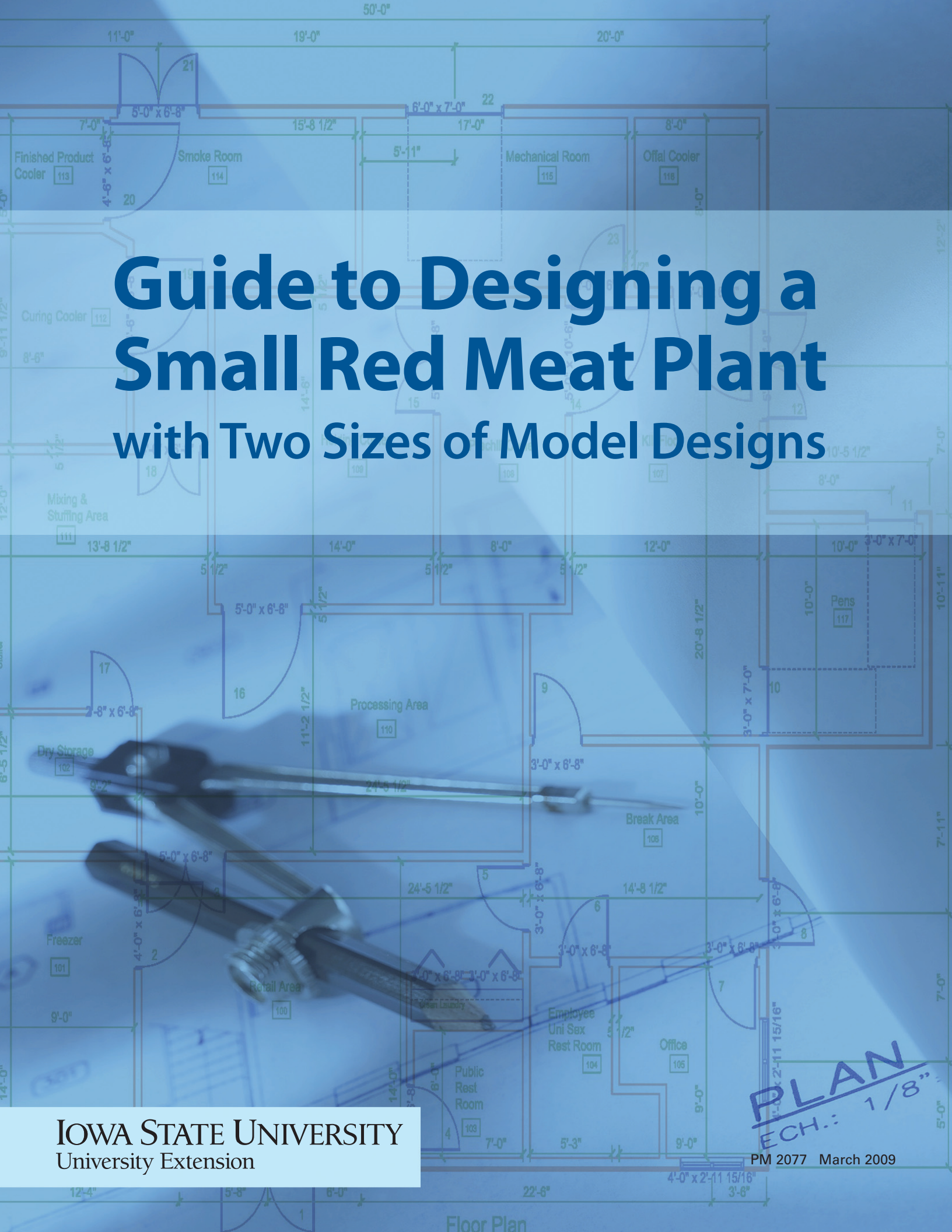

Guide to Designing a Small Red Meat Plant

with Two Sizes of Model Designs

IOWA STATE UNIVERSITY
University Extension

PM 2077 March 2009

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Jack M. Payne, director, Cooperative Extension Service, Iowa State University of Science and Technology, Ames, Iowa.

Guide to Designing a Small Red Meat Plant
with Two Sizes of Model Designs

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Support for the production of this guide has been provided by:
The Value Chain Partnerships Project (www.valuechains.org)
USDA Sustainable Agriculture Research and Education (www.sare.org)
The W.K. Kellogg Foundation (www.wkkf.org)
Iowa Meat Processors Association
North Central Regional Center for Rural Development (www.ncrcrd.iastate.edu)

CAUTION!

These plans are intended for informational purposes only and are *not* intended for direct construction use. Due to the constantly changing nature of regulations we cannot guarantee that all of the specifications of these plans are up to building code in your specific location. You are strongly encouraged to check with your food safety inspection agency and local building authorities before beginning any construction.

No responsibility is assumed for the accuracy of the information contained herein. The entities, and their agents, involved in the production and distribution of these designs shall have no liability or responsibility for errors or omissions in, or any business decisions made in reliance upon, any information contained herein. The designs are provided *as is* without any warranty, express or implied, including no warranties for merchantability or fitness for a particular purpose.

Additional professional services will be required to create plan designs tailored to your specific situation, including but not limited to: assurance of compliance with codes and regulations regarding food safety and building construction; review of specifications for materials and equipment; supervision of site selection, bid letting and construction; and provision for utilities, waste management, roads or other access. ***Furthermore, improper construction may result in structural failure, property damage and personal injury including loss of life.***

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About this Guide and Model Designs

Meat plants are not easy to build. Build one like a house, and it will likely fall down in a few years. Put your work areas together in the wrong layout or in the wrong proportions, and things could take twice as long to get done. Put the drains in the wrong spot and you could have to jackhammer out the floors.

Meat plants can vary widely in use and design. How you build a plant depends on the types of processes you intend to have as part of your plant (e.g. slaughter, fabrication, production of ready-to-eat product). *These designs are ONLY intended for "locker-type" small-scale meat processing plants.* That is to say small-scale plants that intend to slaughter red-meat animals, fully fabricate carcasses, and produce both raw and fully-cooked processed meat products. *These designs are NOT intended for plants that seek to slaughter and/or process poultry, solely can meat, solely make prepared entrees which include meat (e.g. pizzas), and process other species not normally processed at a locker-type plant (e.g. fish).*

If you intend to construct, expand, or upgrade a locker-type meat plant, these plans were created to help you avoid some headaches, including determining whether or not you should actually expand—sometimes a bottleneck can be corrected by upgrading or moving equipment without adding more space, by changing the way you schedule your product processes, increasing batch size, or changing product flow in other ways. The final design of your plant should be based on the specific needs of your particular business. While these designs are NOT intended to be directly built from, they are intended to give you a good start in the right direction. An experienced meat plant consultant created these designs for the Iowa Meat Processors Association and the Small Meat Processors Working Group, a collaboration of Iowa organizations seeking to support small meat processors. *We strongly encourage you to check with your food safety inspection agency and local building authorities before beginning any construction.*

How to Use this Book Successfully[1]

As stated on earlier pages, these designs are intended NOT for direct construction use. These designs are ONLY intended to offer information for "locker-type" small-scale meat processing plants—those that slaughter red-meat animals, fully fabricate carcasses, and produce both raw and fully-cooked processed meat products (e.g. sausages, ham, bacon, beef jerky).

In order to successfully use these plans to build, upgrade, or expand a locker-type meat processing plant, we strongly recommend that you go through the following eight steps. Some of these steps need to be taken concurrently, so understand the whole process thoroughly before physically starting any project.

1. *Determine what types of products and/or services you will offer and the production steps needed for each.*

   If you operate an existing business and are considering building a new facility, now is the time to think deeply about what your future products and/or service options might look like as your business grows. Ultimately, you want to design a facility that will help you focus on the products and services that are most profitable. Consider the following two examples:

   a. If you find that hogs are more profitable for you to process than beef, and you plan to process a larger proportion of hogs in your new facility than you currently do, this could reduce the amount of hanging cooler space needed.

   b. If you plan to produce a high-volume sausage product in your new plant, you might consider purchasing a rollstock packaging machine, which is large and might require additional space in your packaging area.

How product flows through your plant will be critical for both plant efficiency and food safety. That flow will be partially dependent on the processes and equipment you will use. Make a list of the equipment you will need by processing area. Understanding all the steps necessary to produce all your products (raw and fully-cooked) will help you modify the designs to efficiently meet your needs. As you consider this, it may help to draw flow charts of how products move through your plant. Flow charts will also help you write your hazard analysis and critical control point (HACCP) plan and sanitation standard operating procedures (SSOPs). It is often easier to build food safety into your design—with proper flow to avoid cross-contamination—than to write operational SSOPs that you must constantly monitor to ensure that employees follow.

An **HACCP** plan includes a written document that outlines the manufacturing processes in a plant and the recordkeeping used to monitor critical control points for food safety hazards.

SSOPs are documented procedures as to how a plant cleans (sanitizes) all processing areas (equipment, surfaces, etc.).

[1] This section draws from the following documents: "Simplified Systematic Plant Layout" by Jeff Mohr and Mike Willett of the Center for Industrial Research and Service (CIRAS), *CIRAS News,* Vol. 34, No. 1, Fall 1999. Used with permission. http://www.ciras.iastate.edu/publications/management/SimplifiedSystematicPlantLayout(1999Fall).pdf, and Muther, Richard and John D. Wheeler. 1994. *Simplified Systematic Layout Planning.* Marietta, Georgia: Management & Industrial Research Publications.

2. *Determine which markets you will sell to and what services you will provide so you can identify the types of inspections you will need.*

   Inspection by the USDA Food Safety and Inspection Service (FSIS)—often referred to as "federal inspection"—will allow you to sell product to anyone throughout the United States and to many overseas markets. State inspection will allow you to sell product to anyone within your state.

   A "custom-exempt" plant can only slaughter and process animals for the exclusive use of the animal owner(s). A "retail-exempt" plant can further fabricate or process meat for sale from animals that were slaughtered in a federally- or state-inspected facility (state-inspected only if you operate in the same state). A red meat plant can simultaneously do work that is "custom-exempt," "retail-exempt," and state- or federally-inspected; a poultry plant cannot. In Iowa, a plant cannot be both state- and federally-inspected; however, other states vary on this point.

3. *Chart the relationships of activities and work areas.*

   In order to determine an optimal process flow for your plant, many factors must be considered: every process of plant production operations, taking orders, employee break room, utilities, ventilation, and potential cross-contamination. Since it is difficult to take so many different factors into account, a systematic approach is needed to arrive at the best layout for you.

   Begin by identifying all the activities and work areas that need to be included in your plant, for example slaughter, fabrication, sausage kitchen, smokehouse, raw packaging and cooked packaging. It may be helpful to use your HACCP flow charts to help you think about all the areas that product moves through in your plant. It is best to keep the number of work areas or workrooms in the range of 10 to 15 with a maximum of 20. If more than 20, the number of possible arrangements becomes overly complicated.

   You can create a Relationship Chart using a spreadsheet format or a mileage-type chart. An example of a filled-out Relationship Chart for XYZ Meat Processors (designed for a real business) is shown in Figure 1 on page 4. (Figure 2, a blank chart for your use, is located on page 5.) The Relationship Chart is used to document the desired "closeness" between a work area relative to all the other work areas. Use the letters A, E, I, O, U and X to indicate the relationship between each pair of activities: from A=Absolutely Necessary, to U=Unimportant, and X=Not Desirable (see Table 1 below for all definitions).

   You'll notice that in the sample chart for XYZ Meat Processors on page 4, only the important (A, E, and I) relationships are noted. There is no need to note the unimportant (U) relationships. Depending on your needs you may or may not want to chart the ordinary (O) relationships.

Table 1. Relationship Values

VALUE	CLOSENESS
A	Absolutely necessary
E	Especially important
I	Important
O	Ordinary closeness okay
U	Unimportant
X	Not desirable

Work area relationships can generally be defined as follows:

A relationships = more than 75% of product moves between them
E relationships = 50-75%
I relationships = 25-50%
O relationship = less than 25%

For example, slaughter and holding pens will always have an A relationship because 100% of the animals in the holding pens will go to slaughter (unless an inspector determines an animal is unfit for slaughter). Two cautions about these percentages: 1) they are general, use what makes the most sense to you; 2) they apply to both product flow and people flow. Furthermore, there may be solid reasons why two areas with only a small percentage of product or people flow need to have a much closer relationship—such as supervision, restroom access, or waste removal.

Each relationship can also be documented with a specific reason or reasons for the desired closeness. A small table with number codes is provided on Figure 2 to record each reason. It is important to record your reasons as you work on the layout so you have documentation to rely on—you might not remember what your reason was at a later date. Also, if you are considering multiple plant layouts, each layout will have different reasons for locating certain work areas in certain places. Having these reasons written down will keep things easier to understand.

Some examples of reasons for a specific relationship value are:

- Product flow
- Shared personnel
- Food safety / cross-contamination
- Movement of supplies or waste
- Supervision

This is by no means a complete list, but it should give you an idea of what is meant by the reason for a closeness value or relationship. Do not forget to consider which work areas need to be close to the exterior of the building (this criteria is modeled in Figure 1). If you find that the relationships for a certain work area are similar to that of another work area, think about combining the two into a common area. Two examples to consider are:

a. A sausage kitchen and curing cooler could be located in the same area since they both can lead into a smokehouse.
b. The processing (fabrication) room and the sausage kitchen do not necessarily need a wall between them.

4. *Draft plant room layout.*

The next step is to combine the relationships charted in the previous step with space requirements for each activity. The first time you try to do this, review the designs in this book and draw the rooms individually from one of these designs onto graph paper. Cut them out and move them around on a table or other flat surface until you find a floor plan layout that best fits your production activity relationships from the previous step. Then tape them in place on a piece of cardboard. Lay out all of the A relationships first, then build in the E and the I (and, if needed, O) relationships next, keeping the X relationships in mind. You can leave spaces where you want hallways and enlarge, shrink, or change the shape of rooms as you see fit by cutting new pieces of graph paper. Make sure to cut all rooms to the same scale (graph paper helps with this). Figure 3 (page 6) is a picture of one plant owner's result from this process that matches with the Relationship Chart in Figure 1.

Figure 1

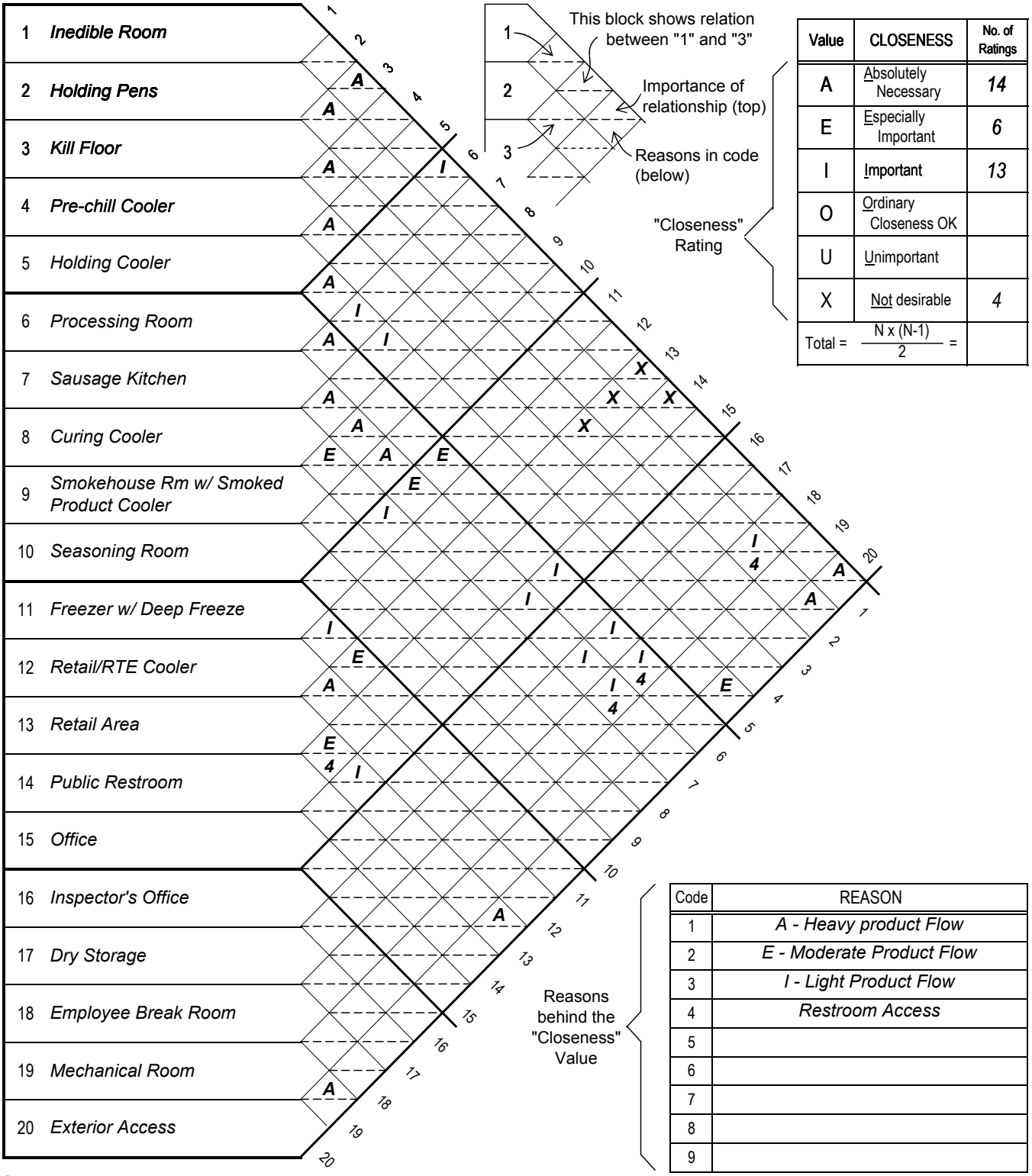
RELATIONSHIP CHART

Plant (Company) *XYZ Meat Processor* Project

Charted by *Bob the Butcher* With

Date *11/30/2008* Sheet of

Reference



Value	CLOSENESS	No. of Ratings
A	Absolutely Necessary	*14*
E	Especially Important	*6*
I	Important	*13*
O	Ordinary Closeness OK	
U	Unimportant	
X	Not desirable	*4*
Total =	$\frac{N \times (N-1)}{2}$ =	

Code	REASON
1	*A - Heavy product Flow*
2	*E - Moderate Product Flow*
3	*I - Light Product Flow*
4	*Restroom Access*
5	
6	
7	
8	
9	

