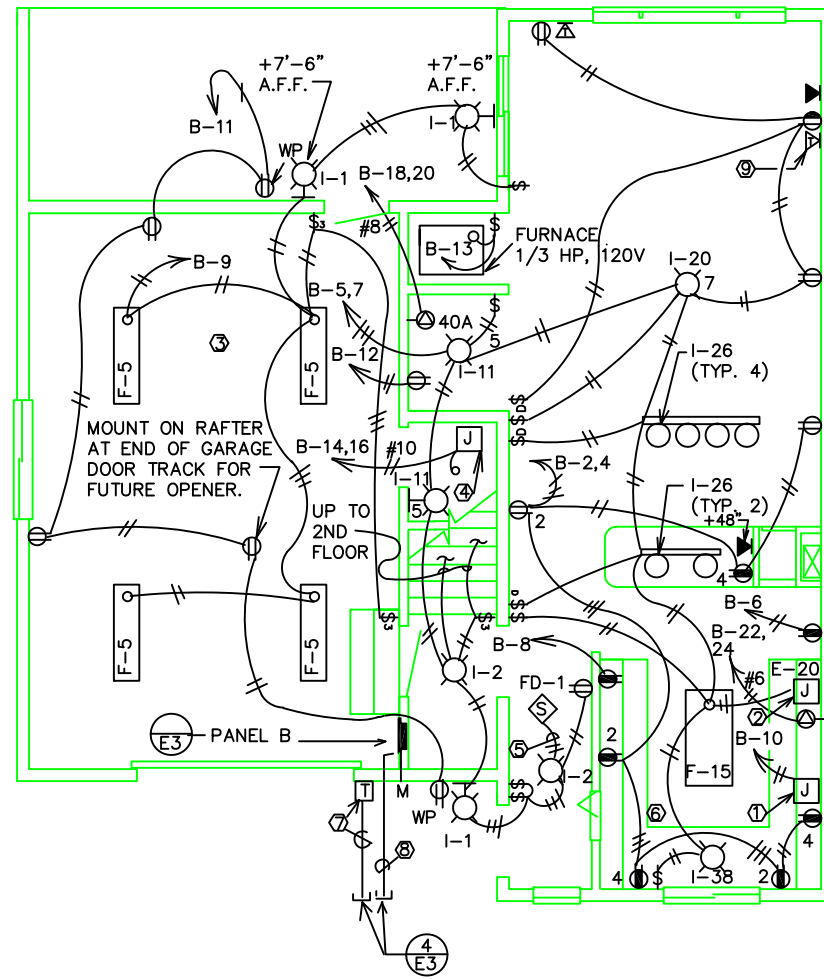


UPPER FLOOR  
SCALE: 1/8" = 1'-0"



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

DUPLEX

PANEL 'A'		LOCATION	GARAGE	TYPE	LOADCENTER
200	AMP	120/240	VOLT	1	PHASE
				3	WIRE

CIR NO	BKR	A.	P.	FDG AWG	DESCRIPTION	LOAD	
						A	B
1	20	1	12		BEDROOM LTS./PLUGS	1380	
3	20	1	12		BATHROOM LTS./PLUGS/FAN		700
5	20	1	12		MAIN FLOOR LTS./PLUGS	660	
7	20	1	12		MAIN FLOOR LTS./PLUGS		1662
9	20	1	12		GARAGE LTS./OUTDOOR LTS.	544	
11	20	1	12		GARAGE/EXTERIOR PLUGS		900
13	20	1	12		FURNACE	864	
15					SPACE		
17					SPACE		
19					SPACE		
21					SPACE		
23					SPACE		
25							
27							
29							
31							
33							
35							
37							
39							
41	20	1	12		KITCHEN PLUGS	1500	
4	20	1	12		KITCHEN PLUGS		1500
6	20	1	12		KITCHEN PLUGS	1500	
8	20	1	12		KITCHEN PLUGS		1450
10	20	1	12		KITCHEN PLUGS	1200	
12	20	1	12		WASHER PLUG		512
14	30	2	12		WATER HEATER	2250	
16					WATER HEATER		2250
18	40	2	8		DRYER PLUG	2500	
20					DRYER PLUG		2500
22	50	2	6		RANGE PLUG	2600	
24					RANGE PLUG		2600
26							
28							
30							
32							
34							
36							
38							
40							
42							
MAIN BRKR 150A						TOTAL VA	14,998/14,074
TOTAL KVA 29.1						TOTAL AMPS	125.0 117.3
BOTTOM <input type="checkbox"/> SURFACE <input type="checkbox"/> S.NEUT <input checked="" type="checkbox"/> FEEDER 2" C., 3# 3CU.							
TOP <input checked="" type="checkbox"/> FLUSH <input checked="" type="checkbox"/> I.G.BUSS <input type="checkbox"/> AIC SYM. 10,000							

