

Penn State **Extension**

Bulk Bin Storage Buildings

Agricultural and Biological Engineering

abe.psu.edu

No. IP732-39

This Idea Plan is intended to provide educational information and ideas concerning floor level bin-type buildings for storing bulk products or commodities. The following attached drawings are based on historical plans and may not meet design and construction standards for your area:

Commodity Bin Shed (USDA 508)
Bulk Storage Shed (USDA 6176)
Salt-Sand Storage Shed (USDA 6382)

If you decide to build a facility similar to any of these plans, be sure to check building requirements for your area. Your local building inspector, engineer, building supplier, or building contractor can help you determine what is a safe and legal facility for housing rabbits in your area. In addition to the rules and regulations covering design and construction of buildings, be sure to consider how you will handle the manure and potential nuisance problems for neighbors, including flies, odor, and noise.

The Department of Agricultural and Biological Engineering at Penn State has a variety of educational material available related to agricultural and biological engineering. This material is intended to help Pennsylvania farmers and others develop buildings and facilities for modern, environmentally-compatible farm facilities. The material can be used in conjunction with county extension staff, builders, suppliers, consulting engineers, the Natural Resources Conservation Service, financial management advisors, farm lenders, veterinarians, and others to assemble a facilities plan suitable for local conditions.

Publications are available in the areas of agricultural safety and health, animal housing systems, building and farmstead planning, crops and greenhouses, machinery systems and tractors, residential housing, soil and water resources, and solid waste management. Contact your county Penn State Extension Office for more information on these subjects. You can also obtain an index of publications concerning the above areas by calling, writing, faxing or e-mailing:

Department of Agricultural and Biological Engineering
246 Agricultural Engineering Building
University Park, PA, 16802-1909
Telephone: 814-865-7685
Fax: 814-863-1031
Email: agbioeng@psu.edu

For more information, the following comprehensive handbook covering design and construction of small pole buildings is available:

NRAES-01—Post-Frame Building Handbook: Materials, Design Consideration, Construction Procedure (1997)
78 pages, \$14.00 (Contact the NRAES below for more information)

NRAES, Cooperative Extension
PO Box 4557
Ithaca, NY 14852-4557
Telephone: (607)255-7654 Fax: (607)254-8770
Email: NRAES@cornell.edu

An **OUTREACH** program of the
College of Agricultural Sciences

Penn State College of Agricultural Sciences research and cooperative extension programs are funded in part by Pennsylvania counties, the Commonwealth of Pennsylvania, and the U.S. Department of Agriculture.

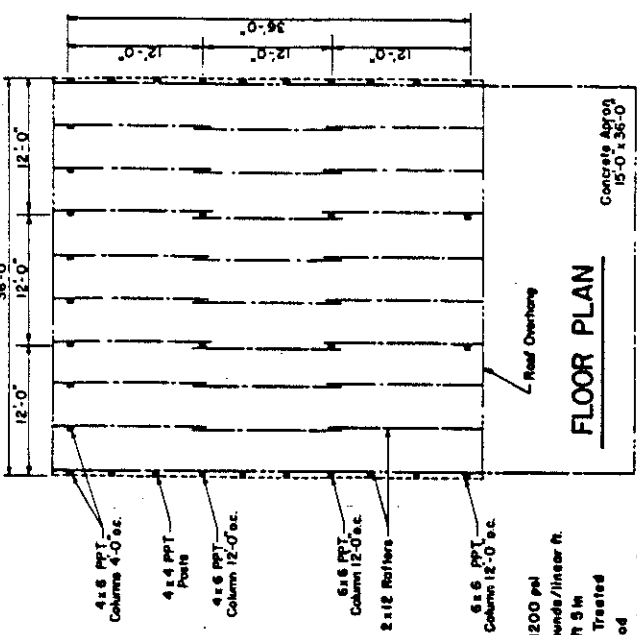
Visit Penn State Extension on the web: extension.psu.edu

Where trade names appear, no discrimination is intended, and no endorsement by Penn State Cooperative Extension is implied.

Penn State encourages persons with disabilities to participate in its programs and activities. If you anticipate needing any type of accommodation or have questions about the physical access provided, please contact [Name and phone number] in advance of your participation or visit.

This publication is available in alternative media on request.