Figure 2

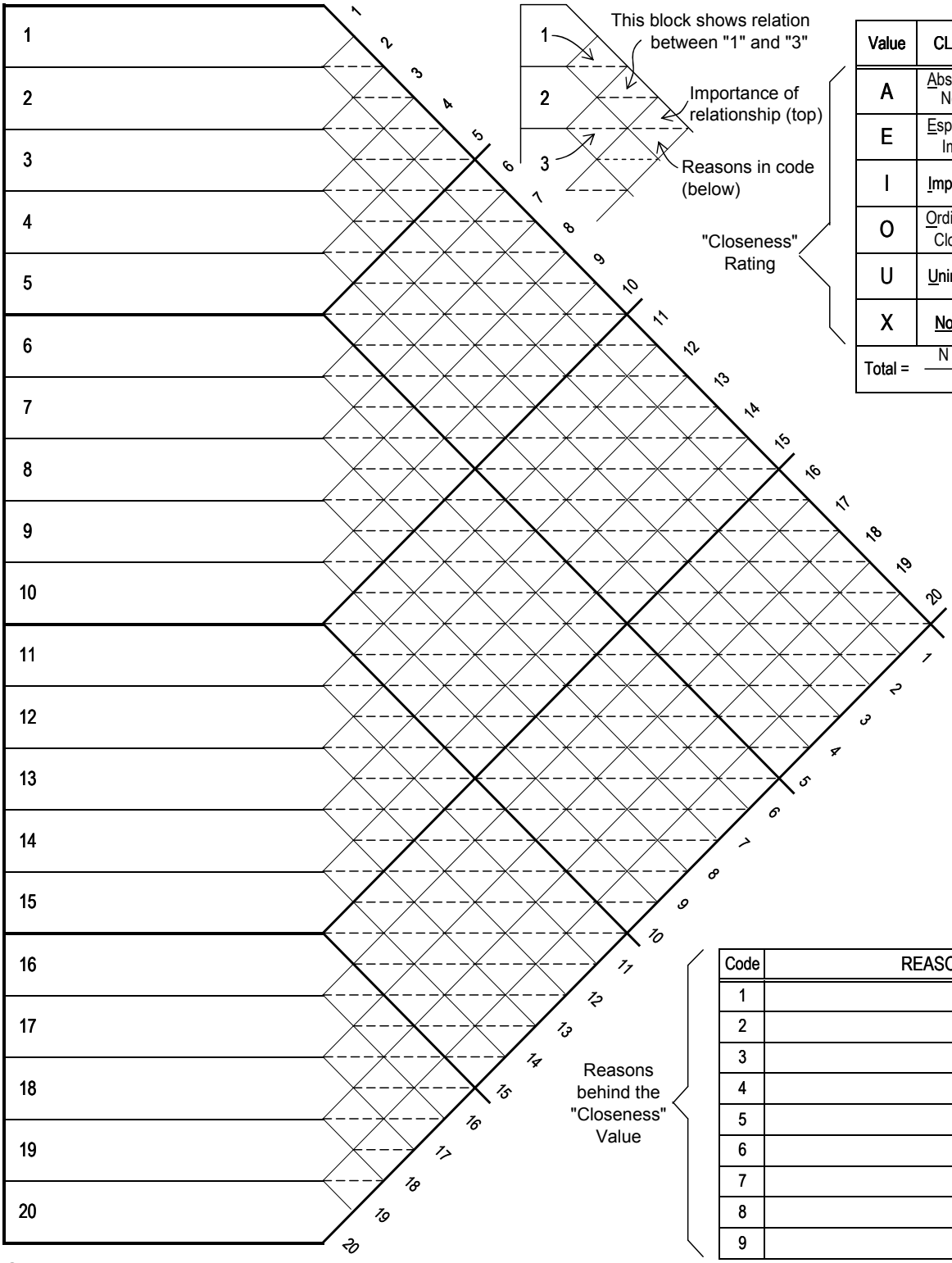
RELATIONSHIP CHART

Plant (Company) _____ Project _____

Charted by _____ With _____

Date _____ Sheet _____ of _____

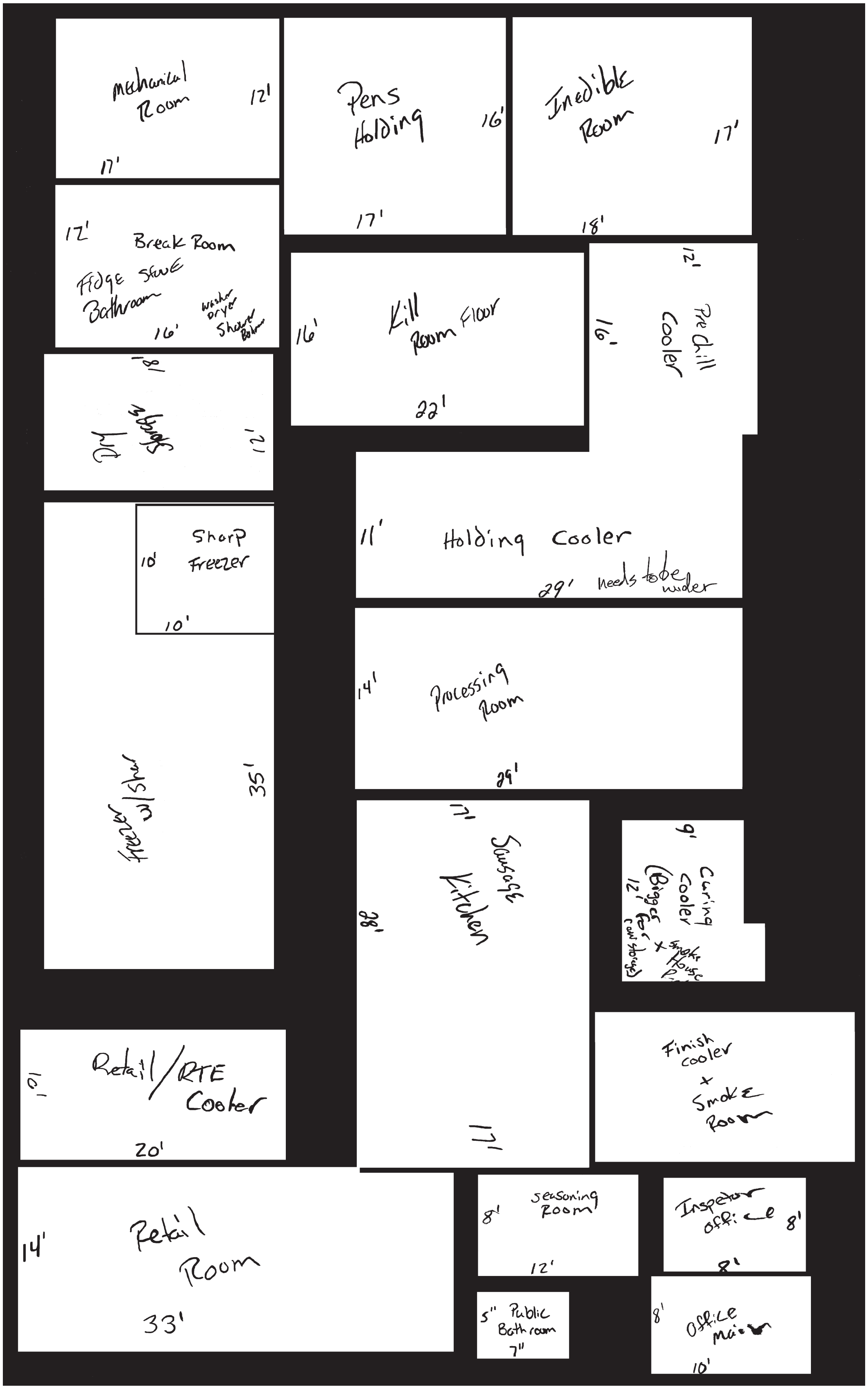
Reference _____



Value	CLOSENESS	No. of Ratings
A	Absolutely Necessary	
E	Especially Important	
I	Important	
O	Ordinary Closeness OK	
U	Unimportant	
X	Not desirable	
Total = $\frac{N \times (N-1)}{2}$ =		

Code	REASON
1	
2	
3	
4	
5	
6	
7	
8	
9	

Figure 3


Mechanical Room
12'
17'
Pens Holding
16'
17'
Inedible Room
17'
18'
12'
Break Room
16'
16'
Kill Room Floor
22'
12'
16'
Pre Chill Cooler
12'
11'
Holding Cooler
29'
needs to be wider
Sharp Freezer
10'
10'
14'
Processing Room
29'
35'
17'
Sausage Kitchen
28'
17'
9'
Curing Cooler
10'
Retail/RTE Cooler
20'
Finish cooler
+
Smoke Room
14'
Retail Room
33'
Seasoning Room
8'
12'
Inspector office
8'
8'
Public Bathroom
8'
Office Main
10'

Once you have a rough floor plan with activity relationships that you like, contact an equipment dealer and get the physical dimension of all the pieces of equipment you plan to buy and make sure each fits in your floor plan with adequate room for operation, cleaning, and maintenance. (It is always easier to give yourself an extra foot or two on paper than to move a wall once your plant is built.) As you position your equipment, think about the placement in similar terms to the way you have just worked out your room positions. Your breaking table and your saw should be next to each other. Your boning table should probably be close by, against a wall. The placement of your grinder, stuffer, and mixer in relation to each other will be entirely up to the needs of your plant.

Adjustments to room sizes should be made in order to create a realistic exterior building shape with straight lines. Make sure to show any dominant physical features such as columns, access doors, walls, etc. If the building or addition already exists, overlay your layouts on the building outline. Depict permanent physical features like load-bearing walls, loading docks, windows, and doors, etc. Once you have arranged things to your liking and everything fits, you might consider going out to a large field (or your building site) and staking out your floor plan on the ground—this might help you get a better feel of how things might look than just reviewing the paper plan.

We strongly recommend trying to make two to three different draft plant layouts. Work with your employees to get their input on the work areas they know best. Perhaps even ask lead employees to come up with their own draft layouts. The more options you consider, the more confidence you will have in the final layout you choose.

5. *Evaluating plant layout options.*

   To decide which layout will best meet your needs, decide on the three to five evaluation factors that are most important to you. Your list might include:

   - Ease of expansion
   - Cost to build
   - Product flow
   - Ease of supervision

   Next, rate your evaluation factors based on importance to you and assign **priority scores** for each on a scale of 1 to 10. The most important factor gets a **priority score** of 10. Less important evaluation factors get proportionally lower scores.

Priority Score (Example):

Evaluation Factors	Priority Score
Ease of expansion	7
Cost to build	9
Product flow	10
Ease of Supervision	5

   Next, **rank** each of your layout options for each of the evaluation factors (tied rankings for multiple layouts are okay). Do not confuse the **rank** with the **priority score** from the previous step (see example on page 8).

   Now go back to your priority scores and for each evaluation factor for each layout option, divide the **rank** by the **priority score,** and then add these to find the new weighted values for each layout (see example on page 8).

Rank (Example):

Layout	Ease of expansion	Cost to build	Product flow	Ease of supervision
Option 1	1	1	2	3
Option 2	2	3	2	1
Option 3	1	2	1	2

Weighted Evaluation Factors (Example):

Layout	Ease of expansion	Cost to build	Product flow	Ease of supervision	Total
Option 1	7 ÷ 1 = 7	9 ÷ 1 = 9	10 ÷ 2 = 5	5 ÷ 3 = 1.67	22.67
Option 2	7 ÷ 2 = 3.5	9 ÷ 3 = 3	10 ÷ 2 = 5	5 ÷ 1 = 5	16.5
Option 3	7 ÷ 1 = 7	9 ÷ 2 = 4.5	10 ÷ 1 = 10	5 ÷ 2 = 2.5	24

The layout with the highest total score *should* be the best alternative. In this example that would be Option 3, but Option 1 would be a close second choice. If the **priority scores** were to change slightly, the highest layout score could easily change. As you can see, there is a lot of subjectivity in this process, but the point is to try to make the subjectivity visible and well thought-out so that this important decision is not made blindly.

6. *Work with your contractors (and architect, if needed) to detail your plant's design.*

   How will the plumbing, electricity, refrigeration, and ventilation work? What types of interior, exterior, and insulation materials will you use? Up to this point, the layout consists of blocks or various shapes for work areas. Now you can develop the final plan that will be used as a guide to show precisely where everything goes in the plan.

   Reproduce the selected layout plan, preferably to a scale of 1/8 or 1/4-inch equals a foot. First, draw in the major equipment and then the smaller equipment and label them. As you begin to do this, you will find yourself re-evaluating the fit of these details and making minor adjustments for such things as door swings, adequate aisle space, and space for maintenance, service, etc. As you position equipment, you should also document other physical features that may be required on separate features "schedules" such as:

   - Ceiling heights
   - Fire or other hazards
   - Door sizes and types
   - Finishing materials
   - Adequate room for cleaning of areas and equipment
   - Minimum support column spacing for carcass rails
   - Ventilation
   - Hot and cold water lines and drains
   - Cooler lines and compressors
   - Electrical and natural gas lines and hookups

   The above list of features should NOT be considered all-inclusive. Each meat plant will have its own unique considerations, and the plans should be created to include any necessary features. Schedules for many of these features are included with each of the two model designs in this book.

   Make sure the arrangement is functionally sound. One of the best ways to accomplish this is to involve employees from the individual work areas in this step. By using teams, not only will you find that you develop a

better layout, but you will have less resistance in installing the plan because employees will take ownership of a plan they helped develop.

7. *Review and revise, revise, revise until you are completely happy with all of the details.*

   You want to build your new plant right *the first time*. There are suggestions in this book about possible ways to do it, but these may not be right for the specifics of your plant and/or geographic area.

   If you are not near a municipal sewer system, you will need to consult with the Iowa Department of Natural Resources about wastewater management. You might also want to consult with a certified civil engineer and/or the Cornell Waste Management Institute in New York State (http://cwmi.css.cornell.edu/), a national leader in this area.

8. *If you have not done so already, contact your food safety inspection service and work with them to finalize the details of your plant before you begin construction.*

   While federal or state food safety inspectors cannot tell you how to build your plant, they may suggest ways your plant can meet the Sanitation Performance Standards of Title 9, Code of Federal Regulations, Section 416.2 (this code, 9 CFR 416.2, is included in the appendix for your reference). These requirements are based on performance, but the code provides no specifics on how you must meet the requirements. The requirements are primarily concerned with:
   - Pest management
   - Use of tested potable water
   - Adequate drainage that prevents backflow and keeps sewage lines distinct from wastewater
   - Adequate lighting and ventilation
   - Adequate rest rooms, handwashing stations, and garbage cans.
   - Walls, floors, and ceilings must be impervious to moisture and easily sanitized.
   - And the catch-all: Building conditions must not result in product adulteration or the creation of insanitary conditions.

There are no regulated metrics for adequacy. You must be able to show that your facilities will be adequate. The idea behind *performance standards* is similar to HACCP, but the requirements for scientific documentation are not as strict. Usually, the guidance of a professional construction contactor or engineer is sufficient.

Food Safety Inspection Agencies

State Inspection for Iowa
Iowa Department of Agriculture and
Land Stewardship
Meat & Poultry Inspection Bureau
(515) 281-3338
www.iowaagriculture.gov/MeatAndPoultry.asp

Federal Inspection
USDA Food Safety and Inspection Service (FSIS)
Des Moines Office of Field Operations
(OFO, covers all of Iowa and Nebraska)
(515) 727-8960 or 1-800-990-9834

Contact information for other FSIS OFO offices can be found online at:
www.fsis.usda.gov/Contact_Us/Office_Locations_&_Phone_Numbers/index.asp

Note on Improving Plant Productivity

For an existing plant, an expansion or upgrade to the facility may *not* be necessary. You may be able to increase the volume of product you can process without a bricks and mortar change. Before you jump head-first into a project that could cost hun-

dreds of thousands of dollars or more, consider your plant as a whole system of activities that are linked together in a certain order.

For example, slaughter leads to fabrication leads to grinding and packaging. The activities that make up a meat processing business are really a chain of dependent events, including the movement of product between different processing areas and storage. A plant cannot sell products until they are packaged, cannot package products until they are moved to the packaging area, and cannot move products to the packaging area until the products are cut, smoked, etc.

Each step is dependent upon what happens before it. The amount of product being processed at each step should match up with what is happening in the steps before and afterwards, otherwise bottlenecks occur. For example, if your sausage kitchen was twice as large, but you had the same size smokehouse, would you be able to produce product twice as fast? Probably not. Before you make the decision to physically expand any part of your plant, ask yourself, "If I had the capacity to do twice as much in this area or process, would I make twice as much money overall or would things just start backing up in the areas and processes afterwards?" Perhaps you don't need a new building, but rather a bigger smokehouse and/or faster packaging equipment. *Processors building new plants should also keep this in mind as you select equipment and design your layout*.

Arrangement of the Designs in this Book

This book contains designs for two different sized plants: a *small* plant measuring 2,600 square feet. and a *large* plant measuring 5,250 square feet. A table providing an overview of each design's capacity and details is provided on the next page. Pages 11 through 13 contain general considerations from the Iowa Meat & Poultry Inspection Bureau broken down by plant area. Page 14 contains comments and considerations specific to the designs contained in this book from veteran Iowa meat processors. Sanitation Performance Standards are included in the Appendix on page 63. These sections should provide food for thought about the needs of your own plant.

The designs for each plant are arranged in the following order:

- Floor Plan
- Plumbing Plan
- Electrical Plan
- Refrigeration Plan
- Equipment Plan
- Exterior Elevations Sketches
- Building Specifications

A key of respective icons is placed on the opposite page from each plan. Following the elevation sketches, building specifications are displayed in detailed tables by plant room. The small plant is displayed first, on page 17, followed by the large plant, beginning on page 41.

Questions about these designs can be directed to any of the following persons:

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(563) 452-3329

kmrichmann@hotmail.com

Plant Capacities and Utilities

	Small Plant	Large Plant
Dimensions	50′ X 50′ + 10′ X 10′	70′ X 75′
Size	2,600 sq. ft.	5,250 sq. ft.
Holding Cooler Size	13 Beef*	20 Beef*
Pre-chill Cooler size	7 Beef*	10 Beef*
Number of Employees	3 – 4	6 – 10
Water Use and Output	150-200 gallons per beef equivalent, average One beef should be equivalent to 2 hogs, sheep, or goats	
Electrical amp service needed	Depends on equipment, consult a licensed electrician	
Possible interior materials	Block tile, glass board, stainless steel, concrete block covered with epoxy paint**	
Possible exterior materials	Steel siding, vinyl siding, cement board siding, tip-up concrete, insulated concrete forms	
Heating	Options include forced warm air and hot water heating. Hot water heating is an excellent source of heating for plants. You can reclaim some heat from refrigeration compressors, and do not have to purchase a separate hot water heater. However hot water heating costs more and you will need air conditioning in certain areas (e.g. retail), so some type of forced air is still needed.	
Ventilation	Proper ventilation is very important, as bad smells can taint products. Ventilation methods vary depending on the building materials used. Consult a licensed contractor.	
Vermin Barrier	Proper construction will keep out most vermin. Sometimes an air curtain or another method is needed at exterior doors for fly control.	
Price per sq. ft.	~$100, depending on materials used	
How might this plant be expanded?	For both designs, the left-hand side of the plant could be extended to make more room that could be utilized for anything that would be needed, except slaughter.	

