

Explora Dome Roof Support Assembly Instructions

This is a lay out for the Roof & Dome Support for a 10 X 10 Observatory Building for the Explora-Dome.

These dimensions are approximate and may vary slightly. It is recommended that you use

2- 2 X 10's side by side on 2 sides of the Dome Support Area for the Dome Mounting Ring

I recommend using Screws for 2 reasons 1 they hold better and 2 If you make a mistake it is easier to repair it.

Always check with local building codes before starting this project.

Below is a list of materials you will need to build the Dome Support Structure for a 10 X 10 Building

2- 2 X 6's 119" Long

2- 2 X 6's 116" Long

2- 2 X 10's X 116" Long (Cut like Fig 1B) (4 if you are in Snow Country)

2- 2 X 10's 87" Long

20 - 2 X 10's X 13" Cut like section AA (Cut Last) Like page 2.

4 - 2 X 6's X 33" Cut 45 degrees on both ends like Fig. 4B Page 5

150 – 3 1/2" Screws and 30 – 2 1/2" Screws

If you build your Mounting Ring out of Plywood you will also need

18 - 2 X 2 3/4 X 4 1/2" Tall (Depending on how far apart you space them)

2 Pieces of 3/4" plywood cut like Diagram 2

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50 – 2 1/2" Screws

Step 1: Start by cutting 2 - 2 X 6's X 116" long and 2 – 2 X 6's X 119" long, now cut the 15 degree bevel on all 4 - 2 x 6's as shown in Fig 1A. Now assemble the 2 X 6's making the 119" Sq. frame, using 2 - 3 1/2" long screws in each corner, assemble all four sides. Once this is done trim off the little nub that sticks up on each corner of the 2 X 6's.

Step 2: Now take 2 of the 2 X 10's that are 116" long and cut like Fig. 1B and place the in the 2 x 6 square and set them to the measurements shown in Step 2 There should be 13" between the 2 X 6 and the 2 X 10's. Now place the 87" 2 X 10's also like shown in Step 2 there should also be 13" space between the 2 X 6 and the 2 X 10's Fasten them in place using 3 – 3 1/2" screws in each corner. Now you should have 87" between each 2 X 10 making a 87" square Fig 2 A. (If you are in Snow Country you may want to use 2 more 2 X 10's shown in red in Step 2 Fig 2 B. You will need to cut the outside edges on the 2 X 10 to the 15 degree bevel like the 2 X 6's. Then you will need to cut 12 of the spacers to 11 1/2" from the narrow end of the spacer this will allow for it needing to be slightly narrower on the wide end.

Step 3: Now in the 2 sections (Fig 3 A.) that are 87" long X 13" wide you can put in the 4 spacers shown that are shown in Fig 3 A, these should be 13" long and should be spaced 17 3/4" on center from each end. Leaving a little more space in the center. Fasten in place using 3 – 3 1/2" long screws on the 2 X 10 side and 2 – 3 1/2" screws on the 2 X 6 side.

(If it is not 13" between the 2 X 10 and the 2 X 6 than adjust the measurement accordingly).

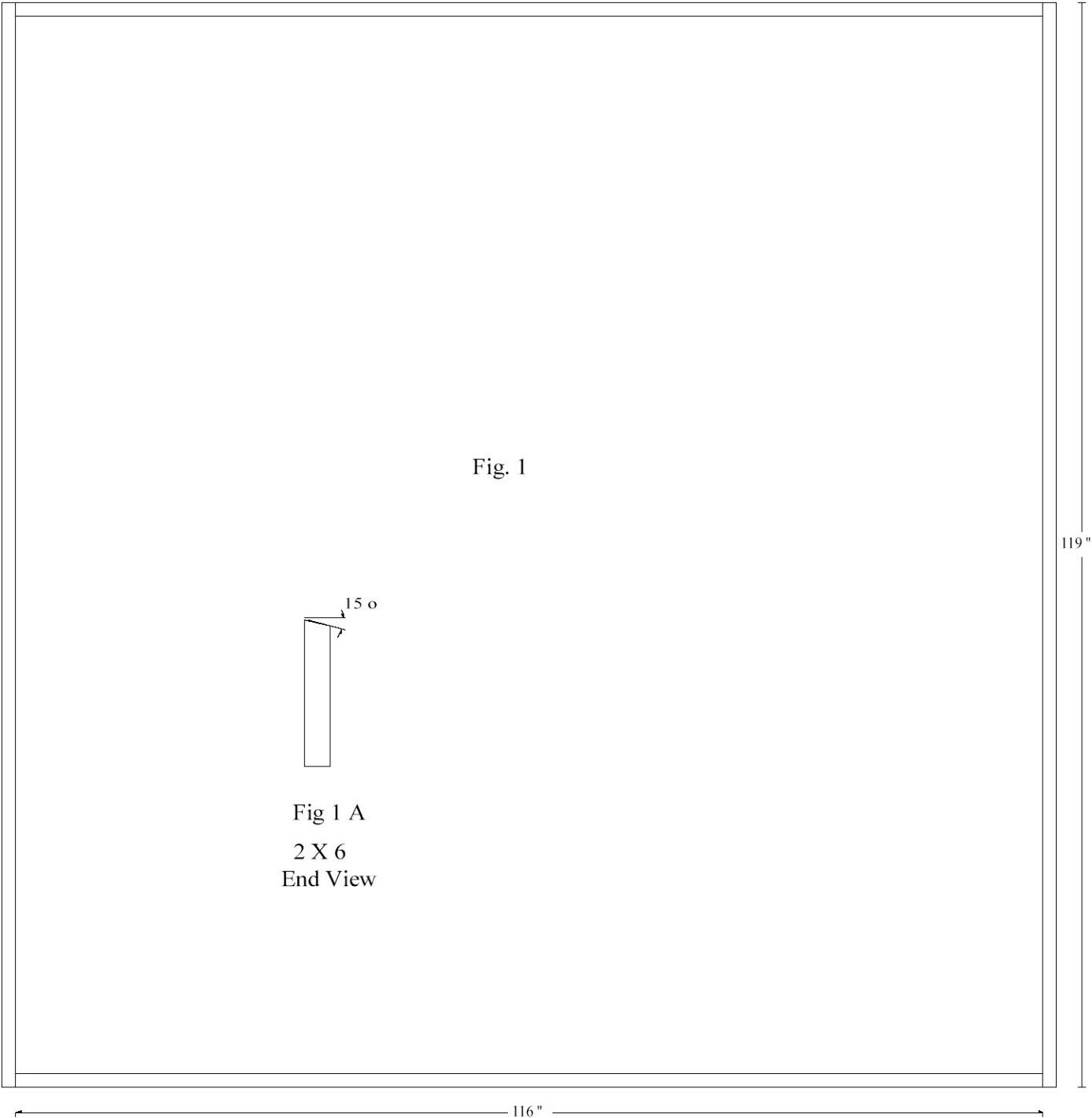
Step 4: Line up the 4 out side spacers with ea end of the 87" 2 x 10's already in place. (Fig 4A) Now measure in 17 3/4" from these spacers to the next set of spacers than put the second set of spacers in place and than measure in 17 3/4" again and set the 3rd set of spacers. It should look like Step 4. Fasten in place using 3 - 3 1/2" screws on the 2 X 10 side and 2 on the 2 X 6 side. Repeat this step on the other side also.

Now fasten the 4 – 2 X 6's that are cut 33" long and have the end cut at a 45 degree angle as shown in Fig 4D. Fasten in each corner of the subassembly as shown in Red in (Fig 4B) fasten in place using 2 – 2 1/2" Screws in each end start far enough in that they do not stick out the other side of the 2 X 10.

If you use our Roof Panels it Helps if you trim down the hump on the four corners pointed out below

Explora-Dome Roof Base Section Step 1

The Low side of the bevel goes to the outside of the square.



