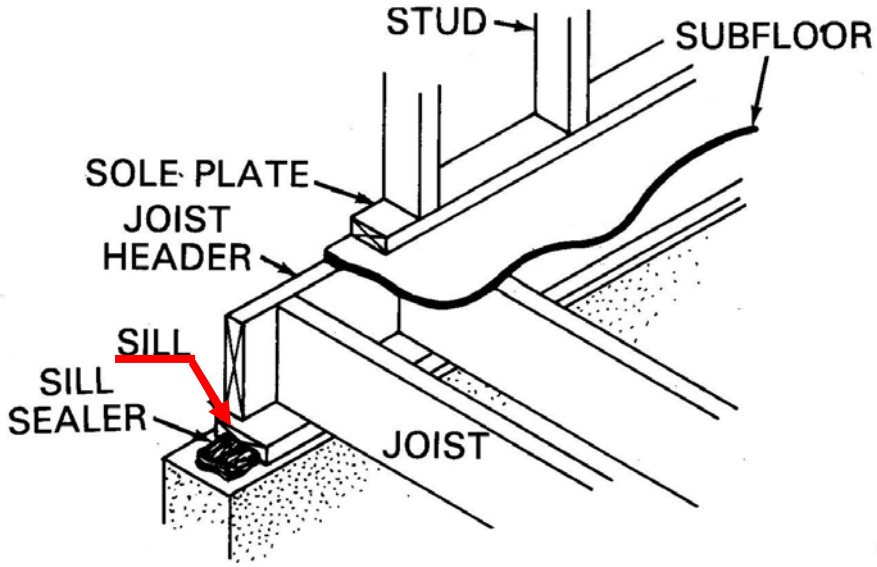
Estimating Materials

Cottage Activity

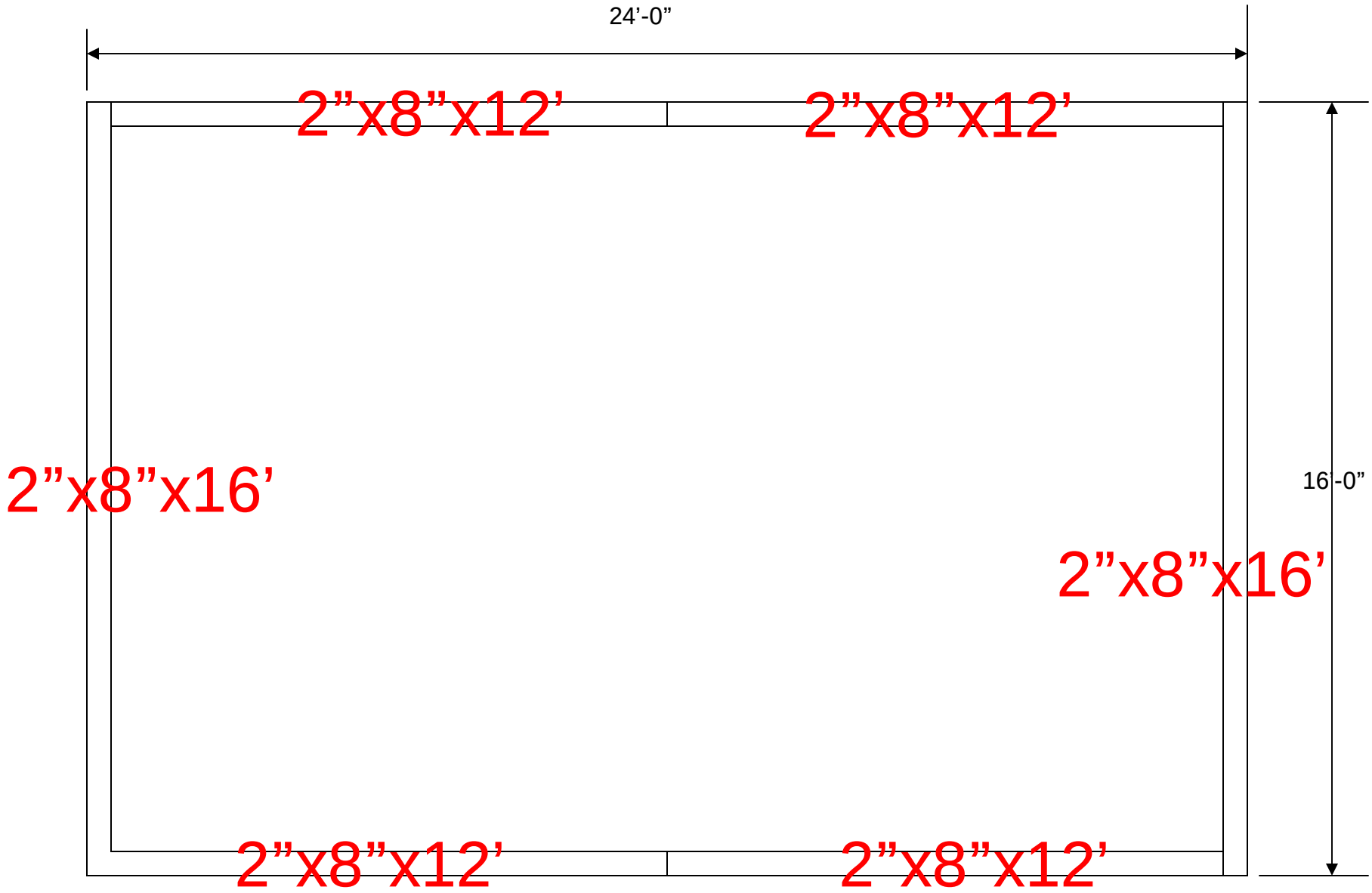
Sill Plate

- A piece of dimensional lumber that is fastened to the top of a foundation wall.
- This plate is the nailing base for floor joists or studs.
- It bonds and anchors the wood frame to the foundation.



Estimating Sill Plate

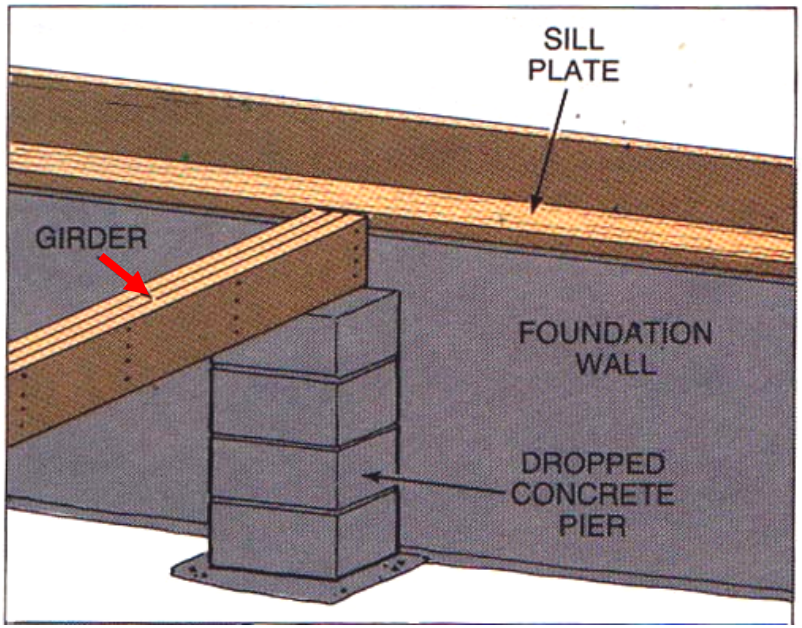
- Usually made of 2” x 6” or 2” x 8” Treated Lumber
  - Formula
    - Total linear feet of foundation wall broken down into 8’ to 16’ lengths.

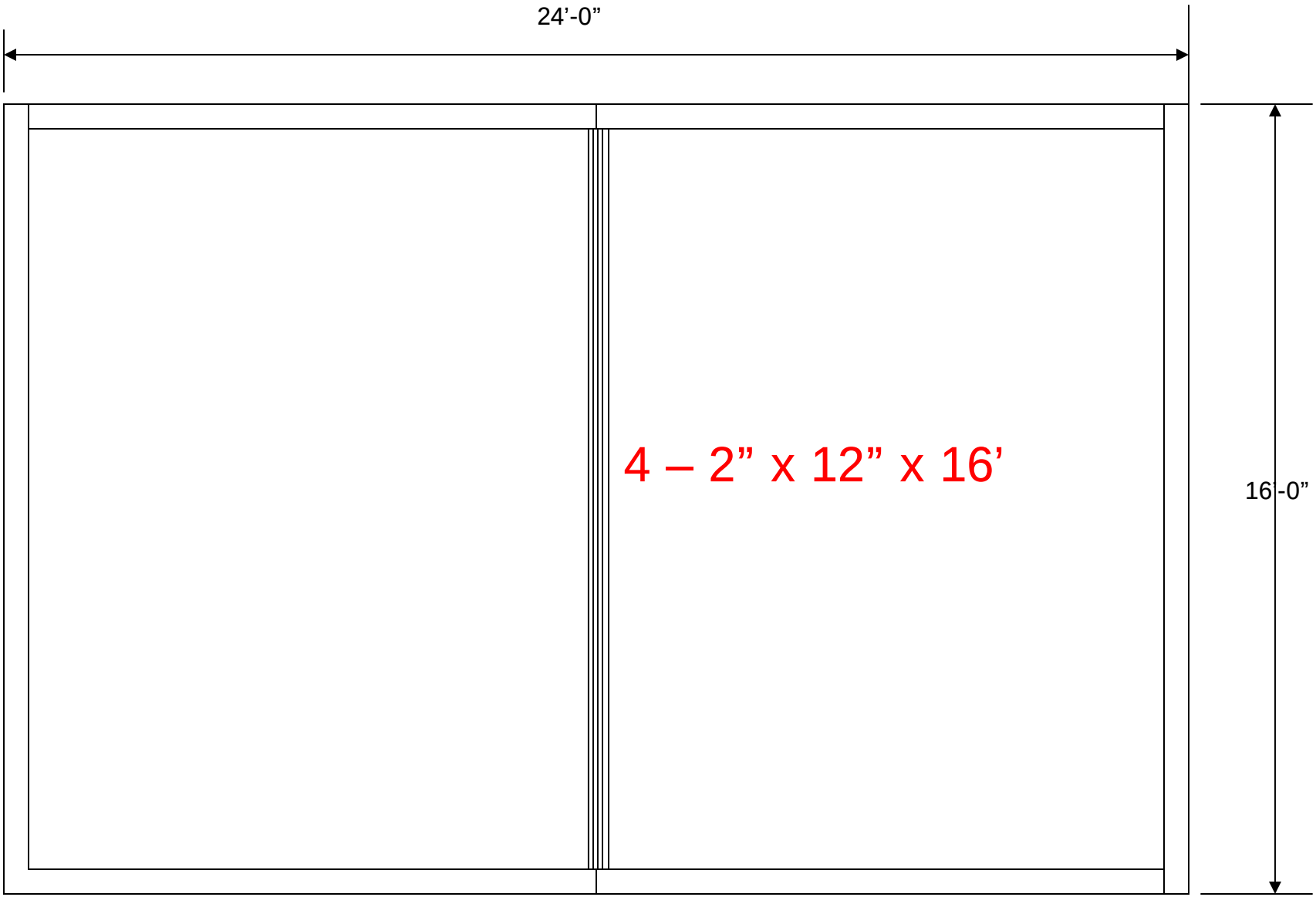

24’-0”
2”x8”x12’
2”x8”x12’
2”x8”x16’
16’-0”
2”x8”x16’
2”x8”x12’
2”x8”x12’

