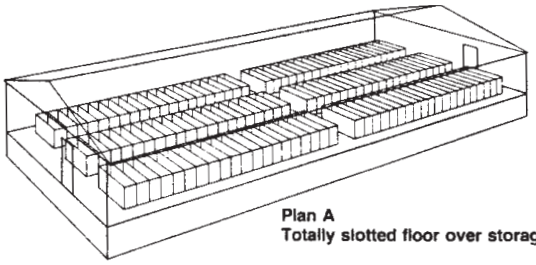
MWPS-72601

Swine Gestation Building

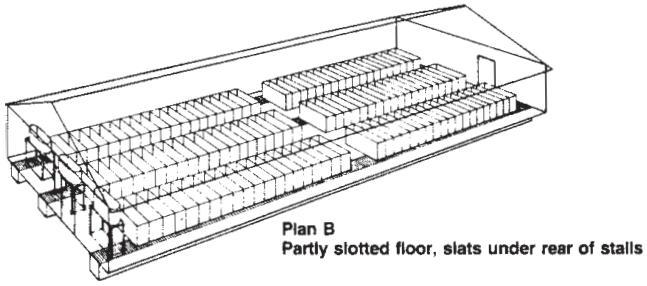
33’ x 92’ stud frame building houses 120 gestating sows in individual stalls. Two plans are included. Plan A shows totally slotted floor over pit manure storage. Plan B shows 24” wide flush gutters at the rear of the stalls. Mechnical ventilation in winter, natural ventilation in warm weather.

CAUTION!

Additional professional services will be required to tailor this plan to your situation, including but not limited to: assurance of compliance with codes and regulations; 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, any deviation from the given specifications may result in structural failure, property damage, and personal injury including loss of life.**



Plan A
Totally slotted floor over storage pit



Plan B
Partly slotted floor, slats under rear of stalls

MIDWEST PLAN SERVICE

Cooperative Extension Work in
Agriculture and Home Economics
and Agricultural Experiment Stations
of North Central Region - USDA Cooperating

Swine Gestation Building

Title Page

MIDWEST PLAN NO. 72601

WARRANTY DISCLAIMER

This plan provides conceptual information only. **Neither midwest plan service nor any of the cooperating land-grant universities, or their respective agents or employees, have made, and do not hereby make, any representation, warranty or covenant with respect to the specifications in this plan.** Additional professional services will be required to tailor this plan to your situation, including but not limited to: assurance of compliance with codes and regulations; 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.

Plan MWPS-72601
SWINE GESTATION BUILDING
Three Rows of Stalls, 120 Sows

This plan is for a 33'x 92' (or 94') stud-frame building housing 120 gestation sows in individual stalls. Mechanical ventilation is provided in cold weather; ventilation doors are opened for natural ventilation in warm weather.

Plan A shows a totally slotted floor with pit manure storage. Plan B shows 30" slats over flush gutters at the rear of each row of stalls.

General Specifications

Fans: Select exhaust fans for the stated capacity at ⅛" static pressure, especially pit fans, to prevent backdrafting when larger fans turn on. Air movement in summer can be increased with unrated fans mounted over the pens near the ends of the building and blowing parallel to the alley.

Pits: Use 3500 psi concrete with 7% air entrainment. Use steel of at least 40,000 psi yield. Install steel and concrete carefully and accurately. Pump pits to within 6" of the bottom at least once a year. Check for solids buildup; increase agitation and pump from port nearest to solids buildup at next pumping.

Heat: Provide 60,000 Btu hr supplemental heat (500 Btu hr stall).

Protecting swine from fan failure

We know of no device that will successfully ventilate a hog house automatically in the case of failure of one or more fans or the whole electric supply system.

- Install a loud automatic warning system to alert anyone at or near the farmstead.
- Have someone baby-sit your animals if you are going to be away for more than a few hours, if there are storm warnings out, or if your herd is in an especially sensitive stage (a number of newborn litters, for example).
- Post instructions on what to do in hot weather, mild weather, cold weather; who to phone for additional advice, etc.
- Prepare walk doors and perhaps summer ventilation panels to be propped open part way or fully.
- Consider a stand-by generator to augment hand-opened doors; operate pit fans and, in hot weather, circulation fans.
- Consider automatic telephone that dials selected numbers when power fails.

Manure storage pit

Pit depth is based on 0.15 cu ft day manure per stall, 6" left in pit after pumping, 10" of freeboard, and 12" additional clearance to improve underfloor ventilation.

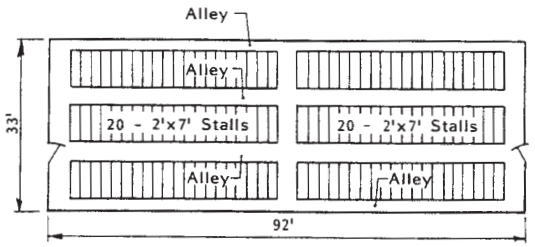
Slat designs

Dimensions in these plans assume concrete slats as listed below and may need to be adjusted for other design or materials. Allow about ½" at each end of a slat for construction variation and grouting.

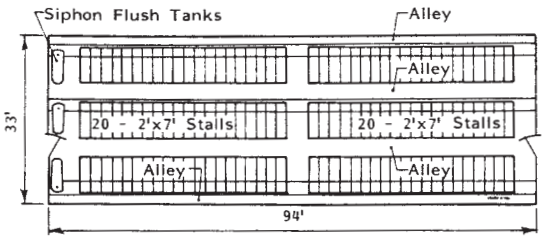
Space slats ⅜" apart in farrowing stalls, with the slot widened to 1" behind the sows. For other swine buildings, use 1" slots.

Slat span	Pig nursery*	Finishing	Farrowing, Sow-pig Nursery, Gestation (stalls)**	Gestation (pens), Boar (pens)
	Width x depth, lower bar size			
4'	4"x4",#3	4"x4",#3	4"x4",#3	4"x4",#3
6'	4"x4",#3	4"x4½",#4	4"x4½",#4	4"x4½",#4
8'	4"x5",#3	5"x5",#4	4"x6",#4	6"x5",#5
10'	4"x5",#4	5"x5½",#5	4"x6",#5	6"x6½",#5
Design Loads				
Slats	Per foot of slat			
	50 plf	100 plf	150 plf	150 plf
Beams, columns	Per sq ft floor area			
	35 psf	50 psf	65 psf	65 psf

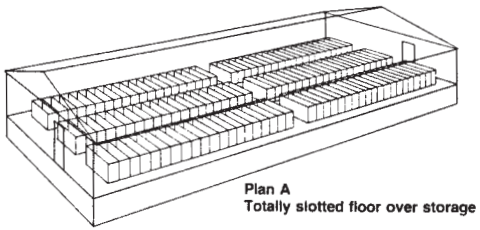
*Concrete slats are not recommended for pigs under 40 lb.
**For sows in stalls, use a maximum of 4" wide slats.

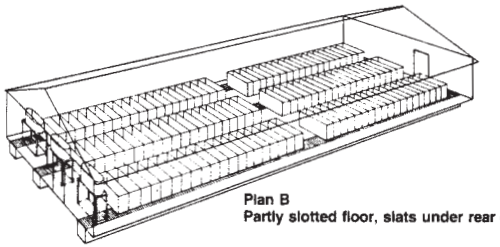


Floor Plan A



Floor Plan B


Plan A
Totally slotted floor over storage pit


Plan B
Partly slotted floor, slats under rear of stalls

Building space and production cycles

Although many variations are successful, the following are typical meat hog production systems. Plan building capacity for some extra animals to allow for large litter size or slow growth rate.

