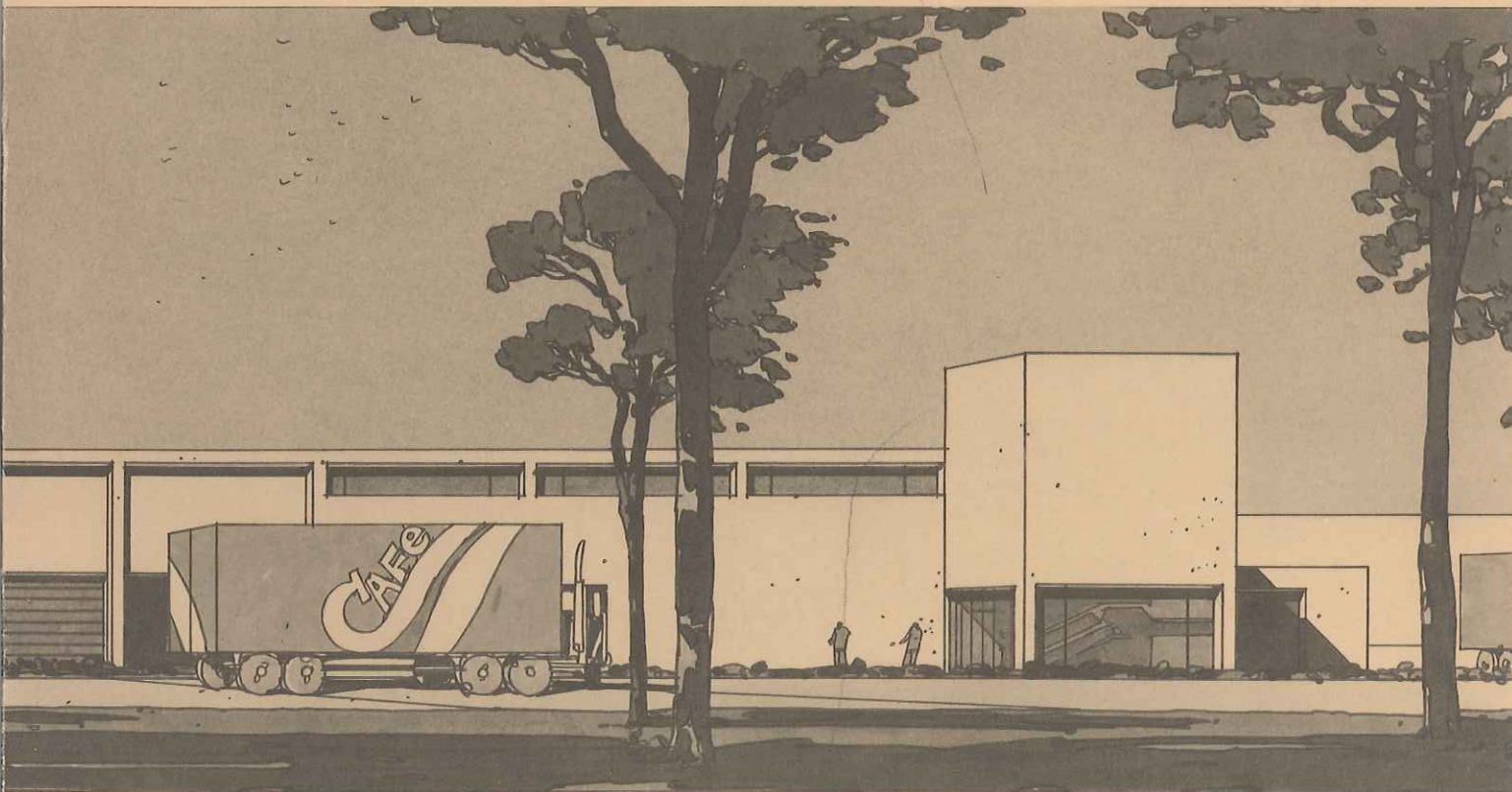


A PROPOSED MODERN FOOD SERVICE SYSTEM for FORT LEWIS, WASHINGTON



UNITED STATES ARMY NATICK LABORATORIES
Operations Research/Systems Analysis Office
Natick, Massachusetts 01760

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Included in the report are a detailed description of the central food preparation facility including plant layout and equipment requirements; concepts and equipment requirements for modification of satellite dining facilities; a new organizational structure with staffing requirements; a concept for a management information system; and a cost benefit analysis. It is estimated that this system will yield nearly a \$2 million annual cost savings as compared to a conventional Army system of the same capacity.

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A PROPOSED MODERN FOOD SERVICE SYSTEM

FOR

FORT LEWIS, WASHINGTON



Operations Research/Systems Analysis Office

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AUTHORS

This report was prepared by the following authors listed in alphabetical order:

R. L. Bustead--NLABS

R. Byrne--NLABS

C. M. Chang--Consultant

R. W. Cramer--Construction Engineering Research Laboratory, Corps of Engineers

R. Fennema--Consultant

A. E. Frey--Consultant

G. Hertweck--NLABS

D. P. Leitch--NLABS

G. E. Livingston--Consultant

J. K. Prifti--NLABS

R. S. Smith--NLABS

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FOREWORD

In 1969 the DOD Facilities and Equipment Planning Board accomplished an on-site survey of military garrison feeding facilities in the United States. As a result of this survey, this Board created, with DOD and Army approval, a project to study, define, and then implement a new, modern food service system at Fort Lewis, Washington. The objectives were to improve performance and reduce costs. This system would then serve as a model for all military services.

In 1970 the DOD Food Research Development Test and Engineering program was established at Natick Laboratories. Included within this program were an increased emphasis on garrison food service systems and a requirement to apply a "total systems concept" in the design of new military food service systems. This requirement was initially addressed by the Operations Research and Systems Analysis Office at NLABS, and resulted in a rather unique but logical merger of the R&D systems study effort with the DOD and Army project to study and then build a modern food service system at Fort Lewis.

The overall project was initiated in November, 1970 and was conducted as Task 03 under Project Number 1J662713AJ45, Systems Studies in Military Feeding. The purpose of this project was to develop a modern food service concept which would increase customer satisfaction and reduce operating costs, in that order of importance.

Due to the extent and complexity of the information and data which have been developed, this report is only one of several which have been published concerning the overall project. A list of these reports is provided below.

NLABS Report Number	Title
72-37-OR&SA	A System Evaluation of Army Garrison Feeding at Fort Lewis, Washington
72-43-PR	The 1971 Fort Lewis Food Preference Survey
72-44-PR	Fort Lewis Dining Facilities Consumer Survey

Report Number	Title
72-46-FL	Application of Food Technology and Engineering to Central Preparation
72-47-OR&SA	An Evaluation of Selected Advanced High Production Feeding Systems
72-48-OR&SA	An Analysis of Consumer Responses to Proposed Changes in Army Garrison Feeding System
72-56-OR&SA	A Qualitative Evaluation of the Environment and Modernization Potential of Dining Halls at Fort Lewis, Washington
72-67-OR&SA	A Cost Analysis of Modern High Production Food Service Systems for Military Garrison Applications
72-64-PR	Consumer Reaction to the Fort Lewis CAFe System

As a result of the effort documented in the above reports, it has been concluded that the central food preparation (CFPF) and warewashing system provided the greatest number of advantages and the greatest operating cost reduction of the modern food service systems considered. This report presents a detailed definition and cost summary of the prototype CFPF and warewashing system proposed for Fort Lewis, Washington. In addition to the concept drawings for the CFPF, recommended modifications to the existing dining halls to make them compatible with CFPF are also presented as well as equipment requirements and cost estimates.

ABSTRACT

This report presents a detailed definition of a modern food service system designed for Fort Lewis, Washington. The system has a capacity of 25,000 meals per day and is based on the concept of central food preparation and warewashing with satellite dining halls. System design criteria was developed using the results from several concurrent studies which were conducted during 1971 at Fort Lewis. The design objectives were to provide significantly improved service to the military customers and substantially reduce manpower requirements.

Included in the report are a detailed description of the central food preparation facility including plant layout and equipment requirements; concepts and equipment requirements for modification of satellite dining facilities; a new organizational structure with staffing requirements; a concept for a management information system; and a cost benefit analysis. It is estimated that this system will yield nearly, a \$2 million annual cost savings as compared to a conventional army system of the same capacity.

INTRODUCTION

The Army's present garrison food service system is primarily based on company sized units which are completely staffed and equipped to cook A-ration type meals whether in garrison or in the field. Through the years various changes have been made to the system; however, these changes usually involved sub-systems and provided only minor improvements in performance.

The advent of volunteer military forces has created an urgent need for new systems of food service which offer significantly improved service to the military customer and substantially reduce manpower requirements. This report covers a modern food service system which can achieve both of these important objectives.

This new system was developed as a direct result of three parallel study activities and a system concept test conducted at Fort Lewis during FY 72. These three studies were:

1. Consumer studies^{1,5*} which addressed the questions of what did the customer want to eat; where did they want to eat; and when did they want to eat?
2. System study² in which the performance of the existing system was analyzed and problem areas identified. A state-of-the-art survey³ was also completed which identified the most promising modern food service systems.
3. Management information system study⁴ in which the computer software and equipment requirements for the modern food service system were developed. An automated signature headcount system was also considered.

The information and data developed from the above studies were utilized to design a new food service system, the Central Army Feeding (CAFe) system, which was then tested at Fort Lewis. This test system and the new system described herein incorporated many new features which improved system performance from a customer point of view. Among these features were: improved menus, improved food quality, free access to three different types of facilities (A-ration, Short Order and Specialty), longer operating hours, unlimited quantities of food, better decor and a credit card system which eliminated signature requirements. In addition to improved system performance, the CFPF and central

*Superscripts denote references

warewashing aspects of the new system will significantly reduce operating costs (nearly a \$2 million annual cost savings when compared to conventional on premise preparation).

SECTION I

GENERAL DESCRIPTION OF PROPOSED SYSTEM

OBJECTIVES

In developing the Fort Lewis food service system the primary objective has been to achieve a high degree of consumer acceptability with the greatest possible labor productivity. In those instances where food quality might have been impaired by seeking to achieve the greatest possible labor reduction, the quality consideration predominated.

Other objectives of the system were intended to respond to criticism of the present system and required system changes uncovered in the consumer surveys described in the previous reports.^{1,5} In addition to the improvement in food quality, therefore, the new system aimed to greatly increase the access of the dining halls to all customers (credit card system); make available larger quantities of food (through self-service); offer foods with higher degree of consumer preference (through a new menu); offer ethnic foods (through specialty houses); provide snack meals throughout the day (through short-order houses); reduce queuing (through modern serving line concepts) and provide more attractive surroundings for the consumption of meals.

SYSTEM DESCRIPTION

The proposed food service system for Fort Lewis includes the following provisions:

1. A new Directorate of Food Operations which has the operational and logistics responsibility for the CFPF and all dining facilities on post. The proposed organization is discussed in Section V of this report.
2. A Management Information System (MIS) which provides for production and inventory and management reports comparing the performance of individual dining halls based on consumer attendance, meal cost, etc. The MIS also provides an automated data collection capability (headcount, food preference selection data, cost data, etc.). Standard computer software and equipment are used to analyze these data to provide the requisite management reports. This is especially important in view of the fact that the entire food service system is driven by a consumer oriented data base.
3. A Central Food Preparation Facility which prepares virtually all of the food items requiring high labor or culinary skill and a Central Warewashing Facility which washes all of the dining hall tableware.

4. A Distribution System which transports all food items prepared at the CFPF and all tableware centrally washed to the dining halls. The return of unused food and dirty tableware to the CFPF is also performed by this activity.

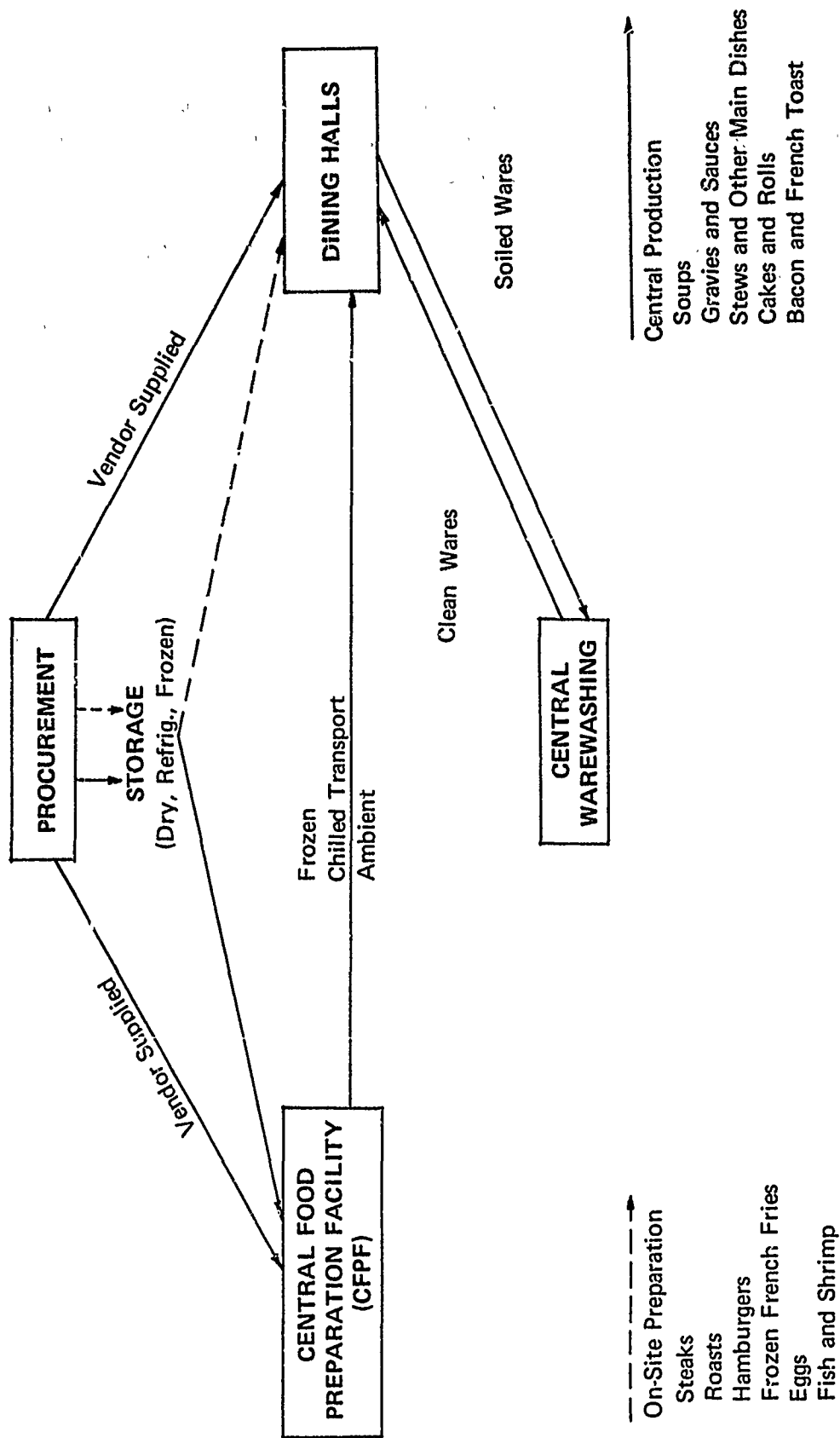
E. A Satellite Dining Hall System which consists of 48 facilities strategically located throughout Fort Lewis to maximize customer convenience. Dining facilities will provide dedicated service, i.e., regular A-ration, short order, or specialty meals. Troop units will be assigned to A-ration facilities; however, individual customers will be allowed free access to all A-ration facilities. Customers will also have free access to all short order and specialty facilities.

CENTRAL FOOD PREPARATION FACILITY (CFPF)

The heart of the new food service system is the CFPF. This facility will produce virtually all of the high labor foods needed to meet the requirements of the military menu. A system flow diagram is shown on Figure 1. An artist's concept and the layout of the proposed CFPF are shown in Figures 2 and 3, respectively.

To achieve maximum efficiency and thereby minimize production costs in the CFPF, foods will be prepared in the largest possible production runs, usually in quantities sufficient to supply the demand for a particular product for one whole menu cycle. This creates a logistical and production scheduling problem which can best be solved with frozen foods. For this reason a majority of foods prepared in the CFPF will be frozen. However, if freezing a particular product adversely affects consumer acceptability, then the product will be shipped in either a chilled or ambient condition. It is, therefore, anticipated that the majority of the entrees and vegetables and some of the dessert products will be shipped in the frozen state. Soups, sauces and dressings will be packed using a nearly aseptic filling method which provides a product life at refrigerator temperatures in excess of a week; salads and some dessert products will be shipped chilled while pastries will be shipped at ambient temperature.

FIGURE 1 SYSTEM FLOW DIAGRAM



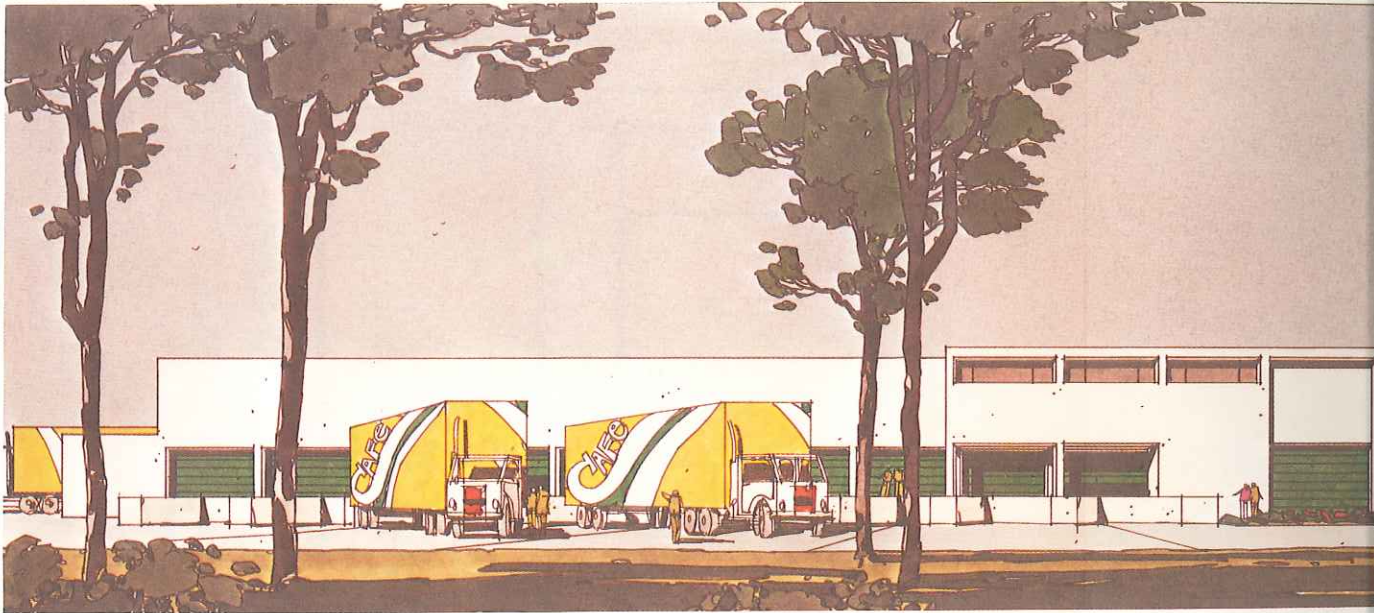
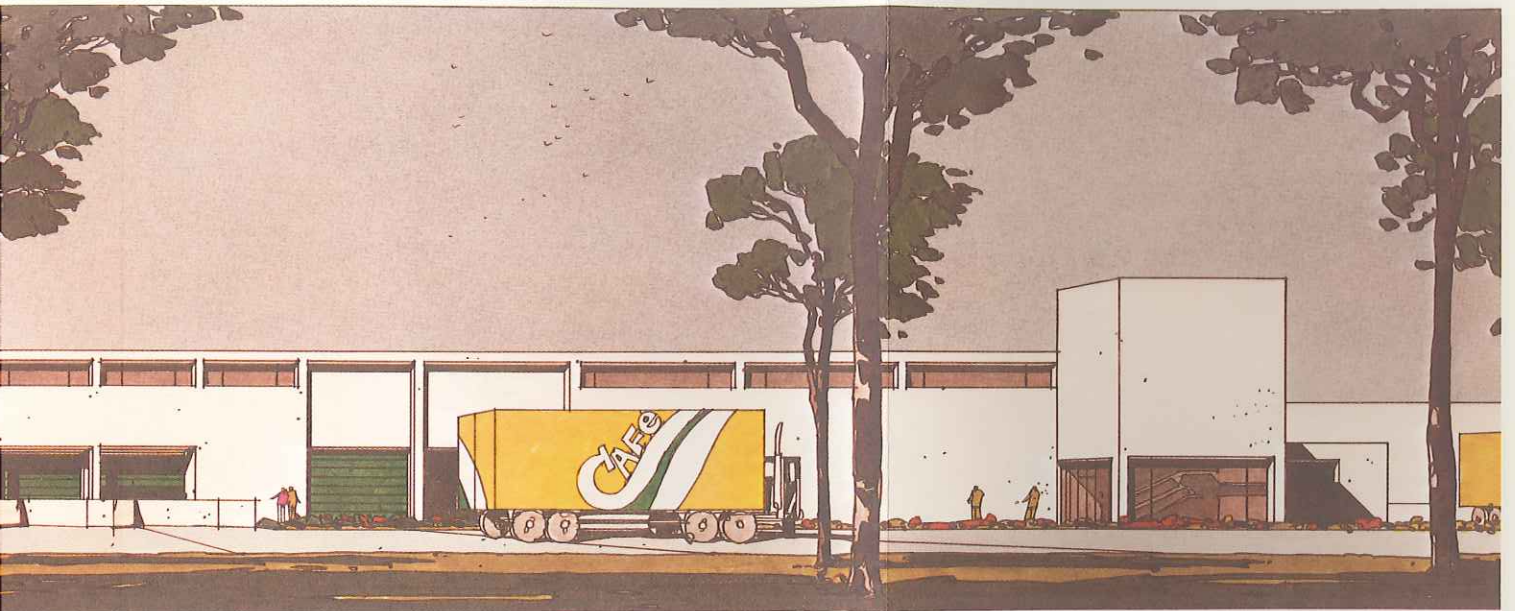
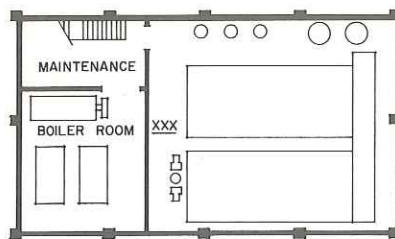
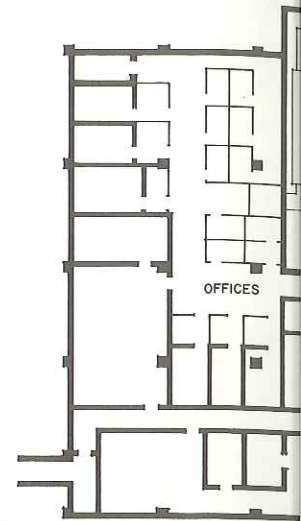


FIGURE 2 ARTIST'S CONCEPT OF CFPF

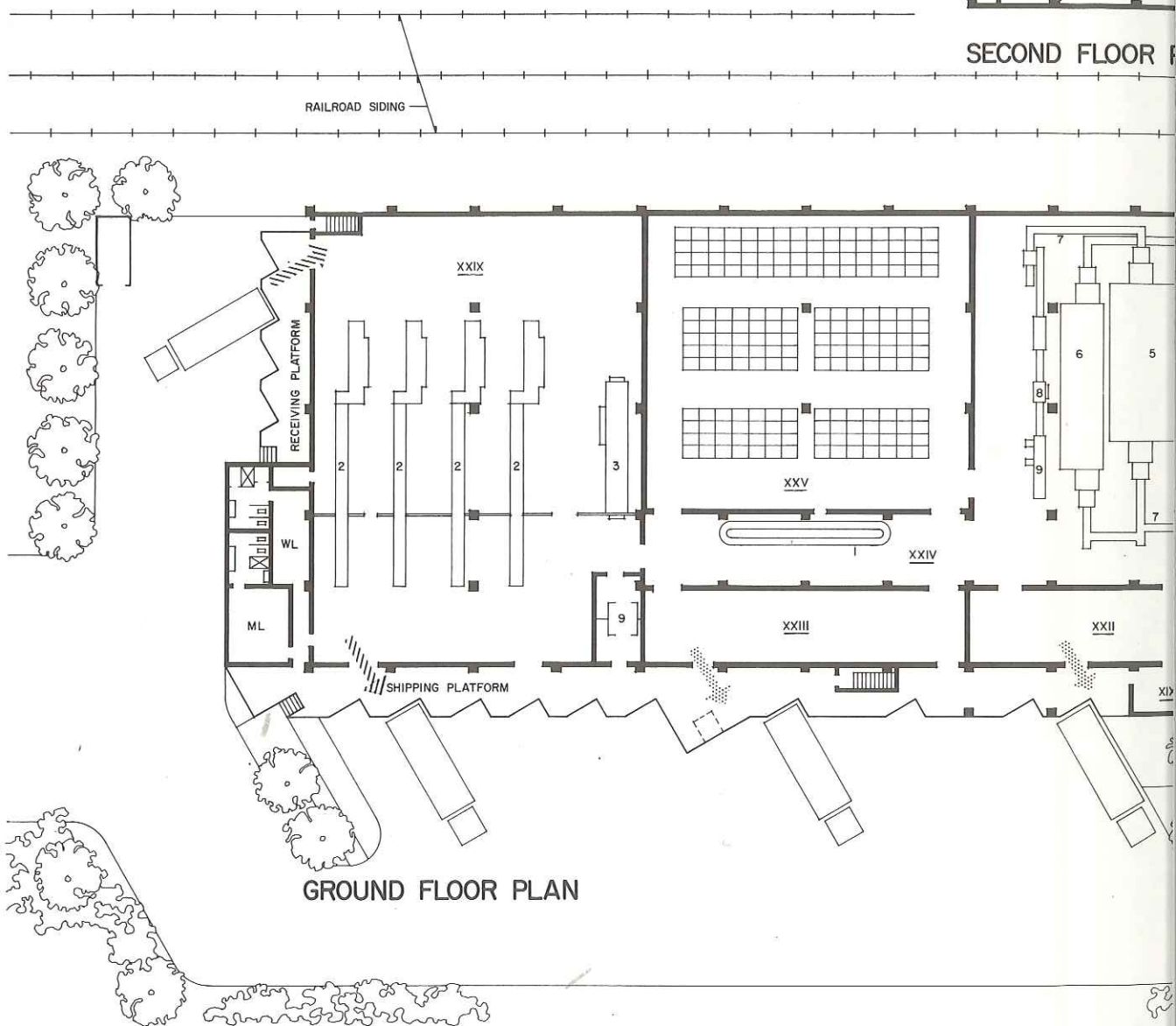




BASEMENT FLOOR PLAN
(WARE WASH BUILDING)



SECOND FLOOR



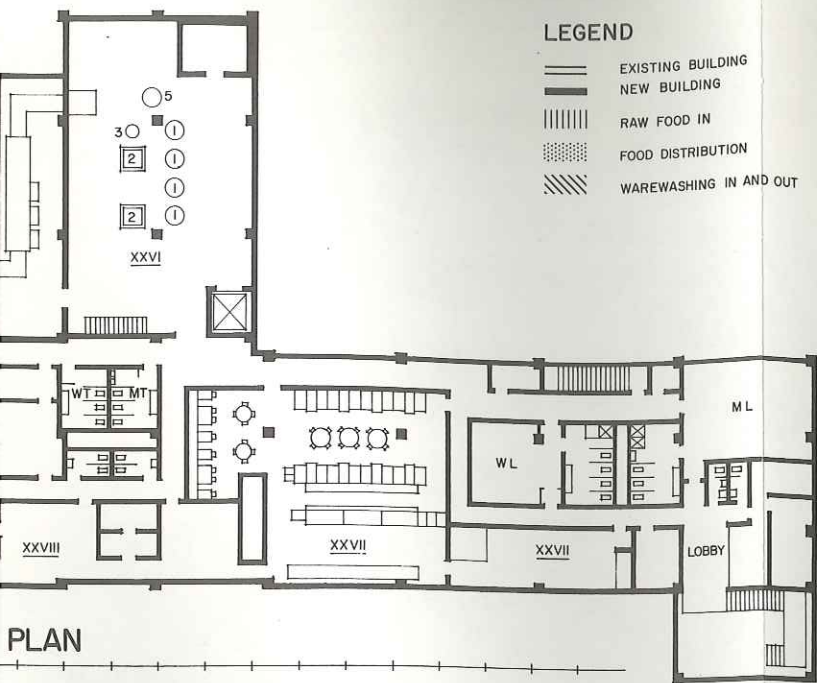
GROUND FLOOR PLAN

CENTRAL FOOD PREPARATION FACILITY

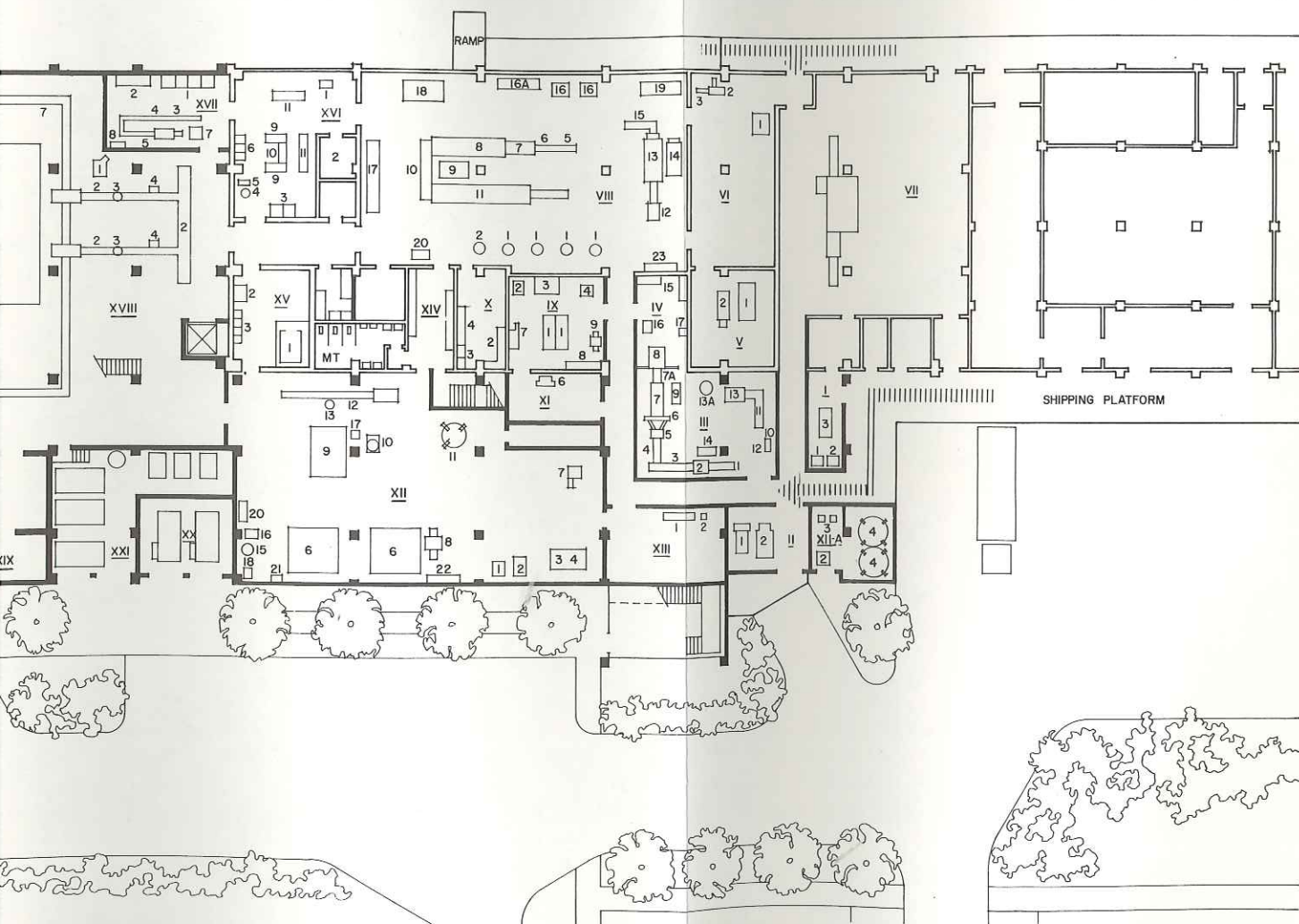
FIGURE 3 LAYOUT OF CFPF



PREPARATION FACILITY



- INDEX OF AREAS**
- I RECLAIM AREA
 - II WASTE DISPOSAL AREA
 - III VEGETABLE CLEANING AREA
 - IV VEGETABLE PREPARATION AREA
 - V INGREDIENT ROOM
 - VI DRY STORAGE AREA
 - VII MEAT THAWING AREA
 - VIII KITCHEN
 - IX MEAT PREPARATION AREA
 - X SLICING AND BONING ROOM
 - XI MEAT COOLER
 - XII DESSERT SHOP
 - XII A FLOUR STORAGE AND HANDLING
 - XIII DESSERT INGREDIENT ROOM
 - XIV SCRUB ROOM
 - XV EQUIPMENT WASH ROOM
 - XVI SALAD AREA
 - XVII SANDWICH AREA
 - XVIII MEAL PORTIONING AND PACKAGING AREA
 - XIX SHRINK FILM COOLER
 - XX BOILER ROOM
 - XXI AMMONIA COMPRESSOR ROOM
 - XXII SHIPPING COOLER
 - XXIII SHIPPING FREEZER
 - XXIV SHIPPING ASSEMBLY AREA
 - XXV STORAGE FREEZER
 - XXVI SECOND FLOOR KITCHEN
 - XXVII TEST KITCHEN AND ASSEMBLY ROOM
 - XXVIII LABORATORY
 - XXIX WAREWASHING
 - XXX WAREWASHING BASEMENT



SCALE 0 10 20 30 40

NORTH

Under the new system, bread and buns, milk and soft serve mix will continue to be delivered directly to the dining halls by commercial vendors. Vendor supplied frozen vegetables, including french fried potatoes, fish and shrimp will be shipped frozen without further processing from the central storage, which will be under the control of the CFPF, to the dining halls. In nearly all cases where the final preparation step required for a frozen food, such as deep fat frying, steaming or grilling, requires no more time than would be needed to reheat a precooked product, precooking will be eliminated and the final step carried out in the dining halls. Thus, the CFPF will prepare and ship the sauce type entrees, prepared dishes of all kinds, precooked pot roast, veal parmesan, etc. Soups will be shipped as twofold concentrates ready for dilution and heating. Salads will be shipped as ready-to-use greens or mixtures of greens to which only the prepared dressing, which will be shipped separately, need be added. Fruit pies will be shipped in ready-to-use form, while pastries will be shipped at ambient temperature. Gelatin salads and prepared desserts such as puddings or gelatins will be shipped chilled ready to use. A summary of food product packaging, procurement and handling methods is shown in Table I.

Every effort has been made in designing the system to minimize environmental problems and effectively reduce waste disposal. All entree products will be frozen in a plastic mold shaped to conform to the dimensions of a half-size steam table pan (10" x 12" x 2 1/2") and after freezing the slab will be overwrapped with polyethylene film. Frozen items which are loose will be shipped in reusable half-size steam table pans covered with polyethylene film. The latter packaging will also be used for all refrigerated dessert products. Soups, dressings and gravies will be shipped in one-gallon, laminated, foil-paper-polyethylene type containers while salads will be shipped in polyethylene wrapped, reusable, half-size bun pans (13" x 18" x 1").

WAREWASHING

A central warewashing capability is included in the proposed system which will wash and sanitize all wares used in the service of the foods in the dining halls. This includes trays, china and flatware. Trays with soiled ware will be placed by the customers in special transporters in the dining halls. Transporters will be returned by vehicles to the CFPF for washing of the soiled ware and transporters. The clean transporters will then be reloaded for shipment back to the dining halls. Equipment used for the shipment of food from the CFPF will also be washed and sanitized in the warewashing facility.

