

# FORESTRY FACTS



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## **750 Board Foot Solar Lumber Dry Kiln** **Scott Bowe and Stefan Bergmann**

The enclosed plans provide a basic blueprint for a small solar lumber dry kiln. The kiln will hold approximately 750 board feet of 4/4-inch lumber, although this capacity can vary significantly depending upon lumber and sticker thickness. Be aware that solar kilns only operate effectively during the summer months in northern climates. They can work for the hobby woodworker but are not dependable for larger manufacturing operations. If you require a steady material flow, you may want to consider a more conventional kiln design.

The enclosed plans are quite generic. The builder can scale the plans up or down to fit his or her needs. If you are interested in a larger 1,500 board foot solar kiln, please refer to the address on the back of this publication for ordering information.

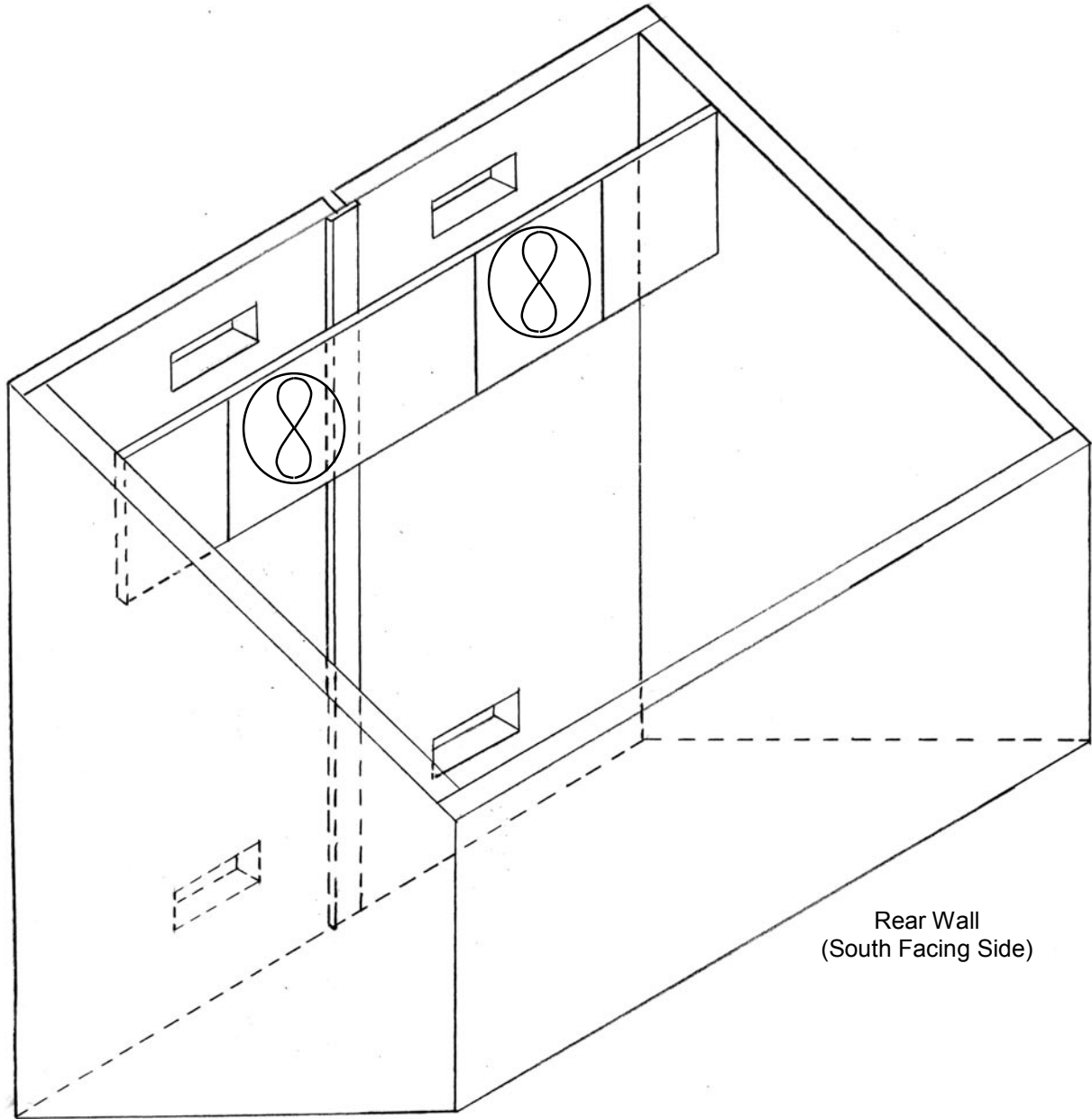
Table 1 provides a general materials list for a solar kiln based on the dimensions provided. Figures 1 to 8 provide basic drawings. Building a solar kiln is relatively simple. Drying quality lumber is much more complicated. If you are new to lumber drying, start by reading the following resources:

