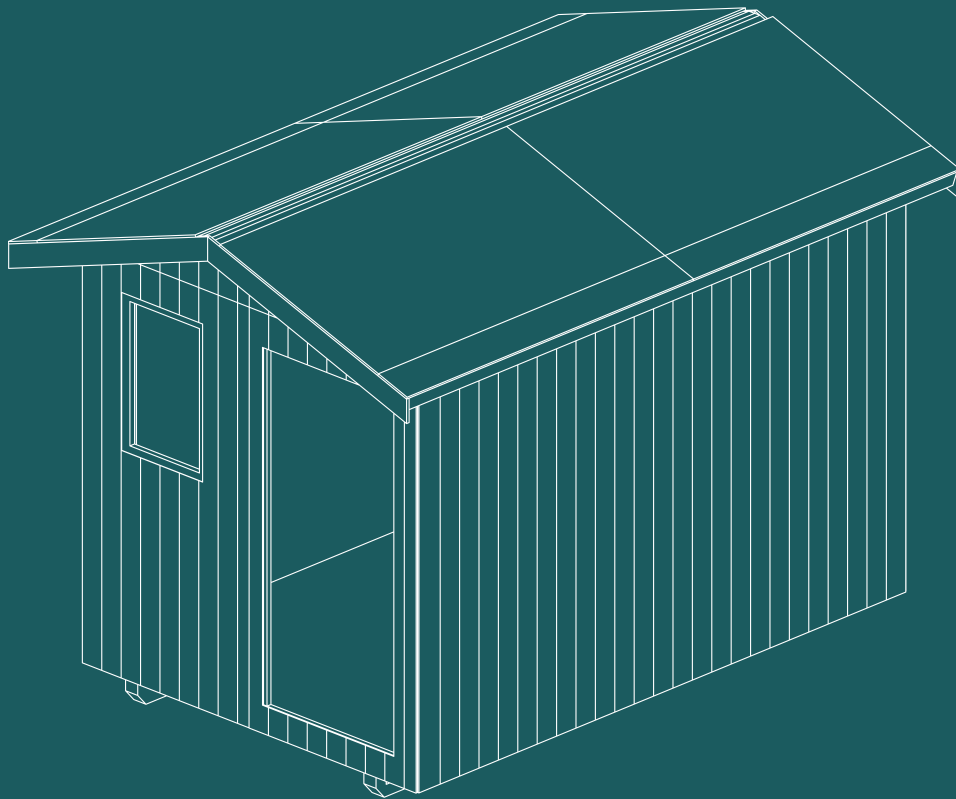


TINY HOME

CONSTRUCTION MANUAL



A COLLABORATION: LIHI AND JACKSON | MAIN ARCHITECTURE
LAST EDITED ON OCTOBER 12, 2022



ACKNOWLEDGEMENTS

Thank you to all of the advocates and organizers behind us, whose relentless efforts have created a world where we have a chance to rebuild a long-broken shelter system. May that dream be realized and may there be housing for all.

Thank you to our amazing partners at The Wood Technology Center, Seattle Central Colleges, and Environmental Works for their historic work on supporting earlier versions of this manual.

Thank you to all of the resident-leaders and organizers in our tiny house villages community, whose input was an invaluable resource to guide this manual.

Thank you to our amazing partners at The Tulalip Tribe, Sawhorse Revolution, The Apprenticeship in Non-Traditional Employment for Women (ANEW), Seattle YouthBuild, The PACT Program, The Seattle Skills Center, and many others who helped ensure that this manual works for students in the furtherance of their education.

Thank you to all of the amazing volunteers, students, and organizations that have supported this movement by building tiny houses over the years. Your efforts are appreciated – every day, every night, every storm, and every winter.

This construction manual is brought to you via the collaborative work of two agencies – the Jackson Main Architecture (JMA) firm and the Low Income Housing Institute (LIHI). The JMA architectural team was led by Katerina Prochaska and included her colleagues Meghan Craig and Dani Karr. The LIHI construction team was led by Stephanie Colbert and included her colleagues Bradford Gerber and Guy Astley. The prototype tiny house construction team was led by Abdul Jones and included James Rey and Tom Highland. The photos were taken by Abdul Jones. The behind-the-scenes administrative work was completed by Rebecca Finkes. We are deeply appreciative of this collaborative JMA-LIHI teamwork and their many hours of discussion, design development, construction, formatting, writing and illustrating. This excellent guide will assist you in the construction of a safe, comfortable and sound home for people in a housing crisis/ transition. AND ... you will learn a lot about construction methods and standards. Act safely and have fun!

INTRODUCTION

“At the Low Income Housing Institute, we believe that Housing is a Human Right, and we work constantly to ensure that everybody has access to affordable and quality housing. We work so hard for this goal in the face of challenging odds - housing unaffordability, homelessness, gentrification. Now more than ever do we need innovative solutions, and to come together to remember all of the ways that community members can support each other to solve seemingly intractable problems.

Your work of showing up to build a tiny house for someone that is experiencing homelessness is one of the most direct and tangible ways that a member of our community can face down these odds. Tiny House Villages are both extraordinary and beautifully mundane. Five, ten, or fifty houses can be brought together around community spaces to quickly and cost-effectively fit into the holes that have been left behind in our housing market and economy. In Seattle, a village for 50 people can be built at nearly 1/25 of the cost, and at nearly ten-times the speed, as one affordable studio apartment.

Couples, families, people with pets, or people with disabilities can stay in tiny house villages when they may be ineligible to stay in other shelters. On-site services not only help keep villages supported and transparent, but support residents in taking steps towards permanent housing that might otherwise have been unattainable.

We thank you for lending your time and your energy into building a tiny house. May it be a positive, fun, challenging, safe, and rewarding experience - and may it remind us all how to stand up to the challenges in front of us.”

– Sharon Lee, LIHI Executive Director

For anyone interested in building a tiny home, volunteering at a village site or supporting in any other way, please email your interest to tinyhouses@lihi.org. A staff person will reply and help you get involved. Thank you!

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FLOOR CONSTRUCTION

NOTE: For definitions of floor framing terminology, see *Tiny Home Construction Manual Dropbox*

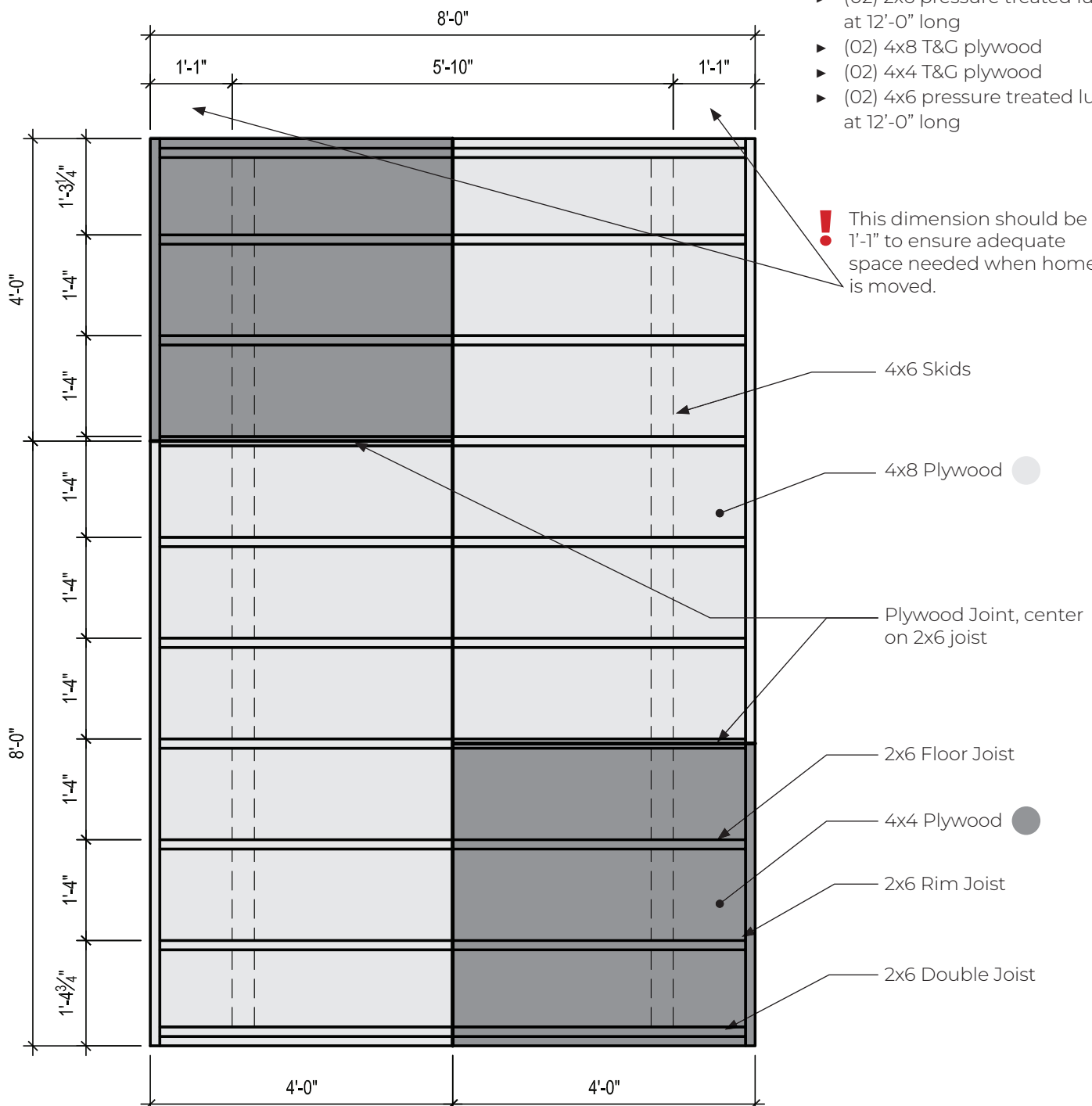
STEP 01	FLOOR FRAMING
STEP 02	SUBFLOOR
STEP 03	FLOOR INSULATION
STEP 04	SKIDS & HURRICANE TIES

FLOOR FRAMING PLAN

Wood Cut List:

- ▶ (12) 2x6 pressure treated lumber at 7'-9" long
- ▶ (02) 2x6 pressure treated lumber at 12'-0" long
- ▶ (02) 4x8 T&G plywood
- ▶ (02) 4x4 T&G plywood
- ▶ (02) 4x6 pressure treated lumber at 12'-0" long

 This dimension should be 1'-1" to ensure adequate space needed when home is moved.



STEP 01: FLOOR FRAMING



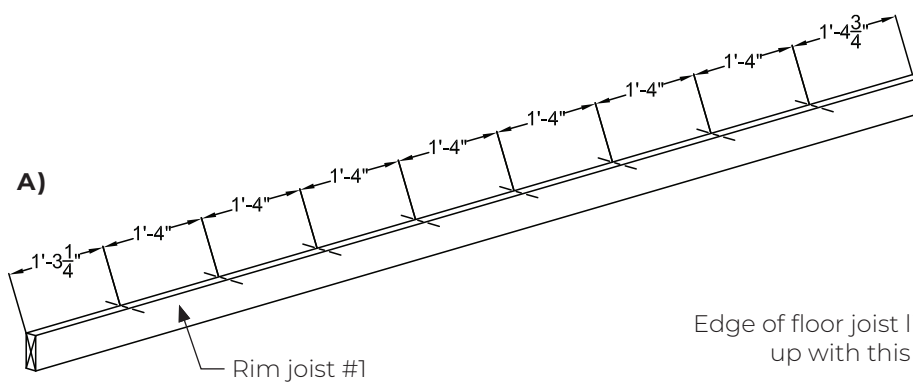
Materials: 2x6 pressure-treated lumber; 16d sinker nails;

Refer to the material and cut lists for details.



Photo: Floor Joist Layout

Crown or "high edge" of the joist



Edge of floor joist lines up with this line

"X" marks the location of the joist

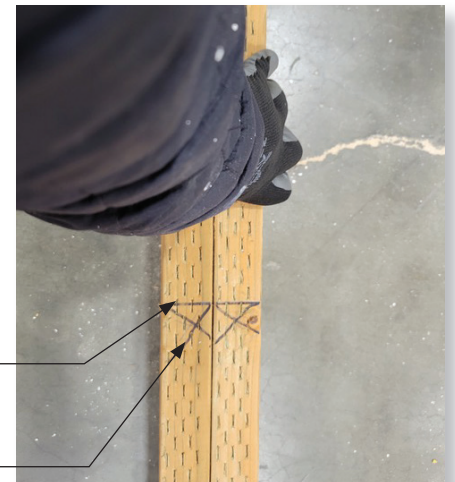
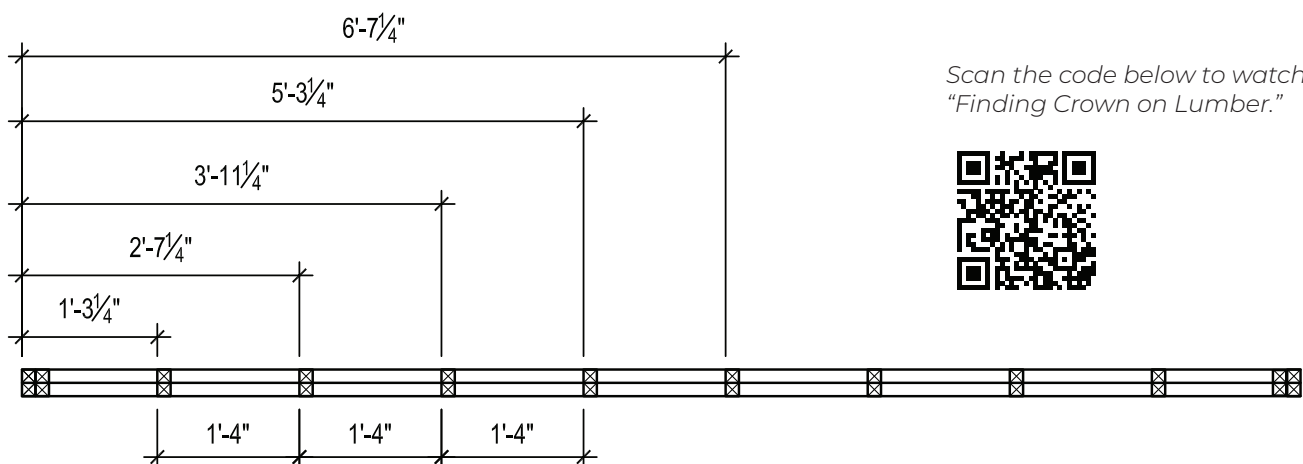


Photo: Rim Joist Tick Marks



HOW TO ASSEMBLE THE FLOOR

1. Pre-cut the 2x6 lumber to the lengths as listed in Floor Framing Plan & cut list. Be sure to mark the crown of each floor joist with an arrow showing high edge. **See photo, Floor Joist Layout. Watch video, Finding Crown on Lumber.**
2. On the topside face of the 12'-0" rim joists, mark the edge of each floor joist location using a speed square. Start measuring 15 1/4" from the edge of the rim joist, and continue at 16" O.C., **per detail A.**
3. Stack the two 12'-0" rim joists on top of the other and copy the tick marks from one joist to the other. **See photo, Rim Joist Tick Marks.**
4. Start assembling the frame with the outside rim joists.
5. Double up the 2x6 floor joists at the front and back of the home.