* Cooler space for one beef will provide space for 1.5 to 2 hogs, sheep, or goats.

** When painting or touching up expoxy, it is critical to seal the area off from the rest of the plant to avoid contamination of food materials, finished products, and packaging.

General Plant Design Considerations from Iowa Meat & Poultry Inspection Bureau

These are provided as suggestions, NOT regulatory requirements. Iowa Meat & Poultry Inspection Bureau, USDA Food Safety and Inspection Service(FSIS), or your local food safety inspection agency will make the final determination if your plant meets all food safety regulatory requirements.

Animal Holding Areas

Construction of animal holding areas should address the following:

1. Unloading of animals.
2. Design of animal paths for fluid movement.
3. Ample space for animals of all sizes.
4. Availability of water for each animal.
5. Ventilation to provide proper cooling/heating.
6. Lighting.
7. Contact your regional Iowa State University Extension Livestock Specialist for more detailed information.

Slaughter Areas

Construction of slaughter areas should address the following:

1. Is there a sterilizer in the slaughter room?
2. Is the knock box in the slaughter able to withstand the animals that it is intended to hold?
3. Is there an adequate inspection pan and head loop for official slaughter rooms?
4. Do you have 50 foot candles at the inspection station on the slaughter floor?
5. Are the rails in slaughter and coolers located at an adequate height for the purpose intended? Is the bleeding rail height adequate?
6. Are toilet facilities located near slaughter floor to prevent slaughter room employees from traveling through plant.

Inedible Areas

Construction of inedible areas should address the following:

1. Inedible rooms need to limit access to the facility (e.g. an interior door for the establishment to place inedibles in the room and an exterior door for the rendering truck to pick up the inedibles without entering the plant).

Receiving and Shipping Areas

Construction of receiving and shipping areas should address the following:

1. Load out areas should be located so that product is not transported back through production areas.
2. Receiving and shipping areas should not open up into a processing room.
3. Receiving and shipping areas should be adjacent or close to where products/supplies are being stored.

Coolers and Freezers

Construction of cooler and freezer areas should address the following:

1. Are there separate coolers for storage of raw and cooked products?
2. Do the coolers have drains in them and are they adequately sized?

Storage Areas

Construction of storage areas should address the following:

1. Is there adequate storage for dry and non-meat ingredients.

2. Is there adequate storage for packaging and labeling supplies?
3. Is there storage for equipment?
4. Is there storage for maintenance tools?
5. Is there separate storage for cleaning tools, supplies, and chemicals—away from food?
6. Is there storage for employee belongings?

Processing Areas—RAW, COOKED, SMOKEHOUSE

Construction of processing areas should address the following:

1. Are there separate areas for processing cooked and raw products?
2. Is the processing room refrigerated?
3. Is the smokehouse in a room by itself with a drain?
4. Do carcass rails lead all the way into the processing areas for convenience and safety of dropping carcasses to tables or work areas?
5. Are floors sloped to drains?
6. Consider placement of equipment for ease of transition from one machine to another, e.g., meat saw close to boning table.

Employee/Welfare Areas

Construction of welfare/employee areas should address the following:

1. Do the bathrooms have separate sewer lines until outside the building or is there a backflow preventative device?
2. Does the restroom have a self-closing door and ventilation that is turned on with the light?
3. Is there a bathroom that customers can use easily?
4. Is there a separate break area for employees?
5. Is there a separate storage area and refrigerator for employee food?
6. Consider the location of the management office within plant—should it be closer to the retail area, employee welfare area, production area? Where does management spend most time? Is other office space necessary?
7. If you operate under FSIS-inspection, a separate office area is needed. If Iowa-inspected, a work area and place to store plant files is needed.

Retail/Customer Areas

Construction of retail/customer areas should address the following:

1. Is the retail area sufficiently separated from processing areas?
2. Can customers pick up their products without causing contamination of processing areas?
3. Are finished product storage areas (e.g., freezer, ready-to-eat cooler) located close or adjacent to retail area (and/or to shipping area)?

Traffic Patterns

Traffic pattern items that should be considered:

1. Is the flow of the product from animal arriving to packaged meat leaving adequate to prevent contamination of areas or products?
2. Is the traffic flow for delivered goods adequate to prevent contamination in processing areas?
3. Are traffic patterns planned to retain separation of cooked and raw products—including people (employees and non-employees), equipment and product?
4. What paths do delivery or pick-up persons take within your plant? How do you prevent contamination from the outside?

Sewer and Water

Sewer and water items that should be considered:

1. Do you have a sewer certificate? (If hooked up to a municipal system, this would come from the city.)
2. Do you have the water tested at least annually? Does your city?
3. What is the source of the water for the plant? City water (public) or private well?
4. Are sewer pipes from toilets/welfare areas separate from sewer pipes from production areas?
5. Is there proper water disposal (sewer) to protect food production areas from contamination—backflow devices?

General Construction Considerations

1. Are the floors, walls, and ceilings in wet areas smooth, impervious to water, and easily cleanable?
2. Are doors and hallways wide enough for the intended purpose—people, product, and equipment movement—e.g., smokehouse trucks?
3. Are there hose bibs in wet areas so that proper washing can be performed?
4. If there are windows, are the windowsills built to prevent accumulation of debris and dirt (no ledges is preferred)?
5. Do the floors in wet areas slope toward the drains and are the drains adequate in size? Do the drains have adequate traps?
6. Are the hands-free handwash sinks located in areas where they will be easily accessible and useable?
7. Is the lighting adequate for the purpose and is it protected?
8. Is there a three compartment sink for cleaning equipment?
9. Will there be curbing around the rooms? What will it be constructed with and how will it be constructed to ensure cleanability and a good seal at the junction where the wall meets the floor?
10. Consider which direction doors open—freezers, coolers, etc.
11. Consider what type of doors are needed—swinging doors, lockable doors?
12. What type of security is needed?
13. Determine the volume of your business and growth of your business when determining the size of coolers, freezers, processing, storage areas, and retail areas.
14. Determine how plant can grow in the future with building additions.
15. Air flow (ventilation, heating, cooling, etc.) inside the plant should be addressed so that positive and negative air pressure are balanced and do not cause adverse situations in the plant—odor from animal holding pens/offal/slaughter area filtering to other parts of the plant. The retail packaging area should be positively pressurized to push air out into the rest of the plant.
16. Will any other operations be happening in the plant? Other non-meat food processing? Catering? Retail sales of non-meat foods and other items. What space is designated for those operations?

Comments from Veteran Iowa Meat Processors for Consideration Based Upon the Needs of Your Particular Business

These comments are made in relation to the plant designs contained in this book and will only make sense by referring to the respective plant design for each comment.

For both plant designs:

- You may want your freezers and/or coolers to be bigger or smaller based on the nature of your business.
- If you plan on a lot of retail business, you might want to design a larger retail area.
- You may not need both a public and an employee restroom.
- You may not need a door between your break room and the retail area.
- Depending on your ventilation set up, you may want to place your livestock pens and/or inedibles outside of the building. You should always have ventilators pulling air from these areas to the outside.
- Depending on your food safety inspection agency, you may only need to provide a desk with a locking file cabinet for your inspector, not a separate office.
- You may want a separate ready-to-eat packing area.
- You may want a laundry washing room/area.
- You may want your pens to be bigger and/or have a larger outside staging area.
- You may want a built-in finished product cooler with glass retail-display doors that open into your retail area, rather than a stand-alone retail cooler unit. (**Note:** "Finished Product Cooler" on both floor plans is ONLY for cooling product coming out of the smokehouse, NOT packaged and/or raw product.)

For the small plant design:

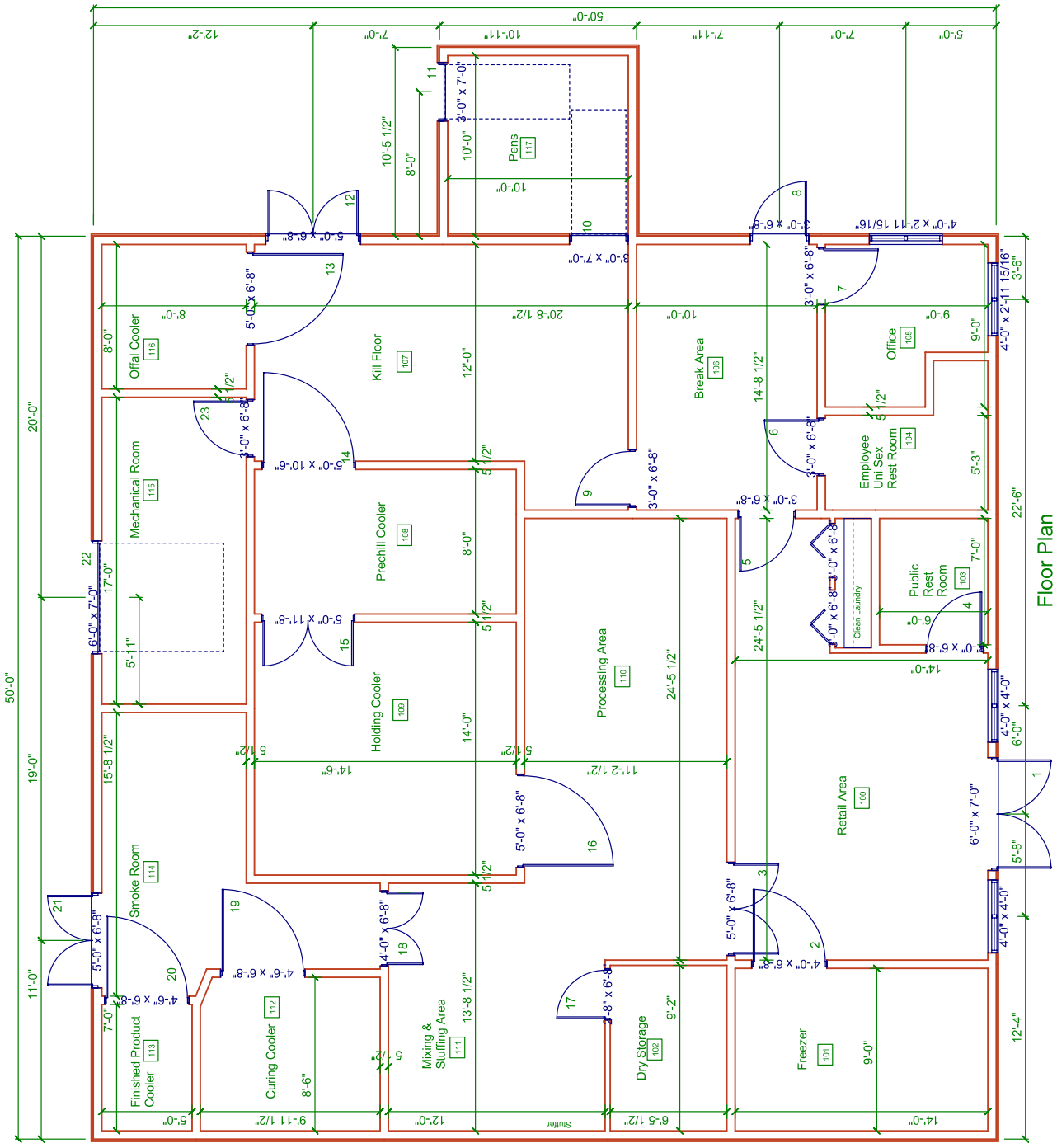
- For the freezer next to the retail area, you may want to have the door open in the other direction.
- You may want the offal cooler to have its own exterior door for after-hours pick-up.
- You will likely want a door between the processing area and the kill floor in order to move bone barrels into the offal cooler (for use only while the kill floor is clean and not in use).
- You may want an equipment wash sink in the processing area.
- If you plan to produce a lot of ready-to-eat product, you will likely want a vacuum packaging machine.

For the large plant design:

- If you personally will often be working in the retail area, you may want to position the office closer to it.
- You may want to place your meat saw closer to your boning table.
- You may want to make your freezer directly accessible from your retail area.
- If you have sufficient volume, you might consider a roll-stock packaging machine (or leave room for one in your designs should you wish to buy one later).

Small Plant Design—2,500 square feet

Small Plant, Floor Plan (Not for Construction Use)



Plumbing Symbol Key Plan

4″ PVS Sewer Line

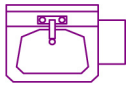
2″ PVC Sewer Line

Grease Interceptor
Size will be determined by
gallons of water used daily

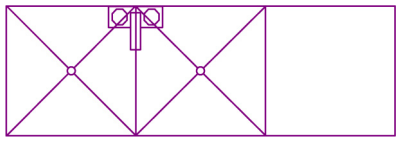
4″ Floor Drain
Floor Sloped to Drain

2″ Condensate Drain
for Refrigeration Evaporators

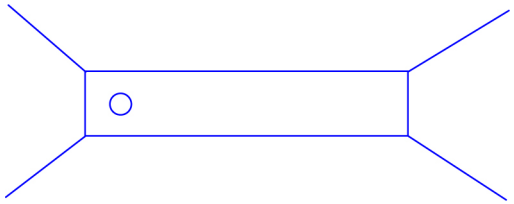
Hose Bib
Hot & Cold Domestic Water



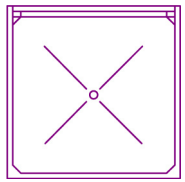
Hand Wash Sink
with Knife Sterilizer



Equipment Wash Sink

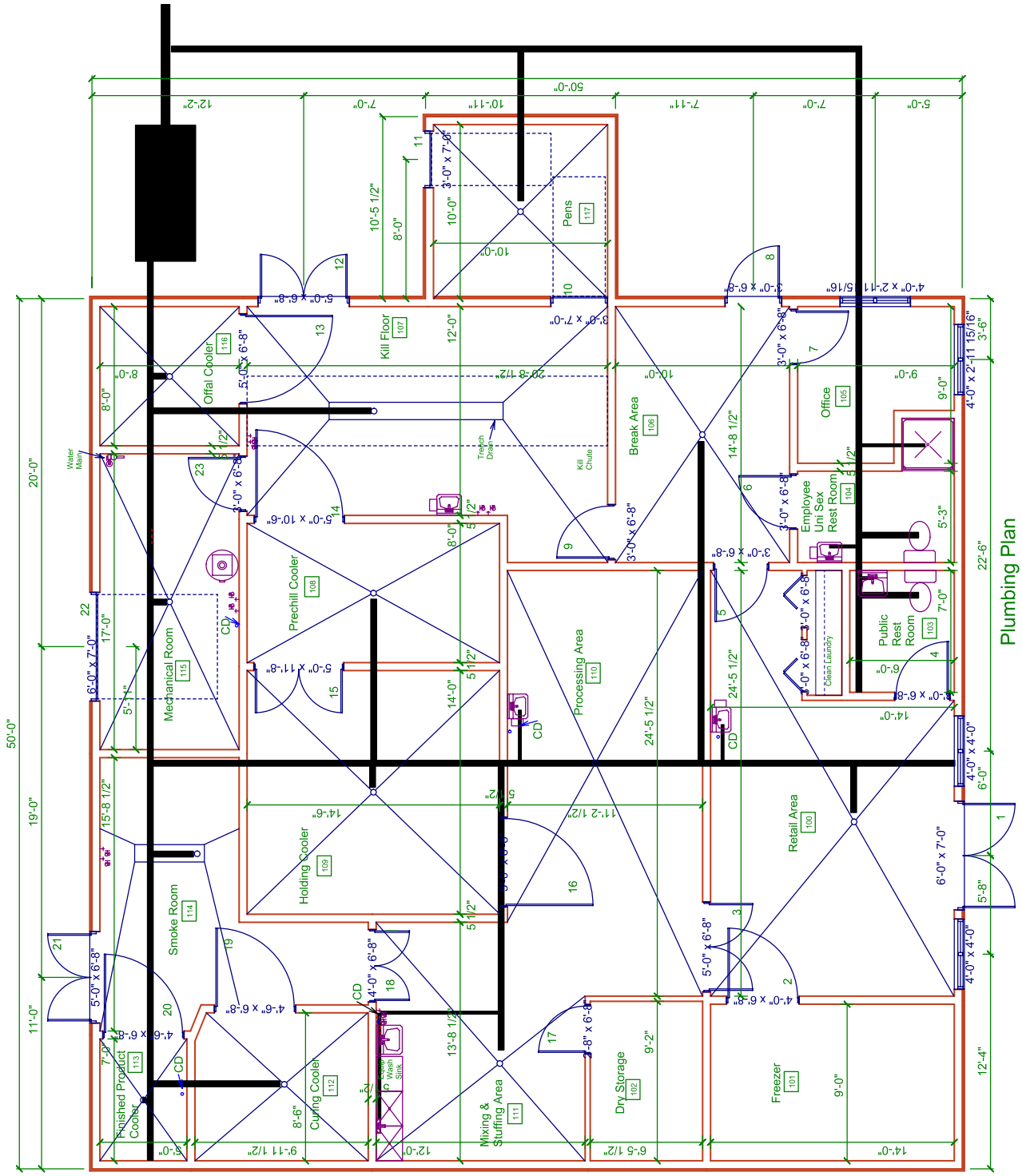


Trench Drain with
Floor Sloped to Drain

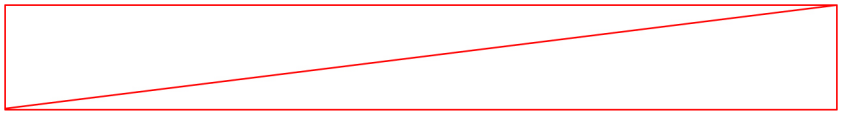


Shower
32″ x 32″

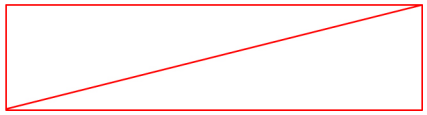
Small Plant, Plumbing Plan (Not for Construction Use)



Electrical Symbol Key Plan



Flourescent Light
(8', Vapor Tight, High Output, T-8)



Fluorescent Light
(4', Vapor Tight, High Output, T-8)

