11 in Annex 5 show the areas, buildings, auction platforms and the capacity in terms of volume of products to be handled in first stage construction. The total projected volume to be handled in the first stage is 830,000 tons. Based on demand projections for Amman presented in Table 4 of Annex 5, the first stage will easily accommodate growth requirements for the next 15 years.

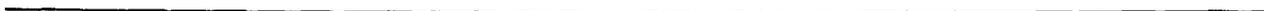
The first stage construction includes 131 commission agents units and 44 banana ripening and storage places. It also includes 6 auction platform units with a total length of 500 meters.

The remaining area will be kept for future expansion according to evolving needs.

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**ANNEX 1**

**PLAN OF WORK**



### **PLAN OF WORK**

For short term consultancy work of Hernan Cardoso under the  
Agricultural Marketing Development Project  
USAID Project

Sigma One Corporation  
November 19 - December 21, 1990

Activity : Assist in planning a study to evaluate operational, innovative and credit efficiency in the wholesale fruit and vegetable marketing system of Jordan.

### **ORGANIZATION OF WORK**

It was necessary and convenient to sub-divide the activity into three sections and priorities, as follow :

1. Analysis of the operational efficiency of the present central wholesale market of the city of Amman.
2. To provide data and other information needed by the project to assist the Amman Municipality in designing a new wholesale market structure, and

#### **1. ANALYSIS OF OPERATIONAL EFFICIENCY OF THE CENTRAL MARKET OF AMMAN**

Introduction.

Since the Municipality of Amman has undertaken the designing and planning of a new central wholesale market (CWM), it is desirable and urgent that AMO assist the municipal planners on those specific marketing facts that could determine the characteristics of the new structure, and on the general considerations that can be useful to the planners to answer the real necessities of the market of the city and the Kingdom.

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Nevertheless no specific study has been carried out about the operational efficiency of the Central market of Amman that serves as technical base to make objective recommendations to the planners of the new market.

The consultant, working together with his counterpart will

- review the operation of the present market,
- review the recent studies and information available about the market,
- interview market officials and participants in the market, and
- design and initiate information gathering activities.

On this basis, the consultant will present a report that covers:

- the technical findings and conclusions derived from this consultation, and
- the research tasks to be completed for further analysis.

### **1.1. Definition of Operation of the Central Market**

Operation of the market is understood as the total physical functions that take place or should take place in the market, in order to meet service requirements of farmers, wholesalers, retailers and consumers. Some administrative procedures or decisions are often considered as operational aspects, such as schedule hours of service and handling rules of products in the market.

For analytical purposes the following operational functions will be considered :

#### 1) Physical movements of products

- Supply transportation
- Unloading
- Stacking
- Reloading
- Distribution transportation

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**2) Handling the products**

Cleaning  
Sorting  
Weighing  
Packing  
Refrigeration

**3) Customers (buyer) relations**

Arriving to the market  
Market hours  
Buying and selling  
Creating the assortment  
Services requirements : food, banks,  
health, communications, etc.).

**2. TO PROVIDE DATA AND OTHER INFORMATION FOR DESIGNING THE NEW CENTRAL WHOLESALE MARKET**

Starting with knowledge from previous studies of the agricultural marketing system in Jordan and by the Municipal plans, in their own field, the consultant will advise the Municipality of Amman on the most appropriate procedures to use in planning and designing the new market.

On the basis of the results of section 1 of this work, and with the operational and administrative experience of the consultant, considerations will be made on the following matters :

**Infrastructure Design Aspects**

- Size of the wholesale market
  - Implications of its location
  - Alternatives for warehouse design
  - Modular alternatives for different types of wholesalers and other users (Exporters, supermarkets, commission agents, etc.)
  - Facilities for truckers (suppliers and distributors)
-

- Roads and parking space
- Auxiliary services : cold storage, banana ripening rooms, crates, etc.
- Complementary services : Banks, cafeterias and restaurants, basic health services, gas station, others according with cultural factors etc.
- Public services : water, communications, electricity, toilets, communications
- Expansion needs.

**Administrative Aspects**

Since the Municipality of Amman will be the responsible for planning and running the market, there is no need to get into these matters so specifically, at this time. They may be part of a pre-operational work that has to be done once the project is built and almost ready to start operation.

**Work Plan**

Starting on November 24th in Amman office, number 1 and 2 of the activity will be carried out until December 10th. ( 15 workdays ).

Number 3, and final report will take until Dec. 19.