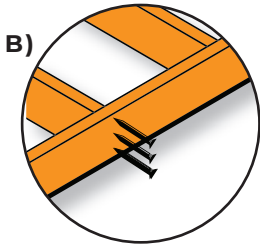
Scan the code below to watch video, "Finding Crown on Lumber."



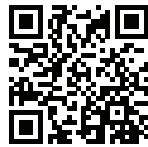
STEP 01: FLOOR FRAMING (CONT.)



Materials: 2x6 pressure-treated lumber; 16d sinker nails; Refer to the material and cut lists for details.

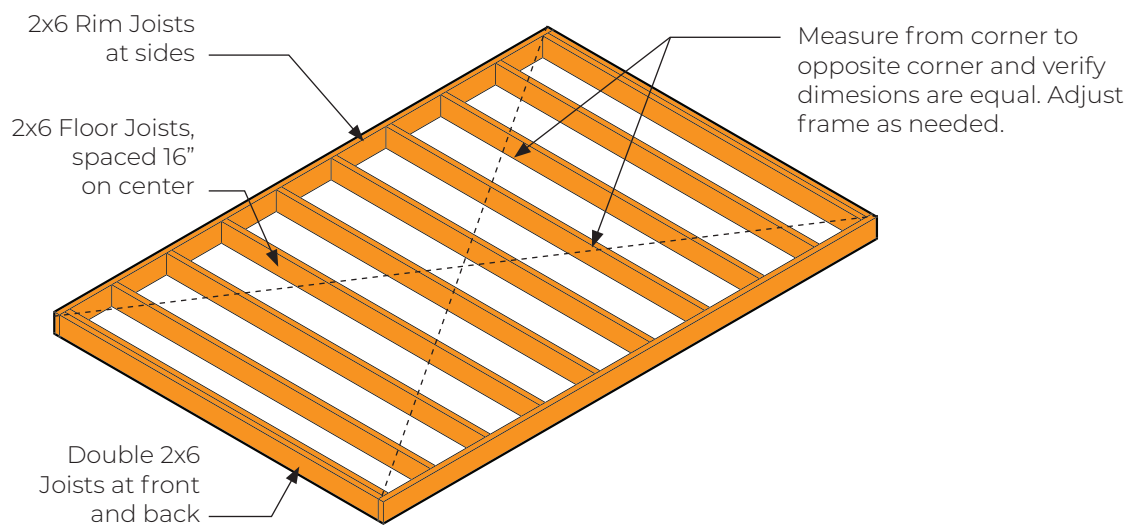
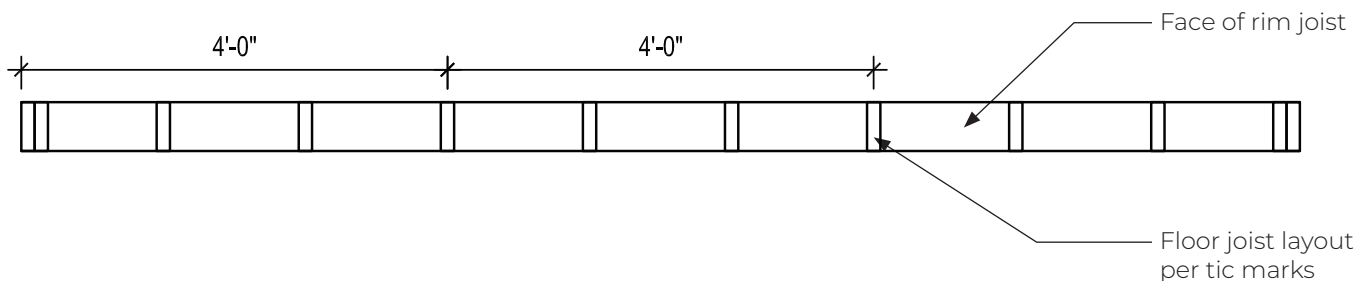


Scan the code below to watch video, "Checking Diagonals for Square."



6. Using the tick marks previously made, install the floor joists between the rim joists using three 16D sinker nails from the outside of the rim joist into the end of each floor joist, **per detail B**.
7. Once the floor frame is assembled and nailed, check the diagonal measurements to ensure they are equal and that the frame is square before sheathing.

If the diagonal measurement is too short: stand on one corner of the frame and using a hammer, strike the adjacent corner. If the diagonal measurement is too long: stand on one corner and strike its opposite corner. Check again and repeat this process as needed until the diagonal dimensions are equal.



STEP 02: SUBFLOOR



Materials: 3/4" T&G plywood; subfloor adhesive; 8d box nails;

Refer to the material and cut lists for details.

Pound panel #3 and #4 against panels #1 and #2. Pound against a 2x4 held up to edge of plywood panel to protect panel edge

Interior panel joint - locate panel butt edges on centerline of joists

Groove edge of panel #3

Tongue edge of #3

Chalk lines to mark location of centerline of joists

Note: Be sure that the chalk lines at the top of panel #1 & #2 are aligned with the center of each joist. Push or pull joist as needed to align.

Groove Edge

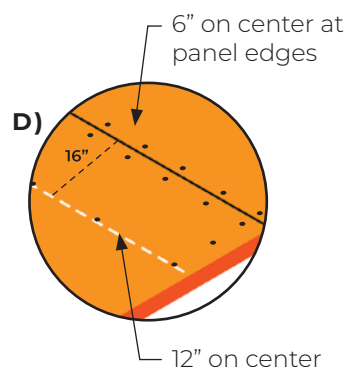
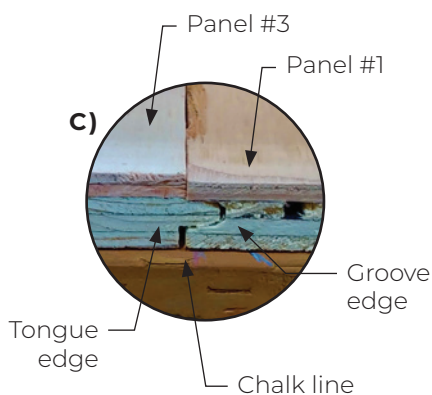
Tongue edge of panel #4

Interior panel joint - locate panel butt edges on centerline of joists

Start nailing **panel #1** along this edge

Tongue edge of **panel #1**

Chalk lines to mark location of centerline of joists



8. Cut one 4x8 plywood sheet into 2 4x4 pieces (#3, #2), 2 plywood sheets (#1, #4) remain full size at 4x8.
9. Measure 48" from the 12' long rim joist to the center of each short end floor joist. Snap a chalk line down the center of the 3rd floor joist.
10. Add chalk lines on top of plywood that locates the centerline of each joist. Mark 16" from front or back of 8' long rim joist. Mark another 16" until the center of each floor joist location is marked on the plywood **see photo on page 7**.
11. Place the first two pieces of plywood on the frame and check for frame and layout accuracy. Remove the sheets and apply a 1/4" bed of subfloor construction adhesive to the top of each joist. **See photo, Framed Floor with Sheathing Adhesive on page 7**.
12. Align the grooved edge of plywood panel #1 and #2 with the centerline chalk line on the joists, **see detail C**.
13. Adjust panel #1 joist markings to align with each floor joist.
14. Nail the subfloor with 8d sinkers at 6" on center along edges, and 12" on center in the interior of the plywood, **see detail D and photo on page 7**.

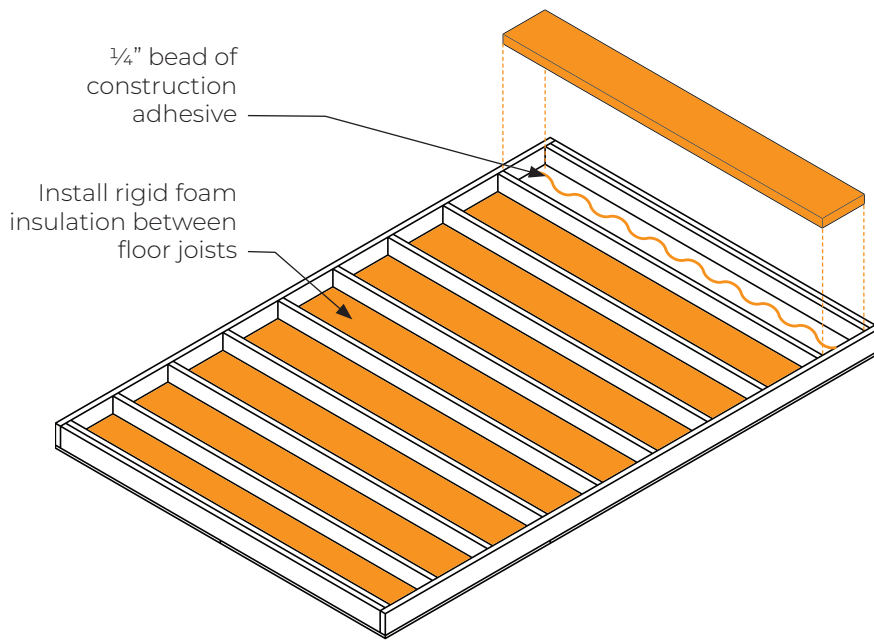
NOTES:

- Start with Panel #1 and nail the long edge to rim joist first. Verify your floor is square and floor joists line up with your chalk line marking on the plywood. Then nail the short edge and proceed to nail all edges of panel #1. Move to panel #2 and so on.
- Check work by walking floor. Look for missing and improperly installed fasteners; Adjust as needed.
- All four edges of each plywood panel should be nailed. Nail firmly into the rim and floor joists below. Top of nail heads should be flush with top of plywood floor.

STEP 03: FLOOR INSULATION



Materials: 2" minimum Rigid Foam Insulation; Wood-foam adhesive; Refer to the material and cut lists for details.



15. Flip the floor frame over so that the plywood is on the bottom.

► **NOTE:** Be very careful flipping the floor frame. We recommend 2-4 people to accomplish this task safely.

16. Cut rigid insulation to fit snugly between floor joists - sizes will vary depending on location.

17. Apply a 1/4" bead of construction adhesive (for foam board) in an "S" pattern to the underside of the plywood.

18. Install the rigid insulation between floor joists and tight to the underside of the plywood, **see photo, Installing Rigid Insulation Floor.**

NOTES:

- If needed, fill any large gaps along the edges of the insulation with latex or foam caulking so that all of the underfloor is sealed well.
- If insulation is foiled, install with foil side up - facing heated area.
- Scan the below QR code for a video with tips on cutting rigid insulation board.

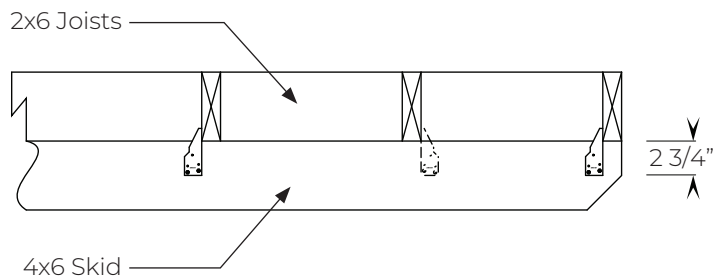
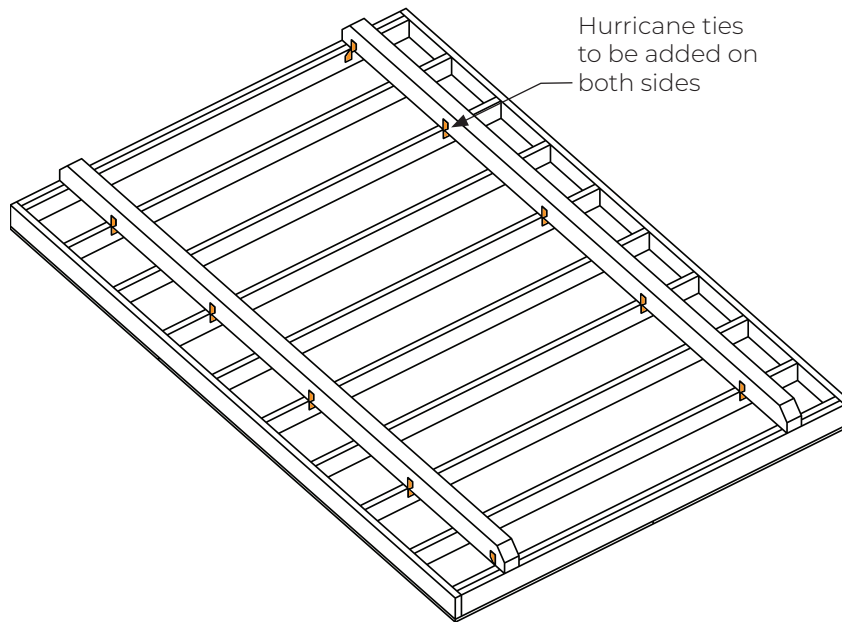


Photo: Installing Rigid Insulation Floor

STEP 04: SKIDS & HURRICANE TIES

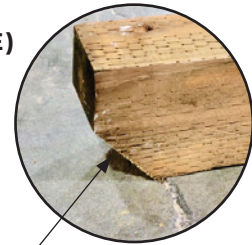


Materials: 4x6 Pressure Treated Beam; Hurricane ties and hanger nails; Refer to the material and cut lists for details.