Emergency Lights

Lighted Exit Signs

Incandescent Jar Lights

GFI Outlet 115v

Regular Outlet 115v

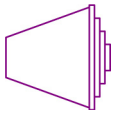
208, 220, 230 v outlet

Light Switch

Light Switch 3-Way

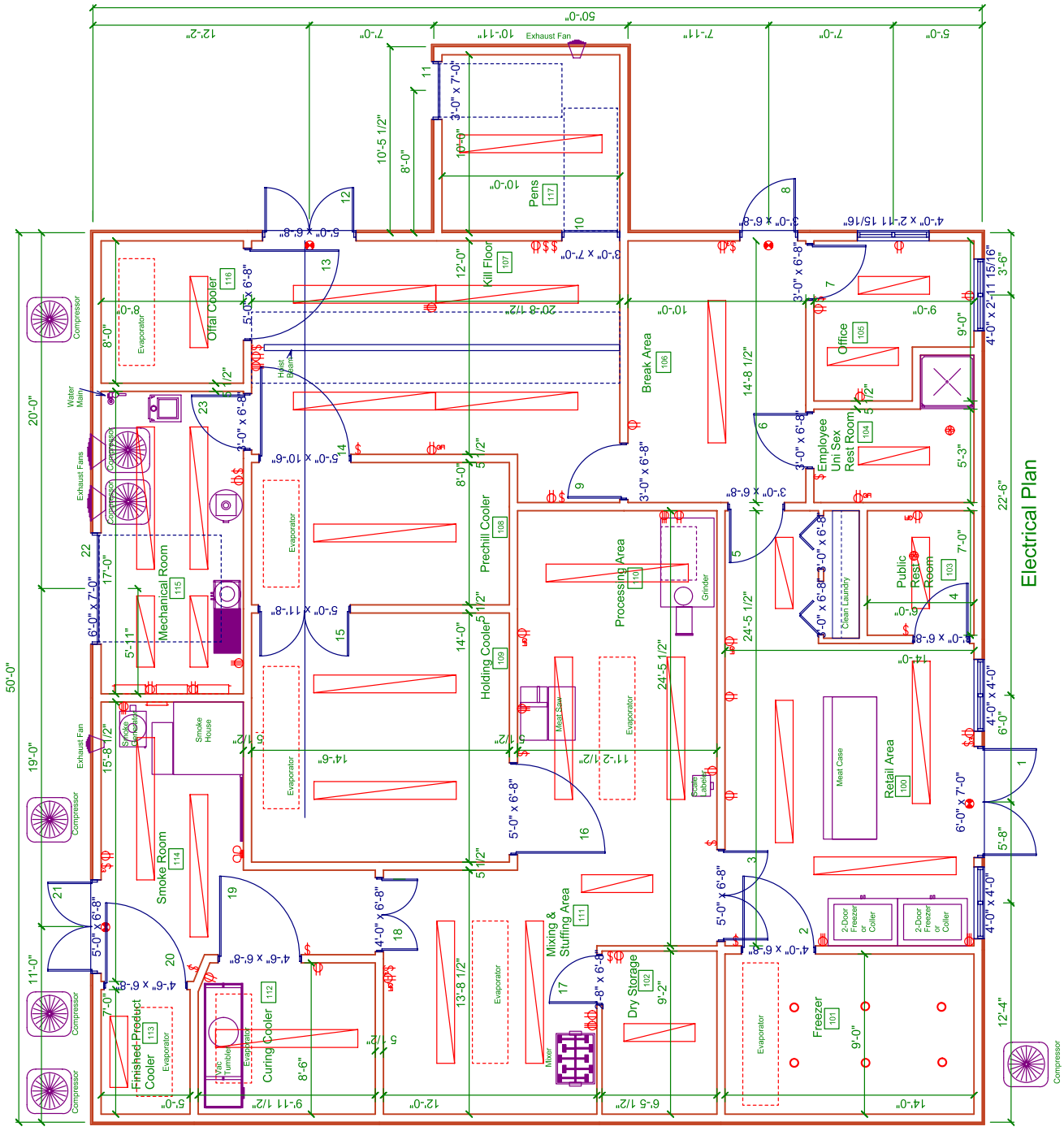
Rest Room Exhaust Fan

Electrical Panel

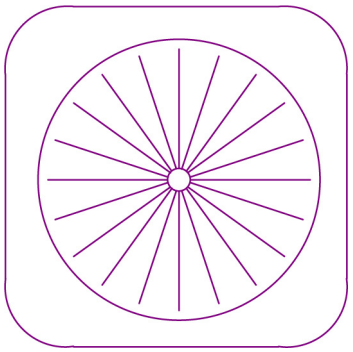


Exhaust Fan

Small Plant, Electrical Plan (Not for Construction Use)



Refrigeration Symbol Key Plan



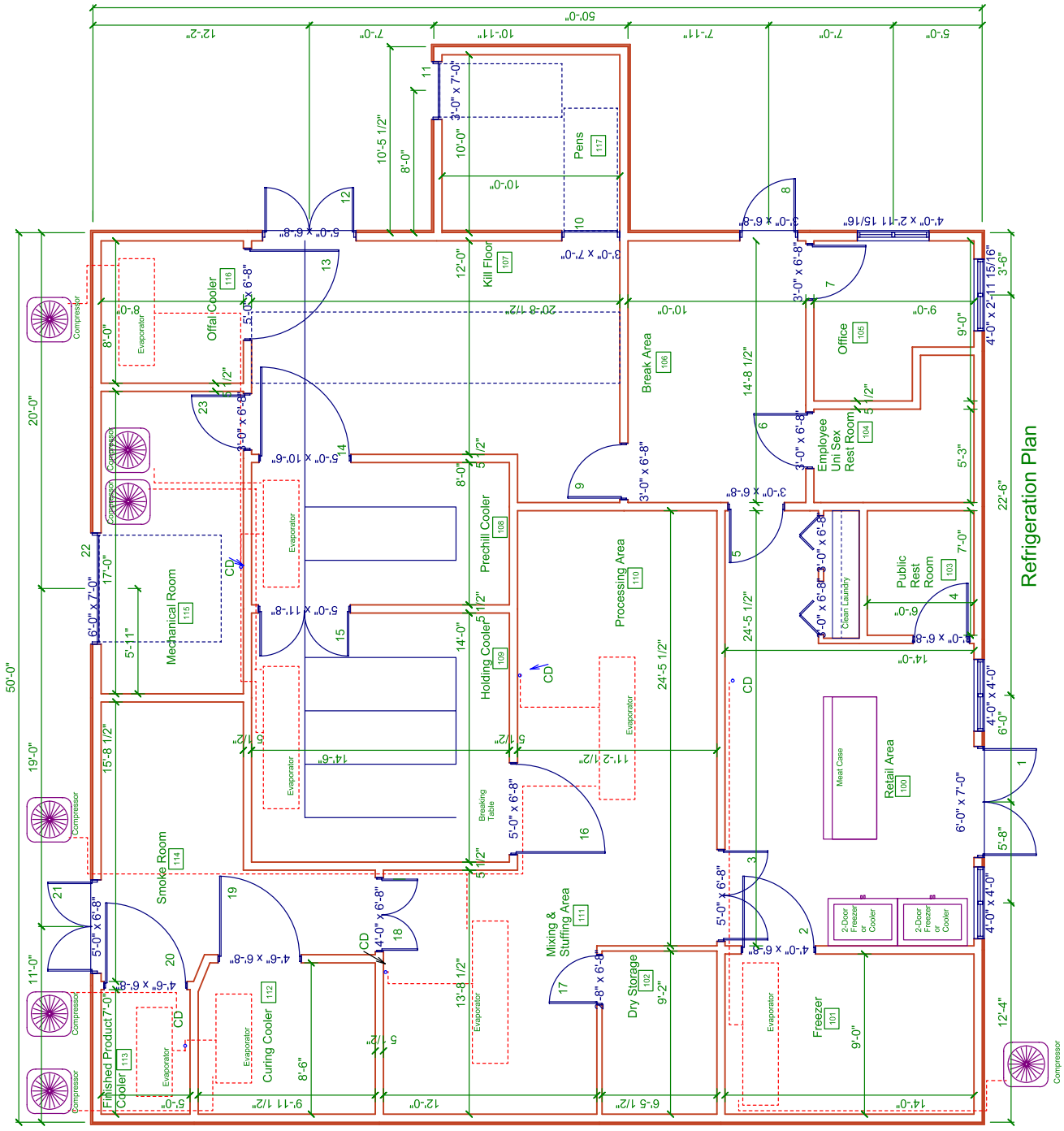
Compressor Condenser Unit

Freon Line

Evaporator Drain Line

Evaporator

Small Plant, Refrigeration Plan (Not for Construction Use)



Equipment Symbol Key Plan


Beef Cradle

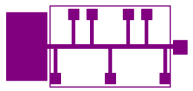

Boning Table


Curing Tub

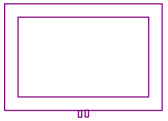

Grinder


Inedible Barrel


8′ Meat Case


Mixer


Power Washer

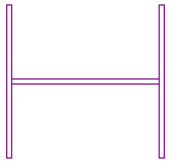

2-Door Freezer or Cooler

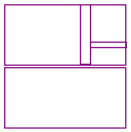

Wrapping Table

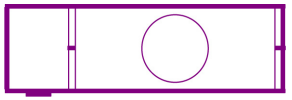

Kill Chute

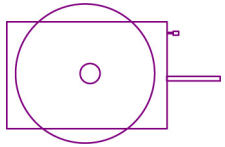

Smoke Generator

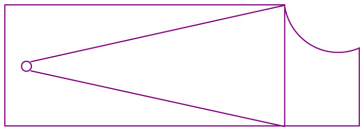

Smoke House 1-Truck

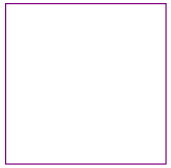

Smoke Truck


Meat Saw

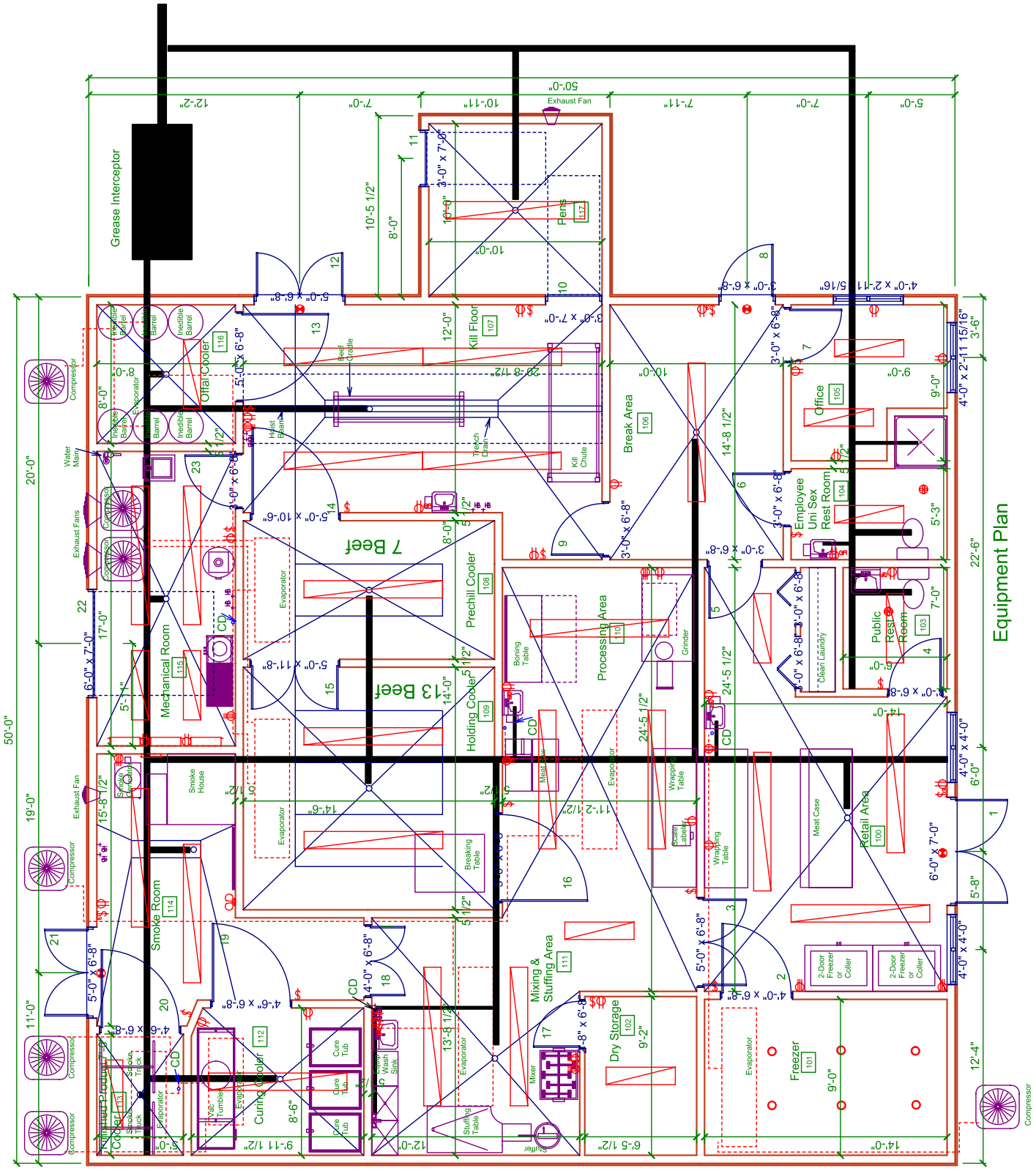

Tumbler


Stuffer

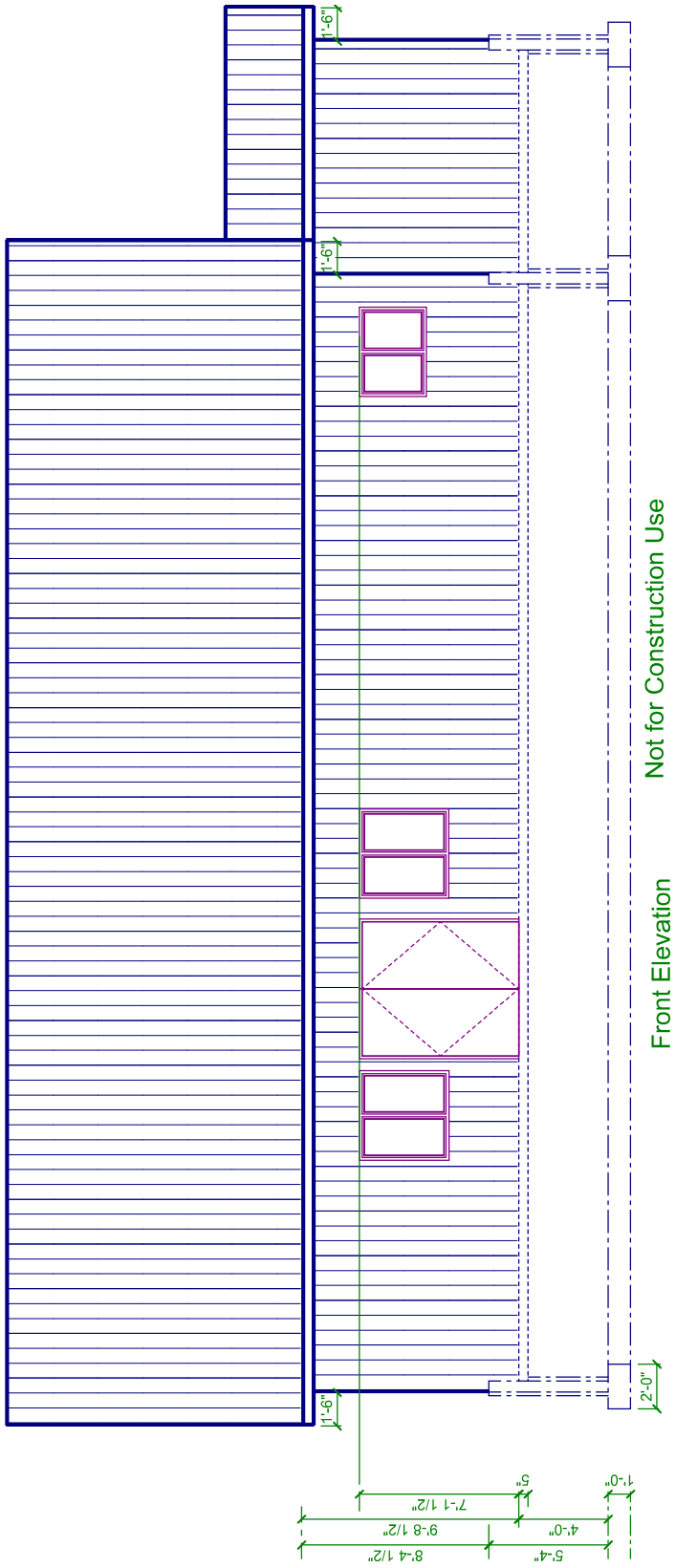

Stuffing Table


Breaking Table

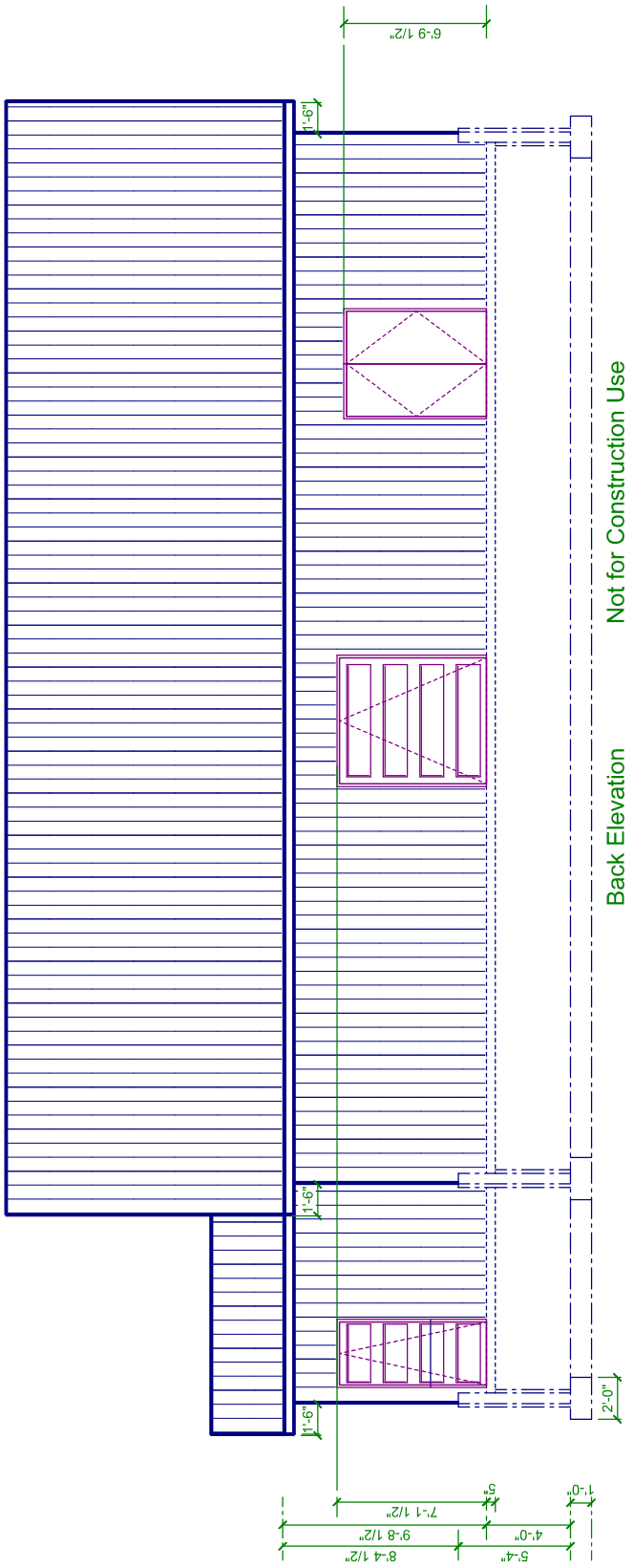
Small Plant, Equipment Plan (Not for Construction Use)



