



# **YAVAPAI COUNTY COMMUNITY HEALTH SERVICES CONSTRUCTION GUIDE FOR FOOD ESTABLISHMENTS**

**Based on the 1999 FDA Food Code Requirements**

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# **INTRODUCTION**

This booklet is available to any person intending to construct or remodel a food establishment in Yavapai County. It is designed to present food establishment construction requirements in a format that is easily understood. It is intended as a general overview and should not be considered all-inclusive.

All new construction and extensive remodeling of food establishments must comply with Section I - Construction Requirements and Section II - Plan Review, as identified in this booklet. Extensive remodeling is considered to be any remodeling that substantially alters the food preparation area (e.g. enlarging the kitchen or reducing the size of the kitchen, adding plumbing or deleting plumbing including the wastewater lines, adding or deleting plumbing fixtures especially sinks, adding or deleting equipment especially walk-in refrigerators and freezers).

Minor remodeling (e.g. painting, new flooring, and interior decorating in the dining area, replacing equipment or fixtures with the same or similar equipment or fixtures) does not need to be reviewed by Health Services.

This booklet is divided into three sections. The first section presents construction requirements for food establishments. These requirements were taken from the Arizona Administrative Code and have been reworded to be easier to read and understand.

Section two contains information on plan review fees; plan submission and inspections leading up to opening the establishment. This information is designed to help the applicant know what Health Services needs on the plans to expedite plan review of the proposed establishment.

The third section is information that the reader may find helpful. The material is informational only, and is not a regulation.

## **PURPOSE OF THIS MANUAL**

The Yavapai County Community Health Services has gathered and placed in this manual construction information from the Arizona Administrative Code regarding new food establishments and buildings being remodeled for food service establishments.

This manual should help the food service establishment owners or operators better understand the requirements and prepare plans that include the necessary information. When well-prepared plans are submitted to Health Services, plan review time is minimized, resulting in quicker turnaround and earlier completion of the construction project.

For further information, please refer to the Arizona Food Code (<http://www.az.gov>) and Yavapai County Health Code (<http://www.co.yavapai.az.us/health.aspx>). Look under the Environmental Health menu on the left side for the Health Code link.

## **OUR MISSION**

Yavapai County Community Health Services will provide leadership, information, and services to improve the health and well being of Yavapai County residents.

## **FEES**

There are costs to Health Services when a new food service establishment opens for business. Included in these costs are time spent reviewing the plans, time for performing construction and opening inspections and overhead costs.

State Law limits Health Services in establishing fees for service. Health Services can only charge . . . . the reasonable cost of providing the services required, including administrative costs.

Our fees have been established keeping the State Laws in mind. If you have any question about the fees please contact Health Services.

# **Environmental Health Offices**

Staff are based in three County offices, with each responsible for various communities. As the County grows and staffing changes, these areas may change.

## **PRESCOTT OFFICE**

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Area responsibility:  
North Prescott, Chino Valley, Paulden, Ash Fork, Seligman

## **COTTONWOOD OFFICE**

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Area responsibility:  
Sedona, Village of Oak Creek, Rimrock, Cornville, Cottonwood, Clarkdale, Jerome, Mayer, Dewey-Humboldt, Camp Verde, Cordes Junction, Black Canyon City, Crown King, Bumble Bee

(The area known as "Uptown Sedona" is in Coconino County)

## **PRESCOTT VALLEY OFFICE**

3212 N. Windsong  
Prescott Valley, AZ 86314  
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Area responsibility:  
South Prescott, Prescott Valley, Skull Valley, Bagdad, Kirkland, Wilhoit, Congress, Yarnell

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## **OTHER AGENCIES**

### **Yavapai County offices**

#### **Prescott**

Development Services  
500 S. Marina St., Room 15  
Prescott, AZ 86301  
(928) 771-3214

#### **Cottonwood**

Development Services  
10 S. Sixth St.  
Cottonwood, AZ 86326  
(928) 639-8151

### **Town and City Building Departments**

Town of Camp Verde  
473 S. Main St. Ste 108  
Camp Verde, AZ 86322  
567-8514

Town of Jerome  
P.O. Box 335  
600 Clark St.  
Jerome, AZ 86331  
634-7943

Town of Chino Valley  
Town Hall, P.O. Box 406  
1982 N. Voss Dr.  
Chino Valley, AZ 86323  
636-4427

City of Prescott  
P.O. Box 2059  
201 S. Cortez  
Prescott, AZ 86302  
777-1356

City of Cottonwood  
827 N. Main  
Cottonwood, AZ 86326  
634-5505

Town of Prescott Valley  
7501 E. Civic Circle  
Prescott Valley, AZ 86314  
759-3050

City of Sedona  
102 Roadrunner Dr  
Sedona, AZ 86336  
282-1154

Town of Clarkdale  
39 N 9<sup>th</sup> St/P.O. Box 308  
Clarkdale, AZ 86324  
639-2500

Town of Dewey-Humboldt  
P.O. Box 69  
2735 S. Hwy 69 Ste 12  
Humboldt, AZ 86329  
632-8643

# **SECTION I**

## **GENERAL CONSTRUCTION AND EQUIPMENT REQUIREMENTS**



## **GENERAL CONSTRUCTION AND EQUIPMENT REQUIREMENTS**

All equipment in new establishments or replacement equipment in remodeled establishments must meet the requirements of the Arizona Administrative Code (AAC) and the Arizona Food Code.

### **1. FLOORS**

- a. Floors in a food establishment (except in dining areas) need to be durable, smooth, easily cleanable and impervious to water, grease or acid. A coved base is required. A description of the floor or floor covering needs to be submitted with the plans. If the plan reviewer is not familiar with the floor covering a sample may be requested.
- b. Floor sinks and floor drains must be installed flush with the floor surface or as required by the local Building Codes. All condensate and similar liquid waste should be indirectly drained into an open floor sink. Horizontal runs of drainpipes should be at least three-quarter inch from the wall and a minimum of six inches off the floor. Drainpipes should terminate at least one inch above the overflow rim of a floor sink. Floor sinks shall be located so that they are readily accessible for inspection, cleaning and repair. Utility lines and pipes may not cross any aisle, traffic area or door opening. Floor sinks or floor drains are not permitted inside refrigeration walk-in boxes.

### **2. WALLS**

Walls in all areas except dining areas shall be smooth, durable, light in color and easily cleanable. Floor and wall juncture must be coved.

### **3. CEILINGS**

- a. Ceilings in all areas except dining areas must be smooth, easily cleanable, durable and light in color. Blown acoustical-type ceiling is not acceptable. Drop-in ceiling paneling may be acceptable if it complies with the preceding requirements and if a sample is submitted to and approved by this Department.

**NOTE:** Waitress stations, salad bars, food serving or self-service open food counters or other similar stations located immediately adjacent to or in dining areas must comply with floor and wall requirements.

## **4. UTILITY LINES**

- a. All utility lines, plumbing, electrical and gas lines may not be unnecessarily exposed. Where it is not possible to install utility lines in the wall, all lines should be at least three-quarter inch away from the walls or ceiling and at least six (6) inches off the floor for cleaning purposes. Alternative installation of utility lines may include enclosing them in a chase or caulking for cleanability.
- b. Where a utility line enters a wall, ceiling or floor, the opening around the utility line must be tightly sealed.
- c. Utility lines must not be installed across any aisle, traffic area or door opening.
- d. Multiple runs or clusters of utility lines should be furred out and encased in a chase or raceway or other sealed enclosure to prevent vermin harborage.

## **5. EXHAUST HOODS AND DUCTS**

- a. Mechanical exhaust ventilation may be required at or above all ranges, griddles, ovens, deep fat fryers, barbecues, rotisseries and high temperature dishwashing machines or similar equipment to effectively remove grease, smoke, steam vapors, heat or odors.
- b. All hoods, ducts and exhaust outlets should be designed and installed in accordance with the Uniform Mechanical Code and other applicable codes.
- c. All joints and seams must be sealed or soldered for ease of cleaning. Riveted seams are not acceptable.
- d. Canopy-type hoods should not be more than seven (7) feet above the floor and should not be more than four feet above the cooking surface. The hood shall overhang or extend a horizontal distance not less than six (6) inches beyond the outer edges of the cooking surfaces, on all open sides. The hood should have grease troughs or drip pans that are easily cleanable. Non-canopy type (high velocity) or back shelf hoods: Non-canopy-type hoods will be approved providing they are constructed to be easily cleanable and they comply with the minimum exhaust air velocity requirements. Shielding at the ends of the hood may be necessary to prevent interference from cross drafts.
- e. Make-up air at least equal to that amount which is mechanically exhausted must be provided. The make-up air system must be interconnected to the exhaust hood on a single switch. Windows and doors are not acceptable for the purpose of providing make-up air.
- f. Fire extinguishing systems may be required by local fire department codes. They should be installed to facilitate cleaning the hood and duct systems.