NUMBER REQUIRED	ITEM	COST EACH	TOTAL COST
	2 X 4 X Precuts		
	2 X 4 X 16		
4	2 x 8 x 12 Treated		
2	2 x 8 x 16 Treated		
	2 X 12 X 8		
	2 X 12 X 12		
	2 X 12 X 16		
	3/4" x 4' x 8' T & G Plywood or OSB		
	1/2" x 4' x 8' CDX Plywood or OSB		
	16' Trusses		
		TOTAL LUMBER COST	**$**

Main Beam or Girder

- Center support for the floor joists
- 2” x 12” x 16’
  - 4 – nailed together

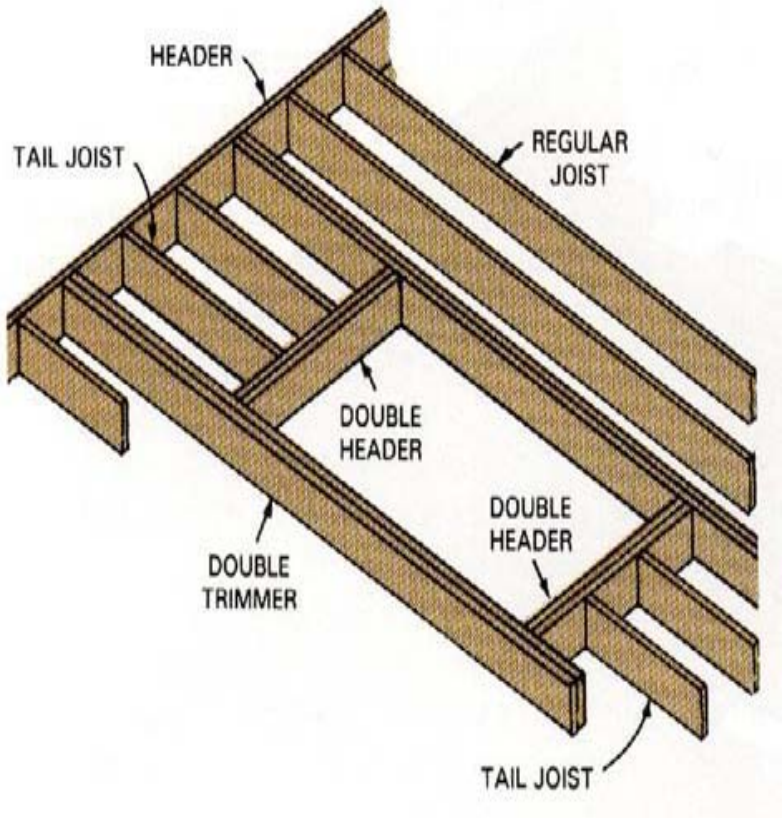


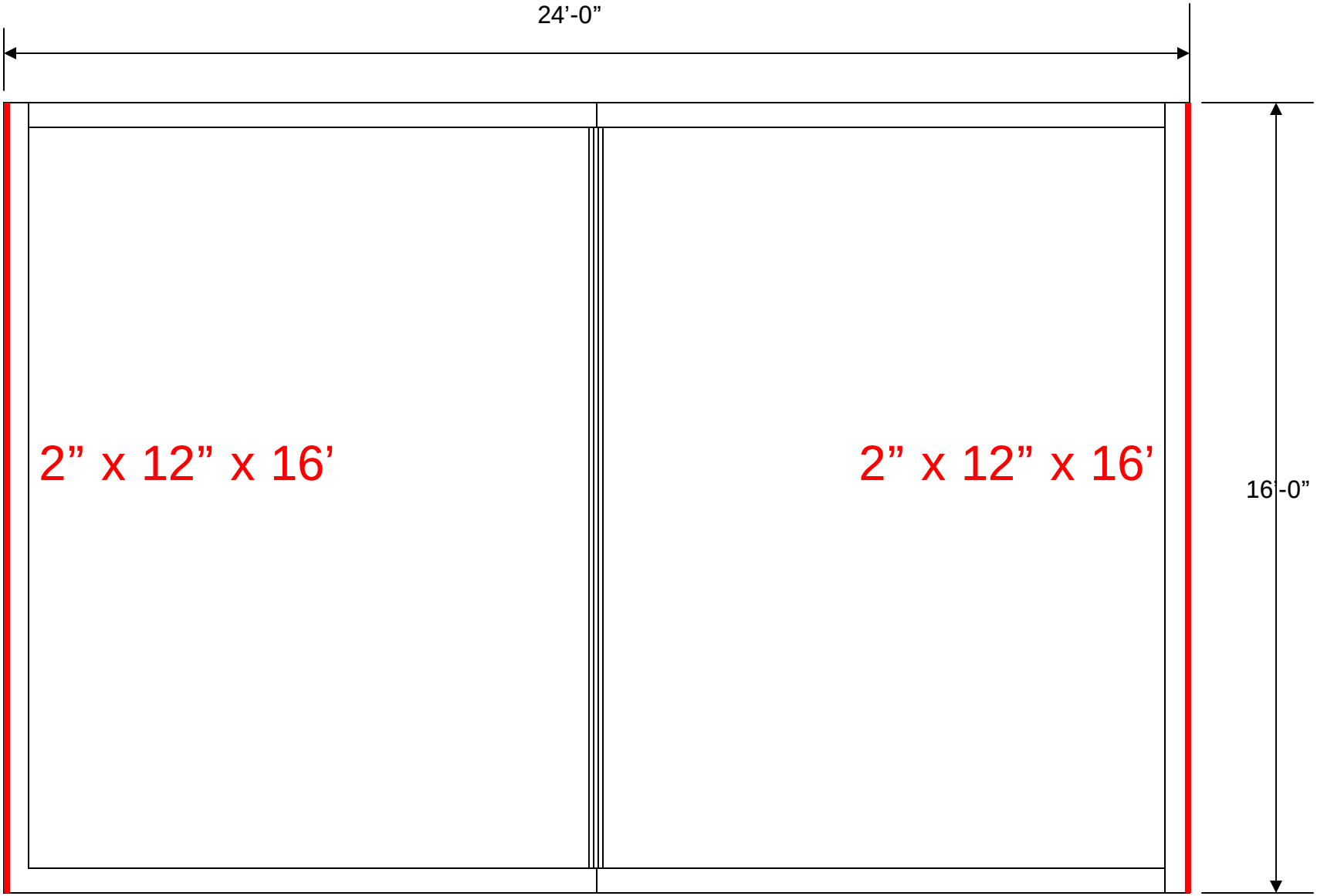

24’-0”
4 – 2” x 12” x 16’
16’-0”

NUMBER REQUIRED	ITEM	COST EACH	TOTAL COST
	2 X 4 X Precuts		
	2 X 4 X 16		
4	2 x 8 x 12 Treated		
2	2 x 8 x 16 Treated		
	2 X 12 X 8		
	2 X 12 X 12		
4	2 X 12 X 16		
	3/4" x 4' x 8' T & G Plywood or OSB		
	1/2" x 4' x 8' CDX Plywood or OSB		
	16' Trusses		
		TOTAL LUMBER COST	**$**

Rim Joist

- Another name is joist header – runs parallel to the main beam. All floor joists are nailed to it on 16” centers.
- 2 - 2” x 12” x 16’ (one at each end of cottage)

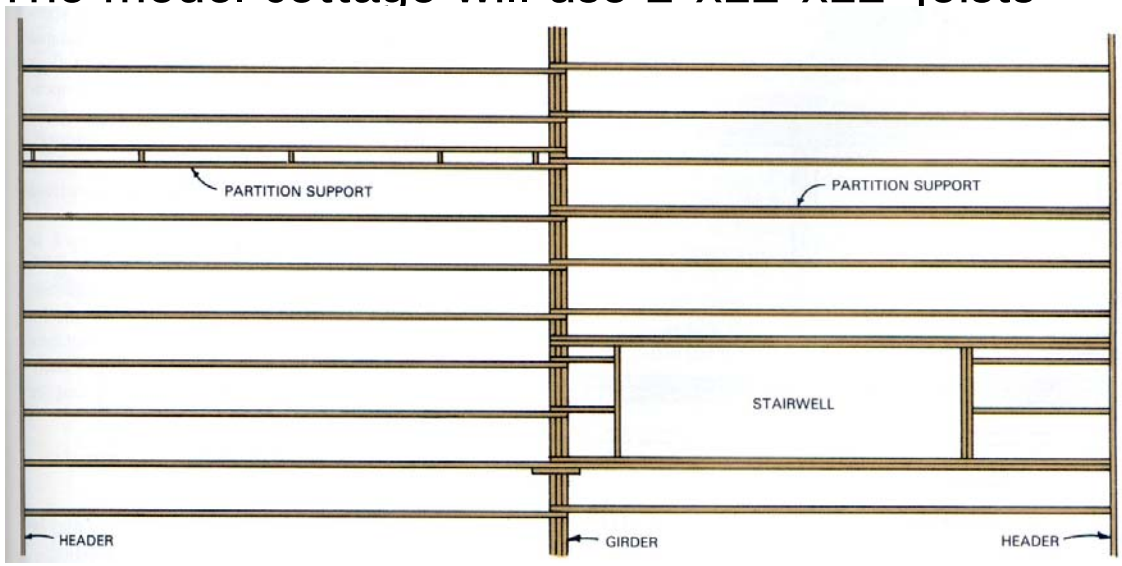



24’-0”
2” x 12” x 16’
2” x 12” x 16’
16’-0”

NUMBER REQUIRED	ITEM	COST EACH	TOTAL COST
	2 X 4 X Precuts		
	2 X 4 X 16		
4	2 x 8 x 12 Treated		
2	2 x 8 x 16 Treated		
	2 X 12 X 8		
	2 X 12 X 12		
4+2	2 X 12 X 16		
	3/4" x 4' x 8' T & G Plywood or OSB		
	1/2" x 4' x 8' CDX Plywood or OSB		
	16' Trusses		
		TOTAL LUMBER COST	**$**

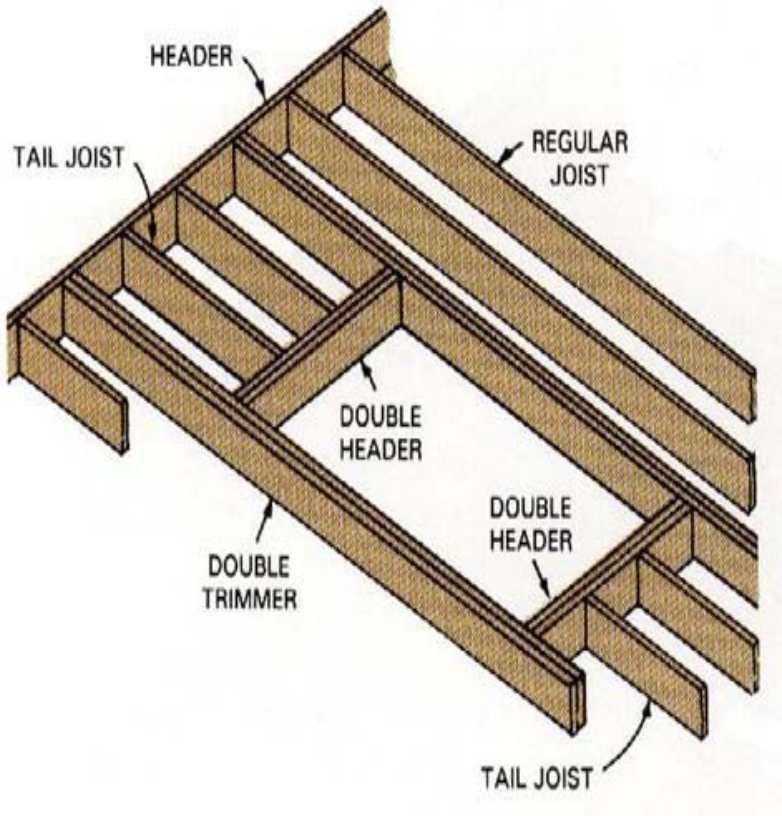
Floor Joists

- Made of 2” thick lumber of varying widths and lengths depending on the span required
  - Web Trusses or Floor Trusses are manufactured alternates to dimensional lumber
- The length of the joist is determined by the span
  - The model cottage will use 2”x12”x12’ joists