19. Cut the 4X6 PT skids to exactly 12'-0". Then bevel cut all ends at a 45-degree angle **per photo E** and **schematic Skid Bevel Cut**.
20. With floor still flipped over so plywood is on the bottom, set skids 1'-1" from the outside edge of rim joists. **See Floor Framing Plan on page 1.**
21. Install skids using hurricane ties **per detail F** against each floor joist & skid. Hurricane ties should be installed on BOTH sides of each skid in a Staggered pattern. **See photo, Skids with Hurricane Ties.**

E)



Bevel cut

F)

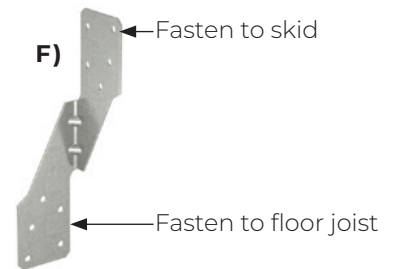


Photo: Skids with Hurricane Ties

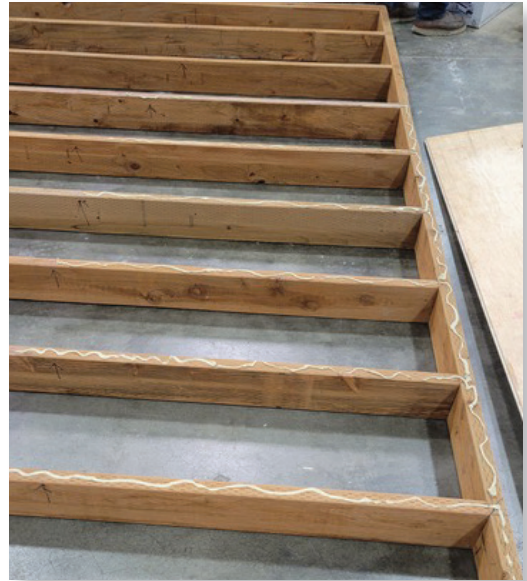
COMPLETED FLOOR VIEW



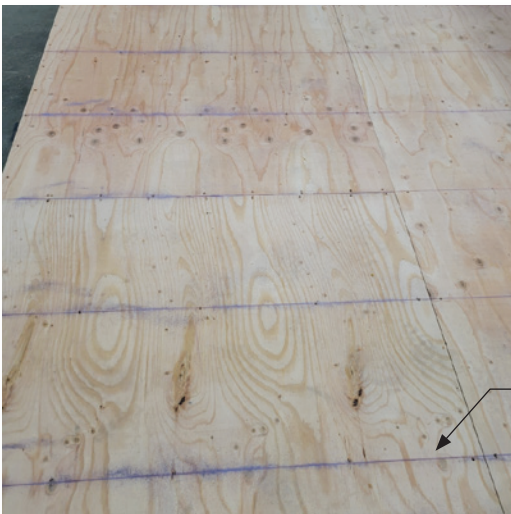
22. Flip the floor back over, so it sits on top of the skids. Be very careful flipping the floor frame. We recommend 2-4 people to accomplish this task.

NOTE:

- Critical step: Check that the framed floor is level in both directions at your build site. Use a min. 4' level as shown in photo. Add shims under the floor skids as needed to level in all directions.



Sub-step #11 (page 04)



Chalk lines

Sub-step #10 (page 04)



Sub-step #14 (page 04)

WALL FRAMING, HOUSE WRAP & SIDING

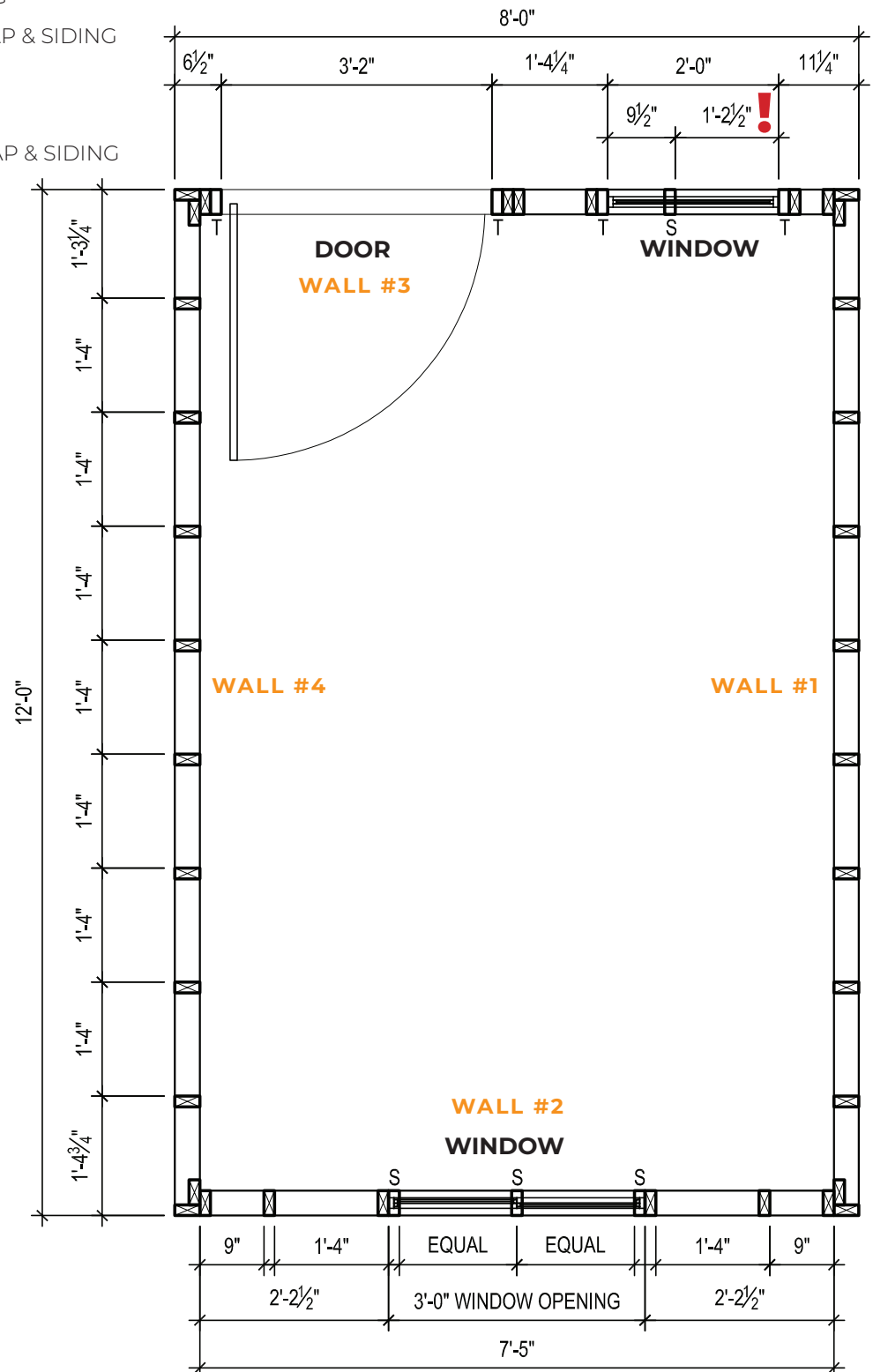
NOTE: For definitions of wall framing terminology, see *Tiny Home Construction Manual Dropbox*

- STEP 05 WALL #1 & #4 FRAMING
- STEP 06 WALL #1 & #4 HOUSE WRAP & SIDING
- STEP 07 WALL #2 FRAMING
- STEP 08 WALL #3 FRAMING
- STEP 09 WALL #2 & #3 HOUSE WRAP & SIDING
- STEP 10 SIDING
- STEP 11 PLACING WALL #1
- STEP 12 PLACING WALL #2
- STEP 13 PLACING WALL #3
- STEP 14 PLACING WALL #4

NOTES:

- ▶ The Wall Framing Plan, right, shows the location of wall studs on the bottom wall plates, as well as individual wall lengths. See the Wall Elevation plans for the heights and lengths of each wall.
- ▶ All four walls should be the same height. **See Step 05 for a view of a wall #1 & #4.**
- ▶ The rough opening (R.O.) dimension is wider and taller than the actual outside measurements of a door or window. This allows space for leveling, squaring and/or shimming the door or window unit.

! For the front wall (#3) window only: locate short stud ('S') 14- $\frac{1}{2}$ " from one trimmer stud ('T') to accommodate the insulation batt width.



WALL FRAMING PLAN

STEP 05: WALL #1 & #4 FRAMING



Materials: 2x4 lumber; 16d sinker nails;

Refer to the material and cut lists for details.

Wood Cut List (All 2x4):

- ▶ (12) 7'-11 1/2"
- ▶ (02) 12'-0"
- ▶ (01) 11'-5"

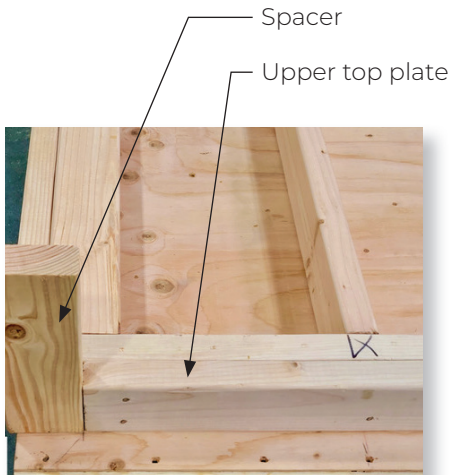
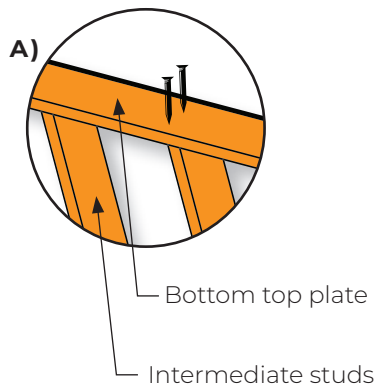


Photo: 2x4 Spacer for Top Plate of Side Wall

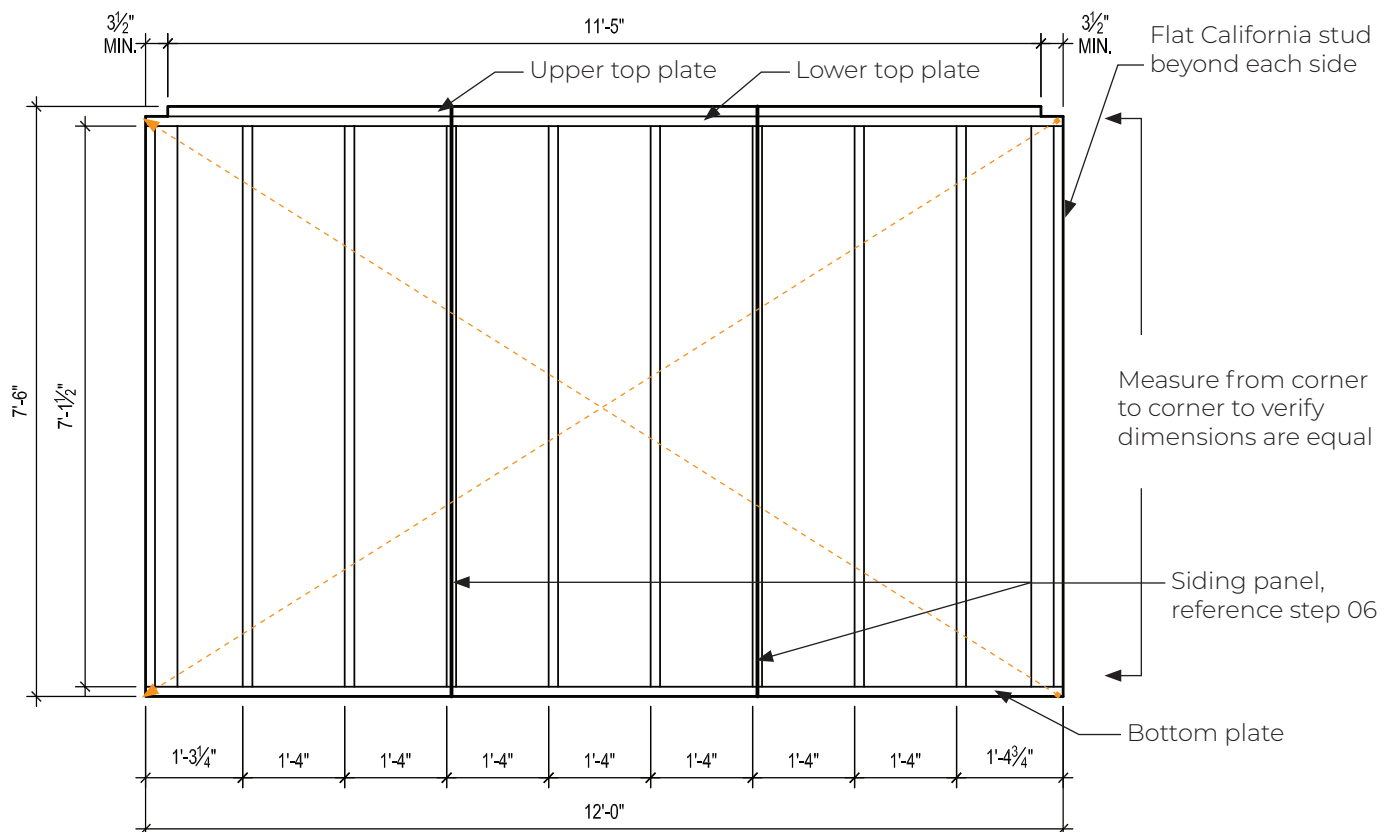


HOW TO ASSEMBLE THE WALL

NOTE:

- ▶ Cut list shows material for one wall. Size and cut lumber needed twice per this list, once for wall #1 and once for wall #4.
- 1. Cut the 2x4 lumber to the correct lengths shown in wall #1, 4 framing elevation below and cut lists.
- 2. Construct wall #1 and wall #4 in Step 05. See stud locations in Wall Framing Plan and wall #1, 4 Framing Elevation.
- 3. Construct wall #1 & #4 on the level surface of the newly built floor.
- 4. Start by framing perimeter 2x4's first to create a rectangle (top plate, sill plate, and each end stud).
- 5. Install the intermediate studs between the top and bottom wall plates. Nail two nails from the outside of the first top plate and the bottom plate, into each stud. Be sure to add the "California Corner" **per Detail A**.
- 6. Check the diagonals to ensure the wall is square.