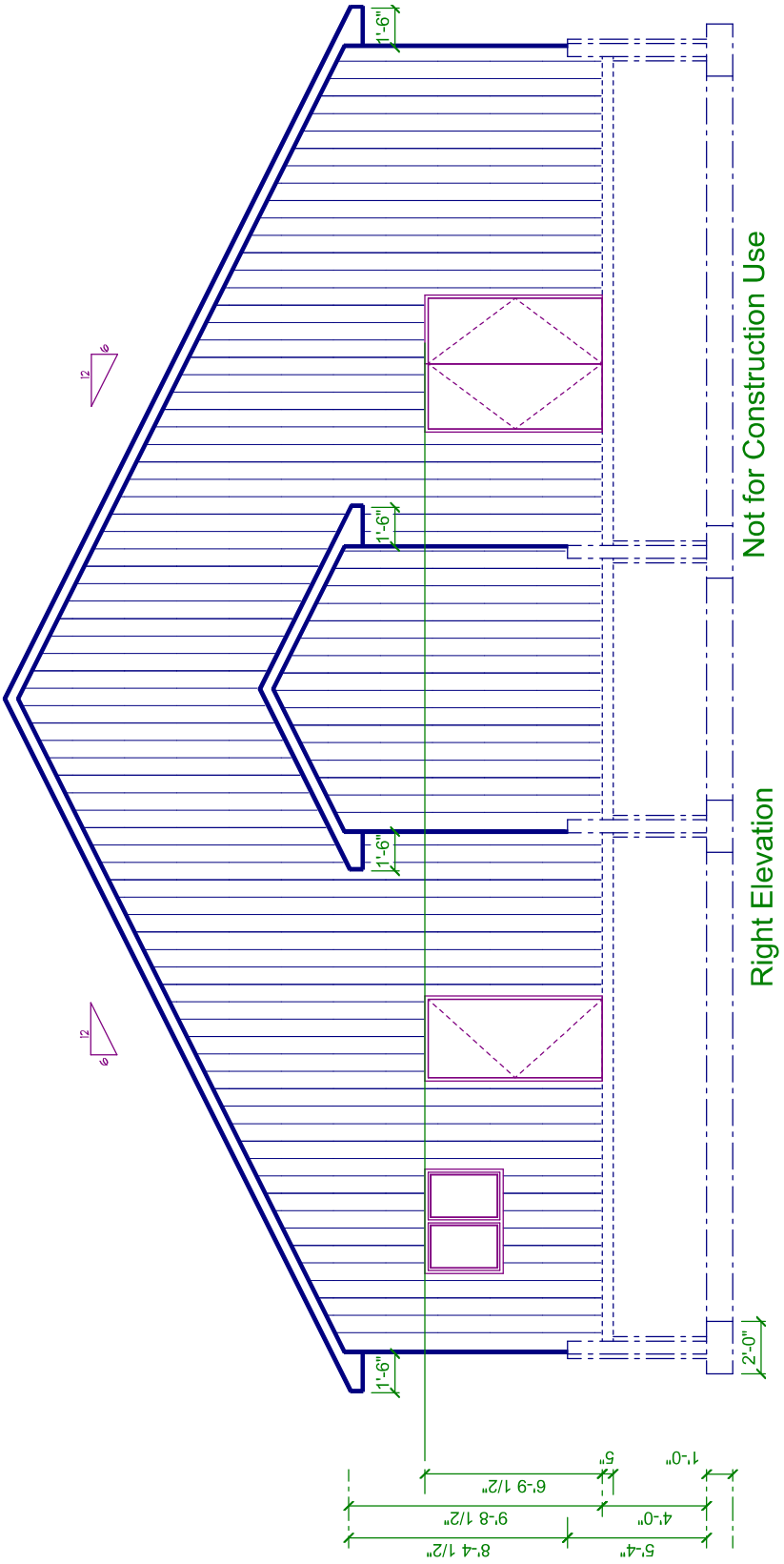
Small Plant, Front Elevation (Not for Construction Use)



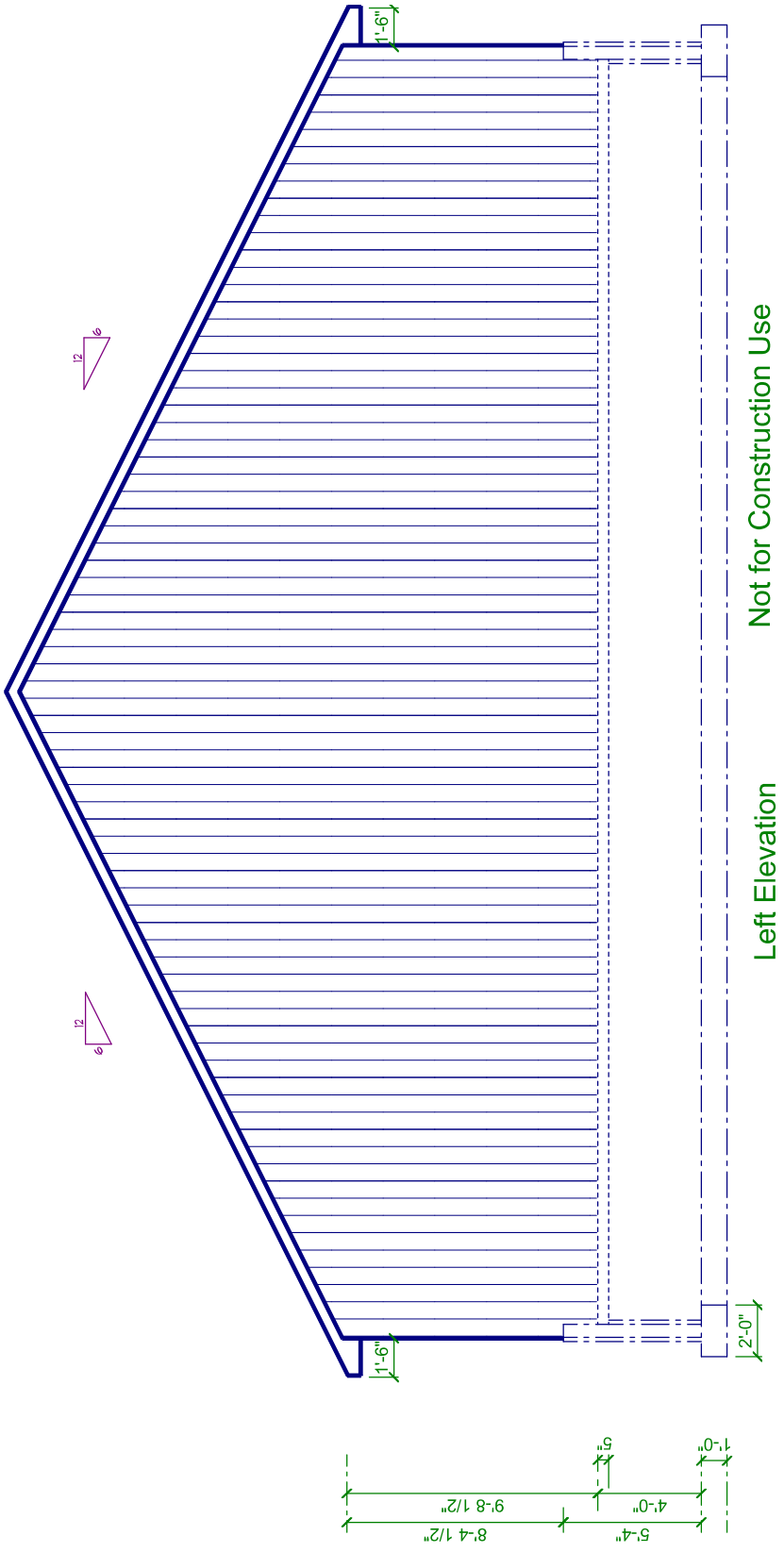
Small Plant, Back Elevation (Not for Construction Use)



Small Plant, Right Elevation (Not for Construction Use)



Small Plant, Left Elevation (Not for Construction Use)



Building Specifications

Small Plant Design

Room Finish Schedule

Room No.	Room Name	Floor	Base	Walls N	Walls E	Walls S	Walls W	Ceiling	Ceiling Height
100	Retail Area	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	10′
101	Freezer	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	10′
102	Dry Storage	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	10′
103	Public Rest Room	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	10′
104	Employee Rest Room	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	10′
105	Office	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	10′
106	Break Room	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	10′
107	Kill Floor	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	14′
107	Kill Floor Cupola	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	18′
108	Prechill Cooler	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	14′
109	Holding Cooler	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	14′
110	Processing Area	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	10′
111	Mixing & Stuffing Area	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	10′
112	Curing Cooler	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	10′
113	Finished Product Cooler	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	10′
114	Smoke Room	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	10′
115	Mechanical Room	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	10′
116	Offal Cooler	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	10′
117	Pens	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	10′

Laminated Product
Fluted Polypropylene .400″ back
.05″ sealed fiberglass reinforced plastic (FRP) panel, single sided skin FRP

(Glasbord is a tradename for FRP)

PVC Trim Boards
1/2″ thick x 3″ wide
22.5^0 angle cut on top (minimum) PVC cove

Door Schedule

Door No.	Room	Size Width	Size Height	Material Type	Finish		Remarks
1	Entry	6′-0″	7′-0″	Glass	Factory		Lockable
2	Freezer	4′-0″	6′-8″	Wood	Factory		Insulated Freezer Door
3	Retail Area	5′-0″	6′-8″	Wood	SS		Double Swing
4	Public Rest Room	3′-0″	6′-8″	Steel	Painted		Lockable Inside
5	Retail Area	3′-0″	6′-8″	Steel	Painted		No Knob (Push & Pull handle)
6	Employee Rest Room	3′-0″	6′-8″	Steel	Painted		Lockable Inside
7	Office	3′-0″	6′-8″	Steel	Painted		Lockable w/Dead bolt
8	Break Room	3′-0″	6′-8″	Steel	Painted		Steel Insulated (Lockable)
9	Kill Floor	3′-0″	6′-8″	Steel	Painted		No Knob (Push & Pull handle)
10	Pens	3′-0″	7′-0″	Steel	Painted		Insulated Roll up Door (Lockable)
11	Pens	3′-0″	7′-0″	Steel	Painted		Insulated Roll up Door (Lockable)
12	Kill Floor	5′-0″	6′-8″	Steel	Painted		Steel Insulated (Lockable)
13	Offal Cooler	5′-0″	6′-8″	Wood	Factory		Insulated Cooler Door
14	Pre chill Cooler	5′-0″	10′-6″	Wood	Factory		Insulated Cooler Door
15	Holding Cooler	5′-0″	11′-8″	Steel	Clear		Double Swing
16	Holding Cooler	5′-0″	6′-8″	Wood	Factory		Insulated Cooler Door
17	Dry Storage	2′-8″	6′-8″	Wood	SS		Double Swing
18	Mixing & Stuffing Area	4′-0″	6′-8″	Wood	SS		Double Swing
19	Curing Cooler	4′-6″	6′-8″	Wood	Factory		Insulated Cooler Door
20	Finished Product Cooler	4′-6″	6′-8″	Wood	Factory		Insulated Cooler Door
21	Smoke Room	5′-0″	6′-8″	Steel	Painted		Steel Insulated (Lockable)
22	Mechanical Room	6′-0″	7′-0″	Steel	Painted		Overhead Steel Insulated (Lockable)

NOTE: Owner may need to furnish cooler doors, freezer door, and double swing doors to contractor.

Concrete Finish Schedule

Room No.	Room Name		Floor Drains	Insulation Thickness Under floor	Remarks
100	Retail Area		1		
101	Freezer		0	8″	
102	Dry Storage		0		
103	Public Rest Room		0		
104	Employee Rest Room		0		
105	Office		0		
106	Break Area		1		
107	Kill Floor		1		Trench Drain
108	Pre chill Cooler		1	2″	
109	Holding Cooler		1	2″	
110	Processing room		1	2″	
111	Mixing & Stuffing Area		1	2″	
112	Curing Cooler		1	2″	
113	Finished Product Cooler		1	2″	
114	Smoke Room		1		Trench Drain
115	Mechanical Room		1		
116	Offal Cooler		1	2″	
117	Pens		1		

NOTES:
All Floors will be concrete with a non-slip finish (4000#).
All floors 5″ thick with rebar spaced at 2′ on center and places on 2-1/2″ chairs.
Floor slopes to drains have to be 3/16″ per foot or greater (no standing water on floors).
Under floor insulation must have a density of 2.5 lbs. per cubic foot or 2″ thick equals R-value of R-10.
Ground under insulated floors must be properly bedded with gravel and/or sand for proper ventilation to avoid ice heaving.

Plumbing Specifications

Room No.	Room Name	Room Size	Remarks
100	Retail Area	17'x14'x10'	1 Floor Drain 1 Wall-mount handwash sink
103	Public Rest Room	7'x6'x10'	1 Toilet 1 Wall-mount handwash sink
104	Employee Rest Room	5'x9'x10'	1 Toilet 1 Wall-mount handwash sink Enclosed Shower
106	Break Area	15'x10'x10'	1 Floor Drain
107	Kill Floor	21'x12'x14'	1 Floor Drain (Trench Drain) 1 Wall-mount handwash sink 2 sets of Hose Bibs (Hot & Cold domestic water)
108	Pre chill Cooler	8'x14'6"x14'	1 Floor Drain
109	Holding Cooler	14'x14'6"x14'	1 Floor Drain
110	Processing room	25'x11'x10'	1 Floor Drain 1 Wall-mount handwash sink 1 Condensate Drain (On sink drain)
111	Mixing & Stuffing Area	14'x12'x10'	1 Floor Drain 1 Equipment wash sink (3 compartment) 1 Wall-mount handwash sink 1 Condensate Drain (On sink drain)
112	Curing Cooler	8'6"x10'x10'	1 Floor Drain
113	Finished Product Cooler	5'x7'x10'	1 Floor Drain 1 Condensate Drain
114	Smoke Room	8'x16'x10'	1 Floor Drain (Trench Drain) 1 Set of Hose Bibs (Hot & Cold Domestic water) Cold domestic water hook-up to smokehouse
115	Mechanical Room	8'x17'x10'	1 Floor Drain Water Main 1 Set of Hose Bibs (Hot & Cold Domestic water) 1 Condensate Drain Water Heater Power washer hook-up
116	Offal Cooler	8'x8'x10'	1 Floor Drain
117	Pens	10'x10'x10'	1 Floor Drain

Owner may need to supply wall mount hand wash sinks & equipment wash sinks to contractor.

NOTES:
All plumbing to meet state and local codes.
All floor drain and risers to be 4" diameter.
Condensate drains for refrigeration need to be 2" diameter lines.
Public and employee rest rooms must be a separate drain line out of building.
All water lines surface mounted in plant.
All water lines 1/2" or larger diameter.
All floor drains need covers and must have deep seal trap and properly vented.

Electrical Specifications

Room No.	Room Name	Lighting Type	Lighting FCP	Switches	Outlets 115v	Outlets 220v	Exhaust Fan	Remarks
100	Retail Area	8'VT, HO T8 4'VT, HO T8	50	1 1 -3way	3 1 GFI	2		Needs a night light
101	Freezer	Incandescent	30					Light switch in Retail Room
102	Dry Storage	4'VT, HO T8	30	1	1			
103	Public Rest Room	4'VT, HO T8	30	1	1 GFI		1	Exhaust fan on with light
104	Employee Rest Room	4'VT, HO T8	30	1	1 GFI		1	Exhaust fan on with light
105	Office	4'VT, HO T8	50	1	4			
106	Break Area	4'VT, HO T8	30	1 -3way	2			
107	Kill Floor	8'VT, HO T8	50	4	3 1 GFI	2		
108	Pre chill Cooler	8'VT, HO T8	30					Light switch in Kill Floor
109	Holding Cooler	8'VT, HO T8	30					Light switch in Process Room
110	Processing Room	8'VT, HO T8	50	2	2 1 GFI	2		
111	Mixing & Stuffing Area	8'VT, HO T8	50		1 1 GFI	1		Lights on with Process Room lights
112	Curing Cooler	8'VT, HO T8	30	1	2			Light switch in hallway
113	Finished Product Cooler	4'VT, HO T8	30	1				Light switch in hallway
114	Smoke Room	8'VT, HO T8	50	1 -3way	1	2	1	
115	Mechanical Room	8'VT, HO T8 4'VT, HO T8	50	1	3	1	2	
116	Offal Cooler	4'VT, HO T8	30					Light switch in Kill Floor
117	Pens	8'VT, HO T8	30					Light switch in Kill Floor

NOTES:
Lights shown on drawing are only showing placement between rails, beams, etc. (may need more or less lights).
Owner may change lighting type, but lighting foot candle power (FCP) must be at least what is shown on specifications.
Need lighted exit signs wherever needed by code.
Need emergency lighting wherever needed by code.
All pvc conduit used in all rooms (metal conduit can be used in mechanical room and above ceilings only).
No #14 wire used.
Must bid Square D equipment only.
GFI outlets must have lighted trip light.
This specification sheet does not include any refrigeration electrical needs (will be provided by refrigeration supplier).