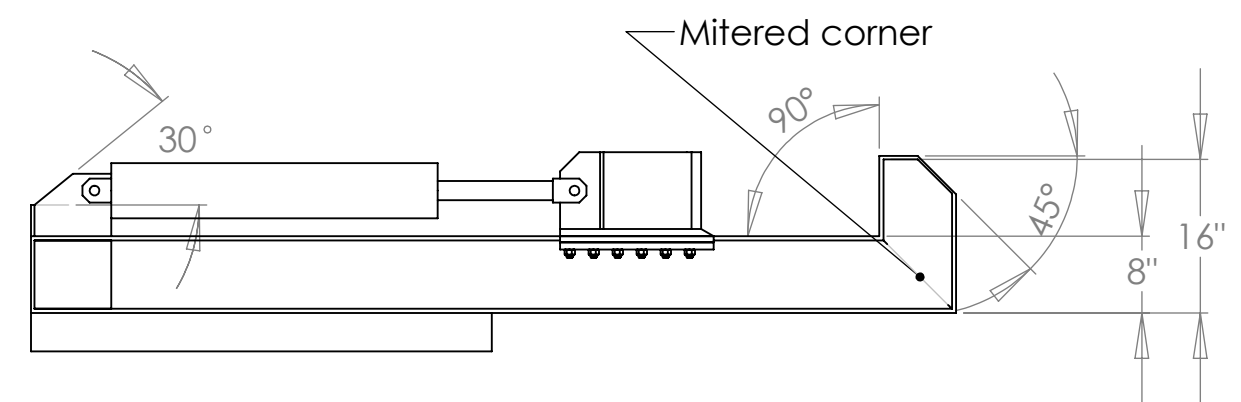