Explora-Dome Roof Base Section Step 2

Fig. 2

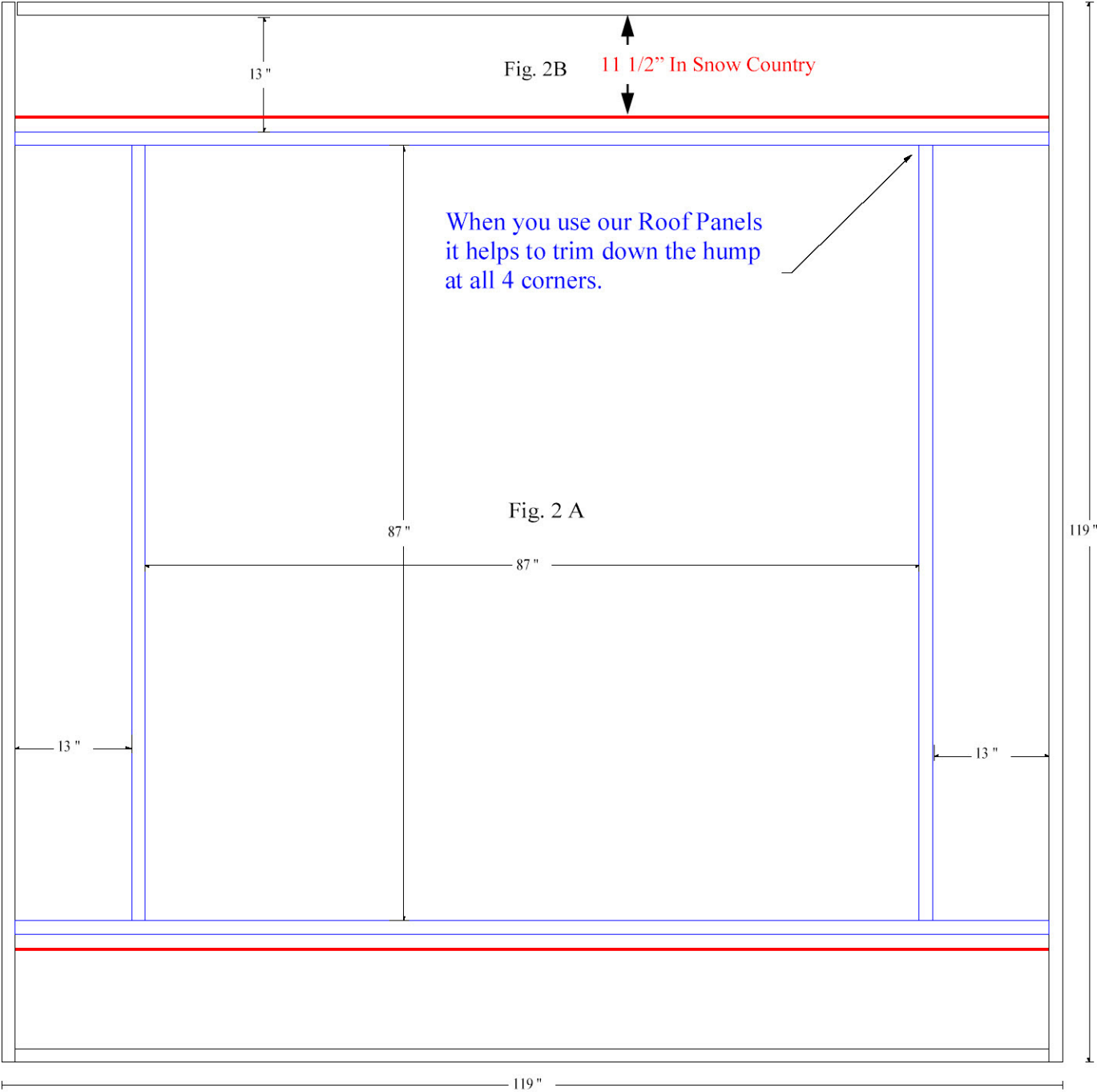
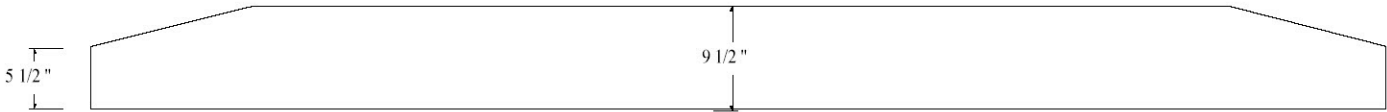
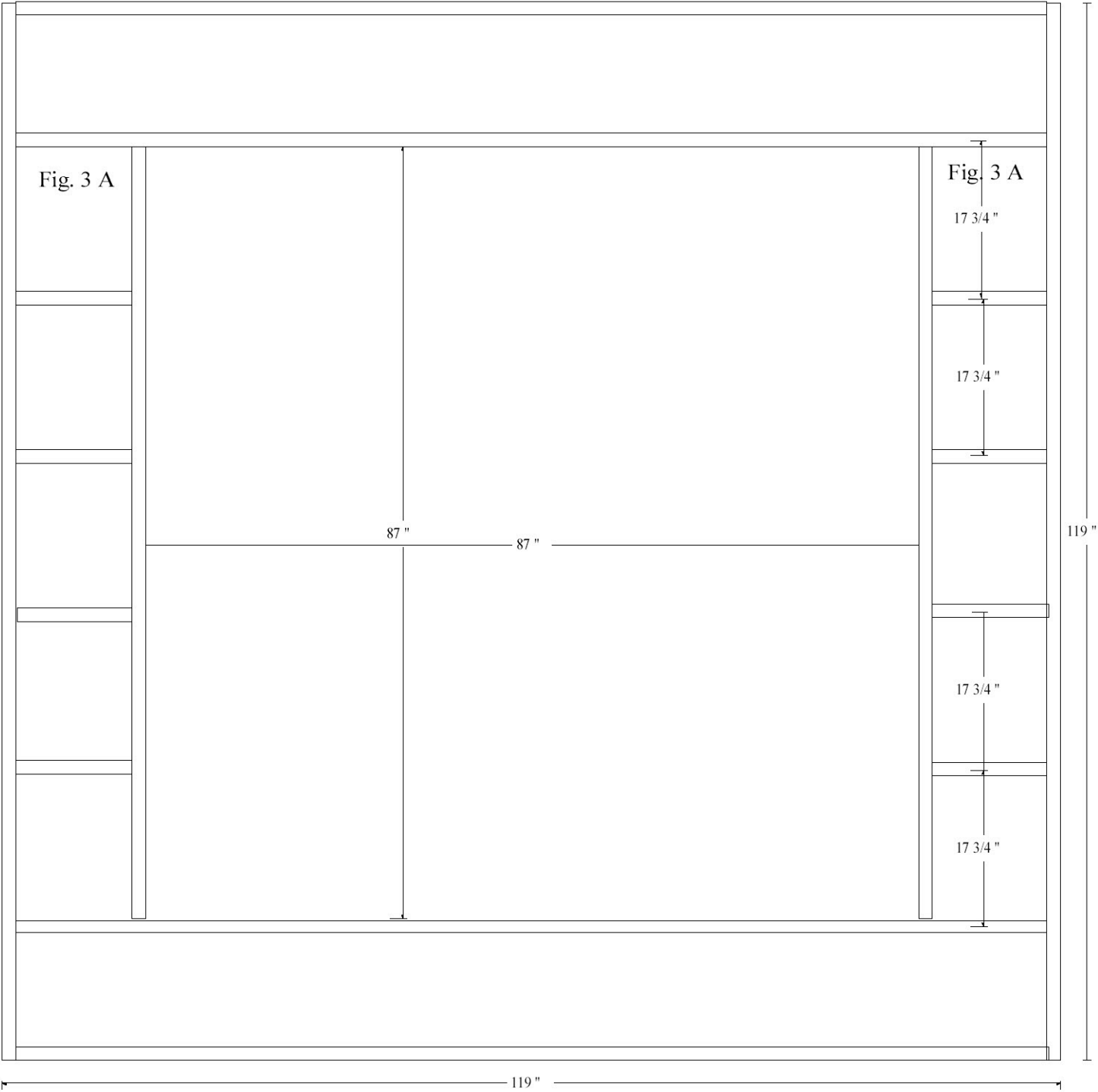