Either:

a) Move sows and litters to sow-pig nursing pens at 1-3 weeks, depending on how soon the farrowing stalls are needed for the next sows. Wean pigs at 3-6 weeks, putting 2-3 litters/pen. Return sows to breeding and gestation facilities.

Or:

b) Wean pigs at 4-6 weeks (20-25 lb). Move pigs to nursery, putting 2-3 litters/pen. Return sows to breeding and gestation facilities.

Or:

c) Wean pigs at 3-4 weeks (12-15 lb) to a prenursery, putting 1-2 litters/pen. At 6-8 weeks move pigs to a nursery, putting 2-3 litters/pen. Return sows to breeding and gestation facilities.

Move pigs to finishing unit at 10-12 weeks (60-75 lb). Move pigs to larger pens, or reduce number of pigs per pen, at about 20 weeks (150 lb).

As they approach market weight, and if the finishing unit is crowded, larger hogs may have to be marketed early.

Sows are rebred during the first or second heat period after weaning. They farrow about 16 weeks later.

Lumber Specifications

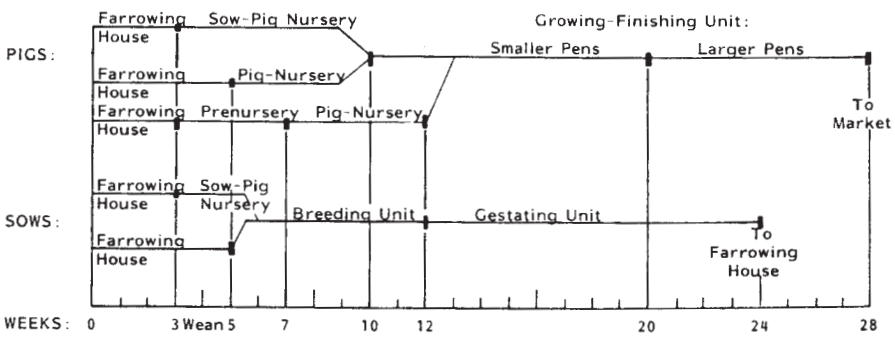
Roof Purlins and Studs
Construction Grade (Doug Fir, Southern Pine or Hem Fir)
Trusses
See Truss Page
Headers
No. 1 or 1500f machine rated (Doug Fir or Southern Pine)
Plywood
Roof Sheathing—⅜" c-c Ext. ("Identification Index" = 20/0)
Siding and Wall Lining and Ceiling—⅜" or ½" c-c Ext with Medium Density Overlay

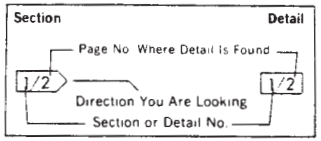
FRP Plywood is a composite material using plywood overlaid with plastic. It is moisture resistant and more durable and easier to clean than plywood.

Sills and Fascia
Pressure Preservative Treated (Southern Yellow Pine or equivalent) Creosote—10 pcf. Penta—0.50 pcf, ACC—0.50 pcf, ACA or CCA (Type A or B) 0.40 pcf.

P. T. means lumber pressure preservative treated against insect and fungus attack.

TYPICAL HOUSING CYCLES



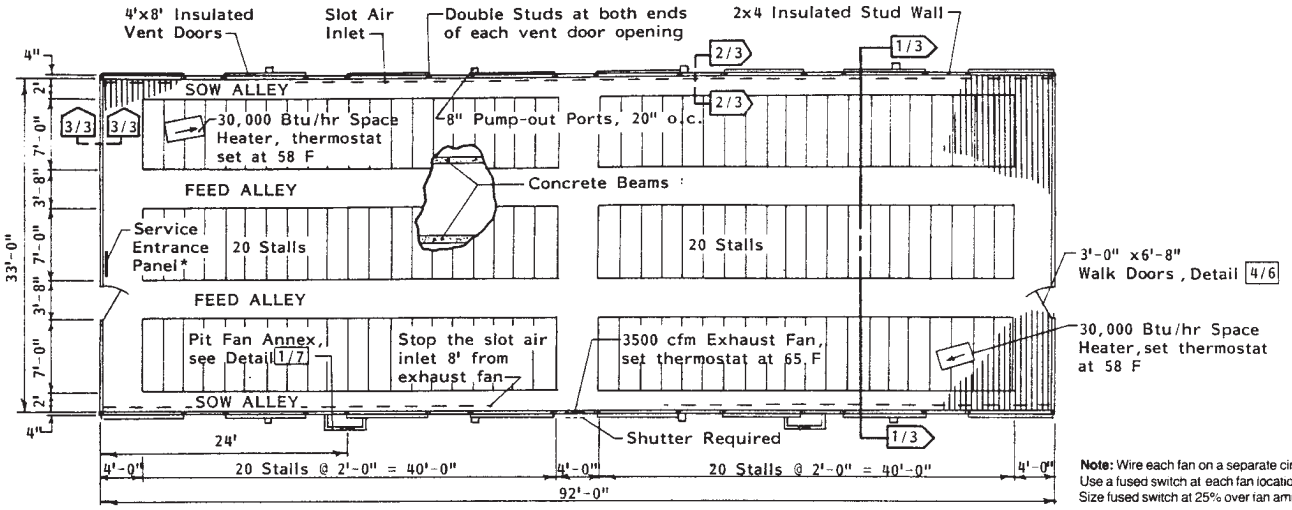


Section & Detail Indicator

MWPS MIDWEST PLAN SERVICE
Cooperative Extension & Research in Agriculture & Home Economics in the 12 North Central Universities—USDA Cooperating

SWINE GESTATION BUILDING
Three Rows of Stalls, 120 Sows

8 Pages plus 34' Truss Sheet	Plan No. mwps-72601	Page 1 of 10



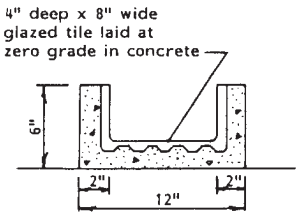
*Plastic, watertight, and dust-tight

PLAN A. FLOOR PLAN—1/2

Totally slotted floor over storage pit.

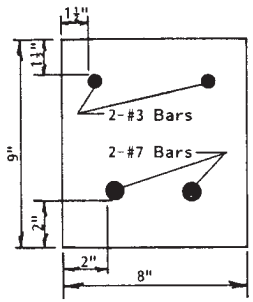
Note: Wire each fan on a separate circuit. Use a fused switch at each fan location. Size fused switch at 25% over fan amperage.

Note: 12" of clearance is needed between manure and bottom of concrete beams to operate pit fans.