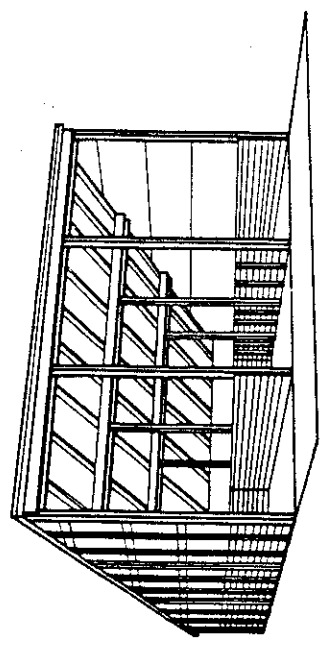
The Pennsylvania State University is committed to the policy that all persons shall have equal access to programs, facilities, admission, and employment without regard to personal characteristics not related to ability, performance, or qualifications as determined by University policy or by state or federal authorities. It is the policy of the University to maintain an academic and work environment free of discrimination, including harassment. The Pennsylvania State University prohibits discrimination and harassment against any person because of age, ancestry, color, disability or handicap, national origin, race, religious creed, sex, sexual orientation, gender identity, or veteran status. Discrimination or harassment against faculty, staff, or students will not be tolerated at The Pennsylvania State University. Direct all inquiries regarding the nondiscrimination policy to the Affirmative Action Director, The Pennsylvania State University, 328 Boucke Building, University Park, PA 16802-5901; Tel 814-865-4700/V, 814-863-1150/TTY.



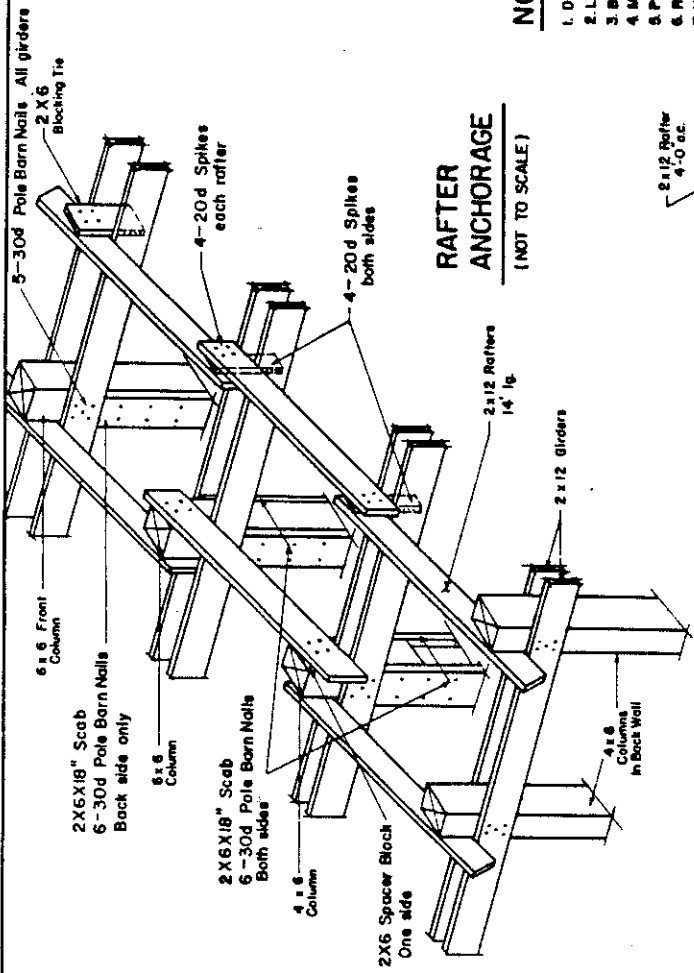
FLOOR PLAN

NOTES:

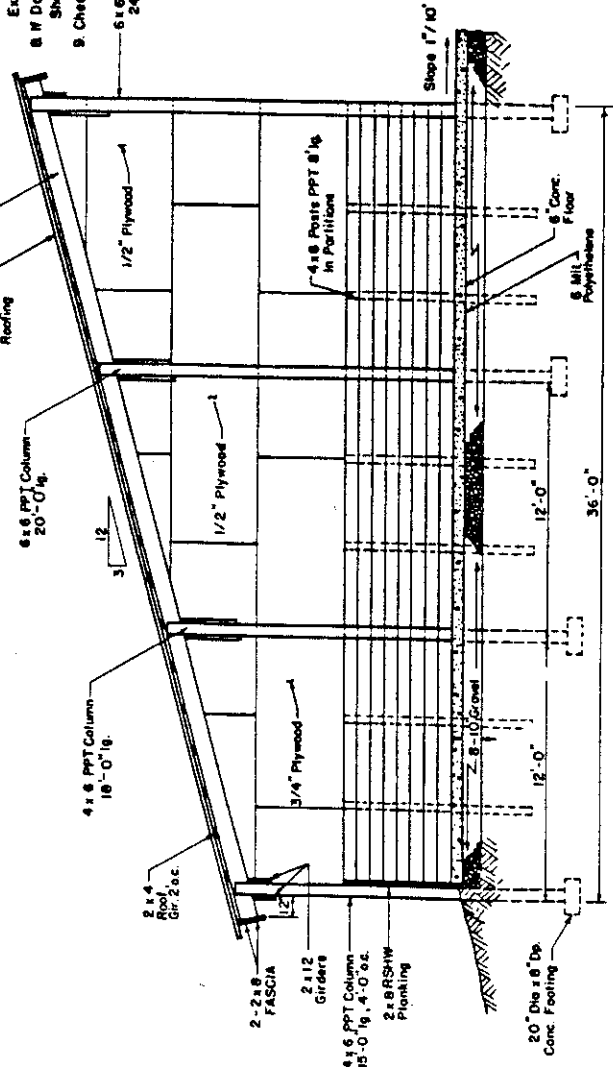
1. Design Roof Load 30 P.S.F.
2. Lumber Bending Stress $F_b = 1200$ psi
3. Bulk Material Load 4000 pounds/linear ft.
4. Minimum Pole Embedment 4 ft 5 in
5. PPT - Pressure Preservative Treated
6. RSHW - Rough Sawn Hardwood
7. Use 3" Bolts Outside To Weatherproof Exposed Plywood Joints
8. If Doors Are Added Front Columns Should Be 6 X 10
9. Check Dumping Height Before Building



PERSPECTIVE (NOT TO SCALE)



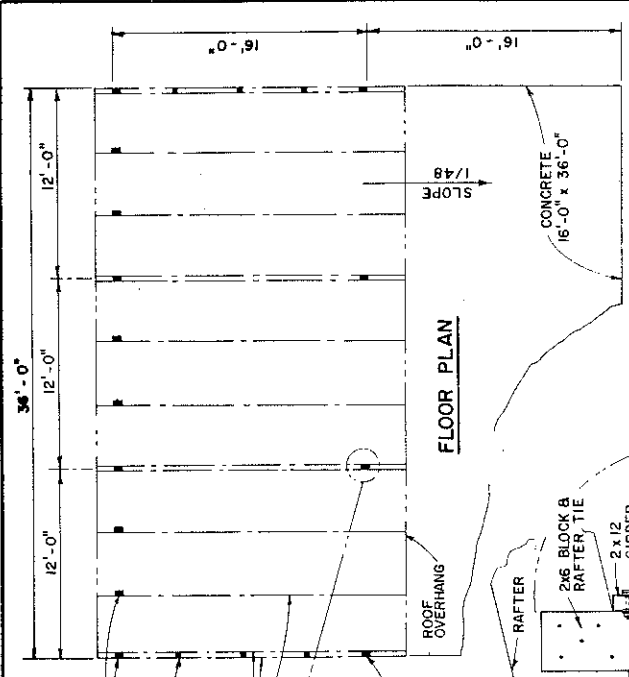
RAFTER ANCHORAGE
 (NOT TO SCALE)