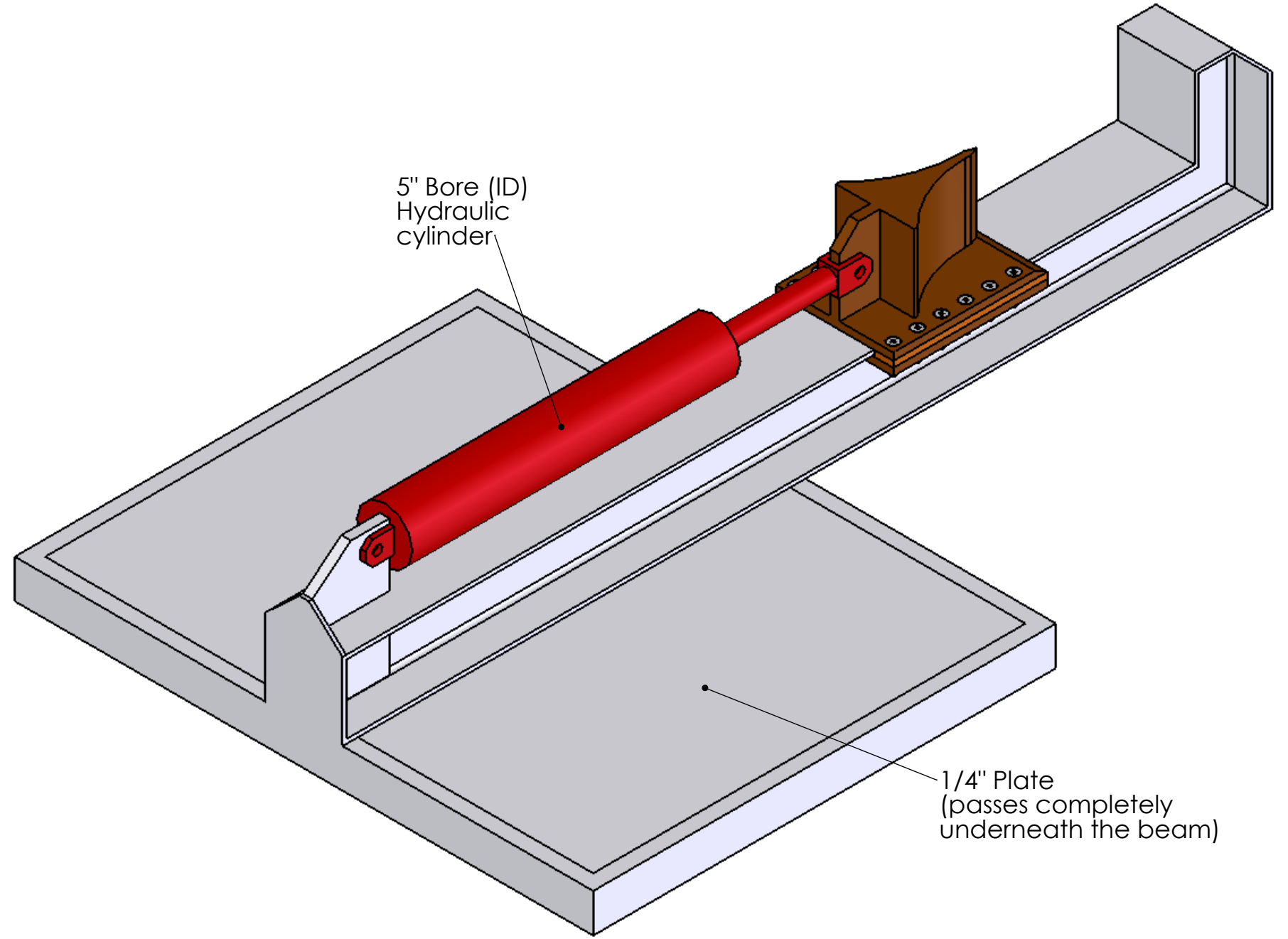
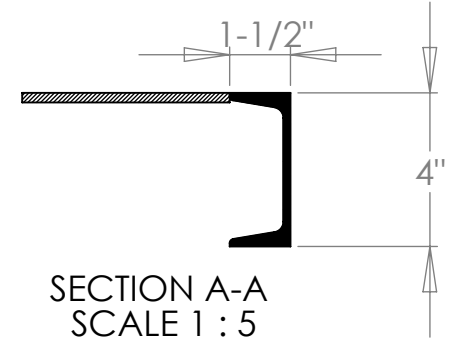