USDA, F. Service, et al. (1991). Dry Kiln Operator's Manual. Madison, Wisconsin, Forest Products Society. Available from the Forest Products Society.  
Phone: 608-231-1361. Website: <http://www.forestprod.org/>

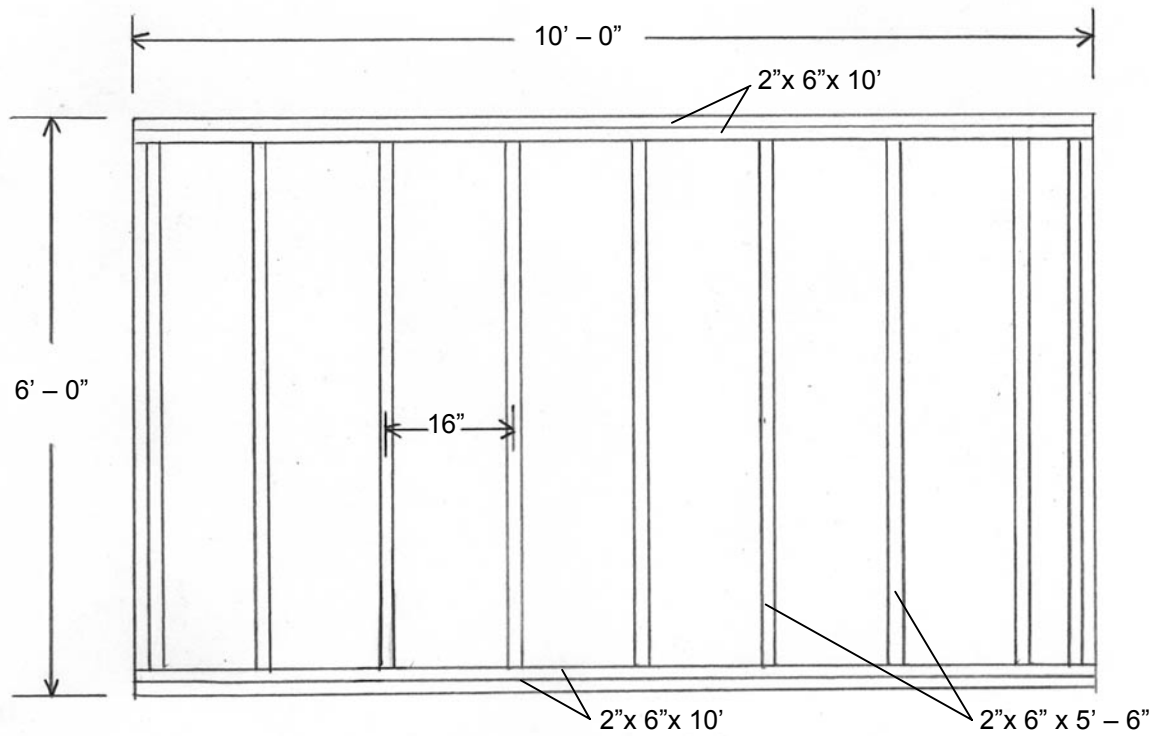
5USDA (1999). Air Drying of Lumber. Madison, Wisconsin, U.S. Department of Agriculture, Forest Service, Forest Products Laboratory: 62. Available from the USDA Forest Products Laboratory. Phone: 608-231-9200.  
Website: <http://www.fpl.fs.fed.us/>