## 6. REFRIGERATION (Food Cold Holding and Food Cooling)

- a. Refrigeration units must be adequate in capacity to meet the needs of the proposed operation and should comply with the following requirements.
  1. Be provided with an accurate, readily visible thermometer.
  2. Must have shelving that is non-absorbent and easily cleanable. Wood is not acceptable in new units or units new to the establishment.
  3. Must have smooth, non-absorbent and easily cleanable interior surfaces. All joints should be sealed.
  4. Condensate waste from refrigeration units must be drained, into a floor sink or evaporated by an approved evaporator unit.
  5. Rapid cool down facilities may be required depending on the quantity of food produced by the establishment.
  6. Refrigerators must be able to maintain food at or below 41°F.
- b. Walk-in refrigerators and walk-in freezers:
  1. Have shelving that is at least six (6) inches off the floor with smooth, round, metal legs, or that is cantilevered and suspended directly from the wall for ease of cleaning. Small, easily movable, casted dollies may be used in place of a lower shelf inside a walk-in refrigerator.
  2. Have condensate waste line, which drains into a floor sink via an air gap outside of the unit.
  3. Must be able to maintain food at or below 41°F or maintain food frozen.

## 7. ICE MACHINES

All ice machines must be located inside the food establishment in an easily cleanable, well-ventilated area. The ice bin must be drained to a floor sink via an air gap.

## 8. FLOOR SINKS

- a. All condensate and liquid waste should be drained into a floor sink via an air gap.
- b. Floor sinks should be installed flush with the floor surface and have proper grates.
- c. Horizontal runs of drainpipe, if not concealed in the wall, should be at least three-quarter inch from the wall and a minimum six (6) inches off the floor. Slope should be one-eighth inch ( $\frac{1}{8}$  ") per foot until terminating above the overflow rim of the floor sink. A drainpipe may be installed in a wall, have a chase placed around it, or have top and bottom sealed to the wall.
- d. Floor sinks should be located so that they are readily accessible for inspection, cleaning and repair.
- e. Floor sinks or floor drains are not permitted inside walk-in refrigerator or freezer.
- f. Floor sinks installed in cabinetry should be designed so if overflow occurs it can easily be cleaned and not seep under walls, cabinetry and equipment.

## 9. THREE-COMPARTMENT SINK

- a. Where multi-service kitchen utensils (i.e., pots, pans, etc.) are utilized, there must be at least one three-compartment sink.
- b. The three-compartment sink must be indirectly drained with an air gap into a floor sink. Note: If the 3<sup>rd</sup> sink (sanitizing/rinse) is used for a food prep sink, the drain should be plumbed separately from the 1<sup>st</sup> and 2<sup>nd</sup> sink and indirectly drained into a floor sink.
- c. The minimum compartment size should be sufficient to accommodate the largest piece of equipment to be washed. The drain boards should be at least as large as the largest sink compartment.
- d. Drain boards, utensil racks, or tables large enough to accommodate all soiled items are needed.
- e. In a large food facility with separate food preparation or dishwashing areas, an additional three-compartment sink may be required in each food preparation or dishwashing area.
- f. A three-compartment sink may not be required if facility is 100 percent pre-packaged, (e.g. no food or drink preparation or serving, no ice packaging, no unpackaged snacks).

## 10. FOOD AND VEGETABLES PREPARATION SINKS

A separate food preparation sink is recommended for thawing foods or washing fruits and vegetables. A food preparation sink needs to indirectly drained with an air gap into a floor sink. If large amounts of food prep is done, it may be recommended that a 2<sup>nd</sup> separate food preparation sink be in place, one for raw meats and another for produce.

## 11. WAREWASHING MACHINES

- a. A Warewashing machine should:
  1. Drain to a floor sink through an air gap or drain by another approved method.
  2. Have two integral stainless steel self-draining drainboards.
- b. Warewashing machines using **hot water** for **sanitizing** should:
  1. Be provided with a booster heater capable of maintaining the sanitizing rinse water at least 180°F. and not more than 194°F.
  2. Be provided with accurate thermometers and pressure gauges.
- c. Ware washing machines using a **chemical sanitizer** must:
- d. Automatically dispense the sanitizer.
- e. Maintain the chemical sanitizing rinse water temperature at 75°F or higher.
- f. Be equipped with a device that audibly or visually indicates when more chemical sanitizer needs to be added.

## **12. GARBAGE DISPOSALS**

Garbage disposals must be installed according to the requirements of the Uniform Plumbing Code. Garbage disposals must not be installed in any sink compartment of a three-compartment sink. The waste piping from the garbage disposal should be directly connected to the building sewer line.

## **13. SERVICE SINK**

- a. A service sink should be located in a separate janitorial room or separated from the rest of the food establishment by a solid wall partition. The partition must be durable, smooth and easily cleanable.
- b. A service sink or a curbed floor drain should be installed for the disposal of mop water, the cleaning of refuse containers, mats and duckboards. The sink should be provided with hot and cold water.

## **14. HANDWASHING SINKS**

- a. Hand sinks, conveniently located, must be provided for employees working in food preparation and utensil washing areas. Hot and cold water through a mixing valve or combination faucet is required.
- b. Soap and sanitary towels must be provided at the hand sinks.

## **15. HOT WATER**

- a. A hot water heater needs to be capable of supplying water at a temperature of at least 110F at all times to all handwashing, dishwashing, potwashing and mop sinks.
- b. All sinks need to have hot and cold running water through a mixing valve, combination faucet, metering faucet, and self-closing or slow-closing faucet.

## **16. DIPPER WELL**

- a. Utensils used for dispensing moist foods may be stored in a dipper well with running water of sufficient velocity to flush food particles to the drain. The dipper well shall be indirectly drained with an air gap into a floor sink.

## **17. WINDOW SCREENS**

All windows that open must be screened with at least 16-mesh to 1 inch screening.

**18. FOOD GUARDS** (Design information is available from Health Services.)

- a. Displays of unpackaged foods must be protected by an approved guard or be dispensed from approved self-service containers.

**19. TOILET ROOMS**

- a. Toilet facilities must be conveniently located and accessible to employees at all times.
- b. Toilet facilities must be so situated that patrons do not pass through food preparation, food storage or utensil washing areas.
- c. The floors, walls and ceilings need to be smooth, durable, non-absorbent, and easily cleanable. Walls and ceiling should be light in color.
- d. Handwashing sinks must be provided within or immediately adjacent to the toilet rooms. The handsink must have hot and cold running water. Soap and sanitary hand drying devices must also be provided at the handwashing sink.
- e. Toilet tissue needs to be provided in a permanently installed dispenser at each toilet.
- f. Restrooms should have tight fitting, self-closing doors.
- g. All toilet rooms must be provided with mechanical ventilation approved by the Department.
- h. Employee restrooms may be required.

**20. OUTSIDE DOORS/OPENINGS**

- a. All doors opening to the outside must be tight fitting, self-closing and solid.
- b. Openings leading to the outside should be protected to prevent the entrance of flies, rodents and other vermin.

**21. REFUSE, RECYCLABLES, AND RETURNABLES**

- a. An area must be provided for the storage of refuse, recyclables and returnables.
- b. If inside, the walls, floor and ceiling of this room need to be constructed so as to be smooth, impervious and easily cleanable and the floor must slope to a floor drain.
- c. Outside trash storage areas should be situated as far away from delivery doors as possible.
- d. Outside storage surface must be constructed of non-absorbent material such as concrete or asphalt and be smooth, durable, and sloped down to drain.

## **22. LIGHTING**

- a. At least 110 lux (10 foot candles) at a distance of 75 cm (30 inches) above the floor, in walk-in refrigeration units and dry food storage areas and in other areas and rooms is required during periods of cleaning.
- b. At least 220 lux (20 foot candles):
  1. At a surface where food is provided for consumer self-service such as buffets and salad bars or where fresh produce or packaged foods are sold or ordered for consumption.
  2. Inside equipment such as reach-in and under-counter refrigerators.
  3. At a distance of 75 cm (30 inches) above floor in areas used for handwashing, warewashing, and equipment and utensil storage, and in toilet rooms
- c. At least 540 lux (50 foot candles) at a surface where a food employee is working with food or working with utensils or equipment is working utensils or equipment such as knives, slicers, grinders, or saws where employee safety is a factor.

## **23. EQUIPMENT**

- a. All display cases, counters, shelves, tables, refrigeration equipment, sinks and other equipment used in connection with food preparation, service and display, must be made of materials that does not allow the migration of deleterious substances or impart colors, odors, or tastes to food.
- b. Materials must be safe, durable, corrosion-resistant and non-absorbent.
- c. Materials must be finished to have a smooth, durable, easily cleanable surface and be resistant to pitting, chipping, crazing, scratching, scoring, distortion and decomposition.
- d. All floor-mounted equipment should be placed on six (6) inch minimum high legs or mounted on approved casters so it is easily moveable or be completely sealed to the floor and wall(s).

## **24. WATER**

The water supply shall be from an approved source, meeting Arizona Department of Environmental Quality requirements.