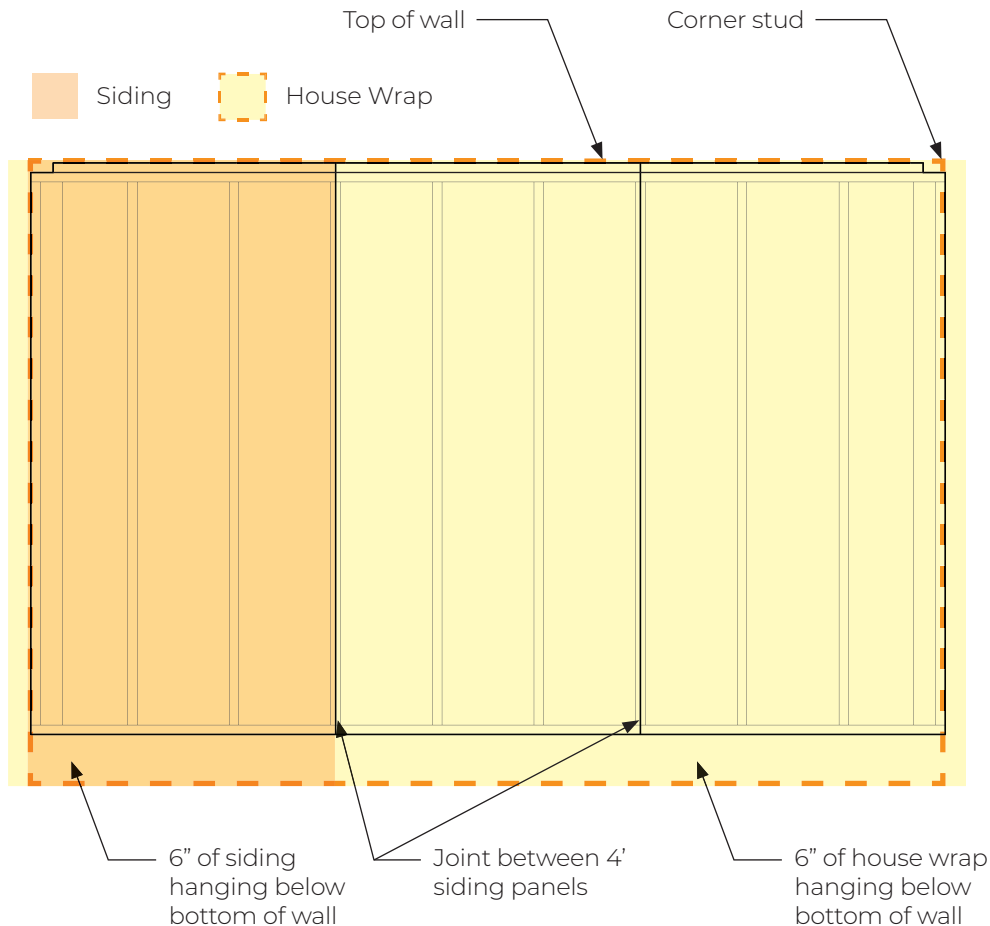
WALL #1 & #4 FRAMING ELEVATION



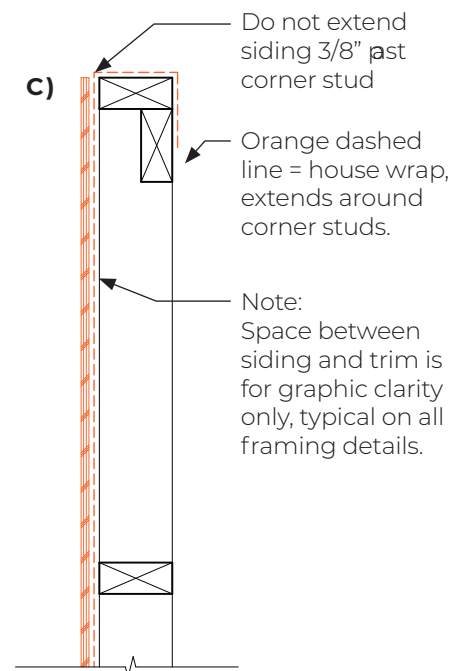
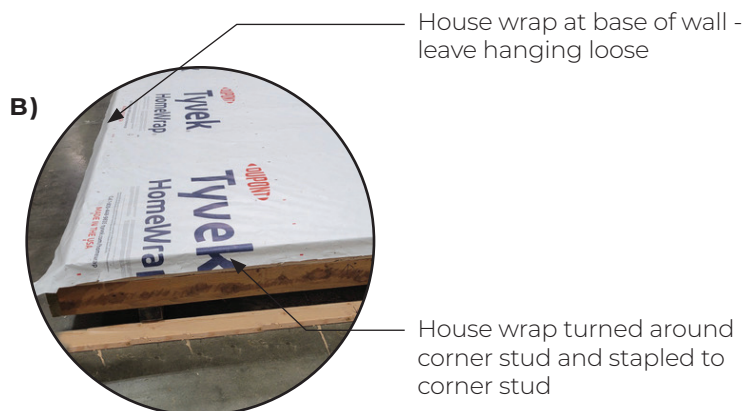
STEP 06: WALL #1 & #4 HOUSE WRAP & SIDING



Materials: House wrap; $\frac{3}{8}$ " T-50 staples; Primed T1-11 siding panels; 7d siding nails; Refer to the material and cut lists for details.



7. Place 9' roll of housewrap at left edge of wall.
8. Leave apx. 6" of house wrap beyond edge of corner stud & apx. 6" beyond base of wall. Cut away excess. Set house wrap roll aside for use on next wall.
9. Staple house wrap to studs, 6" O.C. (on center) to corner stud with $\frac{3}{8}$ " T50 staples.
10. Wrap house wrap around edge of wall framing **per detail B**.
11. Continue to staple house wrap to studs at 6" O.C..
12. Install siding with its top edge flush to the top of the upper top plate, **per detail C**. Be sure that the first panel has the lower edge of "shiplap" groove along the stud and that the next panel has the upper shiplap edge covering the first. Bottom of siding to end $\frac{1}{4}$ " above bottom of rim joist, **per detail F on page 15**. Nail every 6" on ends and 12" in the field of the panels.
13. Lift new wall off of the floor and set aside to make room for construction of second wall. Repeat sub-steps 1-12 to construct wall #4.



STEP 07: WALL #2 FRAMING



Materials: 2x4 lumber; 16d sinker nails;

Refer to the material and cut lists for details.

Wood Cut List (All 2x4):

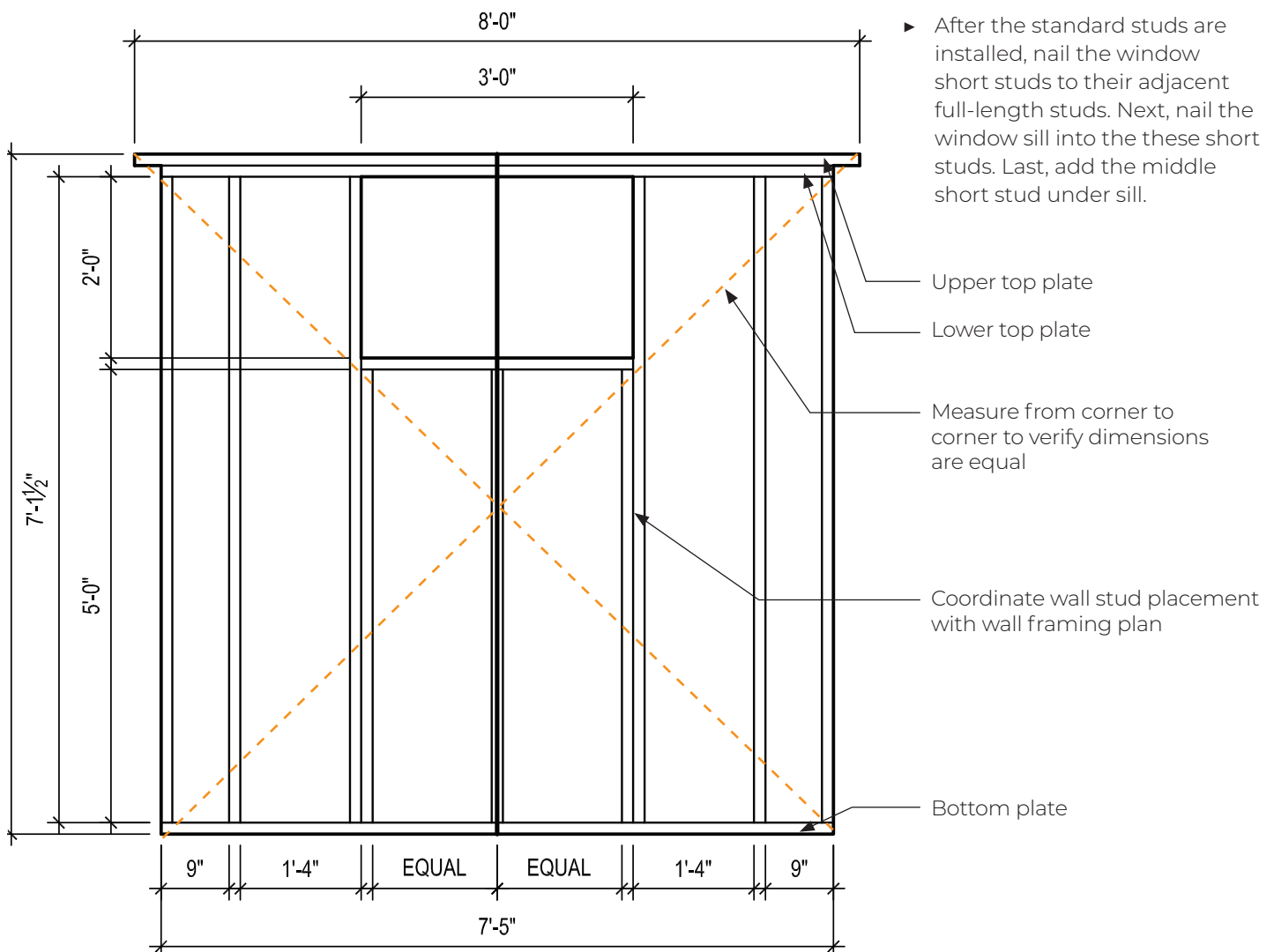
- ▶ (06) Studs: 7'-1 1/2"
- ▶ (01) Lower top plate: 7'-5"
- ▶ (01) Bottom plate: 7'-5"
- ▶ (01) Upper top plate: 8'-0"
- ▶ (01) Sill (under window): 3'-0"
- ▶ (03) Short studs (under window): 5'-0"

* Window centered in wall

14. Cut the 2x4 lumber needed to the correct lengths shown in wall #2 framing elevation below and cut list.
15. Assemble wall on the ground using two 16d nails to secure each stud to the top and bottom plates.
16. Install the upper top plate on wall and ensure that the upper top plate extends past the lower top plate by 3 1/2" on each side.

FRAMING NOTES:

- ▶ Be sure to install the upper top plate after each wall frame is assembled using the lower top plate.
- ▶ Check the wall for square using the diagonals method.
- ▶ Secure top and bottom plates to studs with 2 nails minimum.
- ▶ After the standard studs are installed, nail the window short studs to their adjacent full-length studs. Next, nail the window sill into the these short studs. Last, add the middle short stud under sill.



BACK WALL FRAMING ELEVATION

STEP 08: WALL #3 FRAMING



Materials: 2x4 lumber; 16d sinker nails;

Refer to the material and cut lists for details.

Wood Cut List (All 2x4):

- ▶ (06) Studs: 7'-1 1/2"
- ▶ (04) Trimmers: 6'-9"
- ▶ (01) Lower top plate: 7'-5"
- ▶ (01) Bottom plate: 7'-5"
- ▶ (01) Upper top plate: 8'-0"
- ▶ (03) Headers (over door): 3'-5"
- ▶ (03) Headers (over window): 27"
- ▶ (01) Sill (under window): 24"
- ▶ (01) Short stud (under window): 43 1/2"

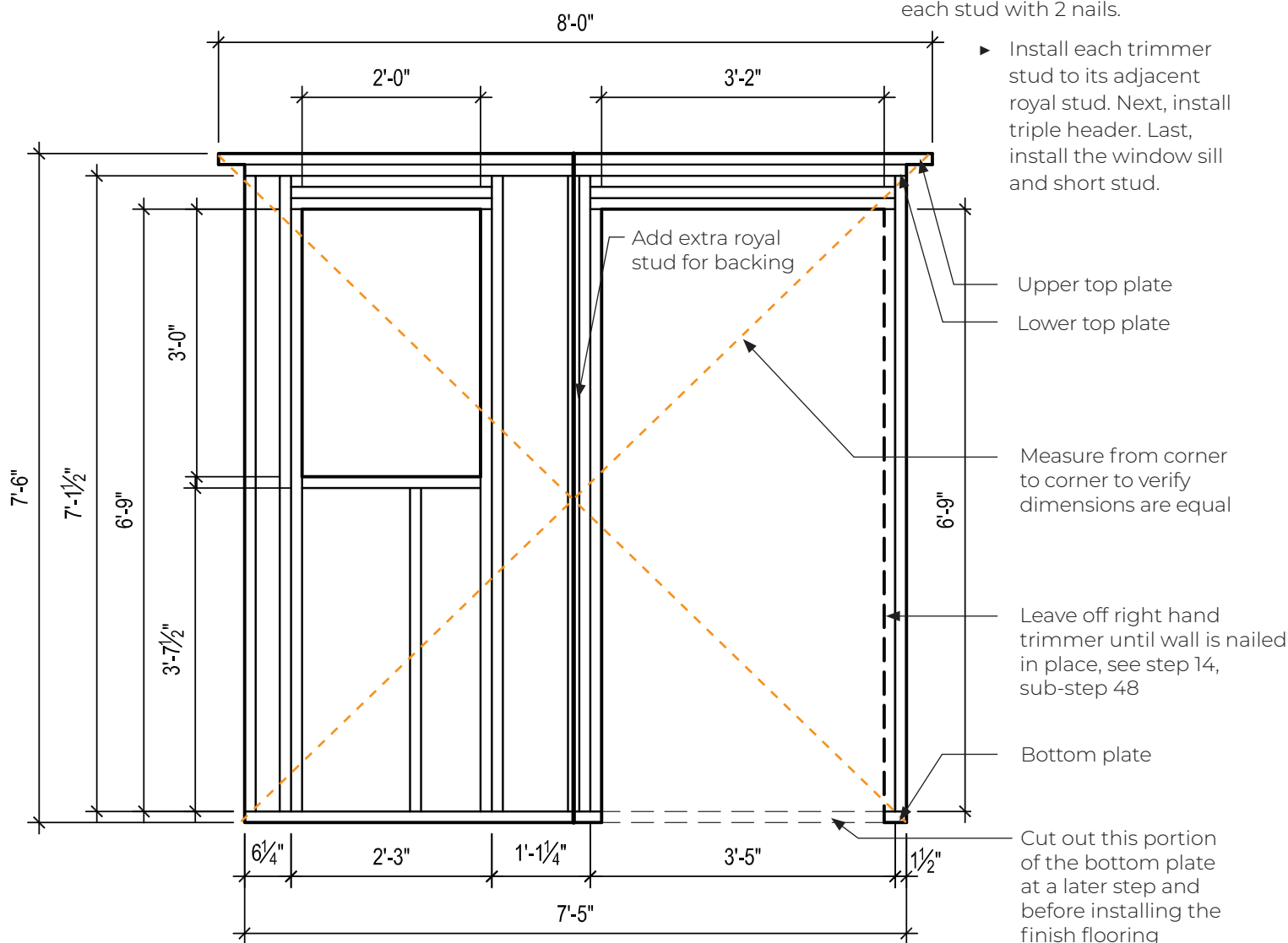
17. Cut the 2x4 lumber needed to the correct lengths shown in end wall framing elevation below and cut list.