**Table 1. General Building Materials List**

Quantity	Item	Description
6	2" x 6" – 12' trtd*	cut to 6' for floor
4	2" x 6" – 10' trtd*	for floor
2	4' x 8' – ¾" CDX*	top of floor
60 sq ft	3 ½" x 15"	R11 fiberglass insulation for floor
8	4' x 8' – ½" CDX*	end walls both sides & under floor
3	2" x 4" – 12' pine	for end walls
1	2" x 4" – 10' pine	for end walls
1	2" x 4" – 8' pine	for end walls
1	2" x 4" – 14' pine	for end walls
8	2" x 4" – 10' pine	for end walls
60 sq ft	3 ½" x 15"	R11 fiberglass insulation for back
4	2" x 4" – 10' pine	for back wall
11	2" x 4" – 4' pine	for back wall
40 sq ft	3 ½" x 15"	R11 fiberglass insulation for back
3	4' x 8' – ½" CDX*	back wall both sides
2	2" x 4" – 10' pine	for roof
6	2" x 4" – 10' pine	for roof
5	26" – 1 ¼" - 10'	corrugated clear roof film
6	10' x 6' pieces	6 mill plastic vapor barrier
2	2" x 8" – 10'	fir header for front wall
12	2" x 4" – 10'	pine doors
7	4' x 8' – ½" CDX*	doors both sides
100 sq ft	3 ½" x 15"	R11 fiberglass insulation doors
6	12"	strap hinges with lags and washers
2	2" x 4" x 12'	pine for fan baffle
1	4' x 4' x ½" CDX*	for fan baffle
2#	2"	neoprene nails for roof
10#	16d	coated nails for framing
10#	7d	coated nails for plywood
4 sq ft	-	screen to cover vents
-	-	misc. materials
<p>*CDX= an exterior grade plywood will perform the best            *trtd= preservative pressure treated lumber</p>		



**Figure 1. Overview of 750 Board Foot Solar Kiln Design**



**Figure 2. Floor** We suggest making a small hole in the plywood flooring for drainage. Install a short piece of hose or tubing to channel the water through the floor system. Scale:  $\frac{1}{2}'' = 1' - 0''$