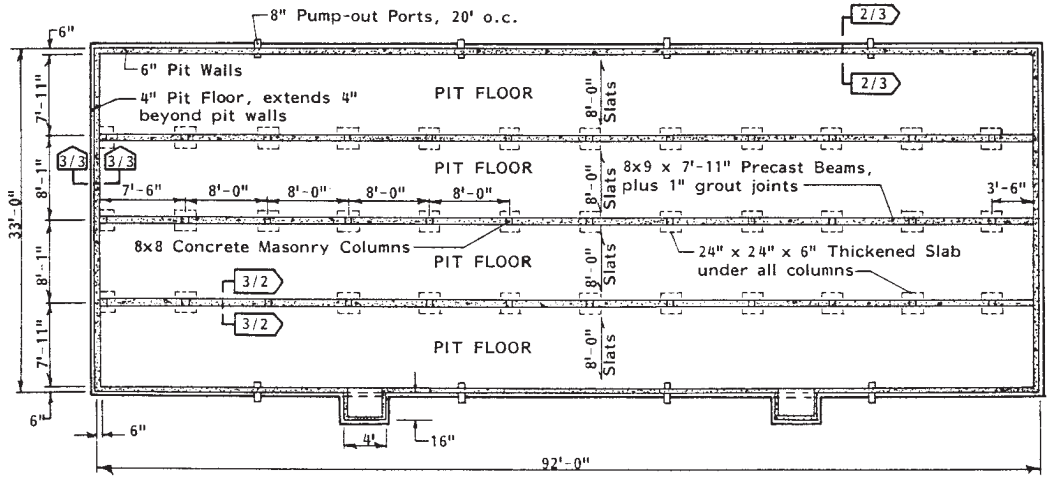


SOW FEED TROUGH DETAIL—2/2

Note: Provide a level trough, manual or float controlled water delivery, and add feed to the water. An alternative (Plan B only) is to hand feed a dry ration on the floor and provide a nipple waterer for each stall.



BEAM DETAIL—3/2



PLAN A. FOUNDATION PLAN—4/2

MIDWEST PLAN SERVICE

SWINE GESTATION BUILDING

Three Rows of Stalls, 120 Sows

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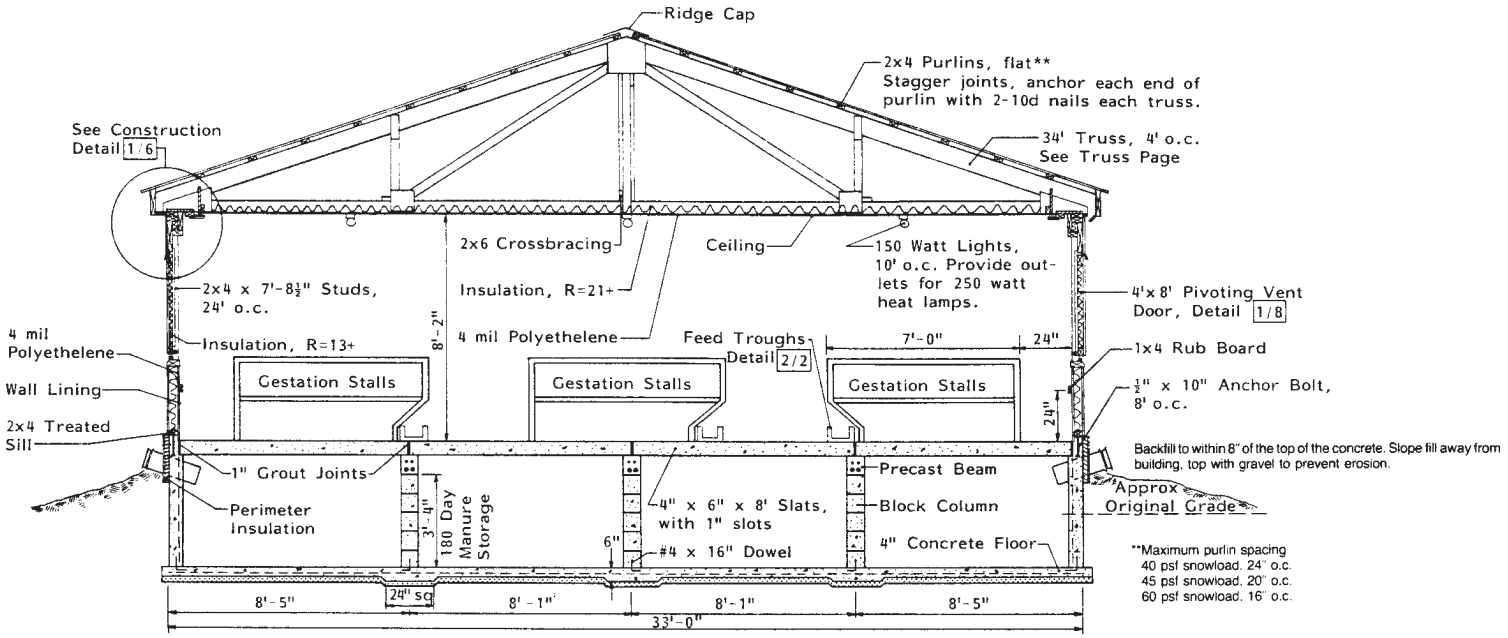
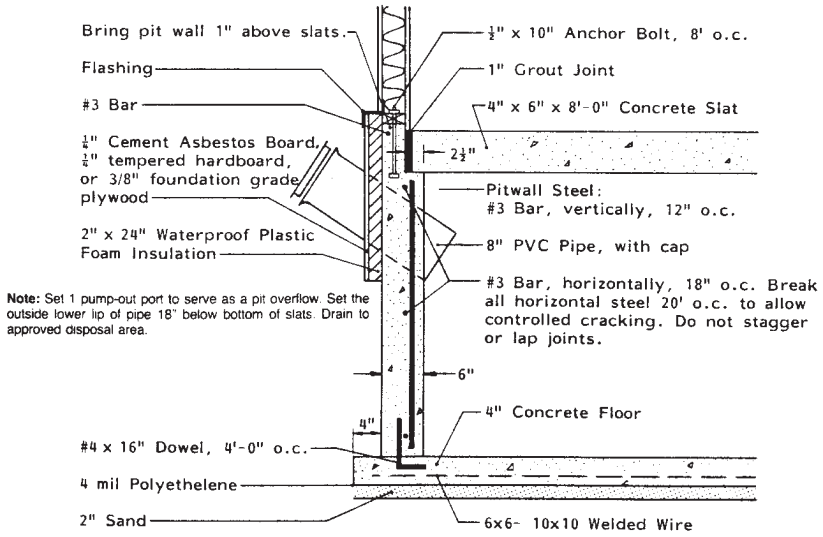


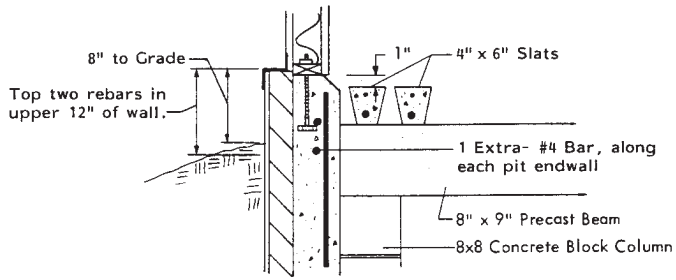
CROSS SECTION—1/3

Totally slotted floor over storage pit.



Note: Set 1 pump-out port to serve as a pit overflow. Set the outside lower lip of pipe 18" below bottom of slats. Drain to approved disposal area.