Floor Joists

- Number of FLOOR JOISTS = Length of run of main beam ***times*** 3/4 (.75) ***plus*** 1 (starting joist) ***times*** 2 (second side)
  - Add two per opening in floor
  - Add two for each internal wall running parallel to joists
  - 2'x12" Lumber for cottage/exam purposes



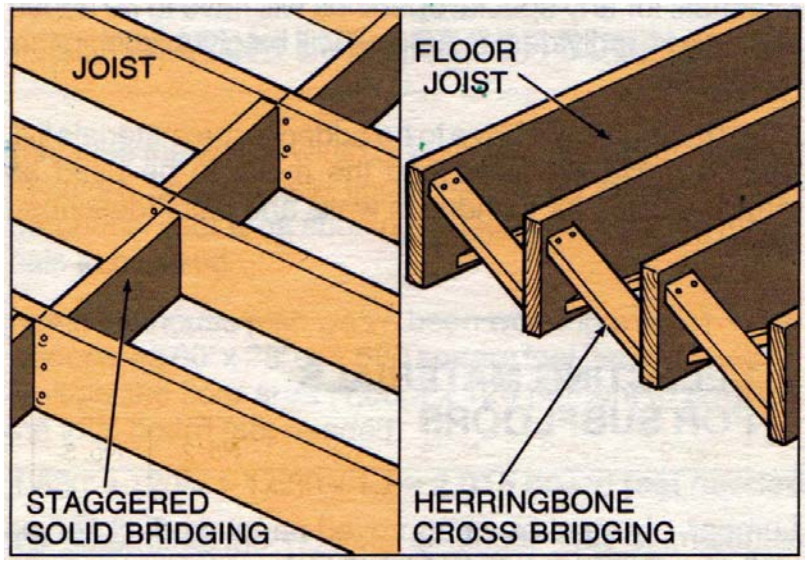
Floor Joists continued

- **16 x .75 + 1 x 2**
- **12 + 1 x 2 = 26**
- Add two joists for stair opening
  - **26 + 2 = 28**
- Floor joists must also be doubled when an internal wall above is running parallel to the joists below
  - **28 + 2 = 30**


24’-0”
16’-0”

Bridging for Floor Joists

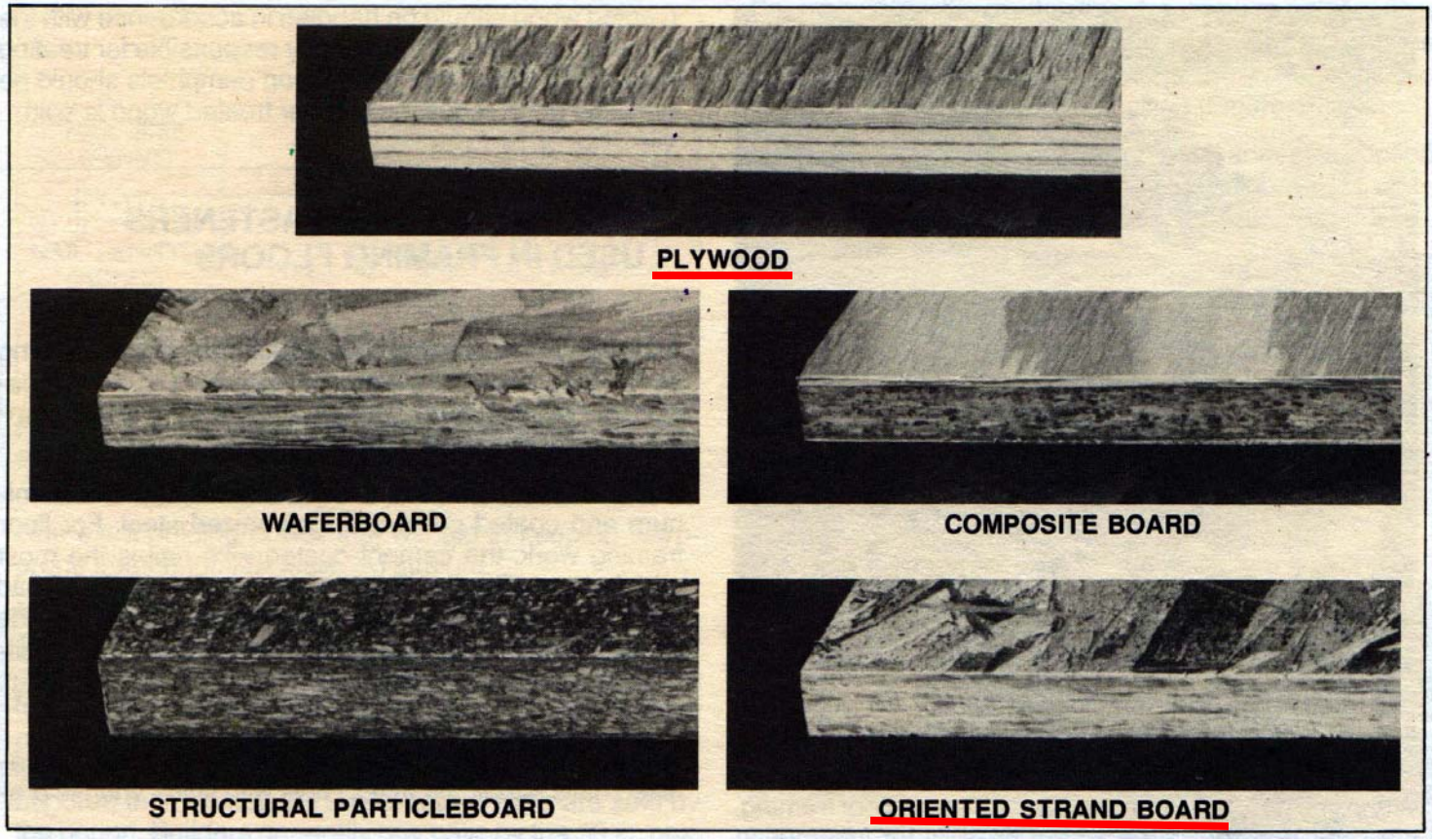
- Bridging is used to stiffen the floor systems and keep the joists from warping and twisting.
- The two types of wooden bridging are
  - Staggered solid block bridging
  - Herringbone cross bridging
- Metal bridging is also available.



NUMBER REQUIRED	ITEM	COST EACH	TOTAL COST
	2 X 4 X Precuts		
	2 X 4 X 16		
4	2 x 8 x 12 Treated		
2	2 x 8 x 16 Treated		
	2 X 12 X 8		
30	2 X 12 X 12		
6	2 X 12 X 16		
	3/4" x 4' x 8' T & G Plywood or OSB		
	1/2" x 4' x 8' CDX Plywood or OSB		
	16' Trusses		
		TOTAL LUMBER COST	**$**

