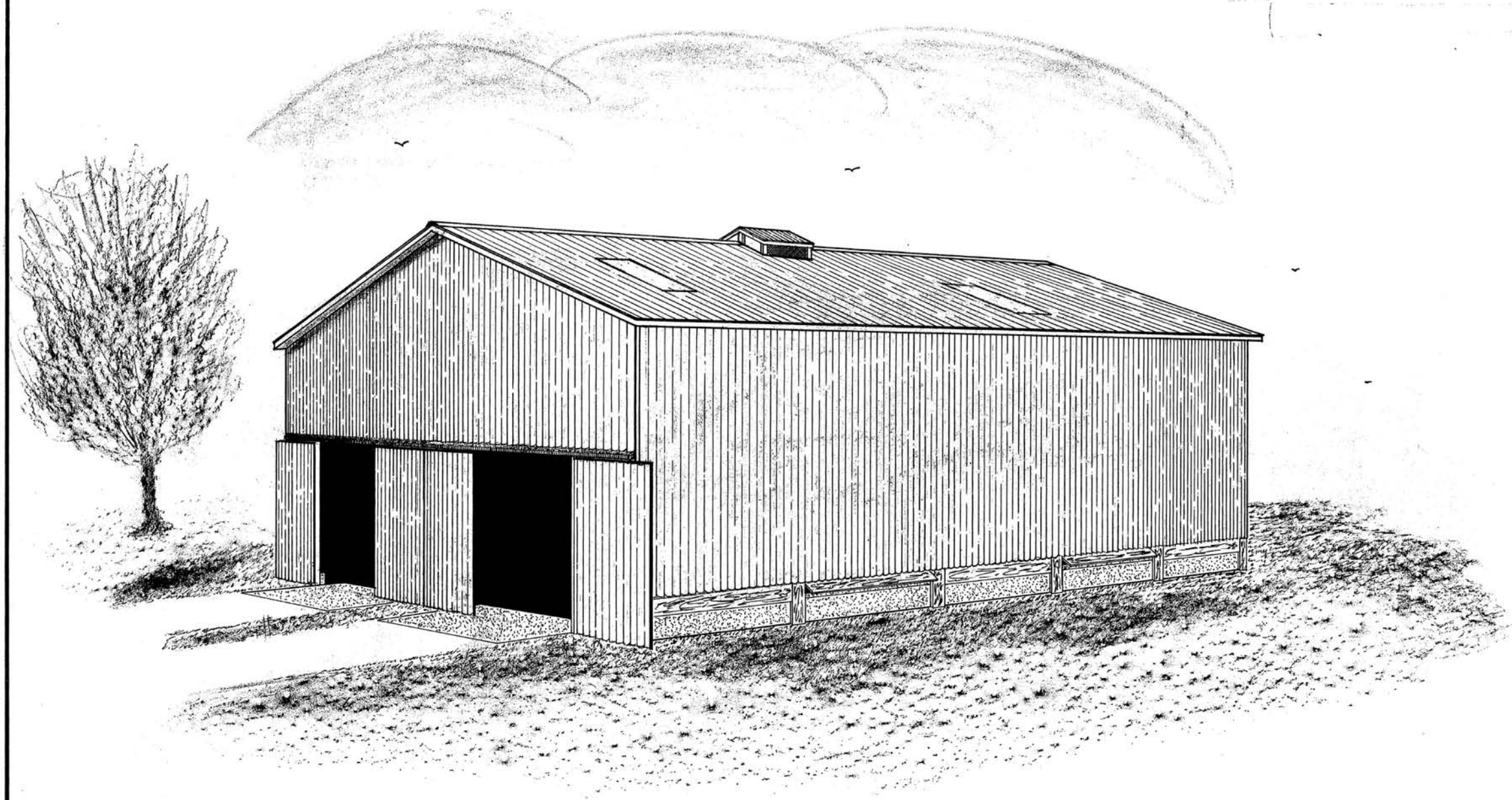

"THESE PLANS ARE FOR USE AS A CONSTRUCTION GUIDE. IF A CONSTRUCTION CONTRACT IS TO BE MADE, WRITTEN SPECIFICATIONS ARE NEEDED."

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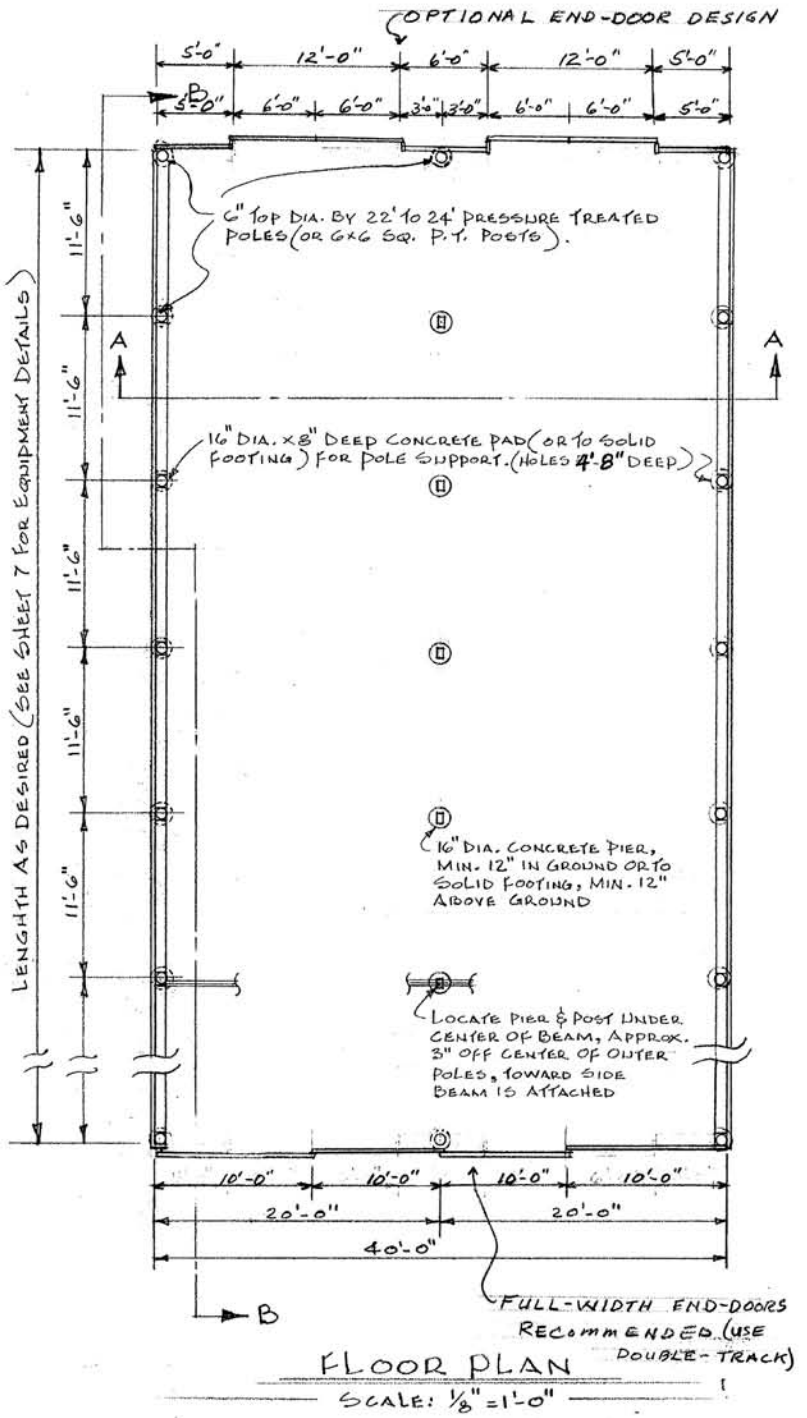
U.S. DEPARTMENT OF AGRICULTURE COOPERATING

POLE-FRAME CLEAR-SPAN BURLEY BARN
— WITH —
TWO-TIER FORCED-VENTILATION CURING
40' WIDE

Designed By: G.A.D.	Sheet 1 of 8
Checked By: J.N.W.	Plan Number:
Drawn By: B.E. BAGTER	KY. 11.735-33 A
Date: OCT. 1967	



FLOOR PLAN

SCALE: 1/8" = 1'-0"

NOTE 1: Unless barn floor and hole depth is uniform, use necessary 24 ft. poles to provide adequate length for leveling eave line.

NOTE 2: Barn design is based on using construction or standard grade Fir, No. 1 or 2 Sou. Yellow Pine, or equivalent, dressed kiln dried lumber having a maximum fiber stress = 1,500 psi. Use of lesser grade or quality lumber may reduce inherent safety factor but still may provide a sound, sturdy, long life structure. Good sound quality sawmill lumber is an acceptable substitute for all framing. If UTILITY grade dressed lumber is used, recommend culling of worst 2 x 6's from tier rails, 2 x 4's from purlin group, and 2 x 10 x 16's be carefully selected.