Refrigeration Room Specifications

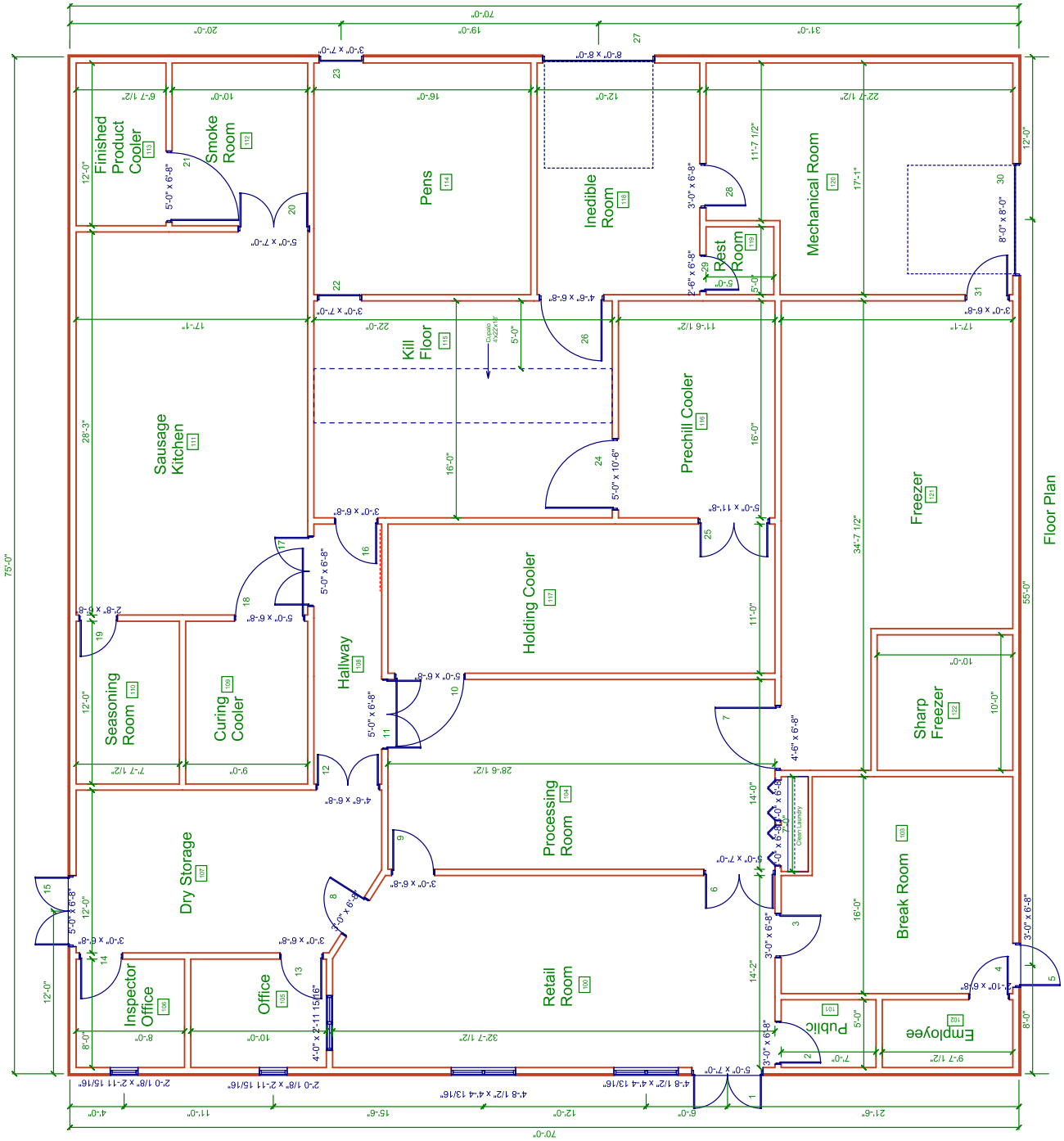
Room No.	Room Name	Room Size	Ceiling R-value	Walls R-value	Floor R-value	Workers in room	Product Temp in	Product Temp out	Remarks
101	Freezer	14'x9'x10'	30	23	40	0	50°F	0°F	Run room temp at 0 - 10°F Freezer 2000# in 24 hours
108	Pre chill Cooler	8'x14'6"x14'	30	23	10	0	100°F	36°F	Cool 5000# product in 24 hours
109	Holding Cooler	14'x14'6"x14'	30	23	10	0	40°F	34°F	Hold product at 34°F Up to 15000# product
110	Processing Room	24'x11'x10'	30	23	10	5	40°F	40°F	Run room temp at 55°F
111	Mixing & Stuffing Area	14'x12'x10'	30	23	10	3	40°F	50°F	Run room temp at 55°F
112	Curing Cooler	8'6"x10'x10'	30	23	10	0	50°F	36°F	Hold product at 34-36°F
113	Finished Product Cooler	5'x7'x10'	30	23	10	0	120°F	40°F	2000# product in 12 hours
116	Offal Cooler	8'x8'x10'	30	23	10	0	100°F	50-60°F	Run room temp at 50°F 3000# product in 48 hours

NOTES:
Need to supply electrical needs for refrigeration to electrical contractor.

Refrigeration lines should be insulated and covered with PVC or other sealed vapor barrier to avoid condensation.

Large Plant Design—5,250 square feet

Large Plant, Floor Plan (Not for Construction Use)



Plumbing Symbol Key Plan

4″ PVS Sewer Line

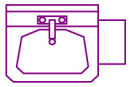
2″ PVC Sewer Line

Grease Interceptor
Size will be determined by
gallons of water used daily

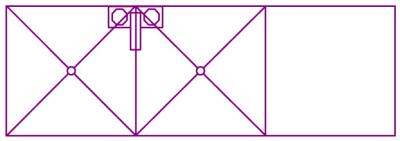
4″ Floor Drain
Floor Sloped to Drain

2″ Condensate Drain
for Refrigeration Evaporators

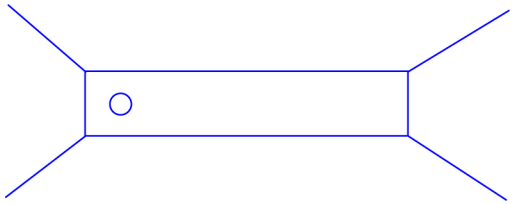
Hose Bib
Hot & Cold Domestic Water



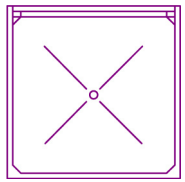
Hand Wash Sink
with Knife Sterilizer



Equipment Wash Sink

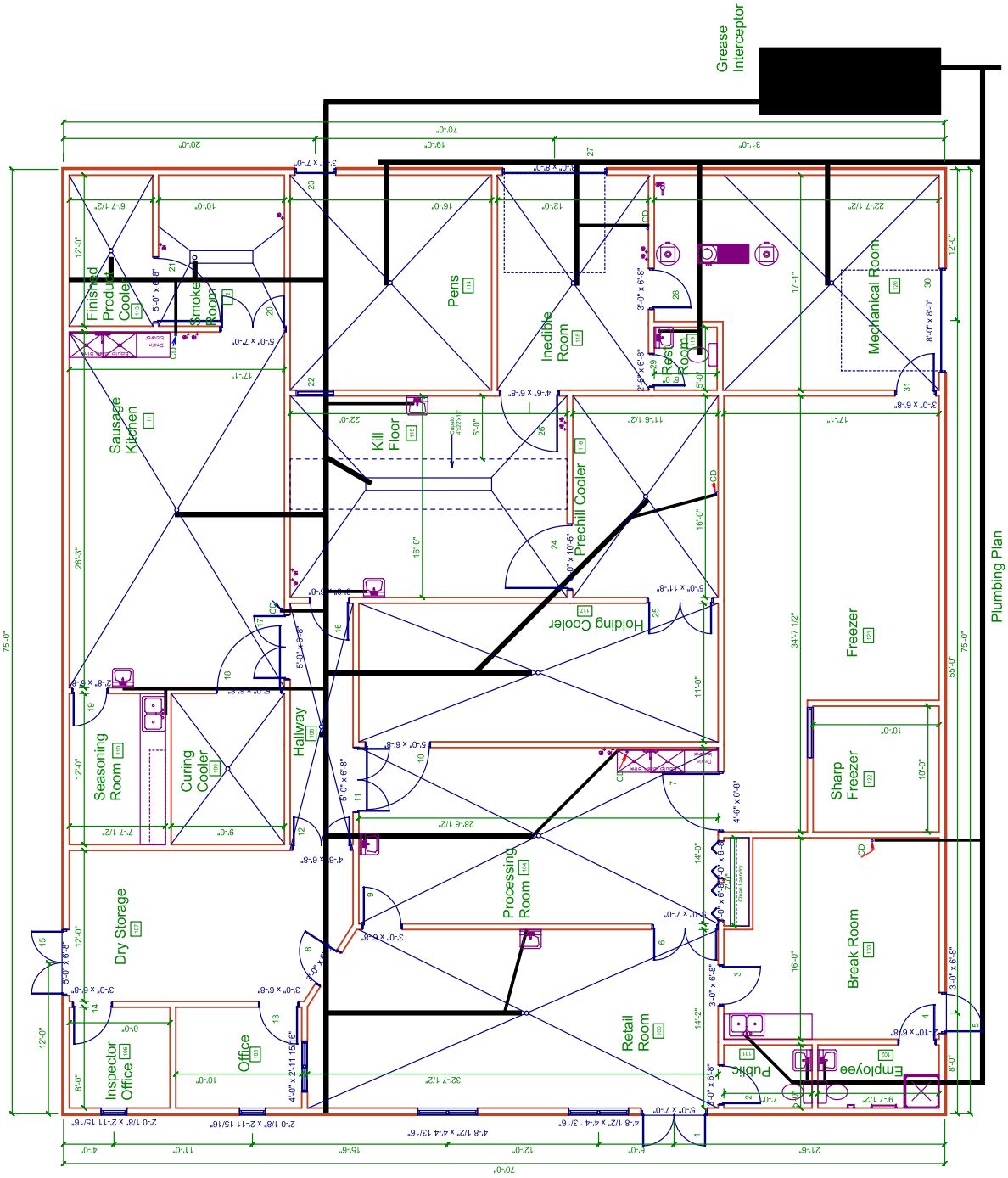


Trench Drain with
Floor Sloped to Drain

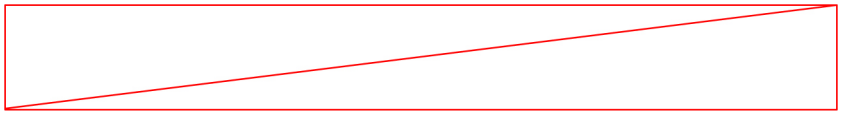


Shower
32″ x 32″

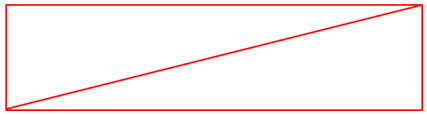
Large Plant, Plumbing Plan (Not for Construction Use)



Electrical Symbol Key Plan



Fluorescent Light
(8', Vapor Tight, High Output, T-8)



Fluorescent Light
(4', Vapor Tight, High Output, T-8)

Emergency Lights

Lighted Exit Signs

Incandescent Jar Lights

GFI Outlet 115v

Regular Outlet 115v

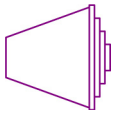
208, 220, 230 v outlet

Light Switch

Light Switch 3-Way

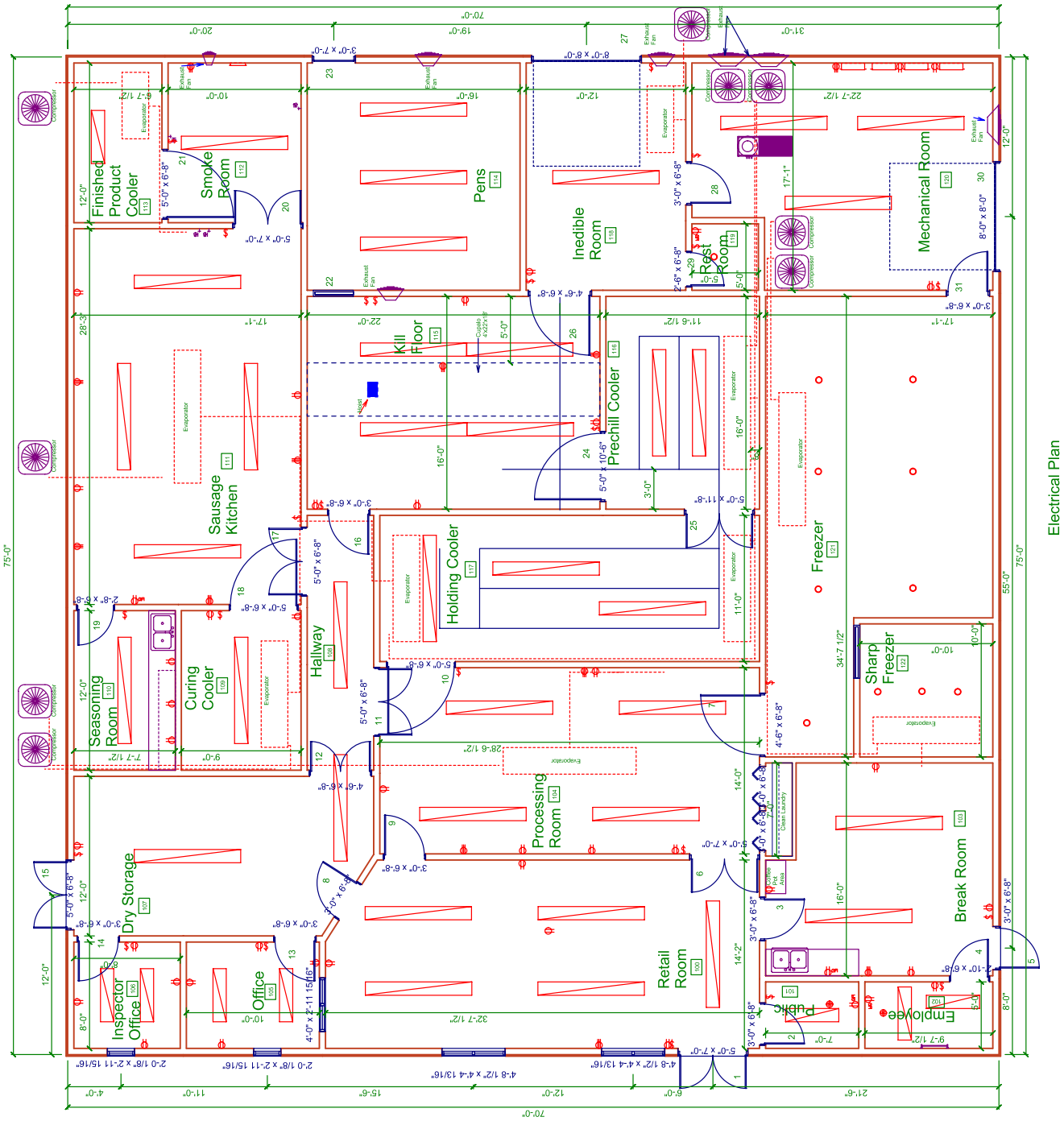
Rest Room Exhaust Fan

Electrical Panel

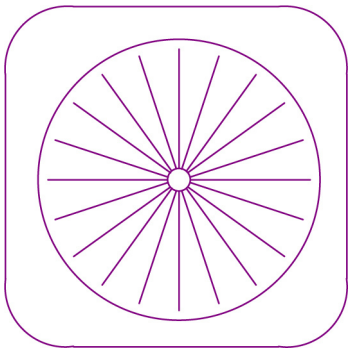


Exhaust Fan

Large Plant, Electrical Plan (Not for Construction Use)



Refrigeration Symbol Key Plan



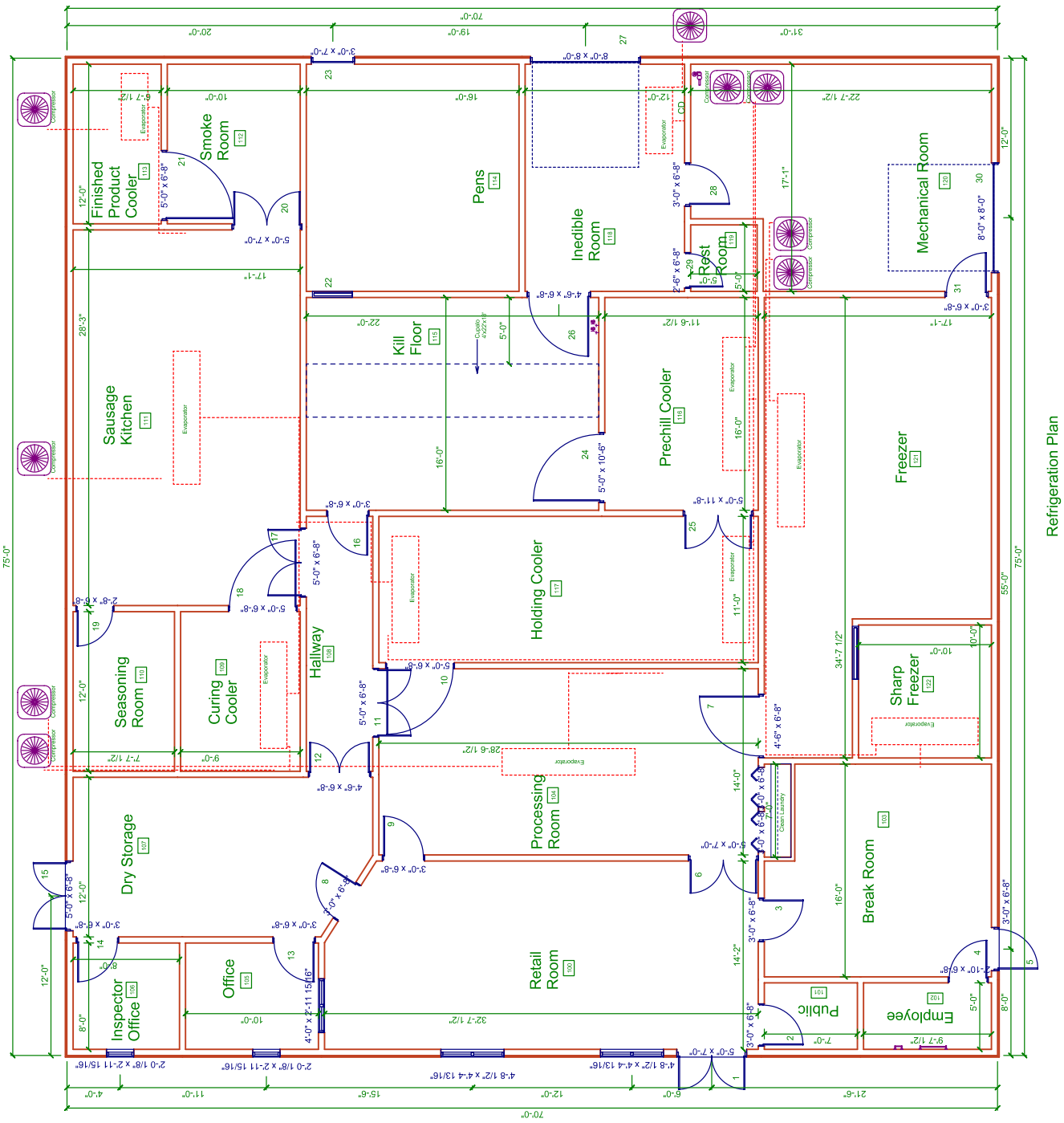
Compressor Condenser Unit

Freon Line

Evaporator Drain Line

Evaporator

Large Plant, Refrigeration Plan (Not for Construction Use)