## **25. BACKFLOW PROTECTION**

An approved backflow preventer must be properly installed upstream of any potential hazard between the potable water system and a source of contamination (eg: all threaded water outlets, mop sinks, sprayers, dishwashers, carbonators, chemical dispensers at three-compartment sink).

## **26. SEWAGE DISPOSAL/GREASE INTERCEPTORS**

- a. All liquid waste generated at a food establishment must be disposed of in a manner acceptable to the Yavapai County Development Services Department or local wastewater jurisdiction.
- b. Grease interceptors are required in most food establishments. Check with Development Services or your local department jurisdiction over wastewater disposal for requirements.
- c. Yavapai County Community Health Services requires grease interceptors to be located outside of the food preparation area.
- d. Grease interceptors which are inside in non-food areas must be constructed to allow proper cleaning around all areas. (eg: placed in the sub-floor, flush with floor)

## **27. FOOD WORKER TRAINING**

- a. Food worker training is required for all employees including managers, cooks, bar tenders, waitresses, dishwashers, and any other individuals that are involved in the preparation, handling or packaging of any raw, ready-to-eat, or processed food. All individuals prior to beginning work at a food establishment should obtain training. Training is available through Yavapai County Environmental Health. Call your nearest office for times.
- b. Each establishment must have at least one person available during all hours of operation that has successfully completed an approved Manager Certification Course and holds a current certificate.

## **28. LOCATION OF HANDWASHING SINKS IN FOOD ESTABLISHMENTS**

Hands are probably the most common vehicles for the transmission of disease-causing pathogens to foods in an establishment. Hands can become soiled with a variety of contaminants during routine operations. Some employees are unlikely to wash their hands unless properly equipped handwashing facilities are accessible in the immediate work area.

- a. Handwashing facilities should be so located so that the travel path from food preparation, food service, dishwashing, cooking or other food handling area is **NOT** greater than twenty (20) feet.
- b. Handwashing facilities must be in plain view of the employees. Handwashing facilities should be centrally located in the area where hands will be contaminated. Placing a handwashing facility in a corner or in an obscure place on a wall, even though the travel path is twenty (20) feet or less, does not meet the intent of being accessible in the immediate work area.
- c. If in the travel path to the handwashing facility the employees must make more



- than one (1) 90-degree turn, the handwashing facility will need to be relocated or another handwashing facility added.
- d. When the travel path to the handwashing facility requires an employee to travel to or through another work area or pass through a doorway, the location of the handwashing facility will need to be changed or another handwashing facility added.
  - e. Working surfaces and food contact surfaces adjacent to the handwashing facility must be protected from splash and water from the employee's hands.
  - f. Work areas that are continually busy or busy during rush hours may need more than one handwashing facility in the work area. For example, a cook's line with a handwashing facility at just one end—the handwashing facility may need to be centrally located or an additional handwashing facility installed.
  - g. A waitress station where food or drink is prepared for service needs a handwashing facility in the immediate work area.
  - h. A bar needs a handwashing facility in the immediate work area.
  - i. Handwashing facilities for restrooms should be located either in the restroom or immediately outside the restroom close to the restroom door.

## **SECTION II**

### **PLAN SUBMITTAL, PLAN REVIEW ESTABLISHMENT APPROVAL**

This section provides information about the procedure used by Health Services to review plans and approve new and remodeled food establishments for operation.

## YAVAPAI COUNTY COMMUNITY HEALTH SERVICES PLAN REVIEW FEES

Food Establishments	Less than 300 sq. ft. w/o food safety plan	115.00
	Less than 300 sq. ft.	370.00
	301 to 600 sq. ft.	405.00
	601 to 1000 sq. ft.	450.00
	1001 to 2500 sq. ft.	495.00
	Over 2500 sq. ft.	635.00
Minor Remodeling		No Charge

Plan review fees include all construction inspections and opening inspections, and review of the Food Safety Plan.

The Food Establishment plan review has two parts. Both must be completed and approved before a Provisional Permit will be issued to a new food establishment.

Part one deals with construction plans and part two deals with the food safety system.

## Part One

### PLAN SUBMITTAL AND PLAN APPROVAL PROCEDURES-CONSTRUCTION

One set of detailed plans and specifications need to be submitted to and approved by Yavapai County Community Health Services prior to construction or extensive remodeling of a food establishment.

Extensive remodeling is considered to be any remodeling that substantially alters the food preparation area (e.g., enlarging the kitchen or reducing the size of the kitchen, adding plumbing or deleting plumbing including the wastewater lines, adding or deleting plumbing fixtures especially sinks, adding or deleting equipment especially walk-in refrigerators and freezers).

Minor remodeling (e.g., painting, new flooring, and interior decorating in the dining area, replacing equipment or fixtures with the same or similar equipment or fixtures) does not need to be reviewed by Health Services. However the Department should be notified.

Other permits or approvals may be required, including: a building permit, zoning clearance, fire department approval, approval of the septic tank system from Development Services, and approval of the water source from the Arizona Department of Environmental Quality.

**NOTE: PLEASE USE WHITE PAPER AND NON-ERASABLE DARK INK (NO PENCILS). MINIMUM SIZE OF PAPER SHOULD BE 8 1/2 X 11 INCHES.**

1. Submit one set of plans with the required plan review fee to the Environmental Health office in Prescott, Cottonwood or Prescott Valley.
2. **A complete set of plans will include the floor plan drawn to scale, including the equipment, plumbing and electrical layouts and an equipment and finish schedule.** (Examples of formats are included on pages 24 through 29.) When an existing food establishment is being remodeled only those areas being remodeled need to be included in the plans.
3. Plans must include sufficient detail to demonstrate compliance with Arizona Administrative Code, Title 9, Chapter 8, Article 1, **FOOD AND DRINK** and Yavapai County Health Code.
4. The contact person will be notified by mail if additional information is needed. Initial review for completeness will occur within 10 working days after plans are received.
5. When the Department is satisfied that the plans comply with minimum requirements of the Food Code, approval to begin construction will be mailed to the contact person.

6. If changes to Health Services approved plans are made by the owner after approval from the Department, additional approval from the Department must be obtained for the changes. (Amended plans need to be submitted.)
7. All construction and equipment installations are subject to final on-site inspection. If there are any questions during the construction phase and/or prior to the facility opening, the contact person should call Environmental Health to avoid possible delays in opening.
8. The food establishment may not open for business until approval to open is granted by Yavapai County Environmental Health. **Appointments for preliminary opening and opening inspections should be coordinated at least three (3) working days in advance to prevent opening delays.** Final approval will be contingent on the following:
  - a. The facility must conform to the latest set of approved plans.
  - b. Proof that the appropriate building, safety, and fire departments have inspected and approved the facility.
  - c. Written approval of water and wastewater systems when required by Health Services.
  - d. Utilities (electric, gas, and potable water) must be provided at time of final inspection to determine proper operation of all equipment.
  - e. All proposed equipment must be in place and operational.
  - f. The "Food Safety Plan" must be approved.
9. The contact person/manager will receive a 90-day provisional permit from Environmental Health when operational approval is granted.

## **FOOD ESTABLISHMENT PLAN APPROVAL**

The plan shall show and specify in detail the following:

### **GENERAL:**

1. Complete and submit an application for plan review. Provide exact name, street address and mailing address of the food facility, the name, mailing address and telephone number of the applicant, contact person and building owner. (The contact person is a person who communicates with Health Services in matters pertaining to the food establishment plan.)
2. Plans should be drawn to scale, (e.g., minimum 3" = 1') using non-erasable ink or print (no pencil) and should include:

- a. The site plan with an arrow indicating north and include proposed exterior rubbish and food waste storage receptacle location with approved drainage and outdoor hose bib.
  - b. Floor plan of entire food establishment, e.g., toilets, dressing room, storage, garbage and trash areas, etc., including all interior and exterior doors. (Include total square footage of the facility). When remodeling, submit plan of remodel area only.
  - c. The complete equipment layout, including elevations of equipment and equipment specifications. List type, make and model of all equipment on an equipment schedule. (Providing manufacturer's cut sheets would be helpful)
  - d. The complete plumbing layout showing sewer, waste drains, floor sinks, vents, cleanouts, and indicate all indirect drainage where required by Code.
  - e. Electrical layout including lighting.
  - f. The complete finish schedule for walls, ceilings and floors that indicates the type of material, the color, the surface finish and the type of floor/wall juncture. Samples of proposed finish materials may be required.
  - g. The complete exhaust ventilation layout including make-up air. Indicate types of hoods, air-balance, etc.
  - h. Location of the manager's or chef's office if needed. Spaces such as change rooms or food storage areas should not be used as office space.
3. State on the plans whether the food establishment is served by a public water system or individual water wells. If an individual water well is the source of potable water, contact ADEQ for water supply requirements. (Requirements include chemical/bacteriological analysis and approved well construction.) Written documentation from ADEQ of potable water suitability should be submitted with the plans package. See page 6 for ADEQ telephone number.
4. State on the plans whether the food establishment is served by a public sewer or by an on-site sewage disposal system.