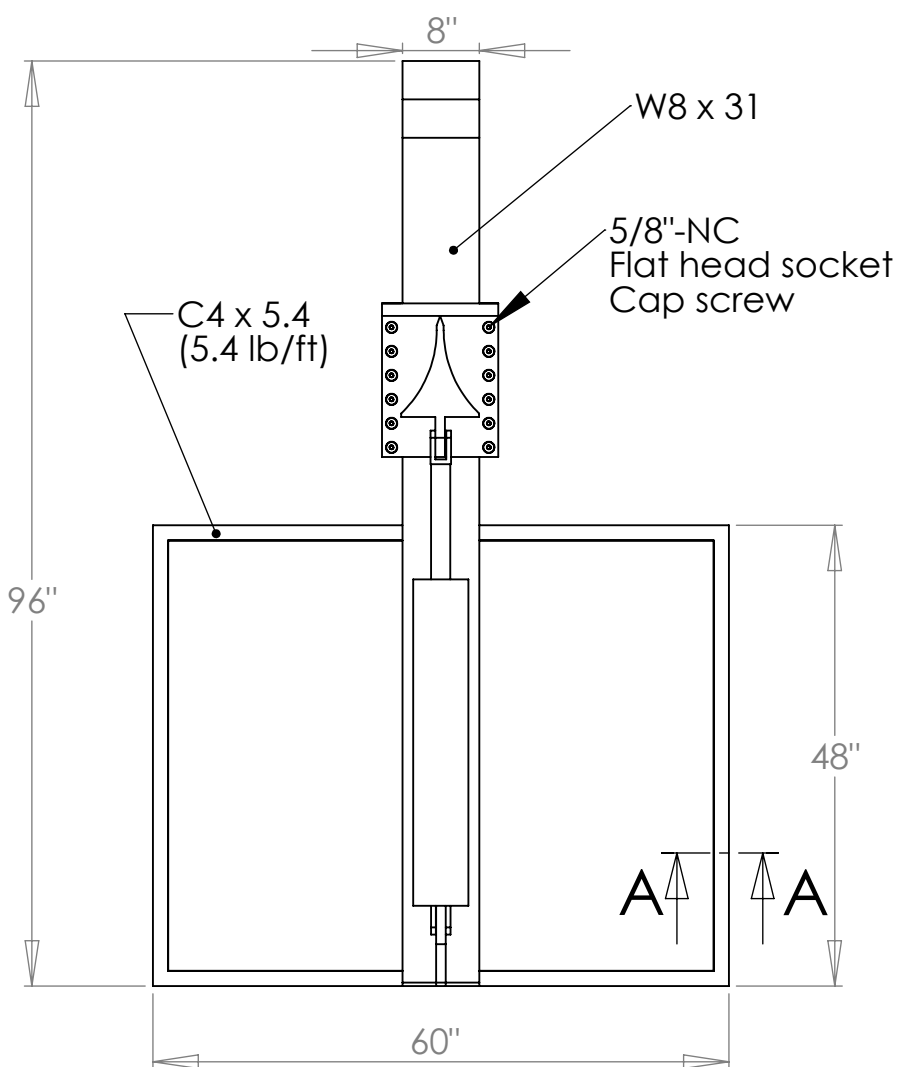