PIT DETAIL—2/3



PIT ENDWALL DETAIL—3/3

MIDWEST PLAN SERVICE

SWINE GESTATION BUILDING

Three Rows of Stalls, 120 Sows

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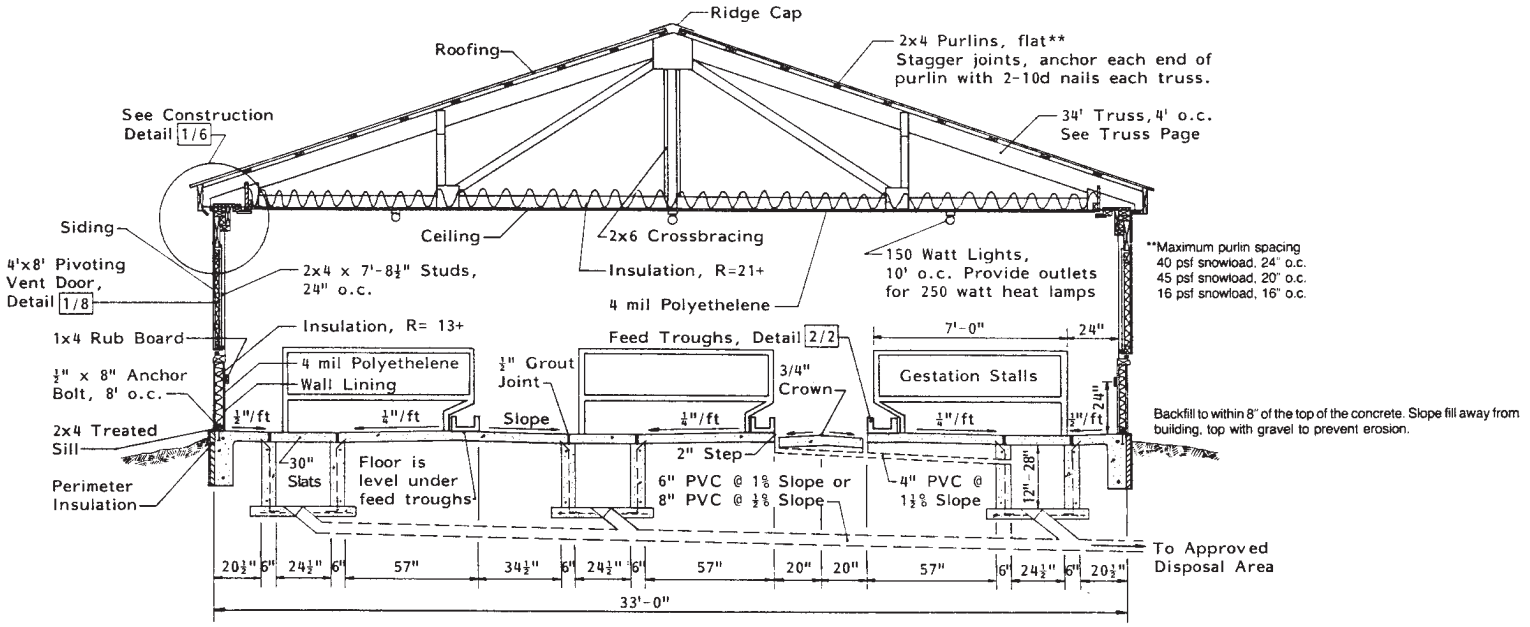
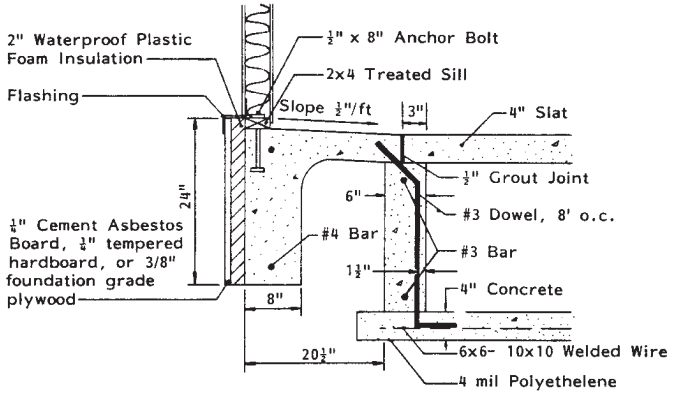
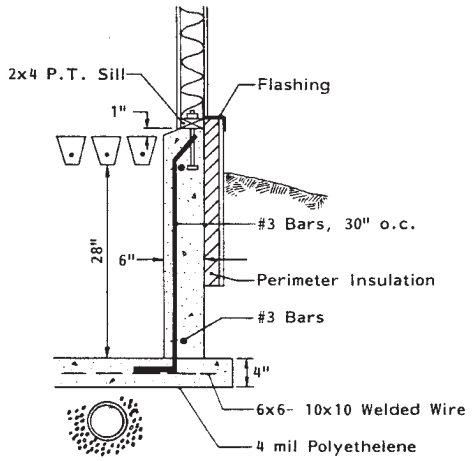


PLAN B. CROSS SECTION—1/5

Partly slotted floor, slats under rear of stalls.



SIDEWALL DETAIL—2/5



PIT ENDWALL DETAIL—3/5

MIDWEST PLAN SERVICE

SWINE GESTATION BUILDING

Three Rows of Stalls, 120 Sows

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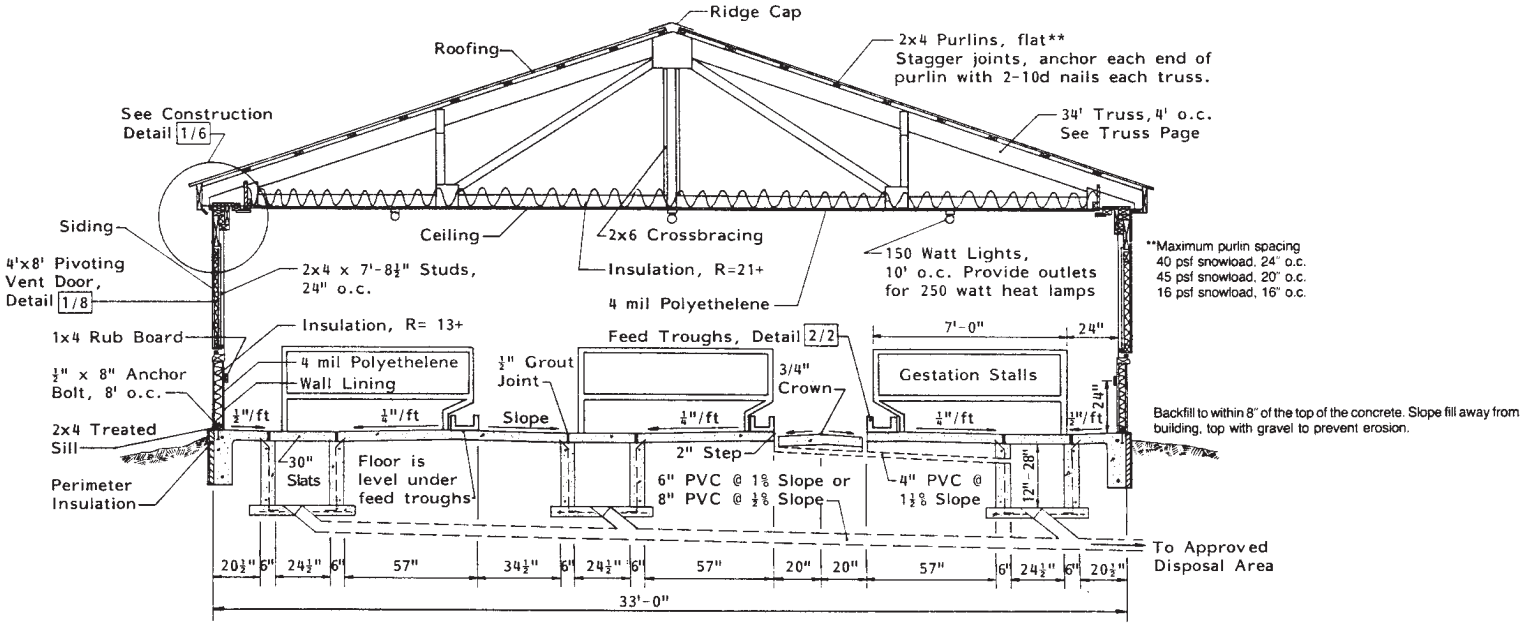
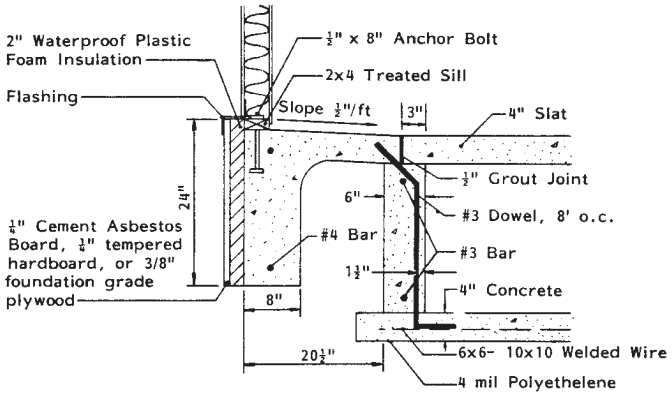
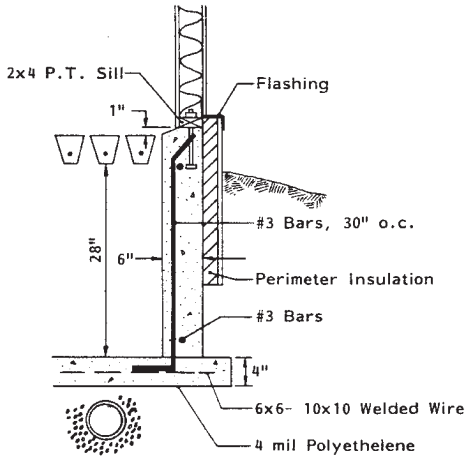