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**ANNEX 2**

**PLANNING**

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## **PLANNING THE NEW CENTRAL WHOLESALE MARKET**

### **Preliminary Notes**

A new central wholesale market (CWM) is a project that has many implications. Urban development and agricultural marketing system development are both critical issues.

To be successful the project designer must carefully evaluate the social and economic impact on those individuals who will use and work in or near the new wholesale market.

### **Urban Development Considerations**

The project must give adequate answers to questions on internal operation as well as the impact on the entire city and not only for today but for the future. The new market must be compatible with the general planning of the city and the growth of the agricultural marketing system.

An incomplete list of questions follows :

- 1 - Are the products of the rural areas, coming into the market both easily and economically ?
  - 2 - Do they have enough and direct roads to get to the market, without going through or into the city road system ?
  - 3 - Is the access area enough to give rapid way to a concentrated and high number of trucks going in and out the market ?
  - 4 - Are roads good enough and connecting ways adequate for hundreds of small trucks and pick ups, going to the different areas of the city in the distribution process, usually at the same time early in the morning ?
  - 5 - What is going to happen in the "old" market place and its surroundings when the new one starts operation ?
  - 6 - What are we thinking about the external areas and surroundings of the new market place ?
  - 7 - What land-use regulations do we have at hand or proposing to orient new developments in the city because of the new market ? Can they be logically and easily enforced ?
-

Thinking about the internal processes in the wholesale market place, questions like the following must be answered :

- 1 - How many and what type of trucks do we expect to come in every day, and at peak times ?
- 2 - At what time do trucks usually arrive, having in mind the harvest hours and the distances they have to travel to reach the market ?
- 3 - What are the functions that each type of truck and its driver carry out in the market? How long do they take ?
- 4 - Since we have so many different types of cars and trucks, (suppliers, delivery trucks, taxis, personal user's cars, etc.) are we planning the right and enough location and transit space for all of them ?

### **Agricultural Marketing Aspects**

The importance of this issue may not be obvious, but experience in numerous other countries as well as in Jordan has highlighted the important effect of wholesale market design and operation on marketing system efficiency and effectiveness.

There are many things happening behind what we apparently see any day in the market. Different marketing policies may induce quite different behavior of people in the market.

Some of the points to have in mind are:

- 1 - Kind and volume of produce expected to flow through the market per day, week, month and year.
  - 2 - Probable seasonal fluctuations and likely future changes with regard to type of products.
  - 3 - Estimated daily peak throughput of produce.
  - 4 - Number of buyers and sellers to trade in the new market.
  - 5 - Characteristics of sellers: Commission agents, farmers, wholesalers of wholesalers, wholesalers-retailers, exporters, etc. Size of each in terms of sales per day. Facilities needed for each group.
-

- 6 - Characteristics and behavior of producers and buyers participating in the market.
  - 7 - Condition of produce on arrival at wholesale market. Unloading and reloading. Selling from the trucks? Packing, grading, handling and stacking methods used.
  - 8 - Methods of wholesale buying and selling.
  - 9 - Dynamics and innovative tendency in the market. Policies and market expectations that may accelerate changes.
-

**ANNEX 3**

**SCHEMATIC GUIDELINE**



**SCHEMATIC GUIDELINE**

TO BE CONSIDERED IN THE DESIGNING PROCESS OF THE NEW  
WHOLESALE CENTRAL MARKET

**A. Process of Designing**

1. Location
2. Size
3. Designing
  - a. Roads and parking
  - b. Buildings
  - c. Services
  - d. Commercial areas
    - 1) Commission agents
    - 2) Re-sellers
    - 3) Exporters
    - 4) Producers

**B. Points in Consideration**

1. For Location
    - 1.1. City Planing
    - 1.2. Relation with the city
    - 1.3. Access
    - 1.4. Infrastructure
      - 1.4.1. Drainage
      - 1.4.2. Water supply
      - 1.4.3. Sewage
      - 1.4.4. Electricity
  2. For Size
    - 2.1. Products to be marketed
      - 2.1.1. Kind of them by groups
      - 2.1.2. Tons by day, month and year
      - 2.1.3. Main peaks during the year
      - 2.1.4. Selling system
-