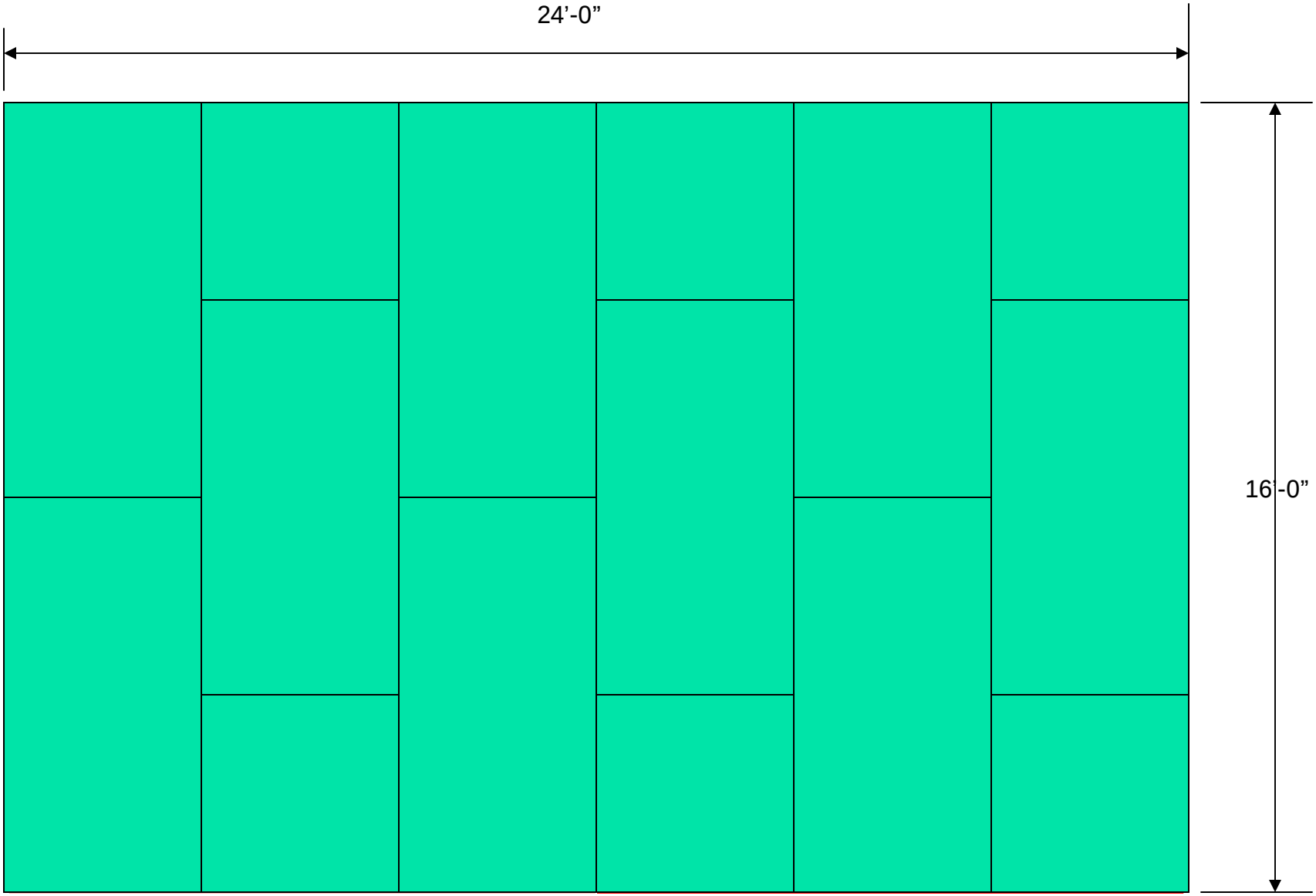
Sub-floor Materials

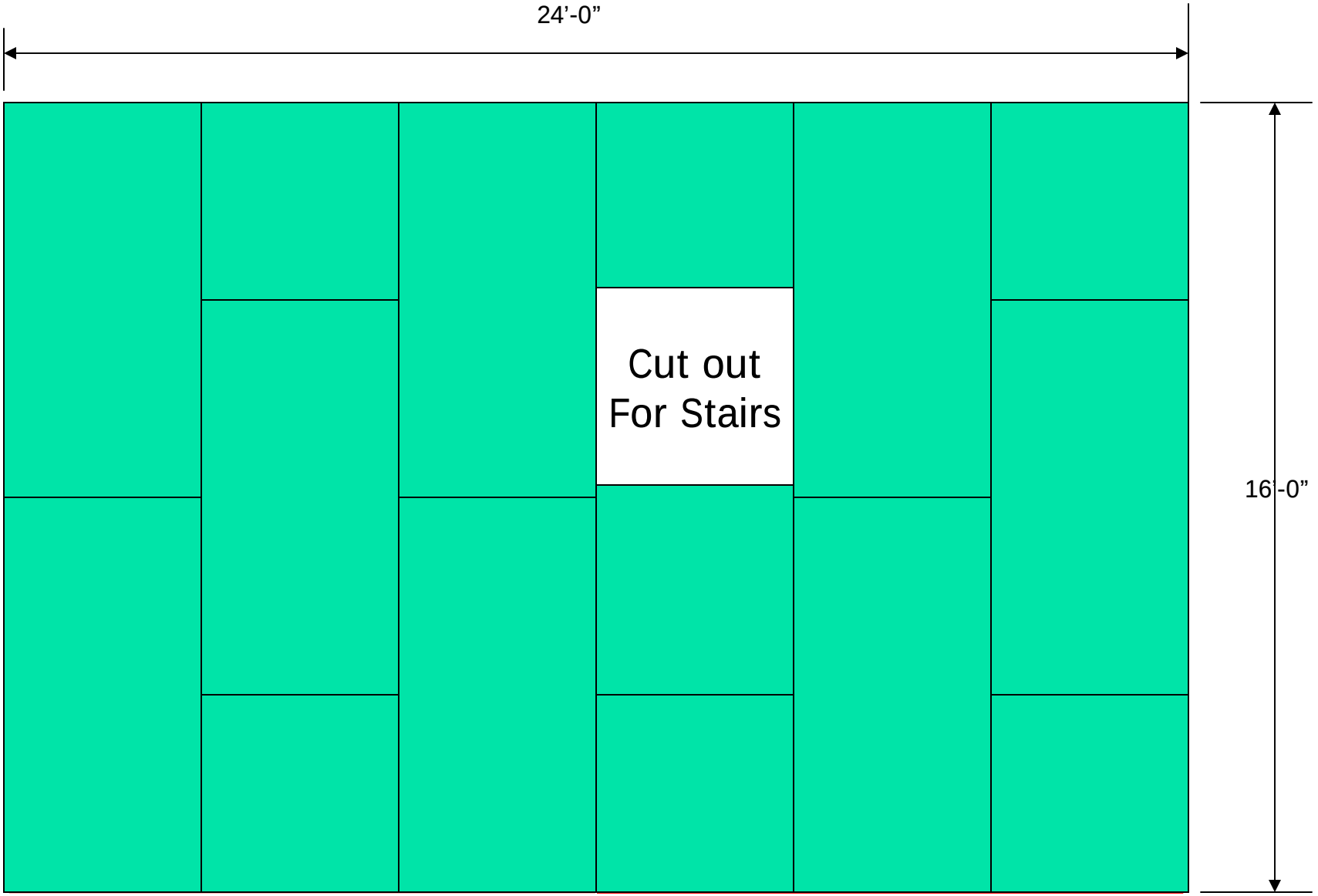
- ¾” x 4’ x 8’ Tongue and groove plywood or OSB



Estimating Sub-floor

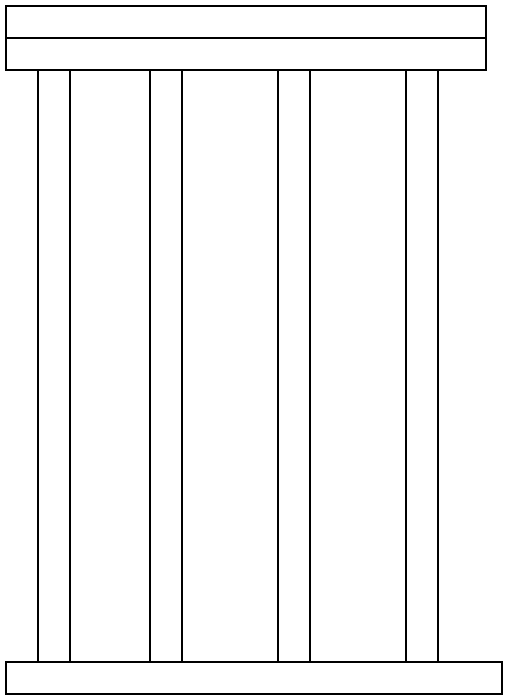
- Formula for figuring how many sheets of sub-floor are required
  - Square foot of entire floor divided by 32
    - 4’x8’ sheet = 32 sq. ft.
    - Cottage: 16 x 24 ÷ 32 = 12


24’-0”
16’-0”


24’-0”
Cut out
For Stairs
16’-0”

NUMBER REQUIRED	ITEM	COST EACH	TOTAL COST
	2 X 4 X Precuts		
	2 X 4 X 16		
4	2 x 8 x 12 Treated		
2	2 x 8 x 16 Treated		
	2 X 12 X 8		
30	2 X 12 X 12		
6	2 X 12 X 16		
12	3/4" x 4' x 8' T & G Plywood or OSB		
	1/2" x 4' x 8' CDX Plywood or OSB		
	16' Trusses		
		TOTAL LUMBER COST	**$**

Precuts

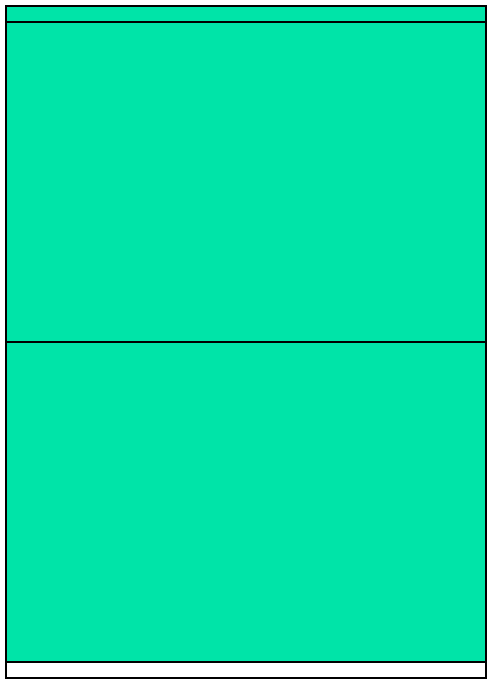


3”

92 5/8”

1 ½”

Total Height of Wall 97 1/8”