18. Assemble wall on the ground using two 16d nails to secure each stud to the lower top plate and the bottom plate.

19. Install the upper top plate on the wall frame and ensure that the upper top plate extends past the lower top plate by 3-1/2" on each side.

FRAMING NOTES:

- ▶ Install the upper top plate after each wall is assembled with the lower top plate.
- ▶ Check the frame for square using the diagonals method.
- ▶ Secure top and bottom plates to each stud with 2 nails.

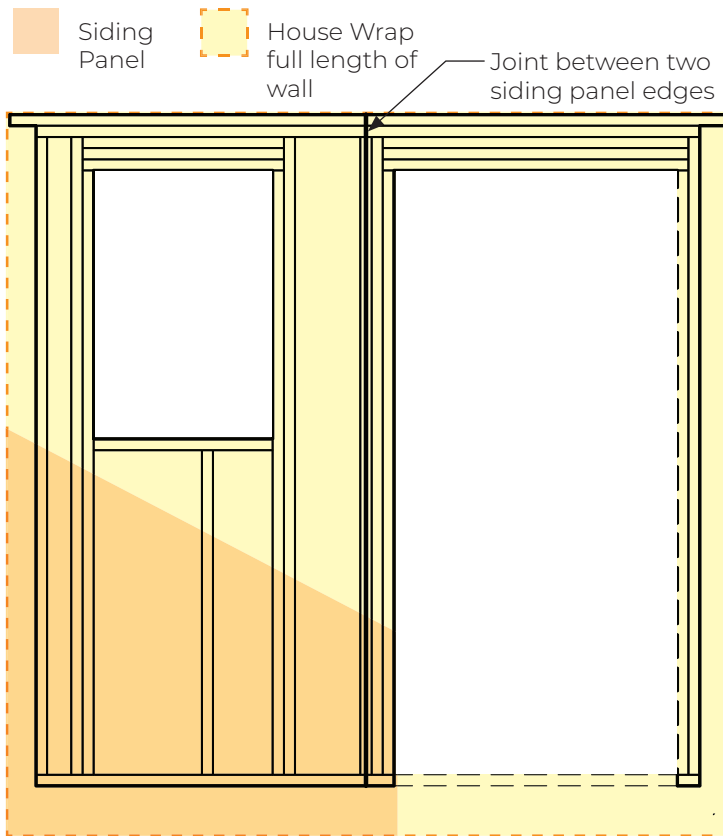


FRONT WALL FRAMING ELEVATION

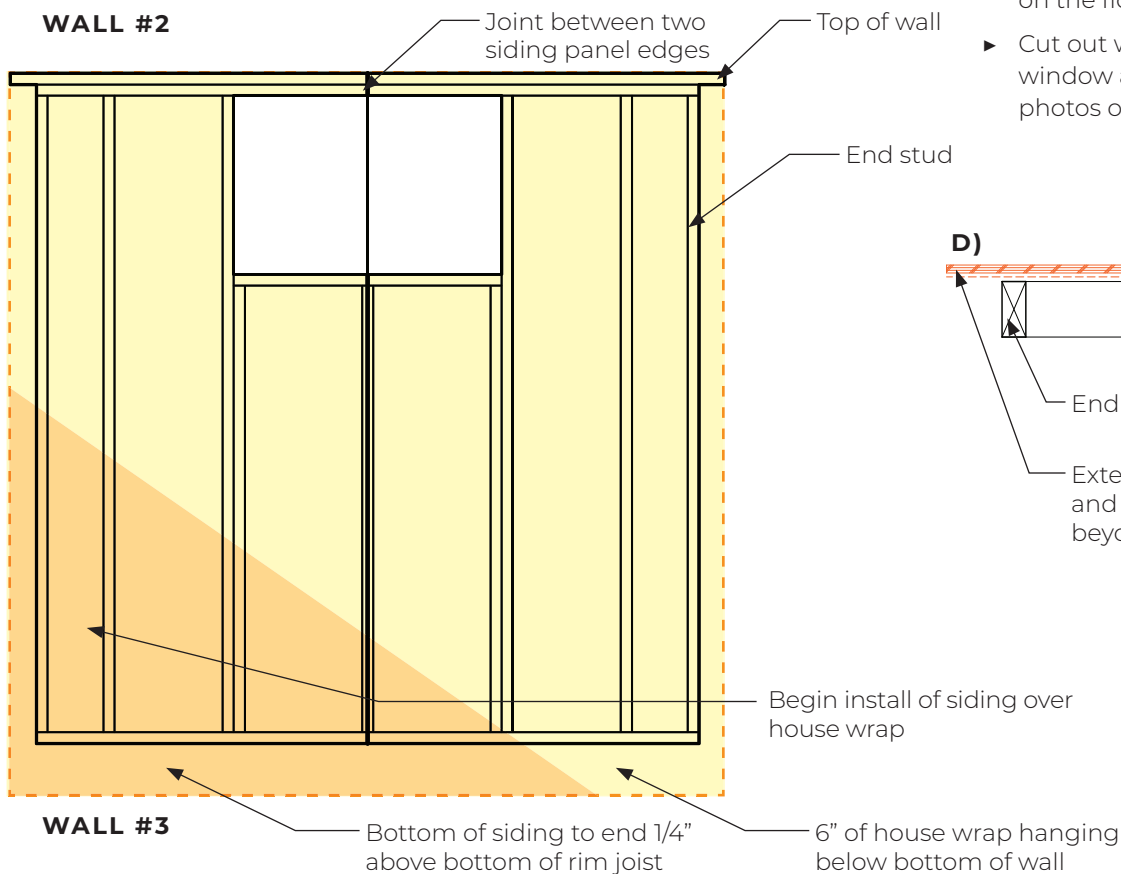
STEP 09: WALL #2 & #3 HOUSE WRAP & SIDING



Materials: House wrap; $\frac{3}{8}$ " T-50 staples; Primed T1-11 siding panels; 7d siding nails; Refer to the material and cut lists for details.



WALL #2

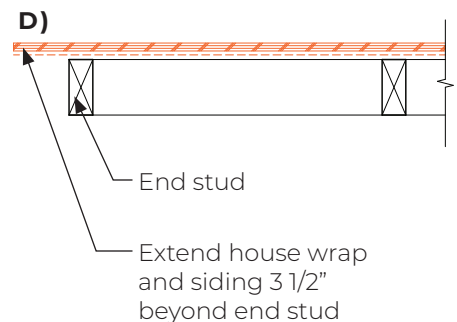


WALL #3

20. Place 9' roll of housewrap at left edge of wall. **See broken red lines on schematic Wall #2 & #3.**
21. Leave apx. 3 1/2" of house wrap beyond edge of each end stud & apx. 6" beyond base of wall. Cut away excess. Set house wrap roll aside for use on next wall.
22. Staple house wrap to all studs at 6" O.C. (on center) to end studs, plates, sills and headers, using 3/8" T-50 staples.
23. Cut out wrap for windows and door openings.
24. Install siding with its top edge flush to the top of double top plate, **per detail E on page 15.**
25. Tack 3 1/2" of loose house wrap to siding, **per detail D.**
26. Extend siding 6" beyond bottom plate, **per detail F on page 15**, and 3 1/2" beyond each end stud **per detail D.**

NOTE:

- The siding should extend 6" below to bottom of the framed wall, so that the floor joists are covered once the walls are placed on the floor frame.
- Cut out wrap and fold over into window and door openings, per photos on page 14.



STEP 09: WALL #2 & #3 HOUSE WRAP & SIDING (CONT.)



Materials: House wrap; $\frac{3}{8}$ " T-50 staples; Primed T1-11 siding panels; 7d siding nails;

Refer to the material and cut lists for details.



Photo: Installing House Wrap



Photo: Wrap Around Corner of wall

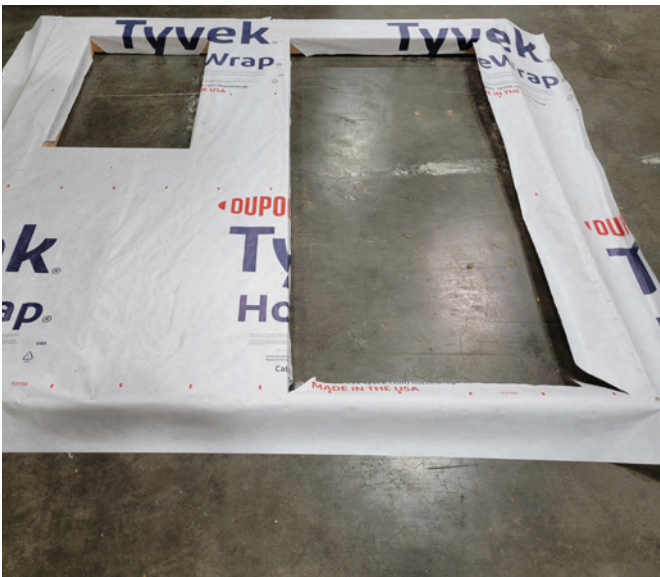


Photo: Front Wall Wrapped



Photo: Installing Wrap Around Window Opening

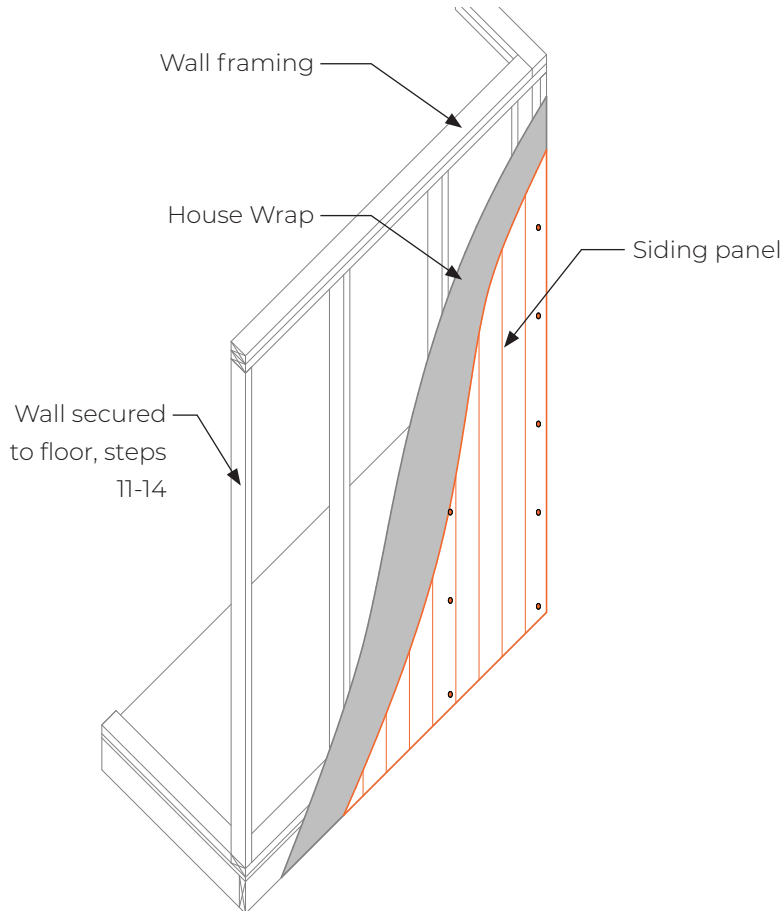
STEP 10: EXTERIOR SIDING DETAILS



Materials: Primed T1-11 siding panels; 7d siding nails; caulk;
Refer to the material and cut lists for details.

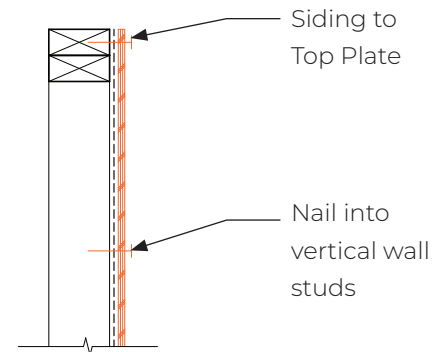
27. Nail siding to studs with 7d siding nails placed every 6" on ends and 12" in the field.