NOTE 3: Use of RING SHANK or SCREW SHANK nails is recommended for superior holding strength. Use 40d (5") nail for framing to P. T. Poles, use 12d (3-¼") for all dressed lumber framing or 16d (3½") for rough lumber framing.

BILL OF MATERIALS ESTIMATE
40' WIDE TWO-TIER FORCED-VENTILATION BURLEY BARN

ITEM (Quantity is for BOTH ENDS)	SIZE	QUANTITY/REMARKS	
ENDS:			
P.T. Poles	6" top x 22'	6 ea.	See Note 1
	4 x 4 x 6' (use at door facings, not req'd. for conc.)	8 ea.	
Curbing	2" x length and width to give 18" height + Gnd. depth, or use concrete	P. Trtd.	
Framing	1 x 6 x 12' - 8 ea. 2 x 6 x 10' - 18 ea.		See Note 2
	2 x 4 x 10' - 12 ea. 2 x 6 x 12' - [illegible] ea.		
	2 x 4 x 14' - 23 ea. 2 x 8 x 12' - [illegible] ea.		
	2 x 4 x 16' - 4 ea.		
Flashing	12" wide Galv. or Alum. metal	80 lin. ft. plus laps.	
Door Hardware	Single or double trk, heavy duty, w/hangers, bolts, and caps, per door design,	80 lin. ft.	
	Rollers & door hanger units, w/bolts, washers	16 ea.	
	Latches, guides, stay rollers as desired.		
BENTS (Quantity is for ea. bent, MULTIPLY BY NO. BENTS FOR BARN TOTAL)			
P.T. Poles	6" top x 22' (less 2 for total barn)	2 ea.	See Note 1
	4 x 4 x 6" (Not used w/concrete curbing)	2 ea.	
Curbing	2" x 12' x widths to give 18" height + Gnd. depth, or use concrete between poles.		
Framing	2 x 4 x 12' - 33 ea. 2 x 8 x 12' - [illegible] ea.		
	2 x 4 x 14' - 6 ea. 2 x 8 x 14' - 8 ea.		
	2 x 6 x 10' - 9 ea. 2 x 10 x 12' - 6 ea.		
	2 x 6 x 12' - [illegible] ea. 4 x 4 x 12' - 22 ea.		
	cut 2' scabs from 2 x 8 x 12' & T.R. blocks from 2 x 4 x 12'.		
Bolts	5/8" x 9", w/2 heavy duty washers	2 ea, plus 2 for end bent	
	5/8" x 12" 2/2 heavy duty washers	4 ea, plus 2 for end bent	
Vent door	1 x 12 x 12'	2 ea, (P. Trt. or paint)	
Hinges	4" strap, w/wood screws or stove volts	6 ea,	
Hooks	To fasten vent doors	6 ea.	
Trusses	40' span, kingpost design, rated 25 or 30 PSF for 6' spacing (or can use truss rated 30 psf @ 4' spacing & space a truss at each cupalo 6' ± and 2' ± to next truss).	2 per bent, plus 1 extra for total barn	
Roofing & Siding	Galv. or Alum., type & style as desired. Length & pcs. as req'd for vent door to roof height.		
Ridge Roll	Type to match roofing	12 lin. ft.	
Skylight panel	Type to match roofing	one panel per 1 or 2 bents	
DUCT MATERIAL			
Air duct liner	1/8" masonite or 1/4" plywood 2 x 4	As req'd.	See Sheet 7 & 8
Framework	2 x 4	As req'd.	
NAILS			
Roofing	1-3/4" Ring or screw shank, w/neoprene washer or lead under head	As Req'd. for roofing & siding.	
General	40d Ring or Screw Shank	14-16 lbs. per bent See Note 3	
	12d R.S. or S.S.	12 - 15 lbs. per bent, See Note 3	

GENERAL NOTES

1. This plan shows a pole-frame trussed-roof barn with two-tier housing and forced ventilation curing for stalk burley tobacco.

2. This housing and curing method has labor saving and improved curing control features with costs competitive with conventional barns.

3. Stick spacing of 5" to 7" is used, 5 or 6 plants per stick. Uniform stick and plant spacing during housing promotes good curing results.

4. Capacity per bent, 40' barn, 8750 pl/ac, 40" x 11' - 6" tier rails.

	Stk Spacing (Stks/rail)			
Pl/stk	7"(21)	6"(24)	5½"(26)	5"(29)
5	.29	.33	.36**	.40*
6	.35**	.40*	.43	X—

* Suggested spacing for typical 6' high burley yielding less than 3000 lbs. per acre.

** Suggested spacing for larger burley yielding above 3000 lbs. per acre. If tobacco not sufficient to completely fill barn, house sticks equally on all tier rails.

5. Operation and management guidelines available in separate pamphlet.

6. The tier rail framework may be removed in the future if desired to provide versatile clear-span structure for other uses.

OPTIONS TO BE SELECTED BY OWNER:

1. Concrete or pressure treated wood curbing.
2. With or without concrete apron under driveway doors.
3. Type of Galvanized Steel or Aluminum roofing and siding.
4. Number of skylight panels in roof (one per bent on alternate sides suggested.)
5. Type of door fastener hardware.
6. Natural or LP Gas heater operation.
7. With or without extra duct and air louvers for recirculation and artificial casing capabilities.

For further information on construction, operation, and management, contact an Area Extension Tobacco Specialist or the Agricultural Engineering Department, University of Kentucky

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POLE-FRAME CLEAR-SPAN BURLEY BARN WITH TWO-TIER FORCED-VENTILATION CURING
40' WIDE

Designed By: C.A.D.	Sheet 2 of 8
Checked By: J.N.W.	Plan Number:
Drawn By: R.E.P.	KY. 11. 7351-3BA
Date: Oct. 1967	

Rev. Jan. 1969
Rev. Apr. 18, 1974

NOTE: SEE SHEET 7 & 8 FOR MORE DETAILS ON AIR SYSTEM

FRESH AIR INTAKE HOUSING

ENDS COVERED WITH SIDING MATERIAL

WIRE SCREEN ½" MESH OR LARGER, OVER SIDE INTAKE AIR OPENINGS

3'-6" OR GREATER

1'-6"

EDGE OF METAL ROOF TURNED UP 1" TO REDUCE RAIN BLOWING OVER ROOFING EDGE

40' TRUSS, 5'-9" O.C. (RATED 25 OR 30 PSF LOAD @ 6' SPACING). IF TRUSSES ARE RATED FOR 4'-0" O.C. SPACING, MOVE A TRUSS AT EACH CUPALO TO 6' ± SPACING AND 2' ± FROM NEXT TRUSS.

2x4 PURLINS @ 7.4" O.C. (2x4 S4S for 4' TRUSS SPACING) 2x4 F.D. S2S for 6' TRUSS SPACING) (OR 2x6 S4S " " " ")

12 / 4

2x4 FRAMEWORK

⅛" MASONITE OR ¼" PLYWOOD LINER TO ROOF FOR AIR SEAL

WIDTH TO FIT FAN FRAME

½" PLYWOOD AIR-BAFFLE (SEE DETAILS, SH. 8)

BOTTOM EDGE OF PURLIN ALIGNED WITH OUTER EDGE OF NAILING GIRT & EXTEND SIDING TO ROOF FOR AIR SEAL

2x4

2x4 "X" BRACING

2"x6"x10' BRACE

LONGITUDINAL 2x4 CHORD BRACE

2x12x12' TRS. SPT. CUT FOR BUTT JOINT ON POLES

3'-4" | 3'-4" | 3'-4" | 3'-4" | 3'-4" | 3'-4"

4x4x12' TIER RAIL

2'-6"

TIER RAIL SUPPORTS

2x6"x5'-6" SCAB

2x4x6'-6" TIES

2x6x12" T.R. SUPPORT SCAB

SEE DETAIL "C"

5'-6"

2x4 FOR ADDED STICK & STANDING SUPPORT

2x6 NAILING GIRT & OUTER TIER RAIL

TIER RAIL SUPPORTS

NOTE: USE: 2-2"x10"x20' FULL DIM. OR 2-2x12"x20' S4S. SOUND QUALITY OAK OR SOU. PINE

2x8x2'-0" SCAB (SEE DETAIL "G" SHEET 5)

(4) 2x6 BUILT-UP POST (SEE DETAIL "D" SHEET 5)

2x6 NAILING GIRT

6" TOP DIAMETER PRESSURE TREATED POLE (OR 6"x6" SQUARE)