PLAN B. CROSS SECTION—1/5

Partly slotted floor, slats under rear of stalls.



SIDEWALL DETAIL—2/5



PIT ENDWALL DETAIL—3/5

MIDWEST PLAN SERVICE		
SWINE GESTATION BUILDING Three Rows of Stalls, 120 Sows		
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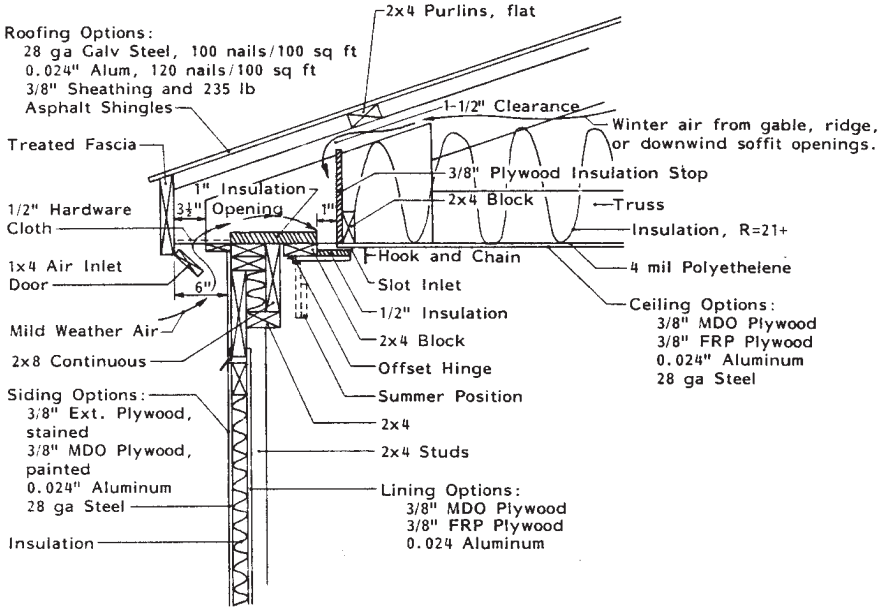


EAVE INLET **SLOT INLET**

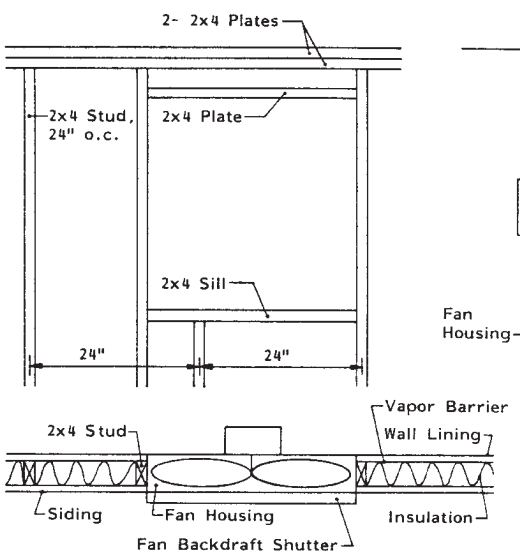
CONSTRUCTION DETAIL—1/6

Install eave inlet and slot inlet along both long walls. Install fans in the long wall opposite winter prevailing winds. Do not install slot inlet at fans or 8' from fans.

Winter: Close upwind soffit doors so all the air is drawn in from the ridge, gable or downwind soffit openings (18 sq ft total opening into attic needed).
Fasten all the slot inlet baffles in "up" position to force cold air across the ceiling. Keep vent doors closed and tightly sealed.
Minimum Slot Openings: ⅛"

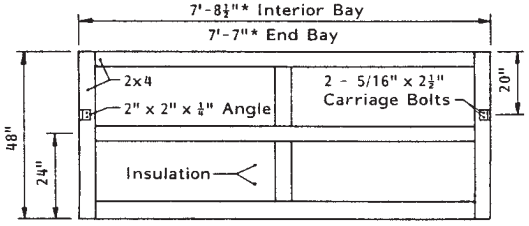
Mild Weather: Open all eave inlets. Open slot inlet baffles to ⅝".

Summer: Open 4' x 8' vent doors—both sides. Shut fans off.



FAN HOUSING—2/6

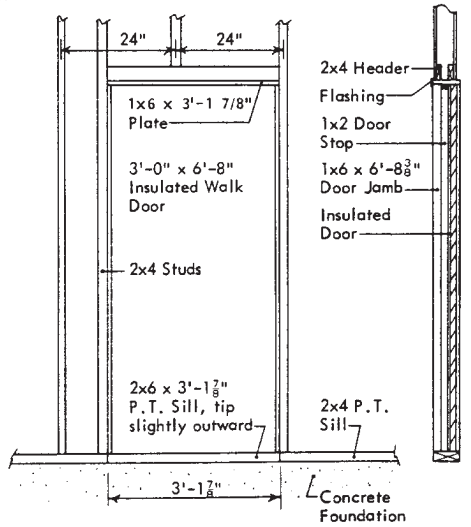
Install according to manufacturer's instructions. Position fan to allow for hood or louvers.

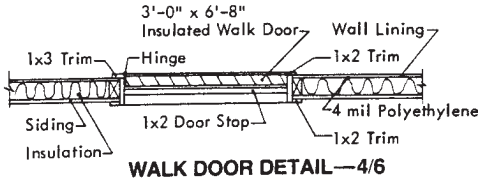


VENTILATION DOOR—3/6

Consider commercial automatic door openers.

Glue and nail ¾" CC Exterior Plywood on the inside. Install insulation. Nail metal siding on the outside.
*Alter this dimension for other than 8' o.c.