Fig 1B



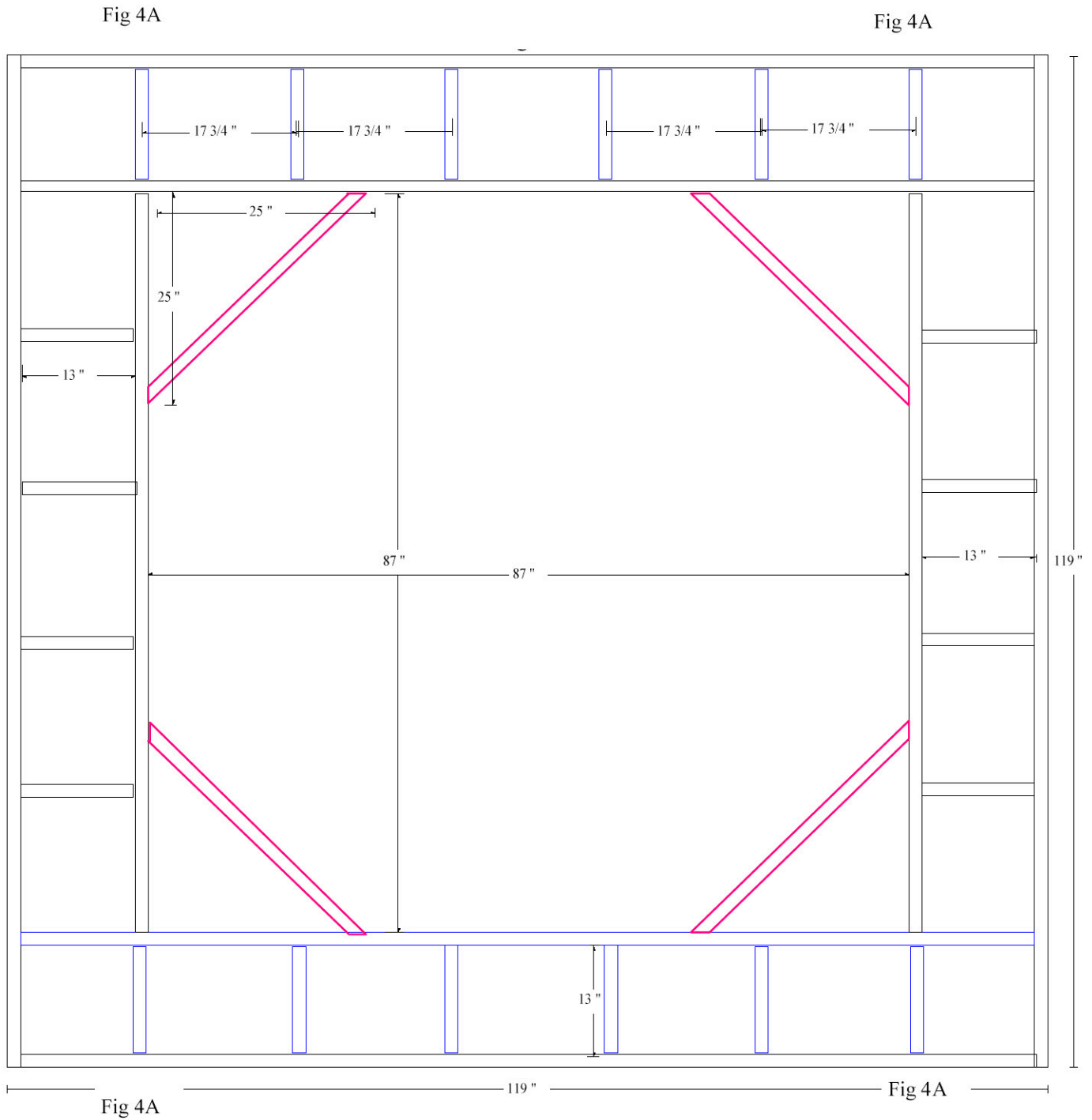
Explora-Dome Roof Base Section Step 3

Fig. 3



Explora-Dome Roof Base Section Step 4

Fig 4



Mounting The Plastic Mounting Ring or Building and Mounting a Wood Mounting Ring

Mounting the Plastic Mounting Ring. (Diagram 1 Page 7)

Start by checking the roundness of the Plastic Mounting Ring it is easier to stretch the smaller part of the ring out than it is to try and pull the larger part in. Cut a 2 X 4 the length needed to push the ring round, if you cut your 2 X 4 short just put some shims between it and the plastic ring. Once this is done you can mount the Plastic Ring to the Roof Support Structure. Start by placing the ring in the center of the Dome Support Structure.

It works best if you use 2" X 6" X 18 ga. flat metal straps. 4" up the plastic ring and 2" down onto the inside of the wood support structure. Use up to 8 straps to hold the mounting ring in place. You should use 6 – #10 X 3/4" Wood Screws 4 in the plastic and 2– in the wood. At this point it should look like the photo on page 7 (Diagram 1)

I also screw the ring through the side wall and down into the wood structure at an angle in 4 different places before I put the straps on just to help hold the ring round while I put the straps on and you can pull the ring where it may need it also.

Making the Mounting Rings out of Plywood and Attaching it to the Dome Support Structure shown on page 8 (Diagram 2)

Starting with 2- 4' X 8' X 3/4" Plywood forming a 8'X8' square mark the center of the 8'X8' square, measure out 47 1/2" and swing a full circle on the plywood to mark the outside of the ring. Now measure out 42" to mark the inside of the ring. Now cut out the 1/2 ring of plywood from each piece of plywood to make the top ring of the mounting ring. To make the bottom ring repeat the process but change the first dimension to 45 1/2" out from the center point to make a 91" Dia. circle and use the same second dimension of 42" from center point to make the id 84". Now cut out the second ring of plywood to form the bottom section of the ring.

If you want to use full 2 x 4's in between the 2 rings make sure you add to the inside circle dimension so your 2 x 4's don't hang over the inside of your plywood rings.