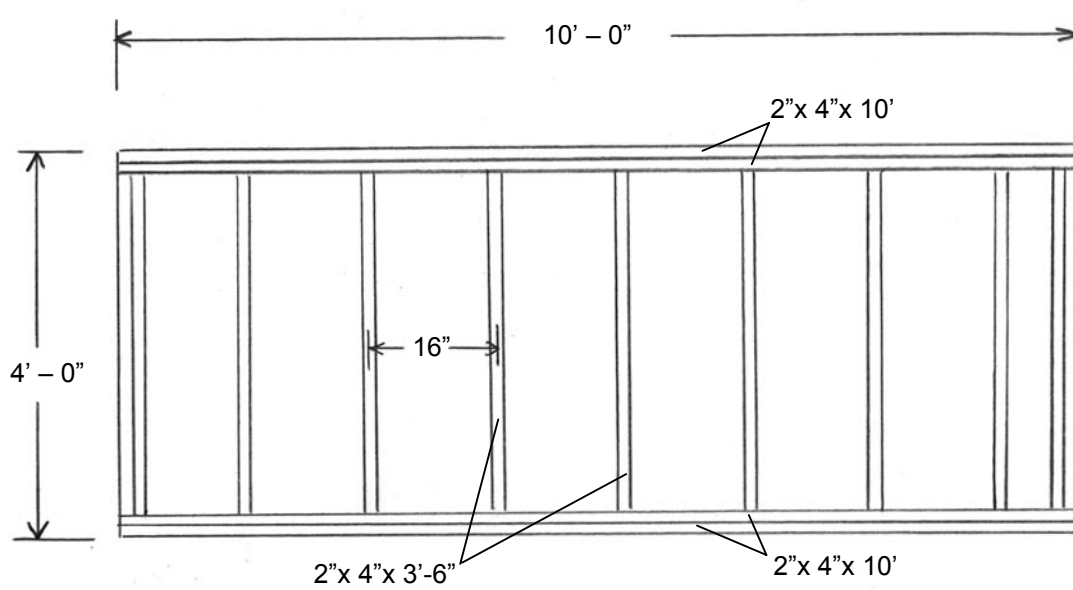
**Materials**

4 Pcs. 2"x 6"x 10' Lumber

11 Pcs. 2"x 6"x 5' - 6" Lumber

44 L. Ft. R-11, 3½" Thick, 15½" Wide Fiberglass Insulation

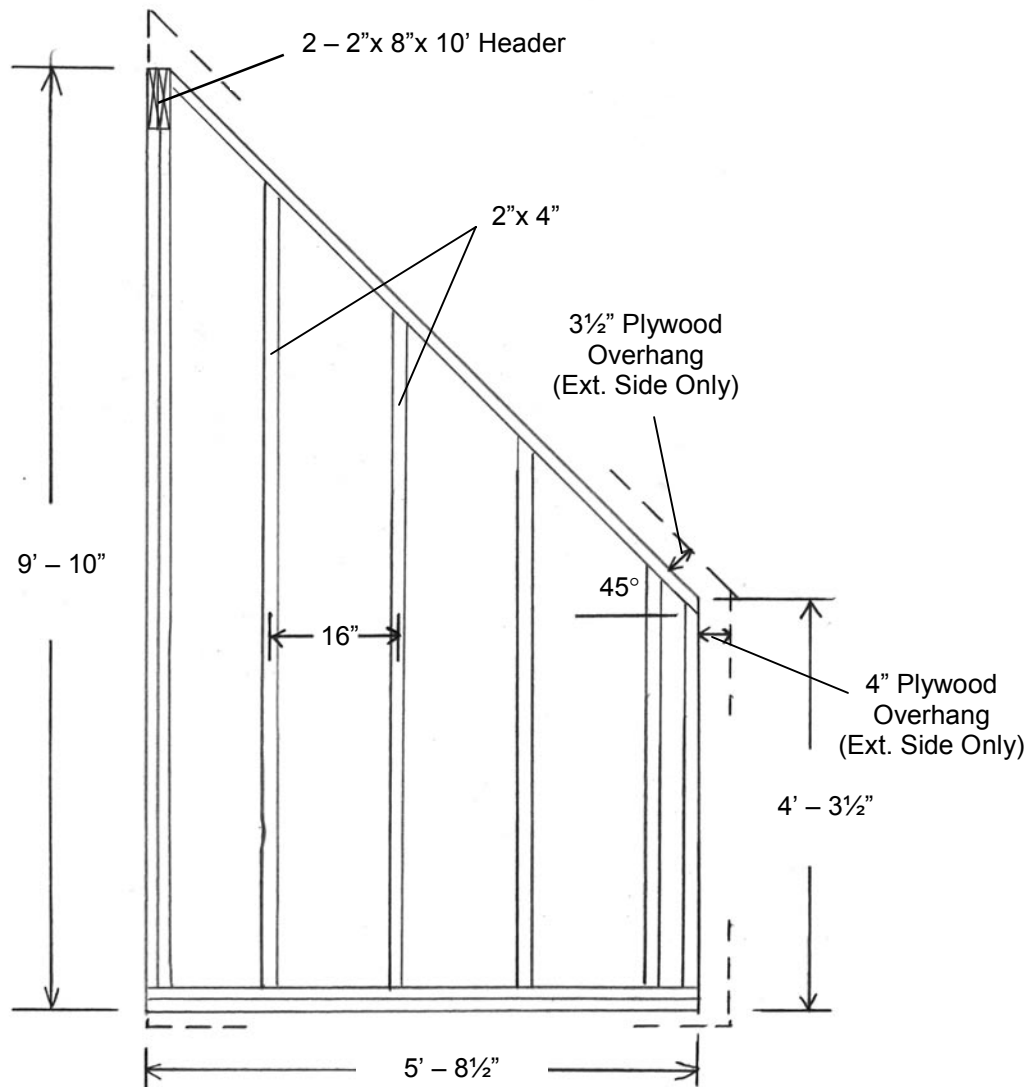
**2 Pcs. ½"x 4"x 8' Ext. Grade Plywood (Top Face Only, Covering Entire Frame Area)**



**Figure 3. Rear Wall** Note that lowest 2"x 4" sill plate is first fastened to the floor, then remaining assembly is fastened to this sill plate. Plywood overhangs the bottom to fasten to floor. Scale: 1/2" = 1' 0"