- 2.2. Trucks
    - 2.2.1. Types
    - 2.2.2. Number by type
    - 2.2.3. In flow hours
    - 2.2.4. Functions
    - 2.2.5. Parking
  - 2.3. Actual market area
    - 2.3.1. Offices
    - 2.3.2. Commercial area
    - 2.3.3. Inside the market
    - 2.3.4. Outside the market
    - 2.3.5. External area of influence
  - 2.4. Services to be provided
    - 2.4.1. To commission agents
    - 2.4.2. To exporters
    - 2.4.3. Re-sellers
    - 2.4.4. Producers
    - 2.4.5. Transporters
    - 2.4.6. Other groups
  - 2.5. Growth tendency
    - 2.5.1. Last 10 years
    - 2.5.2. Actual
    - 2.5.3. Hypothesis for the future
  - 3. For designing
    - 3.1. Roads and parking
      - 3.1.1. Internal traffic system
      - 3.1.2. Interconnection points with the national system of roads
      - 3.1.3. Heavy trucks
      - 3.1.4. Private cars
      - 3.1.5. Costumers' cars
      - 3.1.6. Trucks functions
        - Unloading
        - Loading
        - Selling
-

- 
- 3.2. Commercial areas
    - 3.2.1. Number
    - 3.2.2. Size
    - 3.2.3. Needs
    - 3.2.4. Policies
    - 3.2.5. Functions of
      - Commissions Agents
      - Re-sellers
      - Producers
      - Exporters
      - Others as Agricultural inputs
  - 3.3. Buildings
    - 3.3.1. Administration
    - 3.3.2. Entrances and exits
    - 3.3.3. Banks
  - 3.4. Services
    - 3.4.1. Toilets
    - 3.4.2. Restaurants and cafeterias
    - 3.4.3. Basic health services
    - 3.4.4. Communications
    - 3.4.5. Police
  - 3.5. Complementary commercial services
    - 3.5.1. Bananas ripening
    - 3.5.2. Storage
    - 3.5.3. Cold storage
-

**ANNEX 4**

**LISTS OF  
FRUITS & VEGETABLES**

## LIST OF VEGETABLES IN AMMAN CENTRAL MARKET

TOMATO  
 CUCUMBER  
 SQUASH  
 SQUASH, LARGE  
 SQUASH, SMALL  
 SNAKE CUCUMBER  
 SQUASH, WINTER  
 PUMPKINS  
 PEPPER  
 PEPPER, HOT  
 PEPPER, SWEET  
 EGGPLANT

EGGPLANT, THICK BEAUTY  
 EGGPLANT, BEAUTY  
 EGGPLANT, LONG PURPLE

ONION  
 ONION, DRY  
 ONION, GREEN  
 ONION, SEED  
 GARLIC  
 GARLIC, DRY  
 GARLIC, WITHOUT LEAVES  
 GARLIC, GREEN  
 TARO  
 TURNIPS  
 RADISHES  
 BEETS

SWEET POTATO  
 LEEKS  
 SHALLOT  
 WHEAT, FRESH

CAULIFLOWER  
 CAULIFLOWER, YELLOW (LOCAL)  
 CAULIFLOWER, WHITE  
 CABBAGE  
 CABBAGE, GREEN  
 CABBAGE, RED  
 BRUSSEL SPROUTS  
 ARTICHOKEs  
 ASPARAGUS  
 RHUBARB

LETTUCE  
 LETTUCE, LOCAL  
 LETTUCE, ROMAINE  
 SPINACH  
 MALLOW  
 CORIANDER  
 PARSLEY  
 CHARD  
 EGYPTIAN MALLOW  
 GRAPES LEAVES  
 LISAN LEAVES  
 ENDIVE

CELERY  
 MUSTARD  
 DANDELION  
 CYCLAMEN  
 FENNEL

GREEN BEANS  
 GREEN BEANS, LOCAL  
 GREEN BEANS, MABROMA  
 PEAS, SWEET  
 OKRA  
 OKRA, GREEN  
 OKRA, RED  
 BROAD BEANS  
 BROAD BEANS, GREEN  
 BROAD BEANS, MALTA  
 COWPEAS, BLACK EYED  
 CORN

CORN, YELLOW  
 CORN, WHITE  
 CHICKPEAS  
 CHICKPEAS, DRY  
 CHICKPEAS, GRN  
 SUNFLOWER

MINT  
 SAGE  
 CHICORY  
 CRESS  
 ROCKET  
 THYME  
 HORSERADISH

POTATO  
 POTATO, SEED  
 CARROTS  
 CARROTS, RED  
 CARROTS, BLACK WITHOUT LEAVES  
 CARROTS, YELLOW WITHOUT LEAVES

CAMOMILE  
 PUSLEY  
 GUNDELIA  
 ASKALAN  
 LIME  
 LAKE ALBUSLAN  
 ARUM  
 MUSHROOM  
 MUSHROOM, WILD

## LIST OF FRUITS IN AMMAN CENTRAL MARKET

CITRUS	POMELO
MANDARIN	TANGERINES
LEMON	
LEMON, GREEN	
LEMON, YELLOW	
LEMON, SWEET	
LEMON LIME	
ORANGE	
ORANGE, NAVEL	
ORANGE, LOCAL	
ORANGE, VALENCIA	
ORANGE, RED	
ORANGE, SHAMOUTI	
ORANGE, FRESH	
GRAPEFRUIT	
CLEMENTINE	