HEIGHT 9'-0" TO 10'-0" (OR MORE) AS DESIRED BY OWNER FOR OVERHEAD CLEARANCE (CONSIDER BOTH BEAM AND TOBACCO TIP CLEARANCE

9'-10'-0"

SIDING

2x6 NAILING GIRT

HEIGHT 12" MIN., MORE IF MANURE EXPECTED TO BUILD-UP FROM ANIMAL HOUSING

1x12 HINGED VENTILATOR DOOR (SEE SHEET 5) (11" OPENING MINIMUM)

CONCRETE CURB BET. POLES

GROUND LINE

1'-6"

1'-0" MIN. DEPTH

16" DIA. CONC. PAD - DEPTH TO FIRM SOIL (MIN. 12")

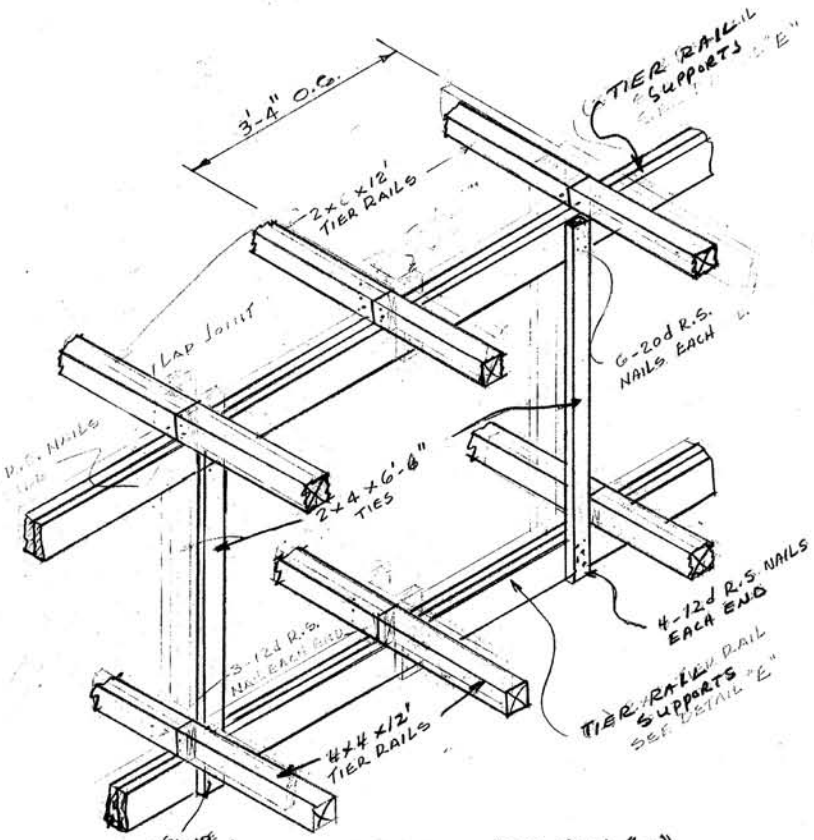
20'-0"

4'-8"

8"x16" DIA. CONC. PADS (OR DIAMETER OF HOLE)

SECTION A-A

SCALE: ½" = 1'-0"



DETAIL "C"

TIER RAIL SUPPORTS & TIER RAILS

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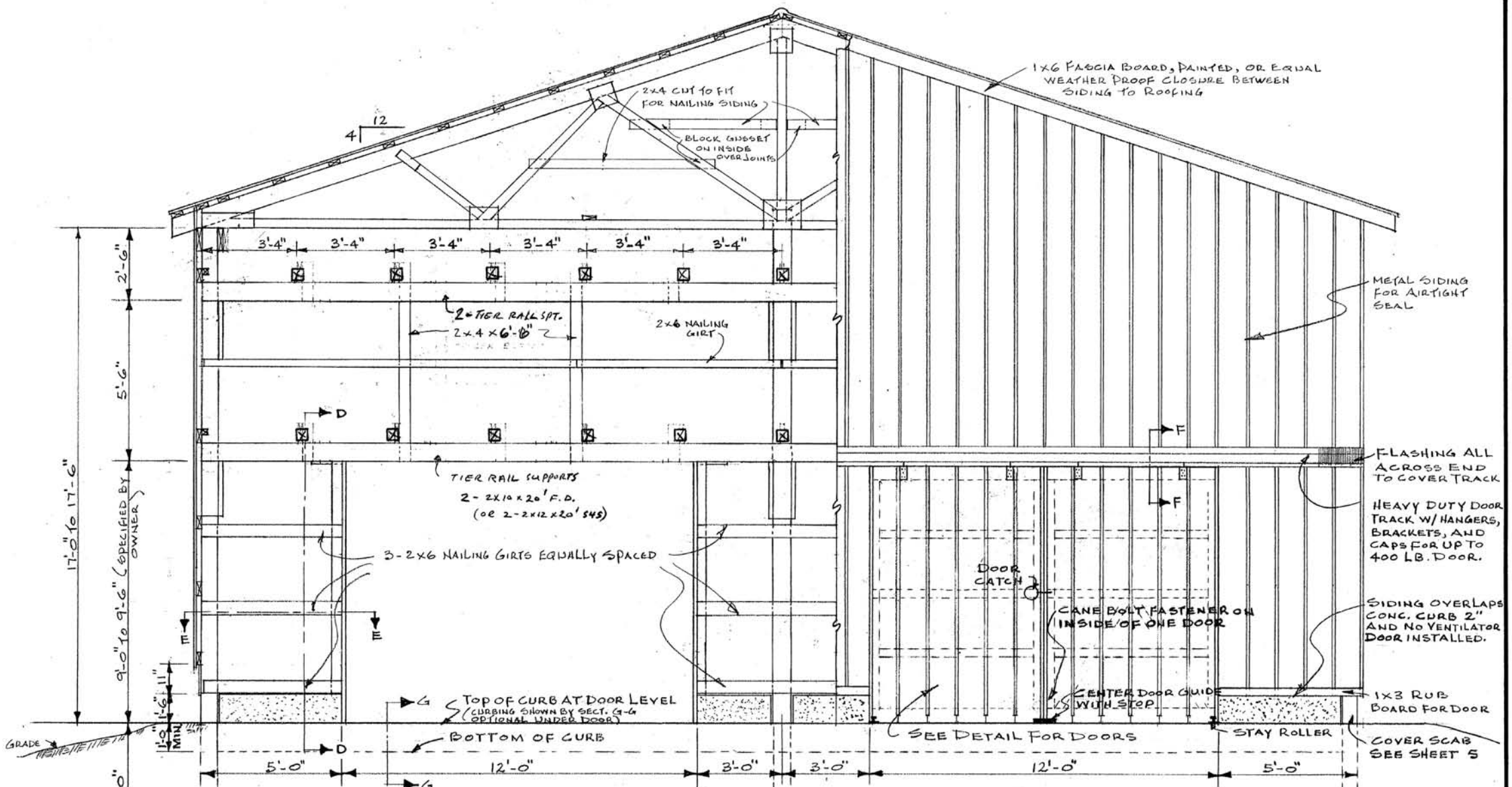
U.S. DEPARTMENT OF AGRICULTURE COOPERATING

POLE-FRAME CLEAR-SPAN BURLEY BARN
— WITH —
TWO-TIER FORCED-VENTILATION CURING
40' WIDE

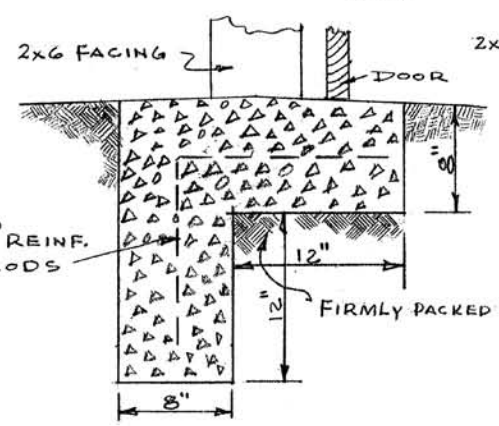
Designed By: G.A. DUNCAN	Sheet 3 of 8
Checked By:	Plan Number:
Drawn By: D.E. DASTER	KY. 11.735-33A
Date: MAY 1968	