Equipment Symbol Key Plan


Beef Cradle

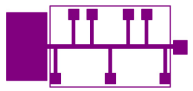

Boning Table


Curing Tub

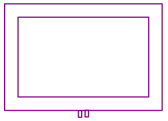

Grinder


Inedible Barrel


8′ Meat Case


Mixer


Power Washer

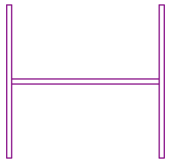

2-Door Freezer or Cooler

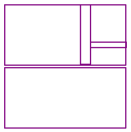

Wrapping Table

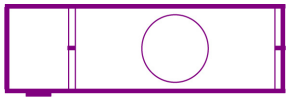

Kill Chute

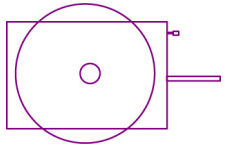

Smoke Generator

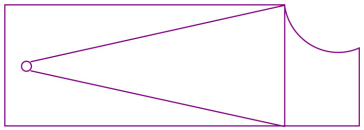

Smoke House 1-Truck

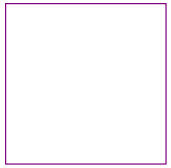

Smoke Truck


Meat Saw

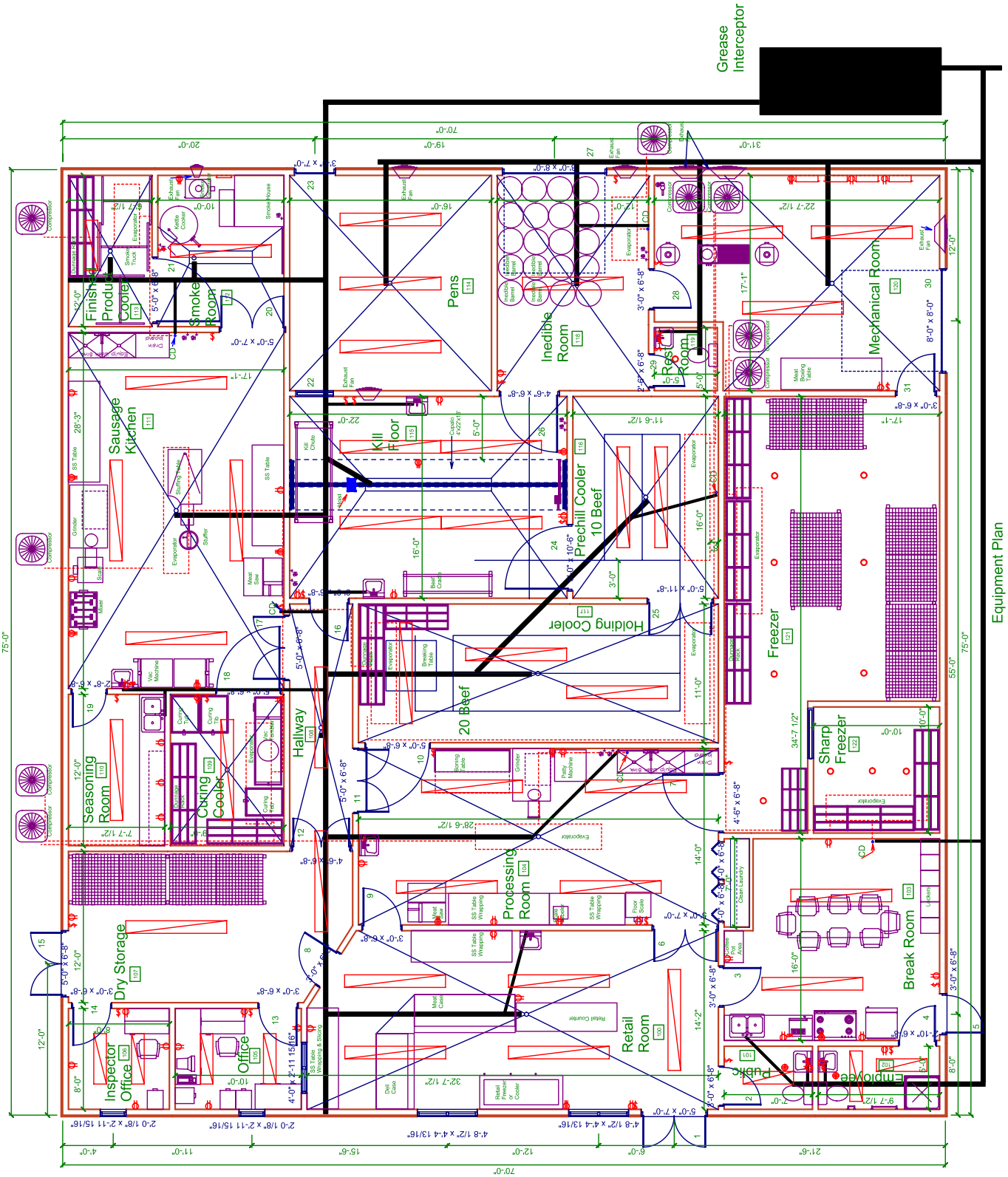

Tumbler


Stuffer

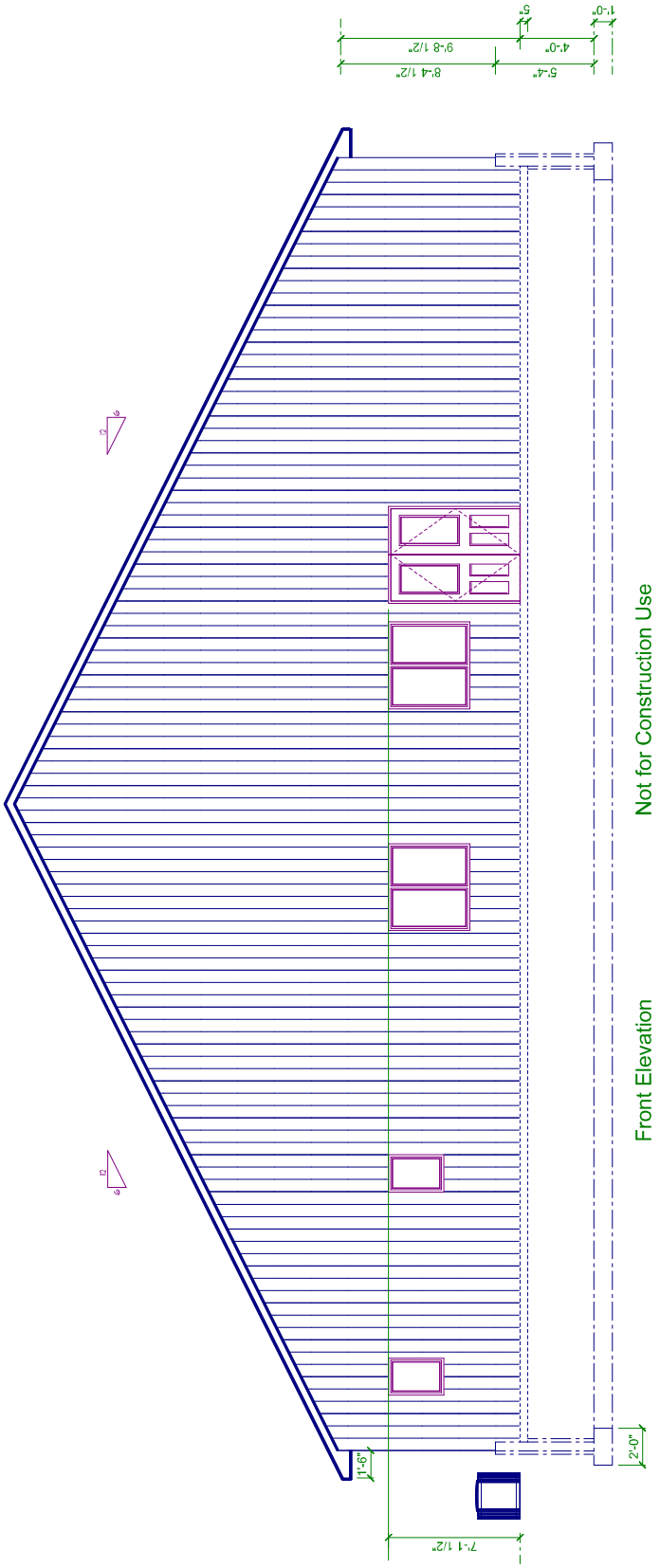

Stuffing Table


Breaking Table

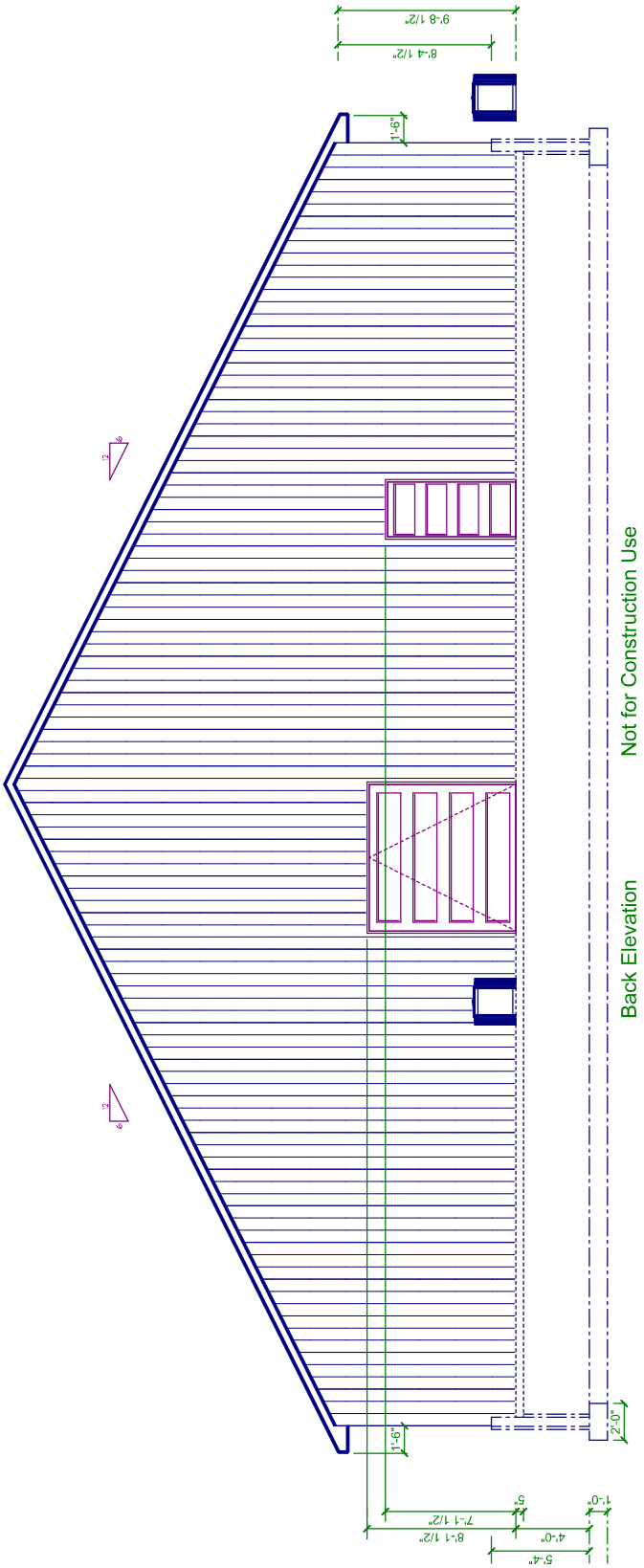
Large Plant, Equipment Plan (Not for Construction Use)



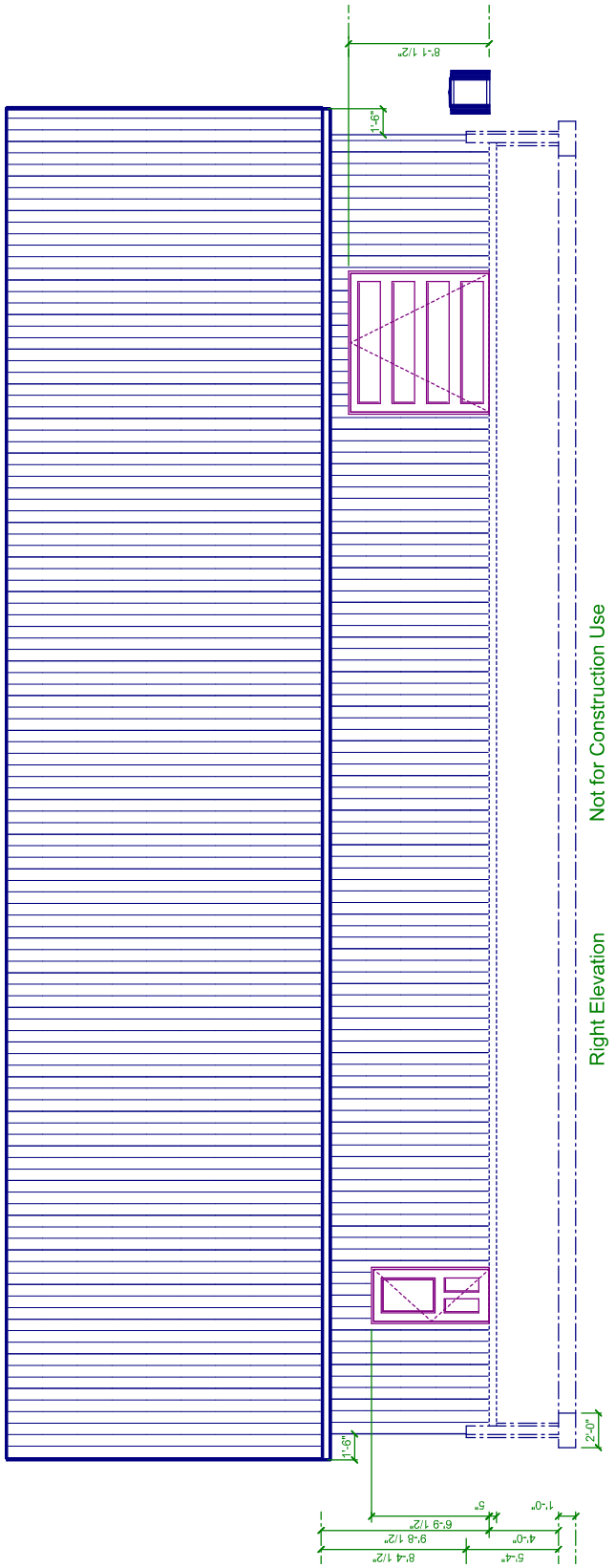
Large Plant, Front Elevation (Not for Construction Use)



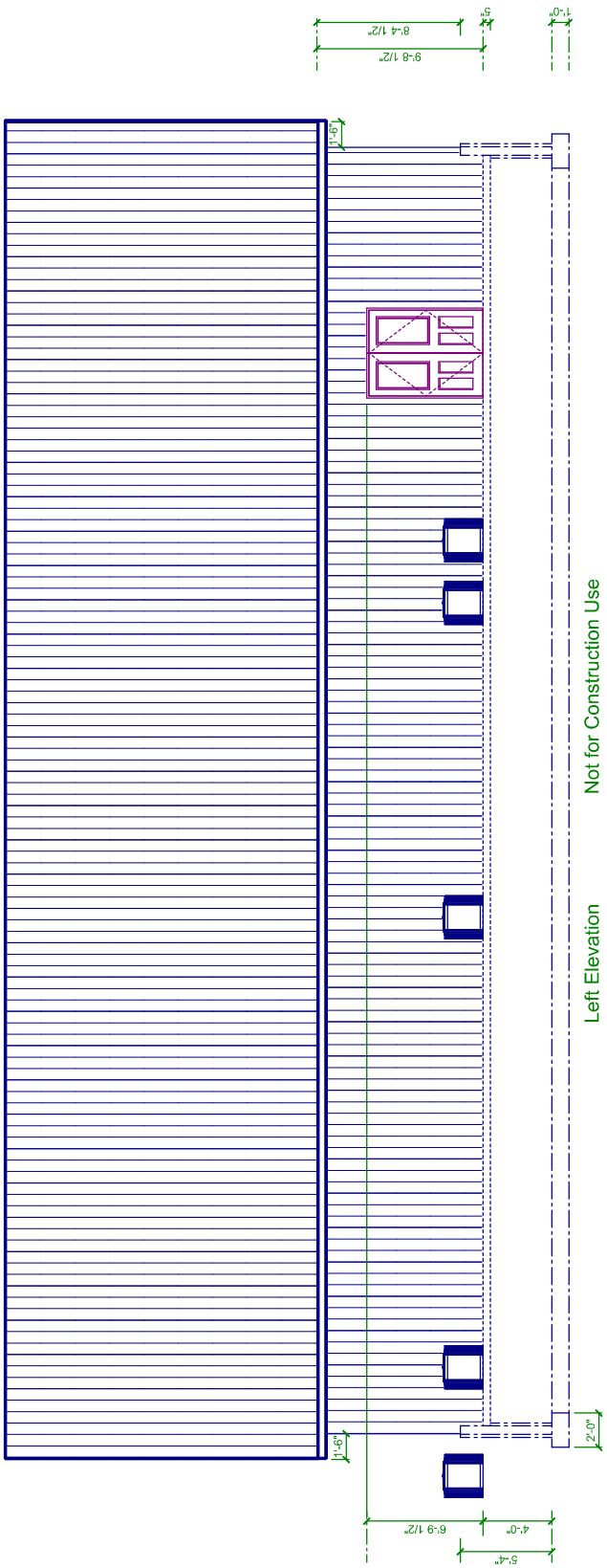
Large Plant, Back Elevation (Not for Construction Use)