NON-CITRUS	PRUNES
APRICOTS	PRUNES, GREEN
APRICOTS, LOCAL	PRUNES, RED
APRICOTS, HAMAWI	LOQUATS
APRICOTS, KLABI	
APRICOTS, MISTKAWI	
CHERRIES	
CHERRIES, RED	
CHERRIES, GREEN	
PLUMS	
PLUMS, PEAR	
PLUMS, RED	
PLUMS, YELLOW	
PEACHES	
PEACHES, LOCAL	
PEACHES, NECTARINE	

PEARS	
APPLES	
APPLES, RED	
APPLES, YELLOW	
APPLES, LOCAL	
APPLES, GOLDEN	
APPLES, KHSHABI	
APPLES, DOUBLE RED	

GRAPES	DATES
GRAPES, WHITE	DATES, DRY
GRAPES, BLACK	DATES, FRESH
GRAPES, HALAWANI	
GRAPES, ZENI	
GRAPES, SEEDLESS	
SWEET MELON	
SWEET MELON, LOCAL	
SWEET MELON, ANANNAS	
WATERMELON	
WATERMELON < 5 KG	
WATERMELON > 5 KG	
FIGS	
FIGS, GREEN	
FIGS, BLUE	
FIGS, BLACK	

STRAWBERRIES
MULBERRY
GUAVAS
BANANAS
AVOCADOS
PAPAYA
MANGO
KIWI
COCONUTS
JUIJUBE
SUGARCANE
PINEAPPLES
KAKA
OLIVES

GREEN ALMOND
GREEN ALMOND, LOCAL
GREEN ALMOND, SHAMI
GREEN ALMOND, SNAKE
GREEN ALMOND, FARK
BRAZIL NUTS (CASTANA)
WALNUTS
HAZELNUTS
PISTACHIOS

**ANNEX 5**

**TABLES & MAPS**

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TABLE 1 : QUANTITIES OF FRUIT AND VEGETABLES  
IN THE AMMAN CENTRAL WHOLESALE MARKET  
1966 - 1989

YEAR	QUANTITY	YEAR	QUANTITY
1966	75,000	1979	315,000
1967	123,989	1980	324,750
1968	179,870	1981	372,742
1969	184,682	1982	485,165
1970	171,380	1983	500,785
1971	181,607	1984	531,546
1972	186,772	1985	580,634
1973	187,350	1986	527,629
1974	218,715	1987	522,156
1975	247,400	1988	471,908
1976	296,718	1989	454,904
1977	270,000	1990	532,000 (*)
1978	301,272		

Source : AMO Database

(\*) : Estimated

Table 2 : NUMBER OF TRUCKS AND QUANTITIES OF PRODUCTS BY MONTH

MONTH	1 9 8 9 =====					1 9 9 0 =====				
	Trucks	Vegt.	Fruits	Total	Daily Avg. Tons/truck of Trucks	Truks	Total	Tons/truck	Daily Avg. of Trucks	
JANUARY	16,000	21,396	10,596	31,992	2.00	516	23,808	46,397	1.95	768
FEBUARY	15,000	19,416	6,806	26,222	1.75	536	20,150	40,886	2.03	720
MARCH	20,331	26,793	5,021	31,814	1.56	655	18,875	40,129	2.13	609
APRIL	25,000	28,675	6,441	35,116	1.40	833	17,600	27,567	1.57	587
MAY	30,000	26,448	10,440	36,888	1.23	968	25,050	41,987	1.68	808
JUNE	39,580	23,597	26,933	50,530	1.28	1,319	45,600	61,219	1.34	1520
JULY	37,900	20,901	24,066	44,967	1.19	1,223	36,000	65,897	1.83	1161
AUGUST	21,289	18,459	11,062	29,521	1.39	687	24,500	46,173	1.88	790
SEPTEMBER	14,937	21,137	8,117	29,254	1.96	498	27,000	35,383	1.31	900
OCTOBER	16,100	24,191	10,162	34,353	2.13	519	26,250	38,205	1.46	847
NOVEMBER	23,000	24,737	10,581	35,318	1.54	767	26,483	44,384	1.68 Estimated	883
DECEMBER	33,000	29,147	12,692	41,839	1.27	1,065	26,483	44,384	1.68 Estimated	854
TOTAL	292,137	284,897	142,917	427,814	1.46	799	317800	532612	1.71	871
AVERAGE	24,345	23,741	11,910	35,651			26483	44384		

Table 3 :FREQUENCY OF TRUCKS COMING INTO THE MARKET BY HOURS BY ONE WEEK.