REV. JAN. 1969 REV. APR 1984
REV APR, 1974

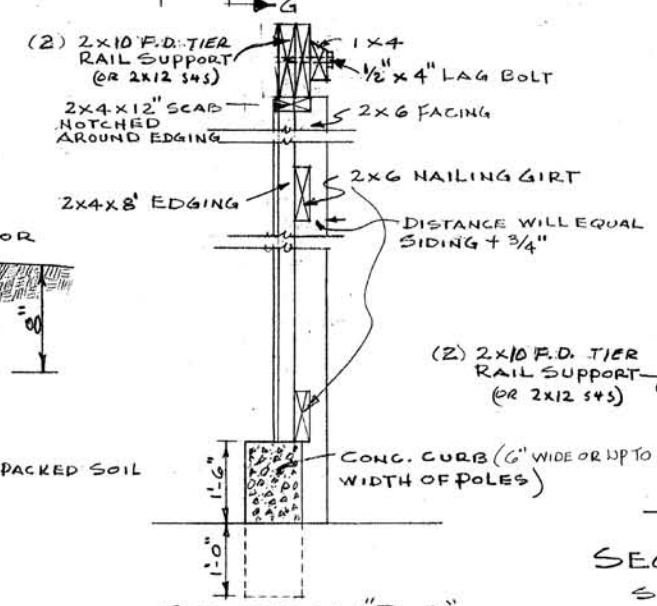


END ELEVATION
SCALE: 3/8" = 1'-0"

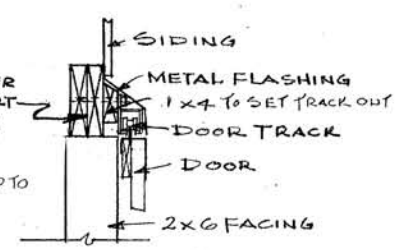
(SHOWING OPTIONAL 12' DRIVEWAY DOOR DESIGN, FULL WIDTH DOORS PER SH. 2 RECOMMENDED.)



SECTION "G-G"
SCALE: 1 1/2" = 1'-0"

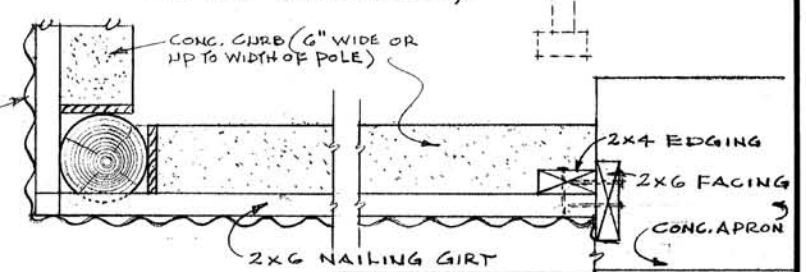


SECTION "D-D"
SCALE: 1" = 1'-0"



SECTION "F-F"
SCALE: 1" = 1'-0"

NOTE:
SEE SHEET 6 FOR DETAIL IF PRESSURE TREATED CURBING USED.



SECTION "E-E"
SCALE: 1 1/2" = 1'-0"

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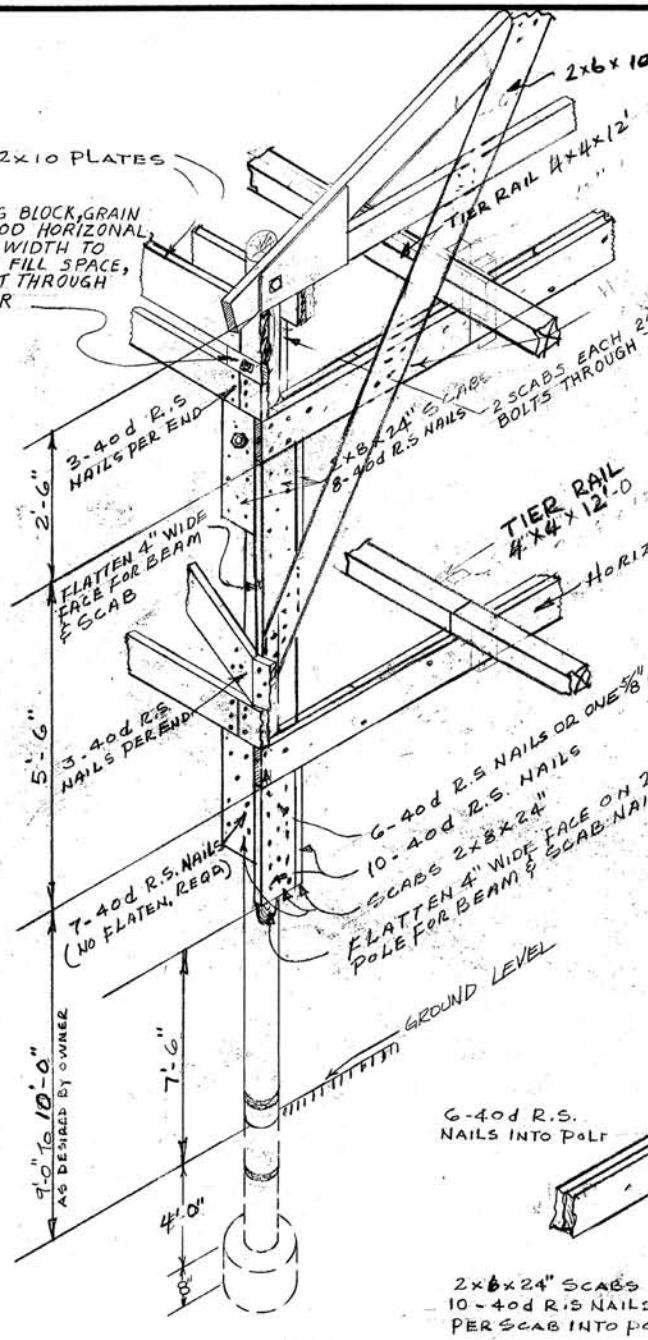
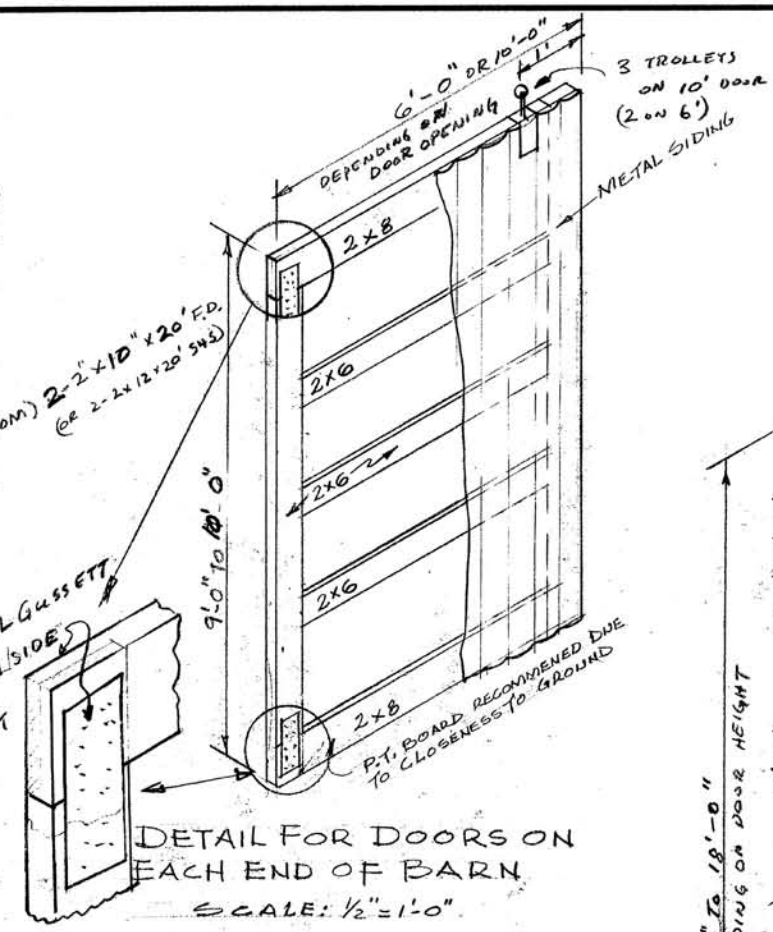
POLE-FRAME CLEAR-SPAN BURLEY BARN
— WITH —
TWO TIER FORCED-VENTILATION CURING
40' WIDE

Designed By: G.A. DUNCAN	Sheet 4 of 8
Checked By: J.N.W.	Plan Number:
Drawn By: DEP	KY. 11.735-33A
Date: OCT. 1967	