TABLE I
SUMMARY OF FOOD PRODUCT PACKAGING
PROCUREMENT AND HANDLING METHODS

Product	Form	Packaging	Commercially Processed	Prepared In CFPF	Cooked On-Site	On-Site Equipment Required	Direct Vendor Delivery
Soups	Chilled Concentrate	1 Gallon Containers		X		Steamer	
Sauces & Gravies	Chilled	1 Gallon Containers		X		Steamer	
Main Dishes							
Steaks & Hamburgers	Frozen	Specification	X		X	Grill	
Sauce-Type Entrees	Frozen	½ Size Steam Table Pan Slab		X		Convection Oven	
Chicken	Frozen	½ Size Steam Table Pan		X		Convection Oven	
Fish & Shrimp	Frozen	Specification	X		X	Deep Fat Fryer	
Dry Heat Roasts	Chilled	½ Size Steam Table Pan	X	X	X	Convection Oven	
Vegetables							
As Purchased Prepared	Frozen Frozen	Specification ½ Size Steam Table Pan	X		X	Steamer Steamer	
Potatoes	Chilled	½ Size Steam Table Pan		X		Convection Oven	
Pasta Products	Frozen	½ Size Steam Table Pan Slab		X		Convection Oven	

TABLE I

**SUMMARY OF FOOD PRODUCT PACKAGING
PROCUREMENT AND HANDLING METHODS**
(cont'd)

Product	Form	Packaging	Commercially Processed	Prepared In CFPF	Cooked On-Site	On-Site Equipment Required	Direct Vendor Delivery
Breakfast Foods	Chilled Frozen	Specification ½ Size Steam Table Pan					
				X	X	Grill Convection Oven	
	Dry Mix Frozen	Specification ½ Size Steam Table Pan		X	X	Grill Convection Oven	
Potatoes	Chilled	½ Size Steam Table Pan		X		Grill or Oven	
Dairy Products	Chilled	Specification Specification Specification	X				X
			X				X
			X				X
Baked Goods	Fresh	Specification	X				X
Breads buns, Donuts							
Cakes, & Rolls	Ambient	½ Size Bun Pan		X			
Pies	Ambient	Pie Pan		X			
Puddings & Gelatin	Chilled	½ Size Steam Table Pans		X			
Cookies	Frozen	Bags		X			
Salads							
Tossed & Slaws	Chilled	Bags		X			
Gelatin	Chilled	½ Size Steam Table Pan		X			

DISTRIBUTION

The distribution system will provide for the delivery to the dining halls of all food products (except those supplied direct from local vendors) as well as all pickup and delivery of the clean tableware. Pickup of excess inventory at the dining halls for transport back to the central preparation facility will also be accomplished. The distribution system will utilize four different types of transporters:

- Stackable wire baskets measuring approximately 13" x 30" x 2 1/2" will transport the half-size steam table pans containing frozen or chilled foods and plastic wrapped, frozen food slabs. Each basket will carry three trays or slabs, or one 13" x 18" dessert pan. The baskets will be transported on dollies on which they will be set two abreast and stacked up to twenty high. The baskets will have one removable side wall which will permit the removal of pans or slabs anywhere within the stack without having to dismantle the stack of baskets.

- Stackable wire baskets holding six, one-gallon containers will be used to transport soups, sauces and dressings. The baskets will be stacked on dollies in a manner similar to those holding the half-size steam table pans. The shipment of these products from the CFPF to the dining hall will be in freezer or refrigerated trucks, as required.

- Special enclosed transporters measuring 11 7/8" x 11 5/8" x 23" holding eight pies will be used to ship pies. The shipment will be made at ambient temperature.

- Enclosed, two compartment transporters measuring 38" x 55" x 63 1/2" will be used for the shipment of clean dishes, flatware and utensils. These will be the same transporters which will return the soiled trays from the dining halls.

DINING HALLS

Under the new system much of the cooking function and virtually all of the dishwashing function currently carried out in the dining halls will be centralized in the facilities already described. Thus, very frequently the dining hall personnel will only be concerned with the final preparation steps required to serve the food and with its presentation and merchandising. Generally, self-service will be used, so that the customer will be allowed to decide for himself the portion size desired.

Dining facilities will be of three types: A-ration, short order, and specialty. The A-ration dining halls will provide the main menu items. The short order facilities will make available a highly diversified menu with extended hours of operation, (1100 to 2300 hours). Some of these items will always be available, e.g. french fries, hamburgers, hot dogs, sloppy Joe mix, etc. while salads, desserts and special sandwiches will be rotated. The specialty facilities will be open only in the evening from 1630 to 2230 hours and will serve primarily ethnic dishes. In order to provide the dining halls with a capability of storing and finishing the prepared foods in a satisfactory manner, they will be equipped with new walk-in freezers and refrigerators, as well as two types of reheating devices for prepared foods. Additionally, short order facilities will have a char-broiler and hot dog broiler.

The prime reheating device will be a roll-in type forced hot air convection oven which will accommodate approximately 24 half-size steam table pans. Food frozen in slabs will be removed from the plastic overwrap and inserted in half-size steam table pans for reheating. Vegetable products will be reheated in a high pressure steamer. This device will also serve as a backup method for the reheating of entrees. Other equipment required in the dining halls to finish hot food will be deep fat fryers, grills and char-grills. In most instances the existing deck oven or range will be retained for additional backup in case of equipment failure.

SECTION II

**DESIGN AND DETAILED DESCRIPTION OF THE
CENTRAL FOOD PREPARATION FACILITY**

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The proposed system presented in this report was based on a Fort Lewis projected troop strength of 21,500 during the 1974 — 1980 timeframe. The system demand was estimated at an 88% enlisted population with 70% of these personnel residing in the barracks. The overall attendance rate, based on experimental data obtained at Fort Lewis, was estimated at 60% which yielded the specific meal consumption listed in Table II below:

TABLE II
ESTIMATED MEAL CONSUMPTION AT FORT LEWIS

Type of Meal	Average Number of Meals Per Day
Breakfast (complete meal)	4,600
Dinner (complete meal)	6,570
Dinner (short order)	3,290
Supper (complete meal)	5,260
Supper (specialty meal)	1,970
Supper (short order)	<u>1,970</u>
TOTAL	23,660

The total system capacity is approximately 25,000 meals per day (includes CFPF and satellite facility preparation). This capacity can be increased by 20% with additional operating personnel at the CFPF and may be further increased to over 50,000 meals per day by operating with a second shift at the CFPF and opening additional satellite facilities.

Inherent in the design of the CFPF are the following capabilities:

- To prepare and serve a highly diversified menu.
- To reduce operating manpower requirements by use of automated, high capacity production equipment.
- To function effectively when maintenance is being performed on equipment.
- To provide for ease of sanitation and microbiological control.

- To provide for expansion under mobilization conditions.

It should be noted that equipment was selected on the basis of proven reliability; therefore, equipment currently under development, but as yet untested, was excluded from consideration.

Manpower requirements and work schedules for the system are based on a 40-hour workweek with a minimum of two consecutive days off. All KP type functions are performed by civilian personnel.

Satellite Dining Hall (SDH) locations are based on the projected troop strengths in each area, anticipated utilization and attendance rates, distances customers had to travel and the dining hall capacity. Recommended modifications to the dining halls are based on experimental data obtained at Fort Lewis.

GENERAL DESCRIPTION OF THE CFPF

The CFPF will require the use of three buildings. Two of these, namely building numbers 4076 and 4175, are currently used for the storage of food products at ambient temperature and will continue to be used for that purpose. The third, building number 4071, which currently houses frozen and refrigerated storage areas, as well as a vacant meat cutting facility, will be enlarged to house the CFPF and its component warewashing operation. New construction will be required for the central food preparation facility and for the central warewashing. The existing meat cutting plant and the adjacent existing meat storage areas will also become part of the CFPF operation. The area within the existing building which will be used for the CFPF measures 270 feet by 72.5 feet. Of this, the area used for production in the meat cutting plant measures 180 feet by 72.5 feet. The addition will be 272 feet in length and 108 feet in width.

The cost of the proposed CFPF is estimated at \$3,056,377 based on 1972 construction costs and excluding any fees for an architect-engineer. The construction cost breakdown is shown on Table III. Itemized costs of equipment for the CFPF are shown on Table IV. It should be noted that the rates used in estimating the CFPF construction cost reflect the variations in the type of construction for particular areas.

The CFPF will have a capability of producing soups, most types of main dishes dressings, gravies, prepared vegetables, pastas, breakfast foods, salad products, pastry

TABLE III
CONSTRUCTION COST OF CFPP

	Area (Sq. Ft.)	Cost/Sq. Ft.(\$)	Total Cost
Existing Building (Renovation)*	13,050	15.00	195,750
Addition			
First Floor	18,965	53.00	1,005,145
Second Floor	3,752	53.00	198,856
Freezer Area	9,057	28.00	253,596
Offices, Lab, Lockers	14,462	30.00	433,860
Warewashing	13,822	35.00	483,770
Docks	3,984	10.00	39,840
Reinforced Roof Area	2,952	30.00	88,560
TOTAL	77,092**		2,699,377
Site Improvement***			
			357,000
GRAND TOTAL			
			3,056,377

*An additional 6,500 square feet of existing building not requiring renovation will also be used for the CFPP.

**The total area does not include 2952 square feet of reinforced roof area.

***Estimated by Fort Lewis Facilities Engineer.

TABLE IV
COST SUMMARY OF EQUIPMENT FOR CFPF FUNCTIONAL AREAS

Functional Area		Cost(\$)
I	Reclaim	1,911
II	Waste Disposal (Food Preparation Area)	10,600
III	Vegetable Cleaning	28,434
IV	Vegetable Preparation	23,718
V	Ingredient Room	11,977
VI	Dry Storage	6,234
VII	Meat Thawing	60,750
VIII	Kitchen	242,157
IX	Meat Preparation	33,541
X	Slicing and Boning Room	4,062
XI	Meat Cooler	1,705
XII	Dessert Shop: Main Work Area	223,240
	Flour Storage & Handling	65,000
	Dessert Ingredient Room	6,482
XIV	Scrub Room	
XV	Equipment Washroom	17,846
XVI	Salad Room	27,626
XVII	Sandwich Room	34,401
XVIII	Portioning and Packaging	705,500
XXIV	Shipping Assembly Area (Also XVIII)	16,000
XXVI	Second Floor Kitchen	110,511
XXVII	Test Kitchen and Assembly Room	50,000
XXVIII	Laboratory	71,125
XXIX	Warewashing	230,073
	Materials Handling	765,691
	Estimated Small Equipment	123,800
	Refrigeration Systems	190,000
	Warewashing Basement	49,000
	Estimated Handling and Installation @ 6% of Total	<u>186,682</u>
	TOTAL	3,298,066

products, deserts and sandwiches. Those items which can satisfactorily be frozen will be handled in that manner. Items, such as salads and most desserts will be shipped in a chilled state, still others, such as pastry products will be shipped at ambient temperatures. The storage freezer in the new facility will have a capacity of approximately 1.2 million portions which is equivalent to a 30 day supply.

Automated equipment is planned wherever appropriate to minimize the labor requirements in the operation. Continuous and conveyORIZED equipment for meat thawing, vegetable preparation, broiling, frying, steaming, boiling, filling, freezing and packaging, are specified. The physical layout of the facility is compatible with the organizational breakdown of responsibilities into the major areas of ingredient preparation, food production and portioning and packaging. Staging areas for the shipment of frozen, chilled and ambient foods to the dining halls are provided, as well as facilities for the receipt and shipment of dishes, flatware and utensils.

DEFINITION OF FUNCTIONAL AREAS

INGREDIENT STORAGE

Dry ingredients, such as canned goods, shortening, grains, sugar, condiments and packaging materials will be stored in buildings 4076 and 4175 and will be moved by forklift truck to the CFPF. In order to do so, it will be necessary to provide a level cross-path across the railroad siding and a ramp up the rear loading dock of the building. Dry ingredients required for immediate use in the CFPF will be stored in the dry storage area (VI)*. The dimensions of this area are approximately 21 feet by 40 feet and it will be capable of storing approximately a two-day supply of dry ingredients and packaging materials.

The dry storage area will be equipped with fixed metal shelving which will be used for small containers and broken cases. The bulk of the storage in this area will utilize pallets.

Frozen foods, including meats, poultry, fish, fruits and vegetables will be stored in the existing freezer storage areas of the facility. Frozen meat and poultry will be transported on pallets by forklift trucks from the freezer storage area into the meat thawing

*Denotes functional area shown in CFPF layout, Figure 3.

area (VII). Fresh chilled meat will be stored in the chill storage area of the existing facility and will be moved as required into the meat thawing area (VII). Frozen vegetables required for products prepared in the CFPF will be transported by forklift truck from the freezer storage area into the vegetable preparation area (IV). Frozen fruit for use in the dessert shop will be forklifted from the freezer to the dessert shop (XII). Flour for the dessert shop will be handled in bulk. It will be pneumatically blown from the delivery trucks into the flour silos in area (XII-A). Two vertical silos, each with a capacity of 25 tons of flour will be located in this area. Specialty flours and cake mixes will be stored in bags in the dessert ingredient room for the dessert shop (XIII). Also located in the silo area (XII-A) will be a dump hopper which will permit bagged flour and mixes to be used, if required. The capacity of this hopper will be 500 pounds per minute. Detergents, cleaning supplies and sanitizing agents will be transported from building 4076 to the first floor area adjacent to area (XIII). Fresh vegetables, such as roots and tubers, will be stored in the chilled storage section of the existing facility and will be transported by forklift truck to the vegetable cleaning area (III) as required.

INGREDIENT PREPARATION

As previously indicated, there will be a clear cut division of responsibility within the operation of the CFPF. The ingredient preparation areas will be operated by the Ingredient Preparation Branch. It will prepare all of the necessary food ingredients in a ready-to-use form, in batches scaled to meet the requirements of the cooking areas. The areas in which ingredient preparation will take place are described below.

Dry Ingredients. The Ingredient Room (V) personnel will manually weigh and package all dry ingredients in plastic bags which will be tie-sealed. Canned foods will also be scaled to production batch size in the Ingredient Room and will be transported from the Ingredient Room to the appropriate production area in covered stainless steel pots. Covered stock pots will also be used for the transport of liquid ingredients, such as oils, vinegar, syrups, etc., used in the food preparation. The equipment in the Ingredient Room consists of tables, can openers and various kinds of scales. One table is equipped with shelves on top and bins below for ingredients, such as sugar, starch, flour, etc. Another table is equipped with spice drawers on top and bins below. Ingredient Room personnel have convenient access to the major and minor ingredients required in preparing the dry mixtures needed for the production areas.

Vegetables. The vegetable preparation will take place in the Vegetable Cleaning Area (III) and the Vegetable Preparation Area (IV). Vegetables, such as potatoes, turnips or carrots will be delivered to the Vegetable Cleaning Area in bags. Bags will be opened and dumped into the rod washer, which will discharge onto an inspection conveyor, which will feed the washed vegetables to either of the peelers. Peeled vegetables will be discharged onto a 24 inch trough trimming table for inspection and trimming. Potatoes will be dropped into a chopper slicer, or will be fed directly into the regulator emptying into the sulfite dip tank. Leafy vegetables will be uncrated and placed on a trough, trimming table, trimmed, cored and discharged into the vegetable washer by means of a right angle conveyor and chute. Washed greens will be emptied into a mobile trough and manually transferred into the chopper slicer and then to the dipping unit or directly to the dipping unit. Dipped greens will be centrifuged for further preparation and batching in the salad area. Sulfited vegetables will be weighed into batches for the appropriate production area (kitchen or salad area). They will be transported in mobile plastic tote bins. The operating capacity on a sustained basis of the root and tuber processing line is estimated at more than 2500 pounds per hour. The estimated operating capacity of the leafy vegetables line is at 200 pounds per hour.

Meat Preparation. Frozen meat and poultry are brought to a temperature of about 25°F in a microwave tempering tunnel operating at a frequency of 915 megahertz (VII). The tunnel receives full boxes of frozen meat or poultry and is rated at a capacity of 2500 pounds per hour for boneless, lean beef or 1700 pounds per hour for chicken. Tempered meat or poultry from the tunnel or chilled meat or poultry from chill storage will be transported to the meat cooler (XI) adjacent to the meat preparation area. The Ingredient Branch personnel operating the Meat Preparation Area will prepare meats and scale them to batch sizes required on the production floor. Meat and poultry prepared for the ovens will be panned in the Meat Preparation Area, the pans being placed in the roll-in carts which can be then moved directly into the convection ovens for cooking.

The Meat Preparation Area is equipped with a meat grinder, a meat dicer, a meatball former (for 2-ounce meatballs), and a 700 pound mixer which will be used for blending meats with spices, bread crumbs, etc., for products, such as meat loaf or veal loaf. Patties will be formed in a patty forming machine capable of producing 6 ounce patties.

The remaining equipment in the Meat Preparation Area is a two compartment sink.

Dessert Shop Ingredients. Ingredient Branch personnel will also be responsible for the operation of the ingredient room for the dessert shop (XIII). The function of this ingredient room will be similar to that of the Ingredient Room (V) previously described. Equipment in the Dessert Ingredient Room will consist of an ingredient table with drawers and bins and a small platform scale.

MAIN PREPARATION

The principal area for food preparation will be the kitchen (VIII) which includes the following equipment:

(1) Five steam-jacketed agitating, trunnion kettles. Four of these kettles will have a capacity of 100 gallons; the fifth will have a capacity of 80 gallons. These kettles will be used primarily for soups and sauces.

(2) A pass-through steamer which will be used primarily for steaming vegetables.

(3) A continuous water cooker for pasta products, such as spaghetti, macaroni or rice.

(4) A continuous braiser which will be used to braise or saute meats. These food products travel through the unit on a conveyor through a very shallow layer of oil. The capacity of this unit is 1500 pieces per hour. This unit will also be used to cook french toast.

(5) Two forced air convection ovens, each with a capacity of about 330 pounds per load (for pot roast). These ovens will be of the roll-in type, each one holding a single roll-in cart, with a maximum capacity of 15 shelves. The roasting time for beef at 400°F will be approximately one hour. The combined capacity, therefore, will be approximately 650 pounds of meat per hour. Meat removed from the roll-in oven will be rolled on the same rack to a cooler. The cooler, situated next to the ovens will have a capacity of four oven racks. The cooler will be equipped with vents, as well as a refrigeration unit, blowing in air at a temperature of 40°F and relative humidity of 76%.

(6) A bacon slicing and frying line, consisting of a slicer which will slice the bacon slabs and deposit the slices onto a conveyor leading into the bacon fryer. This conveyor fryer is especially designed for bacon and incorporates a double belt which submerges the bacon during the frying operation and keeps it from curling. The bacon is discharged from the dryer to a broad belt, to permit draining. The packing of the bacon into steam table pans will be done by the side of the conveyor. The oil used in the bacon fryer will be filtered in an adjoining fat filter. The capacity of the bacon fryer is 325 pounds per hour (approximately 4,875 slices per hour).

(7) The main frying line which will be used for products, such as chicken or veal cutlets, consists of the following components. A conveyor on which the individual pieces will be manually placed, feeding through the batter and breading machine and discharging into the deep fat fryer. The frying time will be approximately three minutes and the fried products will be transferred to a broiler on a slotted conveyor which will permit excess fat to drain off. From there the partially cooked product will be conveyed to an infrared broiler. The infrared broiler is an electrically operated unit which will continue the cooking of the product and result in a more moist and tender product than could be obtained if the foods were entirely deep fat fried. The product will be inverted halfway through the conveyor broiler. The fried foods will be manually loaded into 18" x 26" x 3½" deep pans which will be placed in a holding refrigerator located in area XVI.

(8) A steam jacketed tilting braising pan will provide a capability of braising or sauteing small quantities of foods when required.

The area used for the main kitchen is the main production area from the existing meat cutting plant, which has tiled walls and floors. Two large hoods will be added, one in the shape of a right angle covering the steam jacketed kettles and the pass through steamer, and the other over the two frying lines. Casserole products, soups and sauces will be prepared in the second floor kitchen (XXVI) situated above the filling lines. In this way products can be gravity fed into the hoppers below, thus providing superior quality than would be possible by pumping the products to the filling lines. The equipment in the second floor kitchen consists of four 150 gallon steam jacketed kettles, two 300 gallon steam jacketed kettles equipped with temperature recorders, and one 80 gallon steam jacketed kettle. All of these kettles are equipped with a scraper agitator. An ingrediator, two pumps and a vertical tubular heat exchanger are also provided. The heat exchanger will be used for cooling soups.

Ingredients for use in the second floor kitchen will be brought up from the ingredient preparation areas or from the main production kitchen (in tote boxes, food handling pans, stockpots or bags) using the elevator specified for this purpose.

Minor ingredients will be discharged into the steam jacketed kettles manually, while major ingredients will be hoisted and discharged into the kettles using an overhead hoist and rail located above the large kettles.

A water meter will permit water, when used as an ingredient, to be accurately scaled into the kettles.

The ingrediator will be used to incorporate dry ingredients into slurries for use in soups and stews. The 80 gallon tank will serve as a slurry kettle for this purpose. Stews or other casserole products cooked in the 300 gallon kettles will be dropped hot to the filling line on the floor below. Soups and gravies prepared in the 150 gallon kettles will be pumped to the soup cooler which will be installed through the floor and will supply chilled soups to the one gallon container filling line located on the first floor below the kitchen.

Cooked meat and poultry requiring slicing or boning will be so processed in the Slicing and Boning Room (X). This room will be kept at a temperature of 50°F and will be equipped with two tables, two slicers and a two-compartmented sink.

SALAD ROOM

The Salad Room (XVI) will receive washed, trimmed and cut ingredients from the Vegetable Preparation Area for the final preparation of the salads. This preparation will, in most instances, consist of mixing these vegetable ingredients, bagging and labeling them. Salads will generally be shipped to the dining halls separately from the dressing which will be packed in gallon containers. Gelatin salads will also be preprepared in this area.

Equipment for this area will include a vertical cutter-mixer, a 40 gallon steam jacketed tilt kettle, a 160 quart vertical mixer, a 12 quart table mixer, and a bench scale. A walk-in cooler will be available for the storage of ingredients before use, or finished products prior to transfer to the shipping cooler. In addition, there will be three 36" x 60" cabinet type worktables and two 30" x 96" worktables.

SANDWICH ROOM

The Sandwich Room (XVII) will be used to assemble and wrap sandwiches made using conventional sandwich bread or Italian bread for submarine sandwiches. The equipment in this area will consist of a four-compartment storage cooler for sandwich ingredients, a 30" x 96" table and a sandwich assembly and packaging line. This line will include an automatic butter or margarine applicator and a sandwich wrapping and labeling machine. The feeding of bread onto the line and the depositing of sandwich fillers, as well as the placing of the top slice of bread will be manual. Square sandwiches will be sliced diagonally and wrapped in a triangular fashion, while Italian bread loaves will be sliced mechanically laterally and manually lengthwise into wedges before being fed onto the line. The sandwich assembly and packaging line will be U-shaped. Trays of sandwiches will be accumulated in a pass-through, roll-in type refrigerator.

DESSERT SHOP

The Dessert Shop (XII) will prepare dinner rolls and biscuits, sheet cakes, fruit pies, cream pies, crisps, puddings, brownies and cookies. Gelatin desserts will be preprepared in the second floor kitchen. Mixing equipment is provided to prepare three different types of doughs, i.e., bread dough, pie dough and cake batter. The equipment includes a horizontal mixer for the bread dough, a triple action kneading type of mixer for the pie dough, and a vertical mixer for the cake batters. Flour for the dough will be pneumatically conveyed from the flour storage area and automatically scaled into the mixer bowls. The capacity of the dough mixer will be 1,000 pounds, that of the triple action mixer will be 330 pounds, and the capacity of the upright mixer will be 160 quarts.

SCRUB ROOM

Personnel working in the various food preparation areas will gain access to them from the upstairs locker room through the scrub room (XIV). In this scrub room all personnel entering the food handling areas will be required to wash and sanitize their hands. This requirement will apply each time personnel leave and re-enter the food preparation areas. For this reason, the scrub room is located so that all personnel using the adjacent toilet room will re-enter the production floor through the scrub room. The production floor and scrub room are located so that they are visible from the office of the food preparation supervisor.

PORTIONING AND PACKAGING

The Portioning and Packaging Area (XVIII) will assemble, package, label, and chill or freeze the foods. There will be three filling lines located in the area.

The first filling line will fill one gallon laminated, disposable, polyethylene coated paper foil containers with chilled soups, gravies or salad dressings, which will be gravity-fed from the second floor kitchen. Cartons will be received in a knocked-down form and the filling machine will erect them, fill and heat-seal the bottoms, fill and form heat-seal the tops at the rate of up to ten units per minute. Filled containers will be placed in stackable baskets holding four gallons per basket. Baskets will be loaded on a pallet and forklifted to the holding chiller.

The filling lines for chilled and frozen foods in half-size steam table pans will consist of two double lines, each capable of filling nine trays per minute, or a total line capacity of thirty-six trays per minute. Each line will be equipped with two fillers, one for liquids and one for semi-solid foods. Each of these fillers will have two nozzles in order to fill both sides of each divided line.

Foods which are to be shipped to the dining halls in the form of frozen slabs, will be filled into reusable heavy gauge high density polyethylene molds shaped identically to metal half-size steam table pans (12" x 10" x 2½"). Foods which are frozen loose or foods which are to be shipped in a chilled form will be sent in stainless steel half-size steam table pans. The filling machines will handle either of the two types of containers discussed.

Upon leaving the filling lines, the half-size steam table pans (plastic or metal) will be automatically fed into baskets holding six trays. Baskets will be conveyed either to the chiller or to the freezer where they will be stacked 20 high prior to entry to the freezer or chiller. The basket size will be 32" x 32" so that they will also hold three half-size bun pans for baked goods. The freezer will have four lanes holding 10 stacks per lane, i.e., 40 stacks. Since each stack holds 20 baskets, the total capacity of the freezer will be 800 baskets, or 4800 pans. The freezer temperature will be -40°F and the freezer will handle over 36 pans per minute.

The chiller will consist of a single lane holding thirteen stacks at twenty baskets per stack, for a total of 260 baskets or 1560 pans. The chiller will have an output

of 36 pans per minute and will be controllable within the range of 15° to 35°F. A control panel will enable the operator to determine the path to be followed by the products.

Products which are filled hot into the pans, such as casserole dishes, will be run through the chiller to bring the product temperature down to prevent condensation prior to subsequent freezing. After leaving the chiller, pans will be carried through the tunnel freezer. Products that are to be shipped in a chilled condition, such as dessert products will also be sent through the chiller. Products to be frozen which are assembled cold will be sent directly into the freezer without first going through the chiller. The flow of products on the conveyors will depend upon whether the products are sent directly to the freezer or chiller or through chiller then to freezer.

The capabilities of the filling line will be as follows:

- (1) It will be possible to run frozen products on both lines simultaneously.
- (2) It will be possible to run chilled products on both lines simultaneously.
- (3) If a chilled item and a frozen item, which are filled cold, are run simultaneously, the removal of the chilled item from the chiller will be carried out manually.
- (4) If a frozen item is being run, which is filled hot and therefore requires passage through the chiller, it will not be possible to run a chilled item at the same time.

Upon removal from the freezer, the basket will be automatically unstacked and conveyed to the packaging machine. The removal of pans from the baskets will be carried out automatically and metal steam table pans containing chilled products or loose frozen foods will be over-wrapped with polyethylene film and labeled. The frozen products formed into slabs in the plastic molds will travel through a conveyor in the packaging line which will exert pressure from the underside to release the frozen slab from the mold. Molds will be inverted and slabs released onto the packaging table conveyor for over-wrapping and sealing. Empty plastic molds will be conveyed to an overhead pan washer and returned to the filling line.

At the end of the packaging line packaged trays or slabs will be manually placed into baskets holding three trays or slabs.

STORAGE AND DISTRIBUTION

The Storage and Distribution Branch will store and make ready for shipment all foods prepared at the CFPF. Baskets of chilled foods will be stacked on dollies and moved to the shipping cooler until ready for staging and shipping. Racks containing frozen products will be palletized and fork-lifted into the storage freezer. The freezer will have a capacity of 760 skids. Each skid will hold 16 layers of baskets with 12 slabs per layer. Hence, the capacity of the freezer will be 148,960 slabs (approximately 1.2 million portions which is equivalent to a 30-day supply). The temperature of the shipping cooler will be approximately 35°F. The temperature of the storage freezer will be -15°F. Adjoining the storage freezer (XXV) is the shipping assembly area (XXIV) in which the shipments for the individual dining halls will be made up, using dollies and baskets. Loads ready for shipment on the shipping dollies will be appropriately tagged for the receiving dining halls and transferred into the shipping freezer (XXIII).

WAREWASHING

The warewashing operation will be carried out in Area XXIX. Trucks carrying the soiled equipment returning from the dining halls will off-load at the dock stations on the northwesterly side of the facility. The tray transporters will be automatically brought to the breakdown area by means of an overhead conveyor. Here the trays will be removed from the transporters at each of the four breakdown and washing lines. The trays will be conveyed down the sorting table where the various components will be sorted out and collected in dishwasher baskets resting on a slanted overhead shelf. Food scrap and waste will be emptied in the scrap trough. Filled baskets will be placed on the conveyor and will travel to the dishwasher. Dishwashers are of the flight type and consist of two prewash, wash, rinse, sanitizing rinse, and drying sections. Each dishwasher will have an operating capacity of over 8000 pieces per hour. Sanitized and dry dishes and trays will be removed from the dishwasher conveyor and packed into appropriate dish racks. These dish racks will then be manually loaded in the clean transporters, and the transporters manually loaded on the trucks for shipment back to the dining halls. Silverware will be washed twice, first lying flat, unsorted in open baskets, then, following sorting through mechanical sorters, they will be loaded into plastic tubes and the tubes will be run through the dishwasher again.

The tray transporters, after being emptied, will be automatically moved on the overhead conveyor to a tunnel type transporter washer. This unit will pre-rinse, wash, rinse and dry at a rate of two transporters per minute.

Racks and dollies used for the transport of frozen and chilled foods will also be sanitized in the warewashing facility. A special washer located in an area adjacent to the dishwashers will be used for this purpose. Cleaned and dried racks will be returned to the assembly area for the shipment of food to the dining halls.

LABORATORY

The Laboratory (XXVIII) is located on the second floor of the CFPF, adjacent to the Test Kitchen. The laboratory will provide facilities for personnel of the two sections of the Technical Support Office, i.e., Quality Control Section and Microbiology Control Section. The laboratory will have the equipment and instruments necessary for the performance of the physical, chemical, microbiological and organoleptic tests needed to insure that desired levels of product quality and wholesomeness are maintained in the operation.

To insure end product quality and sanitary integrity a continuous program of quality and microbiological surveillance will be required at all levels of the CFPF operation. Samples taken to monitor the sanitary quality of the CFPF equipment and facilities will also be evaluated microbiologically in the Laboratory. Incoming raw materials, products during preparation and finished products will be sampled and checked in the Laboratory for compliance with prescribed requirements. The types of analyses which will be carried out will, of course, depend on the particular product or ingredient being examined, but will include an appropriate mix of microbiological, chemical, physical and organoleptic tests.

TEST KITCHEN AND ASSEMBLY ROOM

The Test Kitchen (XXVII) will serve as a facility for preparing and testing foods made in the CFPF. The Assembly Room will provide an area for meetings and instruction of both CFPF and satellite dining hall personnel.

OFFICE FACILITIES

Office Facilities are provided on the second floor for the administrative personnel. The food production supervisors, however, have an office adjacent to the Main Kitchen (VIII) while veterinary inspectors' offices remain near the Meat Thawing area (VII).

Locker rooms and toilet facilities for male and female personnel employed in food production are located on the second floor of the CFPF. Separate facilities for office personnel are also located on the second floor, while facilities for the warewashing personnel are located in the warewashing building. The central polling devices (consoles and tape drives) for the MIS will also be located in the office area.

MISCELLANEOUS FACILITIES

In addition to the facilities already described, the central food preparation and warewashing facility will also include the following miscellaneous areas:

(1) The Reclaim Area (I) will be located near the receiving dock to examine products returned from the dining halls and rejected products from the CFPF to determine disposition.

(2) The Waste Disposal area (II) will be used primarily for the disposal of packaging materials from incoming raw ingredients and the waste from the food preparation area.

(3) The Warewashing Basement (XXX) will house the boiler room and sewerage treatment equipment for the warewashing facility. A Maintenance Shop will provide a facility for maintenance personnel to store parts and carry out necessary small repairs.

(4) The Shrink Film Cooler (XIX) will provide a storage area for packaging material.

(5) The boiler room (XX) will provide all the steam required for the CFPF portion of the building.

SECTION III

SATELLITE DINING FACILITY MODERNIZATION CONCEPTS

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GENERAL DISCUSSION

The proposed new food service system at Fort Lewis will be composed of a Centralized Food Preparation Facility (CFPF) and Warewash Facility serving 48 satellite dining facilities in the four principal areas of the post as shown in Appendix II. The dining facilities will offer three different types of service: regular, which provides full course hot meals; specialty, which provides Italian, Mexican, and seafoods; and short order, which provides hamburgers, hot dogs, french fries, etc., with each service generally in a separate facility. However, in one instance the specialty and short order facilities have been combined. The 1941 temporary facilities are located in the North Fort and Personnel areas; the 1938 permanent facilities are located in the Garrison Area; the 1953 facilities in the Division Area; and the 1957 facilities in the Division Area. Concept designs which depict the modernization potential for these facilities have been developed and are shown on Figures 4 through 10.

In the system of 48 dining facilities planned for Fort Lewis, there are 33 regular A-ration dining halls, 6 specialty dining halls, 8 short order dining halls, and 1 combination specialty-short order dining hall. Twenty-five out of the 48 facilities are housed in permanent structures. The remaining 23 are in (obsolete) temporary structures which are planned for use on an interim basis. The location of the different facilities in each of the areas at Fort Lewis is shown on the maps in Appendix II. These locations reflect a prime objective of placing the dining establishments within the most convenient range of the customer group consistent with projected troop strengths while maintaining a degree of unit integrity. The dining halls are distributed as follows with representative concept design provided in figures 4 through 10 for those that are in bold type:

Division	Vintage: 53	11 regular	2 specialty	3 short order	0 comb.
Division	Vintage: 57	2	0	0	1
Garrison	Vintage: 38	4	1	1	0
Personnel	Vintage: 41	4	1	1	0
North Fort	Vintage: 41	12	1	3	0

These 48 existing facilities will require modifications to adapt them to the CFPF concept. Additionally, renovation of the dining hall is also highly desirable from both the standpoints of customer satisfaction and worker productivity. This action covers specific appearance, comfort, convenience, and supply requirements and associated costs for modernization.