WALK DOOR DETAIL—4/6

MIDWEST PLAN SERVICE

SWINE GESTATION BUILDING

Three Rows of Stalls. 120 Sows

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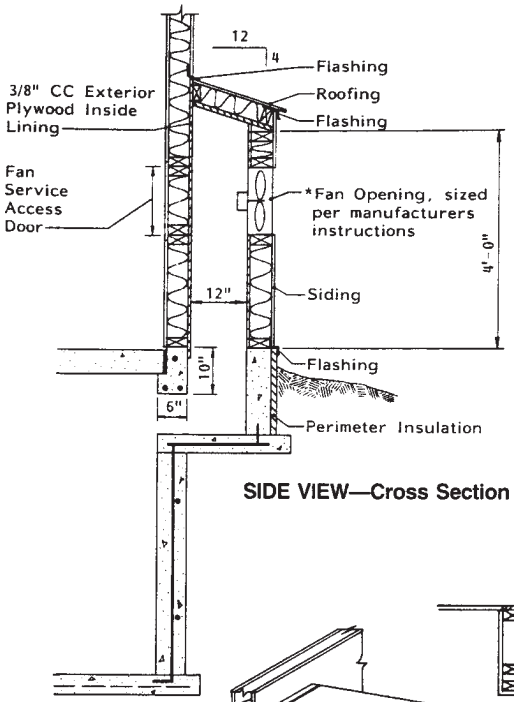
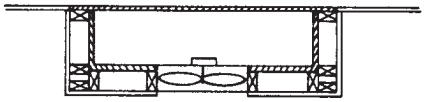
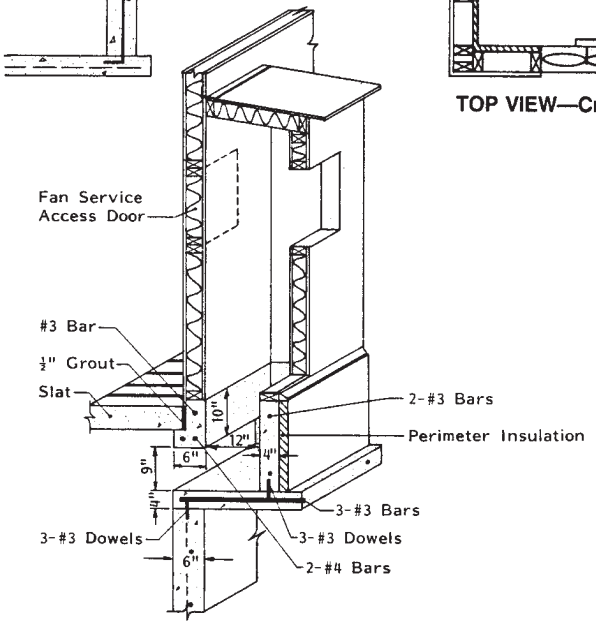


*Pit Ventilation Fan, no shutter required. 750 cfm Continuous Fan

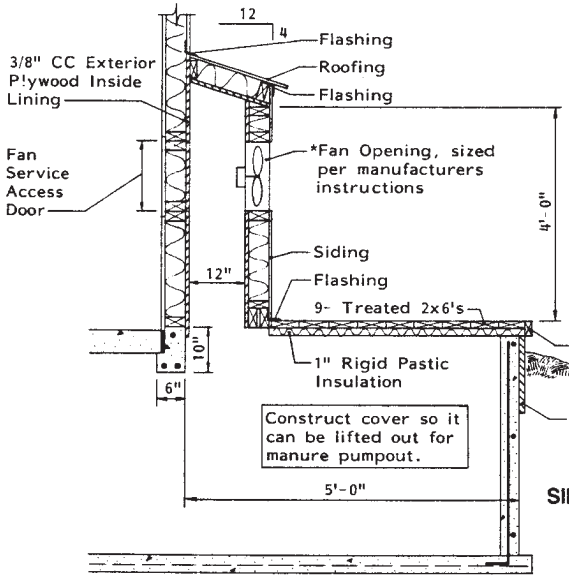
SIDE VIEW—Cross Section



TOP VIEW—Cross Section

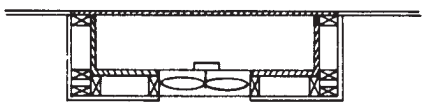


PIT FAN ANNEX DETAIL—1/7
Annex is about 4' wide inside.

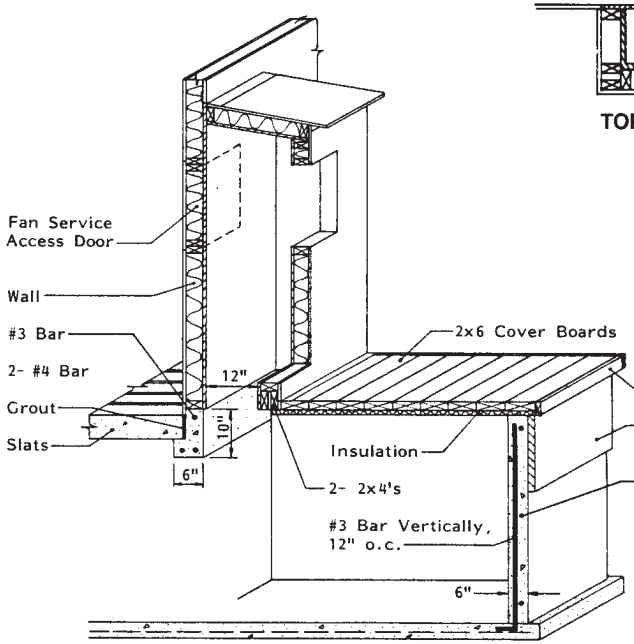


*Pit Ventilation Fan, no shutter required. 750 cfm Continuous Fan

SIDE VIEW—Cross Section



TOP VIEW—Cross Section



OPTIONAL PIT FAN AND CHOPPER PUMP ANNEX—2/7
Annex is about 4' wide inside.