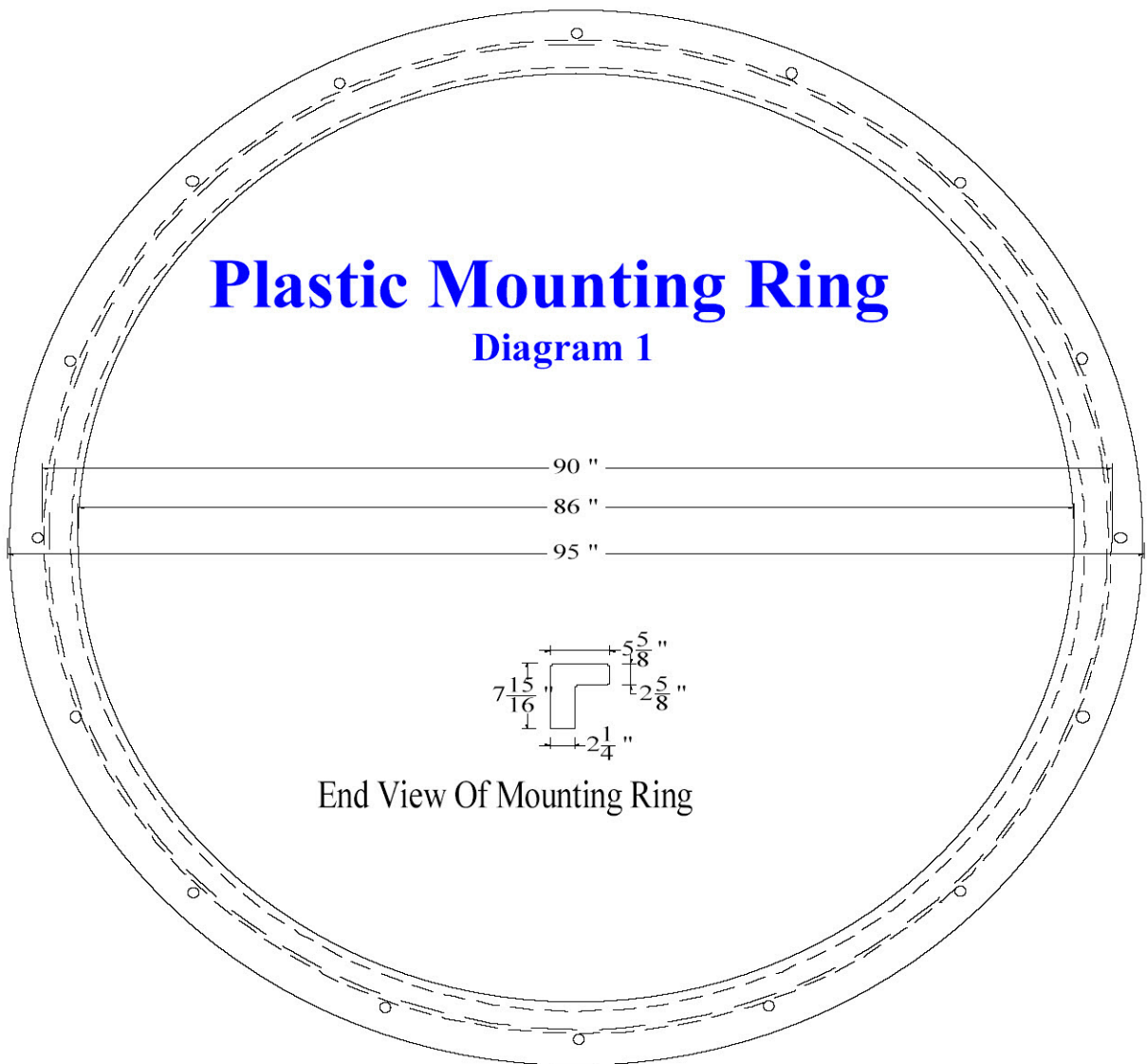
Now attach the 2 X spacers to the small ring of plywood using 2 1/2" screws, starting with one 2 X centered on each end of the plywood ring. Now divide the space between the 2 X's in to 9 equal points and fasten the 2 X's centered on these marks and flush on each side of the plywood using 2 – 2 1/2" long screws. Now using the same spacing measurement attach the remaining 2 X's on the second half of the smaller plywood ring. You do not put any 2 X's on the ends of this section, once you have the remaining 2 X's on the second half, butt the 2 ends together and fasten in place using the 2 1/2" screws. This should now be a full circle with the 2 X's pointing down. Flip this section over and lay one of the other plywood 1/2 ring on the 2 X's, **make sure that you start the second ring a 1/4 turn from the joint of the first section.** This helps to make the ring stronger and hold its shape better. Now the inside of the wider plywood ring should line up with the inside of the 2 X's on the lower section, screw in place with 2 1/2" screws. Now repeat this step for the second half of the ring.

Now attach the finished mounting ring to the Dome Support Structure roof support, keeping the round section centered to the opening. (Shown on page 9 Diagram 4) Fasten it in place using 8 – Screws 2 1/2" long, screw down through the narrow ring of plywood at the bottom of the Mounting Ring in to the Dome Support Structure in 8 different places.

At this point your Dome Support Structure should look like the photo on page 8 (Diagram 3)

Plastic Mounting Ring

Diagram 1



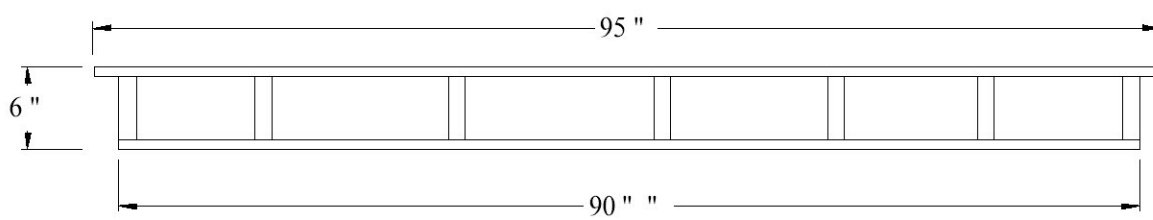
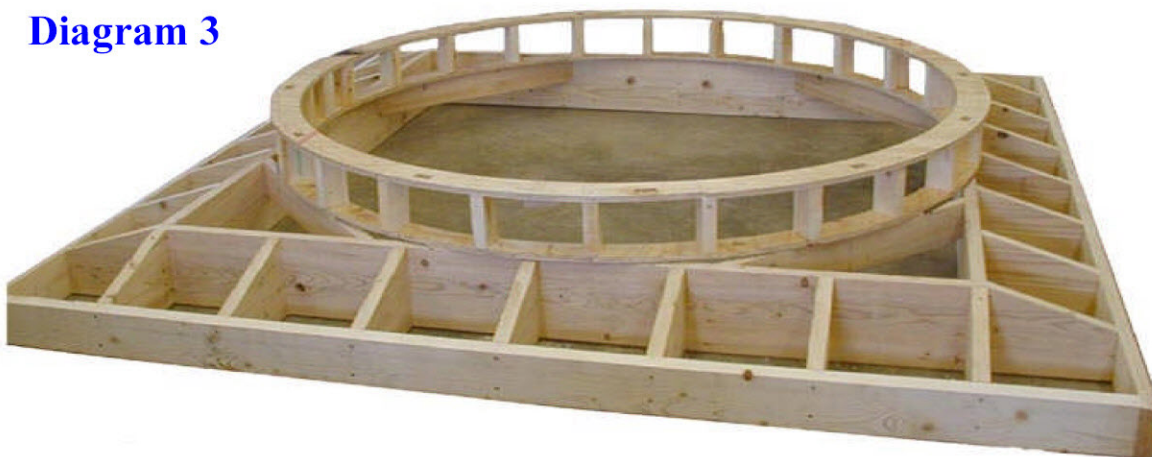
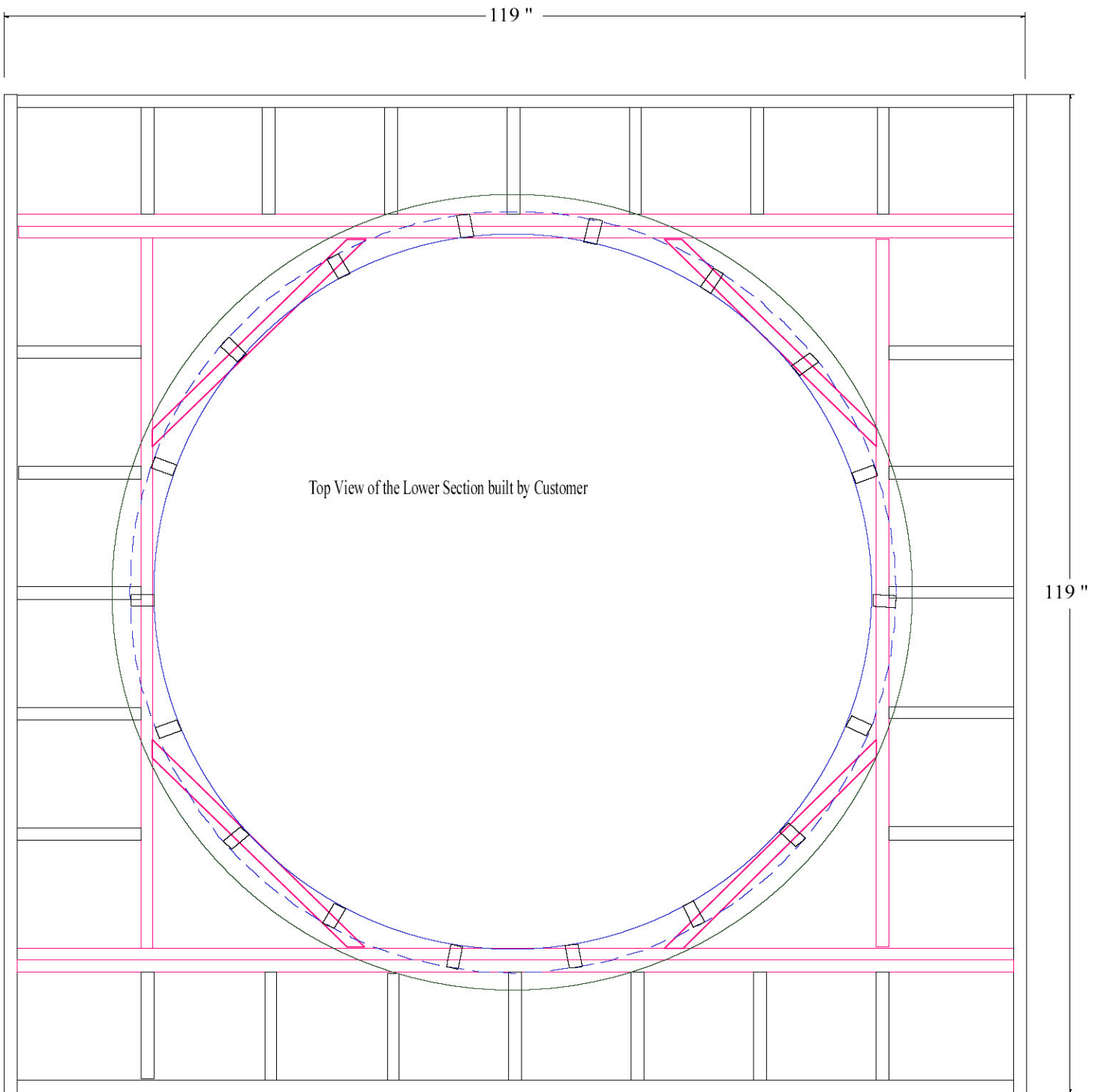