**NOTE:** If an on-site sewage disposal system is to be installed, an application to construct and a building permit must be obtained from Development Services. See page 6 for telephone number. Written documentation of system suitability from Development Services should be submitted with the plans package.

5. Symbols that may be used:

a.	Cold Water	CW	f.	Fan	F
b.	Hot Water	HW	g.	Floor sink	FS
c.	Sewage lines	S	h.	Floor drain	FD
d.	Gas lines	G	i.	Grease trap	GT
e.	Vent	V			

## **FIELD CONSTRUCTION INSPECTIONS**

### **1. CONSTRUCTION INSPECTION**

When rough-ins are completed (i.e., plumbing and ventilation), contact Environmental Health for a construction inspection. Requests should be made at least three (3) working days in advance. A construction inspection should be scheduled for no less than three weeks prior to the proposed opening of the food establishment.

### **2. PRELIMINARY OPENING INSPECTION**

This inspection should occur at least one week before opening. Walls, floors, ceilings should be complete; some finish work may still need to be completed and equipment may need to be connected to the water, gas, electric or waste system.

### **3. OPENING INSPECTION**

Upon completion of all construction, including all finish work and installation of equipment, contact Environmental Health to arrange for an opening inspection. Approval to open will be granted when the establishment passes an inspection. **In no case should an opening inspection be scheduled less than three (3) working days prior to the proposed opening of the establishment.** Approval to open must be obtained from the Yavapai County Community Health Services prior to preparing food, opening for business or using a remodeled area.

You may also need your local building department's approval prior to opening, be sure to check with your jurisdiction.

## **PART TWO**

### **FOOD SAFETY PLAN REVIEW – OPERATION PLAN**

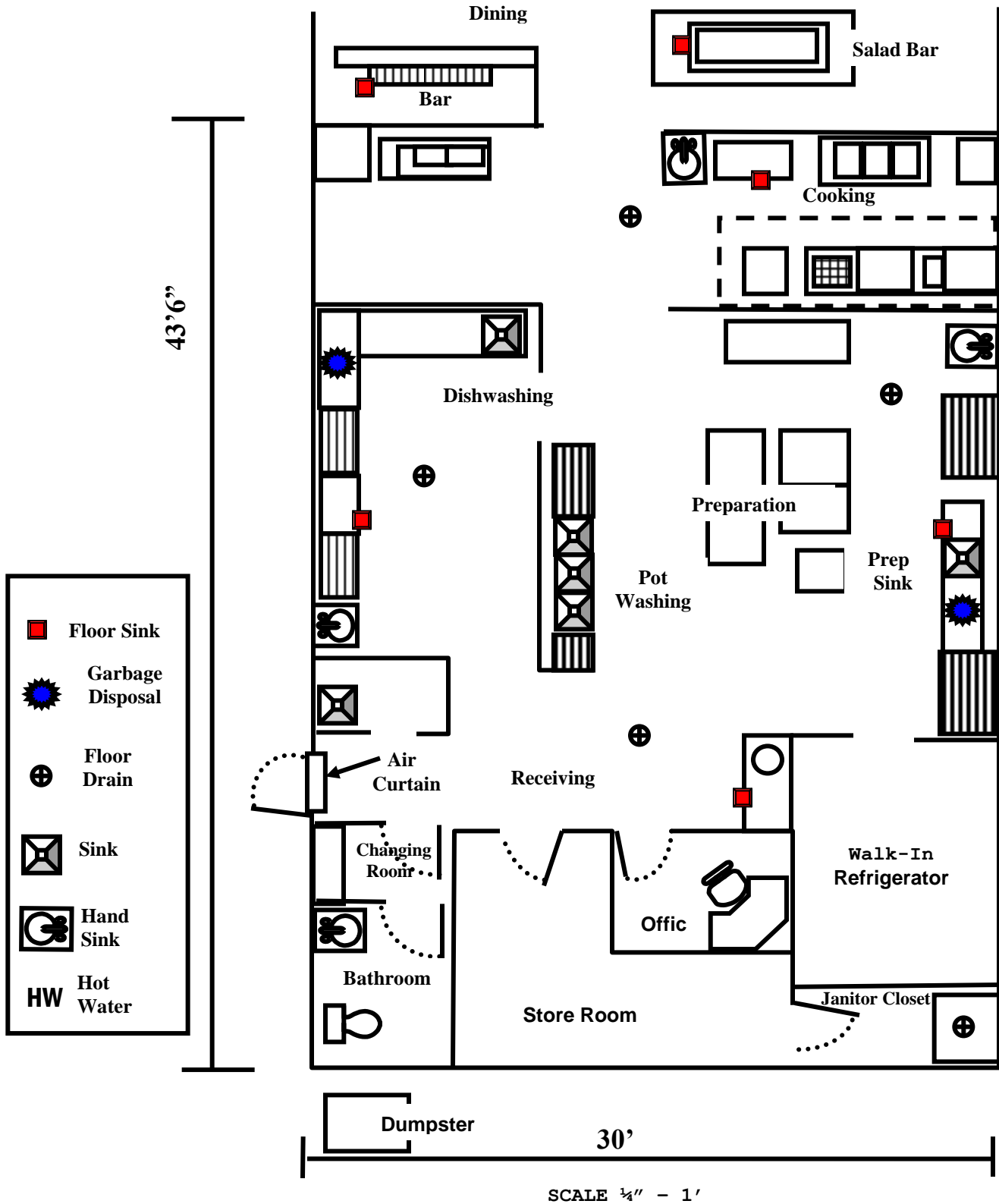
- 1.** To avoid opening delays, the operator of a new food establishment must meet with the he area Health Inspector 60 days before opening to review the food safety plan.
- 2.** The food safety plan must be written and describe the following:
  - a. The person or position responsible for the overall operation.
  - b. Identify critical points (potential problem areas including cooking, cooling, cold-holding, hot-holding, handwashing, etc.) in the operation.
  - c. The person or position responsible for controlling or managing the critical point or points.
  - d. The measurements that will be taken, by whom and when.
  - e. Corrective action that will be taken when the critical point fails to conform to the legal Food Code requirement or the higher food establishment requirement.
- 3.** A Copy of the draft menu and the draft food safety plan must be submitted with the construction plans.



**The following plan samples are for illustration purposes. Not all of the sample plans need to be submitted in the plan review package.**

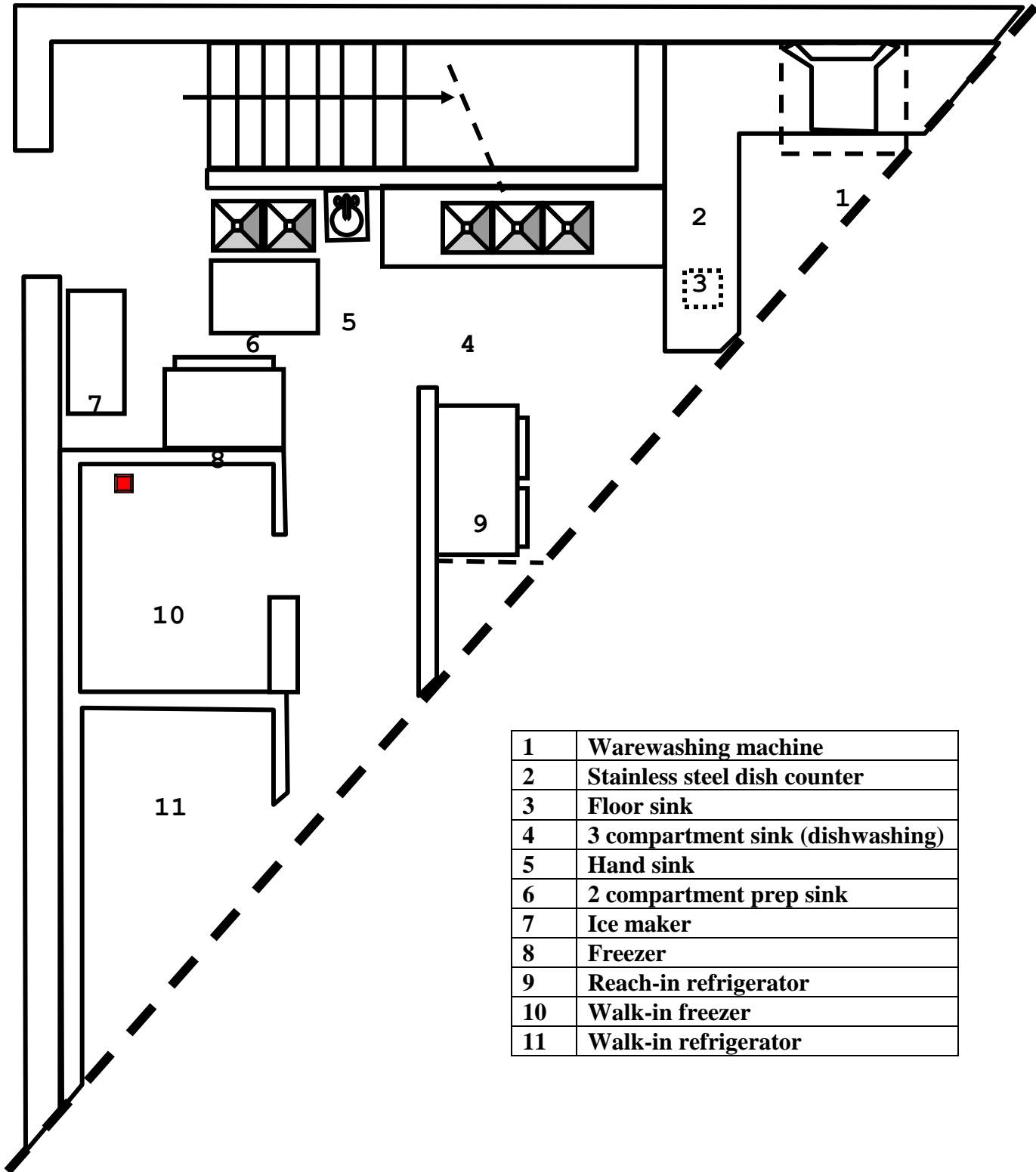
**A plan should not have so much information on it that it is difficult to read and confusing to interpret by the plan reviewer.**