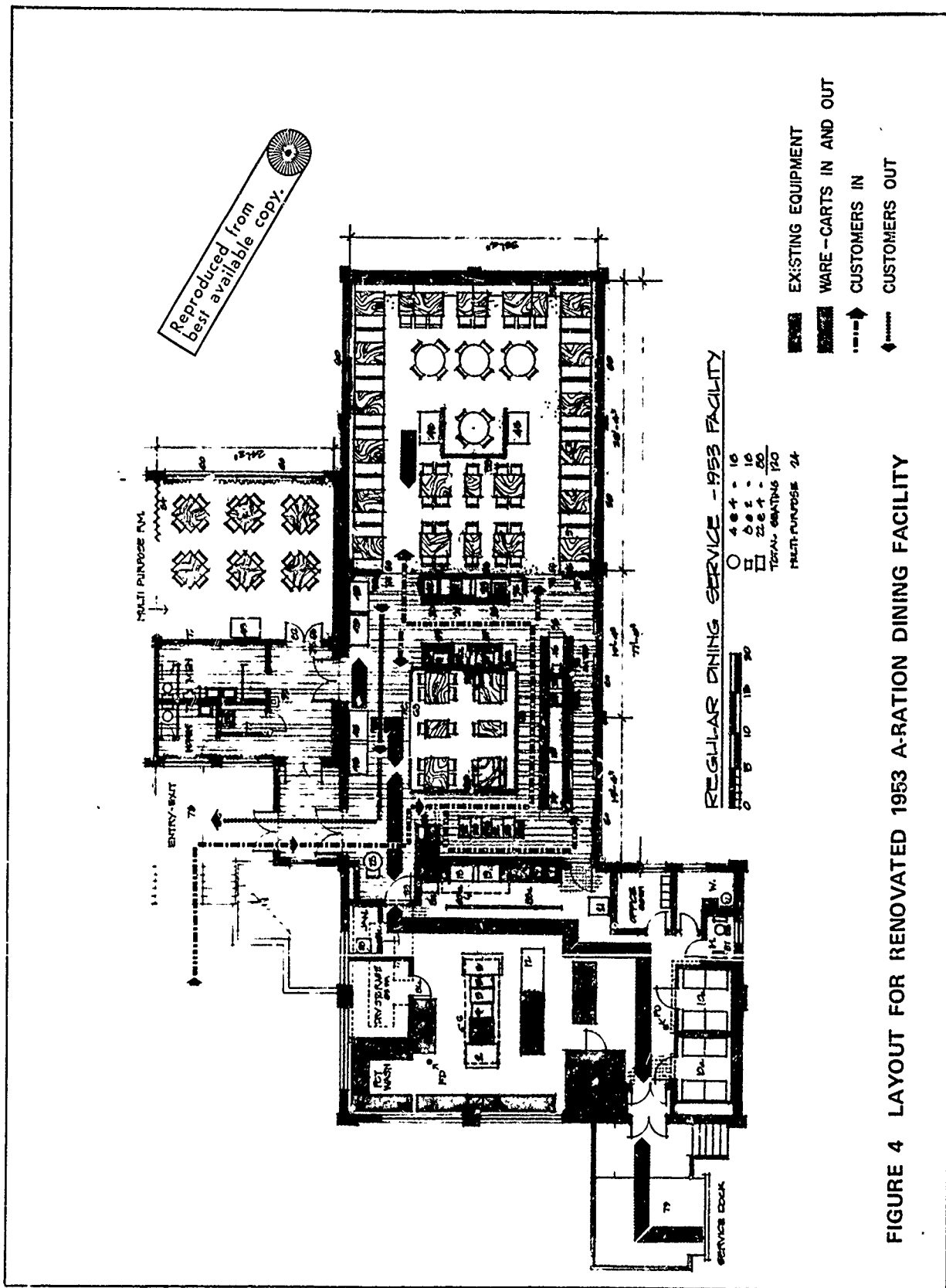
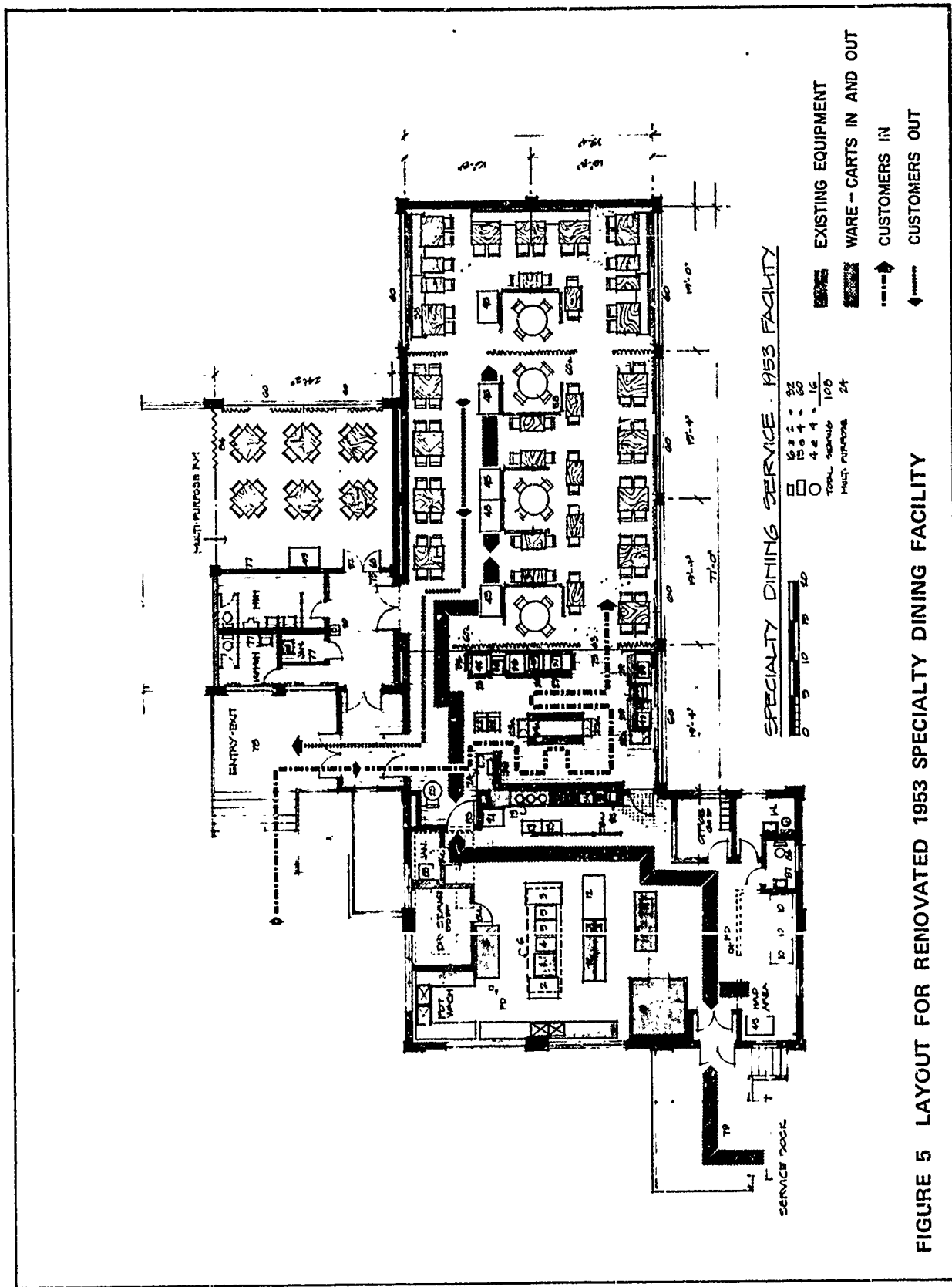
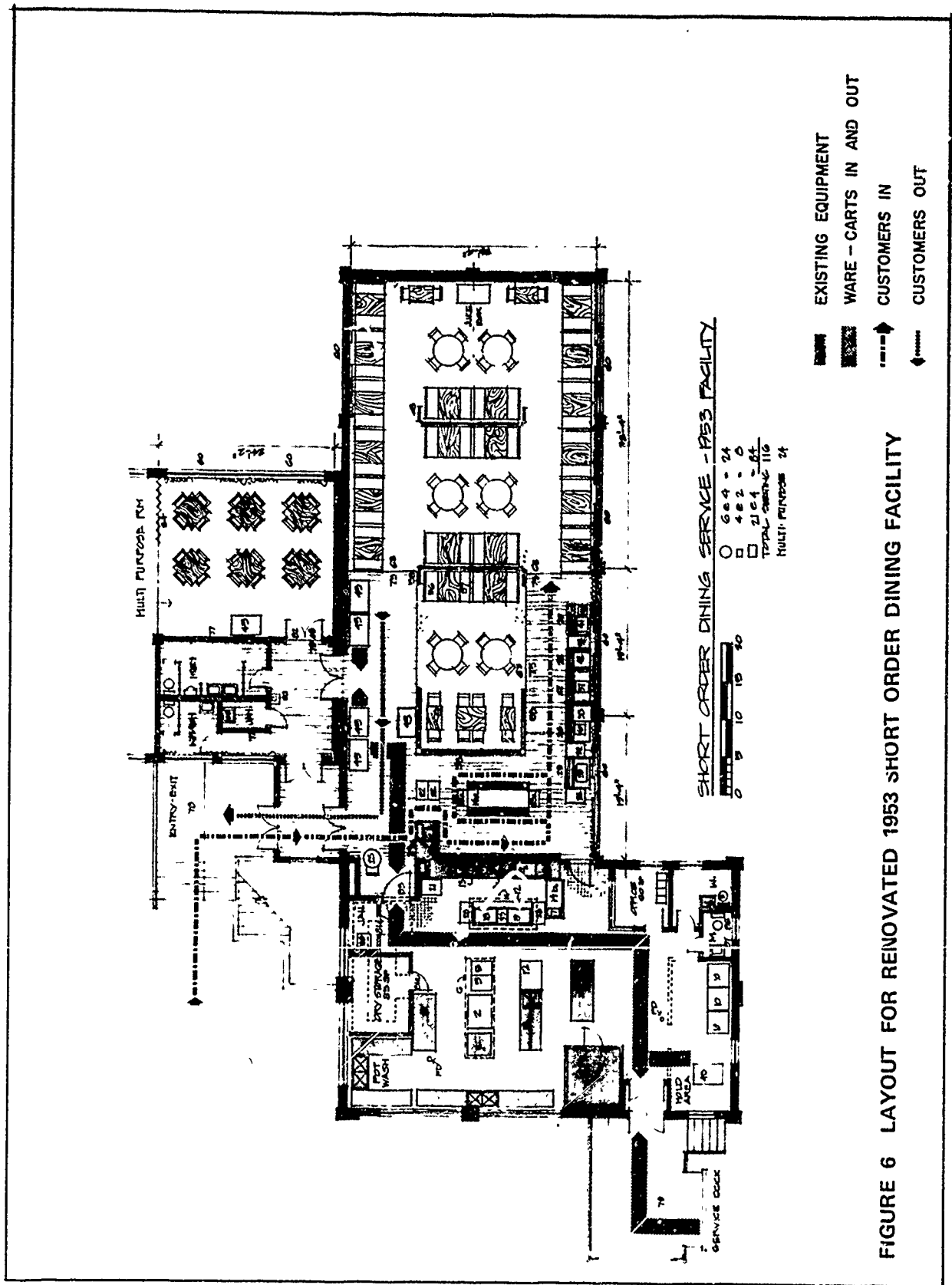


FIGURE 4 LAYOUT FOR RENOVATED 1953 A-RATION DINING FACILITY





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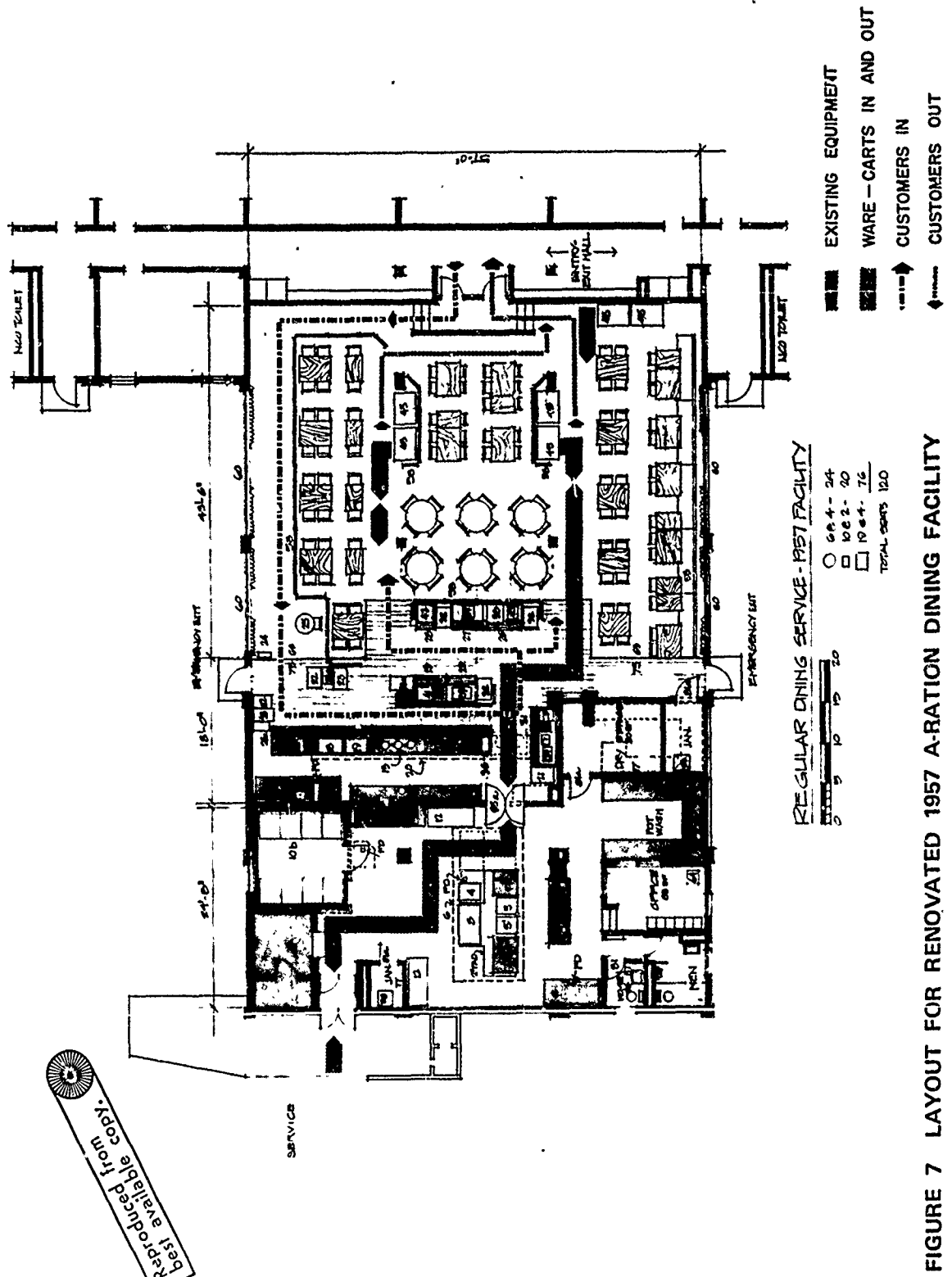


FIGURE 7 LAYOUT FOR RENOVATED 1957 A-RATION DINING FACILITY

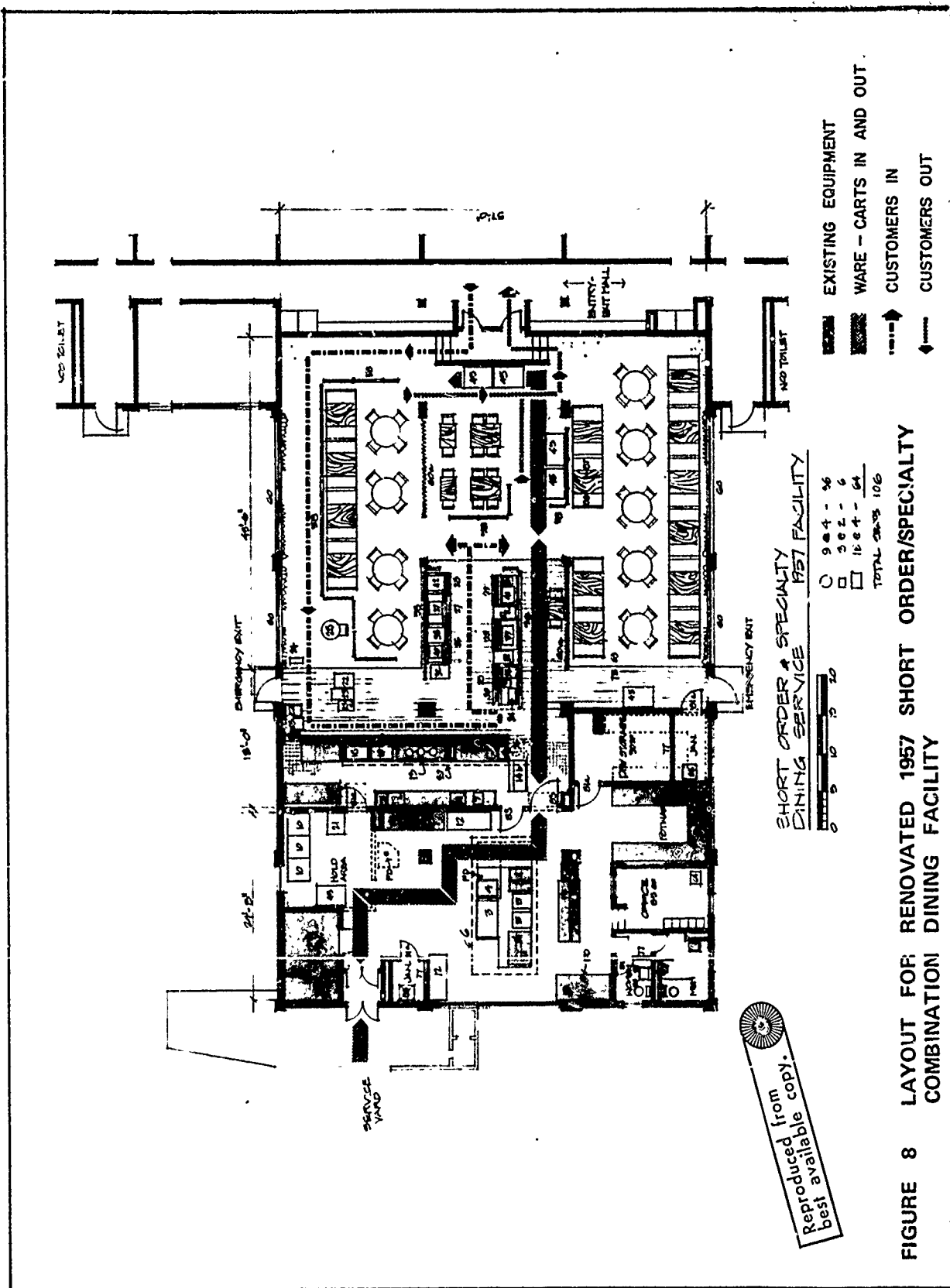
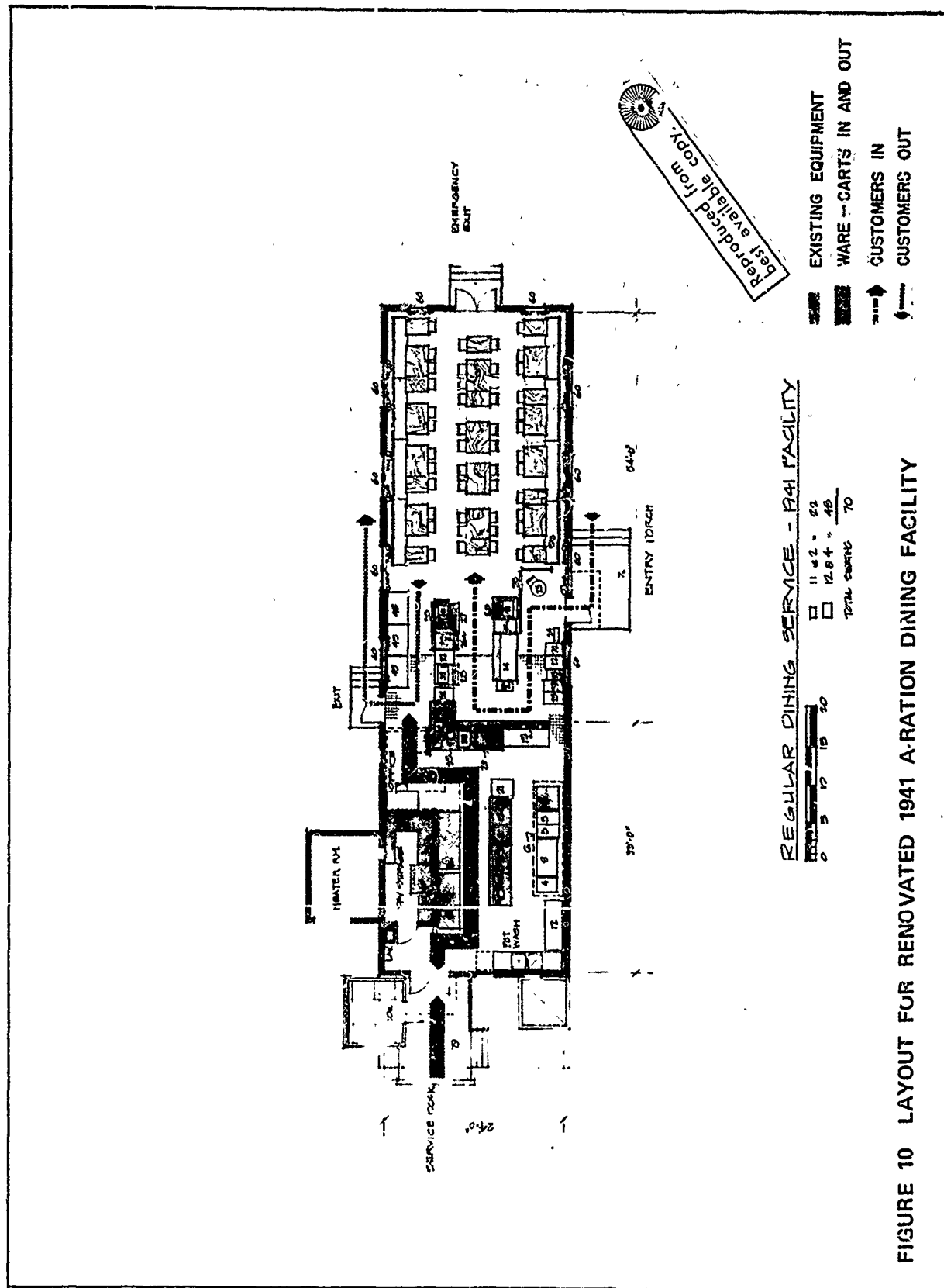


FIGURE 8 LAYOUT FOR RENOVATED 1957 SHORT ORDER/SPECIALTY COMBINATION DINING FACILITY



MODERNIZATION REQUIREMENTS

APPEARANCE

While only one of several important considerations, the appearance of a dining facility is the principal visual expression of the food service system. The interior design concepts for the satellite facilities are intended to provide eye-appeal and social options which are intended to increase customer satisfaction. The essential factors which will have the greatest visual impact are color, light and furniture. An example of this is illustrated in Figure 11 which depicts a refurbished 1953 regular A-ration service facility. The customer viewing sequence illustrated in Figure 12 further depicts the appearance of the 1953 regular service facility. The following is a list of descriptions for the 8 viewing positions illustrated.

- 1 Entrance: facility identification plaque with more spacious stair and landing beyond.
- 2 Check In: tray and tableware pick-up with direction to Buffet beyond. The grill is to the right.
- 3 Buffet: serving lines for cold, hot and ambient food with direction to Beverages beyond.
- 4 Beverages: serving lines for cold and hot drinks and ice cream with glassware pick-up. The main dining room is to the right with a smaller one to the left.
- 5 Seating Choice #1: rectilinear tables for four and two, or combined for six with side chairs.
- 6 Seating Choice #2: rectilinear tables for four with cushioned booths and banquettes.
- 7 Seating Choice #3: circular tables for four with side chairs.
- 8 Exit: via the soiled tray transporters for tray deposit.

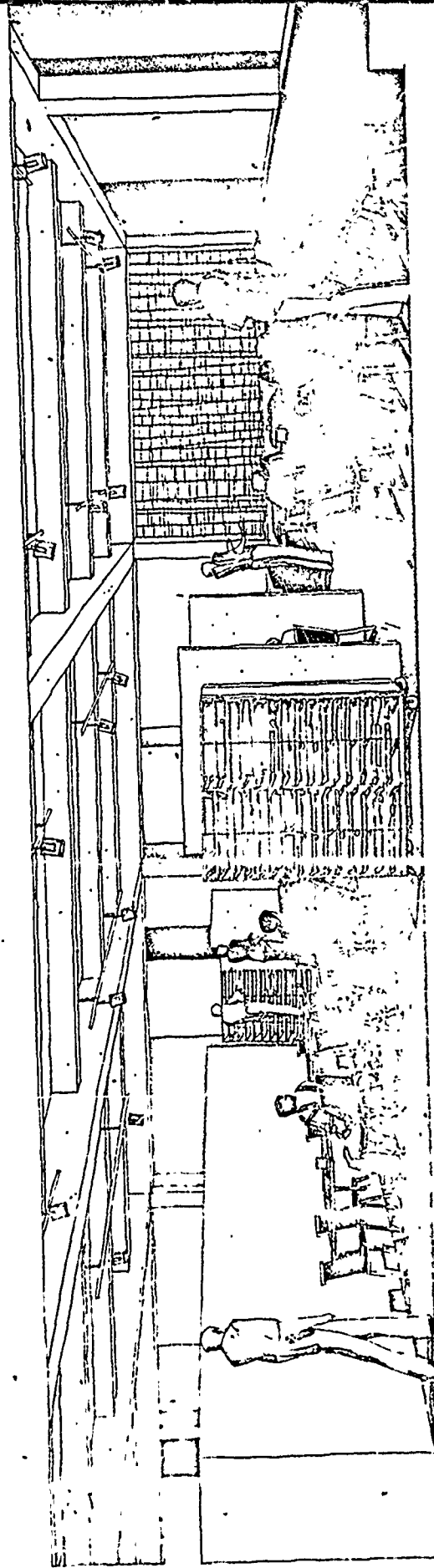


FIGURE 11 ARTIST'S CONCEPT OF RENOVATED 1953 A-RATION DINING FACILITY

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 for greater detail.
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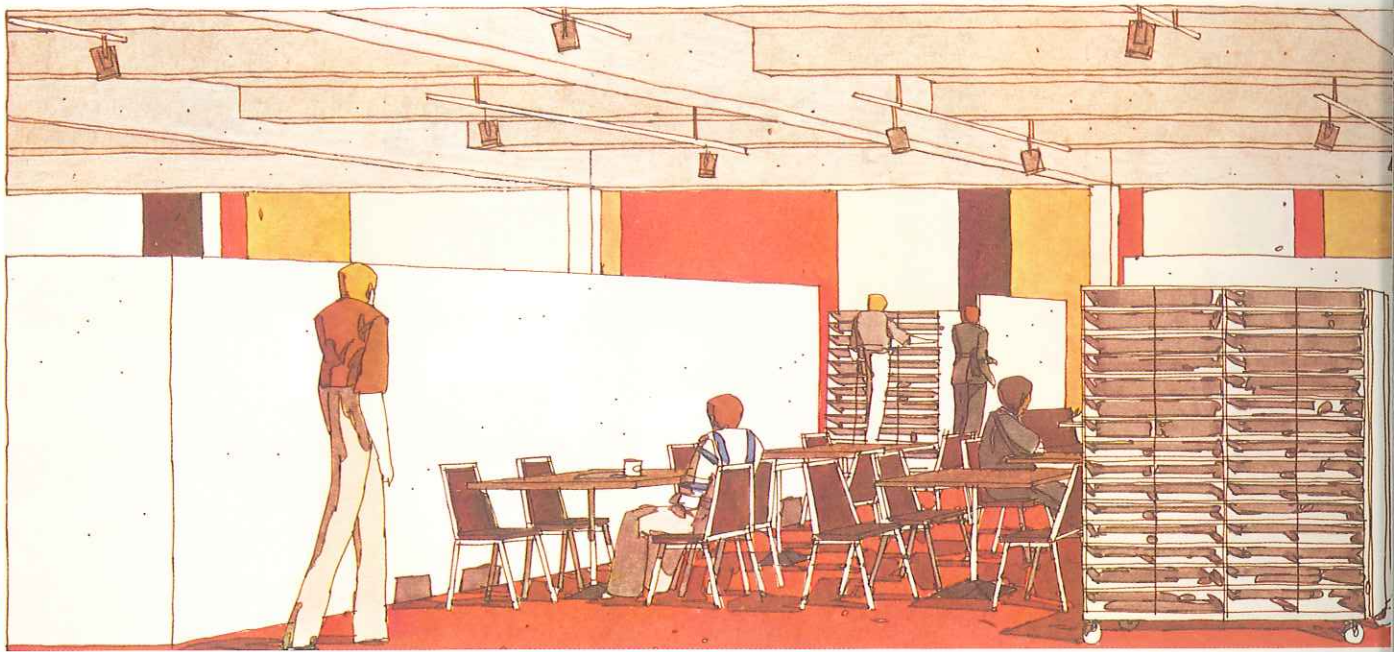
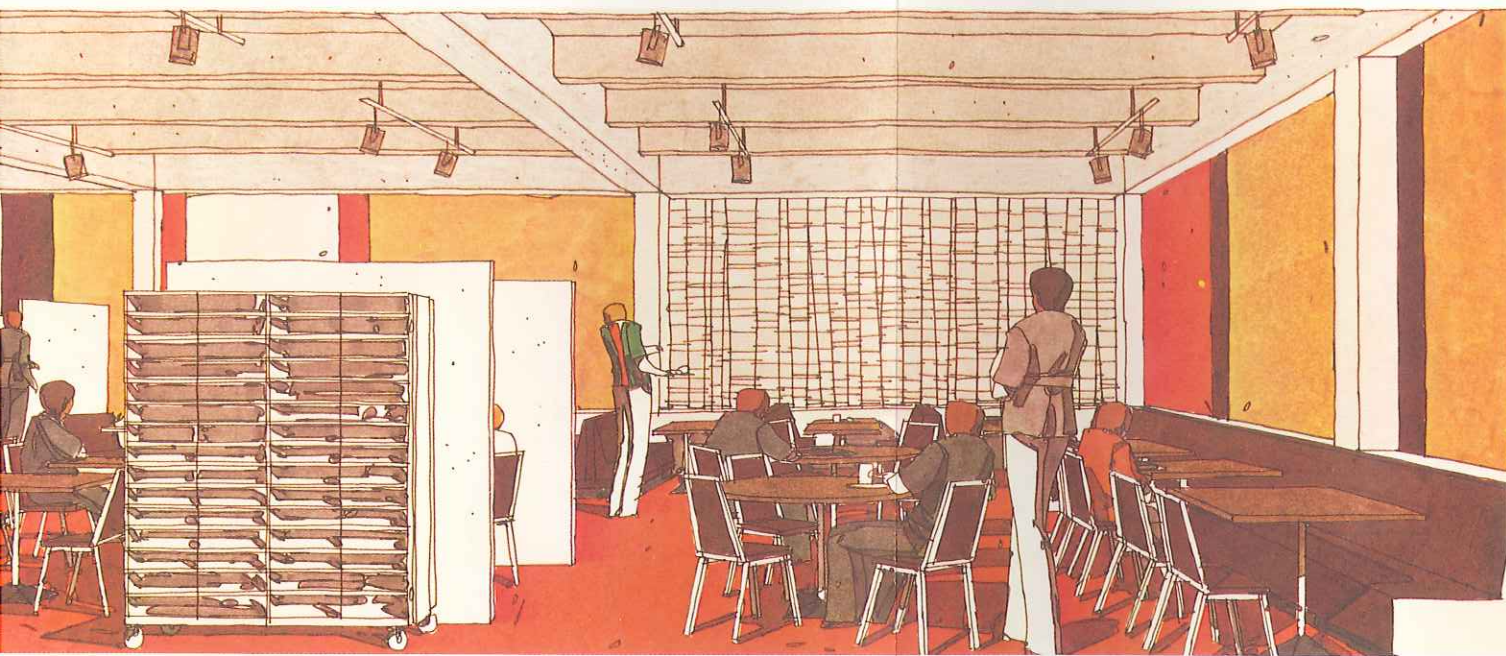
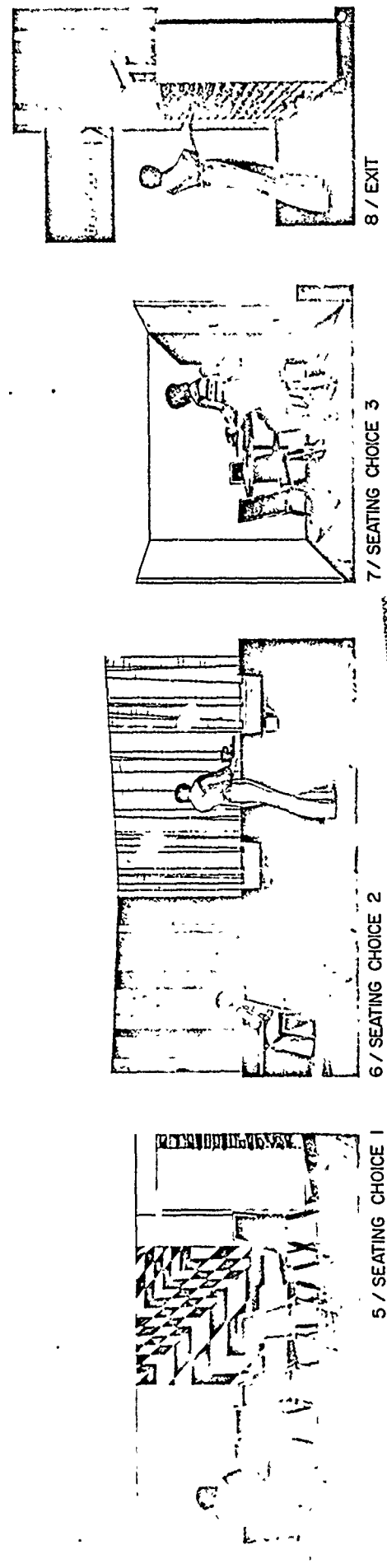
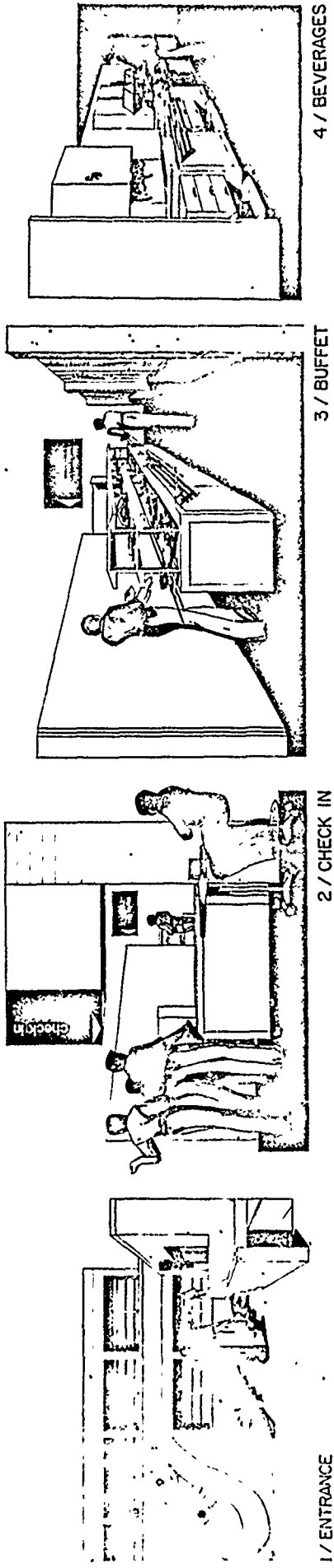


FIGURE 11 ARTIST'S CONCEPT OF RENOVATED 1953 A-RATION DINING FACILITY



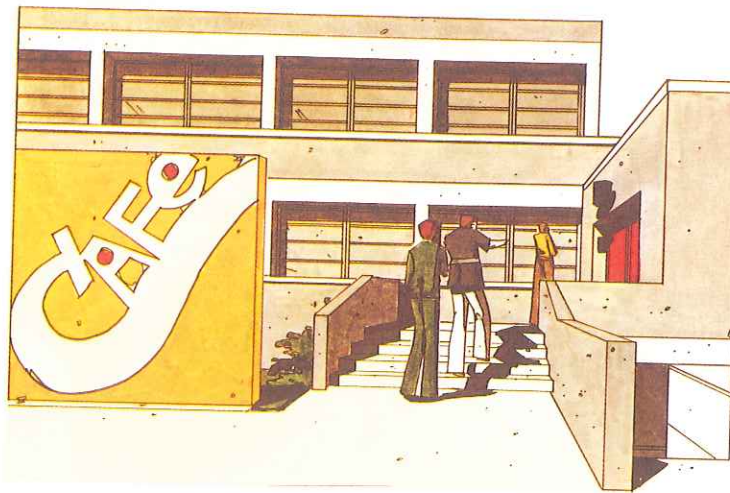
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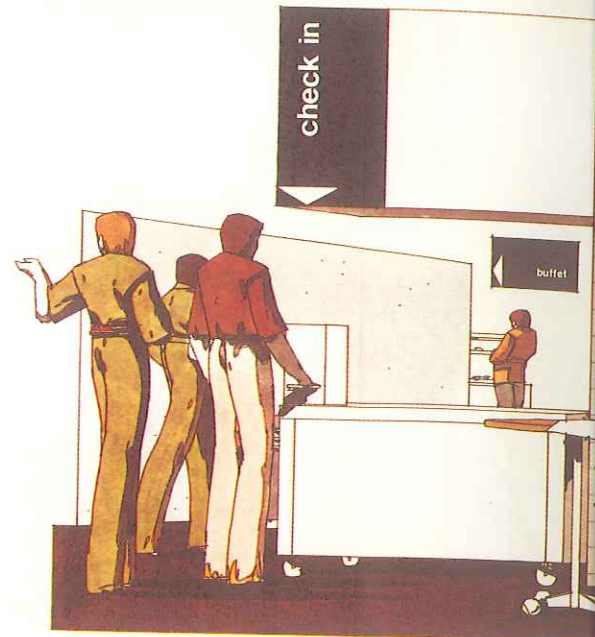
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FIGURE 12 CUSTOMER VIEWING SEQUENCE