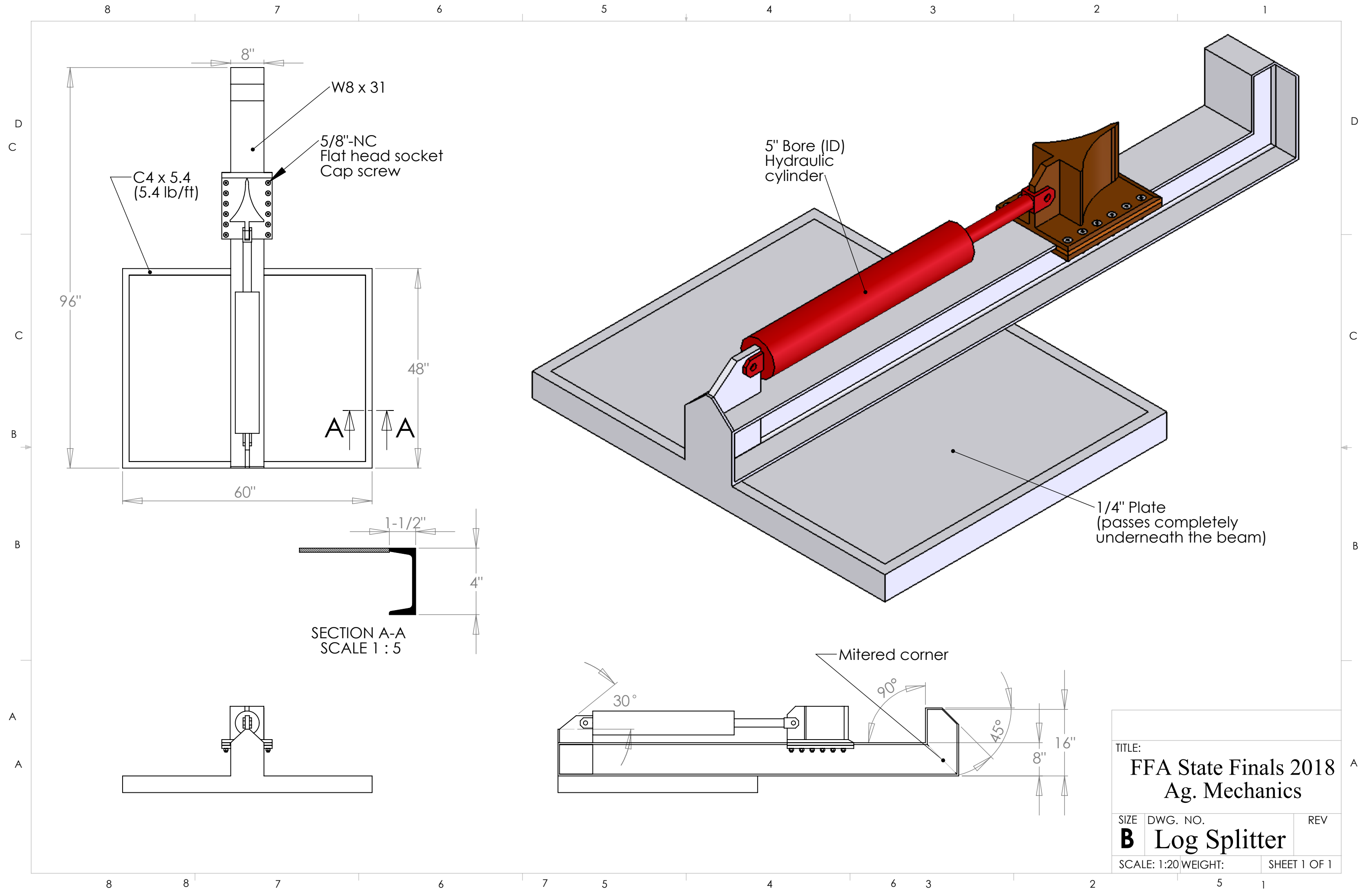
\* GROUND FAULT INTERRUPTER BREAKER