# SAMPLE FLOOR PLAN



**NOTE: this is not intended as a model layout but ONLY to illustrate a procedure for submitting plans and Data for approval**

# SAMPLE EQUIPMENT LAYOUT



1	Warewashing machine
2	Stainless steel dish counter
3	Floor sink
4	3 compartment sink (dishwashing)
5	Hand sink
6	2 compartment prep sink
7	Ice maker
8	Freezer
9	Reach-in refrigerator
10	Walk-in freezer
11	Walk-in refrigerator

**SAMPLE  
EQUIPMENT LIST**

ITEM NO	QUANT.	LIST OF EQUIPMENT	DESCRIPTION & MODEL NO

# SAMPLE FINISH SCHEDULE

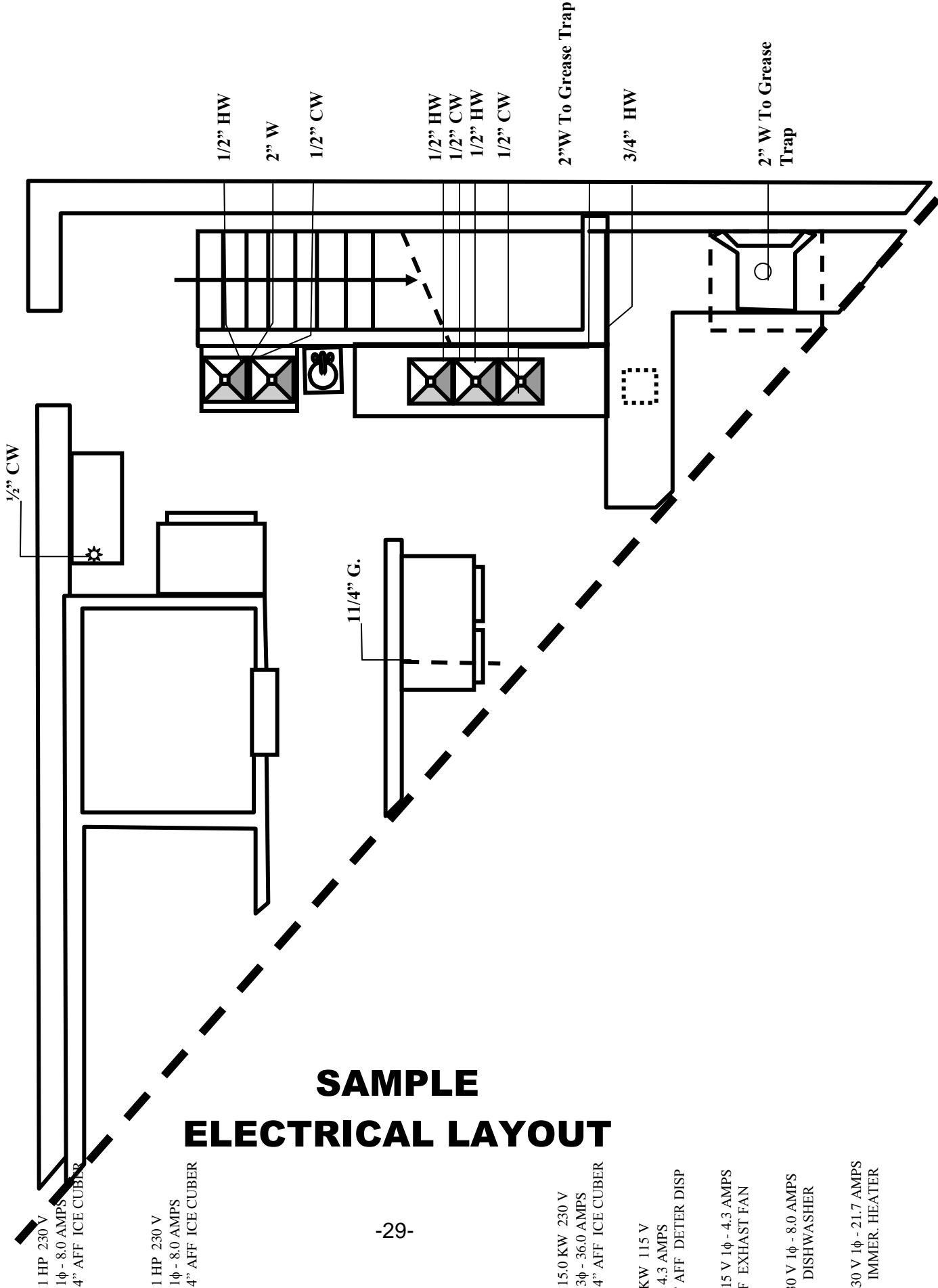
THIS IS A SAMPLE ONLY

Specific brand names and colors for materials should be specified to insure acceptability

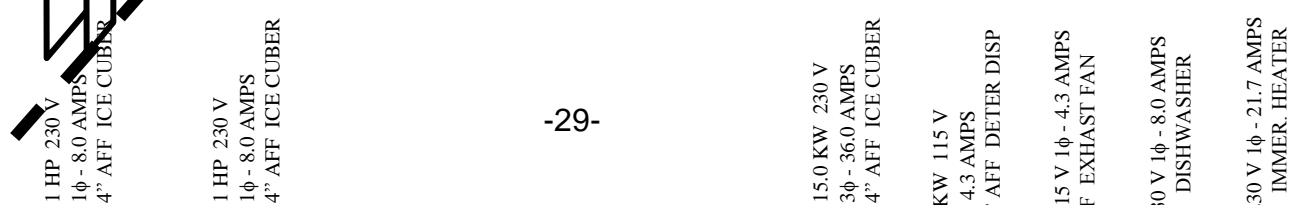
WORK AREAS	FLOOR	FLOOR BASE OR COVE	WALLS	CEILING
FOOD PREPARATION	QUARRY TILE	QUARRY TILE, UP WALL 4 INCHES, 3/8 INCH RADIUS COVE	F.R.P.	WASHABLE NON-ADSORBANT, LAY-IN CEILING PANELS
DISHWASHING	QUARRY TILE	QUARRY TILE, AS ABOVE	F.R.P.	SAME AS ABOVE
STOREROOM	COMMERCIAL GRADE SHEET VINYL	CONTINUOUS WITH FLOOR UP WALL 4 INCHES WITH 3/8 INCH RADIUS COVE	DRYWALL WITH WHITE GLOSS ENAMEL	SAME AS ABOVE
SERVER STATION	QUARRY TILE	QUARRY TILE, AS ABOVE	GREENBOARD, 4 FT. CERAMIC WAINSCOT, LIGHT COLORED	SAME AS ABOVE
BAR	QUARRY TILE	QUARRY TILE, AS ABOVE	LIGHT COLORED ENAMEL PAINTED DRYWALL	SAME AS ABOVE
SALAD BAR	QUARRY TILE: EXTENDS 24" BEYOND TABLE ON ALL SIDES	QUARRY TILE, AS ABOVE	N.A.	WASHABLE CEILING PANELS
RESTROOMS	CERAMIC TILE	CONTINUOUS WITH FLOOR UP WALL 4 INCHES WITH 3/8 INCH RADIUS COVE	GREENBOARD, 4 FT. CERAMIC WAINSCOT.	WATER-RESISTANT DRYWALL, WHITE ENAMEL
CLEANING EQUIPMENT/ MOP EQUIPMENT	QUARRY TILE	CONTINUOUS WITH FLOOR, 3/8 INCH RADIUS COVE	F.R.P.	WASHABLE NON-ABSORBANT CEILING PANELS
DRESSING ROOM(S)	CERAMIC TILE	CONTINUOUS WITH FLOOR UP WALL 4 INCHES WITH 3/8 INCH RADIUS COVE	DRYWALL- WHITE ENAMEL	LIGHT COLORED ENAMEL PAINTED DRYWALL
WALK-IN REFRIG.	SEALED SMOOTH CONCRETE	PREFABRICATED STAINLESS STEEL WALL, 3/8 INCH RADIUS SANITARY COVE	PREFABRICATED STAINLESS STEEL	PREFABRICATED STAINLESS STEEL.