MIDWEST PLAN SERVICE

SWINE GESTATION BUILDING
Three Rows of Stalls, 120 Sows

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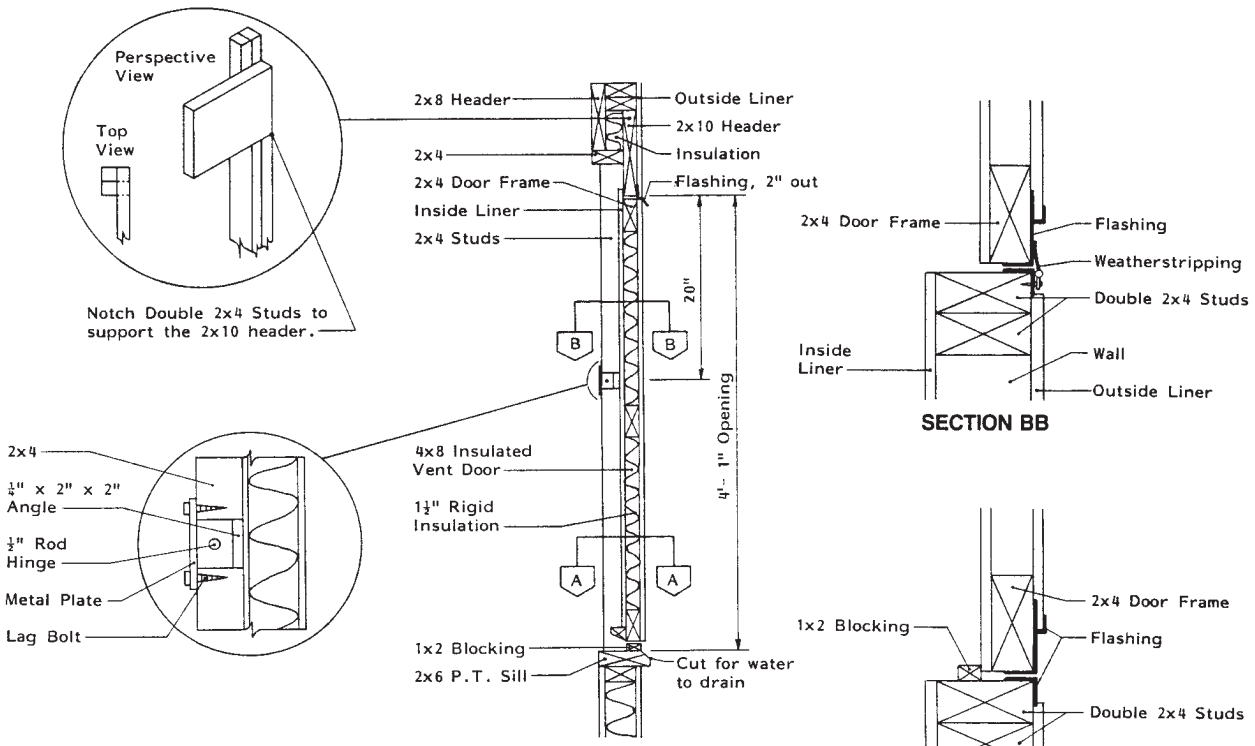
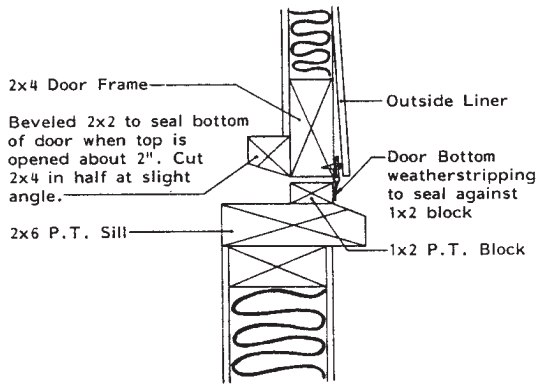
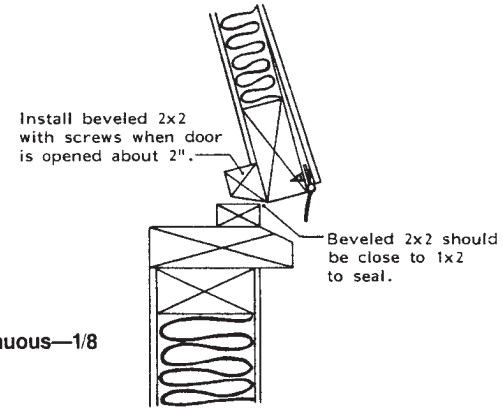
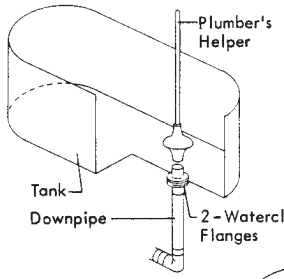


SECTION BB

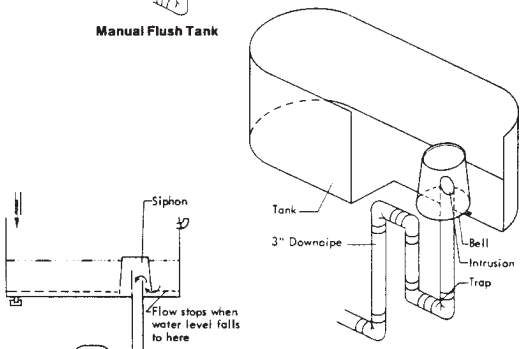
SECTION AA

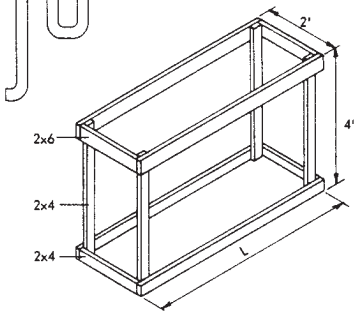






Manual Flush Tank





Siphon Tank Support Frame

L = Tank length - 1'. If L is greater than 6', install 2x4 post near center of span. Provide crossbracing if frame not attached to wall. Cover top with 1" plank.

SIPHON FLUSH TANK—2/8

See MWPS AED - 17

Flush Frequency—minimum flushes per day

	Under slats	Open gutter
Farrow	2	–
Nursery	4	–
Finish	6	12
Gestation	4	6

More flushes per day tend to decrease odors.

MWPS MIDWEST PLAN SERVICE

SWINE GESTATION BUILDING

Three Rows of Stalls, 120 Sows

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VENT DOORS—Not Continuous—1/8

TRUSSES

July, 1984

Dear Customer:

When this plan was released, the last sheet had details for glue-nailed truss selection. Most buildings are erected with purchased trusses. The truss sheet did not have space enough to present all that was needed to build glue-nailed trusses.

Therefore, the sheet has been dropped. The plan has not yet been revised to include the following notes:

TRUSS NOTES

If you buy trusses:

Specify the span, slope, and spacing shown on the plan. Specify the roof and ceiling types. Require strength adequate for the wind and snow loads for your locality.

Require installation details specifying anchorage, bracing, and roofing and ceiling framing and attachment. If you buy glue-nailed trusses:

Have them built and installed to the recommendations in MWPS-9, *Designs for Glued Trusses*, Fourth Edition.

If you build your own trusses:

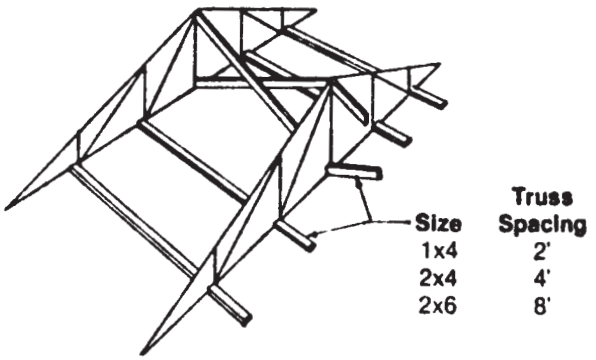
Get a copy of MWPS-9 and follow its recommendations.

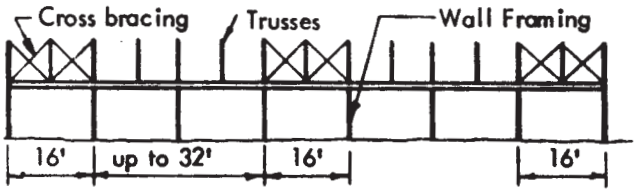
Send $5.00 for *Designs for Glued Trusses, MWPS-9* to:

Midwest Plan Service, 122 Davidson Hall, Iowa State University, Ames, IA 50011

Windbracing

Brace and anchor the trusses as they are placed. Bottom chord stiffeners are required at panel points unless a rigid ceiling is to be installed. Use king post crossbracing in all buildings.





Wind Anchorage

Minimum fasteners for wind anchorage, both ends of each truss.