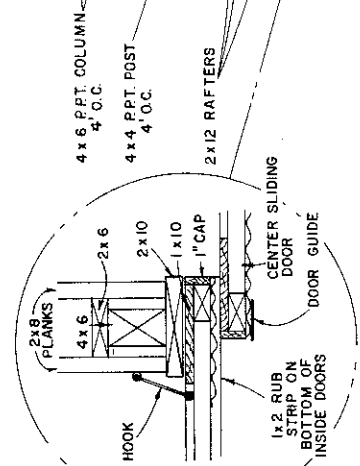
CROSS SECTION

MATERIALS LIST - COMMODITY BIN SHED - PLAN NO 732-508

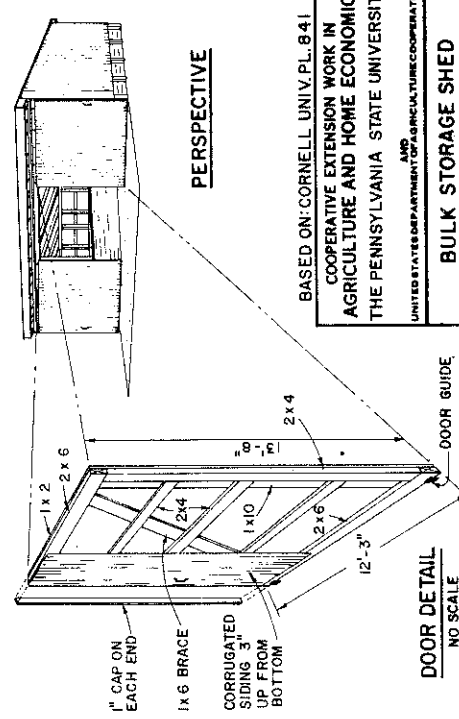
Dimension Lumber	-	$F_b = 1200$ psi				
Purlins	-	57	12'	2 x 4	456	- 16d nails
Rafters	-	30	14'	2 x 12	240	- 20d spikes
Facia	-	12	12'	2 x 8	192	- 16d nails
Girders	-	24	12'	2 x 12	240	- 30d pole barn
Scabs	-	20	18"	2 x 6	120	- 30d pole barn
Spacers	-	2	18"	2 x 6	12	- 20d spikes
Blocking ties	-	18	12"	2 x 6	144	- 20d spikes
Rear wall columns	-	10	15'	4 x 6 PPT		
Intermediate columns	-	4	18'	4 x 6 PPT		
	-	4	20'	6 x 6 PPT		
Front columns	-	4	24'	6 x 6 PPT		
Sides columns	-	2	14'	4 x 4 PPT		
	-	2	16'	4 x 4 PPT		
	-	4	18'	4 x 4 PPT		
	-	2	20'	4 x 4 PPT		
	-	2	22'	4 x 4 PPT		
Interior partitions	-	12	8'	4 x 4 or 4 x 6 PPT		
Plywood sides and back						
13 1/2	4 x 8 sheets	-	3/4 exterior AC or BC	-	336	- 8d galv. nails
13	4 x 8 sheets	-	1/2 exterior AC or BC	-	336	- 8d galv. nails
1	4 x 8 sheets	-	3/8 exterior AC or BC	-	272	- 4d galv. nails
			(batten strips)			
Planking						
Sides	-	48	12'	2 x 8 RSHW	384	- 20d galv. spikes
Back	-	24	12'	2 x 8 RSHW	192	- 20d galv. spikes
Partitions	-	48	12'	2 x 8 RSHW	384	- 20d galv. spikes
				(one side only)		
	-	96	12'	2 x 8 RSHW	768	- 20d galv. spikes
				(both sides)		
Metal Roofing	-	1512 sq. ft. (42' long x 36' wide)				
		Nails and flashing as per manufacturer's recommendations.				
16 - 20" dia. x 8" thick concrete pole pads						
34 - yards of concrete for floor and apron						
50' roll 40' wide 6 mil. polyethelene						