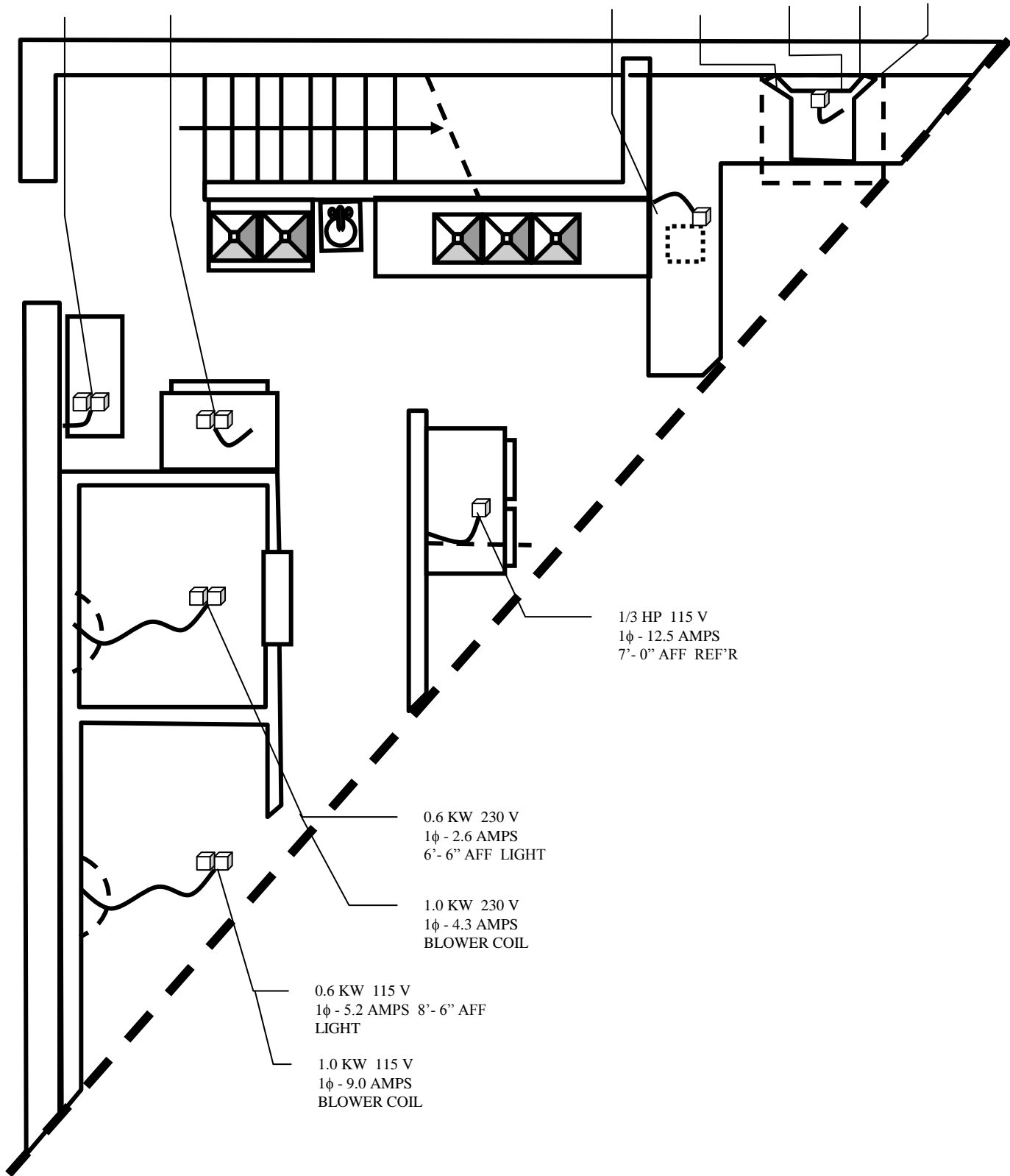
- Salad Bar is covered on top and sides by an approved food guard.

# SAMPLE PLUMBING LAYOUT



# SAMPLE ELECTRICAL LAYOUT





## Section III

### EQUIPMENT AND SPACE

INFORMATION ONLY  
NOT REQUIRED

*Information on pages 33 through 46 was taken from Design and Layout of Foodservice Facilities, by John C. Birchfield, Van Nostrand Reinhold 1988.*

#### WORK SPACE

The information provided below on workspaces can be used as a general guideline. It is no substitute, however, for a common-sense evaluation of any foodservice facility. The amount of space that an individual worker needs is influenced by:

- The number of people working in the space
- The amount and type of equipment
- The clearance for equipment doors
- The type of food being processed
- The amount of space for storage

DESCRIPTION OF THE SPACE	AISLE WIDTH NEEDED
Single aisle with limited equipment	2 feet 6 inches to 3 feet 0 inches
Double aisle with limited equipment	3 feet 6 inches to 4 feet 6 inches
Single aisle with protruding equipment	3 feet 6 inches to 4 feet 6 inches



Double aisle with protruding equipment	4 feet 6 inches to 5 feet 6 inches
Aisle with little traffic	3 feet 0 inches to 4 feet 0 inches
Aisle with major traffic	4 feet 0 inches to 6 feet 0 inches

### WAIT STATION AND SEATING AREAS

The following space recommendations are generally accepted industry standards for the various forms of service in the industry.

FORM OF SERVICE	SUPPORT AREA PER 100 SEATS <sup>a</sup>	SPACE REQUIREMENTS (SQ. FT/CHAIR) <sup>b</sup>
Table service, moderate price	100 sq. ft. of waiter station	12-14
Table service, high price	150 sq. ft. of waiter station	13-16
Table service, luxury	200 sq. ft. of waiter station	16-20
Cafeteria service	500 sq. ft. of straight line cafeteria	11-13
Scramble	600 sq. ft. of waiter station	12-14
Booth service	100 sq. ft. of waiter station	12-14
Banquet (private dining)	25 sq. ft. of storage and service area	10-12
Fast-food	50 sq. ft. of counter area	9-11

<sup>a</sup>This is a separate area, not a part of dining room size. <sup>b</sup>Includes space for aisles and general circulation.

### SPACE FOR RECEIVING AREA

Space in the receiving area varies with the volume of food to be received, frequency of delivery, and the distance between the receiving area and the storage spaces. If the receiving clerk must transport food products great distances before placing them in storage, the accumulation of food products on the back dock may require planning for additional space. But often, too much space is provided for the receiving dock, resulting in the accumulation of miscellaneous unused equipment and debris that add clutter to the food operation. The following chart provides general guidelines for allocating the proper amount of space for the receiving dock.

TYPE OF FOOD OPERATION	SUGGESTED SPACE <sup>a</sup>		NUMBER OF TRUCKS
	SQ. FT.	(SQ.M)	
Fast-food	40-60	(3.72-5.58)	1
Small Restaurant (under 75 seats)	60-80	(5.58-7.44)	1
Medium restaurant (75-150 seats) <b>OR</b>			

Small institution (300-1,000 meals per day)	80-100	(7.44-9.30)	1
Large restaurant (150-400 seats) <b>OR</b>			
Medium institution (1,000-2,000 meals per day)	120-150	(11.16-13.95)	2
Large institution (over 2,000 meals per day)	150-175	(13.95-16.28)	2
Large hotel, restaurant, or institution with complex menu, catering facilities, snack bars	175-200	(16.28-18.60)	3

<sup>a</sup>Does not include space for trash removal truck or trash container. Space for this equipment (approximately 40-60 sq. ft.X3.72-5.58 sq. m.) should be added to the receiving dock.

## SPACE FOR DISH MACHINES

TYPE OF DISH SYSTEM	DISHES PER HOUR	SIZE OF THE SPACE <sup>a</sup>	
		SQ. FT.	(SQ.M.)
Single tank dishwasher	1,500	250	(23.25)
Single tank conveyor	4,000	400	(37.20)
Two tank conveyor	6,000	500	(46.50)
Flight-type conveyor	12,000	700	(65.10)

<sup>a</sup>Including space for dish carts, empty racks, and pot washing. The size of the space will vary significantly on the basis of the layout of the soiled and clean dish tables. For instance, a single tank dishwasher located along a flat wall in a small restaurant might only occupy 125 sq. ft. (11.63 sq.m.).

## RECEIVING BREAK-OUT AREA

A break-out area is a small space for checking in and separating foods. These functions are usually carried out in the receiving area, and if space is not provided, they may encroach on other space. Office space should be small (50 square feet), and the washdown area and garbage room should also be limited in size: a range of 50 to 80 square feet should be sufficient. A small area just inside the receiving door can be allotted for break-out space. The following chart can be used as a guideline in deciding whether or not special rooms are needed.