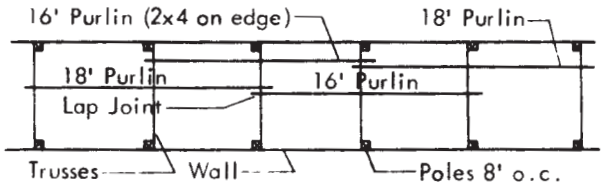
	Truss spacing		
Truss span	2'	4'	8'
20'-24'	1A or 1B	1A or 1B	2A or 1B
26'-30'	1A or 1B	1A or 1B	2A or 2B
32'-46'	1A or 1B	2A or 1B	3A or 2B
48'-50'	1A or 1B	2A or 1B	4A or 2B
52'-60'	1A or 1B	2A or 2B	4A or 3B

A – metal framing anchor
4-30d ring-shank nails – ½" bolt
B – ½" bolt

Roof Purlins

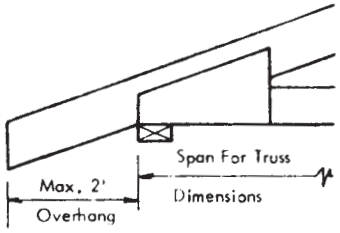
Stagger purlin joints for continuity across the trusses. Purlins may be laid flat with 2' and 4' truss spacings and butt joints used.

Alternating purlin lengths may be used in pole buildings where the poles are spaced evenly and the trusses are not. For poles 8' o.c. they may be of alternating 16' and 18' lengths with staggered and lapped end joints if pairs of trusses are mounted on alternate sides of the poles.



Overhang

For a 2' to 4' overhang, use the top chord and heel gusset design for a ⅓ larger snow load.



Loads

Install trusses to withstand the loads.

- Required by any applicable building code.
- Recommended by an engineer familiar with farm buildings in your area.
- Or, if necessary, estimated from the material below.

Ceiling Dead Load

- 0 psf allows for no materials in addition to the truss, bracing, and stiffeners.
- 5 psf ceiling dead load allows for a metal or plywood ceiling with insulation (warm livestock buildings).
- 8 psf ceiling dead load allows for a gypsum board ceiling with insulation (residential or light commercial buildings).

Roof Dead Load

Add the weights of the truss, purlins or decking, roofing, and roof insulation to get the dead load on the top chord.

Approximate weights of trusses, psf

Example: a 4-web truss for 4′ spacing with 2x8 top chord and 2x6 bottom chord weighs about 1.3 + 0.7 = 2.0 psf. Dashed lines in table indicate example.

Chord size		Truss spacing 2′	4′	8′
Top	Bottom	Truss dead weight, psf		
2x4	2x4	1.6	0.8	0.4
2x6	2x4	2.0	1.0	0.5
2x6	2x6	2.4	1.2	0.6
2x8	2x6	2.7	1.3	0.7
2x10	2x4 + 2x4	3.3	1.6	0.8
2x12	2x4 + 2x6	4.0	2.0	1.0
2x12	2x6 + 2x6	4.4	2.2	1.1
Add the following for:				
2-&4-Web Truss	1.4	0.7	0.4	
6 Web Truss	2.1	1.2	0.6	

Recommended snow loads

For roofs up to about 5/12 slope for buildings outside the jurisdiction of a building code. Farm buildings: 50-yr map load x 0.9 for 25-yr x 0.8 for snow on roof. Other buildings: 50-yr map load x 0.8 to convert from snow on ground to snow on roof.

Minimum recommended load is 12 psf. In areas where all of the maximum snow load results from a single storm without significant wind, the maximum roof load may equal the ground snow load.

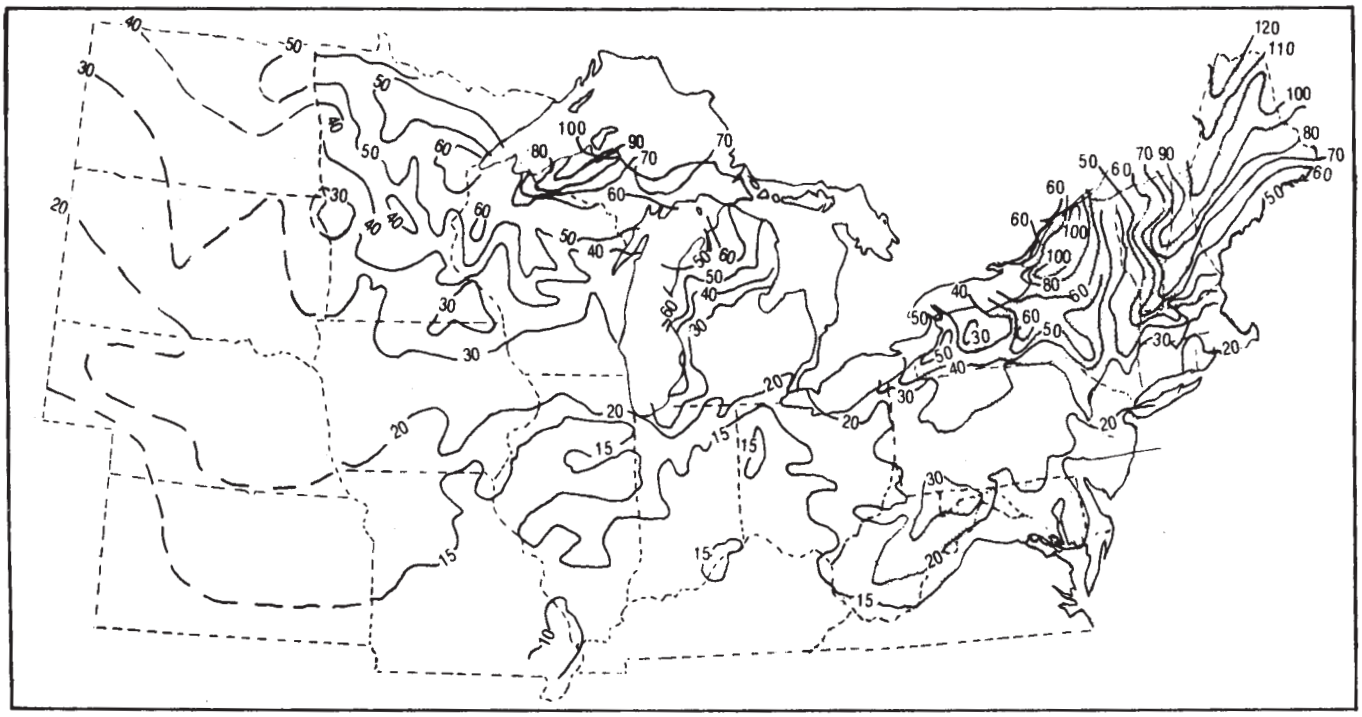
Map load	Roof snow load Farm	Other
	- - - - psf - - - -	
15	12.0	12
20	14.4	16
30	21.6	24
40	28.8	32
50	36.0	40
60	43.2	48
70	50.4	56
80	57.6	64
90	64.8	72
100	72.0	80
110	79.2	88
120	86.4	96

Weights of roofing and ceiling materials

2x4s, 2′ o.c.	0.7 psf
2x6s, 2′ o.c.	1.1
1″ lumber, solid	2.2 psf
1x3s, 16″ o.c.	0.4
3/8″ plywood	1.1
1/2″ plywood	1.4
0.024″ aluminum	0.4
28 ga steel	0.9
Asphalt shingles	2.6
Insulation, per inch of thickness	0.1-0.4

Wind Loads

For most areas of the U.S., trusses are designed to withstand winds of 80 mph on a building less than 30′ high.



Snow load on the ground, 50-yr recurrence interval