5/8” Drywall

48” Drywall

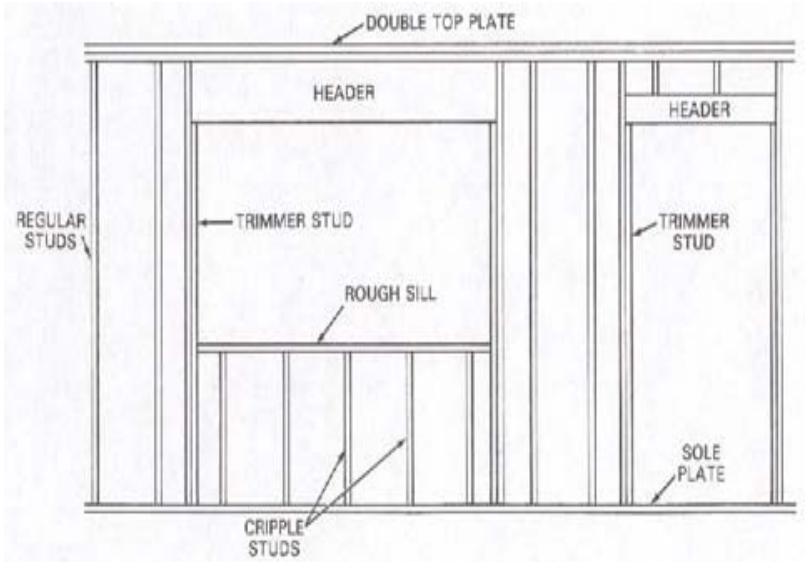
48” Drywall

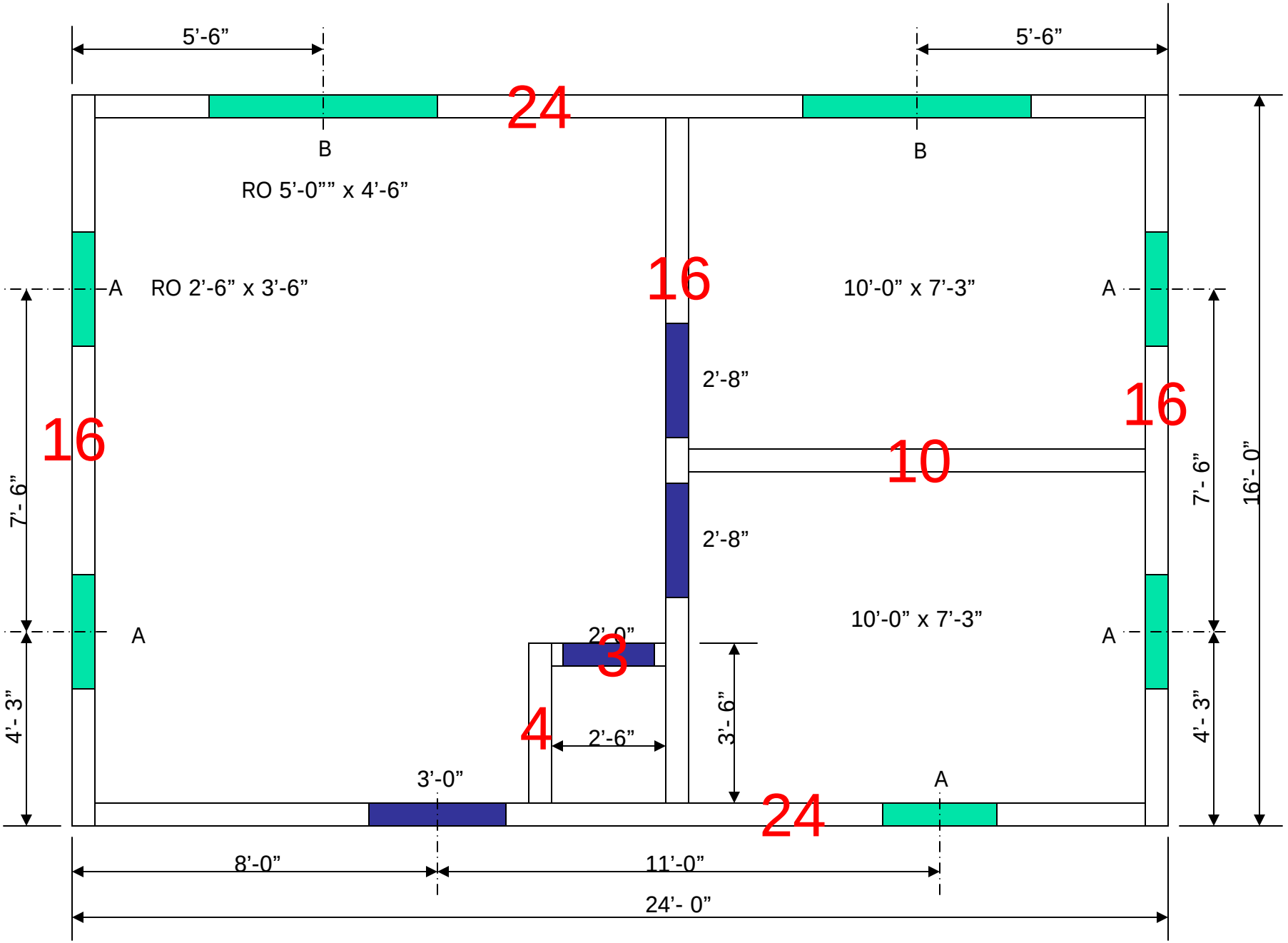
½” Gap at Floor

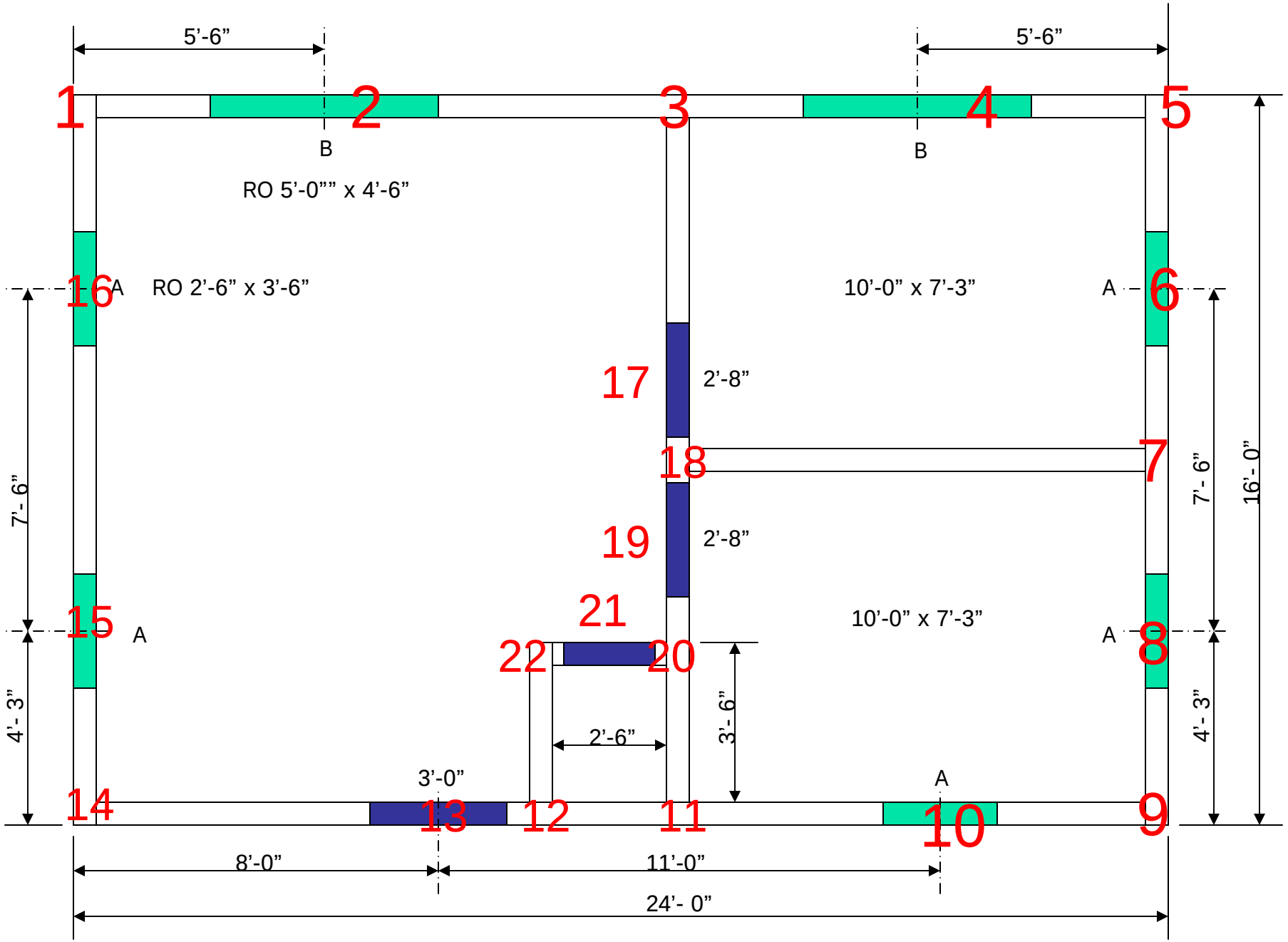
Total Height of Wall 97 1/8”

Precuts

- PRECUTS =
- Linear feet of all walls ***times*** 3/4 (.75) ***plus*** 2 for each wall penetration (door, window, outside corner, inside corner, partition intersection)




5’-6”
5’-6”
24
B
B
RO 5’-0”” x 4’-6”
A
RO 2’-6” x 3’-6”
16
10’-0” x 7’-3”
A
2’-8”
16
16
10
2’-8”
7’- 6”
16’- 0”
7’- 6”
A
10’-0” x 7’-3”
A
2’-0”
3
4’- 3”
4
2’-6”
3’- 6”
4’- 3”
3’-0”
A
24
8’-0”
11’-0”
24’- 0”


5’-6”
5’-6”
1
2
3
4
5
B
B
RO 5’-0”” x 4’-6”
16
A
RO 2’-6” x 3’-6”
10’-0” x 7’-3”
A
6
17
2’-8”
18
7
19
2’-8”
21
15
A
10’-0” x 7’-3”
A
8
22
20
2’-6”
3’-6”
7’- 6”
4’- 3”
7’- 6”
16’- 0”
4’- 3”
3’-0”
A
14
13
12
11
10
9
8’-0”
11’-0”
24’- 0”

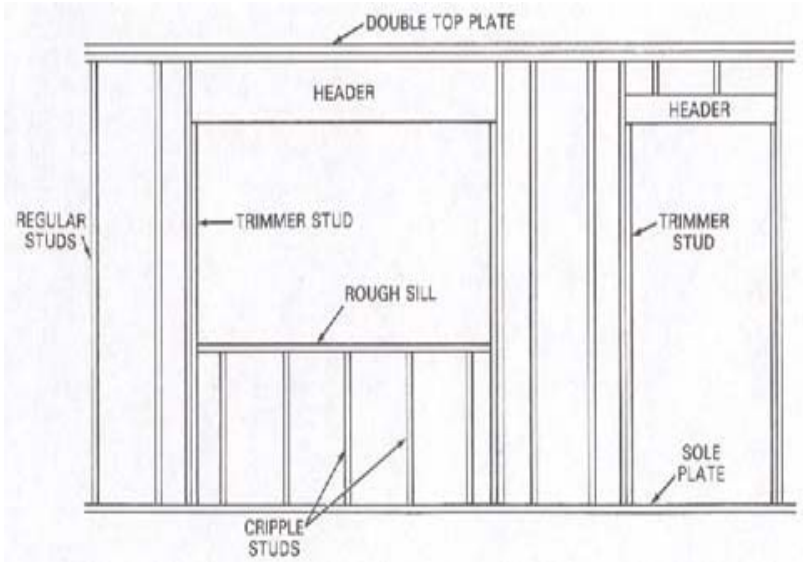
Precuts

- 24+24+16+16+16+10+3+4 = 113
  - 113 x .75 = 84.75 (round up to 85)
- 22 Wall Penetrations
  - 22 x 2 = 44
- 129 total precuts needed
  - 85 + 44 = 129

NUMBER REQUIRED	ITEM	COST EACH	TOTAL COST
129	2 X 4 X Precuts		
	2 X 4 X 16		
4	2 x 8 x 12 Treated		
2	2 x 8 x 16 Treated		
	2 X 12 X 8		
30	2 X 12 X 12		
6	2 X 12 X 16		
12	3/4" x 4' x 8' T & G Plywood or OSB		
	1/2" x 4' x 8' CDX Plywood or OSB		
	16' Trusses		
		TOTAL LUMBER COST	**$**

Top & Bottom Plates

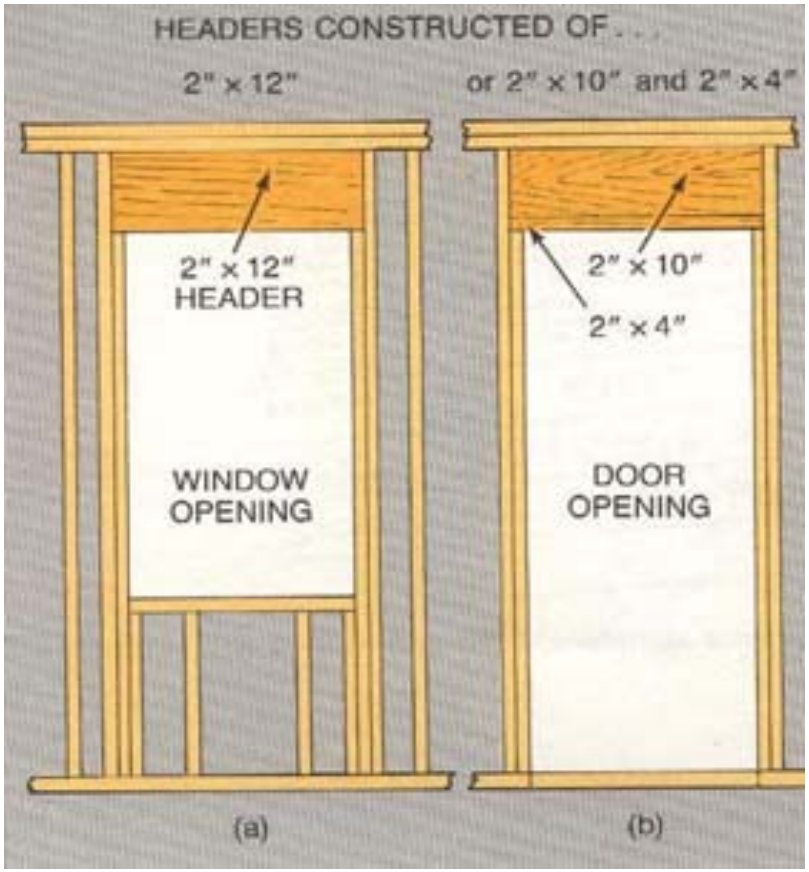
- Take the total linear feet of all walls and ***divide by*** 16 (longest standard size framing lumber) and ***multiply by*** 3 (A bottom sole plate and two top plates are required for each wall section.)
- 113 / 16 x 3 + 10% = 24 (round up)



NUMBER REQUIRED	ITEM	COST EACH	TOTAL COST
129	2 X 4 X Precuts		
24	2 X 4 X 16		
4	2 x 8 x 12 Treated		
2	2 x 8 x 16 Treated		
	2 X 12 X 8		
30	2 X 12 X 12		
6	2 X 12 X 16		
12	3/4" x 4' x 8' T & G Plywood or OSB		
	1/2" x 4' x 8' CDX Plywood or OSB		
	16' Trusses		
		TOTAL LUMBER COST	**$**

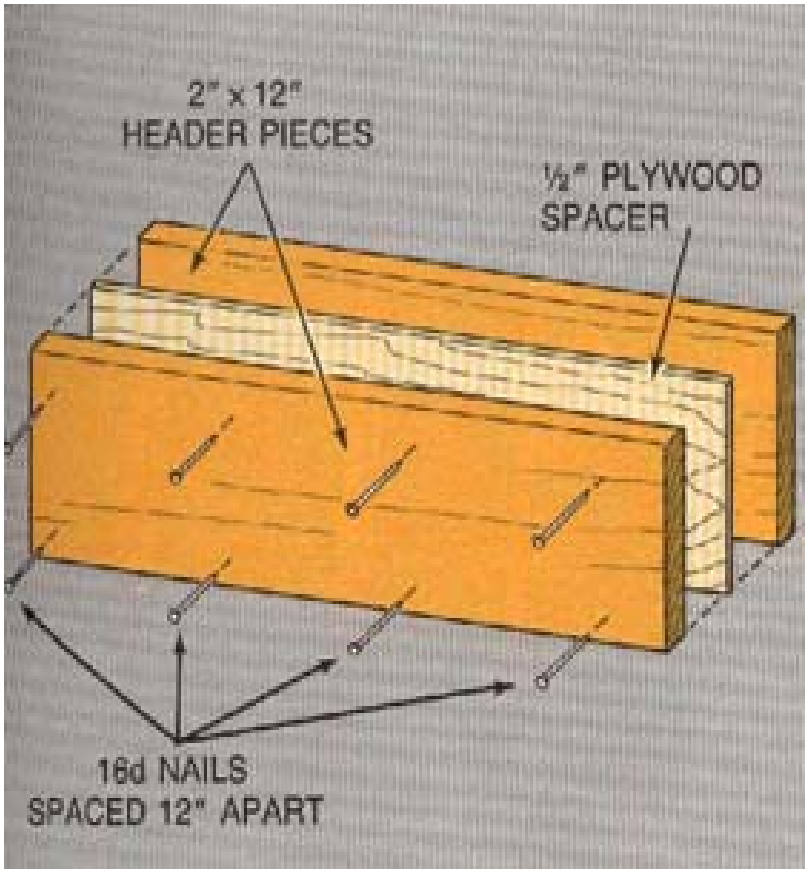
Headers

- Headers carry the weight of the building across door and window openings.