NUMBER OF SEATS	SPACE ALLOTTED		
	OFFICE	WASHDOWN	GARBAGE
Under 50 or fast-food	No	No	Small
50-100	No	Small	Small
100-175	No	Yes	Yes
175-250	Yes	Yes	Yes
250-500	Yes	Yes	Yes
More than 500	Yes	Large	Large

## DRY STORAGE

It is usually better to estimate space needs on the basis of the industry's actual experience with different types of facilities than to make an educated guess. The following chart can be used as a rough guide for determining dry storage needs (assuming that deliveries are made twice per week, and that cleaning supplies and paper are stored separately).

## FOOD PRODUCTS

TYPE OF FOOD OPERATION	RANGE OF SIZE OF DRY STORAGE	
	SQ. FT.	(SQ.M.)
Fast-food	50-125	(4.65-11.63)
Small restaurant	100-150	(9.30-13.95)
Medium restaurant or small institution	200-300	(18.60-27.90)
Large restaurant or medium institution	400-1000	(37.20-93.00)
Large institution with simple menu	1000-2,500	(93.00-232.50)
Large hotel, restaurant, or institution with complex menu, catering facilities, snack bars	3,000 +	(279.00 +)

## PAPER AND CLEANING SUPPLIES STORAGE

The storage of paper supplies can be a very large space problem for food operations that use a large quantity of disposable cups, plates, napkins and plastic ware. No standard space requirement is possible because the extent of the use of disposables and the frequency of delivery are different for each food operation. Paper supply companies and paper manufacturers tend to give significant price breaks for larger orders of paper goods, and the food operator is, therefore, forced to accept large quantities in order to purchase economically.

Cleaning supplies must be stored separately from food supplies to prevent contamination and accidental mixing of detergents with foods. A space 6 to 10 feet wide and 10 to 15 feet deep will handle the storage needs of most small- to medium-sized operations. A guide for cleaning supplies is as follows:

TYPE OF FOOD OPERATION	SIZE OF STORAGE	
	SQ. FT.	(SQ.M.)
Fast-food	60-100	(5.58-9.3)
Small restaurant	75-120	(6.98-11.16)
Medium restaurant or small institution	120-175	(11.16-16.28)
Large restaurant or medium institution	175-250	(16.28-23.25)
Large institution with simple menu	250-300	(23.25-27.90)
Large hotel, restaurant, or institution with complex menu, catering facilities, snack bars	300 +	(27.9 +)

## REFRIGERATED (FREEZER) STORAGE

The following is an example of freezer size calculations based on the following assumptions:

- The facility is a small restaurant with delivery of frozen foods once per week.
- Frozen hamburgers, French fries, and onion rings are a significant part of the volume of the business.
- The menu contains five or six additional items that are purchased frozen.
- Ice cream, in six flavors, is a popular dessert.

FOOD ITEM	PURCHASE UNIT	CUBIC FEET/ (METERS)	TOTAL PER WEEK	CUBIC FEET/ (METERS)
French fries	Case	1.8 (.050)	25	45 (1.260)
Hamburgers	Case	1.2 (.033)	30	36 (1.008)
Onion rings	Case	2.0 (.056)	20	40 (1.120)
Vegetables	Case	1.5 (.042)	15	22.5 (0.630)
Hot dogs	Package	.2 (.006)	35	7.0 (0.196)
Roast beef	12 to 15 lbs	1.0 (.028)	30	30.0 (0.840)
Ice cream	3 gallons	1.5 (.042)	45	67.5 (1.890)
Miscellaneous	Case	1.0 (.28)	35	35 (1.980)
TOTAL cubic feet				283 (7.924 cu.m)

## WALK-IN REFRIGERATION

The following chart may be used as a general guide for determining the amount of space allocated for walk-in refrigeration. Note: additional refrigerated space is almost always needed in the form of reach-ins, cold prep tables, and similar units. See page 43

TYPE OF FOOD OPERATION	NUMBER OF WALK-INS	TOTAL SQUARE FEET/	(SQ.M.)
Fast-food	1	90-120	(8.4-11.2)
Small restaurant	1	120-150	(11.2-14.0)
Medium restaurant or small institution	2	180-240	(16.7-22.3)
Large restaurant or medium institution	3	240-400	(22.3-37.2)
Large institution with simple menu	3	400-600	(37.2-55.8)
Large hotel, restaurant, or institution with complex menu, catering facilities, snack bars	4	600-900	(55.8-83.7)

## DETERMINING KITCHEN SIZE

Comparisons of different types of facilities may be helpful in establishing the size of the kitchen as it relates to the dining room. A comparison of kitchen sizes and dining room capacity can be made from the following chart:

TYPE OF FOOD OPERATION	MEALS PER DAY	DINING ROOM SIZE		PREPARATION AREA SIZE <sup>a</sup>	
		SQ. FT.	(SQ.M.)	SQ.FT.	(SQ.M)
Restaurant, table service-100 seats	1,000	1,400	(130.20)	1,300	(120.90)
Restaurant, table service-175 seats	1,800	2,625	(244.13)	2,000	(186.00)
Country club-200 seats	600	3,400	(316.20)	1,288	(119.78)
Hospital, cafeteria, and 200-bed tray service	1,400	2,250	(209.25)	2,300	(213.90)
College cafeteria-350 seats	2,400	4,200	(390.60)	1,500	(139.50)
University cafeteria and catering department	4,000	5,625	(523.13)	2,530	(235.29)
Coffee shop-100 seats	800	1,225	(113.96)	850	(79.05)

<sup>a</sup>Does not include bakery, storage, and dishwashing.

The owner or manager should look to a design consultant for professional advice before deciding on the amount of space to allot to the food production area.

## RESTAURANT BAKERY

The following chart can be used to make a rough estimate of the amount of floor space for a bakery<sup>\*</sup>, keeping in mind there are many variables that can affect this determination.

NUMBER OF SEATS IN THE FACILITY	LIMITED BAKING <sup>a</sup>		EXTENSIVE BAKING <sup>a</sup>	
	SQ. FT.	(SQ. M.)	SQ. FT.	(SQ.M)
Under 50	40	(3.72)	80	(7.44)
50-100	100	(9.30)	150	(13.95)
100-175	250	(23.25)	400	(37.20)
175-250	300	(27.90)	600	(55.80)
250-500	400	(37.20)	800	(74.40)
More than 500	600	(55.80)	1,400	(130.20)

<sup>a</sup> Storage not included.

<sup>\*</sup> Baking in a restaurant.

## EMPLOYEE LOCKER/TOILET ROOM

### General description of the space

The employee locker room and restrooms are too often given minimal consideration by those who are involved in the total design of a food facility. These facilities deserve careful attention because they affect sanitation, security, and employee attitude. The space, if properly planned, can be clean, orderly, and have a bright appearance that sets the tone for management's expectation of cleanliness and orderliness in other areas of the building. Clean clothes and uniforms should be stored in the restrooms.

#### Relationship to other areas

The locker rooms and restrooms can be designed together so that space is efficiently used and control over uniforms is maintained. The area can be remote from the main food production areas, but the entrance and exit to the space should be arranged so that employees can be observed as they move from the work area to the locker room. Locker rooms can create food and utensil control problems if they are located near exits or are in remote locations that are difficult to supervise.

#### Amount of space

Space for a combined locker room/restroom area is estimated in the chart below. Space allocations for restroom facilities should be checked with local codes to be sure that they comply with ADA and for the minimum number of employee toilet facilities.

NUMBER OF EMPLOYEES <sup>a</sup>	SIZE OF THE SPACE	
	SQ. FT.	(SQ. M.)
5 or under	60	(5.58)
5-10	100	(9.30)
10-20	150	(13.95)
20-40	225	(20.93)
40-75	250	(23.25)
75-100	350	(32.55)

<sup>a</sup>Peak number of employees on duty at one time, not the total number of employees on the payroll.

**SERVICE AREA SPACE FOR  
TABLE SERVICE RESTAURANT LIMITED MENU**

NUMBER OF SEATS	MEALS PER DAY <sup>a</sup>	SERVICE AREA <sup>b</sup>	
		SQ.FT.	(SQ.M.)
Under 50	300	75	(6.9)
50-100	500	100	(9.2)
100-175	750	140	(12.9)
175-250	1,000	160	(14.7)
250-500	1,600	175	(16.1)
More than 500	2,400	200	(18.4)

<sup>a</sup>Breakfast not included.

<sup>b</sup>The chef's pickup station (excluding range and aisle space) and a waiter/waitress station.

**SERVICE AREA SPACE FOR LUXURY  
TABLE SERVICE RESTAURANT EXTENSIVE MENU**

NUMBER OF SEATS	MEALS PER DAY <sup>a</sup>	SERVICE AREA <sup>b</sup>	
		SQ.FT.	(SQ.M.)
Under 50	200	100	(9.2)
50-100	300	120	(11.0)
100-175	600	160	(14.7)
175-250	700	200	(18.4)
250-500	1,000	250	(23.0)
More than 500	1,500	300	(27.6)

<sup>a</sup>Breakfast not included.