Materials List for Floor

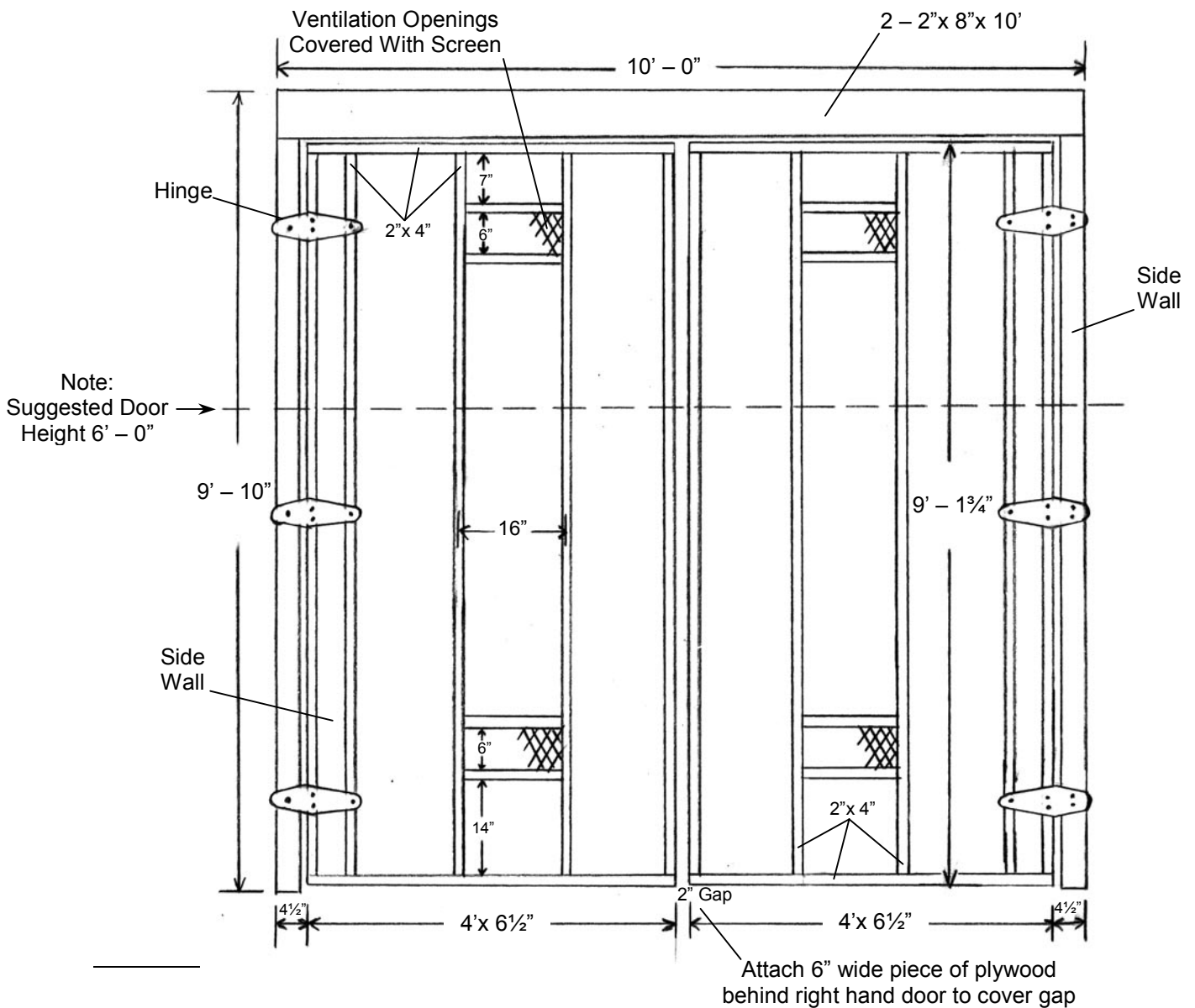
- 4 Pcs. 2"x 4"x 10' Lumber
- 11 Pcs. 2"x 4"x 3' - 6" Lumber
- 28 L. Ft. R-11, 3 1/2" Thick, 15 1/2" Wide Fiberglass Insulation
- 3 Pcs. 1/2"x 4'x 8' Ext. Grade Plywood on Both Sides