Large Plant, Right Elevation (Not for Construction Use)



Large Plant, Left Elevation (Not for Construction Use)



Building Specifications

Large Plant Design

Room Finish Schedule

Room No.	Room Name	Floor	Base	Walls N	Walls E	Walls S	Walls W	Ceiling	Ceiling Height
100	Retail Area	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	10′
101	Public Rest Room	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	10′
102	Employee Rest Room	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	10′
103	Break Room	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	10′
104	Processing Room	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	10′
105	Office	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	10′
106	Inspection Office	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	10′
107	Dry Storage	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	14′
108	Hallway	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	14′
109	Curing Cooler	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	14′
110	Seasoning Room	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	10′
111	Sausage Kitchen	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	10′
112	Smoke Room	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	10′
113	Finished Product Cooler	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	10′
114	Pens	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	10′
115	Kill Floor	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	14′
115	Kill Floor Cupalo	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	18′
116	Pre chill Cooler	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	14′
117	Holding Cooler	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	14′
118	Inedible Cooler	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	10′
119	Rest Room	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	10′
120	Mechanical Room	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	10′
121	Freezer	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	10′
122	Sharp Freezer	concrete	PVC cove	FRP	FRP	FRP	FRP	FRP	10′

Laminated Product
Fluted Polypropylene .400″ back
.05″ sealed fiberglass reinforced plastic (FRP) panel, single sided skin — FRP

(Glasbord is a tradename for FRP)

PVC Trim Boards
1/2″ thick x 3″ wide
22.5^0 angle cut on top (minimum) — PVC cove

Door Schedule

Door No.	Room	Size Width	Size Height	Material Type	Finish		Remarks
1	Entry	6′-0″	7′-0″	Glass	Factory		Lockable/Dead bolt
2	Public Rest Room	3′-0″	6′-8″	Steel	Painted		Lockable Inside
3	Break room	3′-0″	6′-8″	Steel	Painted		No Knob (Push & Pull handle)
4	Employee Rest Room	3′-0″	6′-8″	Steel	Painted		Lockable Inside
5	Break Room	3′-0″	6′-8″	Steel	Painted		Lockable/Dead bolt
6	Retail Room	5′-0″	6′-8″	Wood	SS		Double Swing
7	Freezer	5′-6″	6′-8″	Wood	Factory		Insulated Freezer Door
8	Retail Room	3′-0″	6′-8″	Steel	Painted		No Knob (Push & Pull handle)
9	Retail Room	3′-0″	6′-8″	Wood	SS		Double Swing
10	Processing Room	5′-0″	7′-0″	Wood	Factory		Insulated Cooler Door
11	Processing Room	5′-0″	6′-8″	Wood	Factory		Double Swing
12	Hallway	4′-6″	6′-8″	Wood	Factory		Double Swing
13	Office	3′-0″	6′-8″	Steel	Painted		Lockable/Dead bolt
14	Inspection Office	3′-0″	6′-8″	Steel	Painted		Lockable
15	Dry Storage	5′-0″	6′-8″	Steel	Painted		Lockable/Dead bolt
16	Kill Floor	3′-0″	6′-8″	Steel	Painted		No Knob (Push & Pull handle)
17	Sausage Kitchen	5′-0″	6′-8″	Wood	SS		Double Swing
18	Curing Cooler	5′-0″	6′-8″	Wood	Factory		Insulated Cooler Door
19	Seasoning Room	2′-8″	6′-8″	Steel	Painted		No Knob (Push & Pull handle)
20	Smoke Room	5′-0″	6′-8″	Wood	SS		Double Swing
21	Finished Product Cooler	5′-0″	6′-8″	Wood	Factory		Insulated Cooler Door
22	Pens	3′-0″	7′-0″	Steel	Painted		Roll up Steel Insulated (Lockable)
23	Pens	3′-0″	7′-0″	Steel	Painted		Roll up Steel Insulated (Lockable)
24	Pre chill Cooler	5′-0″	10′-6″	Wood	Factory		Insulated Cooler Door
25	Holding Cooler	5′-0″	11′-8″	Steel	Clear		Double Swing
26	Inedible Cooler	4′-6″	6′-8″	Wood	Factory		Insulated Cooler Door
27	Inedible Cooler	8′-0″	8′-0″	Steel	Factory		Overhead Steel Insulated (Lockable)
28	Mechanical Room	3′-0″	6′-8″	Steel	Painted		No Knob (Push & Pull handle)
29	Rest Room	2′-6″	6′-8″	Steel	Painted		Lockable Inside
30	Mechanical Room	8′-0″	8′-0″	Steel	Factory		Overhead Steel Insulated (Lockable)
31	Freezer	3′-0″	6′-8″	Wood	Factory		Insulated Freezer Door

NOTE: Owner may need to furnish cooler doors, freezer door, and double swing doors to contractor.

Concrete Finish Schedule

Room No.	Room Name		Floor Drains	Insulation Thickness Under floor	Remarks
100	Retail Area		1		
101	Public Rest Room		0		
102	Employee Rest Room		0		
103	Break Area		0		
104	Processing Room		1	2″	
105	Office		0		
106	Inspection Office		0		
107	Dry Storage		0		
108	Hallway		1		
109	Curing Cooler		1	2″	
110	Seasoning Room		0		
111	Sausage Kitchen		1	2″	
112	Smoke Room		1		Trench Drain
113	Finished Product Cooler		1	2″	
114	Pens		1		
115	Kill Floor		1		Trench Drain
116	Pre chill Cooler		1	2″	
117	Holding Cooler		1	2″	
118	Inedible Cooler		1	2″	
119	Rest Room		0		
120	Mechanical Room		1		
121	Freezer		0	8″	
122	Sharp Freezer		0	8″	

NOTES:
All Floors will be concrete with a non-slip finish (4000#).
All floors 5″ thick with rebar spaced at 2′ on center and places on 2-1/2″ chairs.
Floor slopes to drains have to be 3/16″ per foot or greater (no standing water on floors).
Under floor insulation must have a density of 2.5 lbs. per cubic foot or 2″ thick equals R-value of R-10.
Ground under insulated floors must be properly bedded with gravel and/or sand for proper ventilation to avoid ice heaving.

Plumbing Specifications

Room No.	Room Name	Room Size	Remarks
100	Retail Area	14′x32′x10′	1 Floor Drain and 1 Wall-mount handwash sink
101	Public Rest Room	7′x5′x10′	1 Toilet and 1 Wall-mount handwash sink
102	Employee Rest Room	9′8″x5′x10′	1 Toilet 1 Wall-mount handwash sink Enclosed Shower
103	Break Room	16′x17′x10′	Kitchen Sink and 1 Condensate Drain
104	Processing Room	14′x28′x10′	1 Wall-mount handwash sink 1 set of Hose Bibs (Hot & Cold domestic water) 1 Equipment Wash Sink 1 Floor Drain
108	Hallway	5′x17′x10′	1 Floor Drain
109	Curing Cooler	9′x12′x10′	1 Floor Drain
111	Sausage Kitchen	17′x28′x10′	1 set of Hose Bibs (Hot & Cold domestic water) 1 Floor Drain 1 Equipment Wash Sink (3 compartment) 1 Wall-mount handwash sink 1 Condensate Drain (On equipment sink drain)
112	Smoke Rooms	10′x12′x10′	1 Floor Drain (Trench) 1 Cold water hookup for smokehouse 1 Cold water hookup for kettle
113	Finished Product Cooler	6′8″x12′x10′	1 Floor Drain
114	Pens	16′x17′x10′	1 Floor Drain
115	Kill Floor Kill Floor Cupalo	16′x22′x14′ 4′x22′x18′	1 Floor Drain (Trench) 2 Wall-mount handwash sinks 2 sets of Hose Bibs (Hot & Cold domestic water)
116	Pre chill Cooler	11′6″x16′x14′	1 Floor Drain and 1 Condensate Drain
117	Holding Cooler	11′x18′x14′	1 Floor Drain
118	Inedible Cooler	12′17′x10′	1 Floor Drain 1 Condensate Drain 1 sets of Hose Bibs (Hot & Cold domestic water)
119	Rest Room	5′x5′x10′	1 Toilet and 1 Wall-mount handwash sink
120	Mechanical Room	17′x22′ 7″x10′	1 Floor Drain Water Main & Water Heater hookups Power washer hookup

Owner may need to supply wall mount hand wash sinks and equipment wash sinks to contractor.

NOTES:
All plumbing to meet state and local codes.
All floor drain and risers to be 4″ diameter.
Condensate drains for refrigeration need to be 2″ diameter lines.
Public and employee rest rooms must be a separate drain line out of building.
All water lines surface mounted in plant.
All water lines 1/2″ or larger diameter.
ALl floor drains need covers and must have deep seal trap and properly vented.

Electrical Specifications

Room No.	Room Name	Lighting Type	Lighting FCP	Switches	Outlets 115v	Outlets 220v	Exhaust Fan	Remarks
100	Retail Area	8'VT, HO T8	50	1	4	1		Needs a night light
101	Public Rest Room	4'VT, HO T8	30	1	1 GFI		1	Fan on with light
102	Employee Rest Room	4'VT, HO T8	30	1	1 GFI		1	Fan on with light
103	Break Room	8'VT, HO T8	30	1	4 1 GFI	1		
104	Processing Room	8'VT, HO T8	50	2	4	2		
105	Office	4'VT, HO T8	50	1	4			
106	Inspection Office	4'VT, HO T8	50	1	4			
107	Dry Storage	8'VT, HO T8	30	1	1			
108	Hallway	8'VT, HO T8	30					Lights on with Dry Storage light
109	Curing Cooler	8'VT, HO T8	30	1	2			
110	Seasoning Room	8'VT, HO T8	50	1	3			Outlets on separate circuits
111	Sausage Kitchen	8'VT, HO T8	50	2	4	4		
112	Smoke Room	8'VT, HO T8	50	1		2	1	Smoke house needs disconnect box
113	Finished Product Cooler	4'VT, HO T8	30					Light switch in Smoke Room
114	Pens	8'VT, HO T8	50				1	Light & Fan switch in Kill Floor
115	Kill Floor	8'VT, HO T8	50	4	4	2	1	
116	Pre chill Cooler	8'VT, HO T8	30					Light switch in Kill Floor
117	Holding Cooler	8'VT, HO T8	30					Light switch in Processing Room
118	Inedible Cooler	8'VT, HO T8	30	2	1		1	
119	Rest Room	Incandescent	30	1	1 GFI			
120	Mechanical Room	8'VT, HO T8	50	2	4	2	3	Main Power and Panels
121	Freezer	Incandescent	30	1				1 switch in Mechanical Room
122	Sharp Freezer	Incandescent	50					Lights on with Freezer lights

NOTES:
Lights shown on drawing are only showing placement between rails, beams, etc. (may need more or less lights).
Owner may change lighting type, but lighting foot candle power (FCP) must be at least what is shown on specifications.
Need lighted exit signs and emergency lighting wherever needed by code.
All pvc conduit used in all rooms (metal conduit can be used in mechanical room and above ceilings only).
No #14 wire used.
Must bid Square D equipment only.
GFI outlets must have lighted trip light.
This specification sheet does not include any refrigeration electrical needs (will be provided by refrigeration supplier).

Refrigeration Room Specifications

Room No.	Room Name	Room Size	Ceiling R-value	Walls R-value	Floor R-value	Workers in room	Product Temp in	Product Temp out	Remarks
104	Processing Room	14′x28′x10′	30	23	40	6	40°F	45°F	Run room temp at 55°F
109	Curing Cooler	9′x12′x10′	30	23	10	0	50°F	36°F	Cool 1500# product in 24 hours
111	Sausage Kitchen	17′x28′x10′	30	23	10	3	40°F	55°F	Run room temp at 55°F
113	Finished Product Cooler	6′7″x12′x10′	30	23	10	0	120°F	40°F	Cool 1000# product in 12 hours
116	Pre chill Cooler	11′6″x16′x14′	30	23	10	0	100°F	40°F	Cool 6000# in 24 hours
117	Holding Cooler	11′x28′x14′	30	23	10	0	40°F	34°F	Hold 20000# at 34-36°F
118	Inedible Cooler	12′x17′x10′	30	23	10	0	100°F	50-60°F	Run room temp at 50°F 6000# product in 48 hours
121	Freezer	23′x35′x10′	30	23	40	0	0°F	0°F	Hold frozen product 30000#
122	Sharp Freezer	10′x10′x10′	30	23	40	0	50°F	–20°F	3000# in 12 hours

NOTES:

Need to supply electrical needs for refrigeration to electrical contractor.

Refrigeration lines should be insulated and covered with PVC or other sealed vapor barrier to avoid condensation.

APPENDIX

Sanitation Performance Standards of Title 9, Code of Federal Regulations, Section 416.2

PART 416—SANITATION

Sec. 416.2 Establishment grounds and facilities.

(a) Grounds and pest control. The grounds about an establishment must be maintained to prevent conditions that could lead to insanitary conditions, adulteration of product, or interfere with inspection by FSIS program employees. Establishments must have in place a pest management program to prevent the harborage and breeding of pests on the grounds and within establishment facilities. Pest control substances used must be safe and effective under the conditions of use and not be applied or stored in a manner that will result in the adulteration of product or the creation of insanitary conditions.

(b) Construction.

(1) Establishment buildings, including their structures, rooms, and compartments must be of sound construction, be kept in good repair, and be of sufficient size to allow for processing, handling, and storage of product in a manner that does not result in product adulteration or the creation of insanitary conditions.

(2) Walls, floors, and ceilings within establishments must be built of durable materials impervious to moisture and be cleaned and sanitized as necessary to prevent adulteration of product or the creation of insanitary conditions.

(3) Walls, floors, ceilings, doors, windows, and other outside openings must be constructed and maintained to prevent the entrance of vermin, such as flies, rats, and mice.

(4) Rooms or compartments in which edible product is processed, handled, or stored must be separate and distinct from rooms or compartments in which inedible product is processed, handled, or stored, to the extent necessary to prevent product adulteration and the creation of insanitary conditions.

(c) Light. Lighting of good quality and sufficient intensity to ensure that sanitary conditions are maintained and that product is not adulterated must be provided in areas where food is processed, handled, stored, or examined; where equipment and utensils are cleaned; and in hand-washing areas, dressing and locker rooms, and toilets.

(d) Ventilation. Ventilation adequate to control odors, vapors, and condensation to the extent necessary to prevent adulteration of product and the creation of insanitary conditions must be provided.

(e) Plumbing. Plumbing systems must be installed and maintained to:

(1) Carry sufficient quantities of water to required locations throughout the establishment;

(2) Properly convey sewage and liquid disposable waste from the establishment;

(3) Prevent adulteration of product, water supplies, equipment, and utensils and prevent the creation of insanitary conditions throughout the establishment;

(4) Provide adequate floor drainage in all areas where floors are subject to flooding-type cleaning or where normal operations release or discharge water or other liquid waste on the floor;

(5) Prevent back-flow conditions in and cross-connection between piping systems that discharge waste water or sewage and piping systems that carry water for product manufacturing; and

(6) Prevent the backup of sewer gases.

(f) Sewage disposal. Sewage must be disposed into a sewage system separate from all other drainage lines or disposed of through other means sufficient to prevent backup of sewage into areas where product is processed, handled, or stored. When the sewage disposal system is a private system requiring approval by a State or local health authority, the establishment must furnish FSIS with the letter of approval from that authority upon request.

(g) Water supply and water, ice, and solution reuse.

(1) A supply of running water that complies with the National Primary Drinking Water regulations (40 CFR part 141), at a suitable temperature and under pressure as needed, must be provided in all areas where required (for processing product, for cleaning rooms and equipment, utensils, and packaging materials, for employee sanitary facilities, etc.). If an establishment uses a municipal water supply, it must make available to FSIS, upon request, a water report, issued under the authority of the State or local health agency, certifying or attesting to the potability of the water supply. If an establishment uses a private well for its water supply, it must make available to FSIS, upon request, documentation certifying the potability of the water supply that has been renewed at least semi-annually.

(2) Water, ice, and solutions (such as brine, liquid smoke, or propylene glycol) used to chill or cook ready-to-eat product may be reused for the same purpose, provided that they are maintained free of pathogenic organisms and fecal coliform organisms and that other physical, chemical, and microbiological contamination have been reduced to prevent adulteration of product.

(3) Water, ice, and solutions used to chill or wash raw product may be reused for the same purpose provided that measures are taken to reduce physical, chemical, and microbiological contamination so as to prevent contamination or adulteration of product. Reuse that which has come into contact with raw product may not be used on ready-to-eat product.

(4) Reconditioned water that has never contained human waste and that has been treated by an onsite advanced wastewater treatment facility may be used on raw product, except in product formulation, and throughout the facility in edible and inedible production areas, provided that measures are taken to ensure that this water meets the criteria prescribed in paragraph (g)(1) of this section. Product, facilities, equipment, and utensils coming in contact with this water must undergo a separate final rinse with non-reconditioned water that meets the criteria prescribed in paragraph (g)(1) of this section.

(5) Any water that has never contained human waste and that is free of pathogenic organisms may be used in edible and inedible product areas, provided it does not contact edible product. For example, such reuse water may be used to move heavy solids, to flush the bottom of open evisceration troughs, or to wash antemortem areas, livestock pens, trucks, poultry cages, picker aprons, picking room floors, and similar areas within the establishment.

(6) Water that does not meet the use conditions of paragraphs (g)(1) through (g)(5) of this section may not be used in areas where edible product is handled or prepared or in any manner that would allow it to adulterate edible product or create insanitary conditions.

(h) Dressing rooms, lavatories, and toilets.

(1) Dressing rooms, toilet rooms, and urinals must be sufficient in number, ample in size, conveniently located, and maintained in a

sanitary condition and in good repair at all times to ensure cleanliness of all persons handling any product. They must be separate from the rooms and compartments in which products are processed, stored, or handled.

(2) Lavatories with running hot and cold water, soap, and towels must be placed in or near toilet and urinal rooms and at such other places in the establishment as necessary to ensure cleanliness of all persons handling any product.

(3) Refuse receptacles must be constructed and maintained in a manner that protects against the creation of insanitary conditions and the adulteration of product.

[64 FR 56417, Oct. 20, 1999]

Effective Date Note: At 64 FR 56417, Oct. 20, 1999, Sec. 416.2 was added, effective Jan. 25, 2000.