<sup>b</sup>Waiter/waitress stations, hot and cold food pickup stations, and separate beverage stations.



**SERVICE AREA SPACE FOR  
CAFETERIAS STRAIGHT CAFETERIA LINE**

NUMBER OF SEATS	MEALS PER DAY <sup>a</sup>	SERVICE AREA <sup>b</sup>	
		SQ.FT.	(SQ.M.)
100-175	800	350	(32.2)
175-250, One line	1,250	475	(43.7)
175-250, Two lines	1,500	900	(82.8)
250-500	2,000	1,600	(147.2)
More than 500	5,000	2,000	(184.0)

<sup>a</sup>Breakfast not included.

<sup>b</sup>Size of the cafeteria line and aisle space in front of and behind the line.

**SERVICE AREA SPACE FOR  
SCRAMBLE OR FREE FLOW CAFETERIAS**

NUMBER OF SEATS	MEALS PER DAY <sup>a</sup>	SERVICE AREA <sup>b</sup>	
		SQ.FT.	(SQ.M.)
175-250	1,500	1,800	(165.6)
250-300	1,800	2,000	(184.0)
350-500	2,250	2,400	(220.8)
More than 500	5,000	3,000	(276.0)

<sup>a</sup>Breakfast not included.

<sup>b</sup>The service area of the scramble including interior circulation space. Condiment and beverage stations located outside of the service area are not included.

## DETERMINING CAPACITY AND SIZE

Dish machines are rated by the number of dishes or racks per hour (at about 20 dishes per rack) that can be washed. The following chart and calculations illustrate the method for determining the dish machine size, assuming the standard efficiency factor of 70 percent. Remember, it is always wise to err in selecting a machine that is too large rather than too small.

TYPE OF FOOD FACILITY	NUMBER OF DISHES AND GLASSES PER PERSON*
Limited menu restaurant	5-8
Extensive menu restaurant	12-14
Cafeteria	7-10
Luxury hotel dining room	12-16

\*Does not include silverware or stainless eating utensils.

The volume of dishes for a 100-seat restaurant with an extensive menu that turns over the dining room 1.5 times in one hour would be:

$$100 \text{ seats} \times 1.5 = 150 \text{ persons per hour}$$

$$150 \text{ persons} \times 13 \text{ pieces of dinnerware} = 1,950 \text{ dishes per hour}$$

The following are typical capacities, taken from the catalog of a leading manufacturer of dishmachines.

	DISHES PER HOUR	RACKS PER HOUR
Single-tank door	1,550	62
Two-tank conveyor	5,850	234
Three-tank conveyor	6,650	265
Flight-type	12,000	-

In the example, 1,950 dishes per hour at 70 percent efficiency would require a machine that would handle:

$$\frac{1,950}{.70} = 2,786 \text{ dishes per hour}$$

A two-tank conveyor machine would be an excellent choice in this operation.

## REFRIGERATORS AND FREEZERS

SIZE OF FOOD FACILITY (SEATS)	WALK-IN REFRIGERATION				REACH-IN REFRIGERATION			
	FREEZER		REFRIGERATOR		FREEZER		REFRIGERATOR	
	NUMBER	SIZE <sup>a</sup>	NUMBER	SIZE <sup>a</sup>	NUMBER	SIZE <sup>b</sup>	NUMBER	SIZE <sup>b</sup>
Under 50	None	-	None	-	1	B	2	B
50-100	1	X	1	X	1	C	3	B
100-175	1	Y	2	X	2	B	3	C
175 - 250	1	Z	2	Y	2	B	3	C
250-500	1	Z	3	Y	2	C	4	C
500-750	2	Y	3	Z	2	C	5	C
More than 750	2	Z	4	Z	3	C	5	C

<sup>a</sup>Walk-in size key:

X: 9 by 12 ft. (10 sq.m.)  
 Y: 9 by 15 ft. (12.6 sq.m.)  
 Z: 9 by 20 ft (16.7 sq.m.)

<sup>b</sup>Reach-in size key

A: one compartment (section)  
 B: two compartment (sections)  
 C: three compartment (sections)

Source: Sandra Ley, Foodservice Refrigeration (New York: Van Nostrand Reinhold, 1980).

## MIXERS

NUMBER OF MEALS PER DAY	RECOMMENDED MIXERS BAKERY NOT INCLUDED <sup>a</sup>		RECOMMENDED MIXER BAKERY INCLUDED <sup>a</sup>	
	QUANTITY	SIZE	QUANTITY	SIZE
Less than 100	1	5 quart	1	10 quart
100-200	1	10 quart	1	10 quart
			1	20 quart
200-400	1	10 quart	1	20 quart
	1	30 quart	1	30 quart
400-600	1	20 quart	1	30 quart
	1	60 quart	1	60 quart
600-1,000	2	60 quart	1	60 quart
			1	80 quart
1,000-1,500	1	60 quart	2	60 quart
	1	8 quart	1	80 quart
More than 1,500	2	60 quart	1	60 quart
	1	80 quart	2	80 quart
			1	140 quart

<sup>a</sup>Does not include mixers needed for the restaurant bakery.

## CONVECTION OVENS

The oven capacity selected will depend on the number of items on the menu that are normally cooked in an oven and whether or not there is a bakery in the operation. The following chart illustrates typical oven capacity needs for foodservice operations.

NUMBER OF MEALS PER DAY	SINGLE OVEN	DOUBLE OVEN
Under 100	One	None
100-200	One	None
200-400	One	One
400-600	None	Two
600-1000	None	Three
100-1800	None	Four
1800-3000	None	Five

## CONVEYOR OVENS

Conveyor ovens are sized by length, width of the conveyor belt, and speed of the belt. The length will in part determine the amount of heat that is applied to the food product as it passes through the cavity of the oven. The width of the belt will determine the amount of food that can be placed on the conveyor at one time, and the speed of the belt will determine the degree of doneness and amount of heat applied. These factors, plus other engineering features, determine the capacity of the oven. A typical conveyor oven has the following production capacity:

BAKING AREA (SQ. FT.)	BELT WIDTH (INCHES)	PIZZAS PER HOUR	UTILITY REQUIREMENTS (BTU/HR)
8	24	30	135,000
10.7	32	60	135,000
21.4	32	120	270,000

## DETERMINING CAPACITY AND SIZE

### COFFEE MAKERS

The standard cup of coffee is 5 to 6 ounces, and the amount of coffee produced from one pound is usually 22 to 3 gallons. For this reason, coffee urns are sized in multiples of 3 gallons. Typically, production capacity of coffee urns are:

SIZE OF URN	GALLONS PER HOUR	CUPS PER HOUR
3 GAL. (11.4L)	18	432
6 GAL. (22.7L)	25	600
12 GAL. (45.4l)	30	720
18 GAL. (68.1L)	45	1,080

### ICE MACHINES

The following chart may be helpful in determining the capacity for ice production and storage to meet beverage service needs. For the sake of illustration, it is assumed that one peak period of demand occurs during the day and that the glasses contain 25 percent ice by weight.

NUMBER OF GLASSES	SIZE OF GLASS			
	4 OUNCE	6 OUNCE	8 OUNCE	10 OUNCE
200	25 lbs.	37 lbs.	50 lbs.	62 lbs.
400	50 lbs.	75 lbs.	100 lbs.	125 lbs.
600	75 lbs.	112 lbs.	150 lbs.	187 lbs.
800	100 lbs.	150 lbs.	200 lbs.	250 lbs.
1,000	125 lbs.	187 lbs.	250 lbs.	312 lbs.
2,000	250 lbs.	375 lbs.	500 lbs.	625 lbs.

The production and storage capacity of the ice machine selected should exceed the amounts indicated on the chart by 25 percent or more, depending upon the operation.

## PROBABLE USEFUL LIFE OF KITCHEN EQUIPMENT

ITEM	USEFUL LIFE (YEARS)
Convection oven*	7-10
Deck oven	10-15
Rotary oven	12-20
Mixers	15-25
Ranges*	10-15
Steam-jacketed kettles	15-25
Food choppers	10-15
Vertical cutter mixer	12-15
Tilting fry pans	12-20
Grills	8-12
Fryers*	8-12
Broilers	8-12
Steamers-high pressure*	10-15
Steamers-low pressure	12-15
Steamers-no pressure*	8-12
Refrigerator/freezer-walk-in	12-20
Refrigerator/freezer-reach-in	12-20
Carts and cabinets	8-12
Coffee urns	8-12
Dishwashing machines*	10-15
Stainless steel tables, sinks, and counters with stainless steel legs	Unlimited
Galvanized tables and sinks	8-12
Stainless steel shelving	Unlimited
Galvanized shelving	6-10
Hoods and ventilation systems*	8-12

\* These pieces of equipment have been improved in recent years so that they are much more energy efficient than in the past. The decision to replace these items might be made on the basis of energy efficiency, even though existing equipment may still be useful and in good operating condition.