**Figure 4. End Wall—2 Required** Scale: 1/2" = 1' - 0"

**Materials**

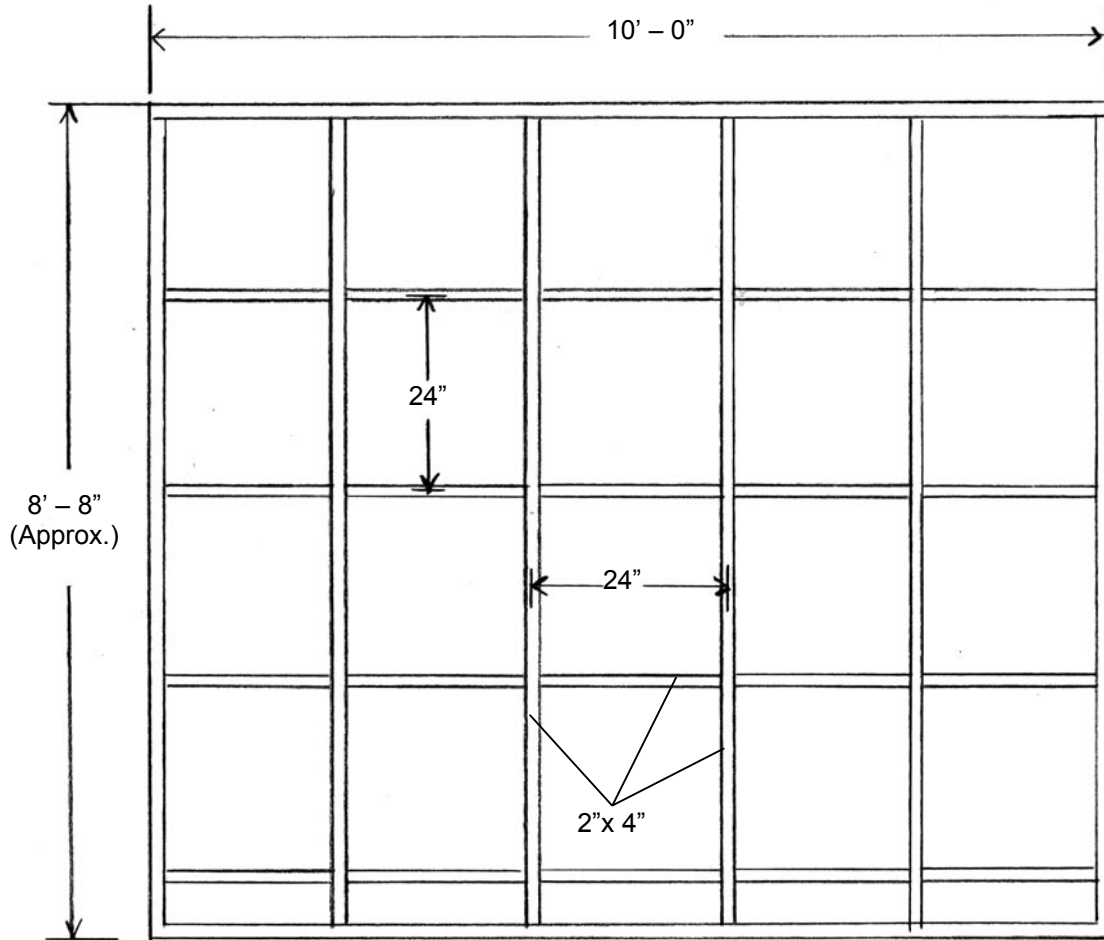
- 6 Pcs. 1/2"x 4'x 8' Ext. Grade Plywood on Both Sides
- 3 Pcs. 2"x 4"x 12' Lumber
- 1 Pc. 2"x 4"x 10' Lumber
- 1 Pc. 2"x 4"x 8' Lumber
- 1 Pc. 2"x 4"x 14' Lumber
- 8 Pcs. 2"x 4"x 9' Lumber
- 35 L. Ft. R-11 3 1/2" Thick, 15 1/2" Wide Fiberglass Insulation