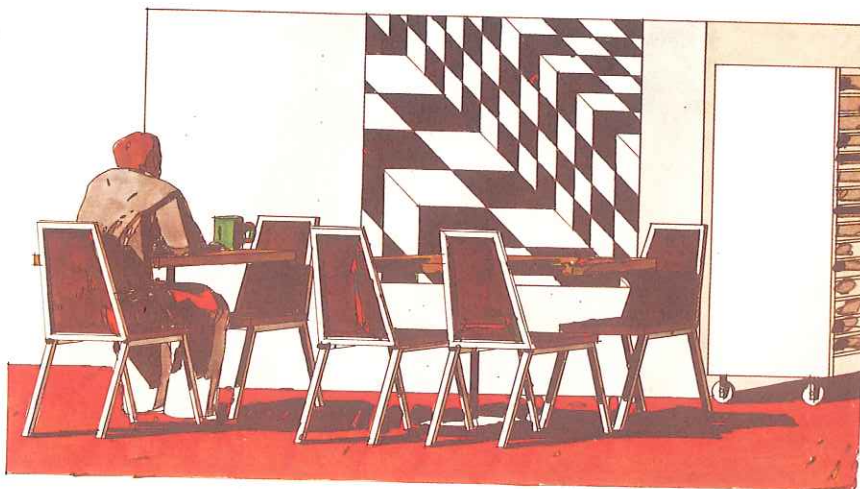
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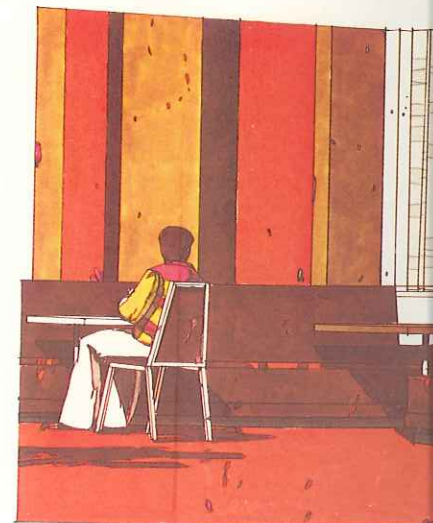
1 / ENTRANCE



2 /

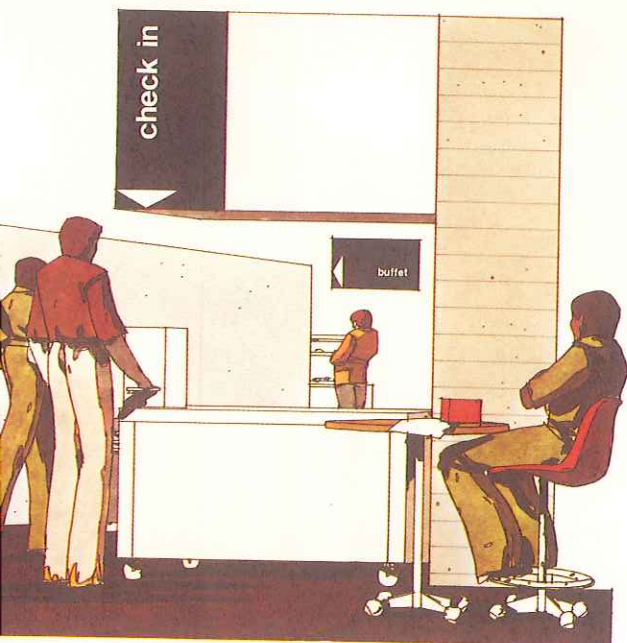


5 / SEATING CHOICE 1



6 / SEATING CHOICE 2

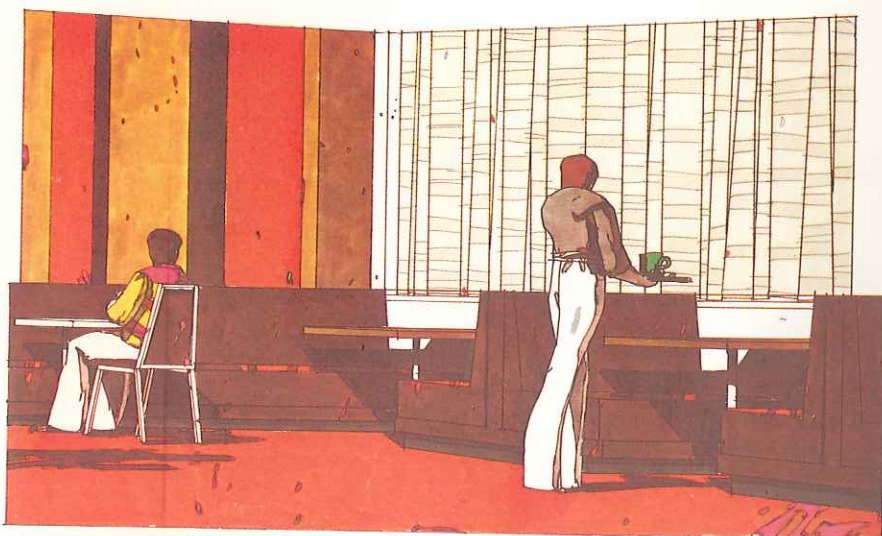
FIGURE 12 CUSTOMER VIEWING SEQUENCE



2 / CHECK IN



3 / BUFFET



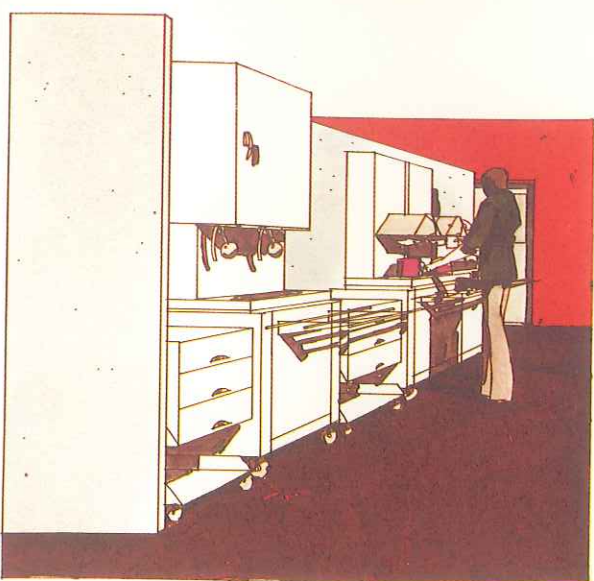
6 / SEATING CHOICE 2



7 / SEATING CHOICE 3



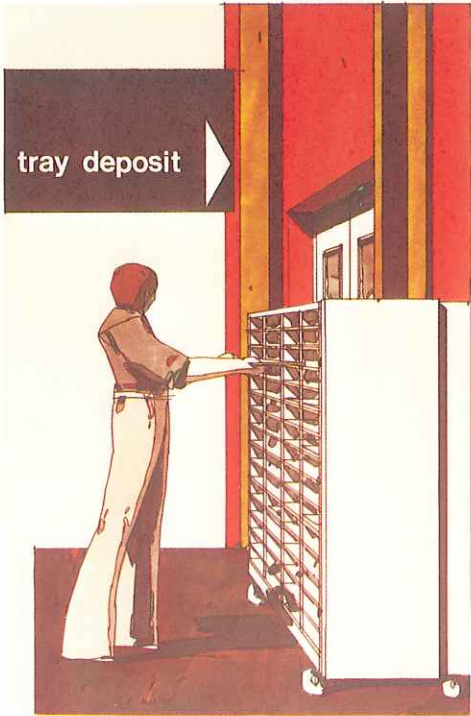
3 / BUFFET



4 / BEVERAGES



7 / SEATING CHOICE 3



8 / EXIT

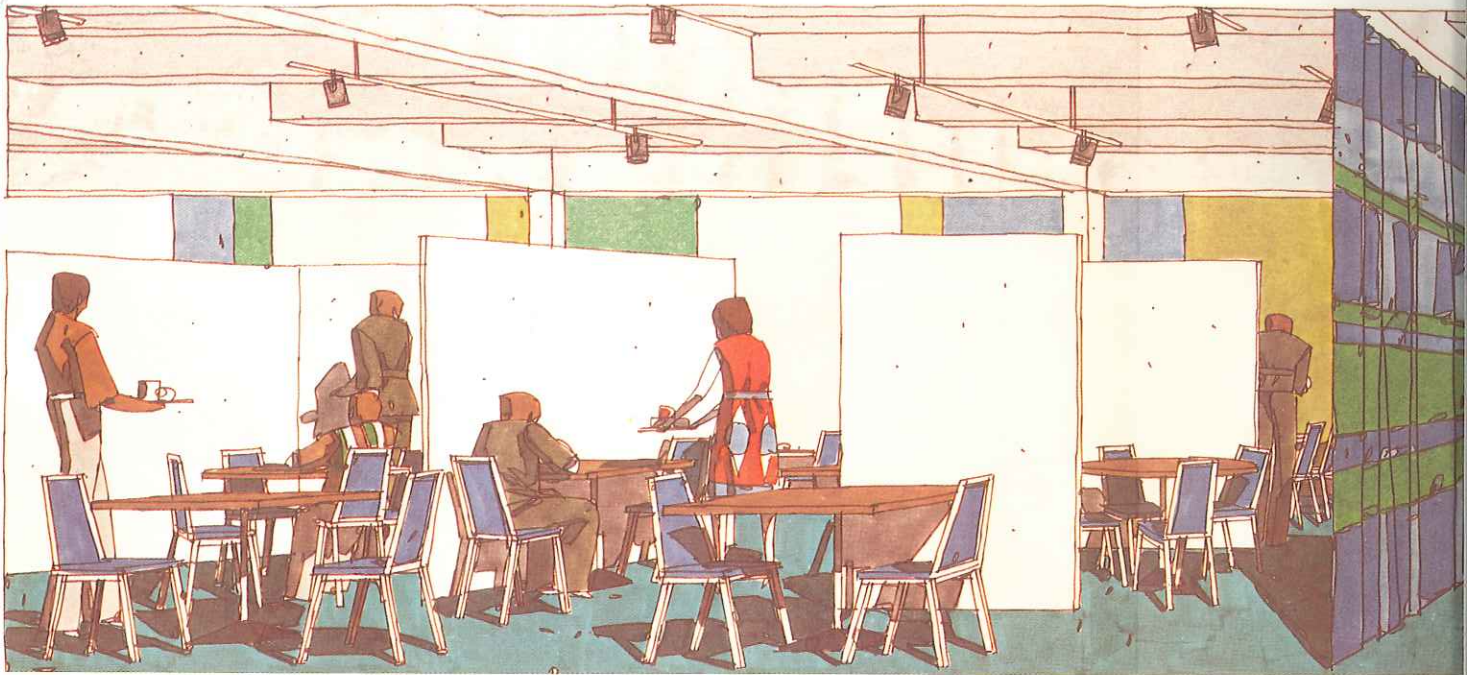


FIGURE 13 ARTIST'S CONCEPT OF RENOVATED 1953 SPECIALTY DINING FACILITY



DINING

A layout for the renovated 1953 A-ration dining facility is shown in figure 4. An illustration and a layout of a 1953 specialty facility are shown in figures 13 and 5, respectively.

Color. User surveys and observations made at Fort Lewis indicated a need for brighter colors in the dining environment. The application of color, in the form of paint, is the least expensive means of significantly changing the appearance of the dining hall. The walls are brightly painted in proportioned patterns, and played against basic solids to add visual rhythm and excitement.

A darker neutral color is applied to the ceilings to lower reflectivity and to psychologically lower the space. The structural integrity of the building is emphasized by applying a single neutral color to the contiguously exposed columns and beams in contrast with surrounding ceiling and wall surfaces. Darker ceilings, contrasting cross beams, and a colorful end wall, all combine to psychologically widen an otherwise physically narrow space (34' x 77').

Basic color schemes combine two analogous colors together with neutral colors and an accent color, which is either a complementary color (complementary scheme) or another analogous color (analogous scheme). The colors of the carpet and other flooring material, drapery and furnishing materials have been carefully considered in the development of each scheme. Included in this consideration are tables, chairs, graphic panels, partitions and even the color of new serving line equipment. Various basic schemes have been developed to provide a variety of decor in the 48 facilities to be renovated at Fort Lewis.

Lighting. The design concepts use color as the principal element of decor; however, many facilities must provide places to eat three different meals: morning, noon and evening. For the sake of customer satisfaction, it would be most desirable to vary the appearance or atmosphere of an establishment from noon to evening. This is accomplished through the use of lighting controls: for the exterior light through the use of window treatments, and for interior light through the use of simple rheostatic devices to control the luminaires.

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Generous drapery applications, recommended at 150 to 200% fullness, are used to filter sunlight and to develop more of a feeling of softness and glow within the dining area. Solid colors, only, are recommended in order not to conflict with the colored wall patterns. Fire retardant material, and open-weave beta fiberglass, and a verel base fabric is used. A requirement common to all window treatments is that they be constructed so they do not hamper ventilation, nor the access to window openings.

A new track system for lighting is used to take advantage of the existing electrical outlets in the newer permanent structures, and to provide different lighting options for accents, or for creating the "atmosphere" below. The track is normally hung on pendants in eight foot sections; however, it can be combined into longer lengths, squares or crosses. The track is constructed as a simple orifice into which different kinds of luminaires can be inserted. Feeding off of existing fixture outlets, two lower wattage, adjustable canister-type luminaires can be used to spread out and provide spot or accent lighting. Globe or other decorative pendant fixtures could be inserted for more general illumination in certain areas with the canisters accenting other areas on wall surfaces.

Additional lighting considerations pertain to the type of service being offered. It is recommended that the short order establishment be more brightly lighted since the nature of that activity is fast service and efficiency. A relatively high level of light (artificial at night) coupled with a complementary color scheme is intended to emphasize activity and the nature of the short order operation while providing a warm friendly atmosphere for eating. Regular service establishments are a little less active in nature and thus are in need of softer lighting and more relaxed atmospheres, especially in the evening.

Furniture. Seating options are of critical importance to the customer's satisfaction with a dining facility. Customers come to eat, but they also come for friendship. The dining facility must, therefore, accommodate this customer requirement. Furthermore, some flexibility must be allowed since the size of the friendship groupings may be as few as two or as many as eight. The most common size has been found to be three. Therefore, an assortment of furniture which is readily adaptable to various seating arrangements has been utilized.

In most facilities, the table options include a circular 48 inch diameter table for four customers and rectangular 36" x 48" and 24" x 36" tables which seat four and two customers respectively. In addition, the rectangular tables can be combined to provide for up to eight customers, if the social group is that large. All tabletops are constructed of durable, hard surface laminates (non-gloss) and are supported on pedestal bases. Such bases are necessary for ease of access into the various seating arrangements discussed below.

Seating options include cushioned booths, banquettes (elongated booths) and (stacking) side chairs to give the customer a reasonable sense of comfort and class. Simply designed seating with durable naphthyl covering is used to assure ease of cleaning and minimum upkeep. Traditional patterns are employed in the arrangement of seating with booths facing booths, banquettes facing chairs, and chairs facing chairs. Space allowances for circulation were somewhat more generous than for equivalent seating arrangements in commercial establishments.

Movable partitions are used to define smaller and more personal spaces with intent to satisfy some aspects of the requirements for privacy. These partitions are interlocked into free standing configurations to close off the view of circulation activities and to subdivide the open dining hall to reduce perceived occupancy and the possible feeling of being crowded. Large floor-to-ceiling divider drapes are also used for similar purposes, and to provide an added element of visual interest.

COMFORT

The comfort of a dining facility can be measured physically in terms of its thermal, air and sound qualities. All can be technologically controlled and are discussed below in relation to the design concepts shown herein. A factor such as safety also bears upon comfort. Consequently, the comfort of each type facility, like its appearance, is a composite of many factors, and is considered in that respect.

Temperature and Air. Complete air conditioning is considered desirable, but not a high priority item for the satellite dining facilities at Fort Lewis. Thus, the cost of air conditioning is not included in the concept designs discussed herein. Temperature in the Fort Lewis area varies on an average between 42° and 59°F. However, extremes

of 0° to 99°F have been recorded with humidity as high as 83%. While these conditions do not exist over long periods of time, one would expect that when such extremes are approached, the dining facilities would become very uncomfortable places to be in, especially for the workers in the kitchen area. DOD Instructions suggest a temperature of 70°F for light activity (dining area), and a temperature of 65°F for active employment (kitchen area).

Exhaust systems in the kitchen area and over the grill area are essential to the comfort of the satellite facilities. If the systems are inadequately sized or improperly maintained, heat, smoke, odor, and air-borne grease particles could make the dining area, as well as the kitchen, most unpleasant. The cleanliness and the appearance of the facility would also be adversely affected. The design concepts generally utilize existing hoods in the kitchen and over the grill. However, some new hoods are required in the 1953 and 1938 facilities. These hoods employ a water and detergent system for extracting grease and fumes. Exhaust systems which discharge cooled air back into the kitchen for worker comfort could also be considered.

Sound. Noise in the existing facilities is a common condition, and has been measured at levels approaching acute annoyance. Sounds generated by the normal activity of the dining hall customers create the basic problem. Sound level readings taken in Fort Lewis dining facilities were previously reported² to be so high that they could be damaging to the human ear. Acceptable levels for commercial facilities are 55-55 db; a level that does not interfere with normal conversations.

The centralization of warewashing is an important factor in the reduction of noise, since it will alleviate much of the dish handling within the satellite facility. However, impact sounds from activities, such as the handling of pans and dishes on the serving line are still a problem.

In dealing with the reduction of noise in the satellite dining facilities, the design concepts basically rely on the use of carpet and generous drapery, partition arrangements, and somewhat upon the use of upholstered furniture. Also where possible, openings in the wall between the kitchen and the serving line are either permanently filled or provided with a door to isolate the noise in the kitchen.

Besides the addition of acoustical absorbents in the dining hall and the isolation of noise in the kitchen, a music sound system is provided to create a masking effect. Customer surveys indicated a high preference for background music in the dining facility. Speakers are distributed overhead with the source equipment located in the kitchen office. Speakers are also provided in the kitchen area for the enjoyment of the employees.

Safety. Comfort in the dining facility is also relative to being free from bodily harm. The permanent structures at Fort Lewis are all fire resistant, but there is need to assure ease of exit in case of panic. This has been considered in all the design concepts for the satellite facilities. A minimum of two means of exit are provided per dining hall, and all doors open out. All facilities meet the 125 foot maximum distance to exit requirement and there are no deadends exceeding 75 feet.

Slip resistant surfaces for flooring should be applied to potential areas of spillage on the serving line, as well as in areas of spillage and grease splatter in the kitchen. The carpet in the dining area is slip resistant and completely fire resistant. It is also static resistant, in order to eliminate potential shocks upon contact with metal.

CONVENIENCE

Two principal factors influence customer convenience. These are the location of the dining facilities in relation to sleeping quarters and work areas, and the ease of customer movement into, through and out of the facility. Each of these factors is discussed separately below.

Location. The fact that the dining facilities currently exist in close physical relationship with sleeping areas and most work areas is the principal advantage of the present system at Fort Lewis. When one is confronted with a choice of whether or not to eat in the dining facility, the nearby location of the facility is a major consideration. The weather in the Fort Lewis area makes convenient location of facilities even more necessary. Precipitation is recorded on the average of 179 days out of the year.

Ease of Movement. Fast and easy movement into and out of the facility without long waits is an equally important consideration. Waiting in line, or worse still, waiting

in line out in the elements, is an extreme customer irritant. Several things are applicable to the reduction of this irritant. Circulation conflicts between customers entering and leaving a facility are virtually eliminated since the warewashing activity has been transferred from the dining facility to the centralized warewashing facility. Furthermore, the equipment to be employed in conjunction with the accounting procedures for the overall management information system, provides speedy check-in through a device which checks a card (similar to a plastic credit card) issued to each customer. And finally, careful layout of serving line equipment, to include tableware, food and beverage dispensers, is used to speed up the acquisition process and to allow customer movement to occur in an orderly manner.

The customer's circulation paths in, and paths out, are shown on each of the design concept layouts. The customer viewing sequence illustrated in Figure 12 depicts some of the points concerning ease of movement into and out of a 1953 vintage A-ration dining facility. A diagram showing the typical food acquisition process and the 8 positions in the customer viewing sequence is shown in Figure 14. This food acquisition process is discussed further below. All discussion is relative to a 1953 vintage A-ration dining facility.

Upon entering the facility, additional waiting space is provided to the left along with customer restrooms. Upon entering the dining hall proper, the card reader device is readily accessible for check-in. A stand-up table for cash exchange is located to one side. Tray and tableware dispensers are located directly beyond the card reader. The grill is to the right and the buffet is beyond to the left. Normally the grill is used for bacon and eggs in the morning, and for certain meat items at night. The customer selects items from the grill prior to going to the buffet line.

Acquiring food from the buffet line is a straight line situation allowing first access to salads, entrees and hot vegetables, breads, and desserts from the portable units. Extra salads are stored in a refrigerated compartment below the first unit. Entrees and vegetables are resupplied from a holding cabinet in the kitchen. Extra bread and desserts are stored below in the third and fourth units. The double sided buffet was employed where space permitted to help speed customer flow, although resupply of the food items will cause some interruptions. Thus, when desired, the lines can readily be converted to single sided operations by simply dropping the bracketed tray slides and moving the units back slightly. Beyond the buffet to the left is the beverage area.

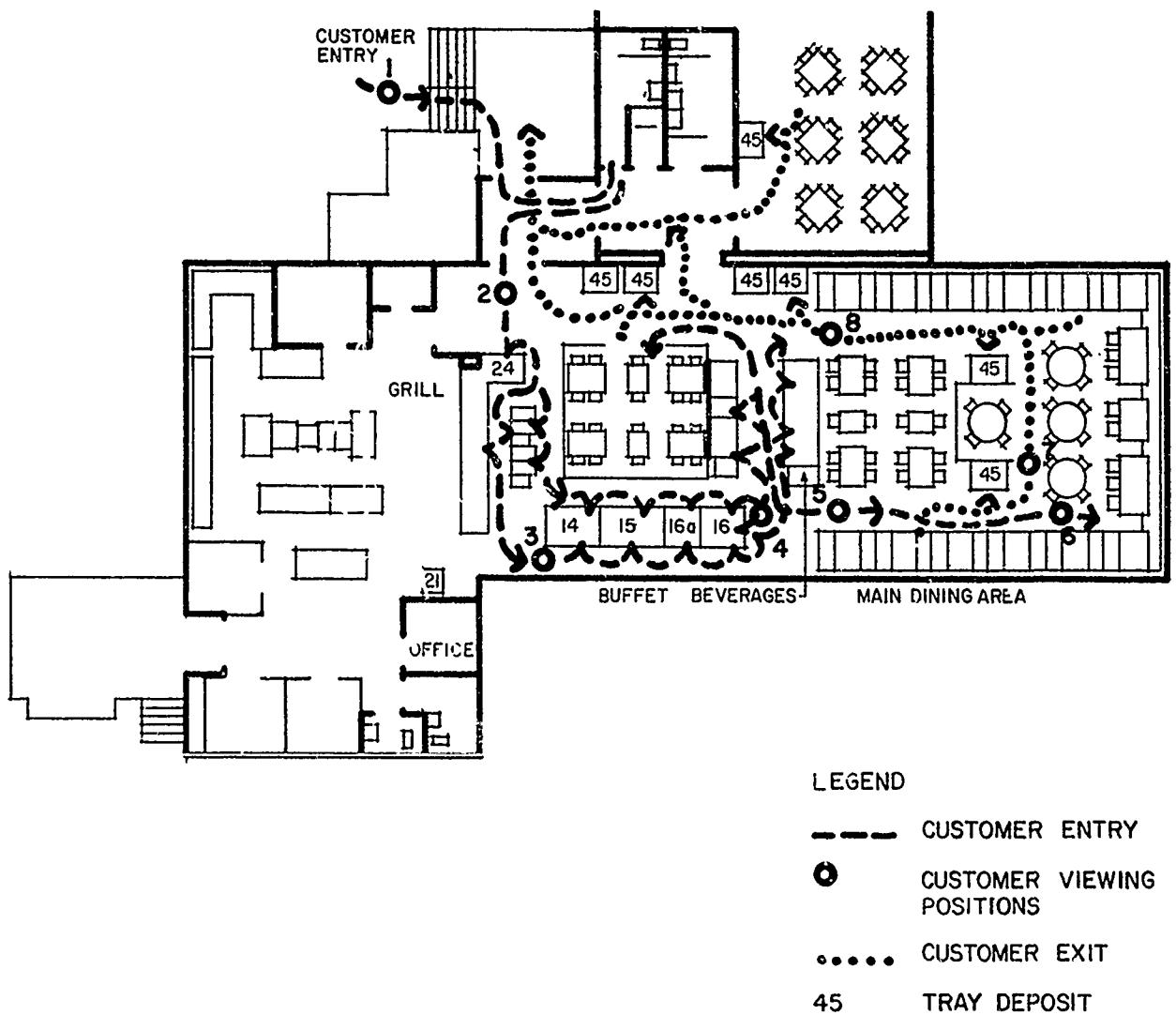


FIGURE 14 FOOD ACQUISITION PROCESS
53 REGULAR SERVICE FACILITY

The beverage acquisition process is a back and forth or scramble situation. Milk and coffee dispensers are located on the left with easy access to glasses and cups. On the right are located juices, ice and water, carbonated drinks and soft ice cream. Generous slide space is provided on both sides for the customer to set his tray while obtaining his beverage. The units on which the dispensers are set are all portable to ease cleaning and maintenance.

Access to the seating areas is to the left and the right from within the beverage selection area. The design concepts generally place the beverage areas in close proximity to the dining area for ease of return for additional drinks, or to allow the customer to place his tray on a table before choosing a beverage. The circulation paths also accommodate a customer desiring to return to the serving line for a second helping of food.

Movement out of the facility is designed to allow a minimum of conflicts with incoming customers. Soiled tray transporters are placed within the main dining area and along the wall adjacent to the exit doors. Each transporter can receive up to sixty soiled trays deposited by the customers on their way out. Sufficient transporters are available so that they will not have to be moved from the dining area until the customers have gone. An exception to this will probably occur in the specialty and short order facilities, but it is not expected to hamper customer convenience since the removal task could be performed during a slack in customer activity.

Restrooms. For convenience and comfort but most importantly for sanitation purposes, DOD instructions require restrooms in the kitchen area, one each for men and women. In new dining facilities those instructions also suggest restrooms for similar reasons be provided for the customer. In the existing facilities at Fort Lewis, the need for both male and female restrooms in the customer area is emphasized by the varied and extended use of facilities, e.g., for specialty houses, and the increasing number of women in the military, not to mention female guests now visiting the dining facilities.

Except for the 1941 and 1953 vintage facilities, adequate space and reasonable access to male restrooms already exist. However, the restrooms are in, or off of, corridors in the adjoining barracks buildings, and their use for the convenience of the dining hall

customers will depend upon the prevailing unit management policies. In the 1953 vintage facility, additional male and female restroom space was obtained in the adjacent "dayroom" area. This solution is shown in the design concepts with an adjoining multi-purpose room intended for use by both the dining hall customer (possibly only for overflow) and the dayroom user. These improvements are itemized in Appendix III. However, they are not included in the estimated costs shown elsewhere in this report.

Janitor closets. Finally, the provision of adequate janitor closets to serve the dining area is noted. With the addition of carpeting, space is required for the storage of vacuum cleaners and accessories. Various makeshift storage spaces were found in the dining facilities at Fort Lewis. Current regulations require frequent cleaning of floors and waxing of resilient tile. Thus, it is necessary to have space for storage of equipment and supplies in, or in very close proximity to the dining area. Solutions are shown in the design concepts for the 1953 and 1957 vintage facilities where adjacent space was converted to this function.

SUPPLY

Supply activities are essential to the operation of satellite dining halls. The design concepts shown reflect the supply requirements for each type of facility in the form of storage space for frozen, chilled and ambient foods; and in the form of circulation space for dollies and transporters used to bring items into the satellite facility from the delivery trucks. Supply activities are discussed in two principle parts; one deals with food products, and the other with tableware.

Food products. Storage for food products in the dining facility is determined by its customer capacity and the units required to maintain an adequate stock for the different meals to be served during a delivery cycle.

Much of the food will be in a frozen state: entrees, vegetables, etc. These items will be packaged at the CFPF for shipment in stackable racks to fit on dollies. The height of the stacks in transit will be limited by weight, which must be kept to a maximum of 450 lbs., for ease of control over the dolly. Once stationary, the stacks are increased

slightly for more efficient use of the storage space. For the regular service facility, which is the principal user of CFPF foods, computations allowing for the factors above prescribe the need for eight dolly spaces in the permanent facilities, and four dolly spaces in the 1941 temporary facilities. Storage of frozen food items is thus provided in walk-in freezer units, sized and shaped to accommodate the required number of dolly spaces. Since the frozen items required for the Short Order and Specialty operations are more limited, on hand (OH) reach-in freezers are retained.

Storage requirements for chilled and ambient foods were derived in a similar manner as above giving consideration for storage of bulk salads, milk, fresh fruits, canned goods, etc. In the permanent facilities, the existing walk-in chillers were determined to be adequate and are retained. Existing reach-in chillers are used in the 1941 facility. Ambient storage is described on each concept as "dry storage". In the 1953 and 1957 vintage facilities, dry storage is located in the place of the existing dishwasher since the latter function is performed centrally. This allows the space nearest the rear entry to be used for frozen storage since a major part of the supply activity is in frozen foods. The chilled storage, as existing, is conveniently located near the rear entry.

A diagram showing a typical food product supply operation from the dock and storage areas, to the serving line, is shown on figure 15.

Tableware. The transporters used in the supply of trays, tableware and utensils to the satellite facility and in the return of the same items, soiled, to the warewashing facility are sized to accommodate the trays to be used in the dining halls, and to allow for ease of control in moving the transporters. Each transporter has a capacity of 60 trays and is equipped with doors for sanitary purposes during movement through, or storage in, the kitchen area.

The number of transporters required for each facility, and for each meal will vary according to expected capacities. If the expected noon time seating capacity is 300, then five transporters would be required. Except for the 1941 facility (where three are provided) each facility concept is provided with places for six transporters.

Transporters will be exchanged at the regular facilities up to three times a day allowing for a change after each meal. Clean ware brought into the facility will be transferred

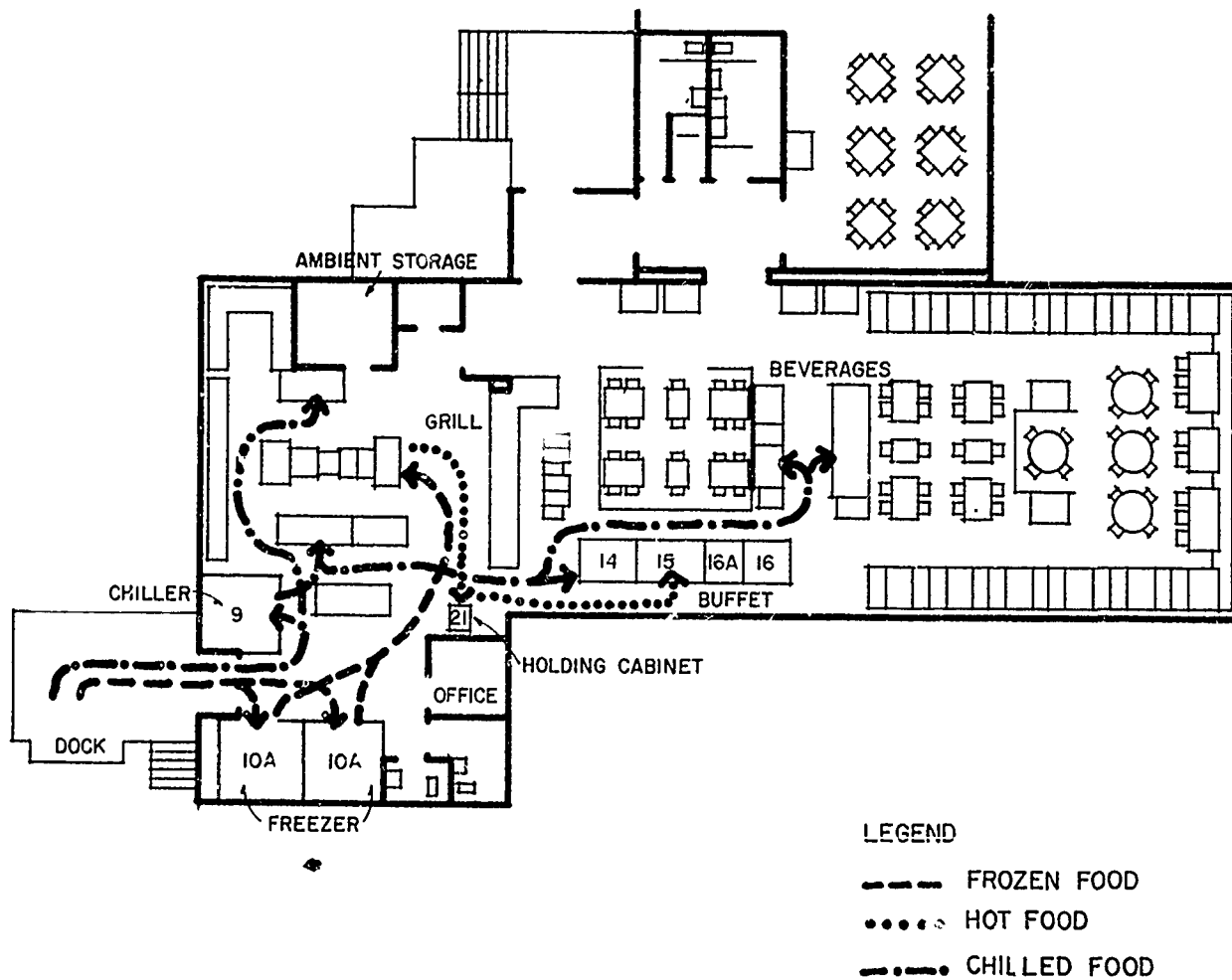


FIGURE 15 FOOD PRODUCT SUPPLY
53 REGULAR SERVICE FACILITY

to dispensers stationed along the serving lines and then the transporters will be moved to their own stations in the dining area. The number of transporters in a facility at any one time will vary, more so in the specialty and short order facilities, than in the regular facilities. In the former facilities, the customer load will be spread over a longer time period, thus presenting a requirement for backup transporters to replace filled ones during the dining period. Space noted as a "hold area" is provided for transporter storage in the 1953 and 1957 design concepts.

A diagram showing a typical tableware supply operation from the dock and the kitchen to the dining area is shown on figure 16.

Transport Docking. The link between the CFPF and the satellite operation is the transportation system of delivery trucks and docks. The frequency of supply necessitates movement of trucks and equipments in and out of the facility in a manner unhampered by physical obstacles.

First, adequate maneuver space for the large semi-trailer type truck is required for positioning the trailer at the facility dock. Generally, few site modifications are required and none are called for in the concept and designs. However, at the 1938 facilities, some minor changes to the existing driveways and curbs should be made; although, such costs are not included in the cost data of this report.

Dock enlargements are included to provide sufficient space for the loading and unloading of dollies and transporters. Further consideration must be given during design to assure that the height of each dock is compatible with the height of the truck beds, or that they can accommodate the hydraulic lift on the truck in a way that maximizes ease of movement.

In addition, the 1938 facilities, and some of the other vintage facilities also will require the leveling of floor joints and surfaces along the paths of circulation designated for the transporters and the dollies. This involves minor ramping, and the removal of obstructions on the floor, e.g. sills, caps, etc. In all facilities, except the 1941, new doors are located between the kitchen and dining areas to allow for more efficient movement of transporters to and from the dining area.