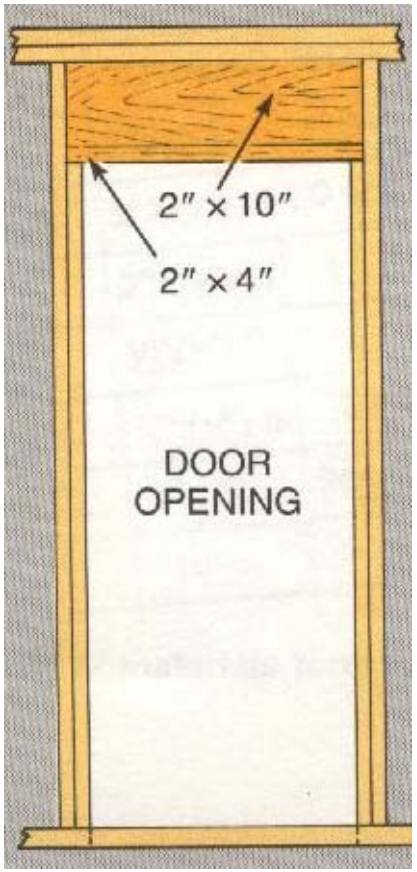
Headers

- In a 2” x 4” wall a ½” piece of plywood or OSB is placed between the 2” x 12” header material to make the header width 3 ½” which is the width of a 2” x 4” stud.



Door Headers

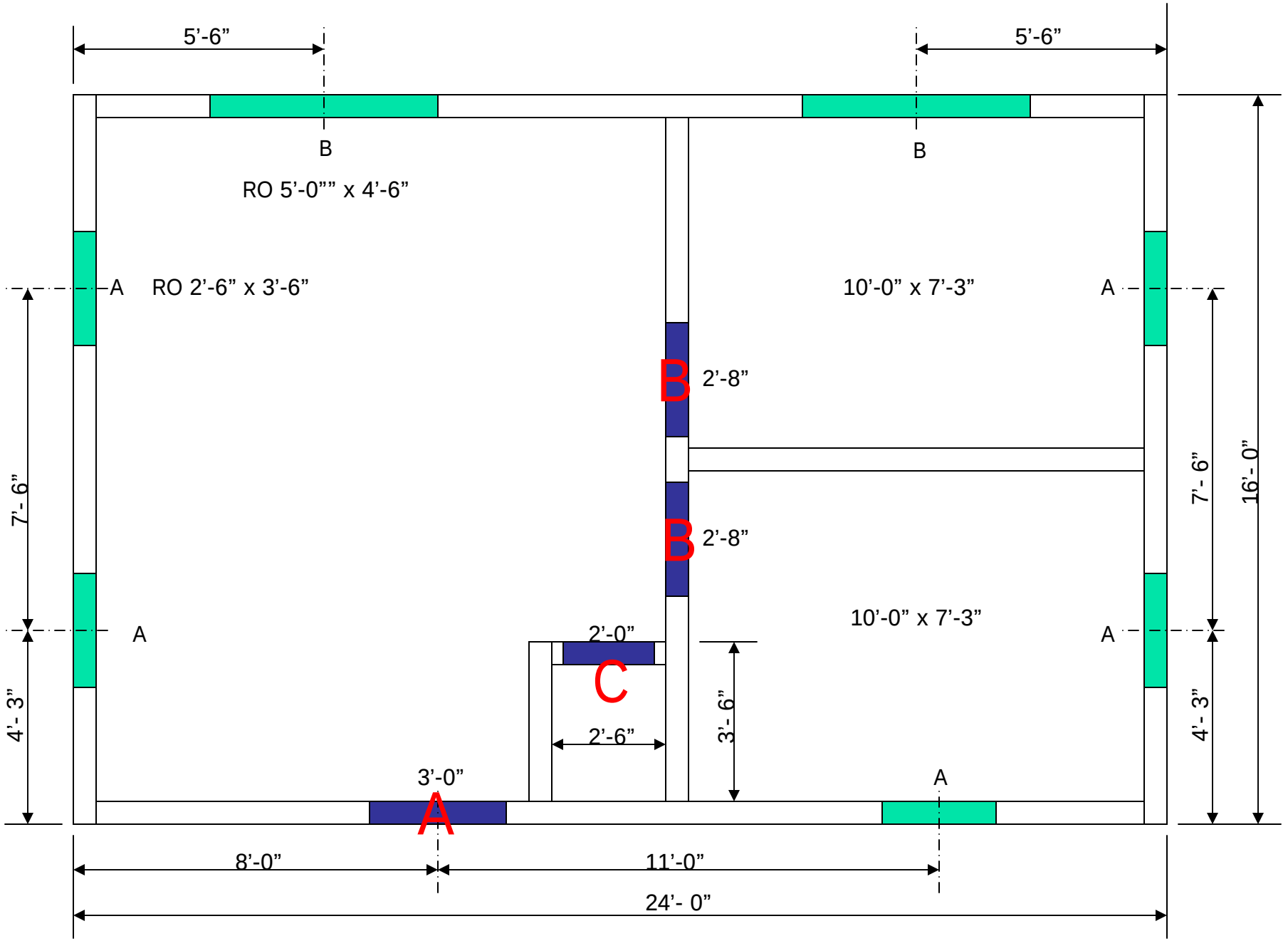
- Door header length
  - Width of door + 5”
    - Ex. 36” door + 1 ½” jamb + ½” level/plumb + 3” for headers



Door A Header

- Door A – 36”
- Door header length
  - 36” + 5” = 41”
    - 41” < 4’
      - 2 x 4’ = 8’
    - One 2”x12”x8’ piece of lumber is needed to build the header for a 36” door.

NUMBER REQUIRED	ITEM	COST EACH	TOTAL COST
129	2 X 4 X Precuts		
24	2 X 4 X 16		
4	2 x 8 x 12 Treated		
2	2 x 8 x 16 Treated		
1	2 X 12 X 8		
30	2 X 12 X 12		
6	2 X 12 X 16		
12	3/4" x 4' x 8' T & G Plywood or OSB		
	1/2" x 4' x 8' CDX Plywood or OSB		
	16' Trusses		
		TOTAL LUMBER COST	**$**


5’-6”
5’-6”
B
B
RO 5’-0”” x 4’-6”
A
RO 2’-6” x 3’-6”
10’-0” x 7’-3”
A
B
2’-8”
B
2’-8”
7’- 6”
16’- 0”
7’- 6”
A
10’-0” x 7’-3”
A
2’-0”
C
4’- 3”
3’- 6”
4’- 3”
2’-6”
3’-0”
A
A
A
8’-0”
11’-0”
24’- 0”

Door B Header

- Door B – 32”
- Door header length
  - 32” + 5” = 37”
    - 37” < 4’
      - 2 x 4’ = 8’
    - One 2”x12”x8’ piece of lumber is needed to build the header for a 32” door.
    - Two door B’s will require two 2”x12”x8’ pieces of lumber

NUMBER REQUIRED	ITEM	COST EACH	TOTAL COST
129	2 X 4 X Precuts		
24	2 X 4 X 16		
4	2 x 8 x 12 Treated		
2	2 x 8 x 16 Treated		
1+2	2 X 12 X 8		
30	2 X 12 X 12		
6	2 X 12 X 16		
12	3/4" x 4' x 8' T & G Plywood or OSB		
	1/2" x 4' x 8' CDX Plywood or OSB		
	16' Trusses		
		TOTAL LUMBER COST	**$**

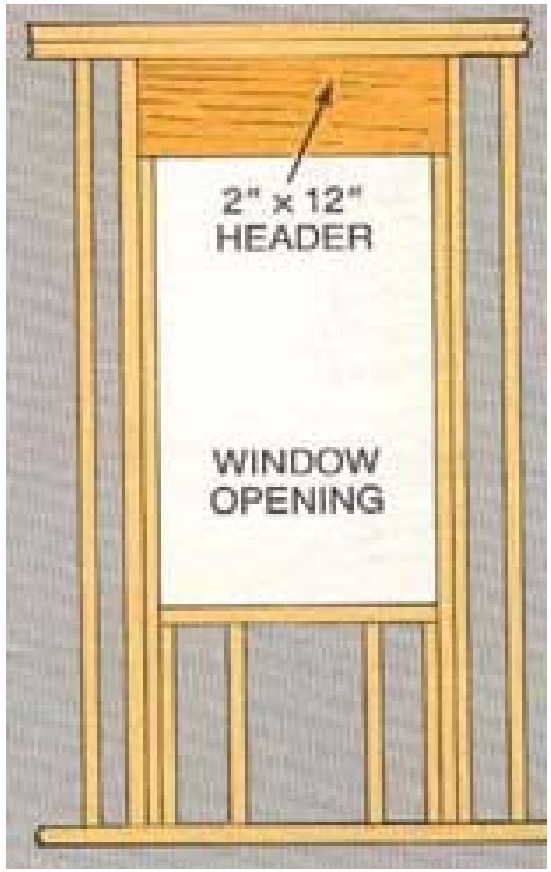
Door C Header

- Door C – 24”
- Door header length
  - 24” + 5” = 29”
    - 29” < 3’
      - 2 x 3’ = 6’
    - One 2”x12”x8’ piece of lumber is needed to build the header for a 32” door.
      - Cannot buy 2”x12”x6’ lengths – must move up to 8’ length

NUMBER REQUIRED	ITEM	COST EACH	TOTAL COST
129	2 X 4 X Precuts		
24	2 X 4 X 16		
4	2 x 8 x 12 Treated		
2	2 x 8 x 16 Treated		
3+1	2 X 12 X 8		
30	2 X 12 X 12		
6	2 X 12 X 16		
12	3/4" x 4' x 8' T & G Plywood or OSB		
	1/2" x 4' x 8' CDX Plywood or OSB		
	16' Trusses		
		TOTAL LUMBER COST	**$**