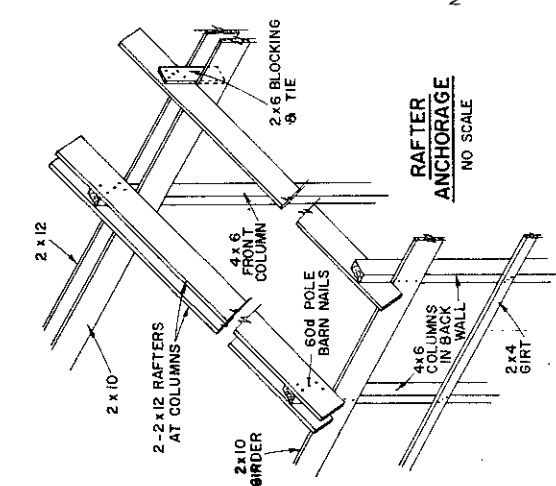
FLOOR PLAN



DOOR DETAIL
NO SCALE

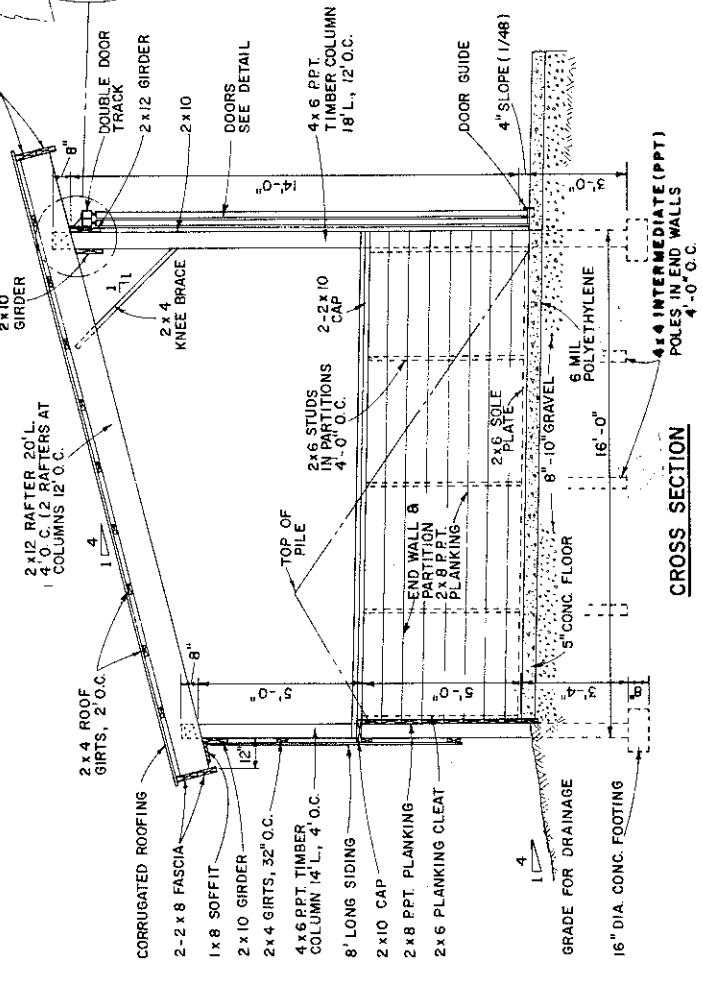


PERSPECTIVE



RAFTER ANCHORAGE
NO SCALE

- NOTE: 1. CAPACITY - FERTILIZER APPROX. 2 TONS./FT. OF LENGTH
 2. ROOF LOAD DESIGNED FOR 30 P.S.F.
 3. LUMBER STRESS - $f = 1200$ P.S.I.
 4. CHECK DUMPING OR FILLING HEIGHT BEFORE STARTING CONSTRUCTION.
 5. (PPT) PRESERVATIVE PRESSURE-TREATED

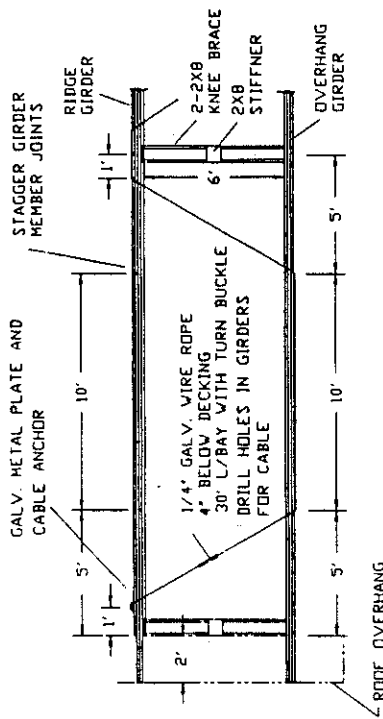
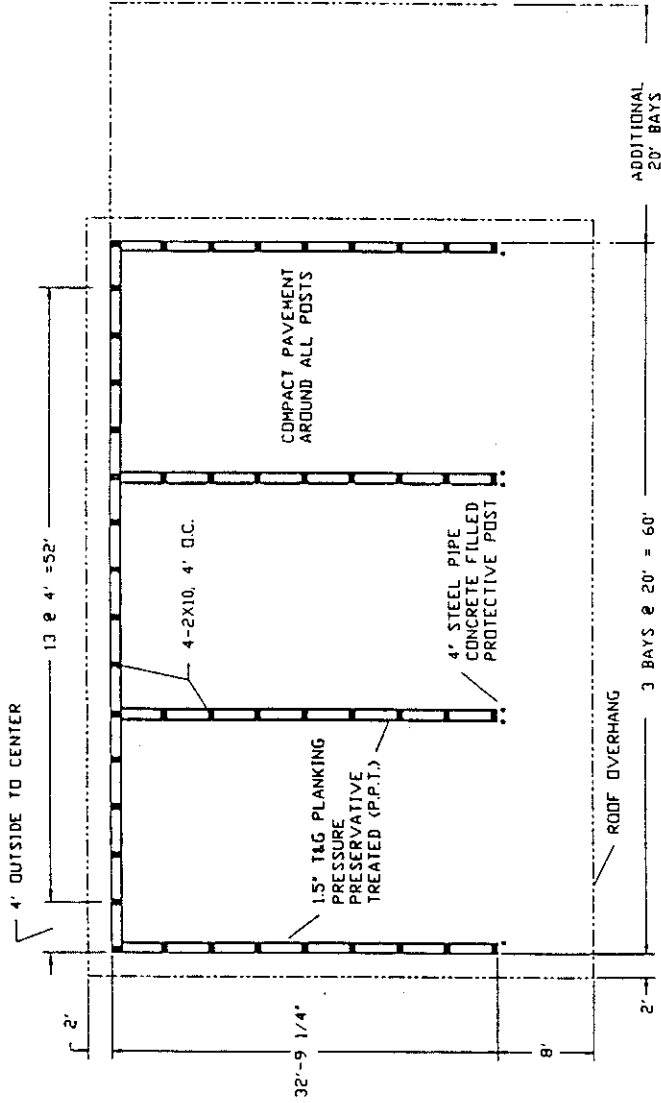