Diagram 3



Dome Support Structure Top View

Diagram 4



Roof Panel Assembly Instruction.

Step 1: If you built your roof section to the lay out we suggest you will want to shave the top corner slightly to help the roof panels fit better (Fig. 1 page 2).

Check the recessed area of the roof panels they should be rounded enough so that when the other roof panel is over it they fit together tightly in the corner (no gap). If they do not you will need to round the corner of the lower panel slightly so they do fit tightly together. You may also need to cut the height of the round section down to fit under your mounting ring depending on weather you used our plastic ring or built a plywood ring. Check the height between the bottom of the mounting ring and the top of the roof structure and cut the roof panels if needed

Step 2: Lay the panels on the frame work so the end of the panel that steps down is under the straight end of the other panel. (Figure 1) When you have all four panels on the roof structure put a ratchet strap around them and draw them snugly together as shown in (Figure 2). Now square the panels to the building by sighting down the length of the panels to see that they are straight and checking the amount of space that is over hanging each side of the building. If you have more space on one side but everything seems to be ok than this will be ok also. (You can just add a thicker spacer board on that side in the final step.) Now check where the panels overlap each other if the top panel extends past the recessed area of the lower panel you will want to cut them off so they are just inside the recessed area (about 3/8" or less) If you need to cut the roof panels mark where they are on the roof structure so you can put them back right where they were. (This will help keep every thing lined up to where you were when you marked them to be cut.) Now carefully mark the top and bottom of the top roof panels that need to be cut off than remove the panels and cut them off. Now reinstall them making sure to place them in the same location they were when you marked them.

Now recheck the top panel where it overlaps the bottom panel area of each seam if the top panel is inside the recessed area than check the overlapping corner of the panel to see if the fit in the corner is correct. Now check the section that is under the mounting ring and make sure it is properly trimmed and ready to be screwed. Now check the top roof panel where it goes over the side of the roof and down the wall to see that it is straight to the building. (I have had to cut the recessed area that is against the mounting ring off completely to get this part of the roof panel to match properly your choice) you just need to make sure you caulk it good when you caulk the overlapping seams of the roof panels. With all this done you should be ready start fastening the roof panels down. (Make sure the marks you put on earlier are still lining up, if they are not but every thing is fitting ok than remark them before you remove 3 of the roof panels.)

Step 3: Leaving 1 roof panel screwed in place under the mounting ring. Use the ratchet strap if necessary to hold this panel in place while you temporarily screw it in place and then on each panel as you reinstall them.

Apply the caulking to the recessed area of the panel that is in place on the roof as shown in (Figure 3) paying close attention to the corner even if you did not need to cut off the recessed area. Now place the 2nd roof panel in place paying close attention to not smearing the caulking out of the corner. Check to see that the panel is in place to your marks. Now screw the seam using the 1" pole barn screws. Place 1 about 1" up from the corner of the round section in to the mounting ring and 1 about 1" down from the underside of the mounting ring, than as needed down the seam to make a good fit. But Not Down the Lip of the roof panel yet. (The screws do not need to be fastened to a roof studs it is best if it floats) Now check the area under the lip of the roof panel that over hangs the side of the building if there is clearance there fill it up with a board the thickness needed, stay about 1/2" short of the corners as not to bind the corner of the roof panel when you pull it down into place. Now pull the roof panel down hard and screw in place using the 1" pole barn screws 1 about 4" in from each corner 1 in the seam and 1 evenly divided between the corner and the seam each way .

Next caulk the recessed end of the 2nd panel the same way you did the 1st panel and place the 3rd panel in place again paying close attention to the lapped area caulking. Again make sure the panel is in place properly , now screw the seam under the mounting ring the same way as the first panel than as needed down the seam. Now check the area under the lip of the roof panel that over hangs the side of the building if there is clearance there fill it up with a board the thickness needed, stay about 1/2" short of the corners as not to bind the corner of the roof panel when you pull it down into place. Now pull the roof panel down hard and screw in place using the 1" pole barn screws 1 about 4" in from each corner 1 in the seam and 1 evenly divided between the corner and the seam each way.

Next place before you place the 4th roof panel you should put it in place before you caulk it to make sure it fits properly you may also need to loosen the first panel depending on weather you screwed more than the lap and the corner. Now with the recessed end on panel 3 and the recessed end on panel 4 caulked carefully slip the recessed end of panel 4 under the straight end of panel 1 and over the recessed end of panel 3. Check to make sure it is in place properly and screw the seam the same way you have been starting under the mounting ring lip. Now check the area under the lip of the roof panel that over hangs the side of the building if there is clearance there fill it up with a board the thickness needed, stay about 1/2" short of the corners as not to bind the corner of the roof panel when you pull it down into place. Now pull the roof panel down hard and screw in place using the 1" pole barn screws 1 about 4" in from each corner 1 in the seam and 1 evenly divided between the corner and the seam each way .