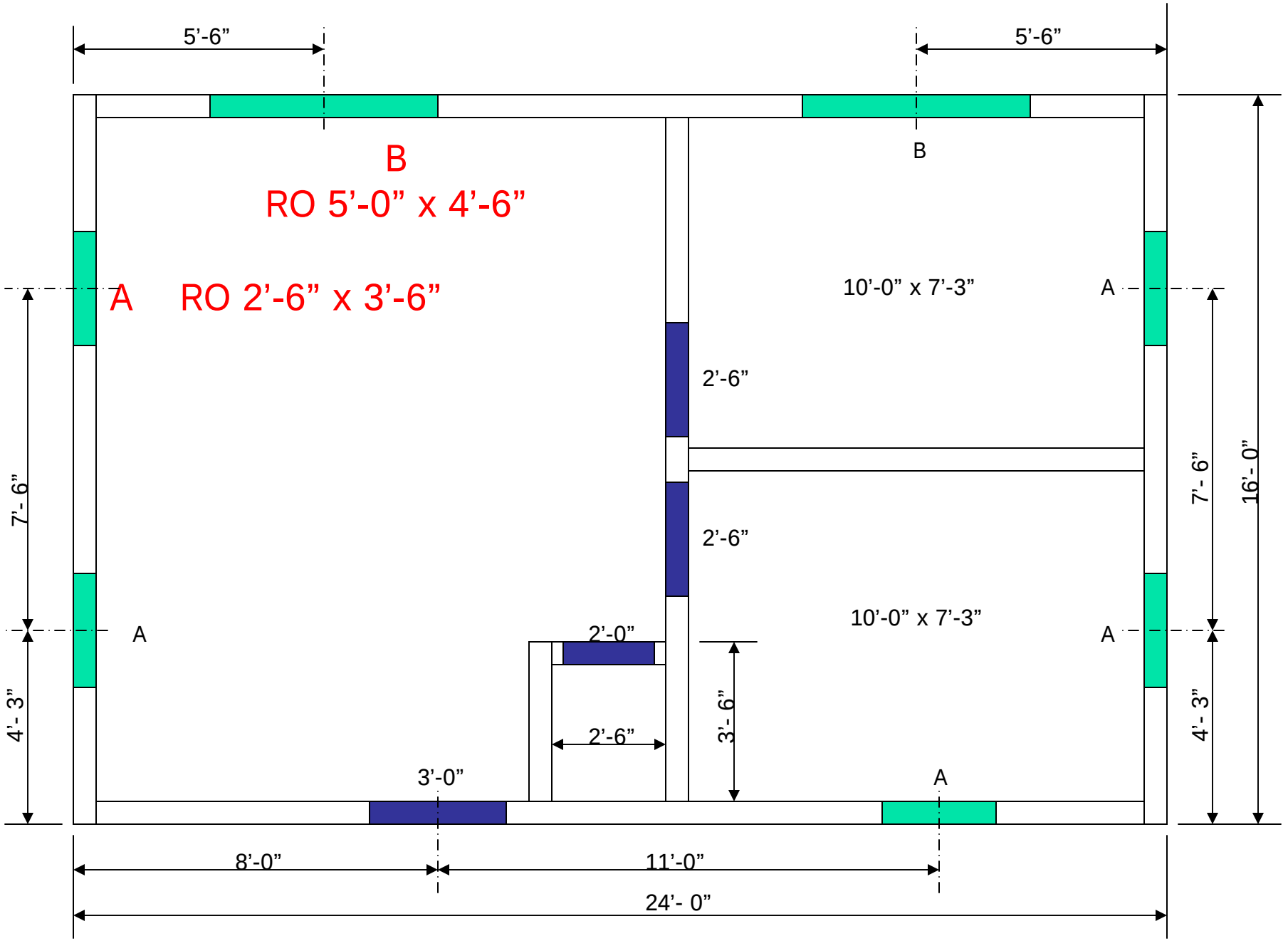
Window Headers

- Window header length
  - Rough Opening Width + 3”



Window A Header

- Window A Rough Opening – 2’-6” wide
- Header length
  - 30” + 3” = 33”
    - 33” < 3’
      - 2 x 3’ = 6’
    - Two 2”x12”x12’ piece of lumber are needed to build the header for four Window A’s.
    - One 2”x12”x8’ piece of lumber is needed for the fifth Window A.


5’-6”
5’-6”
B
RO 5’-0” x 4’-6”
B
A
RO 2’-6” x 3’-6”
10’-0” x 7’-3”
A
2’-6”
2’-6”
7’- 6”
16’- 0”
7’- 6”
A
10’-0” x 7’-3”
A
2’-0”
4’- 3”
3’- 6”
4’- 3”
2’-6”
3’-0”
A
8’-0”
11’-0”
24’- 0”

NUMBER REQUIRED	ITEM	COST EACH	TOTAL COST
129	2 X 4 X Precuts		
24	2 X 4 X 16		
4	2 x 8 x 12 Treated		
2	2 x 8 x 16 Treated		
4+1	2 X 12 X 8		
30+2	2 X 12 X 12		
6	2 X 12 X 16		
12	3/4" x 4' x 8' T & G Plywood or OSB		
	1/2" x 4' x 8' CDX Plywood or OSB		
	16' Trusses		
		TOTAL LUMBER COST	**$**

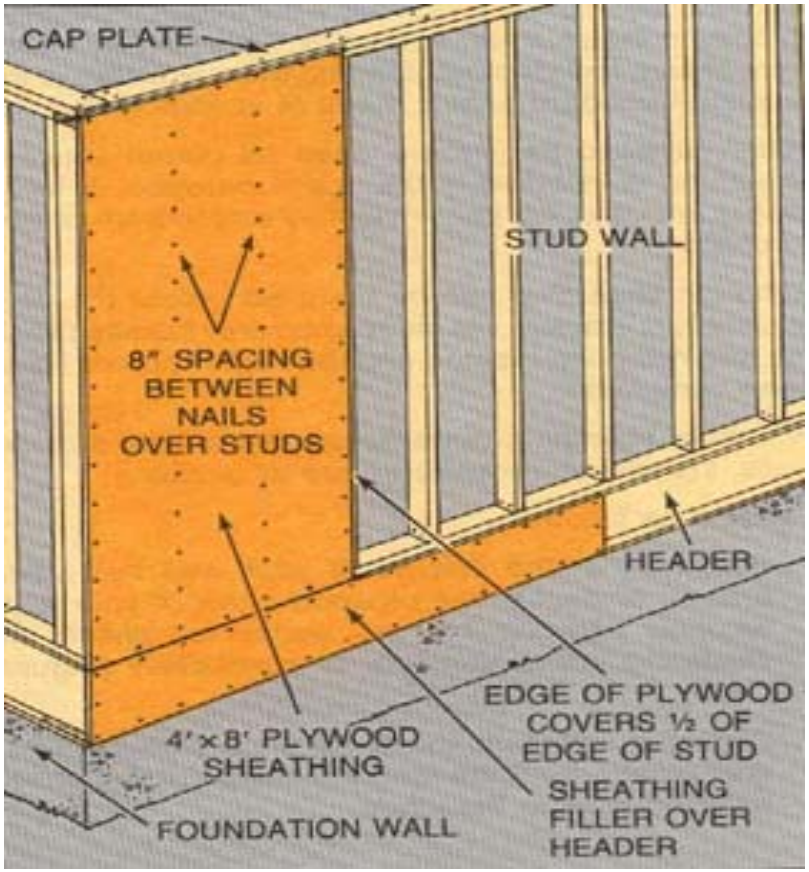
Window B Header

- Window B Rough Opening - 5’-0” wide
- Header length
  - 60” + 3” = 63”
    - 63” < 6’
      - 2 x 6’ = 12’
    - Two 2”x12”x12’ piece of lumber are needed to build the header for two Window B’s.

NUMBER REQUIRED	ITEM	COST EACH	TOTAL COST
129	2 X 4 X Precuts		
24	2 X 4 X 16		
4	2 x 8 x 12 Treated		
2	2 x 8 x 16 Treated		
5	2 X 12 X 8		
32+2	2 X 12 X 12		
6	2 X 12 X 16		
12	3/4" x 4' x 8' T & G Plywood or OSB		
	1/2" x 4' x 8' CDX Plywood or OSB		
	16' Trusses		
		TOTAL LUMBER COST	**$**

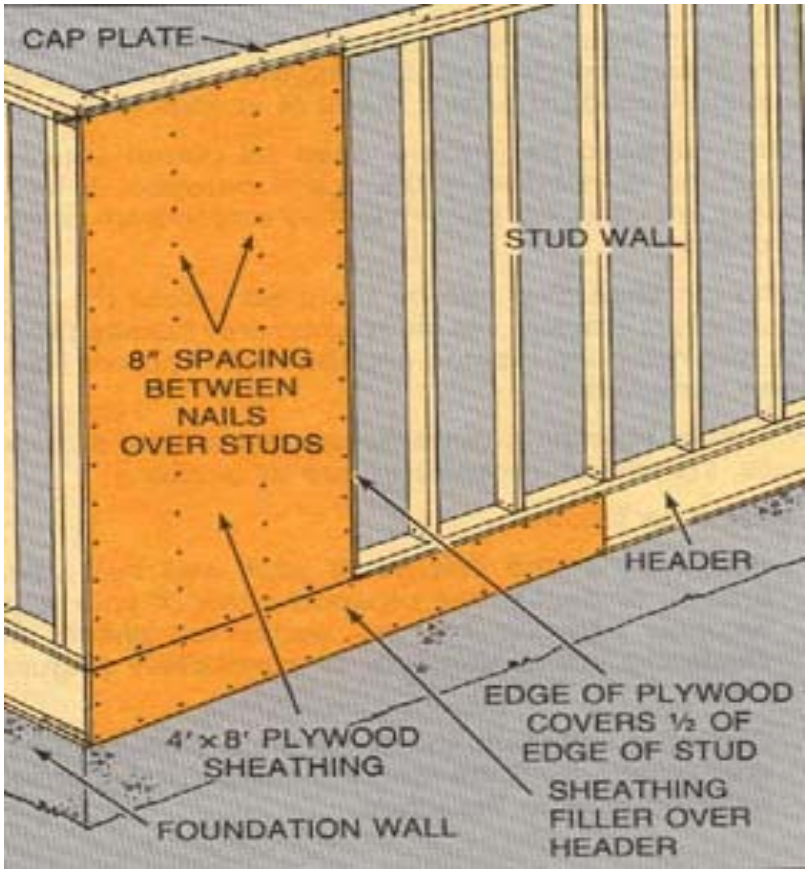
Outside Wall Sheating

- ½”x4’x8’ Plywood or OSB



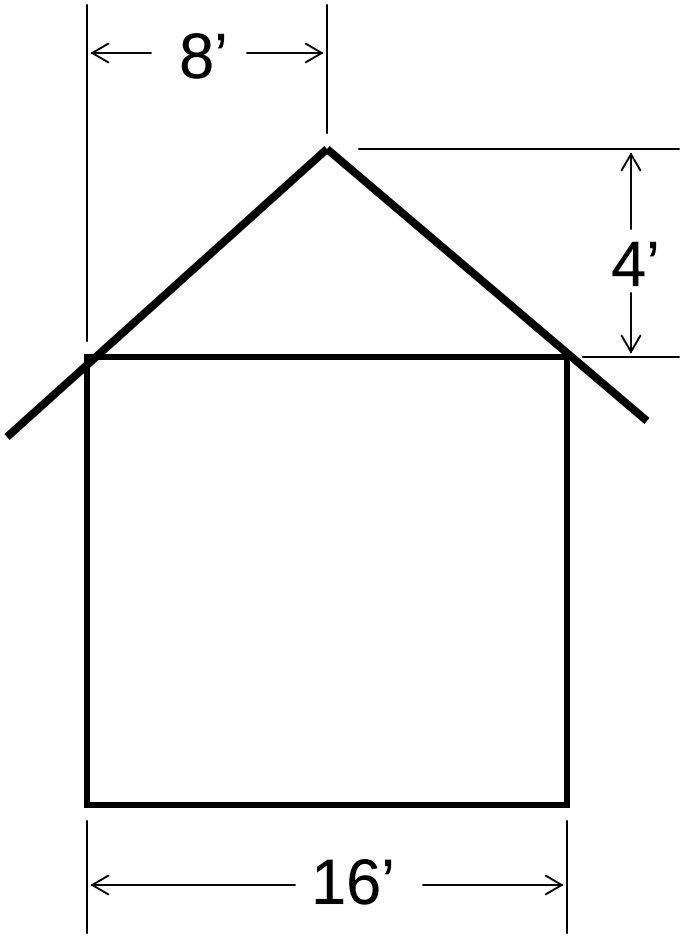
Estimating Outside Wall Sheating Part 1

- Linear feet of perimeter walls *divided by* 4
  - Covers stud walls
    - 16+16+24+24 ÷ 4
      - 80 ÷ 4 = 20