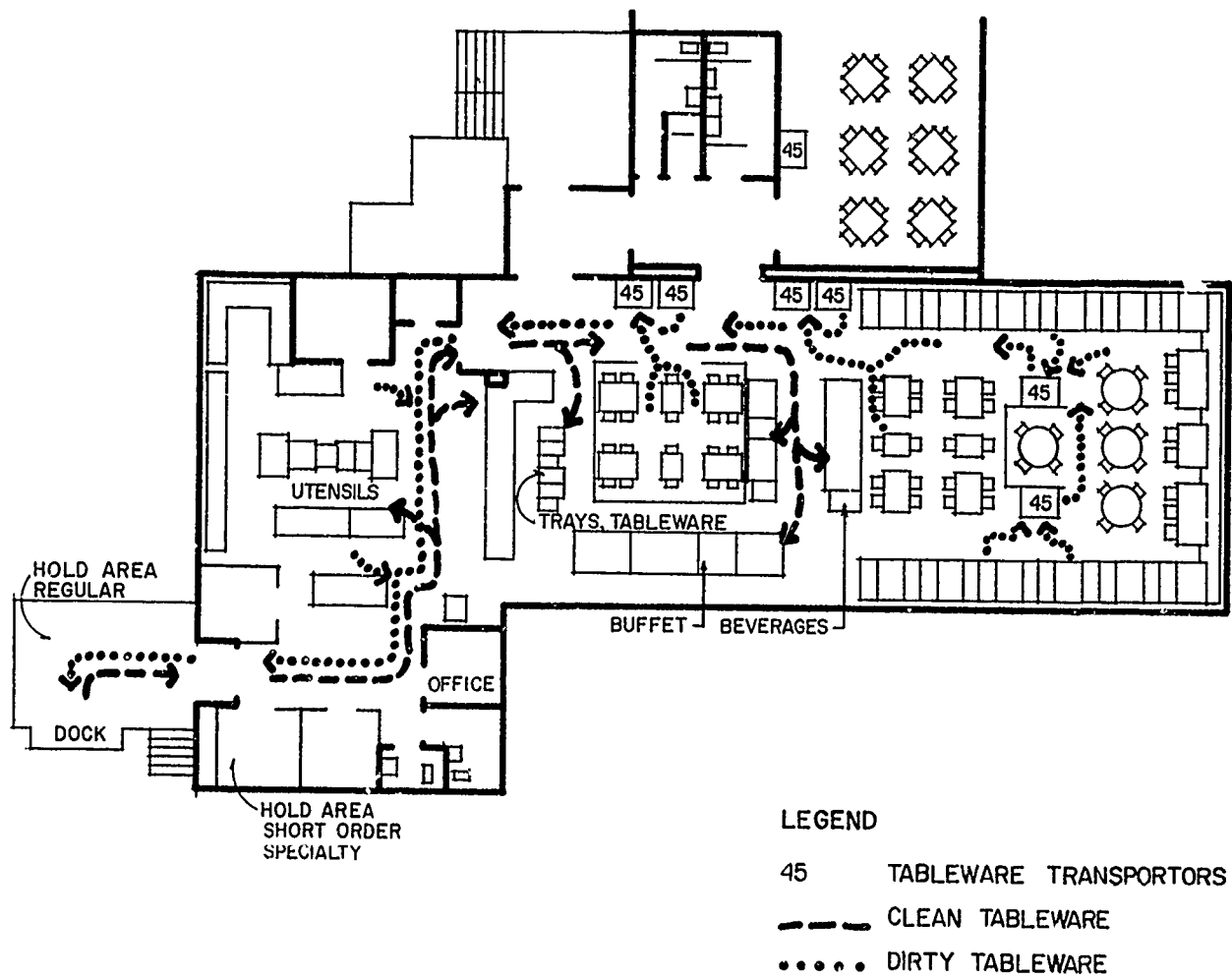


FIGURE 16 TABLEWARE SUPPLY

53 REGULAR SERVICE FACILITY

COST DATA

The cost data presented herein reflect both the cost of renovating the existing facilities and adapting them to the CFPF satellite system. Estimates for new equipment include the cost of installing that equipment. Estimates for building modifications include both the cost of materials and labor. Contingencies are included separately to cover unforeseen costs and shipping costs. Design costs are not included. The total estimated costs for modernizing these facilities are shown in Table V for the concepts developed. These total costs include both the cost of items essential to the new system, and the cost of items required to improve serving lines and decor to increase troop morale.

COST ESSENTIAL TO SATELLITE OPERATIONS

The estimated costs essential to satellite operations compatible with the centralized system, i.e., equipment and building modifications to accommodate supply of food and tableware from the central plant, and for reheating of the food, is shown in Table VI.

A breakdown of the essential items for each type facility can be found in Appendix III. Applicable items are noted with an asterisk. Basically they include the kinds of items shown in Table VII. However, requirements vary between types of service and vintages of facility. The representative example presented in Table VII is for a 1953 Regular Service Facility. The item codes in Table VII relate to the index shown in the first column of Appendix III.

It should be noted that a number of existing or on-hand (OH) items are retained. Items in the inventory at Fort Lewis were considered to be on-hand. This includes such things as reach-in refrigerators, ranges, deck ovens and deep fat fryers. To further minimize costs, the concepts were developed to require as little change in equipment layout as possible. Much of the existing equipment in the kitchens, and in some cases (e.g. the 1957 vintage) on the serving line is on two or three inches thick concrete and tile pads. Replacement and/or relocation of this equipment would entail costly alteration work involving the demolition and possible construction of new pads, as well as electrical and plumbing work. Thus, many of the existing and still usable items of equipment are retained. The equipment that is added, and the modifications that are made (which are done in a way to take advantage of existing pads, vent hoods and floor drains, etc.) are considered necessary for functional efficiency.

TABLE V

**TOTAL COST OF BOTH ADAPTING TO CFPF AND
RENOVATING EXISTING DINING FACILITIES**

Vintage	Type of Service	Items Required(\$)	Contingency(\$)	Total Cost(\$)
1953	Regular	57,315	5,732	63,047
1953	Specialty	44,790	4,479	49,269
1953	Short Order	41,630	4,163	45,793
1957	Regular	49,360	4,936	54,296
1957	Spec/Short Order	44,350	4,435	48,785
1938	Regular	62,830	6,283	69,113
1941	Regular	31,005	3,101	34,106

TABLE VI**COST OF ADAPTING EXISTING DINING FACILITIES
TO THE CENTRALIZED SYSTEM**

Vintage	Type of Service	Items Total(\$)	Contingency(\$)	Total(\$)
1953	Regular	23,150	2,315	25,465
1953	Specialty	16,350	1,635	17,985
1953	Short Order	11,350	1,135	12,485
1957	Regular	22,060	2,206	24,266
1957	Spec./Short Order	16,250	1,625	17,875
1938	Regular	24,250	2,465	27,115
1941	Regular	17,350	1,735	19,085

TABLE VII

ESSENTIAL ITEMS FOR ADAPTING AN EXISTING DINING FACILITY
TO THE CENTRALIZED SYSTEM

Item Code	Description	No. Req'd	Cost(\$)
3	Convection Oven	1	3,000
4	Jet Cooker	1	2,000
10a	Walk-in Freezers	2	6,800
21	Holding Cabinet	1	850
24	Auto Card Check	1	3,000*
45	Scullery Carts	10	5,000
76	Demolition		800
77	Const: Blk. Wall	40'	800
79	Loading Dock		600
83	Service Door	1	300

*This Cost includes the credit card reading equipment plus a prorated share of the central data accumulation equipment.

COSTS FOR DINING HALL RENOVATION

It is important to note that renovation of existing dining facilities at Fort Lewis to improve serving lines, decor and furnishings is not considered "chargeable" to the cost of the centralized system. It is reasoned that those investments are related to improving troop morale and are necessary for conventional food service whether a modern system is implemented or not.

Such improvements include items like a mobile electric serving line equipment, food and beverage dispensers, tables, chairs, booths, partitions, window treatments, carpet, painting and restroom equipment as detailed in Appendix III under item codes, 13-20, 25-31, 33-43, 47-75 and 86-89. The estimated cost per facility for dining area modernization based on the concepts shown in this report are listed in Table VIII.

For the 1941 temporary facility, improvements have been shown in the dining area primarily to indicate a reasonable seating to equipment-investment ratio. It is recommended that improvements to these facilities be made with caution, since these facilities are basically obsolete and should be used only on an interim short term basis.

Finally, it should be noted that although the centralized system can be implemented independent of dining area renovation, the dining area is still an integral and important part of the total system. One should not overlook the fact that continued effectiveness, in terms of customer satisfaction, will depend upon how well customer requirements are met in dining modernization, i.e., improvement of serving lines, decor and furnishings. It is these improvement that will provide the settings for selection and consumption of the products being produced at the CFPF, and regardless of how efficient that operation may be or how high the quality of the product is, inconvenient or unattractive places to eat could adversely effect customer satisfaction with the food service system. Consequently, if the end result is to be a totally modern and effective system, the satellite facilities at Fort Lewis should include improvements that are not only responsive to the centralized system, but to the customer requirements as well.

TABLE VIII

COST OF DINING AREA RENOVATION INDEPENDENT
OF THE CENTRALIZED SYSTEM

Vintage	Type of Service	Items Total(\$)	Contingency(\$)	Total(\$)
1953	Regular	34,165	3,416	37,581
1953	Specialty	28,440	2,844	31,284
1953	Short Order	30,280	3,028	33,308
1957	Regular	27,310	2,731	30,041
1957	Spec./Short Order	28,100	2,810	30,910
1938	Regular	38,180	3,818	41,998
1941	Regular	13,655	1,666	15,021

SECTION IV
MANAGEMENT INFORMATION SYSTEM

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The Centralized Food Preparation System Concept is a radically different approach to food service for the Army--requiring new policies, new procedures, new responsibilities, and new kinds of decisions. In essence, a new information system is required.

EXISTING INFORMATION SYSTEM

The information system associated with present food service operations can be summarily described as manual, cost-conscious and historically oriented.

(1) It is basically a manual system in that most of these data are recorded, analyzed and reported without the use of automated data processing equipment.

(2) Characterizing the system as cost-conscious simply means that costs and accounting data are collected and analyzed more than any other type of information. Granted, cost control is an important managerial responsibility, but there are no reports that focus attention on such consumer-related indices as utilization rates.

(3) Every report described in AR 30-1⁷ and AR 31-200⁸ records primarily historical data. These summaries are important, but are of limited value to the manager whose desire is to anticipate problems rather than to correct them.

MANAGEMENT INFORMATION SYSTEM -- GENERAL CONCEPT

As distinguished from the present system, the proposed CFPF management information system is automated, consumer as well as cost-conscious and future oriented. These three attributes are required of an information system that operates to assure a consumer-oriented, high-quality food service operation. If management is to obtain the stated objectives, reliable and accurate information is required in several key areas.

Perhaps the most important requirement of the proposed food service system is rapid feedback from the consumer. Without such information, the task of "adapting to the changing tastes of the modern military man" becomes extremely difficult. Essentially, management needs continuous and reliable answers to the following sorts of questions:

— What is the attendance rate at each of the dining facilities? How do they compare?

— What are the customer attendance patterns, and how can the system be modified to improve the overall attendance rates?

— With what frequencies are individual food items and/or meal types selected? How are production requirements affected?

— How do the dining facilities compare in terms of meal costs, productivity, and other measures of performance?

It is tempting to argue that the answers are already fairly well known, yet experience gained during the Fort Lewis experiment indicates otherwise. There are a few individuals who eat three meals a day in military dining facilities. A great many more eat but one meal on the average. And in this latter group, approximately equal percentages attend the late evening, the noon, and the breakfast meal. The problem of gaining consumer acceptance data is not one that can be simply resolved through periodic surveys. It requires continual and systematic data collection, analysis and feedback. And in order to keep the consumer the foremost management concern, performance must be measured in terms of consumer-oriented indices.

Management in a large CFPF must anticipate problems to a greater extent than is done in the present system. A problem in a single unit dining facility may be multiplied many times in magnitude and scope if it occurs in the centralized facility. Therefore, the manager often must be able to take corrective action early, or before a situation becomes critical. But to do so, he must have information, i.e., trends and projections to identify potential problem areas and determine the necessary remedial actions.

Without modern automatic data processing resources in the new system, it will not be possible to keep pace with the changing consumers. Efforts will be directed toward crisis control rather than problem solving, and the volume of data required to be processed in production control, cost accounting and other areas for effective management will not be made available on a timely basis.

The major inputs to the proposed MIS will be as follows:

- (1) Master Recipe File
- (2) Menu File

- (3) Headcount File
- (4) Meal Card File
- (5) Food Selection Data File
- (6) Ingredient Cost File
- (7) Quality Control Data File
- (8) Production Data File
- (9) Daily Troop Strength
- (10) Future Troop Strength
- (11) Inventories File

The principle outputs of the proposed information system will be as follows:

- (1) Daily Production Guides
- (2) Daily Ration Issue Slips
- (3) Cooks' Worksheets
- (4) Production Performance Reports
- (5) Inventory Reports
- (6) Dining Hall Performance Reports
- (7) Meal Card Usage Reports
- (8) Purchase/Requisition Documents

These inputs and outputs are discussed in greater detail in the management information systems study.⁴ Only the major decisions and information requirements are summarized in this report.

RATION ACCOUNTABILITY

DECISIONS AND RESPONSIBILITY

In the proposed system, controlling access and accounting for rations becomes a significant problem for two reasons:

- (1) Individuals are permitted free access to any satellite facility.
- (2) Each type of satellite facility (A-Ration, Short Order, and Specialty) is governed by somewhat different operating procedures, e.g., hours of operation.

To meet accountability requirements within the above constraints, an automated data collection system is mandatory. In addition to identifying potential cases of meal card abuse--such as "loaning" a card to a friend or using an invalid meal card--it will also disclose other situations constituting misuse such as listed below:

- (1) Cards appearing at two facilities at the same time (duplicated cards).
- (2) Cards appearing at the same facility within several minutes (possible card "loaning").
- (3) Cards assigned to "Rations-in-Kind" customers being used after the customer has been placed on "Separate Rations".

In order to properly control and account for rations served in the satellite facilities, the following three pieces of information will be needed:

- (1) Individual identifier; e.g., Social Security Account Number.
- (2) Date and time of card usage.
- (3) Location at which the card is used.

Furthermore, this information must be readily accessible. If not automated, the time required to process individual signatures or handwritten meal card numbers would be too great to permit tight control.

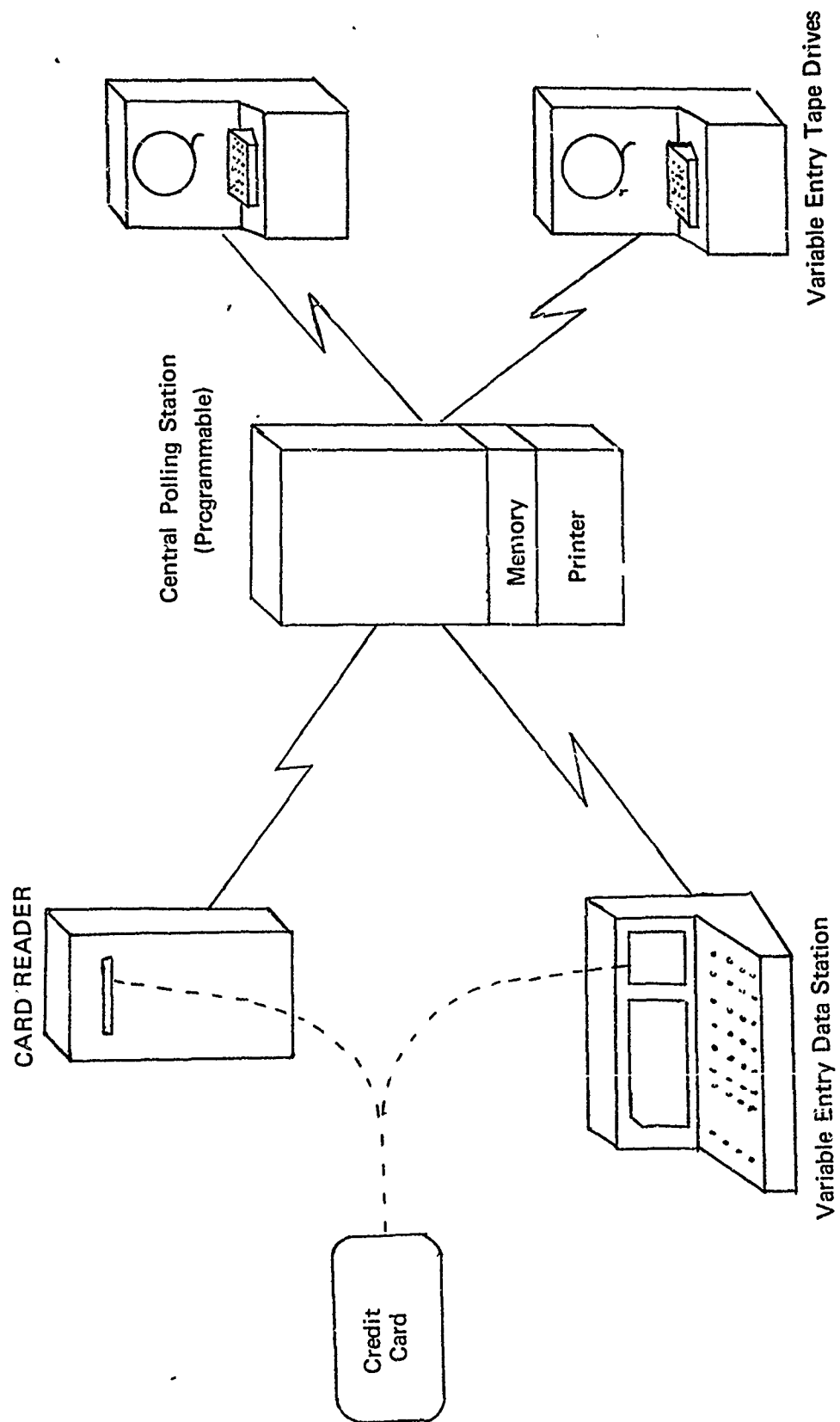
INFORMATIONAL REQUIREMENTS

Management must be able to identify meal card use irregularities, and to review dining hall records related to rations served. The headcount records are thus an extremely important source of information. Figure 17 presents the proposed hardware configuration for automatic recording of headcount data.

SYSTEM DESCRIPTION

The system proposed is an on-line data collection system. Machine-readable meal cards will be issued in place of the present paper cards. Each individual, as he enters the satellite facility, will insert his meal card into a card reader. The information will then be sent to a central polling device which adds date, time, and location codes. Tape drives, attached to the central polling device, will thus record on magnetic tape all information required to account for rations served in each dining facility.

FIGURE 17 DATA COLLECTION SYSTEM



Each individual will be issued a plastic meal card (in lieu of DD 714 paper meal cards). The card will contain all required identification information--principally the individual's social security account number. The use of a punched hollerith code for all data is recommended in the interests of maximum system reliability at reasonable cost.

The following is a list of required equipment:

- (1) Badge (Credit Card) Readers -- with location identifier.
- (2) Variable Entry Recorders -- portable.
- (3) Central Polling Device -- with Date/Time Generator.
- (4) Tape Drives -- with Keyboards.

Equipment items (1) and (2) above are located in the dining halls and are connected by telephone lines to item (3). With such an arrangement, an individual's social security number can be recorded on magnetic tape at almost the same instant that his card is inserted in a dining hall badge reader.

FOOD PREPARATION

DECISION-MAKING PROCESS

The Food Preparation function is particularly complex due to the large variety of products which are processed and distributed. Frozen, chilled and ambient finished goods, as well as raw materials will be "processed" through the CFPF.

Production decisions will usually involve such factors as:

- (1) Determining how much product to make.
- (2) Assuring that raw materials (or rework stock) are available for the scheduled production runs.
- (3) Scheduling to optimize utilization of both labor and equipment.
- (4) A schedule assuring that finished goods are available as required.
- (5) Adjusting to unexpected disruption of any stage of the production cycle.

Volume, material availability and production schedules are examples of areas in which production decisions are influenced by or have significant impact on other functions.

INFORMATION REQUIREMENTS

Daily production levels will be established on the basis of economic production quantities, which require at least the following data:

- (1) Expected headcount.
- (2) Food selection/preference factors.
- (3) Raw materials inventory level.
- (4) Finished goods inventory level.
- (5) Batch size constraints.
- (6) Product characteristics (e.g., type, shelf-life, etc.).

The required information must be collected, analyzed, and in many cases reported on a daily basis; otherwise, costs can substantially increase or consumers' demands may not be satisfied.

Whereas, in the conventional system, the dining steward estimates future headcounts in but one facility--the CFPF Production Manager requires estimated headcounts in 48 dining facilities. Poor predictions by dining stewards had limited impact. However, poor predictions or decisions in the proposed CFPF can have a significant effect of much greater consequence. The production manager must also be provided with current raw goods inventories. Suppose, for example, that raw material is declared unusable with insufficient lead time to restock. Rapid substitutions must be made--particularly when this problem occurs on the morning the materials are required for preparation. An effective decision cannot be made without accurate feedback on existing raw material inventory.

MENU PLANNING

DECISION-MAKING PROCESS

There are perhaps three basic questions which are characteristics of this complex process known as planning a menu.

- (1) What to serve?
- (2) How often to serve each item?
- (3) How to prepare food?

Each of these questions implies a number of decisions that must be made, and requires information and data of various kinds.

INFORMATION REQUIREMENTS

Each CFPF installation is to have complete authority to change menus as long as specified cost constraints and minimum nutritional requirements are met. However, to maintain a consumer-oriented menu, planners must also be provided with several kinds of information. First, actual food selection data must be collected, analyzed and incorporated into the menu planning process. Each time that a menu item is modified (in terms of ingredients or formulation procedures), added or deleted from the menu, additional selection data will be collected. Periodic samples will be taken on all food items to monitor selection factors. Second, food preference surveys will be conducted on a periodic basis to provide preference data on a larger variety of foods than are contained in actual menus. In general, these surveys will provide partial answers to two questions:

- (1) Are there foods highly preferred, but not currently offered in the menu?
- (2) Is the preferred frequency of foods in line with the frequency with which they appear on the existing menu?

Menu planning decisions will also be based upon data obtained from the test kitchen results and taste panel evaluations of proposed menu and formulation changes.

SATELLITE FACILITY PERFORMANCE

DECISIONS AND RESPONSIBILITIES

In terms of maintaining a consumer-oriented food service system, some of the most crucial decisions are made by the dining stewards and the Satellite Manager. High quality, appetizing food can be produced by the CFPF, but it does not necessarily appear on the serving line in the same condition.

Therefore, the Satellite Manager must be able to take corrective action or recommend such, whenever consumer indices reflect inadequate performance at the dining hall level. He must also select and evaluate alternative courses of action to resolve consumer problems as they arise. Dining hall operating hours may, for example, have to be extended when and where excessive waiting times become a significant troop irritant.

INFORMATION REQUIREMENTS

Two prime data requirements are necessary to maintain a consumer-oriented food service system. First, consumer-oriented performance measures must be established. Second, performance on these criteria must be reported for each dining facility, among the most important of which are:

- (1) Attendance rates
- (2) Consumer acceptance
- (3) Cleanliness
- (4) Service

In a free access system, such as that proposed, "authorized meals" does not have the same meaning that it does in the existing food service system. Individuals, under the free-access concept, are not restricted to any particular dining hall. In one sense, the "authorized meals" for each dining hall in a free-access system would equal the total troop population on the post for each given meal. Computing attendance rates according to current practices would result in very low percentages which would be unrealistic and would have a negative impact upon the dining stewards' motivation. Thus a reasonable market will have to be defined for each dining facility. Units will be "assigned" to each facility based upon factors such as geographical proximity. Attendance rates can then be expressed as a percentage: the number of meals served divided by the number of individuals "assigned" to the dining facility for these meals. The Satellite Division will be responsible for establishing the reasonable market for each satellite facility.

Consumer acceptance can be quantified in several ways, e.g., periodic questionnaire interview surveys will be conducted to provide troop evaluations of food service in each dining facility.

Cleanliness and food quality information will be collected during regular quality control inspections, and reported as part of routine dining hall performance reports.

The most significant feature of the proposed information system is that these performance measures will be reported for each dining hall. Two aspects of this report deserve special emphasis:

(1) First, the performance measures contain consumer, as well as cost criteria. Cost and accounting data--so thoroughly reported in the existing system--are not the only indicators of dining hall performance, but the loss of customers is as visible as a loss of inventory items.

(2) Secondly, dining halls may be easily compared to each other with respect to the performance measures. These comparisons will be explicit and inadequate performance will be readily recognized.

SECTION V

ORGANIZATIONAL STRUCTURE AND STAFFING

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Although the food service system proposed in this report will reduce the skill level required at the dining hall, it will also result in a high degree of sophistication at the CFPF. This increased complexity will require new levels of civilian and military professional expertise to operate the system since it creates a major technical function, food preservation, that did not exist previously. It will also create a requirement to bring all activities within the food service system under the direct control of a single organization, i.e., subsistence activities will no longer be splintered between the troop Commanders and the Chief of Services.

Duties new to existing subsistence activities, i.e. those of providing a major service, managing a large number of facilities, and managing a large number of personnel with highly diversified skills, create a requirement for establishing a new Directorate, separate and equal in status to the other Directorates on post. Since this activity will provide both services and facilities and control all phases of the subsistence operations it will be called the Directorate of Food Operations. Figure 18 is a proposed organization structure showing its relationship with the other major post activities and figure 19 shows an organization structure for the Directorate of Food Operations. Appendix IV details the proposed TDA, for the 645 personnel required to run the system, listing each job and the recommended staffing. General duties for each area are as follows:

DIRECTORATE OF FOOD OPERATIONS (DFO)

The Directorate of Food Operations has complete responsibility for all subsistence activities on the installation including food service, subsistence, logistics and management of materials, equipment and facilities. The Directorate exercises control over operation of all dining halls in the food service system; establishes and publishes policies and procedures for operating the system; has overall responsibility for the technological aspects of food preservation; and is responsible for maintaining a high degree of customer satisfaction. The responsibility for the financial status and the overall performance of the food service system also rests with the Directorate.

SUBSISTENCE REVIEW COMMITTEE (SRC)

The Subsistence Review Committee assures that the food service system is responsive to the needs of the customers. Members are appointed by the installation commander. The chairman is the Commanding Officer or his designated staff alternate. The DFO

FIGURE 18
PROPOSED NEW ORGANIZATION STRUCTURE FOR FORT LEWIS

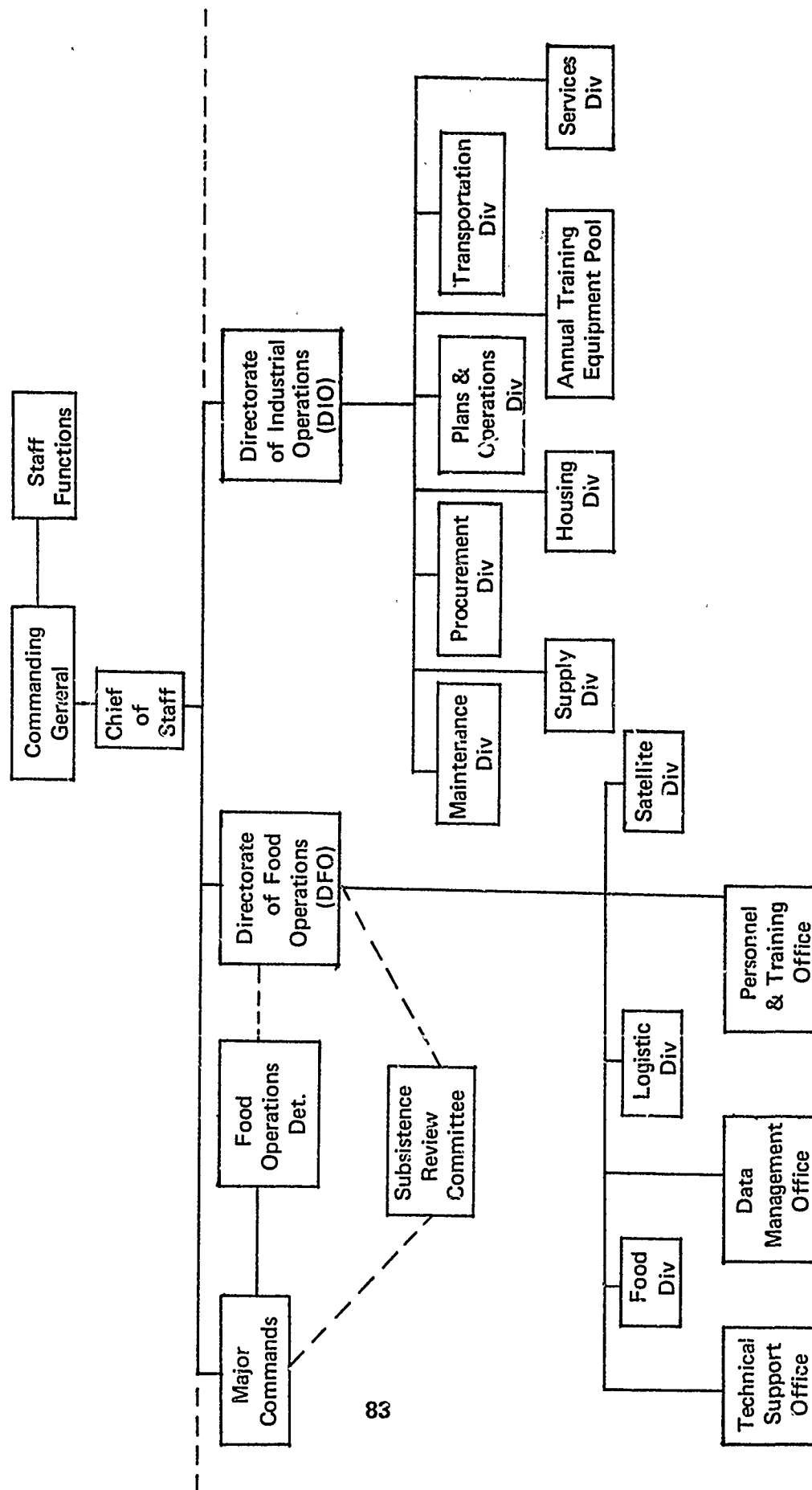
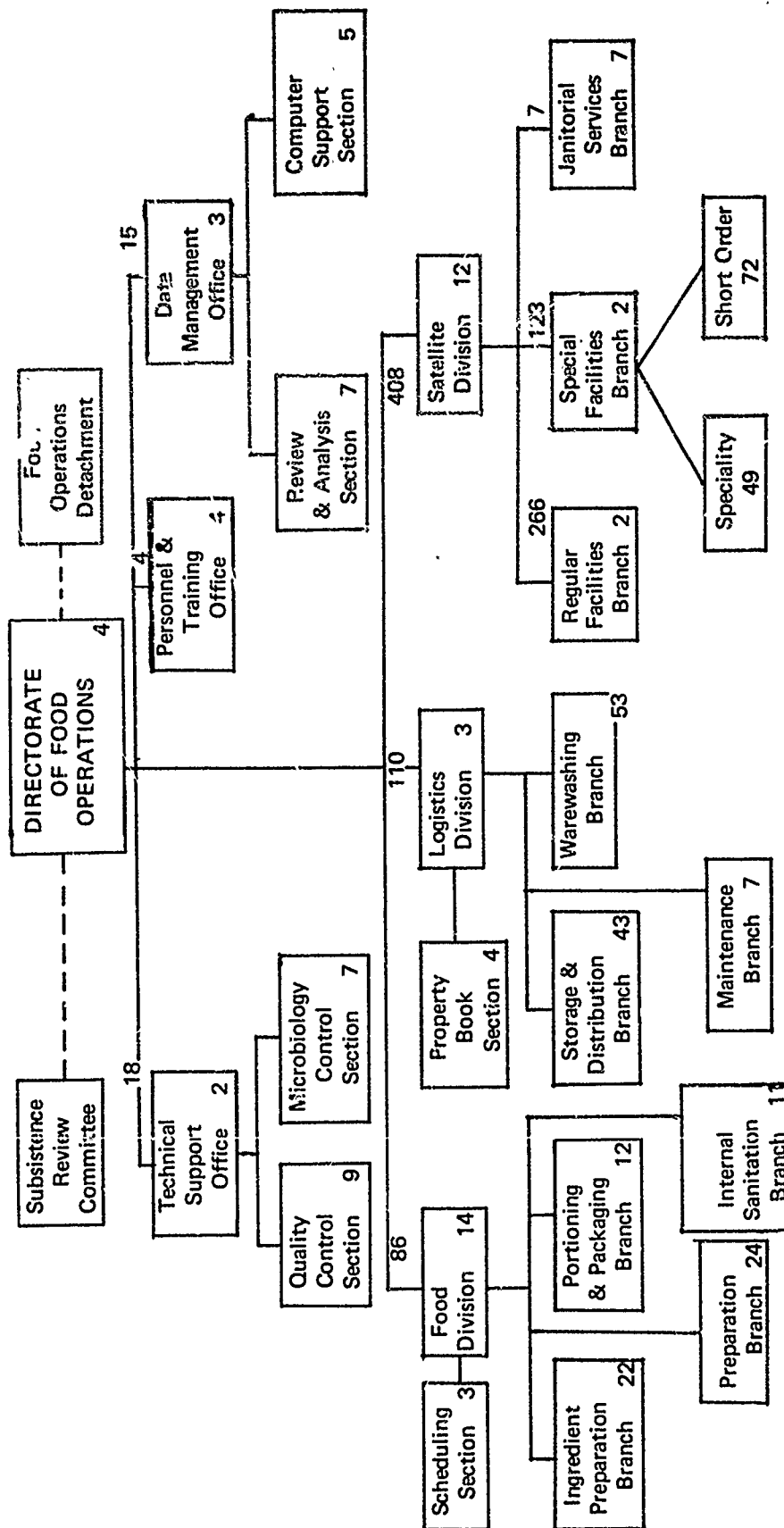


FIGURE 19
PROPOSED ORGANIZATIONAL STRUCTURE FOR MODERN FOOD SERVICE
SYSTEM CENTRAL FOOD PREPARATION FACILITY



Total Personnel 645

and installation surgeon are permanent members of the committee and are responsible for the administrative support. The remainder of the committee is distributed equally among officers, non-commissioned officers and enlisted men representing the troop population and such other functions as the commander deems appropriate. Meetings are held at least monthly. The committee is authorized to make recommendations concerning any part of the food service system.

FOOD OPERATIONS DETACHMENT

A Food Operations Detachment has command control over all military food service personnel while the supported TO&E units are in garrison. The detachment is not assigned to the DFO but provides the military personnel that operate the Directorate. This detachment is also responsible for transferring the necessary food service personnel to the TO&E units in the event of unit deployment.

TECHNICAL SUPPORT OFFICE

The Technical Support Office operates the quality control and microbiology control sections of the CFPF. This office plans, directs, and controls a broad program assessing the quality, wholesomeness, utility of the food, food preparation and food service for the Directorate. Additionally, it has major responsibility for the technological aspects of food preservation, and provides solutions to all technical problems with follow-up to verify the effectiveness of those solutions adopted.

Quality Control Section. This section has the responsibility for insuring that food is produced in accordance with the established food product standards. This includes the raw foods and the foods prepared at the CFPF, and recommending corrective action to the DFO when discrepancies are uncovered. The performance of this function requires the following:

- Sample and inspect the food products and conduct physical testing of both raw and processed foods and finished products.
- Conduct organoleptic evaluations of prepared foods at the CFPF.

- Adjust recipe formulations, processing procedures, and equipment utilization to correct product quality deficiencies and improve operational efficiency.
- Determine food waste and disposition of rejected, unused or overage food products.
- Conduct training for system equipment utilization, proper food service procedures and proper presentation of food on the serving line.
- Perform menu revisions and adjustment for nutritional constraints.
- Conduct inspections of warewashing equipment, dishware and all other items sanitized at the central warewashing facilities.

Microbiology Control Section. This section has the responsibility for maintaining the microbiological safety of all food products in the system. The performance of this function includes the following:

- Conduct all microbiological and chemical sampling and testing. Performs the sanitation inspections and temperature monitoring.
- Operates the laboratory and maintains contact with larger better equipped military laboratories to accomplish tests not within its capability.
- Establishes and maintains a dining hall rating system and conducts organoleptic evaluation of prepared food as it is presented on the serving line.

DATA MANAGEMENT OFFICE

The Data Management Office provides the management information systems support for the Directorate. It accumulates and analyzes operational data and provides reports containing the pertinent information to management so that problem areas are surfaced for solution. This office also performs the accounting, data processing, statistical, credit card, and external report functions.

Review and Analysis Section. This section is responsible for identifying procedural deviations, unusual variances, and other problems and bringing them to the attention of management for solution. Areas of concentration will be in verifying the accuracy of operating costs, attendance rates, production requirements, dining hall requisitions, disposition of food turned in by dining halls, and inventory levels. The section is also responsible for meal credit card issue/replacement records, identifies card misuse, and supervises the accounting for the Directorate. It reviews dining hall records in accordance with AR 30-1⁷ and other prescribed criteria and produces the required external reports.

Further, the Review and Analysis Section collects and analyzes the data on troop preferences, food selections and customer population to provide dining hall requirements for the Directorate, and determines and recommends improved merchandising procedures designed to increase dining hall attendance. It also conducts consumer surveys using specialized questionnaires and interviews at pre-established intervals and whenever significant changes in menus, recipes, or food handling procedures occur.

Computer Support Section. This section is responsible for operating the management information system for the Directorate. It receives and enters all raw data that is not collected by automated data collection devices, e.g. credit card readers; and it provides management reports. It maintains a direct working relationship with the installation management information systems office and assures that automated data collection equipment in the dining halls and CFPF functions properly. Examples of support are: inventory, cost analysis, and developing production and delivery requirements.

PERSONNEL AND TRAINING OFFICE

The Personnel and Training Office prepares and maintains job descriptions and personnel records for all civilian and military personnel assigned to the Directorate, including the requisition of replacements, preparation of efficiency reports, and administering the training and rotation program.