**Figure 5. Front Wall (Doors)** We suggest you design the door to be 6' in height, as indicated by dashed line in drawing above. Scale:  $\frac{1}{2}" = 1' - 0"$

**Materials**

- 2 Pcs. 2" x 8" x 10' Lumber
- 2 Pcs. 2" x 4" x 10' Lumber
- 10 Pcs. 2" x 4" x 9' Lumber
- 7 Pcs.  $\frac{1}{2}"$  x 4' x 8' Ext. Grade Plywood on Both Sides
- 63 L. Ft. R-11,  $3\frac{1}{2}"$  Thick,  $15\frac{1}{2}"$  Wide Fiberglass Insulation
- Screen for Ventilation Openings



**Figure 6. Roof** Scale:  $\frac{1}{2}" = 1' - 0"$

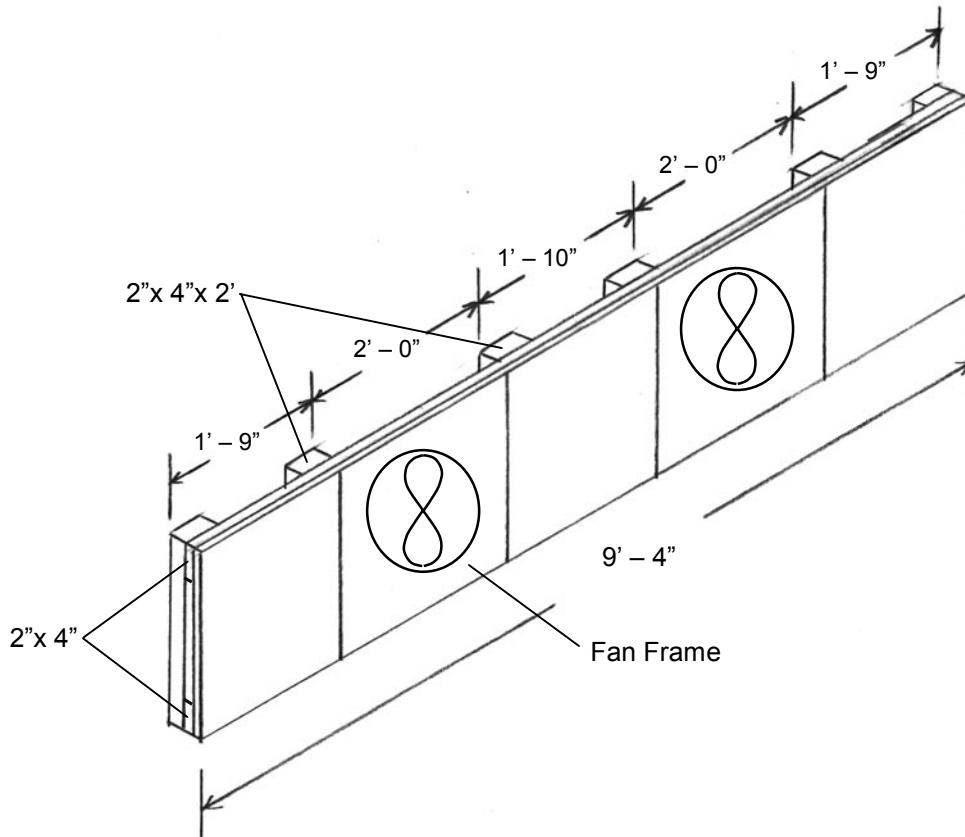
Materials

2 Pcs. 2"x 4"x 10' Lumber

6 Pcs. 2"x 4"x 9'

5 Pcs. 26" Wide, 9' Long Corrugated Translucent Fiberglass (Outer Covering)