28. See **details G and H** for joints between panel edges.

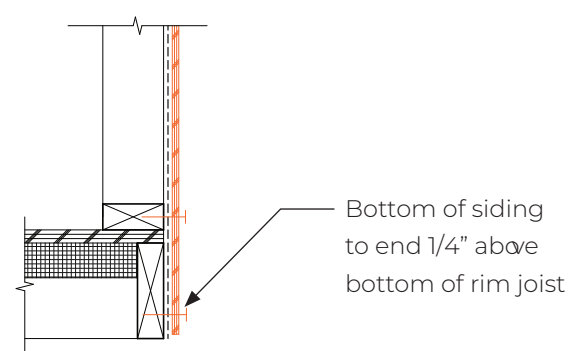


Sheet Panel Siding Perspective

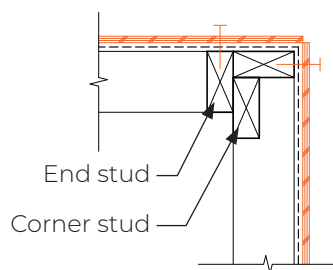
E) Side View



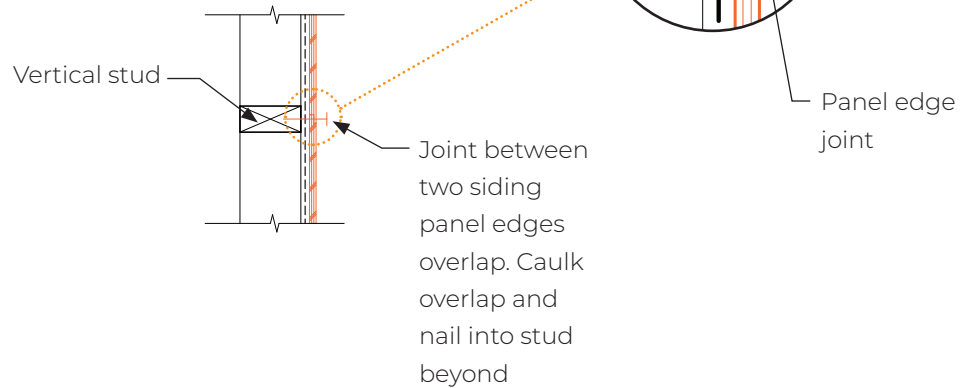
F) Side View



G) Plan View



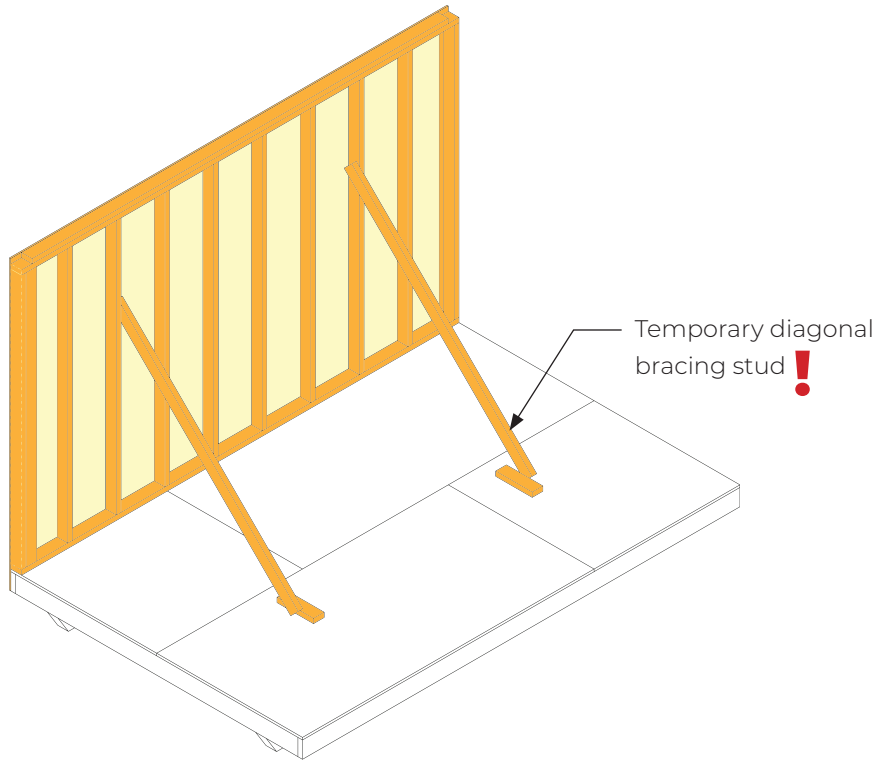
H) Plan View



STEP 11: PLACING WALL #1



Materials: 16d nails; Refer to the material and cut lists for details.



TEMPORARY WALL BRACING

29. Start with wall #1.
30. Lift into place and locate on edge of constructed floor.
31. Nail or screw through bottom wall plate and plywood floor, into the floor joist below, **per detail I**.
32. While one person holds the wall up, a second person should use a 4-foot level to hold the wall plumb. A third person should then nail or screw the diagonal bracing to the upper portion of the stud, and, into the temporary blocking. See schematic, Temporary Wall Bracing.
33. Nail siding to the face of the floor joists along the perimeter of the house, using 7d siding nails at 8" on center **per detail F on page 15**.

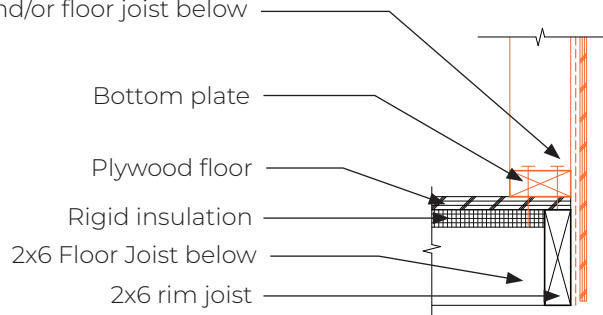
NOTE:

- If the stud is directly above the floor joist below, angle the nail so that it drives into floor joist below OR nail two nails into the rim joist within the stud bays.

! Use scrap lumber for the temporary diagonal bracing. Install at a minimum of $\frac{2}{3}$ the height of the wall.

Nail through bottom plate and plywood floor, into the rim joist and/or floor joist below

I) Side View

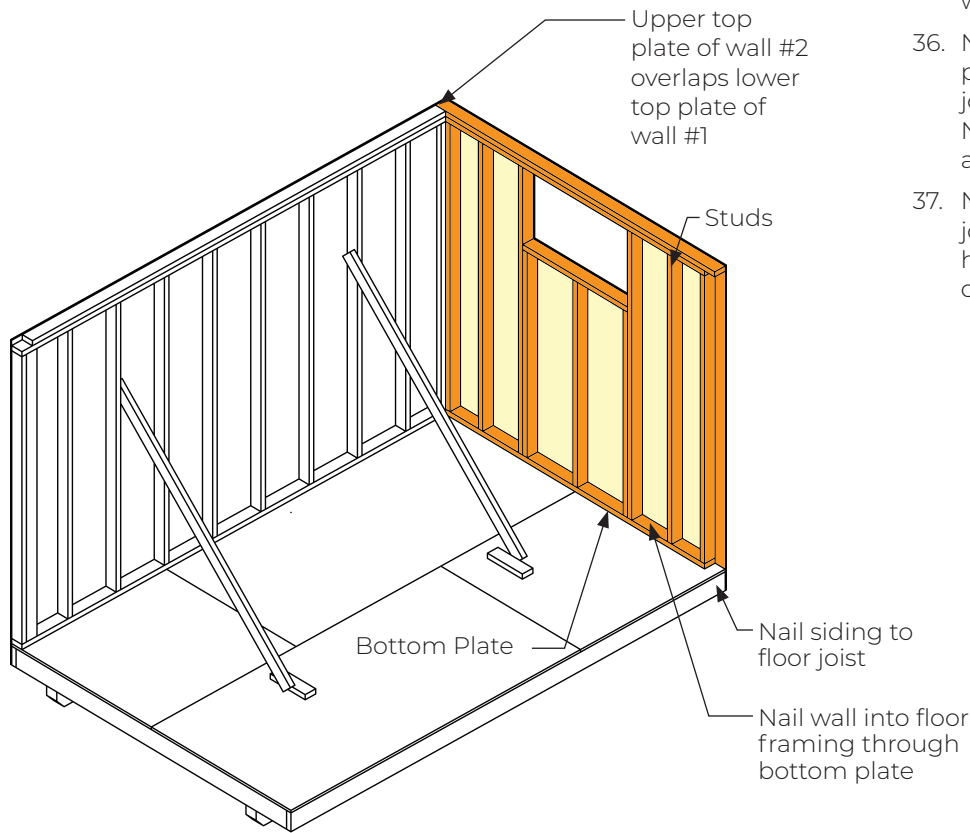


WALL CONNECTION TO FLOOR

STEP 12: PLACING WALL #2

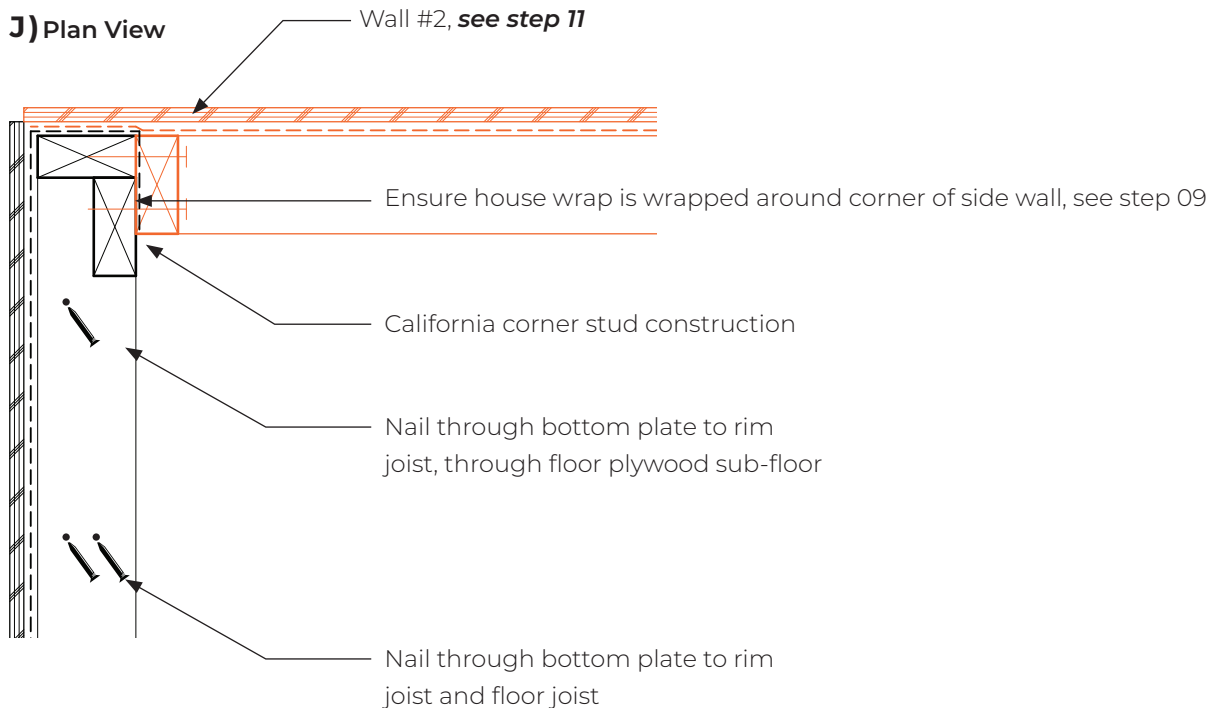


Materials: 16d nails; Refer to the material and cut lists for details.



34. Lift wall #2 into place and locate on edge of constructed floor platform.
35. Make sure the corner is aligned with wall #1.
36. Nail into place through bottom plate and plywood floor into floor joist **per detail I in sub-step 31**. Nail through end stud into wall #1 as shown in corner **detail J** below.
37. Nail siding to the face of floor joists along the perimeter of the house, using 7d siding nails at 8" on center, **detail F on page 15**.

J) Plan View

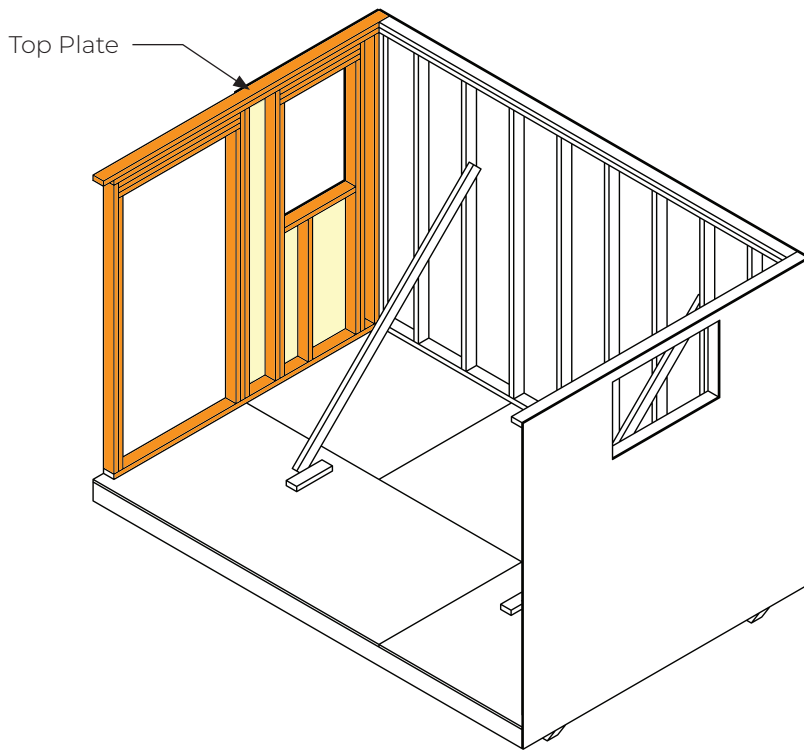


CALIFORNIA CORNER STUD DETAIL

STEP 13: PLACING WALL #3



Materials: 16d nails; Refer to the material and cut lists for details.