CROSS SECTION

BASED ON: CORNELL UNIV. P.L. 841
 COOPERATIVE EXTENSION WORK IN
 AGRICULTURE AND HOME ECONOMICS
 THE PENNSYLVANIA STATE UNIVERSITY
 UNITED STATES DEPARTMENT OF AGRICULTURE COOPERATING

N.Y. 73	EX. 6176	SHEET 1 OF 1
---------	----------	--------------

Order No. 732-6176



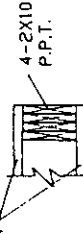
PLAN VIEW
 RIDGE AND OVERHANG GIRDER
 KNEE BRACE AND CABLE SUPPORT



PLAN VIEW



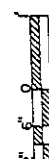
1.5\"/>
 PARTITION



POST SECTION
 BELOW PLATE



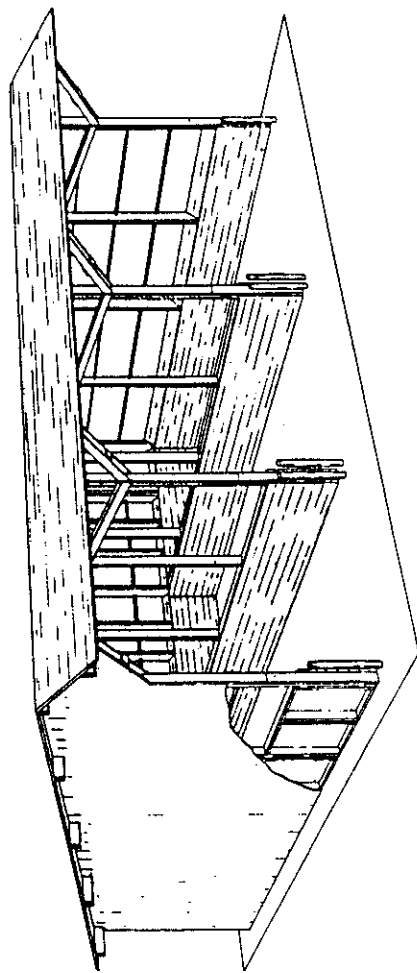
POST SECTION
 10' ABOVE FLOOR



DESIGN CRITERIA:
 SALT-SAND LOAD 100 P.C.F. FLUID EQUIVALENT,
 5.5' MAX. DEPTH FOR 1500 P POST & T&G PLANKING

ROOF LOADS, GIRDERS & DECKING
 FOR 52 P.S.F. USE 1850 F LUMBER
 FOR 42 P.S.F. USE 1500 F LUMBER
 FOR 25 P.S.F. USE 875 F LUMBER

WIND LOAD 15 P.S.F. OR 76.5 MPH
 NAILING PATTERN, TWO ROWS 1\"/>



PERSPECTIVE

NOTES:
 MAX. CAPACITY PER BAY = 142 CU YDS. (190 TONS)
 CAUTION: ENTIRE SITE SHOULD BE PAVED AND SURFACE
 RUNOFF COLLECTED AND DISPOSED OF PROPERLY TO
 PROTECT GROUND WATER.