JUNE 2 - 8 OF 1.990

HOURS	Sat.	Sun.	Mon.	Tue.	Wed	Thu.	Fri.	Average
1 A.M.	19	26	40	20	37	25	12	26
2 A.M.	29	14	0	10	25	26	16	17
3 A.M.	46	21	19	25	26	32	12	26
4 A.M.	64	9	50	44	64	76	8	45
5 A.M.	37	81	81	30	121	72	3	61
6 A.M.	58	64	78	5	100	86	29	60
7 A.M.	42	108	58	9	118	70	79	69
8 A.M.	53	55	62	37	120	72	42	63
9 A.M.	38	48	44	52	63	57	27	47
10 A.M.	43	60	62	42	41	88	41	54
11 A.M.	44	71	57	43	73	21	48	51
12 A.M.	35	72	34	25	45	35	33	40
1 P.M.	26	24	14	33	12	33	21	23
2 P.M.	17	33	19	25	20	9	33	22
3 P.M.	20	42	21	32	27	14	16	25
4 P.M.	70	17	31	18	30	5	17	27
5 P.M.	22	37	32	21	39	7	31	27
6 P.M.	22	31	35	33	40	4	32	31
7 P.M.	31	35	48	64	9	9	37	33
8 P.M.	73	37	94	65	44	19	8	49
9 P.M.	41	33	98	67	74	19	9	49
10 P.M.	56	67	33	49	55	27	14	43
11 P.M.	42	35	56	50	50	33	23	41
12 P.M.	54	8	51	25	43	13	30	32
Total p.m.	474	399	532	482	443	192	291	402
Total a.m.	508	629	585	342	833	660	350	558
TOTAL TRUCKS	982	1028	1117	824	1276	852	641	960

Source : Amman Wholesale Market

## TOTAL NUMBER OF TRUCKS WHICH PRODUCT IS TO BE COMERCIALIZED BY DAY

(Since products coming to one day market are concentrated since 3 p.m. of last day before)

	Sat.	Sun.	Mon.	Tue.	Wed	Thu.	Fri.
TRUCKS AT 6 A.M.	608	582	532	628	697	642	201
IN FROM 6 A.M.-3P	356	535	428	271	592	471	353
TOTAL x MARKET/DA	964	1117	960	899	1289	1113	554

Source : Calculated From Table 3

TABLE 4

## POPULATION GROWTH AND EXPECTED INCREASE OF AMMAN'S W.C.M VOLUME

YEARS	POPULATION(*)	VOLUME Tons/year
1991	1,250,000	550,000
1992	1,287,500	566,500
1993	1,326,125	583,495
1994	1,365,909	601,000
1995	1,406,886	619,030
1996	1,449,093	637,601
1997	1,492,565	656,729
1998	1,537,342	676,431
1999	1,583,463	696,724
2000	1,630,966	717,625
2001	1,679,895	739,154
2002	1,730,292	761,329
2003	1,782,201	784,168
2004	1,835,667	807,694
2005	1,890,737	831,924
2006	1,947,459	856,882
2007	2,005,883	882,589
2008	2,066,060	909,066
2009	2,128,041	936,338
2010	2,191,883	964,428
2011	2,257,639	993,361
2012	2,325,368	1,023,162
2013	2,395,129	1,053,857
2014	2,466,983	1,085,473
2015	2,540,993	1,118,037
2016	2,617,222	1,151,578
2017	2,695,739	1,186,125
2018	2,776,611	1,221,709
2019	2,859,910	1,258,360
2020	2,945,707	1,296,111

(\*) Assuming population in the area of influence of the W.C.M.