FOOD DIVISION

The Food Division is a major operating division, responsible for all food processed centrally including the ingredient preparation, food preparation, portioning and packaging,

and internal sanitation activities of the CFPF. The division is composed of the activities outlined below. It should be pointed out that each branch is responsible for the operation, cleanliness and preventive maintenance of the equipment which is assigned to the branch.

Ingredient Preparation Branch. This branch weighs and measures, tempers, thaws, bones, cuts, washes, trims, prepares, packages, labels, assembles, and issues ingredients according to prescribed schedules and recipes. It also maintains separate areas for nonperishables, vegetables, meats, and poultry, and controls the assignment of branch personnel to minimize cross-contamination.

Preparation Branch. This branch prepares and cooks all the foods which are processed at the CFPF, supervises work centers which prepare and/or cook, and is responsible for insuring that the foods are cooked at the proper temperatures using established formulations and procedures.

Portioning and Packaging Branch. This branch portions, fills, combines, pans, bags, and freezes or chills the prepared foods, including the weighing and labeling of the packaged foods.

Internal Sanitation Branch. This branch is responsible for achieving the standards of sanitation required in the CFPF.

Scheduling Section. This section plans and schedules food preparation times and quantities in a manner that will assure a uniformly high level of food quality, minimize food losses, and make effective use of equipment and storage space. It is also responsible for supplying food production information and data to the Data Management Office.

LOGISTICS DIVISION

The Logistics Division is a major operating division responsible for the storage and distribution of all food products and the washing and distribution of all dishware utilized by the dining halls. The following is a list of the functions performed by the various branches of this division.

Storage and Distribution Branch. This branch requisitions, receives, stores, issues and inventories perishable and nonperishable foods and tableware supplies. This also

includes the assembly of food products for distribution to the dining halls as well as receiving raw ingredients at the CFPF. This branch is also responsible for the development and maintenance of the delivery and pickup schedules for the dining halls.

Warewashing Branch. This branch washes, sterilizes and sorts all tableware, trays, racks, transporters, and silverware used by the dining halls. It is also responsible for the continuous inspection of all washed items to insure cleanliness.

Maintenance Branch. This branch arranges for and schedules with the Facilities Engineer all maintenance of the CFPF and dining hall facilities including installed equipment not covered by contract. It operates the high pressure steam boilers, is responsible for organization maintenance on the transporters and performs emergency repairs on CFPF equipment to prevent outage of critical equipment during operations.

Property Book Section. This section maintains the administrative control of all nonexpendable equipment required in the CFPF. In addition, it requisitions tableware supplies, as required, to support operations and to maintain prescribed levels of supply, and performs required stock control operations as required by AR 710-2.⁹

SATELLITE DIVISION

The Satellite Division is a major operating division, responsible for the management and operational control of all satellite dining halls and including inventories and assignment of personnel. It has major responsibility for promoting consumer acceptance and increasing dining hall attendance. This division also maintains an operational field kitchen for training purposes and provides field food service, as required.

Regular Facilities Branch. This branch supervises all the regular A-ration dining facilities on the installation. It insures that foods are received, stored, prepared and displayed in a manner that will meet sanitary and nutritional standards and encourage a high degree of consumer acceptance. It also assures that established headcount procedures are followed, and monitors stock rotation and turn-in of unused food/ingredients.

Special Facility Branch. This branch supervises all the short order and specialty facilities on the installation. It insures that foods are received, stored, prepared and

displayed in a manner that will meet sanitary and nutritional standards and encourage a high degree of consumer acceptance. It also assures that established headcount procedures are followed, and monitors stock rotation and turn-in of unused food/ingredients.

Janitorial Services Branch. This branch performs the heavy cleaning for all the dining halls on a regularly scheduled basis.

SECTION VI
COST BENEFIT OF CFPF

This section of the report presents a summary of the various cost factors which comprise the annual operating costs of both the proposed CFPF as well as a conventional system. Much of the data presented in this section is summarized from a previous NLABS report⁶. A comparison of the annual operation costs of the conventional and CFPF systems is shown in Table IX. The resultant annual cost savings yielded by the CFPF is \$1,923,000.

DESCRIPTION OF CONVENTIONAL SYSTEM

The conventional system is a decentralized system operated at the small unit level and supported by the usual ration breakdown and services office personnel. All food is prepared and served on-site at the dining hall. The system is based on 48 dining halls staffed in accordance with TDA staffing regulation AR 570-21⁰ as it applies to the number of customers that are expected to attend. These 48 dining halls are the same facilities selected for the CFPF system; however, in this case, no modifications to the dining hall kitchens are included. The staffing levels have been adjusted for a 40-hour workweek for cooks and civilian KP's.

CONVENTIONAL SYSTEM OPERATING COST

FOOD

Food costs utilized are based on recent Basic Daily Food Allowance reported by Fort Lewis. The expected total headcounts and existing food cost data resulted in an estimated total annual food cost of \$4,971,000.

LABOR

The total labor cost was computed as \$7,622,000. This cost is also based upon the staffing levels shown in Table X and existing salary data for the types and grades of personnel required to operate this system. The specific numbers and types of personnel, dining hall management, cooks, and civilian KP's were based upon the number of dining halls, expected attendance, and TDA allowances for these factors adjusted for a 40-hour workweek for all personnel and improved productivity from civilian KP's.

TABLE IX
ANNUAL OPERATING COSTS FOR CONVENTIONAL
AND CFPF FOOD SERVICE SYSTEMS (\$1000)

Cost Factor	Conventional	CFPF
Food	4,971	4,225
Labor	7,622	5,561
Maintenance	198	258
Utilities	58	96
Procurement	64	55
Distribution	167	207
Laundry and Cleaning Supplies	158	110
Miscellaneous (Replacement of Equipment, Utensils, etc.)	85	175
Amortization (Facilities, Equipment, etc.)	0	713
Total Cost	13,323	11,400
Annual Cost Savings	—	1,923

TABLE X
MANPOWER REQUIREMENTS FOR CONVENTIONAL
AND CFPF FOOD SERVICE SYSTEMS

Manpower Category		Conventional	Central Food Prep & Warewashing
Military			
Management:	Officer and warrant officers	10	11
	Non-commissioned officers	7	24
	Dining Hall Stewards	48	48
	Cooks	418	193
	Dining Room Attendants (KP)	None	None
	Vehicle Operators and Assistants	18	27
	Other	2	16
Civilian			
	Technical Management	3	9
	Technical	1	13
	Wageboard Supervisors	2	5
	Wageboard Skilled Personnel	1	21
	Cooks	None	48
	Warewashing Attendant	None	44
	Dining Room Attendant	427	161
	Clerks and Typists	6	13
	Other	8	12
TOTAL PERSONNEL		951	645

OTHER OPERATING COSTS

Based on previous studies,⁶ all other costs for the conventional system amount to \$730,000 annually. These include utilities, repair and maintenance, transportation, laundry, cleaning supplies, etc.

CFPF OPERATING COSTS

FOOD

Food costs are estimated to be \$4,225,000 annually and reflect a 15% cost savings which would be realized through the increase in raw food yield at the CFPF. These projected savings are based upon actual operational experience with similar systems in military, institutional, and airline food service operations.

LABOR

Labor costs are estimated to be \$5,561,000 annually. This represents a total labor force of 645 civilian and military personnel as shown on Table X. This level of staffing is based upon a detailed analysis of work sampling data collected in the dining halls during an experiment involving central food preparation and warewashing conducted at Fort Lewis in 1971; the menu; food processing equipment capabilities; quality control and sanitation requirements and transportation activities required to successfully operate this system. A significant factor which should be emphasized with regard to this system is the 22 civilian technical and management specialists which are required at the CFPF due to the increased complexity of the food processing, sanitation and management information system.

OTHER OPERATING COSTS

All other operating costs for the CFPF system amount to \$901,000 annually. These include utilities, repair and maintenance, transportation, laundry, cleaning supplies, etc.

AMORTIZATION

Amortization of facilities construction and equipment are included in the operating cost. The cost of capital is 6%, building life is 30 years, food service equipment life is 12 years and the management information system equipment life is 8 years.

CAPITAL INVESTMENT COST

The CFPF, as shown in Table XI, would require a capital investment of \$7,453,559. This cost represents the construction of the CFPF and central warewashing facility, distribution equipment for the delivery of food products and dish ware to the dining halls, and modifications to the kitchen area of all 48 dining halls. These dining hall modifications will increase the frozen and chilled food storage capacities, provide the capability to finish precooked and preprepared foods, and enlarge the loading docks. A detailed discussion of the dining hall modifications are presented in Section III of this report.

TABLE XI
CFPF CAPITAL INVESTMENT COST*

Cost Factor	Cost(\$)
Central Food Preparation and Warewashing Facility Construction	3,056,377
Equipment for Central Facility	3,298,066
Modifications and Equipment (48 Dining Halls)	999,186
New Vehicles and Modifications to Existing Vehicles	99,930
TOTAL COST**	7,453,559

*These figures do not include \$1,104,000 for dining hall refurbishment, which is recommended for improved troop morale, but is not essential to the central preparation or vendor supplied food service systems. These figures also do not include Fort Lewis's estimate of \$2,200,000 for utilities upgrading which would be part of an overall Fort Lewis facilities improvement program including both dining halls and barracks.

**These figures reflect the construction and equipment costs in effect during mid year 1972. The effect of price escalation cannot be predicted; however, in the recent past costs for similar systems have increased at a rate of 7 to 10% per year.

SECTION VII
IMPLEMENTATION CONSIDERATIONS
AND SUMMARY

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PERSONNEL QUALIFICATIONS AND OPERATING PROCEDURES

While the preliminary engineering data provided in this report will serve as a basis for the architectural and engineering work required in implementing construction of the CFPF at Fort Lewis, it should be noted that a commensurate and parallel effort will be required in designing the accompanying "software" and developing an interface with other systems if the success of the system's operation is to be ensured.

Areas of particular concern which require special attention and development of new procedures, new operating manuals for the CFPF are discussed below:

STAFFING

To provide effective management for the CFPF, qualification requirements for the supervisory and technical positions should stipulate formal education and relevant experience in the food processing industry, particularly for personnel in production, maintenance and quality control.

PREPARATION TECHNIQUES

Since the food processing equipment used in the CFPF is totally unlike equipment normally found in existing Army kitchens, food preparation techniques will need to be specified for the equipment selected, and ultimately a totally new set of recipes and operating procedures will have to be developed for use in the CFPF. In addition to equipment differences, the inter-relationship and inter-dependency of product formula, packaging, preservation methods, shelf-life requirement and reconstitution techniques must be recognized in the development of product preparation specifications.

FORMULATION

In advance of the development of product manufacturing specifications, product recipes and formulation should be reviewed and/or developed for the following purposes:

- (1) Simplification of preparation
- (2) Adaptability to new cooking methods proposed
- (3) Compliance with minimum storage life requirements

- (4) Freeze-thaw stability and adaptability to reheating methods to be used.

TRAINING

The complexity of the proposed system and the new types of job responsibilities which it creates require that personnel who staff the system be especially trained for this purpose. Civilian and military personnel with appropriate background training will need to receive specialized instruction to work in the areas of food production, equipment maintenance and repair, logistics and operational control, and quality and sanitary control.

MAINTENANCE

The smooth operation of the CFPF will require a continuous program of preventive maintenance. A complete maintenance manual for the CFPF will be required in advance of the commencement of operations.

FOOD SUPPLY

The CFPF will not operate on a day to day, meal to meal basis, since it will prepare food up to 45 days prior to actual use. This preparation will require a major new technical function, i.e. food preservation. The food supply system will, therefore, have to adjust to handle CFPF. For example, the procurement system for subsistence will be expected to provide fresher foods. This is due to the fact that even frozen foods have a finite shelf-life and CFPF requires some of this for additional storage after preparation. A frozen food item nearing the end of its storage life will not produce a quality product if thawed, processed, refrozen and held for an additional period of time. In addition, the federal stock catalogue for subsistence will be expected to provide larger package sizes than are currently available.

INTERFACE BETWEEN GARRISON AND FIELD FEEDING

In the present system equipment issued for the preparation of food in the field is essentially an adaption of equipment used in the garrison facilities. Each unit maintains as part of its organic resources, field food preparation equipment. Further, the staffing levels¹⁰ for Army TO&E units which have a field feeding requirement are identical for both garrison and field operations.

It is important to differentiate between the two basic types of field food service requirements which exist in the Army today:

- The first relates to the requirement to provide food service in the field for training purposes. In this case the requirement is of short duration, usually between 24 and 72 hours and usually within 5 to 10 miles from the Army installation.

- The second relates to the requirement to provide food service in the field under combat conditions. In this case the duration of the requirement is highly variable, but probably much greater than 72 hours, and there would be no garrison installation nearby. All Army TO&E units, therefore, must retain a capability to provide food service under both of these field conditions.

SYSTEMS ANALYSIS

During the systems analysis study of garrison food service at Fort Lewis,² it became obvious that much of the guidance on field feeding provided in TM 10-405¹⁵ was not followed in day to day operations. Surveys of a number of TO&E organizations verified that, as a matter of practice, when combat type units go to the field to train at a CONUS installation, the food is supplied directly from the unit dining halls. This is accomplished by preparing the food and transporting it hot in mermite cans. Virtually all of the food service personnel surveyed indicated that the use of the field equipment for short periods of time was impractical and would create an excessive work load. In some cases it had been over twelve months since the unit food service personnel had actually operated in the field using the field equipment.

MODERN FOOD SERVICE SYSTEM

The design of the CFPF system defined in this report was accomplished with full knowledge that it must interface with existing field food service requirements. Since the CFPF system results in significant manpower savings and requires a new management structure, undoubtedly many Commanders will wonder what effect this will have on their field capability. However, in the final analysis the CFPF system will provide an increase in the operational flexibility of TO&E units as compared to the present system.

The organizational structure of the CFPF system places all food service personnel, including those who service TO&E units, under the "Directorate of Food Operations".

In the case of field food service for training purposes in the proximity of the garrison installation, food will continue to be supplied from the dining hall with one significant difference. In addition to supplying food in a hot condition, food may now also be supplied to the field in either a frozen, or chilled condition and reheated on-site in the M-59 range. In any case, insulated transporters, which have the capability of being airlifted or trucked, would be utilized. The modern system, therefore, would support all field requirements while the unit was stationed in garrison.

TO&E FOOD SERVICE PERSONNEL

Under the new CFPF system all military food service personnel are assigned to the Food Service Detachment. In the event that one of the TO&E units is deployed to a combat or crisis situation overseas, the Food Service Detachment will provide each unit with a nucleus of trained, senior level, food service personnel from his available resources. In order to bring the units up to their authorized TO&E staffing, low skill food service and KP personnel could be provided either from other Army units in the United States or from training posts. This method is presently used to staff TO&E units at their 100% authorized levels, in time of deployment, for other specialized skilled personnel when the unit has been operating in a peace-time posture at a reduced staffing level.

FIELD TRAINING FOR FOOD SERVICE PERSONNEL

It is very important to note that the CFPF organizational structure provides for regularly scheduled training of food service personnel on field equipment. The Personnel and Training Office will arrange the training schedule of all military food service personnel so that as a minimum, they will receive two full weeks of field training each year in order to maintain their proficiency. This training would not only include the preparation and service of food using the current field equipment, but also instruction in the assembly, disassembly and cleaning of this equipment. A special training facility will be made available for this purpose. As a result of this continuing training program, many TO&E unit food service personnel will be better trained in the use of field equipment than they are at present.

MANAGEMENT INFORMATION SYSTEM (MIS)

Four primary problem areas with the MIS can be identified. They are:

- (1) Obtaining Required Authorizations
- (2) Training
- (3) Interface
- (4) Auditing Standards.

Before the CFPF information system can become operational, authority will be required to procure ADP equipment, adopt new procedures, add new reports, delete old reports and forms, and develop the required software. Specifications will have to be written and approved in the area of meal cards issued in lieu of the present paper meal card (DD 714).

In the second area, training will have to be planned and conducted with respect to all phases of the new information system. Equipment operators will have to be trained. Dining stewards will have to be thoroughly indoctrinated with respect to use of new reports and forms. They will also have to become familiar with new headcount recording equipment. Training will be the most crucial and time-consuming implementation problem area.

The new CFPF information system also has substantial impact on several other existing systems. The BASEOPS programs and priorities should be expanded to include the computer time required for CFPF data processing.

Finally, new accounting standards will have to be established. Audit tests, now expressed qualitatively in AR 30-17 will have to be restated in quantitative terms so that appropriate computer programs can be developed. Since the CFPF information system contains new software, new procedures and audit tests will have to be developed to assure that the programs are functioning properly.

DINING HALL ALTERATION REQUIREMENTS

Basically there are potentially two steps to the successful implementation of the modern food service system at Fort Lewis. Both require consideration in the design of

satellite dining facilities. One initially effects the minor alteration of existing facilities to improve serving lines, decor and furnishings, and the other affects construction of CFPF's and the necessary alteration of existing facilities to accommodate satellite operations.

Each of these two potential steps could possibly receive funding from different appropriations, subject to different regulations and constraints. Construction of the CFPF and the work necessary to alter existing facilities to satellite facilities should be funded as one project from Military Construction Appropriations (MCA), subject to the constraints discussed in AR 415-15¹¹. The improvements to serving lines, decor and furnishings, however, will most likely be funded from Operations and Maintenance Appropriations (O&MA) subject to constraints on the type and scope of work as discussed in AR 415-35¹², Minor Construction, and AR 420-10¹³, Facilities Engineering.

Further, it is probable that the two steps discussed above would be effected separately ; thus, the designs must allow for the improvement of serving lines, decor and furnishings at one time (e.g. FY 73), and the accomplishment of construction alteration to CFPF-Satellite operations at another time (e.g. FY 74 or FY 75). The design concepts for the satellite dining facilities were developed with this two-step activity in mind.

Construction is generally defined as the erection, installation or assembly of a new facility; and the expansion, alteration, conversion or replacement of an existing facility. Construction or erection best defines the work required for the CFPF. The term alteration best defines the work proposed for bringing the existing dining halls on line as satellite facilities. Alteration is described as that work required to adjust interior arrangements or other physical characteristics so that a facility may be more effectively adapted or utilized for its presently designated functional purpose. (Functional purpose is categorized by facility type in AR 415-28)¹⁴. This includes equipment installed in and made a part of an existing facility. Some examples of alteration costs include the cost of work required to connect equipment (e.g. electrical and plumbing work), the cost of permanent equipment made a part of the facility (e.g. hoods), the cost of demolition, and construction work (e.g. walls, acoustics ceilings, fixed partitions, new doors and restroom fixtures), and the cost of work required to update utilities serving the facilities to be altered.

The 1953 and 1957 vintage facilities are most adaptable to the two-step activity discussed above. First, dining hall improvements could be made while the kitchen remains essentially intact. At a later time alterations could be made to bring about a modern

satellite facility. To do this, the design concepts allow for the replacement of the dishwashing facility with a new dry storage room and a janitor's closet. The vacated dry storage room is removed to provide new space for freezers close to the service dock. A new door between the kitchen and the dining area is provided to ease the flow of soiled tray transporters to and from the dining room and the service dock. And, the existing janitor's closet is converted to a second restroom providing for both men and women employees as prescribed by DOD criteria.

With regard to the initial dining hall improvements, there are certain constraints associated with O&MA appropriations that should be understood. First, installation of new serving lines, even though portable, will require some minor construction (alteration) for plumbing and electrical connections, etc. Minor construction can be funded with O&MA appropriations, but approval of such construction is limited to \$50,000 per project. And if the construction is applicable to two or more similar real property facilities at the same installation requiring concurrent work, all will be grouped together into a single project (AR 415-35)¹². According to AR 415-28,¹⁴ there are two classes of real property related to dining facilities. These are facilities attached to barracks, and mess facilities detached. Thus, minor construction in the 48 dining facilities at Fort Lewis would be one project since all include work of the same type on similar facilities (all are attached to barracks). Any project estimated to exceed \$50,000 would have to meet the criteria for urgency described in AR 415-35,¹² and then it could not exceed \$300,000.

Secondly, painting, new lighting and new floor surfaces will be required. These are normally considered as maintenance and repair as defined in AR 420-10¹³. Maintenance includes recurrent work required to preserve or restore a real property facility to such condition that it may be effectively utilized for its designated purpose. It also includes work to sustain existing components such as by painting. Repair is the restoration of a failed or failing real property facility or component by overhaul, overlay or replacement of constituent parts or materials damaged by action of the elements, or wear and tear in use. This includes correction of conditions which adversely affect use of the facility for its designated purpose due to nonconformance with current prescribed standards and codes where such work, for reasons of economy, should be accomplished concurrently with restoration. A maintenance or a repair project estimated to exceed \$300,000 will require prior approval of Department of Army.

Maintenance, repair and minor construction (alteration) can be considered as three single projects even though they may be accomplished simultaneously as an integrated

undertaking. If this were the case, dining hall improvements using O&MA funds in the 48 facilities at Fort Lewis would be constrained as follows:

1. Construction: \$50,000 or about \$1,000 alterations per dining facility for installation of portable equipment.
2. Maintenance: \$300,000 or about \$6,000 per facility for painting, etc.
3. Repair: \$300,000 or about \$6,000 per facility for new floor surfaces, lighting, etc.

Purchase of portable equipment and furnishings is exempt from these constraints, requiring only the authorization and approval of Department of Army Troop Support Agency.

These figures provide an example of funds allowable under O&MA appropriations. It was found from previous experience at Fort Lewis that larger expenditures were required for minor construction (alteration), repair and maintenance in the older permanent (1938) structures in the Garrison Area than in any of the other facilities. The cost data shown in Table V and in Appendix III also reflect this fact. These facilities are simply outmoded, and require more major modifications than their counter-parts in the Division Area. Also there is no standard plan for the facilities in the Garrison Area. Therefore, each satellite facility in that area will require more special attention and detail in design and alteration.

The 1941 facilities also pose a problem that should be handled cautiously. These facilities currently need, but because of their temporary construction and obsolescence, do not warrant major investments. As with the 1938 facilities, these facilities could demand a disproportionate share of the funds described above; and as a result the better facilities, which are also the better investments, could be left unfortunately short of funds to achieve acceptable dining standards. It is recommended that the major work necessary on the older facilities be included as part of the MCA project for CFPF — satellite/construction-alteration.

SUMMARY

This discussion of implementation considerations concludes the presentation of the detailed definition of a modern food service system designed specifically for Fort Lewis, Washington. The design will provide significantly improved service to the military customers and substantially reduce manpower requirements.

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APPENDIX I
EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION
AND WAREWASHING FACILITY

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY

I. Reclaim Area

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
1	Reach-in refrigerator 22-25 cu. ft. capacity, self-contained, interior: Stainless steel. Front/ Sides: Stainless steel or vinyl-coated steel.		Elect: 115 v 60 cy. 1 ph.	674	1	674
2	Reach-in freezer 22-25 cu. ft. capacity, self-contained, interior: Stainless steel. Front/ Sides: Stainless steel or vinyl-coated steel.		Elect: 115 v 60 cy. 1 ph.	799	1	799
3	Table, stainless steel, 8' x 30", N.S.F., 6" splash back along 2 short, 1 long edges. 14" dia. circular hole, with 3" smooth welded chute. Hole in center from end to end and to within 3" from rear splash back.		None	438	1	438

TOTAL FOR I - RECLAIM AREA

1,911

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

II. Waste Disposal (Food Preparation Area)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
1	Can/bottle crusher	Up to 2 Tons/Hr.	Elect: 5 HP motor 208 v. 60 cy. 3 ph.	2,750	1	2,750
2	Heavy-duty paper and carton shredder	2000 Lbs./Hr.	Elect: 15 HP motor 208 v. 60 cy. 3 ph.	7,850	1	7,850

TOTAL FOR II - WASTE DISPOSAL (FOOD PREPARATION AREA) 10,600

III. Vegetable Cleaning Area

1	Even-flo regulator, elevator, to feed rod reel washer, with dump bin.		Elect: 1/2 HP variable speed motor drive	2,335	1	2,335
2	Rod, reel washer, for root vegetables. 304 ss, 2B finish except standard drive components. Discharge: 36" height. Rod spacing: 1/4".		Elect: 1/3 HP gearhead motor drive Water: cold Drain:	2,460	1	2,460

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

III. Vegetable Cleaning Area (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
3	8' x 24" inspection belt troughing type.		Elect: 1/2 HP motor	2,033	1	2,033
4	Even-flo regulator, elevator, to hopper near ceiling.		Elect: 1/2 HP motor	2,335	1	2,335
5	Hopper, with double spout, to 2 peelers.			500	1	500
6	Potato peelers, with carborundum abrasive non-corrosive construction, with removable peel basket.	Approx: 50 lbs. hard root vegetables per minute per machine	Elect: 3/4 HP motor 115 v. 60 cy. 1 ph. Water: Inlet Water Outlet: Drain	1,047	2	2,094
7	Troughing inspection trimming conveyor, 8' x 24" with hinged chute.		Elect: 1/2 HP variable speed drive	2,033	1	2,033

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

III. Vegetable Cleaning Area (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
7a	Even-flo regulator, elevator to dip tank.		Elect: 1/2 HP variable speed motor	2,235	1	2,235
11	Inspection trimming conveyor (24" wide) with boards on side, and mountings for coring machines, with hinged chute, leading to leafy vegetable washer.		Elect: 1/2 HP variable speed motor	2,251	1	2,251
12	Coring machines, for manually coring lettuce, cabbage, celery.		Elect: 1/2 HP motor 110 v. 60 cy. 1 ph.	535	2	1,070
13	Washer, for leafy vegetables. Washes with circulating water. Soil drained off. Vegetables mechanically dumped into receiving basket by mechanical tilt.	Approx. 27 lbs. light leafy vgs. per 2 to 4 min. wash	Elect: 2 1/2 HP motor for circulation. 1/2 HP motor for tilt. 208 v. 60 cy. 3 ph. Water: Cold, Hot Drain:	6,200	1	6,200

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

III. Vegetable Cleaning Area (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
13a	Centrifuge, for removing surface water from washed leafy vegetables.	Capacity: 50 lbs. Estimate: 300 lbs./hr.	Elect: 2 HP motor 208 v. 60 cy. 3 ph.	1,724	1	1,724

10	Table. Same as for IV 10 to contain 2 coring machines (11 - 12).		None	418	1	418
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14	2-Compartment sink with 1 drainboard (on right side) approx: 24" x 84".		Water: Hot Cold Drain:	746	1	746
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TOTAL FOR III - VEGETABLE CLEANING AREA 28,434

IV. Vegetable Preparation Area

8	DiL tank (modified ferris wheel type) to immerse cleaned, trimmed, cut vegetables in anti-oxidant solution to have 30"d x 18" w cylinders; 304 SS, 2B finish. 36" discharge height and double bagging discharge.		Elect 1/4 HP variable speed motor/drive Water: Cold Drain:	3,220	1	3,220
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EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

IV. Vegetable Preparation Area (cont'd)

Item Number:	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
9	Vegetable dicer, chopper chopper, shredder equipped with: 5/16" 1/4" slicing parts; 3/4 dicing grid; whole cabbage head insert, and 1/16" slicer, shredder blade combination.	2 Tons per hour	Elect: 1 HP motor, 208 v. 60 cy. 3 ph.	2,694	2	5,388
10	Table, 3' x 8' to accommodate dicer/slicers (IV-9). Stainless steel with undershelf, 2 drawers.		None	418	1	418
15	Flake ice machine and storage bin. Ice- maker connected directed to storage bin, and mounted as single unit, self-contained.	Produce: 208# flaked ice per hour/mach. Storage capacity: 1000 lbs/machine	Elect: 208 v, Compressor: 5 HP Evap. Motor: 2 @ 1/2 HP ea. Condenser: water cooled Refrigerant F12;19# Plumbing: Evap: 1/4" water inlet 1/2" drain Machine: Condenser water inlet: 3/4 F.I.P.T. Drain: 3/4 F.I.P.T.	6,434 (price includes 4 yr warranty and estimated freight)	2	12,868

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

IV. Vegetable Preparation Area (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
16	Platform scale, pendulum. Dial to 300 lbs. Total capacity: 450 lbs.		None	1,600	1	1,600
17	Sink, one compartment, no drainboard. Approx. 21" x 18".		Water: Cold Drain:	224	1	224

TOTAL FOR IV - VEGETABLE PREPARATION AREA 23,718

118

V. Ingredient Room

1	Ingredient work table, 3' x 8' with shelves on top, 6 bins, underneath. All ss.		None	3,822	1	3,822
2	Ingredient work table, 3' x 8' with 2 rows of spice drawers above and 6 bins underneath. All ss.		None	4,882	1	4,882
3	Electric can openers. Institutional, heavy duty type.	Average: #10 cans: 6 per minute; 360 per hour #303 cans: 9 per minute; 540 per hour	Elect: 115 v. 60 cy. 1 ph.	59	3	177

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

V. Ingredient Room (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
4	Bench scale, scoop type. Beam: to 16 oz. in 1 oz. Beam: 1# to 10# + hand wts. to total 20# or approximate equivalent.		None	425	2	850
5	Bench scale, from 1# to 50# in 1 oz. graduations, or approximate equivalent. Pendulum type 20" x 20" platform, include adjustable wheeled stand.		None	866	1	866
6	Platform scale, portable. Pendulum or equivalent in ounces to 100 lbs. May be beam or dial with wheels. Platform: 22" x 22" with tare bar.		None	1,105	1	1,105

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

V. Ingredient Room (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
1	Over-under scale, to 5 lbs. Chart: 1 oz x 1/8 oz. over/under. Tare beam: with test wts: 2 of 1#; 1 of 2# End Reading or approximate equivalent.		None	275	1	275

TOTAL FOR V -- INGREDIENT ROOM 11,977

120

VI. Dry Storage Area

1	Floor scale 4' x 4' platform, semi-frame. Chart: 1000 lbs. in 1 lb. graduations, plus tare beam. Capacity beam. Total capacity: 1600 lbs.		Utilities: None Requires floor pit	1,704	1	1,704
2	Bean stoner (specific gravity separator). Separates stones from dried beans, etc. by combination of vibration and air flotation.	Capacity, variable according to size and density up to 3 tons per hour.	Elect: 5 HP motor 208 v. 60 cy. 3 ph. Exhaust duct for air/dust	2,195	1	2,195

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

VI. Dry Storage Area (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
3	Even-flow regulator elevator, to feed stoner (VI-2).		Elect: 1/2 HP variable speed motor drive	2,335	1	2,335

TOTAL FOR VI -- DRY STORAGE AREA

6,234

VII. Meat Thawing Area

1	Microwave tunnel, for continually tempering frozen meat to 25°F. Includes 208 V to 460 V transformer.	Tempers approx. 2500 lbs. raw boneless beef, in 60# packing carton, from 0° to 25°F per hour. Other items vary.	Elect: 25 KW 208 (-> 460) v. 60 cy. 3 ph.	60,750 (price includes estimate of \$750 for the transformer by equipment manufacturer)	1	60,750
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TOTAL FOR VII -- MEAT THAWING AREA

60,750

VIII. Kitchen

1	Kettles, stainless steel; steam heated, 2/3 jacketed 100 gal. capacity. Agitated; tilting; with cover for 100 p.s.i. ASME.		Steam: Inlet; Exhaust Elect: 1 1/2 HP motor	5,423	4	21,692
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EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

VIII. Kitchen (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
2	Kettle, stainless steel; steam heated, 2/3 jacketed 80 gal. capacity. Agitated; tilting; with cover for 100 p.s.i. ASME.		Steam: Inlet; Exhaust Elect: 1½ HP motor	5,370	1	5,370
5	Feed conveyor to dusting machine (VIII-6); variable speed; on casters.	15 to 45 F.P.M.	Elect:	1,735	1	1,735
6	Dusting machine for predusting poultry parts prior to breading/battering in VIII-7. Variable speed; on casters.	4000 lbs. chicken parts per hour. Discharge conveyor 15 to 43 F.P.M. Hopper capacity: 200 lbs. flour	Elect: 1 HP motor 208 V. 69 cy. 3 ph.	6,970	1	6,970
7	Batter & breading machine, with poultry flip and flour modifications. Variable speed; on casters.	Up to 25,000 mixed poultry parts per hour Belt speed 15 -45 FPM	Elect: Total: 2½ HP motor	12,110	1	12,110

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY

VIII. Kitchen (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
8	Deep fat fryer for poultry-continuous. For preliminary cooking of poultry parts prior to final cooking in VIII-11.	Estimated capacity: 1400 lbs./hour on 28 sq. ft. of frying surface.	Elect: 165 KW 208 v. 60 cy. 3 ph. Exhaust Hoist: for conveyor during cleaning	17,754	1	17,754
9	Filter, for filtering frying oil in VIII-8.		Elect:	9,375	1	9,375
10	Transfer conveyor to deliver poultry parts from deep fat fryer, VIII-8 to infrared cooker, VIII-11. Conveyors make 2 right angle turns.		Elect: 3 motors	7,255	1	7,255
11	Continuous infrared cooker to receive precooked poultry parts from deep fat fryer, VIII-8. Variable speed drive. Belt continuously washed. CO ₂ fire control system integral incorporate.	Approximate output: 1500 lbs. poultry parts per hour.	Elect: 300 KW, 208 v. 60 cy. 3 ph. Water: 5 gal/min. at 40 p.s.i. Exhaust:	40,000	1	40,000

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

VIII. Kitchen (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
12	Bacon slicer automatically slices slabs of bacon and delivers slices to fryer (VIII-13) properly spaced and sliced to specified thickness.	Up to 50 slices per minute. Thickness control to 5/16".	Elect: 1/3 HP motor 115 v. 60 cy. 1 ph.	3,670	1	3,670
13	Deep fat fryer for bacon, continuous, variable speed. To have submerger belt and 10 foot discharge conveyor, with top conveyor for draining excess frying fat. 13 square feet of frying surface.		Elect: 208 v. 60 cy. 3 ph. 75 KW Exhaust ducts	13,143	1	13,143
14	Filter for filtering oil in fryer (VIII-13).		Elect:	9,135	1	9,135
15	Blotter, blower, for removing excess fat from fried bacon.		Elect:	2,000	1	2,000

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

VIII. Kitchen (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
16	Convection ovens, for roasting meat, pyrolytic self-cleaning, Each oven with 3 stainless steel racks, stainless steel wire shelves, and heat-resistant rack wheels. Each with pyrometer with selector switch and 4 probes for external measurement of product temperature.	Stuffed Shoulder of Veal: 20 per load, 12-14 lbs. each @ 14 portions each = 280 portions in 2½ hrs. @ 350°F	Elect: 208 V. 60 cy. 3 ph. 45 KW heaters Motors: 5 HP, 13.6 amp ¼ HP, 5.6 amp Controls - 5.0 amp	7,212	2	14,424
16a	Meat tempering cabinet, 4 rack capacity to cook freshly cooked meat to +40°F in 1 hour in 3 stages, at controlled relative humidity.		Elect:	5,000	1	5,000

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

VIII. Kitchen (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
17	Pass-through pressure steam cooker, for cooking vegetables. Includes: 4 feeding trolley/s, 4 heated distribution trolleys, 4 sets of 18 perforated pans with nesting handles 12" x 20" x 4".	Approximately: 1008 lbs. potatoes per hour; 1260 lbs. cabbage per hour, 1116 lbs. carrots per hour.	Steam: 265#/hr. Water pressure: @37 p.s.i. Electric: 0.2KW, 3 wires Floor Drain:	23,983	1	23,983
18	Continuous cookers, water, for rice/pasta products, including: 1 heated distribution trolley, 1 salting device, 1 feeding device.	Approximate Capacity: Pasta: 1100 lbs per hour, finished weight. Rice: 900 lbs. per hour, finished weight.	Electr: Cooker: 6KW Heated distribution trolley: 3.3KW. Steam: 397#/hr. @4.4 to 7.4 p.s.i. Hot Water: @122°F, @ max. of 400 gal/hour.	27,167	1	27,167
19	Continuous braising machine including: 1 distribution trolley, and oil circulating cart.	Up to 1500 pieces per hour.	Elect: 208 v. 60 cy. 3 ph. 100 KW Exhaust duct	17,350	1	17,350
20	Steam jacketed tilting braising pan. 30 gal. capacity, 1000 sq. in. flat heating surface, tilting, covered.		Steam: to 50 p.s.i. Inlet: 3/4" Outlet: 3/4"	2,835	1	2,835

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

VIII. Kitchen (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
23	Sink, 2-compartment, overall: approx. 21" x 72" with 2 drain boards, stainless steel. Integrally welded (same as IV-3).		Cold water. Hot water. Drain.	486	1	486
24	Hoist for poultry fryer conveyor (VIII-8) for cleaning - 1/2 ton hoist.		Elect:	380	1	380
25	Hoist for bacon fryer conveyor (VIII-13) for cleaning - 1/4 ton hoist.		Elect:	323	1	323