Figure 1

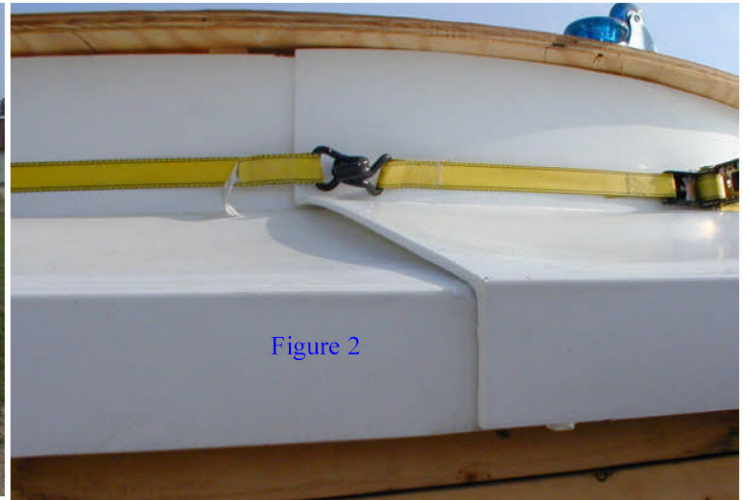


Figure 2



Figure 3

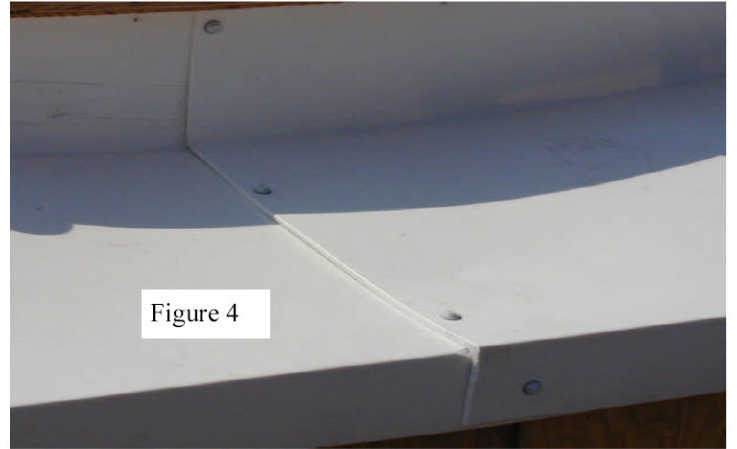


Figure 4

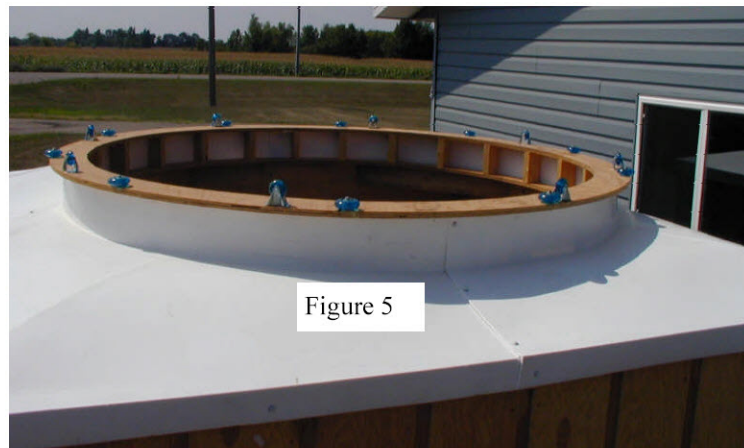


Figure 5

Figure 6

Explora-Dome Wall Lay Out For The 10 X 10 Building

Here is a sample lay out for the walls and floor of a 10 X 10 building. I have resized the over all width and length to make a little more clearance when you use our Plastic Roof Panels. The height of your walls and column is determined by how you want to be seated when looking out your telescope and the horizon height. The location of your support column needs to be determined by the scope and scope mount you are using and the zenith location you wish to view. Under most circumstances the column is 4 – 6” off set forward of center so you can get a better view of zenith.

A few of the Telescopes that have been under this Dome are a 14" Cassegrain, 10" F5 Devonian W/ 2' Walls Refractor under 4' in length. These measurements are meant as a guide and may vary slightly!

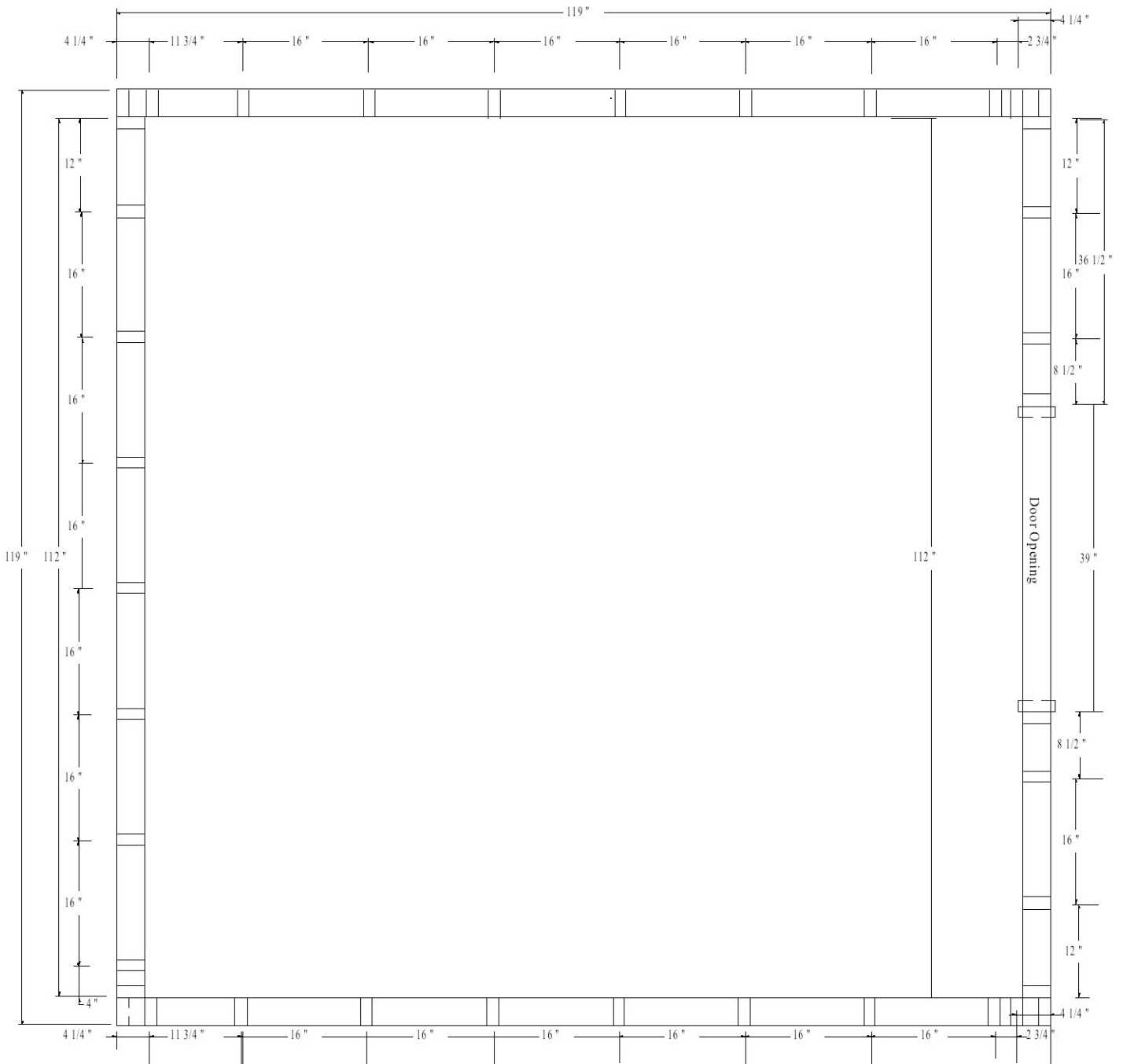
Materials Needed:

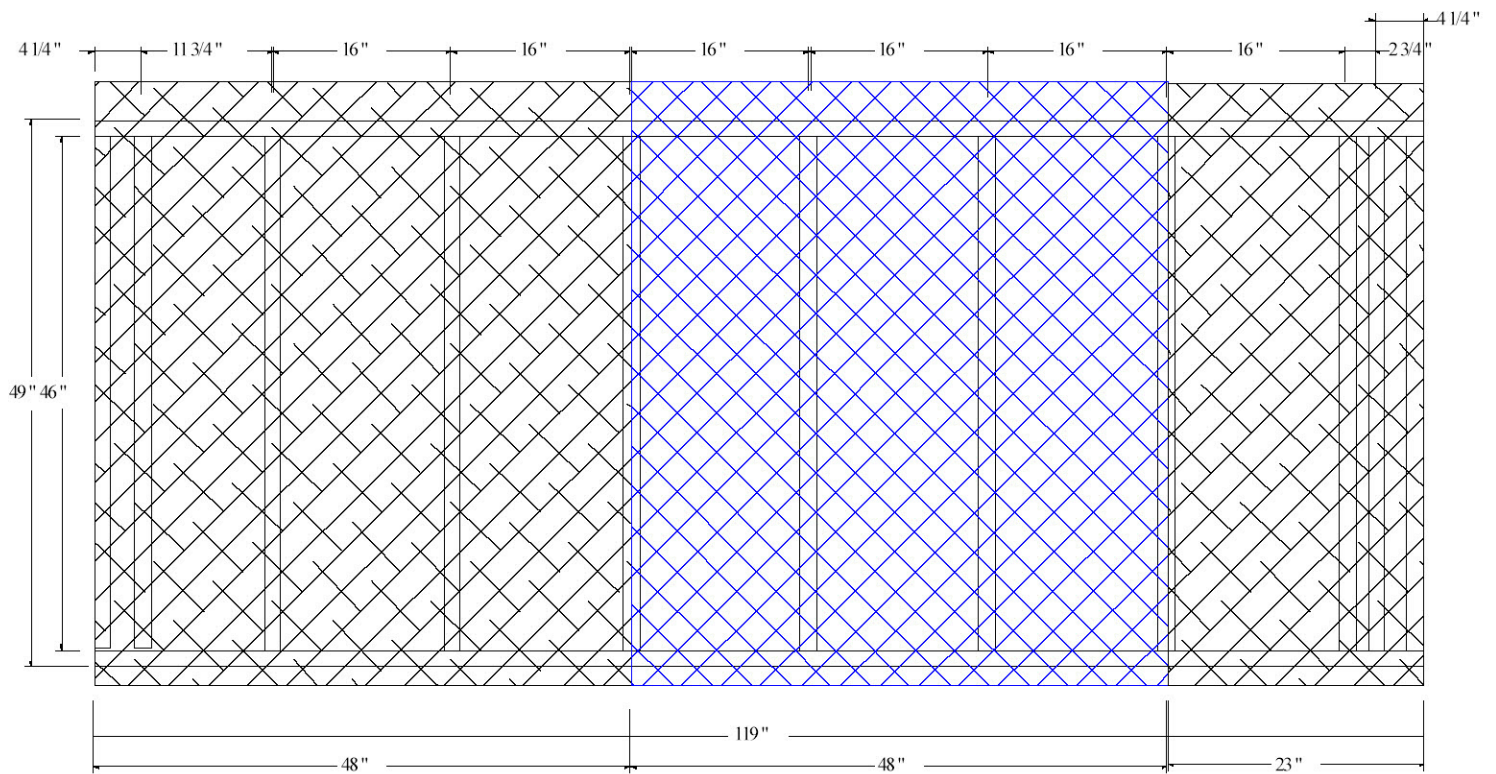
40 – Wall Studs 2 – 2 X 4 X 119” 2 – 2 X 4 X 112” 1 – 2 X 6 X 12’ cut to 4 5/8” Wide for the Door Jam.

12' - Brick Molding for Door Frame 12'- 1 X 2 for Door Stop 5 - 4' X 8' X 54" Siding T-111 or similar.

2 – 2" X 2" X 8' for backing the Plywood for the Door if you want to support it more. 110 3 1/2" Screws

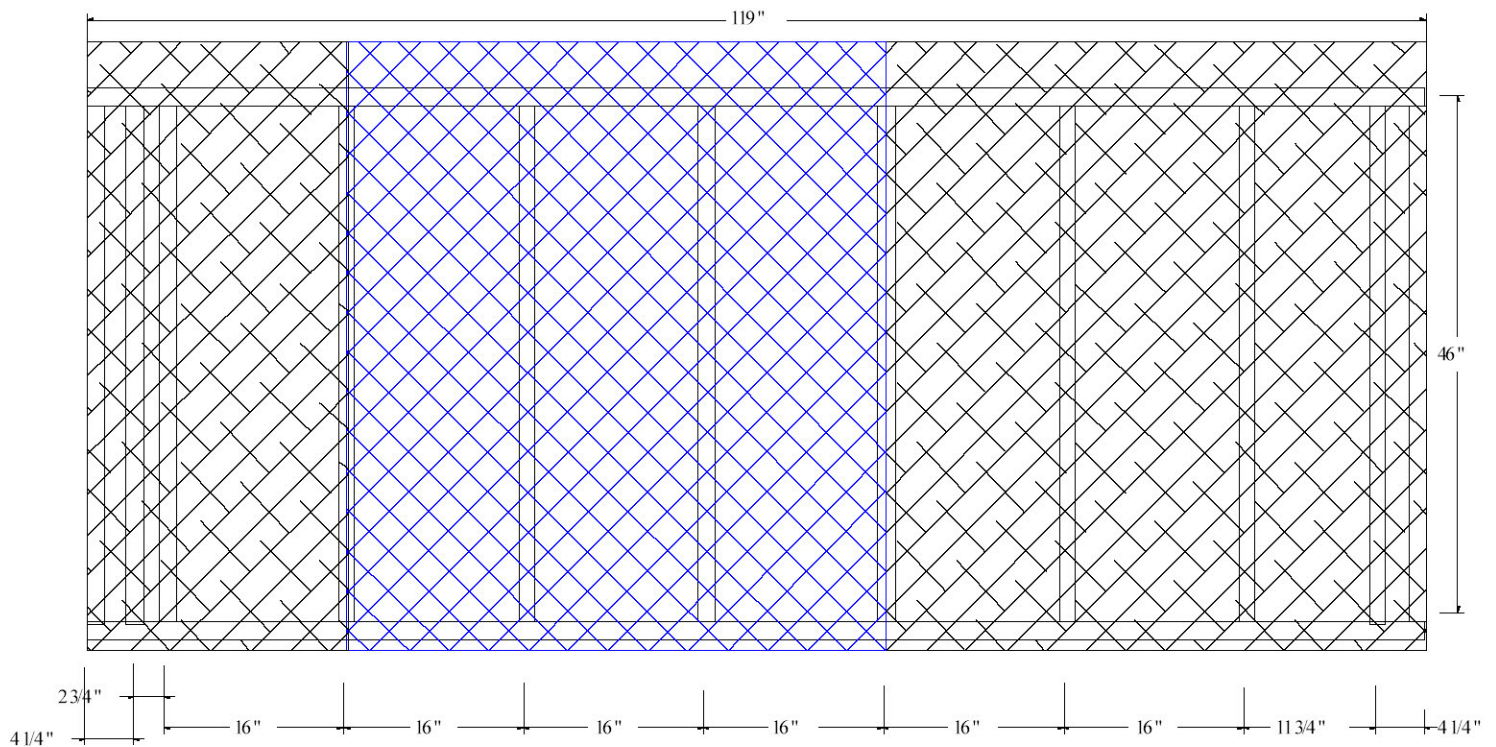
OR a piece of Plywood 3/4" X 35 1/2 X 48.