TABLE 5  
AMMAN'S WHOLESALE CENTRAL MARKET PROJECT  
BUILDING AREAS SUMMARY

UNIT TYPE A						A			
UNIT TYPE B						B			
UNIT TYPE B - Low level - Internal						B-L1-Int			
UNIT TYPE B - Low level - External						B-L1-EXT			
UNIT TYPE B - Low level - External - Boulevard						B-L1-E-B			
BUILDING NUMBER	FRONT METERS	NUMBER OF STALLS		USE	INTERNAL	AREA DISPLAY	TOTAL		
1	92	23	A	COMM.AGENTS	736	552	1288		
2	76	19	A	COMM.AGENTS	608	456	1064		
3	92	23	A	COMM.AGENTS	736	552	1288		
4	94	24	A	COMM.AGENTS	752	564	1316		
5	80	20	B	COMM.AGENTS	640	480	1120		
5a	80	20	B-L1-Int	STORAGE	640	480	1120		
6	96	24	B	COMM.AGENTS	768	576	1344		
6a	96	24	B-L1-Int.	STORAGE	768	576	1344		
7	180	45	B	COMM.AGENTS	1440	1080	2520		
7a	104	26	B-L1-Ext	AGR.INPUTS	832	624	1456		
7b	76	19	B-L1-E-B	C. SERVICES	608	456	1064		
8	90	23	B	COMM.AGENTS	720	540	1260		
8a	90	23	B-L1-EXT	AGR.INPUTS	720	540	1260		
9	64	16	B-L1-E-B	C. SERVICES	512	384	896		
10	300	75	B-L1-EXT	AGR. INPUTS	2400	1800	4200		
1610		403			12880	9660	22540	Sq.mt	

TABLE 6  
AMMAN'S WHOLESALE CENTRAL MARKET PROJECT  
TOTAL AREAS BY KIND OF USE

KIND OF USE	FRONT METERS	NUMBER OF UNITS	AREA - Sq. mts. INTERNAL	Sq. mts. DISPLAY	TOTAL Sq. mts.	VOLUME OF PRODUCTS*
COMMISSION AGENTS	800	200	6400	4800	11200	208000 Tons/Year
STORAGE - BANANAS	176	44	1408	1056	2464	45760 Tons/Year
AGRIC. INPUTS STORE	494	124	3952	2964	6916	
COMMERCIAL SERVICE	140	35	1120	840	1960	
ADMINISTRAT. BUILDN	---	2			1000	
	1610	403	12880	9660	23540	253760 Tons/Year

=====  
\*Index of efficiency of floor space for Inside stores and storage 25 Tons/sq.mt/year.  
for Display area 10 Tons/sq.mt/year.  
=====

TABLE 7  
 PLATFORMS AREAS SUMMARY

PLATFORM NUMBER	LONG METERS	WALK AREA Sq.mts.	LOAD-UNLOAD AREA-Sq.mts.	TONS CAPACITY	TRUCKS/SPACE Number at once	VOLUME OF PRODUCTS
M	80	160	960	288	52	103680 Tons/Year
N	80	160	960	288	52	103680 "
O	80	160	960	288	52	103680 "
P	80	160	960	288	52	103680 "
Q	60	120	720	216	39	77760 "
R	120	240	1440	432	79	155520 "
S	80	160	960	288	52	103680 "
T	80	160	960	288	52	103680 "
	660	1320	7920	2376	439	855360 Tons/Year

TABLE 8

## VOLUME OF PRODUCTS IN TONS BY YEAR.

Index of efficiency of floor space	For Inside stores and storage	25 Tons/sq.mt/year.
	For Display area	10 Tons/sq.mt/year.
	For Auction platform	300 ks/sq.mt/day = 108 Tons/sq.mt/day
VOLUME TO BE HANDLED =	253760	855360 TOTAL BY YEAR 1109120 Tons a year.

=====

TABLE 9  
 AMMAN'S WHOLESALE CENTRAL MARKET PROJECT  
 PROPOSAL FOR FIRST STAGE PROJECT CONSTRUCTION  
 BUILDINGS AREAS BY USES

	FRONT METERS	NUMBER OF UNITS	INTERNAL	AREA - Sq.mts. DISPLAY	TOTAL	BUILDINGS NUMBERS	VOLUME OF PRODUCTS
COMMISSION AGENTS	524	131	4192	3144	7336	1,2,5,6,7.	136240 Tons/Year
STORAGE - BANANAS	176	44	1408	1056	2464	5a and 6a	45760 Tons/Year
AGRIC.INPUTS STORE	194	49	1552	1164	2716	7a and 8a.	
COMMERCIAL SERVICE	140	35	1120	840	1960	7b and 9	
	1034	259	8272	6204	14476		182000 Tons/Year

TABLE 10  
 PLATFORMS AREAS SUMMARY ( FIRST STAGE ).