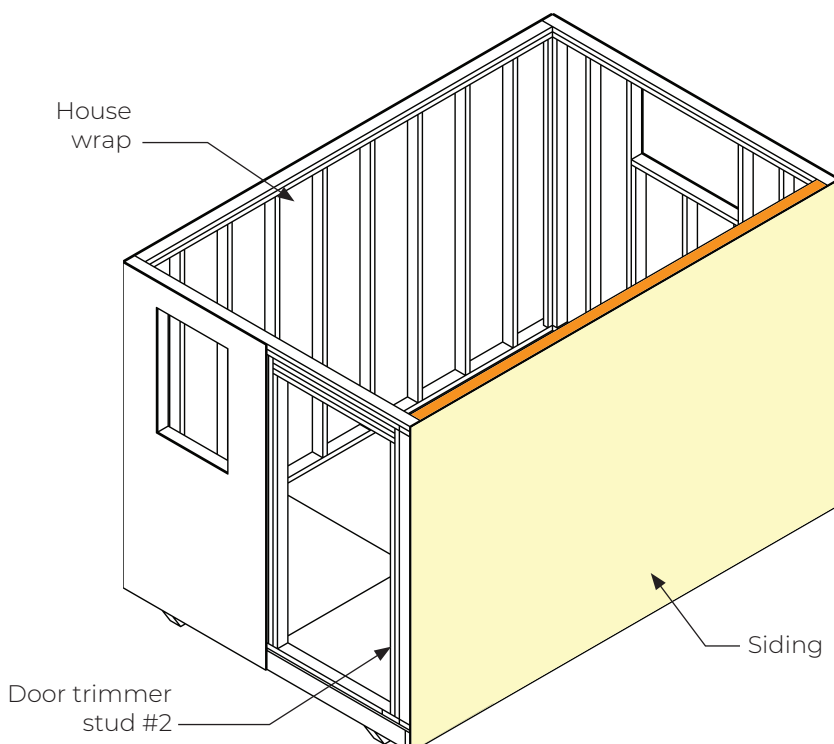


38. Lift wall #3 into place and locate on edge of constructed floor platform.
39. Make sure the corner is aligned with wall #1.
40. Nail into place through bottom plate and plywood floor into floor joist. **See detail I and sub-step 31 on page 16.**
41. Nail through end stud into wall #1 as shown in corner **detail J on page 17.**
42. Nail siding to the face of floor joists along the perimeter of the house, using 7d siding nails at 8" on center, **per detail F on page 15.**

STEP 14: PLACING WALL #4



Materials: 16d nails; Refer to the material and cut lists for details.



43. Lift wall #4 into place and locate on edge of constructed platform.
44. Make sure the corners are aligned with wall #2 and #3.
45. Nail into place through bottom plate and plywood floor into floor joist. **See detail I and sub-step 31 on page 16.**
46. Nail through end stud into wall #1 as shown in corner **detail J on page 17.**
47. Verify that the walls are plumb and that the corners meet evenly. Check that adjacent walls are square to each other. Use the diagonal method as needed. Correct all as needed and if possible.
48. Remove temporary diagonal bracing from the inside of the walls.
49. At this time, add the second trimmer to door opening, **step 08, Front Wall Framing Elevation notes.**

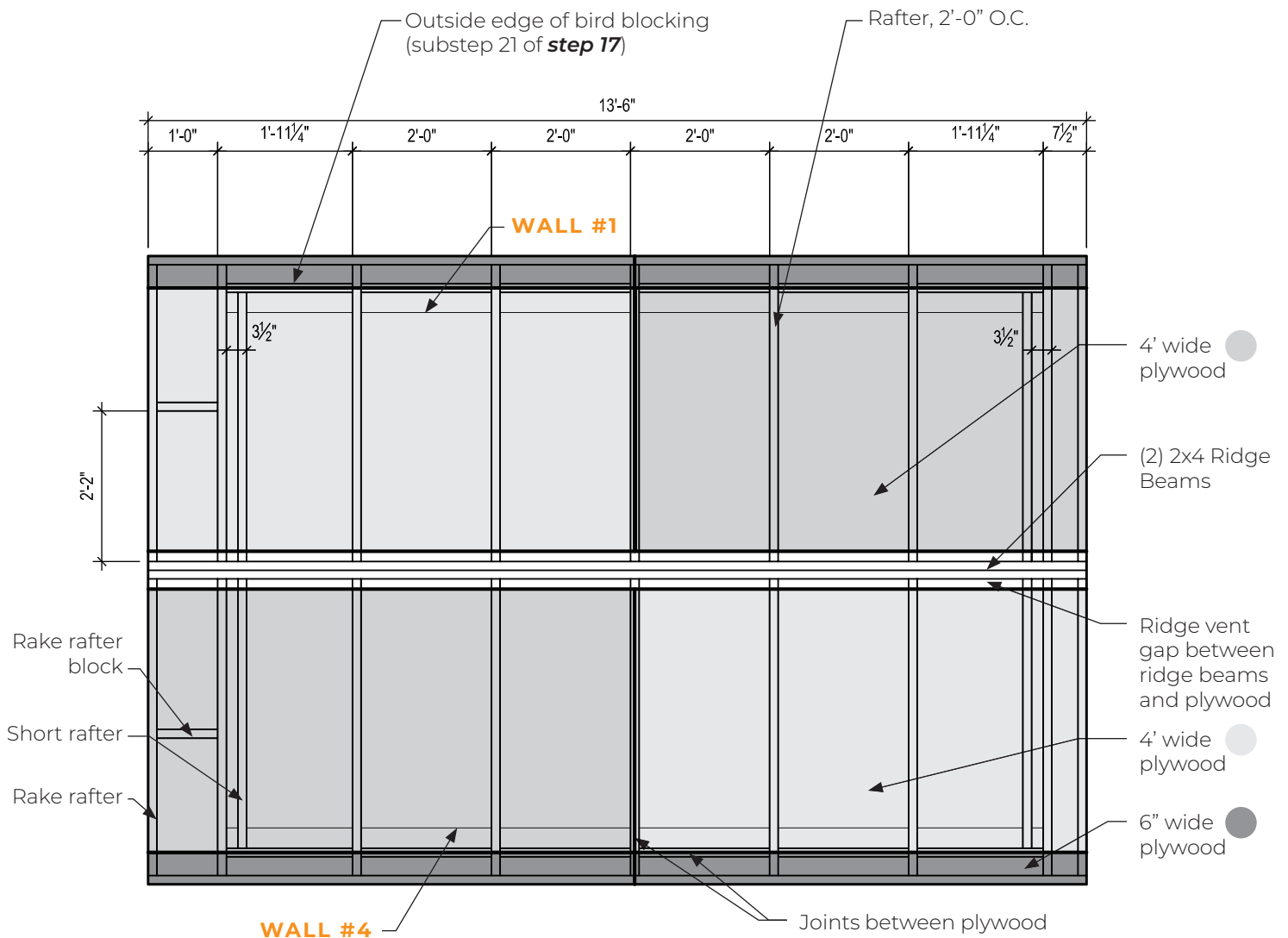
COMPLETED WALL VIEW



ROOF FRAMING

NOTE: For definitions of roof framing terminology, see *Tiny Home Construction Manual Dropbox*

- STEP 15 ROOF FRAMING – GENERAL
- STEP 16 ROOF FRAMING – RIDGE POSTS
- STEP 17 PLACING ROOF FRAMES ON WALLS
- STEP 18 GABLE WALL FRAMING
- STEP 19 ROOF BARGE TRIM
- STEP 20 ROOF SHEATHING
- STEP 21 ROOF SHEATHING & RIDGE VENT
- STEP 22 TRIANGULAR GABLE WALL SIDING
- STEP 23 GABLE WALL #2 IAQ VENT



ROOF FRAMING & SHEATHING PLAN

STEP 15: ROOF FRAMING – GENERAL

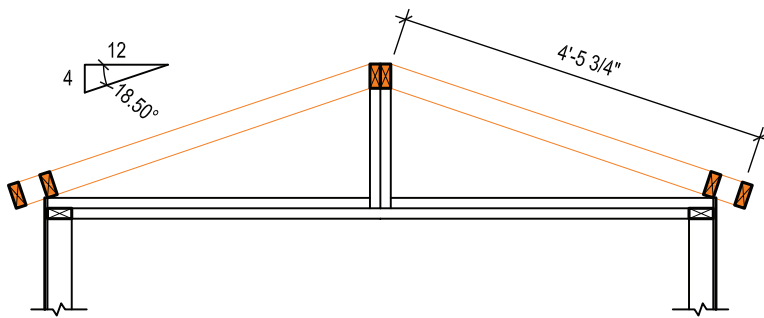
Materials: 2x4 lumber; 15/32" CDX plywood; 16d sinker nails; 3" T25 construction screws; 8d galvanized common nails; Refer to the material and cut lists for details.

Wood Cut List:

- ▶ (9) 2x4 Rafters 4'-5 3/4"
- ▶ (2) 2x4 Short rafters 4'-1"
- ▶ (1) 2x4 Ridge beams 13'-6"
- ▶ (1) 2x4 Fascia board 13'-6"

NOTES:

- ▶ Save leftover lumber for later steps on gable wall framing.
- ▶ Cut list shows material for one roof frame. Size and cut lumber needed twice per this list, once for each roof framing plan.



ROOF FRAMING SECTION

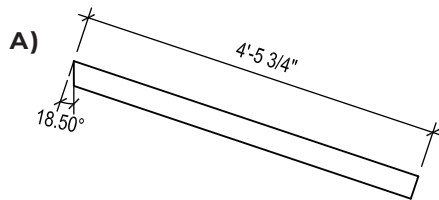
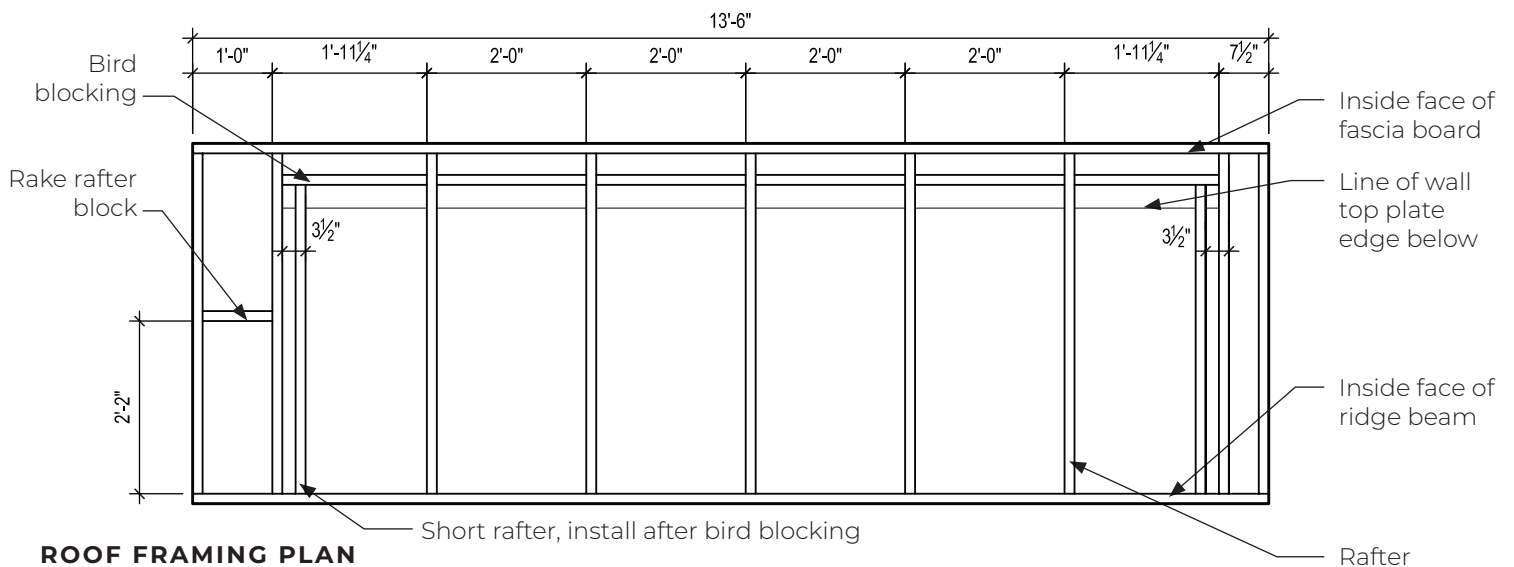


Photo: Rafter Layout on Fascia and Ridge Beam

1. Cut 9: 2x4 rafters with a 18.5 degree cut at the top end (=4:12 roof slope) and a square 90-degree cut at the bottom end. Cut all @4'-5 3/4" long. **See detail A and Roof Framing Section.**
2. Cut 2: 2x4 rafters with a 18.5 degree cut at the top end (=4:12 roof slope) and a square 90-degree cut at the bottom end. Cut these rafters @4'-1" long.

Note: These rafters will be used at the front and back of the house for nailing the interior ceiling sheathing.

3. Cut 1: 2x4 ridge beam at 13'-6" long.
4. Cut 1: 2x4 fascia board at 13'-6" long.
5. Mark the rafter layout, **per the Roof Framing Plan**, on the inside face of each ridge beam and on the inside face of each 2x4 fascia board. **See photo, Rafter Layout on Fascia and Ridge Beam.**
6. Using the fascia board, copy the rafter layout to the top of the top wall plates on both wall #1 & #4.



ROOF FRAMING PLAN

One Roof Frame

STEP 15: ROOF FRAMING – GENERAL (CONT.)

 **Materials:** 2x4 lumber; 15/32" CDX plywood; 16d sinker nails; 3" T25 construction screws; 8d galvanized common nails; Refer to the material and cut lists for details.



Fascia board

Rafters

Ridge beam

Photo: Roof Framing on Ground

7. Using 2: 16D sinker nails, attach the top of each rafter to the ridge board, making sure that the top edge of the rafter is flush with the top edge of the ridge board.

Using 2: 16D sinker nails, attach the 2x4 eave fascia board to the bottom rafter tail end on all full-length rafters (only). **See Photo, Roof Framing on Ground.**

NOTE: Install the short 4'-1" rafters after the bird blocks are installed.

See STEP 17, sub-step 24.

8. Cut 2: 2x4's @10½" for the front overhang. Install these at 2'-2" down from the top edge of the first two rafters.

See photo, Rake Rafter Blocking and Roof Framing Plan.

Repeat sub-steps 1-8 to construct the second roof frame. This will be a mirrored image of the first roof frame.