Estimating Outside Wall Sheating Part 2

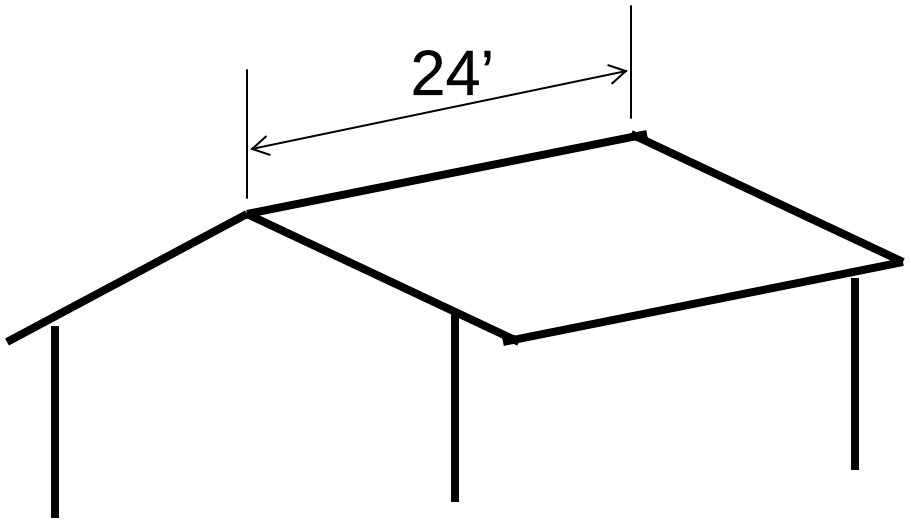
- Height of truss *times* (1/2 of the length of span of truss) *times* 2 *divided by* 32
  - Covers gable ends of truss
  - 4 x 8 x 2 ÷ 32 = 2



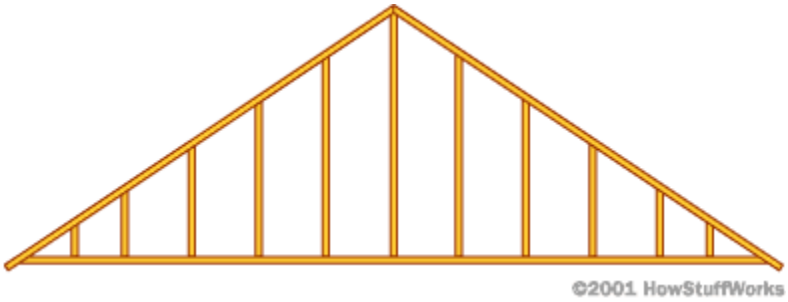
NUMBER REQUIRED	ITEM	COST EACH	TOTAL COST
129	2 X 4 X Precuts		
24	2 X 4 X 16		
4	2 x 8 x 12 Treated		
2	2 x 8 x 16 Treated		
5	2 X 12 X 8		
34	2 X 12 X 12		
6	2 X 12 X 16		
12	3/4" x 4' x 8' T & G Plywood or OSB		
22	1/2" x 4' x 8' CDX Plywood or OSB		
	16' Trusses		
		TOTAL LUMBER COST	**$**

Estimating Roof Trusses

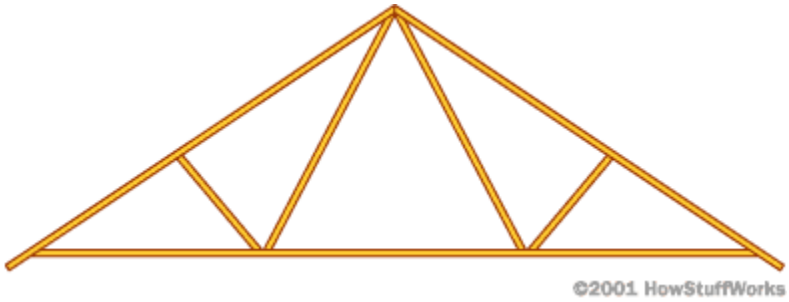
- Gable Roof
  - Length of house *divided by* 2 (24” O.C.) *plus* 1 (starting truss)
  - 24 ÷ 2 + 1 = 13
    - 2 gable end trusses
    - 11 web trusses



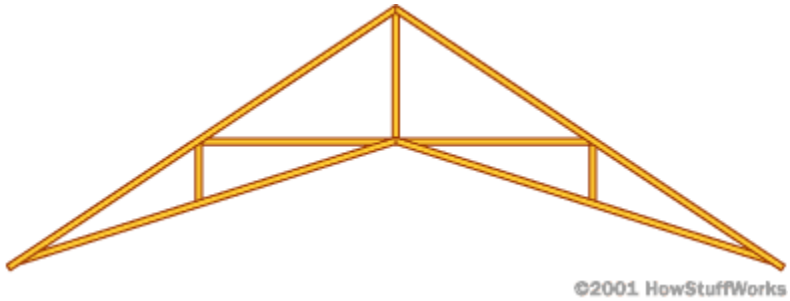
Types of Trusses



Gable End Truss

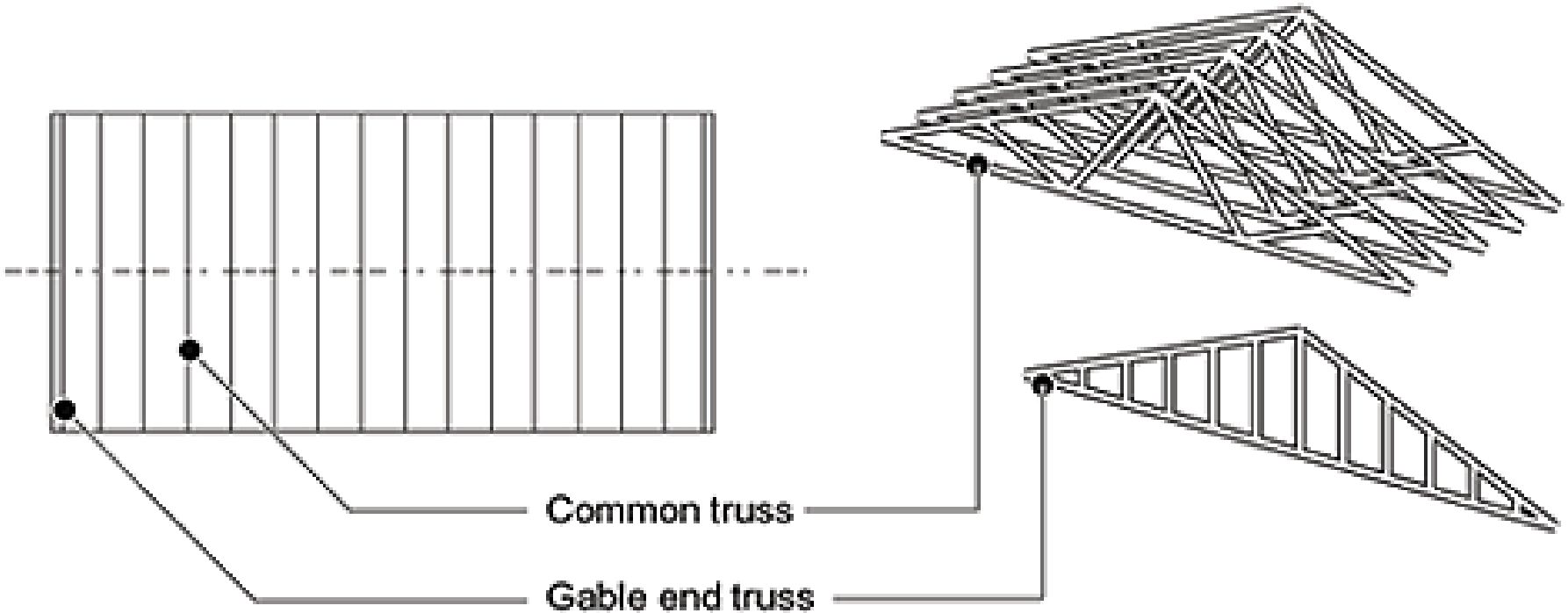


W or Common Truss



Scissor Truss

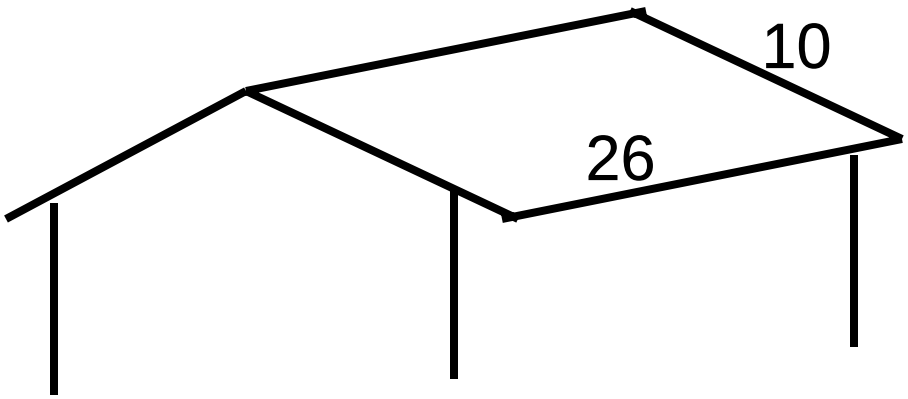
Location of Truss Types



NUMBER REQUIRED	ITEM	COST EACH	TOTAL COST
129	2 X 4 X Precuts		
24	2 X 4 X 16		
4	2 x 8 x 12 Treated		
2	2 x 8 x 16 Treated		
5	2 X 12 X 8		
34	2 X 12 X 12		
6	2 X 12 X 16		
12	3/4" x 4' x 8' T & G Plywood or OSB		
22	1/2" x 4' x 8' CDX Plywood or OSB		
13	16' Trusses		
		TOTAL LUMBER COST	**$**

Estimating Roof Sheating

- 1/2” or 5/8” x 4’ x 8’ Plywood or OSB
- Square feet of entire roof *divided by* 32
  - 10 x 26 x 2 = 520 ÷ 32 = 16.25
    - Round up to 17



NUMBER REQUIRED	ITEM	COST EACH	TOTAL COST
129	2 X 4 X Precuts		
24	2 X 4 X 16		
4	2 x 8 x 12 Treated		
2	2 x 8 x 16 Treated		
5	2 X 12 X 8		
34	2 X 12 X 12		
6	2 X 12 X 16		
12	3/4" x 4' x 8' T & G Plywood or OSB		
22+17	1/2" x 4' x 8' CDX Plywood or OSB		
13	16' Trusses		
		TOTAL LUMBER COST	**$**

NUMBER REQUIRED	ITEM	COST EACH	TOTAL COST
129	2 X 4 X Precuts		
24	2 X 4 X 16		
4	2 x 8 x 12 Treated		
2	2 x 8 x 16 Treated		
5	2 X 12 X 8		
34	2 X 12 X 12		
6	2 X 12 X 16		
12	3/4" x 4' x 8' T & G Plywood or OSB		
39	1/2" x 4' x 8' CDX Plywood or OSB		
13	16' Trusses		
		TOTAL LUMBER COST	**$**