SYMBOL LIST

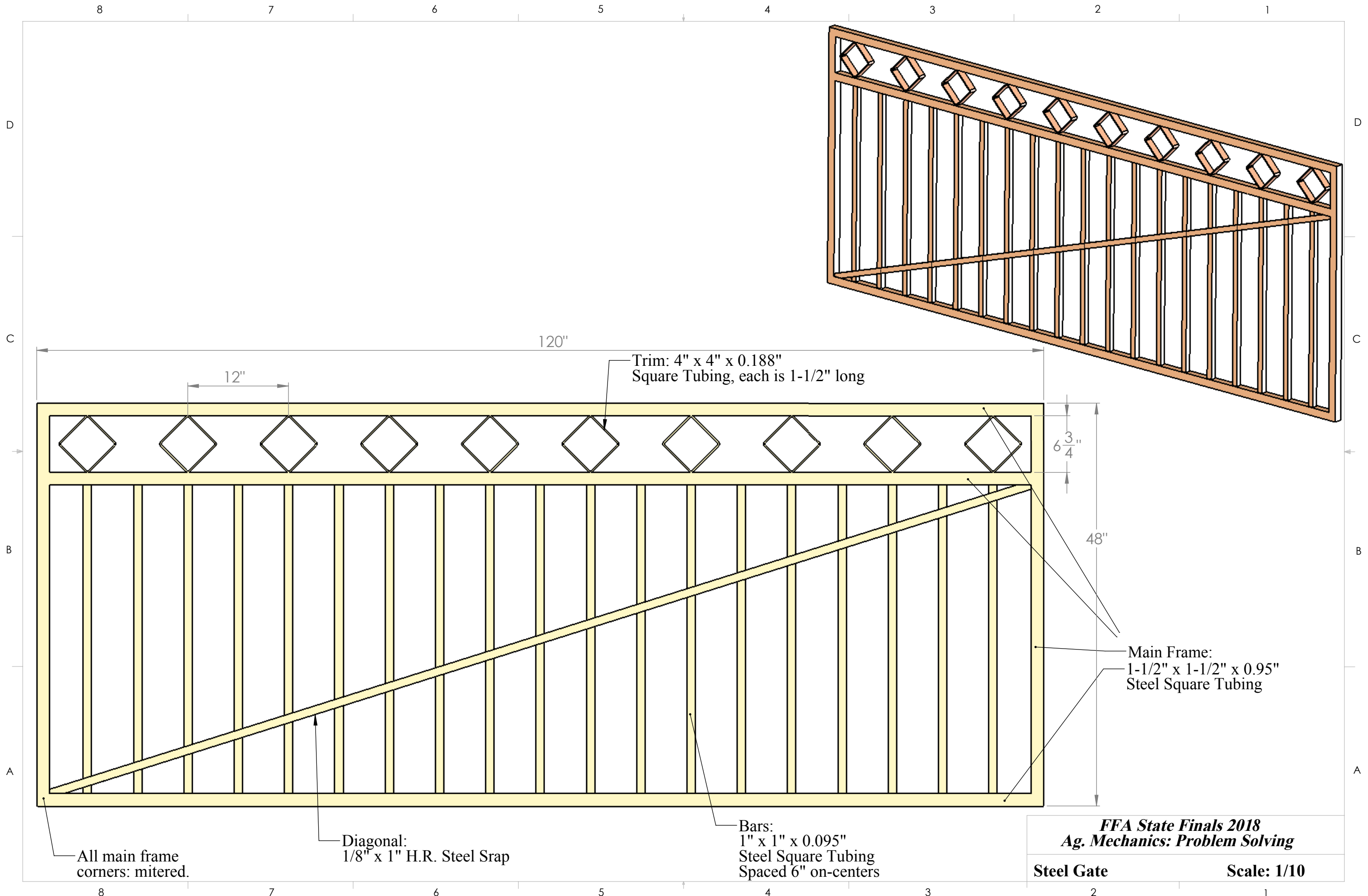
- FLUORESCENT FIXTURE
- INCANDESCENT FIXTURE, CEILING MOUNTED
- INCANDESCENT FIXTURE, WALL MOUNTED
- INCANDESCENT FIXTURE, TRACK MOUNTED
- DUPLEX RECEPTACLE
- DUPLEX RECEPTACLE MOUNTED ABOVE COUNTER, +48" U.O.N.
- DUPLEX RECEPTACLE, SPLIT WIRED
- SIMPLEX SPECIAL PURPOSE OUTLET
- TELEPHONE OUTLET, WALL MOUNTED
- TELEVISION OUTLET, WALL MOUNTED
- WALL SWITCH - ONE WAY
- WALL SWITCH - THREE WAY
- DIMMER SWITCH, 600 WATT
- SMOKE DETECTOR
- INFRA-RED RADIANT HEATER AND VENT FAN
- JUNCTION BOX
- DISCONNECT SWITCH
- EQUIPMENT CONNECTION
- WP WEATHERPROOF
- GFI GROUND FAULT INTERRUPTER
- U.O.N. UNLESS OTHERWISE NOTED
- METER AND BASE
- ELECTRICAL PANEL

NOTES:

- ① CONNECTION POINT FOR UNDERCOUNTER DISHWASHER. CONNECT TO EQUIPMENT PROVIDED BY OTHERS.
- ② CONNECTION POINT FOR HOOD LIGHT AND FAN. PROVIDE EQUIPMENT TYPE E-20 (SEE SPECS.) AND ALL CONNECTIONS REQUIRED.
- ③ FIXTURES IN THIS AREA ONLY TO BE PROVIDED WITH ZERO (0) DEGREE COLD WEATHER BALLASTS.
- ④ CONNECTION POINT FOR WATER HEATER.
- ⑤ CONNECT TO UNSWITCHED LEG.
- ⑥ ALL KITCHEN RECEPTACLES TO BE MOUNTED AT +44" TO CENTER OF DEVICE.
- ⑦ PROVIDE 2" GRC CONDUIT ONLY STUBBED OUT FOR TELEPHONE SERVICE PER DETAIL 4/E3. COORDINATE EXACT LOCATION OF STUB OUT WITH SITE UTILITIES CONTRACTOR.
- ⑧ PROVIDE 2" GRC CONDUIT AND CONDUCTORS STUBBED OUT FOR POWER SERVICE PER DETAIL 4/E3. COORDINATE EXACT LOCATION OF STUB OUT WITH SITE UTILITIES CONTRACTOR



TITLE:		
FFA State Finals 2018 Ag. Mechanics		
SIZE	DWG. NO.	REV
<b>B</b>	<b>Log Splitter</b>	
SCALE: 1:20 WEIGHT:		SHEET 1 OF 1



120"

12"

Trim: 4" x 4" x 0.188" Square Tubing, each is 1-1/2" long

6 <sup>3</sup>/<sub>4</sub>"

48"

Main Frame:  
1-1/2" x 1-1/2" x 0.95" Steel Square Tubing

Bars:  
1" x 1" x 0.095" Steel Square Tubing Spaced 6" on-centers

Diagonal:  
1/8" x 1" H.R. Steel Strap

All main frame corners: mitered.

**FFA State Finals 2018**  
**Ag. Mechanics: Problem Solving**  
**Steel Gate** **Scale: 1/10**

**FFA State Finals: 2018**  
**Ag. Mechanics: Problem Solving**

**Instructions:** Verify your contestant number on the Scantron form issued by the proctor. Examine each of the three sets of plans provided. Consider the questions pertaining to each, and record your answers on the Scantron. Scratch paper is provided for your calculations.

**Electrical Plan:**

1. What size wire is used for the bedroom lights and outlet circuit?
  - a. 8 AWG
  - b. 10 AWG
  - c. 12 AWG
  - d. 14 AWG
  
2. How many fluorescent fixtures are to be installed in the garage?
  - a. 1
  - b. 2
  - c. 4
  - d. None
  
3. What size wire is used for the Dryer plug?
  - a. 8 AWG
  - b. 10 AWG
  - c. 12 AWG
  - d. 14 AWG
  
4. What size circuit breaker should be installed for the Dryer plug?
  - a. 20 A
  - b. 30 A
  - c. 40 A
  - d. 60 A
  
5. How many duplex outlets are to be installed in the bedrooms on the upper floor?
  - a. 1
  - b. 2
  - c. 6
  - d. 8
  - e. None of the above
  
6. How many 3-way wall switches are needed to complete the wiring?
  - a. 1
  - b. 2
  - c. 3
  - d. 4

7. What size is the main circuit breaker?
  - a. 20 A
  - b. 150 A
  - c. 200 A
  - d. 14,998 VA
  
8. Approximately what length of wire would be needed to run from the Dryer plug to the loadcenter panel in the garage?
  - a. 10 ft
  - b. 40 ft
  - c. 150 ft
  - d. 1 inch
  
9. What voltage is the furnace?
  - a. 120 V
  - b. 240 V
  - c. 20 V
  - d. 12 V
  
10. What size feeder wire is running into the load center panel?
  - a. 12 AWG Copper
  - b. 10 AWG Copper
  - c. 8 AWG Copper
  - d. 3 AWG Copper
  - e. 1 AWG Copper
  
11. Approximately how much type NM-8-3 wire is needed to complete the project?
  - a. None
  - b. 10 ft
  - c. 40 ft
  - d. 200 ft
  - e. 1000 ft
  