23 L. Ft. 4' Wide Plastic (Inner Covering)

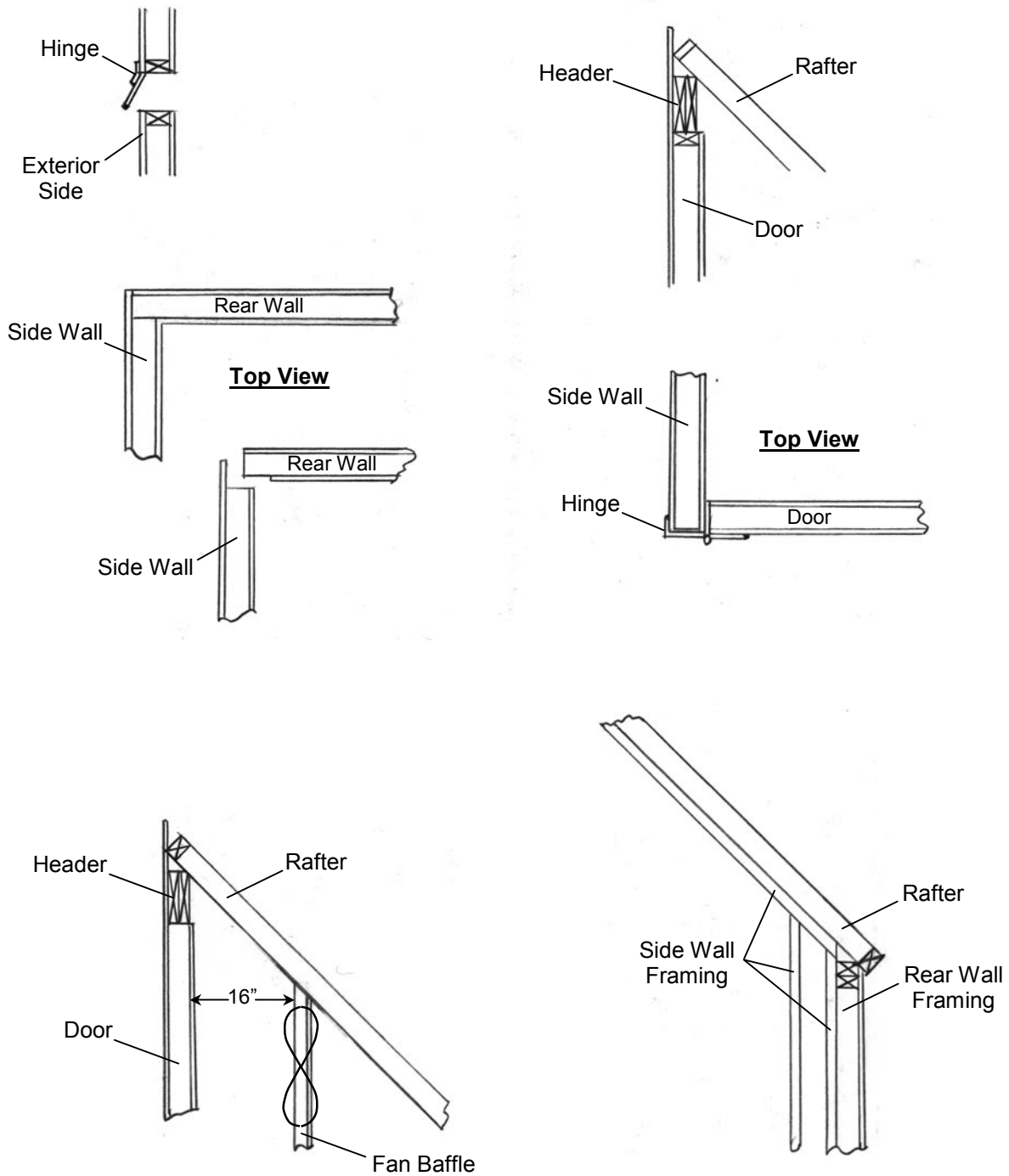


**Figure 7. Fan Baffle** Scale:  $\frac{1}{2}" = 1' - 0"$

Materials

- 1 Pc. 2"x 4"x 12' Lumber
- 1 Pc.  $\frac{1}{2}"$ x 4'x 4' Ext. Grade Plywood
- 2 Pcs. 2"x 4"x 10' Lumber

**Rear Wall**  
**Vent Door**



**Figure 8. Detailed Drawings for Kiln Components**

## **1,500 Board Foot Solar Kiln**

Plans and information for a 1,500 board foot solar kiln are available from the Brooks Forest Products Center at Virginia Tech University:

Brooks Forest Products Center  
Virginia Tech University  
1650 Ramble Road  
Blacksburg, VA 24061  
Phone: (540) 231-8752

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