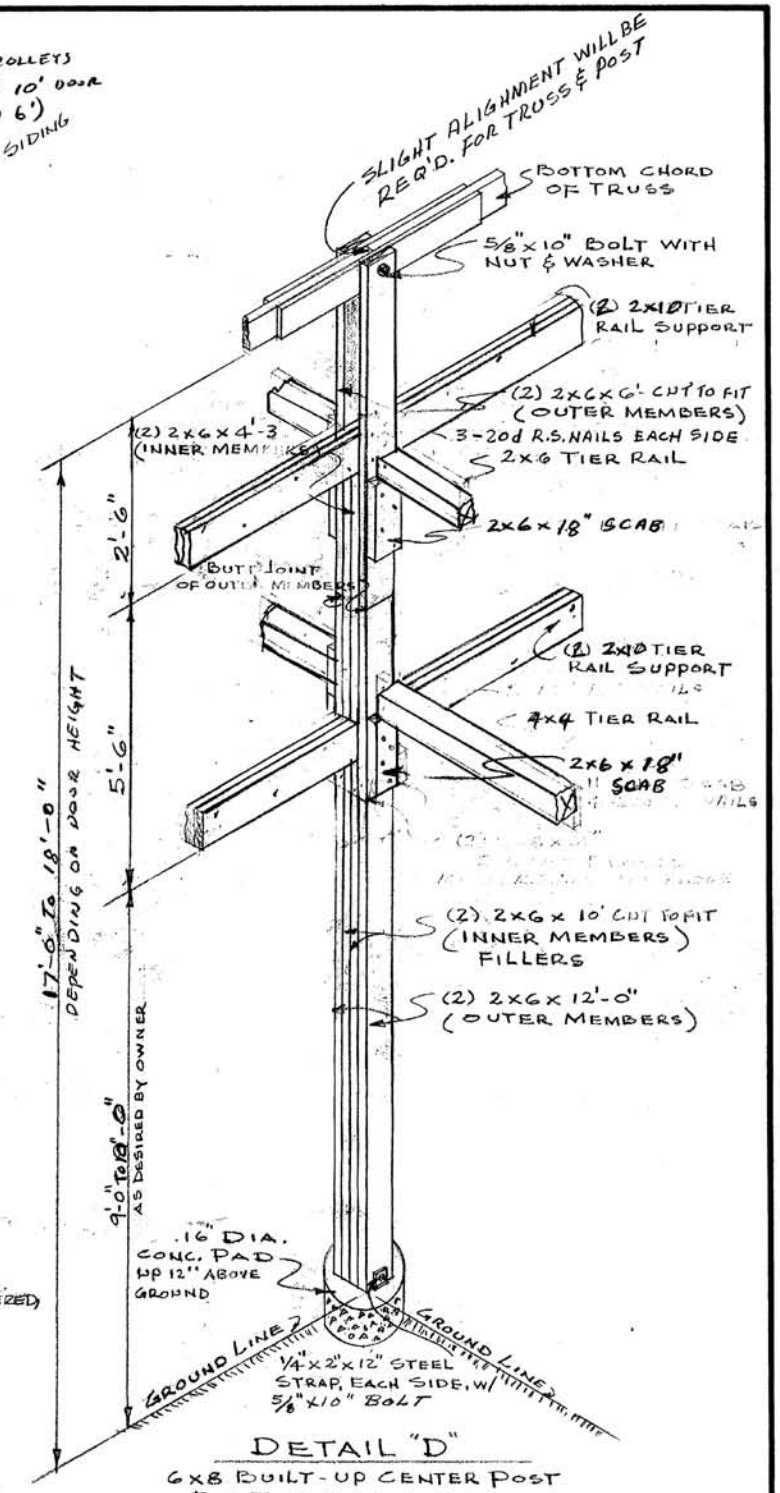
REV. JAN. 1969
REV. APR. '74



DETAIL "G"
ATTACHMENTS TO PRESSURE TREATED POLES IN OUTSIDE WALL

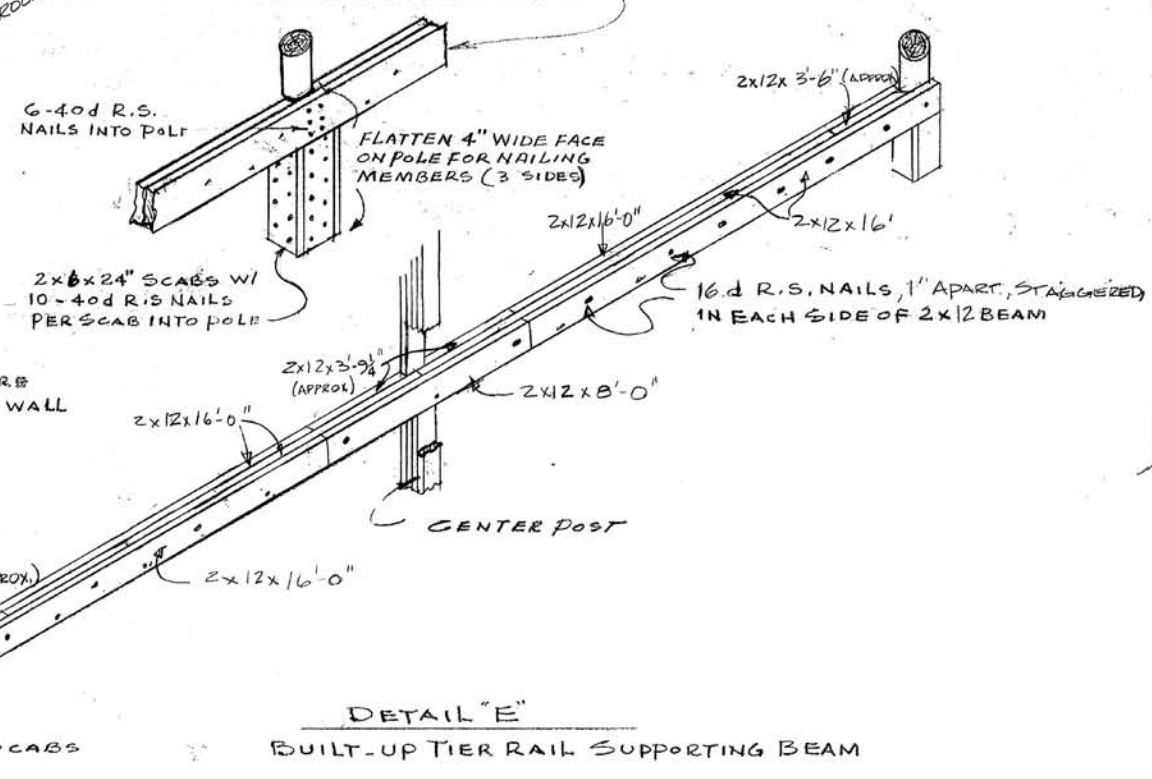


DETAIL FOR DOORS ON EACH END OF BARN
SCALE: 1/2" = 1'-0"



DETAIL "D"
6x8 BUILT-UP CENTER POST FOR TIER RAIL SUPPORT
SCALE: 1/2" = 1'-0"

NOTE: ATTACH BEAM TO CENTER END POLE AS SHOWN



DETAIL "E"
BUILT-UP TIER RAIL SUPPORTING BEAM

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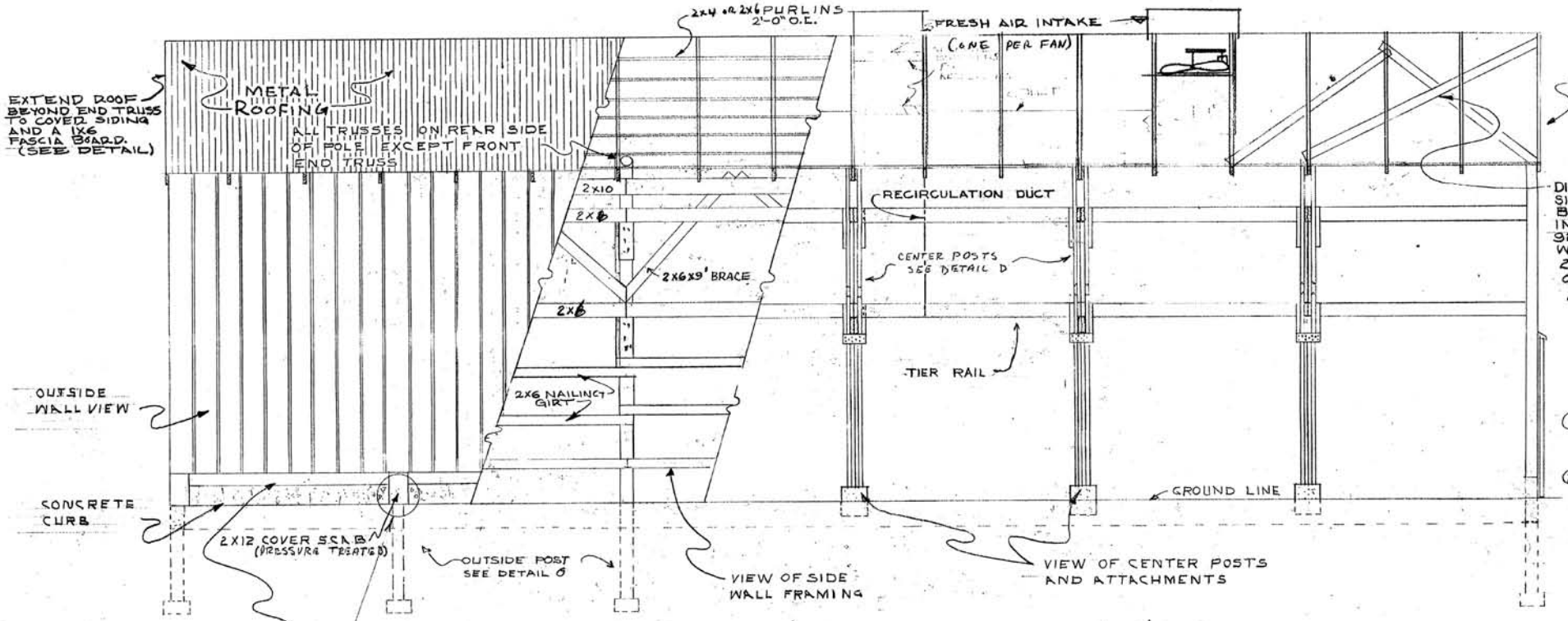
POLE-FRAME CLEAR-SPAN BURLEY BARN
—WITH—
TWO TIER FORCED VENTILATION CURING
40' WIDE