12. Approximately how much 6 AWG wire is needed to complete the wiring to the Range plug in the kitchen?
  - a. None
  - b. 10 ft
  - c. 50 ft
  - d. 200 ft
  - e. 128 ft

## Log Splitter Questions: Assume we are constructing one machine.

13. How heavy are (2) 20' pieces of C4 x 5.4?
  - a. 80 lb
  - b. 160 lb
  - c. 108 lb
  - d. 216 lb
  
14. What is the cross-sectional area of the hydraulic cylinder's piston (bore)?
  - a. 78.5 in<sup>2</sup>
  - b. 19.6 in<sup>2</sup>
  - c. 5 in<sup>2</sup>
  - d. 25 in<sup>2</sup>
  
15. The local steel yard has the following lengths of W8 x 31 available as rems (remnants). Which one below is the cheapest and will still suffice?
  - a. 8'
  - b. 9'
  - c. 10'
  - d. 11'
  
16. How many 20' lengths of C4 x 5.4 are required?
  - a. 1
  - b. 2
  - c. 0
  - d. 3
  
17. What are the dimensions of the ¼" Plate?
  - a. 48" x 96"
  - b. 48" x 60"
  - c. 48" x 30"
  - d. 45" x 57"
  
18. How heavy is a 10' piece of the W8 x 31?
  - a. 80 lb
  - b. 248 lb
  - c. 248 kg
  - d. 310 lb
  
19. How many 5/8" NC Flathead Socket Cap screws are required?
  - a. 6
  - b. 8
  - c. 10
  - d. 12
  - e. 32

20. At what angle is the mitered end of the W8 x 31 cut?
- 90 degrees
  - 30 degrees
  - 16 degrees
  - 45 degrees
21. If an 8" tall item is shown on a drawing with a (1" = 1') scale, how large would it be on the paper?
- 8'
  - 0.67"
  - 1/8"
  - 1/8'
22. If the hydraulic pump can deliver 2000 psi (pounds per square inch), how much force can be delivered by the hydraulic cylinder?
- 2000 psi
  - 10000 psi
  - 39300 lb
  - 40 tons

## Steel Gate Plan Questions:

23. To build 4 gates, how many 20' lengths of 1-1/2" tubing would be required? Assume a saw kerf of 1/8".
- 3
  - 5
  - 7
  - 8
  - 9
24. How long does the diagonal need to be?
- 120.00"
  - 192.24"
  - 122.64"
  - 107.33"
25. To build 4 gates, how many 20' lengths of 1/4" x 1" H.R. flat would be required?
- 1
  - 2
  - 3
  - 4
26. Neglecting saw kerf, how much 4" x 4" x 0.188" square tubing is required to construct one gate?
- 15"
  - 15'
  - 67-1/2"
  - 6-3/4"
27. What is the length of the vertical bars (1" square tubing)?
- 41-1/4"
  - 48"
  - 36-3/4"
  - 38-1/4"
28. Assuming the cost of cold drawn steel tubing is \$0.80/lb, how much would (15) 20' lengths of 1-1/2" x 1-1/2" x 0.065" tubing cost (including tax @ 7.75%)? (See included table on last page)
- \$380.40
  - \$304.32
  - \$327.90
  - \$80.00



29. At the same cost per pound, how much would (18) 20' lengths of 1" x 1" x 0.065" tubing cost (include tax)?
- \$282.08
  - \$320.60
  - \$256.48
  - \$360.00
30. To build 4 gates, how many 20' lengths of 1" square tubing would be required?
- 15
  - 9
  - 13
  - 3
31. If you used your ruler to measure something on the drawing, a  $2\frac{3}{8}$ " measurement would represent what actual length?
- $2\frac{3}{8}$  ft
  - 23.8 ft
  - $23\frac{3}{4}$ "
  - $23\frac{3}{4}$  ft
32. What is the length of the gate in centimeters?
- 304.8 cm
  - 3048.0 cm
  - 30.48 cm
  - 3.048'