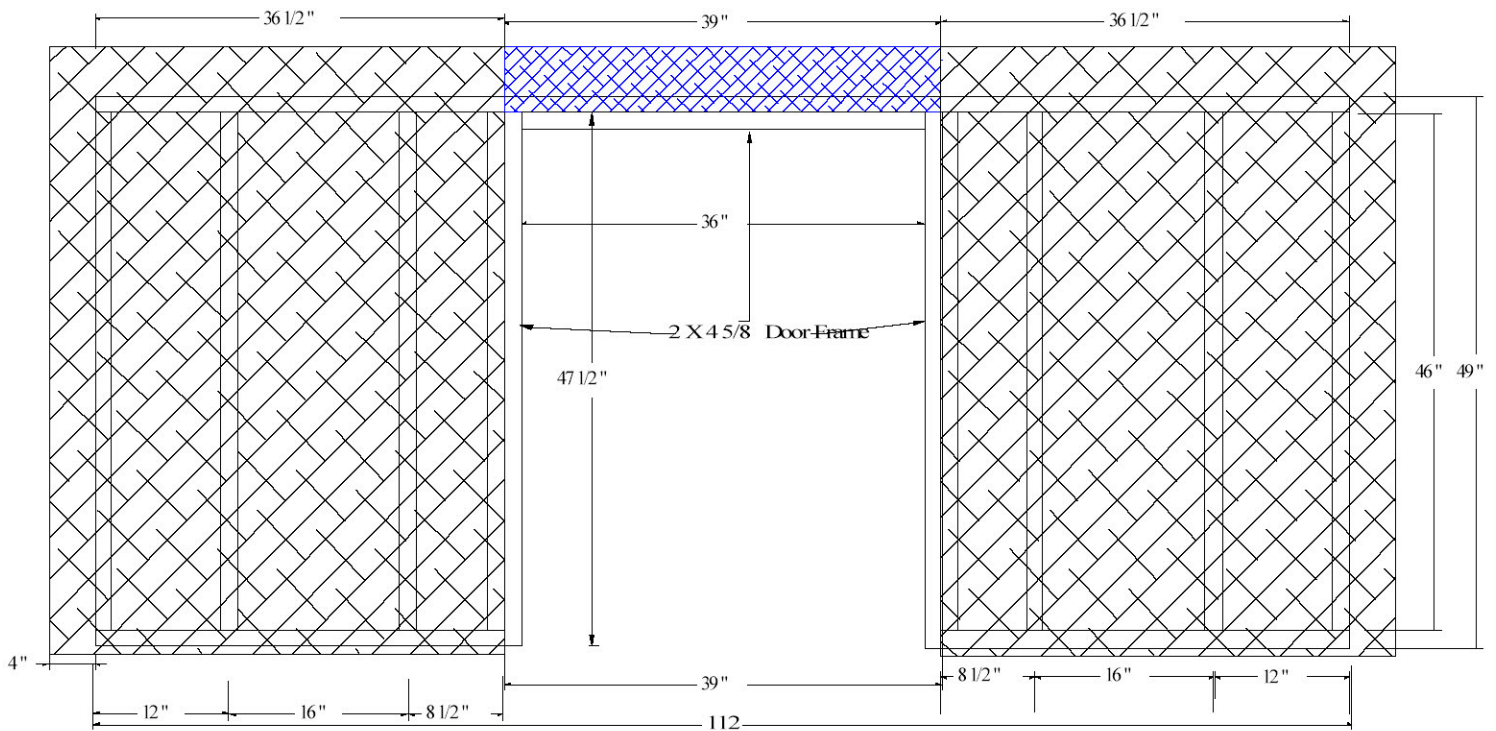




Side Walls

The lay out of the wall studs allow for the best usage of 4' wide siding. On the average the wall height before the roof support is installed is 49" . With my Roof Support Lay Out add 2' to the wall height to get the horizon point on the Dome.

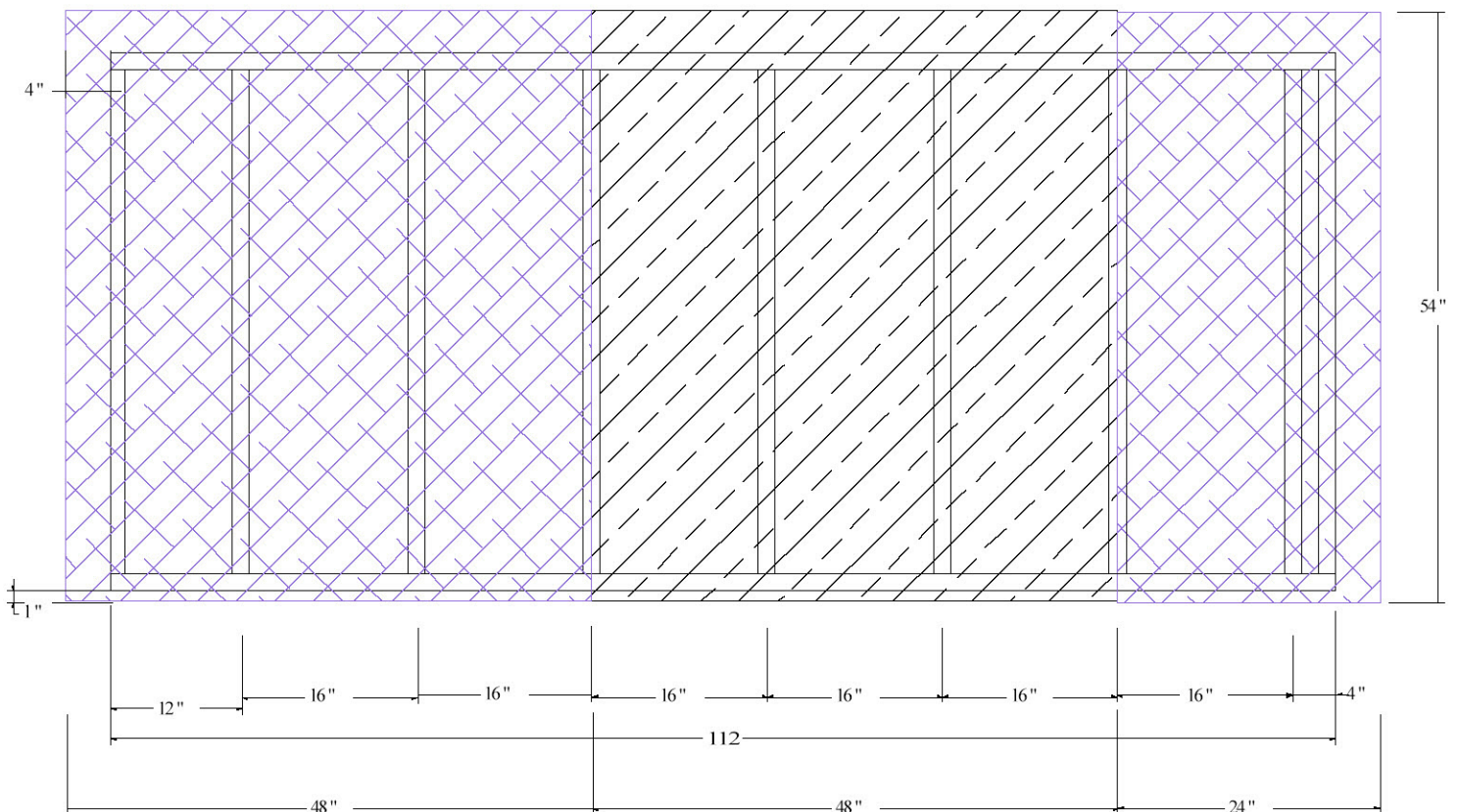




Back Wall And Front Wall

The lay out of the wall studs allow for the best usage of 4' wide siding. On the average the wall height before the roof support is installed is 49" . With my Roof Support Lay Out add 2' to the wall height to get the horizon point on the Dome.

We allow the siding to over hang the plywood on the floor by 1" to cover the edge of the floor plywood. The remainder of the siding goes up the side of the Roof Support to cover that enough so when you install the Roof Panels they are long enough to go over the siding. The siding over hangs the ends of the wall studs by 4" on each end of the 112" wall lengths because these walls go between the 119" walls.



Explora-Dome Floor Lay Out For The 10 X 10 Building

Here is a layout for the floor section (for best usage of the plywood,) there is a section in the center of the floor that is boxed out for the pier if you want to be able to build the floor in two sections and slide it up to the pier and have adjustably in the floor location.

You will need to determine the depth of the 2 X you want to use in your floor support. We figured on 2 X 8's Treated and 3/4" Plywood Treated also.

Material Needed:

9 - 116" Long 4 - 46 1/2" Long 2 - 47 1/2" Long and 2 - 119" Long and 3 1/2 - 4 X 8 X 3/4" Plywood
110 - 1 3/4" Screws 90 - 3 1/2" Screws