Designed By: G.A. DUNCAN	Sheet 5 of 8
Checked By:	Plan Number:
Drawn By: RANDY LASCH	KY. 11.735-33A
Date MAR. 1968	

REV. JAN. 1969



NOTES ON TRUSS BRACING

DIAGONAL BRACE ON UNDERNEATH SIDE OF TRUSS TOP CHORD (ON BOTH ROOF SIDES, BOTH ENDS, AND IN MIDDLE BENTS IF BARN IS OVER 92' LONG. USE "X" BRACING ON CENTER WEB OF TRUSS OTHER THAN AT DUCTS. USE 2-2x4's FULL LENGTH OF BARN ON TOP OF BOTTOM CHORD, EQUALLY SPACED ACROSS WIDTH.

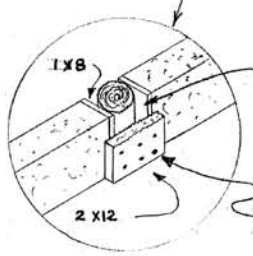
NOTES ON P.T. CURBING:

1. P.T. CURBING CUT FOR BUTT JOINT CENTERED ON OUTSIDE OF EACH POLE. USE INSIDE WALL AGAINST MANURE.
2. UNLESS BARN EXTERIOR IS WELL DRAINED, P.T. CURBING OR SUITABLE WATER BARRIER SHOULD BE EXTENDED 6"-10" DEEP TO PREVENT SURFACE WATER SEEPAGE INTO BARN AND CAUSE WET FLOOR.

SECTION B-B

SCALE 1" = 5'-0"

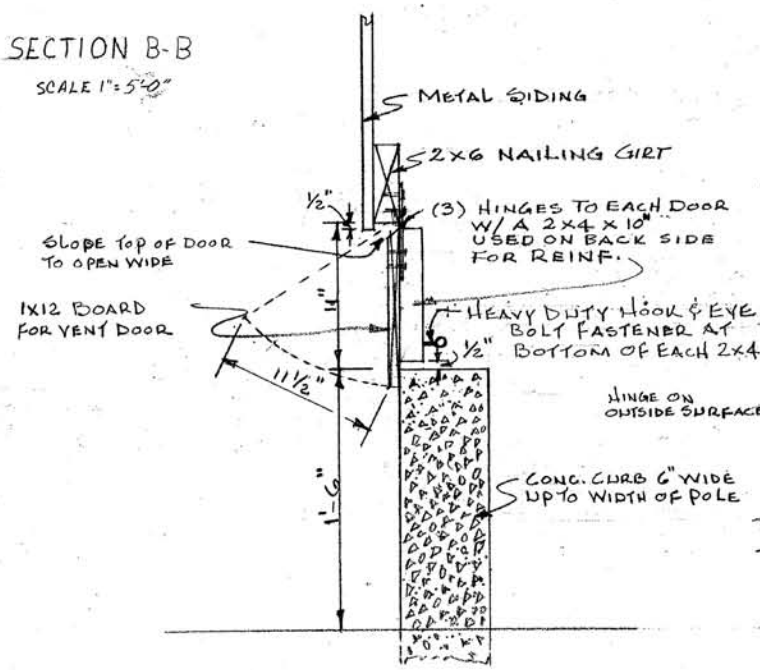
VENTILATOR DOOR FITS FREELY BETWEEN COVER SCABS & HINGES OUTWARDLY (SEE DETAIL ON THIS SHEET)



1x8 PRESSURE TREATED BOARD AT END OF CURB. DO NOT REMOVE WITH FORMING. ALTERNATE: ALLOW CONCRETE TO GO AGAINST POLE.

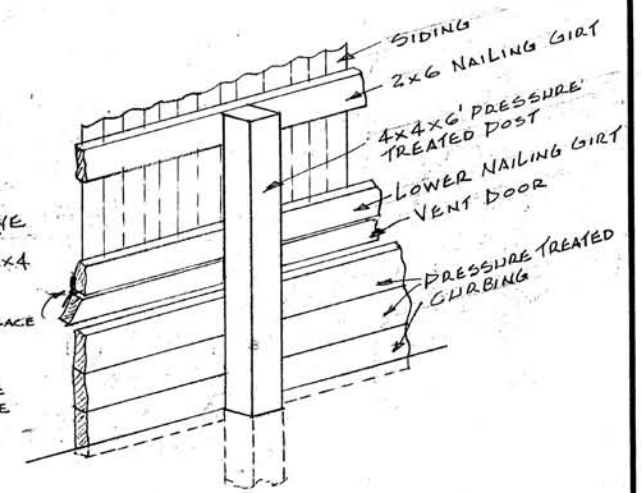
COVER SCAB (PRESSURE TREATED) EXTENDS FROM 6" BELOW GROUND LEVEL UP UNDER SIDING TO LOWER NAILING GIRT ON OUTSIDE OF ALL POLES AND FLUSH WITH TOP OF CURBING ON INSIDE OF ALL POLES

SCALE ½" = 1'



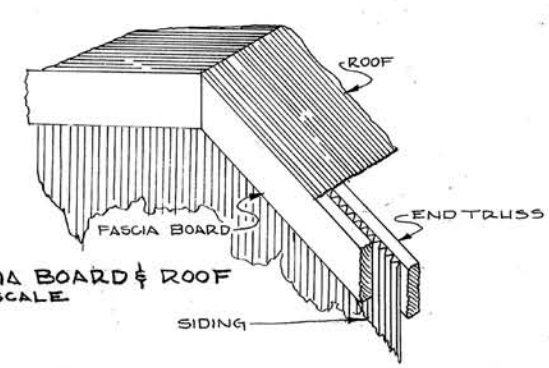
DETAIL OF VENTILATOR DOOR

SCALE: 1½" = 1'-0"



MIDSPAN DETAIL IF PRESSURE TREATED CURBING IS USED

SCALE ½" = 1'-0"



DETAIL OF FASCIA BOARD & ROOF

NO SCALE

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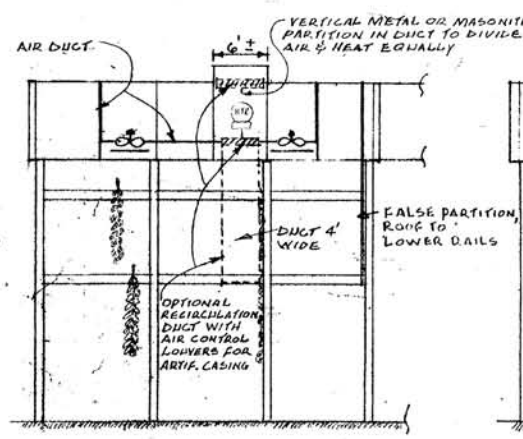
POLE-FRAME CLEAR SPAN BURLEY BARN
—WITH—
TWO TIER FORCED VENTILATION CURING
40' WIDE

Designed By: GA DUNCAN	Sheet 6 of 8
Checked By:	Plan Number:
Drawn By: RW LOSCH	KY. 11.735-33A
Date: MAR. 1968	