242,157

TOTAL FOR VIII - KITCHEN

IX. Meat Preparation

1	Meat cutting tables, 3' x 8' each with white polyethylene top, stainless steel undershelf, 2 stainless steel drawers.		None.	908	2	1,816
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EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

IX. Meat Preparation Area (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
2	Meat grinder, heavy duty, floor model, fully equipped, including plates with these holes: 1/8", 3/16", 1/4", 3/8", 1/2", 3/4".	Rated hourly output: 2,500 lbs.	Elect: 3 H.P. motor 208 v. 60 cy. 3 ph.	1,359	1	1,359
3	Horizontal meat mixer, 700 lb. capacity, with air-tilt mechanism.		Elect: 7 1/2 H.P. motor 208 v. 60 cy. 3 ph.	7,488	1	7,488
4	Meat cuber/dicer with cutting tools to allow 6mm, 12mm. and 15mm. spacings.	Rated hourly capacity: 900 to 3000 lbs., depending on size and shape of cut.	Elect: 3 H.P. motor 208 v. 60 cy. 3 ph.	5,850	1	5,850
7	Meat ball forming machine, capable of forming meat balls of uniform size from 3 grams to 200 grams each (approx. 1/10 oz. to 7 oz.).	Manufacturer's rating: 5000 to 20,000 pieces per hour. Larger pieces run at lower speed.	Elect: 2 H.P. variable speed motor.	13,500	1	13,500

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

IX. Meat Preparation Area (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
8	Sink, 2 compartment, 2 drain boards. Overall, approx: 24" x 108". Stainless steel, integrally welded (same as III-4).		Cold water. Hot water. Drain.	746	1	746
9	Meat patty forming machine, capable of forming 5 1/2 oz. Salisbury steaks, 3/4" thick, and 3 oz. veal burgers, 1/2" thick. Includes 2' sanitary belt, and portable table. Machine puts paper between each patty. Will automatically stack 2 through 16 patties per stack.	Rated to form 2100 patties/hr.	Elect: 115 v. 60 cy. 1 ph.	2,782	1	2,782

TOTAL FOR IX - MEAT PREPARATION AREA

33,541

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

X. Slicing and Boning Room

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
1	Table, 8' x 2', stainless steel, no drawers.		None	227 Price quoted on 8' x 3' table)	1	227
2	L-shaped stainless steel table. 30" wide. 96" x 66" on outside of L. 66" x 36" on inside of L.		None	610	1	610
3	Sink, 2 compartment, 2 drain boards, integrally welded, stainless steel; overall, approx.: 21" x 72" (same as IV-3).		Cold Water Hot Water Drain.	486	1	486
4	Automatic slicing machines for slicing meats, 2 speed.	36 to 51 slices per minutes.	Elect: 1/3 H.P. 115 v. 60 cy. 1 ph.	1,065	2	2,130
5	Table, 3' x 10', stainless steel, with undershelf, and 3 drawers to support meat slicing machines, (X-4).		None	609	1	609
TOTAL FOR X - SLICING AND BONING ROOM						4,062

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

XI. Meat Cooler

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
6	Meat saw, high speed, suitable for cutting refrigerated/frozen meat, frozen fish, 18" cutting clearance.		Elect: 1 H.P. motor 208 v. 60 cy. 3 ph.	1,705	1	1,705

TOTAL FOR XI - MEAT COOLER

1,705

XII. Dessert Shop

1	Dough mixer, triple action, 1 1/2 barrel size with additional bowl/dolly.	470 lbs. mixing capacity	Elect: 5 H.P. motor 208 v. 60 cy. 3 ph.	7,620	1	7,620
2	Vertical mixer, 160 qt. bowl, to include: 3 tinned steel bowls 3 bowl truck with casters, 1 rubber batch aluminum beater. Variable speed drive, automatic timer, and automatic bowl raising and lowering.		Elect: 5 H.P. motor 1/3 H.P. raise/lower motor 208 v. 60 cy. 3 ph.	6,795*	1	6,795

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

XII. Dessert Shop (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
3	Horizontal dough mixer, 1000# dough capacity, refrigerated jacket, refrigeration condensing equipment, 2 speed mixing action, either dumping or stationary.		Elect: mixer motor: 40 H.P. Refrig. Compressor: 7 1/2 H.P. 208 v. 60 cy. 3 ph.	25,120	1	25,120
4	Automatic flour scaling hoppers.			Included in XII-A	2	
5	Dough troughs, 6' x 30", mechanically operated bottom outlets, plastic covers.	1000 lbs. dough capacity.	None	470	4	1,880
6	Trav ovens, 56 pan capacity, electrically heated.		Elect: 208 v. 60 cy. 3 ph. 103 K.W. Steam: intake Drain:	37,874	2	75,748

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

XII. Dessert Shop (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
7	Dough divider, 4 pocket, for dividing and scaling bread dough portions.	Rated capacity: Scaling range: 8 to 36 oz. Capacities: 20 to 80 loaves per minute approx. 1200-4800 loaves per hour.	Elect: 3 H.P. motor. 208 v. 60 cy. 3 ph.	15,785	1	15,785
8	Cake scaling depositor.		Elect:	10,845	1	10,845
9	Proof Box - 3' wide x 2' deep standard with air conditioning unit and ducts.		Elect:	11,700	1	11,700
10	Sheeter/roller.		Elect:	5,420	1	5,420

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

XII. Dessert Shop (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
11	Pie machine: to have 9-pie holding capacity, capability of portioning and rolling dough, trimming and crimping crusts and automatically filling pies. Units include: a) automatic pie dough portioner b) 9-plate rotary pie machine c) twin cylinder filling machine one oz. to one half gal. per stroke.	Capabilities: a) rated @ 2400 dough pieces per hour, @ 3" x 5 1/2" b) rated, maximum: 600 of 2 crust pies per hour or 1200 of single pies per hour c) rated maximum: 100 strokes per minute.	a) Elect: 1/2 H.P. motor 115 v., 60 cy., 1 ph. b) Elect: 3/4 H.P. motor 1/3 H.P. motor c) Elect: 110 v., 60 cy., 1 ph. Air: 80-120# pressure, @8-12 c.f.m.	Group cost 20,400	1	20,400
12	Sweet goods table and conveyor: to include table with sanitary belt approx. 24' long and 24" wide. To include dough sheeter, having hopper of 200 lbs. dough capa-	Cutting range: 18-108 strokes per minute.	Elect: Table drive: 3/4 H.P., (230) (208)v., 60 cy., 3 ph. Sheeter drive: 1/4 H.P. (230) (208) v. 60 cy., 1 ph. Cutter drive: 1/2	Group cost 23,415	1	23,415

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

XII. Dessert Shop (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
12 (cont'd)	city, with sheeting rolls capable of adjusting width/thickness of dough. Installed over the conveyor table should be removable dough cutters, additional rollers, filling machine and final cutting rollers.		H.P., 115 v., 60 cy., 1 ph. Total power requirements 230 v., 3 ph., 10 amps; 115 v., 1 ph., 25 amps.			
13	Icing machine: to include variable speed pump, capable of pumping icing from 160 qt. vertical mixer bowl (XII-2) and deliver directly to an 18" icing distributor head, mounted on a conveyor stand, portably constructed, to ice baked goods on the sweet goods table conveyor (XII-12).	Capacity depends on icing viscosity: gal./min. 11.5-1.9 10.1-1.7 2.75-0.92 visc (cps) 1000-5000 6000-50000 60000-150,000	Elect: maximum current: 7 amp. (@ 220 v., 3 ph., 60 cy.)	Group prices: 3,902	1	3,902

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

XII. Dessert Shop (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
14	Over-under scale to 5 lbs. Chart: 1 oz. x 1/8 oz. over/under Tare beam: with test wts: 2 of 1#, 1 of 2# End reading, or approx. equivalent (same as V-7).		None	275	1	275
15	Kettle, steamheated, stain- less steel, 2/3 jacketed, 60 gal. agitated, tilting, covered.		Steam: inlet exhaust Elect: 1 H.P. motor.	5,030	1	5,030
16	Vertical mixer 110 qt. bowl, to include: power lift, 3 stainless steel bowls, 3 bowl trucks, 1 dough hook, 1 spiral dough developer, 1 wire whip, 4 speed mixer.		Elect: 3 H.P. motor 208 v. 60 cy. 3 ph.	5,367	1	5,367
17	Small roll divider, semi-automatic, 36 pocket.		Elect:	1,000	1	1,000

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

XII. Dessert Shop (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
18	Two plate electric stove, with full body stand.		Elect: 208 v. 60 cy. 3 ph. 10 amps.	442	1	442
19	Hoist, 2 tone, for dough troughs, 6" tr"ey.		Elect:	1,100	1	1,100
20	Table, for scale, stainless steel, with ss undershelf and 2 ss drawers.		None	405	1	405
21	Sink, single compartment 24" x 24", stainless steel.		Water: Hot Cold Drain	245	1	245
22	Sink, 2 compartment, 2 drain boards, overall, approx. 24" x 108" stainless steel, integrally welded.		Water: Hot Cold Drain	746	1	746

SUB-TOTAL FOR XII - DESSERT AREA

223,240

*If stainless steel bowls are substituted for tinned bowls, total price is \$7,740.

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

XII-A Desert Shop Flour Storage and Handling

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total
1-5	Flour storage and handling system. Includes: pneumatic system, dump hopper, sifter, blower, 2 storage silos of 50,000 lb. capacity each, (2 of #3 scales) with necessary piping, and auxiliary equipment for automatic flour handling, from delivery to scales.		Elect:	Total system: 65,000	1	65,000
1	Bag chute.					
2	Dump bin with blower to silos.					
3	Vertical flour sifter for storage bin.					
4	2 silos, with 50,000 lb. capacity each.					
5	Pneumatic conveying system.					

SUB-TOTAL FOR XII-A - FLOUR STORAGE AND HANDLING 65,000

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

XIII. Dessert Ingredient Room

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
1	Ingredient work table, 3' x 8', with 2 rows of spice drawers above, and 6 bins underneath. All stainless steel. (same as V-2).		None	4,882	1	4,882
2	Platform scale: Pendulum, Dial to 300 lbs.; total capacity: 450 lbs.		None	1,600	1	1,600

SUB-TOTAL FOR XIII - DESSERT INGREDIENT ROOM 6,482

XV. Equipment Wash Room

1	Rack washer for washing processing racks, single door.	Variable - Wash cycle: 0 to 10 min. Rinse cycle: 0 to 10 min.	Requires fit for installation. Elect: 10 H.P. 208 v., 60 cy., 3 ph. Steam: 350 lbs./hr. Rinse Water: 20 g.p.m. @20 p.s.i. @180°F Tank capacity: 300 gal. Drain.	9,500	1	9,500
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EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

XV. Equipment: Wash Room (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
2	Pot washer for washing pots, beater bowls, pans, and other processing utensils	Variable - Wash cycle 0 to 10 min. Rinse cycle: 0 to 10 min.	Elect: 10 1/4 H.P. 208 v. 60 cy., 3 ph. Steam: 100 lbs./hr. Rinse Water: 18 g.p.m. @20 p.s.i. @180°F. Venting: 300 CFM @1/2 sp. Drain:	7,600	1	7,600
3	Two compartment sink, 2 drain board, overall approx. 24" x 108".		Water: Hot Cold Drain:	746	1	746

TOTAL FOR XV - EQUIPMENT WASH ROOM 17,846

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

XVI. Salad Area

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
1	Vertical cutter/mixer for cutting, comminuting, chopping salad ingredients, and sandwich fillings.	60 quart capacity 60 lbs., meat loaf per 45 seconds.	Elect: 2 speed motor 20 H.P. @1750 rpm 25 H.P. @ 3500 rpm 208 v., 60 cy., 3 ph. plus 3/4 H.P. mixing baffle motor.	6,000	1	6,000
2	Walk-in cooler, 9' x 20' 7' high, divided in center, 1 door in ea. compartment. 1 self-contained unit, 2 thermostatic controls.		Elect:	4,450 *	1	4,450
3	Electric range, 6 plates, oven below.		Elect: 208 v. 60 cy. 3 ph. 18.7 total KW	963	1	963
4	Kettle, steam heated, 40 gal. capacity, 2/3 jacketed, stainless steel, with cover-tilting, for 100 p.s.i. A.S.M.E.		Steam: inlet, exhaust	1,220	1	1,220

*1 section is for salad dept. the other is for meat after cooling in meat temp cabinet (VII-16A)

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

XVI. Salad Area (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
5	Vertical mixer, 160 quart bowl, to include: 3 stainless steel bowls, 3 bowl trucks with casters, 1 rub batch aluminum beater, variable speed drive, automatic bowl raising, and lowering.		Elect: 5 H.P. drive motor, 1/3 H.P. raise/lower motor, 208 v., 60 cy., 3 ph.	7,740	1	7,740
6	Sink, 2 compartment, 2 drainboards, integrally welded. Approx. overall 21" x 72". (same as IV-3).		Cold Water. Hot Water Drain.	486	1	486
7	Food slicer, automatic drive. Adjustable feeding mechanism for thinly sliced sandwich meats.	36 to 51 slices per minute.	Elect: 1/3 H.P. motor, 115 v., 60 cy., 1 ph.	1,250	1	1,250
8	Mixer, table model, 12 qt. capacity to include: 3 stainless steel bowls, 1 aluminum batter beater, 1 loop wire whip with stainless steel wires, 1 dough hook.		Elect: 1/3 H.P. motor, 115 v., 60 cy. 1 ph.	832	1	832

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

XVI. Salad Area (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
9	Cabinet type work tables, 3' x 5', with 3 adjustable shelves and sliding doors.		None.	1,191	2	2,382
10	Cabinet type work table, 3' x 5' with 3 drawers & bottom shelf.		None.	1,068	1	1,068
11	Tables, 8' x 30" stainless steel, with 2 s/s drawers, & s/s undershelf.		None.	405	2	810
14	Bench scale, scoop type. Beam: 0 to 16 oz. in 1 oz. Beam: 1# to 10# & hand wts. to total 20 lbs. or approximate equivalent.		None.	425	1	425

TOTAL FOR XVI - SALAD AREA

27,626

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

XVII. Sandwich Area

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
1	Storage refrigerators, 4 compartments, 2 doors in each or 2 units of 2 compartments each, & 2 doors per compartment.		Elect: 1/3 H. P. motor 115v. 60 cy 1 ph.	994 for 2 compartment unit	2	1,988
2	Table, 8' x 30" with undershelf 12" above floor. 4 ss drawers, 12" ss backsplash, all stainless steel.		None	690	1	690
3	Sandwich buttering machine	Approx: 800 pieces per hour	Elect: 208v. 60 cy. 3 ph. Max. KW = 10	6,519	1	6,519
4	Sanitary make-up Conveyor: a) 15' x 18" wide, with 12" drop side tables, all ss & Vari-speed motor. b) 180° return, all ss, 18" wide belt, w 4' inside radius & 3' straight section.		Elect: 115v. 60 cy 3 ph.	8,500	1	8,500

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

XVII. Sandwich Area (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
5	Sandwich wrapping machine, for triangular shape, plus one additional shape.	Up to 50/minute	Elect:	8,450	1	8,450
6	Coder.		Elect:	2,500	1	2,500
7	Refrigerator - 1 section - roll-in-self contained. To accommodate roll in rack with maximum dimensions: 65" h, 27" w, 29" d. On side opposite roll-in door, there are 2 special 1/2 length, reach doors, with thermo-pane glass windows.		Elect: 1/2 H.P. condenser 60 cy. 1 ph.	2,854	1	2,854
8	Roll/bun/slicer.	13,000/hr	Elect: Conveyor: 1/3 H.P. Spindle drive brake-motor: 1-1/2 H.P.	2,900	1	2,900
TOTAL FOR XVII - SANDWICH AREA						34,401

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

XVIII. Portioning and Packaging Area

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
1	Filling machine, for forming, filling, sealing, 1 gallon paper containers for soups, gravies, salad dressings.	Maximum: 10 units per min, or 600 units per hr.	Elect: #6 wire Wall disconnect fuses: 50 amp (Total Power: 8.83 KVA machine) Multiphase motor on machine: 1.33 Accessory power: Air compressor: 7.5 HP Vac pump: 1 H.P. Cooling water: 250 G.P.H., @ 30 PSI, @ max: 50° F. Compressed air Usage: 32 CFM @ 100 PSI	53,300	1	53,300
2	Double "T" shaped conveyor, with 2 lines conveying pans under dual-nozzle filling machines & delivering pans to freezer refrigerator conveyor.		Elect:	45,000	1	45,000

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

XVIII. Portioning and Packaging Area (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
2 (cont'd)	Plastic/metal pan dispensers are part of the start of the double "T" conveyor. Total conveyor 90'.					
3	Fillers, heavy duty, to accurately deposit stews, etc. in 1/2 size steam table pans, or plastic equivalent. Each filler to have 2 filler nozzles, special manifold, adjustable nozzle & hose, and proximity timers for sensing of double trays. To fill at least 9 pans per minute per nozzle, with at least 5 pounds per filling.	Capable of filling 2 pans at one, up to 75 per minute.	Elect: 1-1/2 H.P. drive	12,275	2	24,550

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

XVIII. Portioning and Packaging Area (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total
4	Fillers, heavy duty to accurately deposit sauces & gravies into 1/2 size steam table pans or plastic equivalent. Each filler to have 2 filler nozzles, adjustable nozzle and hose, and proximity timers for sensing double trays. To fill at least 9 pans per minute per nozzle.	Capable of filling 2 pans at once, up to 75 per minute.	Elect:	7,575	2	15,150
5	Continuous blast freezer.	System to be capable of refrigerating, or freezing, or both, at rate of 1/2 size steam table pans per minute.	Elect:		1*	330,00

*Includes items 6 & 7.

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

XVIII. Portioning and Packaging Area (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
6	Continuous cooler, consists of complete unit, receiving filled pans (plastic or metal) from filling line, to: (a) pre-cool hot foods in cooler, deliver to freezer, discharge from freezer; remove from pans deliver to wrapping machine and send empty pans to washer; (b) deliver room temp or cool foods directly to freezer & proceed as in (a); (c) deliver foods to be chilled, to cooler, and then directly to wrapping machine.					

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

XVIII. Portioning and Packaging Area (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
7	Conveyor System. Includes: freezer and cooler, enclosures, refrigerating coils, refrigerating fans, conveyors from filling line to pick-off area; also refriger. freezer trays, stackers, transfers, and electrical.					
8	Wrapping machine to wrap, seal, and shrink polyethylene film over: (a) slabs of meals/components, approx 10" x 12" x 2-1/2" (b) Half size steam table pans, approx 10-3/8" x 12-3/4" x 2-1/2" containing chilled food; (c) 1/2 size baking pans, approx. 13" x 18", containing frozen baked goods. Wrapping machine includes a shrink tunnel. To be capable of wrapping,	Nominal speed 40 packages per minute through wrapper 30 to 60 ft/min. through shrink tunnel.	Elect: Wrapper: (220) 208 v., 60 cy, 3 ph. Shrink Tunnel: Blower motor: 3/4 H.P. Power: (220 v.) 30 Amp Single ph (will require special specification).	31,200	1	31,200

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

XVIII. Portioning and Packaging Area (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
8 (cont'd)	sealing and shrinking at least 36 units per minute. Variable speed.					
9	Labeling machine.		Elect:	2,500	1	2,500
10	Conveying system for taking empty pans, trays from freezer discharge to wash machine on 2nd floor, including wash machine, & return of cleaned pans to meal preparation area.		Elect: Steam:	200,000	1	200,000
11	Packing table, 16' x 24", with conveyor & hinged side table.		Elect:	3,800	1	3,800
TOTAL FOR XVIII - PORTIONING AND PACKAGING						705,500

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

XXIV. Shipping Assembly Area						
Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
1	Picking table, consisting of merry-go-round conveyor, straight except for return corners, total length each side: 36', with side boards.		Elect:	16,000	1	16,000
TOTAL FOR XXIV - SHIPPING ASSEMBLY AREA						16,000
XXVI. Second Floor Kitchen						
1	Kettles, stainless steel, 2/3 jacketed, steam heated. 150 gal. capacity, with scraper agitator; covers; 3" quick-opening bottom outlet. For 100 P.S.I., A.S.M.E., for cooking soup.		Steam: Inlet, Exhaust Elect: 1-1/2 H.P. motor	7,925	4	31,700
2	Kettles, stainless steel, 2/3 jacketed steam heated. 300 gal. capacity; with scraper agitators; covers;		Steam: Inlet; Exhaust Elect: 1-1/2 H.P. motor	11,800	2	23,600

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

XXVI. Second Floor Kitchen (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
2 (cont'd)	3" quick-opening bottom outlet. Fitted with automatic temperature indicator, recorders. For 100 P.S.I., A.S.M.E., for cooking/mixing stew.					
3	Kettle, stainless steel steam heated, 2/3 jacketed. 80 gal. capacity, with scraper agitators, high shear operation cover. For preparing gravy thickness slurries. For 100 P.S.I., A.S.M.E.		Steam: Inlet; exhaust	8,950	1	8,950
4	Pump, for transferring soup to cooler. Capable of lifting 15 ft. Suitable for hot soup. Includes motor.	18 G.P.M.	Elect: 1 H.P. motor 208 v. 60 cy. 3 ph.	1,261	1	1,261

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

XXVI. Second Floor Kitchen (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
5	Soup cooler.			42,600	1	42,600
6	Pump for transferring slurries to stew-kettles (XXVI-3).		Elect:	1,200	1	1,200
7	Ingrediator, to disperse thickening agents.		Elect:	1,200	1	1,200
TOTAL FOR XXVI - SECOND FLOOR KITCHEN						110,511

XXVII. Test Kitchen and Assembly Room

1	Range			900	1	900
2	Deck Oven			1,000	1	1,000
3	Convection Oven			3,000	1	3,000
4	Microwave Oven			2,000	1	2,000
5	Jet Cooker			2,000	1	2,000
6	Fryer			300	2	600
7	Hood			3,400	1	3,400
8	Toaster			112	1	112
9	Refrigerator/Freezer			2,500	1	2,500
10	Base Unit			2,000	1	2,000

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

XXVII. Test Kitchen and Assembly Room (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
11	Sandwich Unit			250	1	250
12	Portable Hot Food Unit			5,200	1	5,200
13	Portable Cold Food Unit			2,800	1	2,800
14	Griddle			250	1	250
15	Broiler			500	1	500
16	Hot Dog Unit			400	1	400
17	Broiler Hood			1,200	1	1,200
18	Lowerator			450	3	1,350
19	Silverware Dispenser			100	1	100
20	Beverage Dispenser			1,225	1	1,225
21	Milk Dispenser			250	1	250
22	Juice Dispenser			350	1	350
23	Cream Dispenser			250	1	250
24	Ice & Water Unit			1,550	1	1,550
25	Butter Dispenser			50	1	50
26	Bread Dispenser			150	1	150
27	Roll Warmer			110	1	110
28	Booths (for 6)			120	8	960
29	Banquette	24'		800	1	800
30	Tables	24' x 36"		35	6	210
31	Tables	48" diam.		62	2	124
32	Tables	36" x 48"		50	10	500

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

XXVII. Test Kitchen and Assembly Room (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
33	Chairs, Dining Room			75	30	2,250
34	Chairs, Assembly Room			25	20	500
35	Podium, Lectern, Screen, Mirror					900
36	Carpeting - Dining Room and Assembly Room			9.00/yd	210 yds	1,890
37	Decorative Accessories Miscellaneous Small Equipment					2,000
						1,809
						45,500
						4,500
						50,000

10% Contingency

TOTAL FOR XXVII - TEST KITCHEN AND ASSEMBLY ROOM

XXVIII. Laboratory

Microbiological Laboratory

1	Torsion PL-2 balance			475	2	950
2	Bactronic colony counter model C110 with plug in marking pen					
3	Water bath and cover			262	1	262
4	Water bath			695	1	695
5	Filamatic pipetter			260	1	260
6	pH meter and electrodes			1,095	1	1,095
7	Autoclave, Barnstead			5,650	1	5,650
8	AO microscope			1,884	1	1,884

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

XXVIII. Laboratory (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
Microbiological Laboratory (cont'd)						
9	Temp unit water bath			275	1	275
10	Incubator 0-60°C			2,803	1	2,803
11	Incubator 35-60°C			2,114	1	2,114
12	Chairs, office			124	2	248
13	Demineralizer, corning cartridge and water solenoid accessory kit			245	1	245
14	Freezer, kelvinator			1,500	1	1,500
15	Portable control environment walk-in-room			11,505	1	11,505

NOTE: 16-26 includes Chemistry and Microbiology

16	47" sink base and sink			433	2	866
17	18" drawer units			123	6	738
18	35" 4 drawers			172	18	3,096
19	1 drawer and cabinet					
	47" top - 2 half drawers			187	6	1,122
	bottom - 3 wide drawers					
20	47" desk-side with file drawer and 2 upper drawers			206	2	412

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

XXVIII. Laboratory (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
Microbiological Laboratory (cont'd)						
21	35" wide wall cabinets with sliding-doors			72	24	1,728
22	35" top			87	12	1,044
23	47" top for sink			113	4	452
24	47" work top			128	8	1,024
25	Island type tops					
	35"			87	8	696
	47"			108	4	432
26	Service shelf					
	8" high/8" deep — 8 ft			38	8	304
	6' x 12"			60	4	240
27	Balance, mettler, H10P			2,250	1	2,250
28	Moisture balance, mettler			1,440	1	1,440
29	Balance, mettler, P1000N			1,015	1	1,015
30	Balance, weights, Class S			275	1	275
31	Blender, Osterizer w/access			69	1	69
32	Calculator, Monroe			1,200	1	1,200
33	Centrifuge, I.E. CS Model w/access			1,507	1	1,507
34	Colorimeter, DAS, B&L			1,500	1	1,500
35	Digestion and distillation apparatus, Kjeldahl, portable					
	Dishwasher, Turbo Jr., w/access			500	1	500
36				5,000	1	5,000

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

XXVIII. Laboratory (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
Microbiological Laboratory (cont'd)						
37	Extraction heater w/supports			295	2	590
38	Fat analyzer, Hobart			225	1	225
39	Furnace, muffle			347	1	347
40	Gauge, vacuum, FIRA			100	1	100
41	Heater, elect.			45	6	270
42	Hot plate, pyroceram			36	2	73
43	Illuminator, titration			37	1	37
44	Meat chopper, Hobart			250	1	250
45	Oven, gravity convection			395	1	395
46	Oven, mech. convection			735	1	735
47	Oven, vacuum			325	1	325
48	Pump, porta-temp			175	1	175
49	Pump, water			48	1	48
50	Pump, Vacuum			275	2	550
51	Refractometer, Abbe			995	1	995
52	Shaker, vari-speed			254	1	254
53	Sieve sets, 8" Dia.			67	1	67
54	Stirrer, 2 speed			64	2	128
55	Stirrer, magnetic			42	2	84
56	Support, lab jack			37	1	37

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

XXVIII. Laboratory (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
Microbiological Laboratory (cont'd)						
57	Viscometer w/access			725	1	725
58	Voltage adjuster			88	6	528
59	Heating mantle			25	6	150
60	Water bath, steam			148	1	148
61	Titration, moisture precision			650	1	650
62	Balance table, marble			139	1	139
63	Stool, laboratory			26	4	104
64	Fume hood assembly			1,800	2	3,600
65	Miscellaneous equipment			-	-	2,000
	Organoleptic Laboratory			-	-	1,000
TOTAL FOR XXVIII - LABORATORY						71,125

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

XXIX. Warewashing

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
1	Silver sorting machines.	Maximum: 3000 pieces per hour per machine.	Elect: 115 v. 60 cy. 1 ph.	3,500	6	21,000
2	Warewashing machines.		Steam: Water: Cold Hot 140° F. Elect: 15-1/2 total hp, 208 v. 60 cy. 3 ph. Exhaust: Drains:	21,189 (including field assembly)	4	84,756
	Sorting tables.		Elect: 5 HP motor for waste dip. Conveyor motor 1/2 HP Water: Hot Cold Drain:	12,167 includes freight & assembly	4	48,668
3	Automatic cart washer, to wash, rinse, and dry present shelley carts, and others of similar dimensions by automatically	Variable speed: 2 to 8 F.P.M. Estimate capability of max of 57 carts per hr, depending on cart constructions	Steam: Wash tank: 2580 lbs. per hr. @ 15 psi. Dryer: 1515 lbs. per hr. @ 90 psi.	38,000	1	38,000

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WASHING FACILITY (cont'd)

XXIX.	Warewashing (cont'd)	Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
3	(cont'd)		conveying them through the several compartments.		Elect: 33 HP all motors Venting: 4900 CFM @ 1/2" S.P. (each end) Water: Wash tank capacity: 450 gal. fresh water. Rinse flow rate 40 GPM @ 20 psi (180°F.) (intermittent) Drain: Pit — required			
4			Conveyorized ware soaking tank, with 200 GPM, propeller, (custom designed). 15 foot tank.			800/ linear foot.	1 15' unit	12,000
5			Racks, for cups 16 cups/rack.			5	550	2,750
6			Racks, for glasses 25 glasses/rack.			9	656	5,904

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

XXIX. Warewashing (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
7	Silver washing racks.			5	50	250
8	Rack dollies — to accommodate glass & cup racks.			15	168	2,520
9	Cart and rack washing machine.	Chamber type pass through.		14,225	1	14,225

TOTAL FOR XXIX — WAREWASHING 230,073

Materials Handling Equipment

1	Lift trucks — front rider platforms. Fork: 27" x 48" 4000 lb. capacity. Includes 432 Amp. battery & charger.		Elect: for charger	4,058	2	8,116
2	High lift stacker for use in storage freezer. Complete with battery and charger. Lift: 156".	Battery rated as capable of running 10 to 12 hrs. per day per charge. Charger requires 6 to 8 hours.	Elect: for charger 208 v. 60 cy. 3 ph.	6,320	1	6,320

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

Materials Handling Equipment (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
3	Tote bins, molded fiber-glass bodies, with permanent, V.S.P.A. approved polyethylene liners. Capacity 95 gal. with 5", all swivel wheels, self-lubricating with thread guards.		None.	137	25	3,425
4	Pans for transporting prepared ingredients to point of use. 17-3/4" x 25-3/4" x 4" with handles.		None.	10	5000	50,000
5	Racks, with casters, capable of holding 10 of above pans, (XX-4), 7-3/4 x 25-3/4 x 4". Racks to have maximum height of 65".		None.	171	450	76,950

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

Materials Handling Equipment (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
6	Baskets, stainless steel. Inside dimensions approx. 33" x 13-1/2" x 5", stackable, with one end low to permit removal of single slabs when stacked. To store either 3 or 10-3/8" x 12-3/4" x 2-1/2" S.S. half size steam table pans, or frozen 10" x 12" x 2-1/2" packaged slabs.			12	51,000	612,000
7	Dollies — to transport frozen & food baskets to & from distribution area to loading area. Approx. 19" W 27" L with approx. 1-3/4" flange on each long side, 5" swivel casters.			40 each	180	7,200

EQUIPMENT LIST FOR CENTRAL FOOD PREPARATION AND WAREWASHING FACILITY (cont'd)

Materials Handling Equipment (cont'd)

Item Number	Equipment Description	Performance Characteristics	Utility Requirements	Unit Price(\$)	No. of Units Required	Total Price(\$)
8	Carriers for 1 gal., soup, gravy, salad dressing — containers, @ 6 gallons/container.			2	840	1,680

TOTAL FOR -- MATERIALS HANDLING EQUIPMENT 765,691

Small Equipment

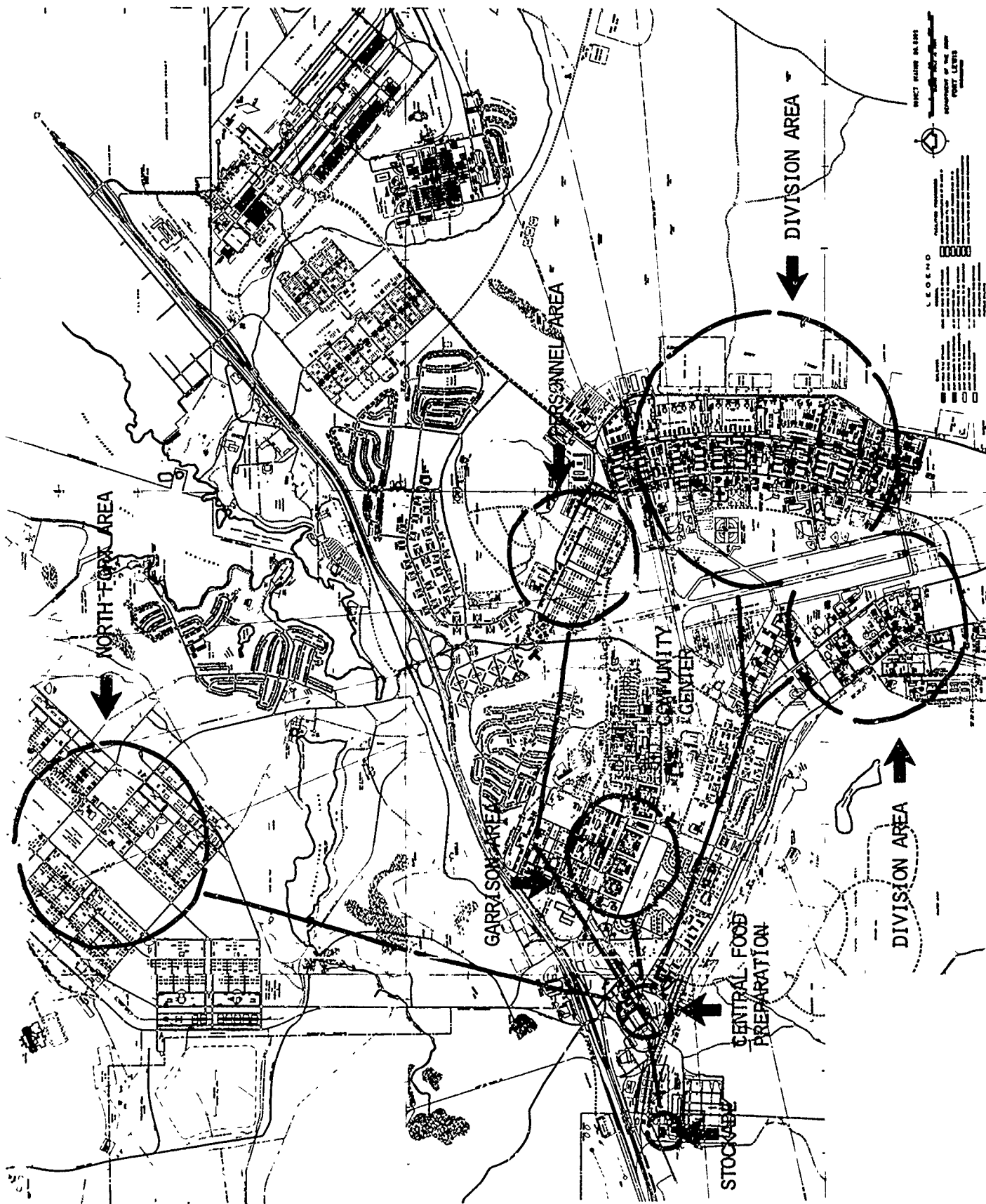
1	Half size steam table pans 10-3/8" x 12-3/4" x 2-1/2".			4	13,000	52,000
2	Half size bun pans, 17-3/4" x 12-7/8" x 1.			3	5,000	15,000
3	Utensils for food production.			Estimated		50,000
4	Utensils for ware & equipment washing.			Estimated		6,800

TOTAL FOR -- SMALL EQUIPMENT 123,800

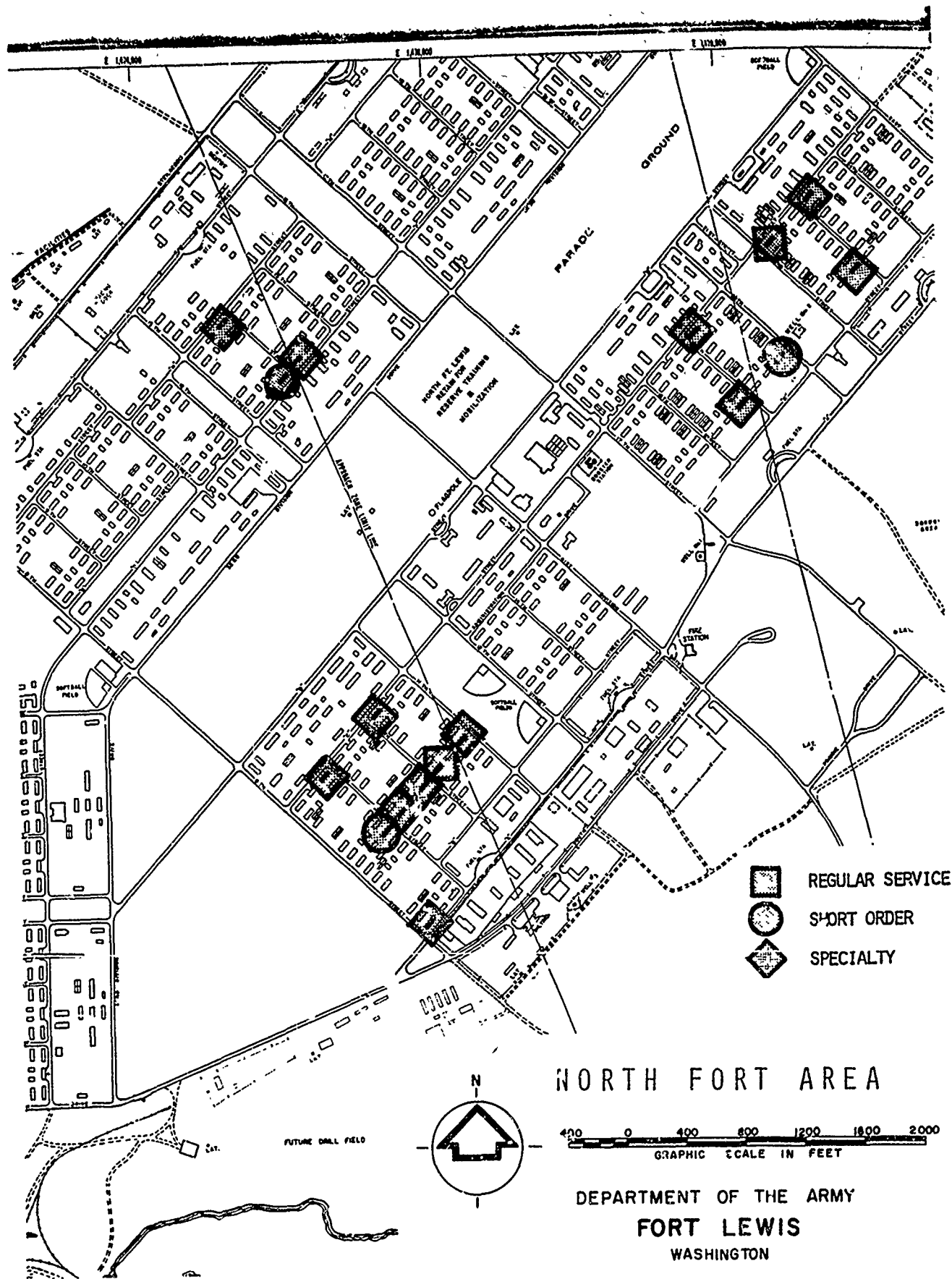
APPENDIX II

AREA MAP OF FORT LEWIS AND LOCATIONS

OF SATELLITE DINING FACILITIES







APPENDIX III

INDEX OF EQUIPMENT AND COST DATA FOR RENOVATED SATELLITE DINING FACILITY DESIGNS

Item codes which appear on the design concepts are listed in the first column of the Index. Item 1-12 pertain to kitchen equipment, items 13-43 to serving line equipment and dispensers, item 45 is the soiled dishware transporter, items 47-66 pertain to furniture and decor, and items 74-89 to building modifications. Items noted with an asterisk are considered essential to the satellite operation, i.e., for compatibility with the CFPF. The remaining items concern dining hall modernization and are considered highly desirable to improve troop morale. The chart entitled Multi-purpose Room lists the equipment and modifications required for conversion of the unit day room into a combination day room and dining area.