PLATFORM NUMBER	LONG METERS	WALKING AREA	LOAD-UNLOAD(*) AREA	TONS CAPACITY	TRUCKLOADS AT 6.A.M.	#. TRUCKS PARKING LOTS	VOLUME OF PRODUCTS
M	80	160	960	288	192	52	103680 Tons/Year
N	80	160	960	288	192	52	103680 "
O	80	160	960	288	192	52	103680 "
P	80	160	960	288	192	52	103680 "
Q	60	120	720	216	144	39	77760 "
R	120	240	1440	432	288	79	155520 "
	500	1000	6000	1800	1200	332	648000 Tons/Year
							648000

Platform width : 14 mts. ( 2 for walk side, and 12 for auction area)

\* Efficiency use space = 300 kgs/sq.m./day

TABLE 11

## VOLUME OF PRODUCTS IN TONS BY YEAR.

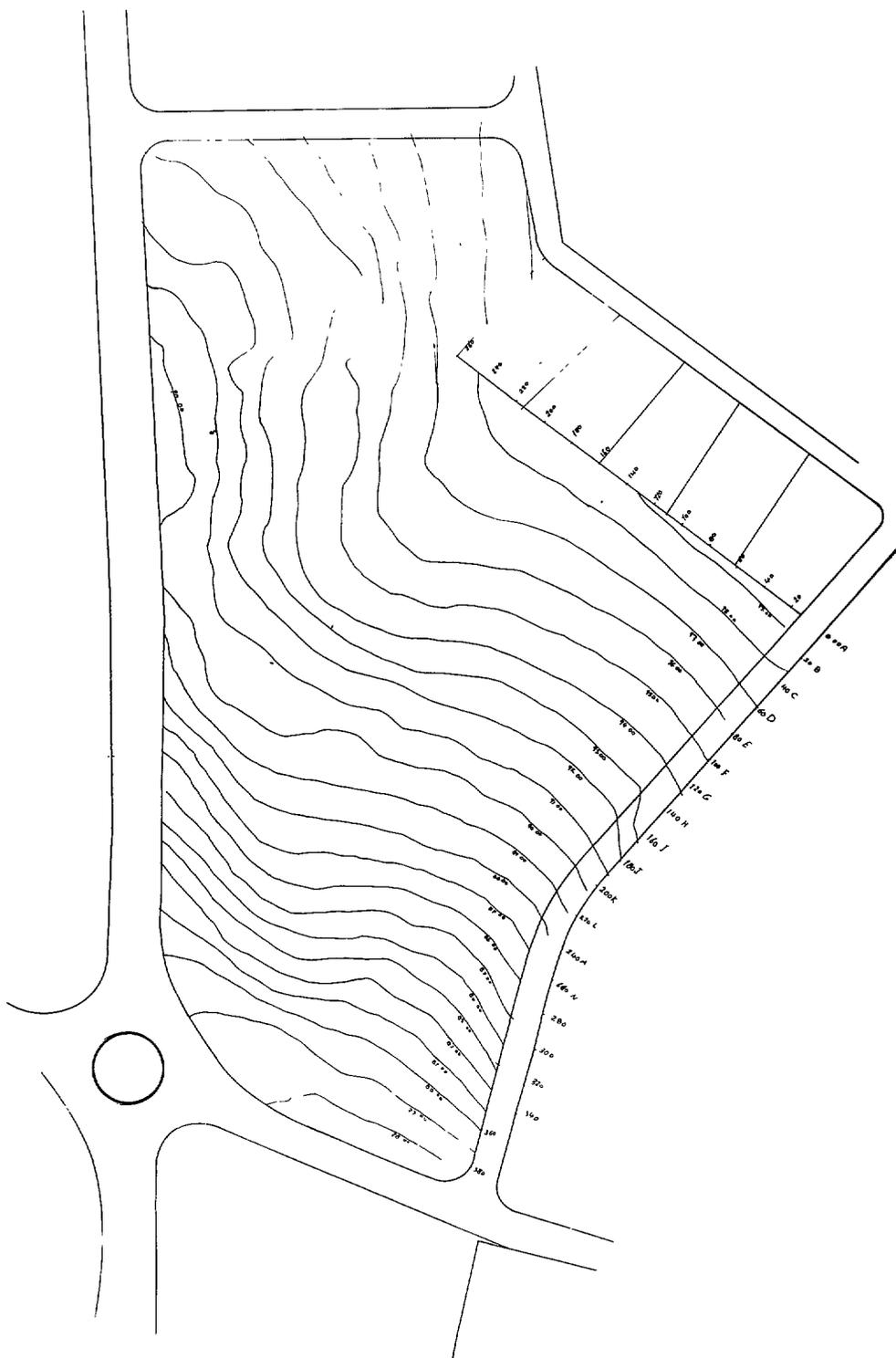
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Index of efficiency of floor space	For Inside stores	25 Tons/sq.mt/year.
	For Display area	10 Tons/sq.mt/year.
	For Auction platform	300 ks/sq.mt/day = 108 Tons/sq.mt/day