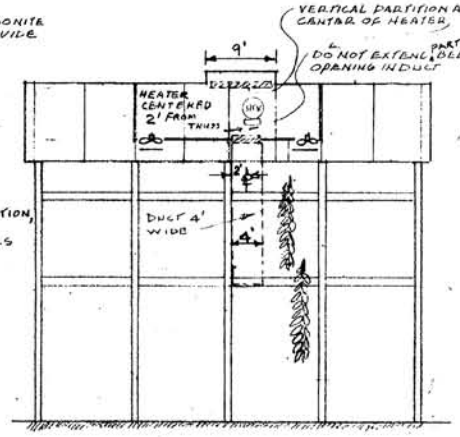
REV. JAN. 1960

NOTE:
FOR BARN LESS THAN 4 BENTS LONG, USE 32' WIDE PLAN

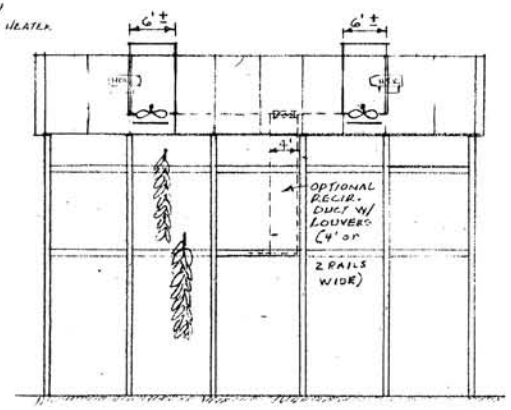
NOTE:
SEE SHEET 8 FOR TYPICAL INSTALLATION DETAILS



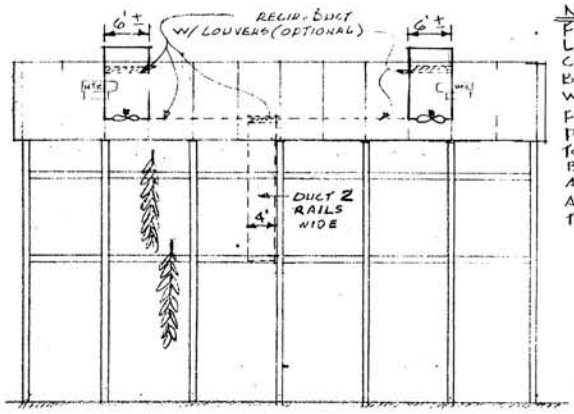
3 BENTS - 34'-6" LONG



4 BENTS - 46' LONG



5 BENTS - 57'-6" LONG



6 BENTS - 69' LONG

(NOTE CHANGE IN HEATER INSTALLATION FOR THESE TWO SIZES)

NOTE:
FOR 7 BENTS OR LONGER, USE COMBINATION OF TWO BENT ARRANGEMENTS WITH PLASTIC, PLYWOOD, FIBERBOARD, ETC, PARTITION FROM ROOF TO LOWER TIER RAIL BEAM TO SEPARATE AIR SYSTEMS, HOUSE AND MANAGE AS TWO SEPARATE UNITS.

[redacted]

EQUIPMENT ARRANGEMENTS & SIZES

NOTE: EQUIP. SIZES BELOW ARE SMALLEST SIZE RECOMMENDED

ITEM	3 BENTS 32' WIDTH	3 BENTS 40' WIDTH	4 BENTS 32' WIDTH	4 BENTS 40' WIDTH	5 BENTS 32' WIDTH	5 BENTS 40' WIDTH	6 BENTS 32' WIDTH	6 BENTS 40' WIDTH
CUPALO AIR INTAKE OPENING	6'LONG x 1'-6" HIGH x 4' WIDE	$6'_L$ x $1'-6''_H$ x $4'_W$	$9'_L$ x $1'-6''_H$ x $4'_W$	$9'_L$ x $1'-6''_H$ x $4'_W$	$6'_L$ x $1'-6''_H$ x $4'_W$ OR $5'_W$ - 2 REQ'D.	$6'_L$ x $1'-6''_H$ x $5'_W$ - 2 REQ'D.	$6'_L$ x $1'-6''_H$ x $5'_W$ - 2 REQ'D.	NOT RECOMMENDED
FAN (CFM @ 0.1" S.P.)	8,500 CFM - 2 REQ'D.	10,500 CFM - 2 REQ'D.	11,500 CFM - 2 REQ'D.	14,500 CFM - 2 REQ'D.	14,000 CFM - 2 REQ'D.	17,500 CFM EA. - 2 REQ'D.	17,500 CFM EA. - 2 REQ'D.	
HEATER *	150,000 BTU/HR	200,000 BTU/HR	200,000 BTU/HR	250,000 BTU/HR	125,000 BTU/hr - 2 REQ'D.	150,000 BTU/hr - 2 REQ'D.	150,000 BTU/hr - 2 REQ'D.	
TOP SHUTTER (OPTIONAL)	64" W x 44" H	SAME AS 32'	1 EA. 64" W x 44" H & 44" W x 32" H	SAME AS 32'	2 EA. - 64" W x 44" H OR 64" x 56"	2 EA. - 60" W x 52" H	2 EA. - 60" W x 52" H	
BOTTOM SHUTTER (OPTIONAL)	44" W x 44" H	SAME AS 32'	44" W x 44" H	SAME AS 32'	1 EA. - 44" x 44" OR 56" W x 44" H	1 EA. - 56" W x 44" H	1 EA. - 56" W x 44" H	
					IF 48" FANS REQ'D., USE NOTE →	NOTE: MAKE CUPALO, FAN ENCLOSURE & RECIRCULATION DUCT 5' WIDE FOR THESE SIZES		

* UNIT-HEATER INPUT RATING ACCEPTABLE SINCE UNIT NOT VENTED TO OUTSIDE UNLESS OTHER REGULATIONS SO REQUIRE.

EQUIPMENT SPECIFICATIONS

FANS
- Rating certified by AMCA Standard Test Code, or equal.
- Heavy-duty all-welded frame.
- Cast (ALUM.) propeller, or air-foil formed (STEEL) blades welded to hub.
- Sealed, permanently lubricated ball bearings on belt-drive models.
- For horizontal operation (thrust bearings). TO DIRECT AIR DOWNWARD WITH MOTOR MOUNTED ON TOP.

MOTOR
- 115V or 230V, 60 cycle AC, 1 phase.
- Capacitor type, totally enclosed, ball bearings, continuous duty rating.

HEATER
- Gas unit-heater type with aluminized steel heat exchanger seam or arc welded, or equal.
- American Gas Association lab approved.
- Integral fan motor to be 115V, 60 cycle AC, 1 phase, single speed, totally enclosed with built-in thermal overload protection.
- Pilot light or electric ignition with 100% safety shut-off on main & pilot burner gas.
- Manual shut-off valve, pressure regulator, gas valve for 115V or 24V operation (115/24V transformer included if used).
- Unit for NATURAL or LPG operation as specified by purchaser.

AIR CONTROL LOUVERS (optional for recirculation)
- Steel frame, aluminum or steel blades.
- All blades tie-rod connected.
- Manually operated.

HUMIDISTAT
- 20 to 80% or higher range, SPDT, 115V, 4 amp or higher contact rating, rated for agricultural duty and use. (Honeywell H404A-1003, or equal)

SAFETY SWITCH BOX*
- Two pole, 30 amp size, pull switch.

MOTOR STARTING RELAY*
- Two pole, 115V coil, contacts rated for total motor HP, general purpose enclosure.

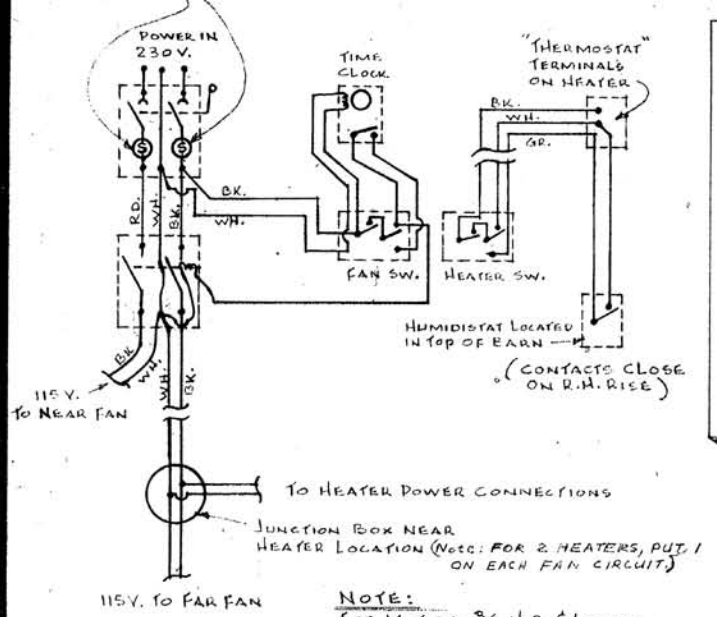
TIME CLOCK*
- 24-hour cycle, 1 hour ON-OFF settings, SPST, 115V, 5 amp or higher contact rating, with general purpose enclosure. (Paragon 4003 or equal)

TOGGLE SWITCHES*
- 2 each SPST, 2 each SPDT (3-way), 115V, 5 amp or higher, household type with box and cover plate.