INDEX OF EQUIPMENT AND COST DATA FOR RENOVATED SATELLITE DINING FACILITY DESIGNS

Item Code	Item Description	Manuf.	1963 Regular			1953 Specialty			1953 Short Order			1957 Regular			1957 Specialty and Short Order			1938 Regular			1941 Regular		
			No. Req'd.	Est. Cost	No. Req'd.	Est. Cost	No. Req'd.	Est. Cost	No. Req'd.	Est. Cost	No. Req'd.	Est. Cost	No. Req'd.	Est. Cost	No. Req'd.	Est. Cost	No. Req'd.	Est. Cost	No. Req'd.	Est. Cost	No. Req'd.	Est. Cost	
1	Range	FSN 7310-282-6626	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	
2	Deck oven	FSN 7310-273-1880	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	
3*	Connection oven	Crown-X	1	3000	1	3000	1	3000	1	3000	1	3000	1	3000	1	3000	1	3000	1	3000	1	3000	
4*	Jet cooker	Market Forge	1	2000	1	2000	1	2000	1	2000	1	2000	1	2000	1	2000	1	2000	1	2000	1	2000	
5	Deep fat fryer	FSN 7310-809-9390	2	OH	2	OH	2	OH	2	OH	2	OH	2	OH	2	OH	2	OH	2	OH	2	OH	
6	Kitchen Hood and exhaust	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	
7	Pop-up toaster	FSN 7310-685-5333	2	210	1	105	1	105	2	210	1	105	2	210	1	105	2	210	1	105	1	105	
8	Refrigerator reach-in	OH	1	OH	1	OH	1	OH	1	OH	2	OH	2	OH	2	OH	2	OH	2	OH	2	OH	
9a	Refrigerator-drawer	Wyott	1	685	1	685	1	685	1	685	1	685	1	685	1	685	1	685	1	685	1	685	
9	Refrigerator walk-in	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	
10	Freezer 36" x 36" reach-in	OH	1	OH	3	OH	3	OH	3	OH	1	OH	3	OH	3	OH	3	OH	3	OH	3	OH	
10a*	Freezer walk-in 8'-0" x 9'-0"	Hcbart	2	6300	1	6300	1	6300	1	6300	1	6300	1	6300	1	6300	1	6300	1	6300	1	6300	
10b*	Freezer walk-in 12'-0" x 12'-0"	Hcbart	1	6000	1	6000	1	6000	1	6000	1	6000	1	6000	1	6000	1	6000	1	6000	1	6000	
11	Meat slicer	FSN 7320-222-4177	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	
12	Work tables	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	
13	Infrared hood	Cros-cur	1	120	1	120	1	120	1	120	1	120	1	120	1	120	1	120	1	120	1	120	
14	Refrig. base unit 74"	Duke	1	2060	1	2060	1	2060	1	2060	1	2060	1	2060	1	2060	1	2060	1	2060	1	2060	
14a	Refrig. base unit 88"	Duke	1	2280	1	2280	1	2280	1	2280	1	2280	1	2280	1	2280	1	2280	1	2280	1	2280	
14b	Refrig. sandwich bar 48"	Duke	1	825	1	825	1	825	1	825	1	825	1	825	1	825	1	825	1	825	1	825	
15	Portable hot food unit 88"	Duke	1	1450	1	1450	1	1450	1	1450	1	1450	1	1450	1	1450	1	1450	1	1450	1	1450	
15a	Portable hot food unit 74"	Duke	1	700	1	700	1	700	1	700	1	700	1	700	1	700	1	700	1	700	1	700	
16	Portable solid top unit 60"	Duke	1	500	1	500	1	500	1	500	1	500	1	500	1	500	1	500	1	500	1	500	
16a	Portable solid top unit 46"	Duke	1	500	1	500	1	500	1	500	1	500	1	500	1	500	1	500	1	500	1	500	
17	Portable grid-broil stand 102"	Duke	1	1100	1	1100	1	1100	1	1100	1	1100	1	1100	1	1100	1	1100	1	1100	1	1100	
18	Grid	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	
19	Char. roller w/griddle attachment	Wearver	1	500	1	500	1	500	1	500	1	500	1	500	1	500	1	500	1	500	1	500	
19a	Hot dog broiler w/bun warmer	Wyott	1	370	1	370	1	370	1	370	1	370	1	370	1	370	1	370	1	370	1	370	
20	Grille hood & exhaust	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	

INDEX OF EQUIPMENT AND COST DATA FOR RENOVATED SATELLITE DINING FACILITY DESIGNS (cont'd)

Item Code	Item Description	Manuf.	1953 Regular			1953 Specialty			1953 Short Order			1957 Regular			1957 Specialty and Short Order			1938 Regular			1941 Regular		
			No. Req'd.	Est. Cost	No. Req'd.	Est. Cost	No. Req'd.	Est. Cost	No. Req'd.	Est. Cost	No. Req'd.	Est. Cost	No. Req'd.	Est. Cost	No. Req'd.	Est. Cost	No. Req'd.	Est. Cost	No. Req'd.	Est. Cost	No. Req'd.	Est. Cost	
20a	Grill hood & exhaust: 9 x 4	Wyott Hydraulvent	1	1200	-	-	1	1200	-	-	-	-	-	-	-	-	1	1200	-	-	-	-	
21*	Holding cabinet	Cris-coor	1	850	1	850	1	850	1	850	1	850	1	850	1	850	1	850	1	850	1	850	
22	Tray lowerator	OH	2	OH	2	OH	2	OH	2	OH	2	OH	2	OH	2	OH	2	OH	2	OH	2	OH	
23	Dinner plate lowerator-heated	FSN 7320-531-4047	2	OH	2	OH	2	OH	2	OH	2	OH	2	OH	2	OH	2	OH	2	OH	2	OH	
23a	Small plate/bowl lowerator	OH	2	OH	2	OH	2	OH	2	OH	2	OH	2	OH	2	OH	2	OH	2	OH	2	OH	
24*	Automatic card checker		1	3000	1	3000	1	3000	1	3000	1	3000	1	3000	1	3000	1	3000	1	3000	1	3000	
25	Head count cash table & chair	Herman Miller	1	130	1	130	1	130	1	130	1	130	1	130	1	130	1	130	1	130	1	130	
26	Portable solid top unit for ice disp. 60"	Dulce	1	380	1	380	1	380	1	380	1	380	1	380	1	380	1	380	1	380	-	-	
26a	Tray slide F.S. ice disp. 24"	Dulce	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	40		
27	Portable solid top unit for bev. disp. 45"	Dulce	1	325	1	325	1	325	1	325	1	325	1	325	1	325	1	325	1	325	1	325	
28	Portable solid top unit 32"	Dulce	1	300	1	300	1	300	1	300	1	300	1	300	1	300	1	300	1	300	2	600	
29	Portable solid top unit 46"	Dulce	2	660	2	660	2	660	2	660	2	660	2	660	2	660	2	660	2	660	-	-	
30	Portable solid top unit 60"	Dulce	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
31	Portable solid top unit 88"	Dulce	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
32	Glass lowerator	OH	2	OH	2	OH	2	OH	2	OH	2	OH	2	OH	2	OH	2	OH	2	OH	2	OH	
32a	Cup lowerator	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	
33	Food warmer w/ roll warmer kit	Star	2	210	1	105	1	105	2	210	2	210	2	210	2	210	2	210	2	210	1	105	
34	Bread dispenser	FSN 7320-611-6582	1	160	1	160	-	-	-	-	1	160	1	160	1	160	1	160	1	160	1	160	
35	Butter pat disp.	FSN 7320-109-8183	1	50	1	50	-	-	-	-	1	50	1	50	1	50	1	50	1	50	1	50	
36	Silverware disp.	Dulce	1	110	1	110	1	110	1	110	1	110	1	110	1	110	1	110	1	110	1	110	
37	Carbonated beverage disp.	FSN 7310-151-6525	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	
38	Ice & water disp.	DSI	1	1550	1	1550	1	1550	1	1550	1	1550	1	1550	1	1550	1	1550	1	1550	-	-	
38a	Free standing ice & water disp.	DSI	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1600		
39	Milk dispenser	FSN 7310-935-3121	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	
40	Juice dispenser	FSN 7310-977-3726	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	1	OH	
41	Coffee maker-2iced	Silex	1	710	1	710	1	710	1	710	1	710	1	710	1	710	1	710	1	710	1	710	
42	Soft serve & shake maker	Sweden	1	2400	1	2400	1	2400	1	2400	1	2400	1	2400	1	2400	1	2400	1	2400	-	-	

INDEX OF EQUIPMENT AND COST DATA FOR RENOVATED SATELLITE DINING FACILITY DESIGNS (cont'd)

Item Code	Item Description	Manuf.	1953 Regular			1953 Specialty			1953 Short Order			1957 Regular			1957 Specialty and Short Order			1938 Regular			1941 Regular		
			No. Req'd.	Est. Cost		No. Req'd.	Est. Cost		No. Req'd.	Est. Cost		No. Req'd.	Est. Cost		No. Req'd.	Est. Cost		No. Req'd.	Est. Cost		No. Req'd.	Est. Cost	
43	Cream dispenser refrigerated	Wyott	1	235		1	235		1	235		1	235		1	235		1	235		-	-	
45*	Tableware transporter		10	5000		10	5000		10	5000		10	5000		10	5000		10	5000		8	4000	
47	48" diam table	Shelby Williams	4	250		4	250		6	375		6	375		9	560		12	745		-	-	
49	36" x 48" table	Shelby Williams	22	1100		15	750		21	1050		19	950		16	800		11	550		12	600	
50	24" x 36" table	Shelby Williams	8	280		16	560		4	140		10	350		3	105		15	525		11	385	
53	Stacking side chair	Shelby Williams	64	1025		90	1440		36	580		106	1700		50	800		87	1395		46	740	
55	8'-0" Banquette	Shelby Williams	4	1060		6	1600		-	-		5	1325		-	-		12	3180		8	2120	
56	4'-0" single booth	Shelby Williams	2	130		-	-		12	780		-	8		520		-	-		-	-	-	
57	4'-0" double booth	Shelby Williams	10	1200		-	-		14	1680		-	10		1200		-	-		-	-	-	
58	Partitions and accessories	Herman Miller	21	1470		20	1400		13	910		24	1680		25	1750		13	910		4	280	
	Panel 80" x 48"	Herman Miller	9	450		6	290		7	340		10	480		8	385		7	340		2	100	
	Panel 80" x 24"	Herman Miller	-	-		3	120		-	-		2	80		-	-		-	-		-	-	
	Panel 80" x 12"	Herman Miller	15	55		11	40		11	40		19	70		20	70		11	40		2	10	
	Panel hinge & end cap assembly	Herman Miller	10	210		11	235		6	140		12	255		8	170		6	130		2	45	
	Panel end cap	Herman Miller	10	65		12	75		6	40		10	65		10	65		6	40		4	30	
58a	Screening panels	-	4	120		3	90		-	-		-	-		-	-		-	-		-	-	
59	Window shutters	Pinecrest	-	-		-	-		-	-		-	-		-	-		20	2400		-	-	
60	Window drapery	Ben Rose	230 yds.	1725		230 yds.	1725		230 yds.	1725		155 yds.	1165		155 yds.	1165		-	-		60 yds.	450	
	Window drapery track	Golden Line	90'	180		90'	180		90'	180		65'	130		65'	130		-	-		60'	120	
60a	Divider drapery	Ben Rose	-	-		120 yds.	720		-	-		-	-		80 yds.	480		-	-		-	-	
	Divider draper track	Golden Line Co.	-	-		70	140		-	-		-	-		40	80		-	-		-	-	
61	Decorator panel		5	500		5	500		5	500		6	600		6	600		5	500		-	-	
63	Carpet	Lees Faculty	200 yds.	1800		230 yds.	2070		210 yds.	1880		280 yds.	2520		280 yds.	2520		250 yds.	2250		-	-	
64	Music sound system		1	800		1	800		1	800		1	800		1	800		1	800		1	300	
65	Lighting system	Halo		1000			1000			1000			1000			1000			1200			600	

INDEX OF EQUIPMENT AND COST DATA FOR RENOVATED SATELLITE DINING FACILITY DESIGNS (cont'd)

Item Code	Item Description	Manuf.	1953 Regular			1953 Specialty			1953 Short Order			1957 Regular			1957 Specialty and Short Order			1938 Regular			1941 Regular		
			No. Req'd.	Est. Cost	No. Req'd.	No. Req'd.	Est. Cost	No. Req'd.	No. Req'd.	Est. Cost	No. Req'd.	No. Req'd.	Est. Cost	No. Req'd.	No. Req'd.	Est. Cost	No. Req'd.	No. Req'd.	Est. Cost	No. Req'd.	Est. Cost	No. Req'd.	Est. Cost
66	Painting			700			700			700			700			700			700			300	
74	Vinyl cove base		120'	60		140	70		65			180	90		180	90		200	100				
75	Quarry tile		1170	3510		740	2220		1030	3090		750	2250		720	2160		900	2700				
76*	Demolition			800			800			800			1000			1000			800			500	
77*	New conc. block wall		40	800		40	800		40	800		40	800		40	800		100	2000				
78	Entry steps			300			300			300												300	
79*	Loading dock			600			600			600												600	
80*	42" exterior door																					300	
81	24" interior door											1	150		1	150		1	300				
81a	30" interior door		2	350		2	350		2	350		3	925		4	700		2	350				
82	60" entry/ext. door- double (glass & alumin.)																	2	800				
82a	60" emergency exit door																	1	400				
83*	42" service door (single)		1	300		1	300		1	300					2	600		1	300				
83a*	60" service door (double)											1	400										
86	Toilets		1	400		1	400		1	400		1	400		1	400		2	800				
87	Lavatory & accessories		1	300		1	300		1	300		1	300		1	300		2	600				
88	Janitor's sink		1	300		1	300		1	300		2	600		2	600		1	300				
89	Exhaust ventilator		1	300		1	300		1	300		1	300		1	300		2	600				

Multi-Purpose Room

All 1953

Item Code	Item Description	Manuf.	No. Req'd.	Est. Cost
45	Tableware transporter		1	\$500
48	42" sq. table	Shelby Williams	6	300
53	Stacking side chair	Shelby Williams	24	390
60	Window drapery	Ben Rose	20 yds.	600
	Window drapery track	Golden Line Co.	40 lf	80
53	Carpet	Lees Faculty	65 yds.	585
75	Quarry tile		360	1080
77	New conc. block wall		65	1300
81a	30" interior door		3	525
82	60" entry/exit door - double (glass & alum.)		1	400
84	Wood folding door	Pella	1	1200
86	Toilets		3	1200
87	Lavatory & accessories		3	900
88	Janitor's sink		1	300
89	Exhaust ventilator		2	600
90	Water fountain		1	400
	Subtotal			\$10,360
	10% Contingency			\$ 1,040
	Total			\$11,400

APPENDIX IV
DETAILED STAFFING REQUIREMENTS

A new proposed detailed table of distribution and allowances (TDA) has been prepared delineating every job in the directorate of food operations by job title, grade and MOS. The recapitulation is shown below and the proposed TDA follows the recapitulation.

DESCRIPTION	NO.
RECAPITULATION BY IDENTITY GROUP	
MILITARY	
OFFICERS	6
WARRANT OFFICERS	5
ENLISTED	308
TOTAL MILITARY	319
CIVILIANS - DIRECT HIRE	
GENERAL SCHEDULE	42
WAGE SYSTEM	284
TOTAL CIVILIANS - DIRECT HIRE	326
TOTAL CIVILIANS	326
TOTAL TDA	645

DETAILED TABLE OF DISTRIBUTION AND ALLOWANCES **SECTION II - ORGANIZATION**

TDA NO.
DATE

DESIGNATION
BASE FOR COMPUTATION OF CHANGES

TDA ☐ MTDA ☐

INDEX		DESCRIPTION c	GRADE d	MOS e	BR f	ID g	ARMY MGT STRUCTURE CODE h	REQ i	AUTH j	RMK k
PAR a	LINE b									
01	00	OFFICE OF THE DIRECTOR								
	01	DIRECTOR	06	04114	QM	O	90404400	1		
	02	SERGEANT MAJOR	E9	94250	NC	E	90404400	1		
	03	DEPUTY (SUPVY FD TECHNOLOGIST)	14	01382	GS	C	90404400	1		
	04	SECRETARY-STENOGRAPHER	06	00318	GS	C	90404400	<u>1</u>		
		TOTAL						4		
02	00	TECHNICAL SUPPORT OFFICE								
	01	CHIEF (SUPVY FOOD TECHNOLOGIST)	13	01382	GS	C	90404400	1		
	02	SECRETARY-STENOGRAPHER	05	00318	GS	C	90404400	<u>1</u>		
		TOTAL						2		
02A	00	QUALITY CONTROL SECTION								
	01	SUPERVISORY FOOD TECHNOLOGIST	12	01382	GS	C	90404400	1		
	02	DIETITIAN/HOME ECONOMIST	11	00630/ 00492	GS	C	90404400	1		
	03	GENERAL ENGINEER	11	00801	GS	C	90404400	1		
	04	VETERINARY NCO	E7	91R40	NC	E	90404400	1		
	05	VETERINARY SPECIALIST	E5	91R40		E	90404400	1		
	06	EXECUTIVE CHEF	11	00301	GS	C	90404400	1		
	07	PHYSICAL SCIENCE TECHNICIAN	05	01311	GS	C	90404400	1		
	08	PHYSICAL SCIENCE AIDE	04	01311	GS	C	90404400	1		
	09	PHYSICAL SCIENCE AIDE	03	01311	GS	C	90404400	<u>1</u>		
		TOTAL						9		

DETAILED TABLE OF DISTRIBUTION AND ALLOWANCES SECTION II - ORGANIZATION

TDA NO.
DATE

DESIGNATION
BASE FOR COMPUTATION OF CHANGES

TDA ☐ MTDA ☐

INDEX		DESCRIPTION c	GRADE d	MOS e	BR f	ID g	ARMY MGT STRUCTURE CODE h	REQ i	AUTH j	RMK k
PAR a	LINE b									
02B	00	MICROBIOLOGY SECTION								
	01A	FOOD HYGIENIST OR	04	03204	MS	0	90404400	1		
	01B	ENVIRONMENTAL SANITARIAN	04	03370	MS	0	90404400			
	02	MICROBIOLOGIST	12	00403	GS	C	90404400	1		
	03	MICROBIOLOGIST	09	00403	GS	C	90404400	1		
	04	FOOD TECHNOLOGIST/CHEMIST	07	01382/ 01320	GS	C	90404400	1		
	05	PREVENTIVE MEDICINE SPEC	E4	91S10		E	90404400	1		
	06	BIOLOGICAL LAB TECHNICIAN	05	00404	GS	C	90404400	1		
	07	CLERK-TYPIST	03	00322	GS	C	90404400	<u>1</u>		
		TOTAL						7		
03	00	DATA MANAGEMENT OFFICE								
	01	SUPVRY COMPUTER SYSTEMS ANALYST	13	00330	GS	C	90404400	1		
	02	SECRETARY-STENOGRAPHER	05	00318	GS	C	90404400	<u>1</u>		
		TOTAL						2		
03A	00	CONSUMER ANALYSIS SECTION								
	01	SOCIAL PSYCHOLOGIST	12	00180	GS	C	90404400	1		
	02	INDUSTRIAL PSYCHOLOGIST	09	00180	GS	C	90404400	1		
	03	STATISTICIAN	07	01530	GS	C	90404400	1		
	04	STATISTICAL CLERK	E5	74C20		E	90404400	1		
	05	CLERK TYPIST	03	00322	GS	C	90404400	<u>1</u>		
		TOTAL						5		
03B	00	REVIEW AND ANALYSIS BRANCH								
	01	INDUSTRIAL ENGINEER	11	00896	GS	C	90404400	1		

DETAILED TABLE OF DISTRIBUTION AND ALLOWANCES
SECTION II - ORGANIZATION

TDA NO.
DATE

DESIGNATION

TDA ☐ MTDA ☐

BASE FOR COMPUTATION OF CHANGES

INDEX		DESCRIPTION c	GRADE d	MOS e	BR f	ID g	ARMY MGT STRUCTURE CODE h	REQ i	AUTH j	RMK k
PAR a	LINE b									
	04	ACCOUNTANT	09	00510	GS	C	90404400	1		
	05	STATISTICAL CLERK	E5	74C20		E	90404400	2		
	06	SENIOR ACCOUNTING SPECIALIST	E5	73D20		E	90404400	<u>1</u>		
		TOTAL						7		
03B	00	COMPUTER SUPPORT SECTION								
	01	COMPUTER SYSTEM ANALYST	11	00510	GS	C	90404400	1		
	02	COMPUTER PROGRAMMER	09	00334	GS	C	90404400	1		
	03	STATISTICAL CLERK	E5	74C20		E	90404400	1		
	04	CARD PUNCH OPERATOR	E4	71U20		E	90404400	<u>2</u>		
		TOTAL						5		
04	00	PERSONNEL AND TRAINING OFFICE								
	01	PERSONNEL MANAGEMENT SPEC	11	00201	GS	C	90404400	1		
	02	PERSONNEL SGT	E7	71H40	NC	E	90404400	1		
	03	PERSONNEL CLERK	05	00203	GS	C	90404400	1		
	04	SECRETARY-STENOGRAPHER	04	00318	GS	C	90404400	<u>1</u>		
		TOTAL						4		
05	00	FOOD DIVISION								
	01	FOOD DIVISION CHIEF	05	04114	QM	O	90404400	1		
	02	NCOIC	E9	94Z50	NC	E	90404400	1		
	03	FOOD TECHNOLOGIST	13	01382	GS	C	90404400	1		
	04	SECRETARY-STENOGRAPHER	05	00318	GS	C	90404400	1		
	05	CLERK-TYPIST	03	00322	GS	C	90404400	1		
	06	COOKS HELPER	E3	94B20		E	90404400	4		
	07	FOOD SERVICE WORKER	03	07408	WG	C	90404400	2		

DETAILED TABLE OF DISTRIBUTION AND ALLOWANCES
SECTION II - ORGANIZATION

TDA NO.

DATE

TDA ☐ MTDA ☐

DESIGNATION

BASE FOR COMPUTATION OF CHANGES

INDEX		DESCRIPTION c	GRADE d	MOS e	BR f	ID g	ARMY MGT STRUCTURE CODE h	REQ i	AUTH j	RMK k
PAR a	LINE b									
	08	FOOD SERVICE WORKER	02	07408	WG	C	90404400	<u>3</u>		
		TOTAL						14		
05A	00	INGREDIENT PREPARATION BRANCH								
	01	INGREDIENT SUPERVISOR	WO	941A0		P	90404400	1		
	02	NCOIC	E8	94Z50	NC	E	90404400	1		
	03	COOK SUPERVISOR	E7	94B40	NC	E	90404400	1		
	04	COOK SUPERVISOR	E6	94B40	NC	E	90404400	2		
	05	COOK LEADER	E5	94B20		E	90404400	2		
	06	COOK	E4	94B20		E	90404400	2		
	07	MEAT CUTTER FOREMAN	08	07407	WS	C	90404400	1		
	08	MEAT CUTTER LEADER	08	07407	WL	C	90404400	1		
	09	MEAT CUTTER	08	07407	WG	C	90404400	5		
	10	SUB STORAGE SPEC	E4	76X20		E	90404400	2		
	11	STOCK CHECKER	E3	76X20		E	90404400	1		
	12	STOREROOM MAN	E3	76A10		E	90404400	2		
	13	FOOD SERVICE WORKER	03	07408	WG	C	90404400	<u>1</u>		
		TOTAL						22		
05B	00	PREPARATION BRANCH								
	01	SUPERVISORY FOOD TECHNOLOGIST	12	01382	GS	C	90404400	1		
	02	FOOD SERVICE TECHNICIAN	WC	941A0		P	90404400	1		
	03	NCOIC	E8	94Z50	NC	E	90404400	1		
	04	CHIEF BAKER	E7	94D40	NC	E	90404400	1		
	05	COOK SUPERVISOR	E6	94B40		E	90404400	1		
	06	COOK	08	07404	WL	C	90404400	1		
	07	ASSISTANT BAKER	E6	94D40		E	90404400	1		

DETAILED TABLE OF DISTRIBUTION AND ALLOWANCES SECTION II - ORGANIZATION

TDA NO.

DATE

DESIGNATION

BASE FOR COMPUTATION OF CHANGES

TDA ☐ MTDA ☐

INDEX		DESCRIPTION c	GRADE d	MOS e	BR f	ID g	ARMY MGT STRUCTURE CODE h	REQ i	AUTH j	RMK k
PAR a	LINE b									
	08	COOK LEADER	E5	94B20		E	90404400	2		
	09	LEAD BAKER	E5	94D40		E	90404400	1		
	10	COOK	E4	94B20		E	90404400	12		
	11	BAKER	E4	94D20		E	90404400	<u>2</u>		
		TOTAL						24		
5C	00	PORTIONING & PACKAGING BRANCH								
	01	NCOIC VETERINARY NCO	E8	91R40	NC	E	90404400	1		
	02	COOK SUPERVISOR	E7	94B40	NC	E	90404400	2		
	03	COOK LEADER	E5	94B20		E	90404400	2		
	04	COOK	E4	94B20		E	90404400	<u>7</u>		
		TOTAL						12		
05D	00	INTERNAL SANITATION BRANCH								
	01	NCOIC	E8	94Z50	NC	E	90404400	1		
	02	FOOD SERVICE WORKER LEADER	02	07408	WL	C	90404400	2		
	03	FOOD SERVICE WORKER	02	07408	WG	C	90404400	5		
	04	JANITOR	02	03566	WG	C	90404400	<u>3</u>		
		TOTAL						11		
05E	00	SCHEDULING SECTION								
	01	INDUSTRIAL ENGINEER	11	00896	GS	C	90404400	1		
	02	MATHEMATICAL TECHNICIAN	05	01521	GS	C	90404400	1		
	03	CLERK TYPIST	03	00322	GS	C	90404400	<u>1</u>		
		TOTAL						3		

DETAILED TABLE OF DISTRIBUTION AND ALLOWANCES SECTION II - ORGANIZATION

TDA NO.

DATE

DESIGNATION

TDA ☐ MTDA ☐

BASE FOR COMPUTATION OF CHANGES

INDEX		DESCRIPTION c	GRADE d	MOS e	BR f	ID g	ARMY MGT STRUCTURE CODE h	REQ i	AUTH j	RMK k
PAR a	LINE b									
06	00	LOGISTICS DIVISION								
	01	LOGISTICS DIVISION CHIEF	05	04010	SM	O	90404400	1		
	02	LOGISTICS SPECIALIST	11	02001	GS	C	90404400	1		
	03	SECRETARY-STENOGRAPHER	05	00318	GS	C	90404400	<u>1</u>		
		TOTAL						3		
06A	00	STORAGE & DISTRIBUTION BRANCH								
	01	CHIEF	04	04130	QM	O	90404400	1		
	02	DISTRIBUTION SUPERVISOR	E8	71N40	NC	E	90404400	1		
	03	DISTRIBUTION SUPERVISOR ASST	E7	71N40	NC	E	90404400	1		
	04	TRUCK DRIVER	E5	64B20		E	90404400	18		
	05	ASSISTANT DRIVER	E4	64B20		E	90404400	9		
	06	SUBSISTENCE STORAGE SPECIALIST	E7	76X40	NC	E	90404400	1		
	07	WAREHOUSEMAN	06	06907	WG	C	90404400	2		
	08	COOKS HELPER	E3	94B20		E	90404400	7		
	09	STOCK CHECKER	E3	76X20		E	90404400	1		
	10	RATION CLERK	04	00301	GS	C	90404400	1		
	11	CLERK-TYPIST	03	00322	GS	C	90404400	<u>1</u>		
		TOTAL						43		
06B	00	WARE WASHING BRANCH								
	01	GENERAL FOREMAN	05	07408	WS	C	90404400	1		
	02	FOOD SERVICE WORKER FOREMAN	02	07408	WS	C	90404400	1		
	03	FOOD SERVICE WORKER FOREMAN	01	07408	WS	C	90404400	1		
	04	FOOD SERVICE WORKER LEADER	02	07408	WL	C	90404400	6		
	05	FOOD SERVICE WORKER	02	07408	WG	C	90404400	20		
	06	FOOD SERVICE WORKER	01	07408	WG	C	90404400	<u>24</u>		
		TOTAL						53		

DETAILED TABLE OF DISTRIBUTION AND ALLOWANCES SECTION II - ORGANIZATION

TDA NO.
DATE

DESIGNATION

TDA ☐ MTD ☐

BASE FOR COMPUTATION OF CHANGES

INDEX		DESCRIPTION c	GRADE d	MOS e	BR f	ID g	ARMY MGT STRUCTURE CODE h	REQ i	AUTH j	RMK k
PAR a	LINE b									
06C	00	MAINTENANCE BRANCH								
	01	EQUIPMENT MAINTENANCE FOREMAN	09	05301	WS	C	90404400	1		
	02	MECHANIC	08	05301	WG	C	90404400	1		
	03	BOILER PLANT OPERATORS	09	05402	WG	C	90404400	3		
	04	KITCHEN AND BAKERY EQUIP MECH	10	05310	WG	C	90404400	1		
	05	OILER AND GREASER	06	05323	WG	C	90404400	<u>1</u>		
		TOTAL						7		
06D	00	PROPERTY BOOK SECTION								
	01	PROPERTY BOOK OFFICER	W0	0761A		P	90404400	1		
	02	SENIOR SUPPLY NCO	E8	76Z50	NC	E	90404400	1		
	03	PROPERTY BOOK CLERK	E5	76Y20		E	90404400	1		
	04	SUPPLY CLERK	E4	76Y20		E	90404400	<u>1</u>		
		TOTAL						4		
07	00	SATELLITE DIVISION								
	01	CHIEF	05	04114	QM	O	90404400	1		
	02	FOOD TECHNOLOGIST (HOTEL & RESTAURANT MGT)	09	01382	GS	C	90404400	1		
	03	NCOIC	E9	94Z50	NC	E	90404400	1		
	04	SUPERVISORY SERGEANT	E8	94Z50	NC	E	90404400	1		
	05	COOK SUPERVISOR	E7	94B40	NC	E	90404400	1		
	06	COOK LEADER	E6	94B20		E	90404400	1		
	07	COOK LEADER	E5	94B20		E	90404400	1		
	08	COOK	E4	94B20		E	90404400	3		

DETAILED TABLE OF DISTRIBUTION AND ALLOWANCES SECTION 1 ORGANIZATION

TDA NO.
DATE

TDA ☐ MTD A ☐

DESIGNATION

BASE FOR COMPUTATION OF CHANGES

INDEX		DESCRIPTION c	GRADE d	MOS e	BR f	ID g	ARMY MGT STRUCTURE CODE h	REQ i	AUTH j	RMK k
PAR a	LINE b									
	09	CONTRACT ASSISTANT	05	01102	GS	C	90404400	1		
	10	CLERK TYPIST	03	00322	GS	C	90404400	1		
		TOTAL						12		
07A	00	REGULAR FACILITIES BRANCH								
	01	FOOD SERVICE SUPERVISOR	W0	941A0		P	90404400	1		
	02	SUPERVISORY SERGEANT	E8	94Z50	NC	E	90404400	1		
	03	COOK SUPERVISOR	E7	94B40	NC	E	90404400	33		
	04	COOK LEADER	E6	94B40		E	90404400	16		
	05	COOK LEADER	E5	94B20		E	90404400	24		
	06	COOK	E4	94B20		E	90404400	59		
	07	COOK	08	07404	WG	C	90404400	33		
	08	FOOD SERVICE WORKER	03	07408	WG	C	90404400	33		
	09	FOOD SERVICE WORKER	02	07408	WG	C	90404400	66		
		TOTAL						266		
07B	00	SPECIAL FACILITIES BRANCH								
	01	FOOD SERVICE SUPERVISOR	W0	941A0		P	90404400	1		
	02	SUPERVISORY SERGEANT	E8	94Z50	NC	E	90404400	1		
	03	COOK SUPERVISOR	E7	94B40	NC	E	90404400	15		
	04	COOK LEADER	E6	94B40		E	90404400	8		
	05	COOK LEADER	E5	94B20		E	90404400	12		
	06	COOK	E4	94B20		E	90404400	26		
	07	COOK	08	07404	WG	C	90404400	15		
	08	FOOD SERVICE WORKER	03	07408	WG	C	90404400	15		
	09	FOOD SERVICE WORKER	02	07408	WG	C	90404400	30		
		TOTAL						123		

DETAILED TABLE OF DISTRIBUTION AND ALLOWANCES
SECTION II - ORGANIZATION

TDA NO.

DATE

DESIGNATION

BASE FOR COMPUTATION OF CHANGES

TDA ☐ MTDA ☐

INDEX		DESCRIPTION c	GRADE d	MOS e	BR f	ID g	ARMY MGT STRUCTURE CODE h	REQ i	AUTH j	RMK k
PAR a	LINE b									
07C	00	JANITORIAL SERVICES BRANCH								
	01	DUTY FOREMAN	E7	57G40	NC	E	90404400	1		
	02	FOOD SERVICE WORKER	03	07408	WG	C	90404400	3		
	03	FOOD SERVICE WORKER	02	07408	WG	C	90404400	<u>3</u>		
		TOTAL						7		