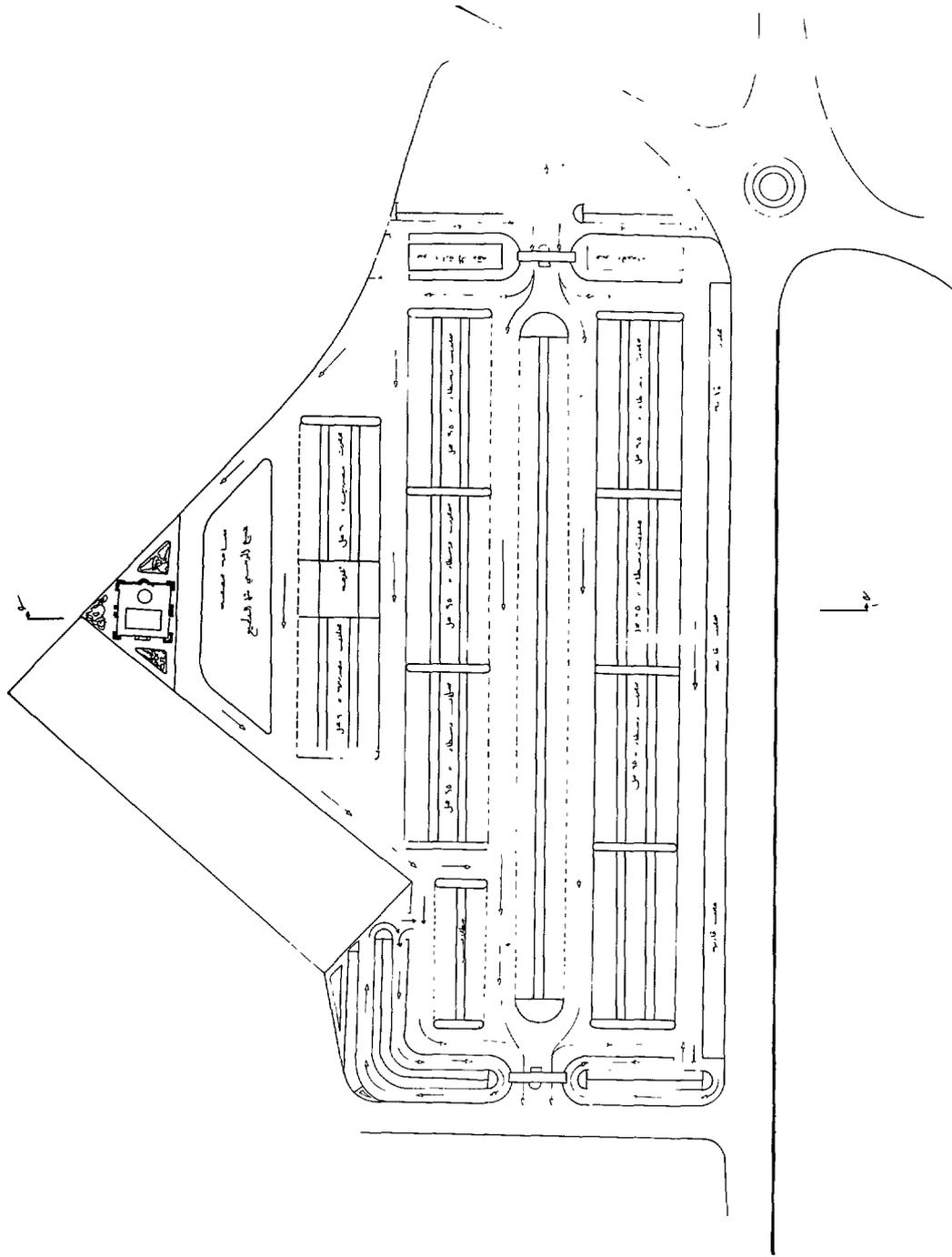
VOLUME TO BE HANDLED =           182000           648000   TOTAL BY YEAR           830000 Tons a year.

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# MAP 2 : TOPOGRAPHY



# MAP 3 : ORIGINAL MUNICIPALITY DESIGN



# MAP 4