WIRING
- Romex or heavy-duty plastic covered with grounding wire, sizes as shown, length as req'd.

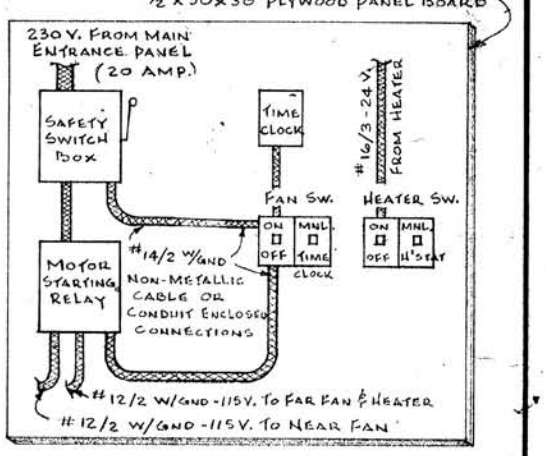
*NOTE: A complete pre-wired control box may be commercially available in 1969.

ELECTRICAL CONTROLS & WIRING



NOTE:
FOR MOTORS 3/4 H.P. & LARGER, MODIFY CIRCUIT FOR 230V. TO EACH FAN WITH INDIVIDUAL MOTOR PROTECTION & 115V. TO HEATER

WIRING DIAGRAM



CONTROL PANEL LAYOUT

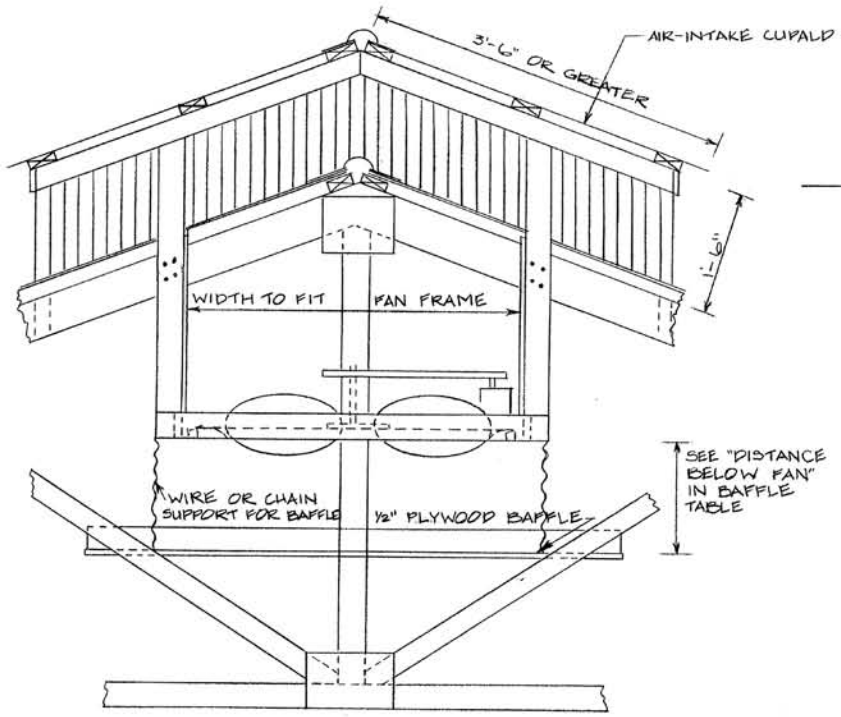
COOPERATIVE EXTENSION WORK IN
AGRICULTURE AND HOME ECONOMICS
DEPARTMENT OF AGRICULTURAL ENGINEERING
COLLEGE OF AGRICULTURE
UNIVERSITY OF KENTUCKY &
U.S. DEPARTMENT OF AGRICULTURE COOPERATING

POLE-FRAME CLEAR-SPAN BURLEY BARN WITH TWO-TIER FORCED-VENTILATION CURING 32' & 40' WIDE

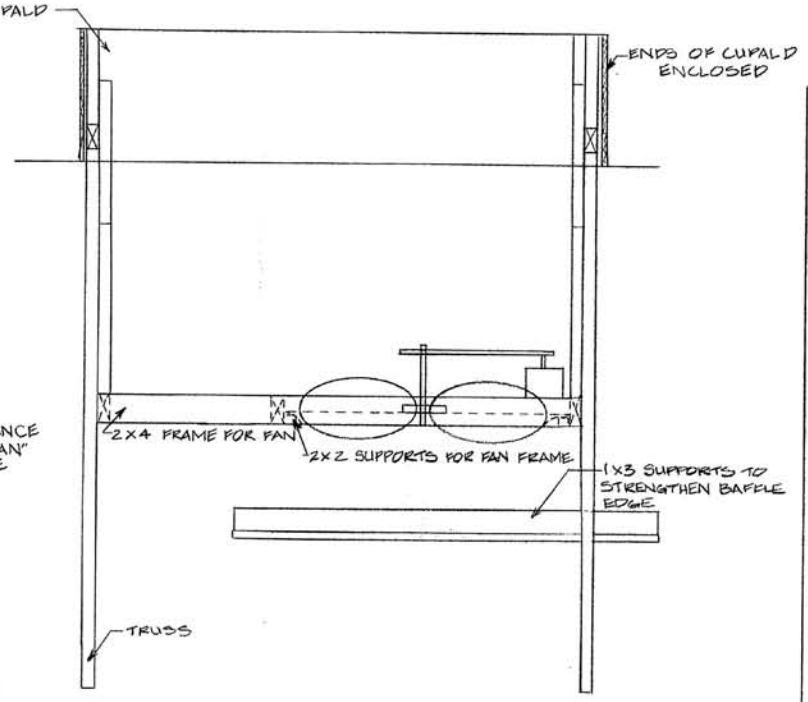
Designed By: G.A. DUNCAN	Sheet 7 of 8
Checked By:	Plan Number:
Drawn By: D.E. DASTER	KY. 11.735-33A
Date: MAY, 1968	

REV. FEB 69, 74

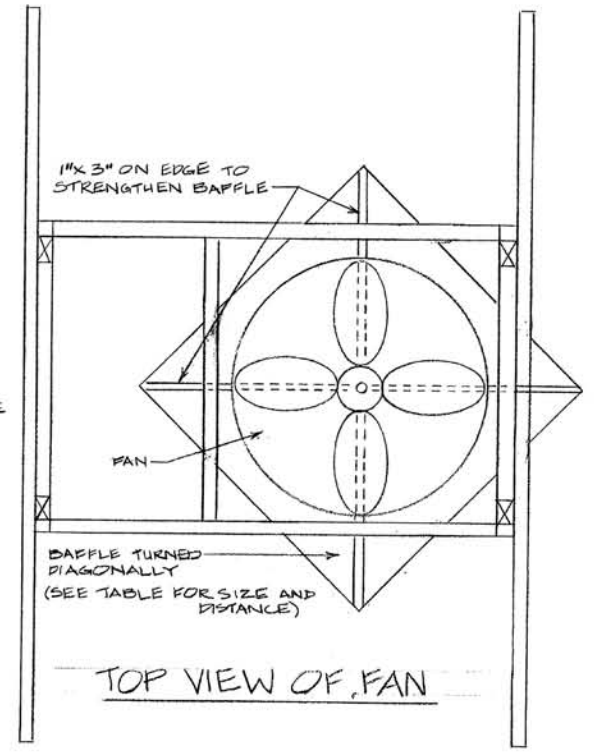
REVIEWED 1974



END VIEW OF FAN INSTALLATION



SIDE VIEW OF FAN



TOP VIEW OF FAN

BAFFLE SIZE & SPACING

FAN DIA	BAFFLE SIZE	DISTANCE BELOW FAN
36"	48" x 48"	16"
42"	60" x 60"	20"
48"	72" x 72"	22"-24"

POLE-FRAMING CLEAR-SPAN BURLEY-BARN USING TWO-TIER HOUSING & FORCED-AIR CURING 40' WIDE

COOPERATIVE EXTENSION SERVICE
AGRICULTURE AND HOME ECONOMICS
DEPARTMENT OF AGRICULTURAL ENGINEERING
COLLEGE OF AGRICULTURE
UNIVERSITY OF KENTUCKY
AND
U.S. DEPARTMENT OF AGRICULTURE COOPERATING

DESIGNED BY: G. A. DUNCAN
CHECKED BY:
DRAWN BY:
DATE: 4-84
REVISIONS: 6-85

SHEET 8 OF 8

PLAN NUMBER
KY. II. 735-33A