Rake rafter

Rake rafter blocking

Front wall

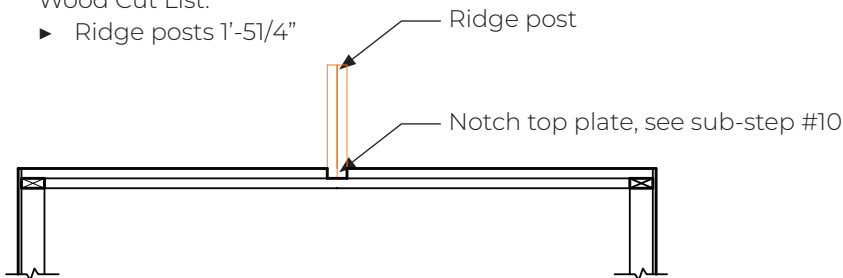
Photo: Rake Rafter Blocking

STEP 16: ROOF FRAMING – RIDGE POSTS

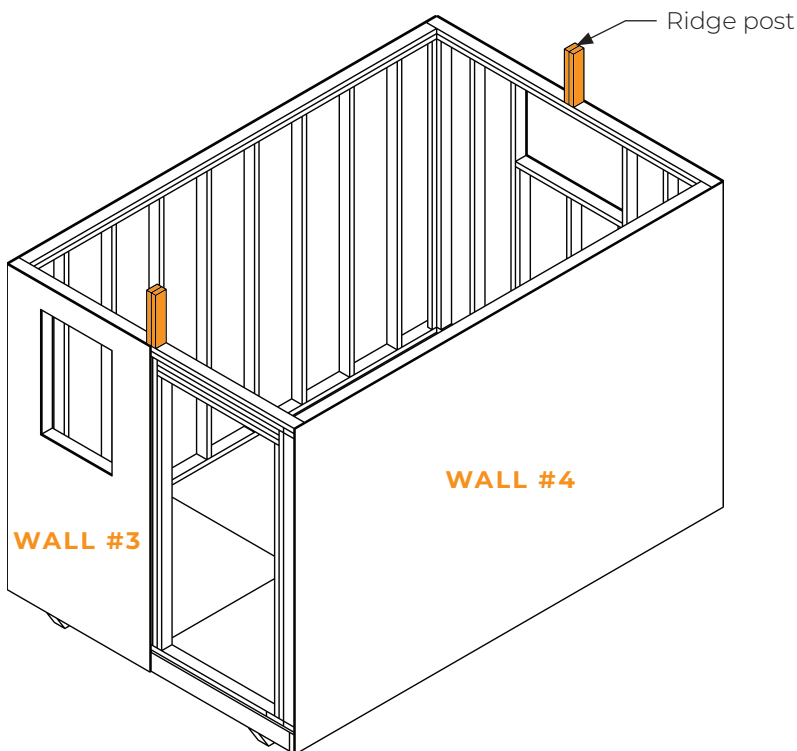
 **Materials:** 2x4 lumber; 15/32" CDX plywood; 16d sinker nails; 3" T25 construction screws; 8d galvanized common nails; Refer to the material and cut lists for details.

Wood Cut List:

- Ridge posts 1'-5 1/4"



RIDGE POST FRAMING SECTION



HOW TO ASSEMBLE THE GABLE END

- Measure and cut 4: 2x4's @ 1'-5 1/4" for the ridge posts. **See Ridge Post Framing Section.**
- On the top of the front wall, measure to the center of its top plate and place a mark using a speed square. Then mark for one 2x4 ridge post on each side of this line. Using a circular saw (Skillsaw) or reciprocating saw (Sawzall) cut out a 3" wide x 1-1/2" deep section of 2x4 from the top plate.
- At the center of the wall, install a temporary 2x4 brace to the inside of the wall. **See Photo, Ridge Post Temp Brace.** Using a level, check ridge posts for plumb on left and right, as well as in and out. **See Photo, Level on Roof Ridge Posts.**
- Note:** Add a temporary vertical 2x4 to side of ridge posts that extends higher than the ridge posts, to hold roof frame from sliding when installing frame, **per sub-step 15 of STEP 17.**
- Install the double ridge posts using 3" T25 construction screws. Secure at the bottom of these 2x4's into the adjacent top wall plate. In addition screw through the temporary brace into the posts. Check for plumb on left and right sides, as well as inside and outside of the wall.
- Repeat steps 10-12** for wall #2.



Photo: Level on Roof Ridge Posts

Temporary brace for holding roof frame, **see photo next page**

Temporary bracing for ridge posts

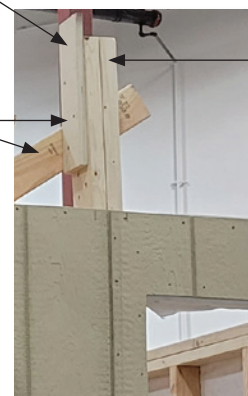


Photo: Ridge Post Temp Brace

GABLE END FRAMING SEQUENCE

STEP 17: PLACING ROOF FRAMES ON WALLS



Materials: 2x4 bird blocking; 3" T-25 construction screws



Temporary brace to hold roof frame

Ridge posts

Photo: Raising Roof Frame Set Up

14. Set up at least 4 ladders (or scaffolding) inside and outside the tiny house. **See Photo, Raising Roof Frame Set Up.**
15. With a minimum of 4 people, lift each framed rafter system on to the gable wall ridge posts. **See Photo, Roof Frames Attached.**
16. Using clamps, marry the two ridge beams to each other. Be sure that these beams are flush at the tops and the ends. **See Photos, Ridge Beams Clamped, Roof Ridge Beams.**
17. Once the ridge beams are aligned, screw them together between rafters using 2: 3" T25 construction screws at 24" OC.
18. Secure the ridge beams to the double ridge posts using 2: 3" T25 on each edge of the four ridge posts. Check for plumb again.
19. Check that the rafters are aligned properly on the tops of wall #1,4, using the marks made in sub-step 6.

Screw through ridge beams to double ridge post per sub-step 18



Photo: Roof Frames Attached



Screw together ridge beams per sub-step 17

Photo: Ridge Beams Clamped



Photo: Roof Ridge Beams

STEP 17: PLACING ROOF FRAMES ON WALLS (CONT.)

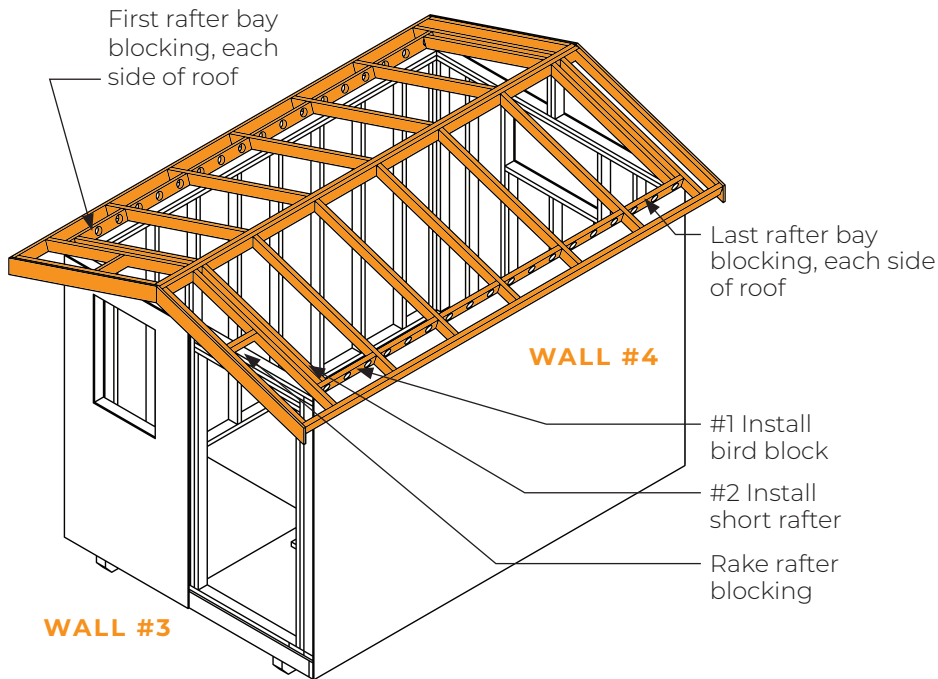
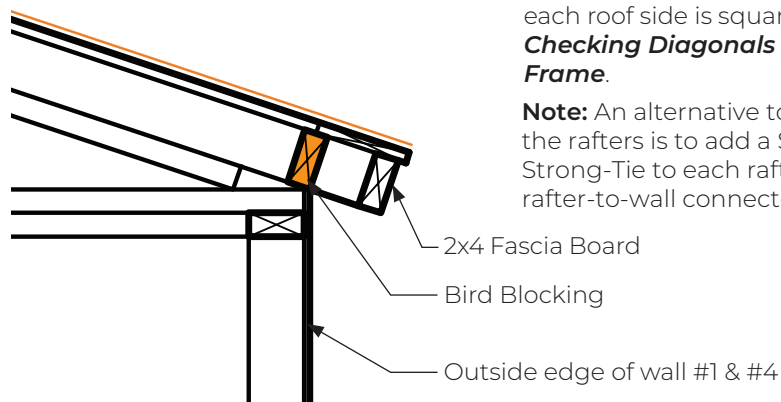


Photo: Checking Diagonals on Roof Frame



Photo: Bird Blocking

B) Side View



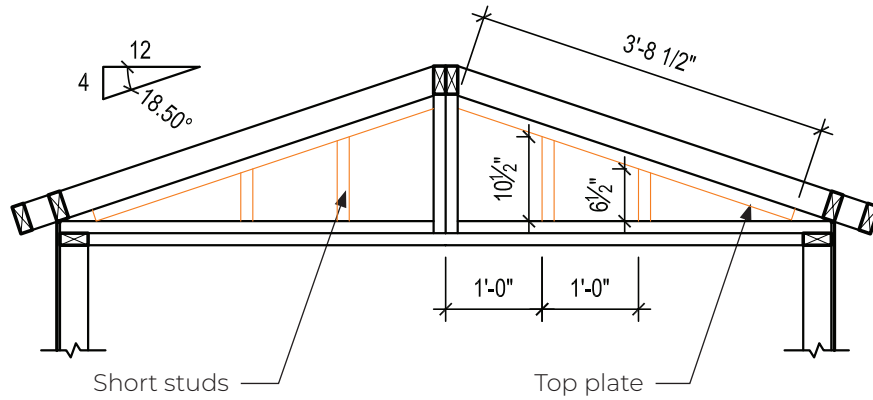
20. Cut four of the 2x4 bird blocks at 1'-9-11/16" long. These will be used for the first and last rafter bays, at the front and back of the house. **See Roof Framing Plan, page 21.**
 21. Begin installation of the bird blocking at the first rafter bay at the front of the house. This one measures 1'-9-11/16". Use 2: 16D sinker nails, secure bird block to rafters at each end of the bird block. **See Roof Framing Plan, page 21 for location of bird blocks.**
 22. Continue installation of the bird blocking, moving from the front of the house towards the back. **See photo Bird Blocking.**
- Note:** The last bird block along wall #1 & #4 measures 1'-9-11/16".
23. Install the rake rafter blocking (2x4x10-1/2") between the rake rafter and the first rafter on wall #3. For exact location, **See 3D view, this page and photo Rake Rafter Blocking on page 22.**
 24. Using the short 4'-1" rafters, toe-nail each top edge to the ridge board and nail the lower edge through the bird block. Complete at the 4 rafter bays at the front and back of the house.
 25. **Complete steps 21-24** on the other roof frame.
 26. In addition, be sure that the bottom edge of each bird block face is flush to the outside of side wall #1 & #4 sheathing. **See detail B.**
 27. Starting from the wall #3 and moving towards the wall #2, toe-nail each rafter into the top wall plate.
 28. Once all rafters and bird blocking are secured use a level to check that the gable walls are still plumb. Use the diagonal method to check that each roof side is square. **See photo, Checking Diagonals on Roof Frame.**

Note: An alternative to toe-nailing the rafters is to add a Simpson H1 Strong-Tie to each rafter. This is a rafter-to-wall connector.

STEP 18: GABLE WALL FRAMING



Materials: 2x4 lumber; T25 screws



GABLE WALL FRAMING SECTION

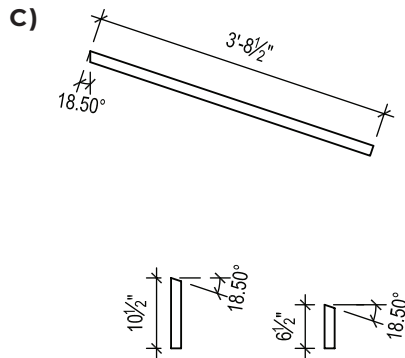


Photo: Gable Wall Upper Triangle

Refer to Gable Wall Framing

Section for details on framing the upper section of the gable walls (wall #2 & #3)

NOTE: this section is “stick-framed” above the existing walls #2 & #3.

29. Cut a total of 8 short studs for the 4 triangular walls, per the **Gable Wall Framing Section**. Cut the 4 top plates for each of these walls at 3'-8 1/2", per the **Gable Wall Framing Section**.

NOTE: The bottom end of this board is cut at 90-degrees and the top end is cut at 18.5-degrees. The length (3'-8 1/2") of this board is taken from the long tip of the angled cut at the top of the board, to the square cut at the bottom end of the board. **See detail C.**

30. Beginning with one of the four upper wall sections, install the top wall plate to the bottom edge of the gable end rafter by flushing the plate edge to the rafter of outer face. Attach with 3" T25 construction screws every 8".
31. Install the first 6 1/2" short stud to this new top wall plate using screws. **See Photo, Gable Wall Upper Triangle**. Use a torpedo level to ensure that the stud is plumb. Attach at the top and the bottom of the stud.
32. Install the second 10 1/2" short stud @12" O.C. from the first stud using T25 screws. Use a torpedo level to ensure that stud is plumb. Attach at the top and bottom of the stud. **See layout in Gable Wall Framing Section and Photo, Gable Wall Upper Triangular Section.**
33. **Repeat all sub-steps 31-33** for the remaining three upper wall sections of walls #2 & #3.
34. The exterior siding will be installed in a later step.

STEP 19: ROOF BARGE TRIM



Materials: 1x6 primed trim; 7d galvanized nails;

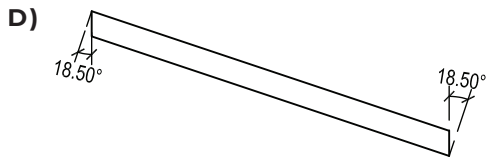


Photo: Barge Trim

Barge trim

Sheathing installed in next step



Photo: Barge Trim Overhang

Eave fascia

Barge trim with 2" overhang

35. Using the primed 1x6 trim boards, measure and cut these for the angled barge trim. Cut parallel 18.5-degree angles at the top and bottom of each board. Cut 4 boards @ 4'-11". **See photo, Barge Trim and Detail D.**

NOTE: be sure that the rough sides are on the outside of the house AND that the angles are correct/parallel.

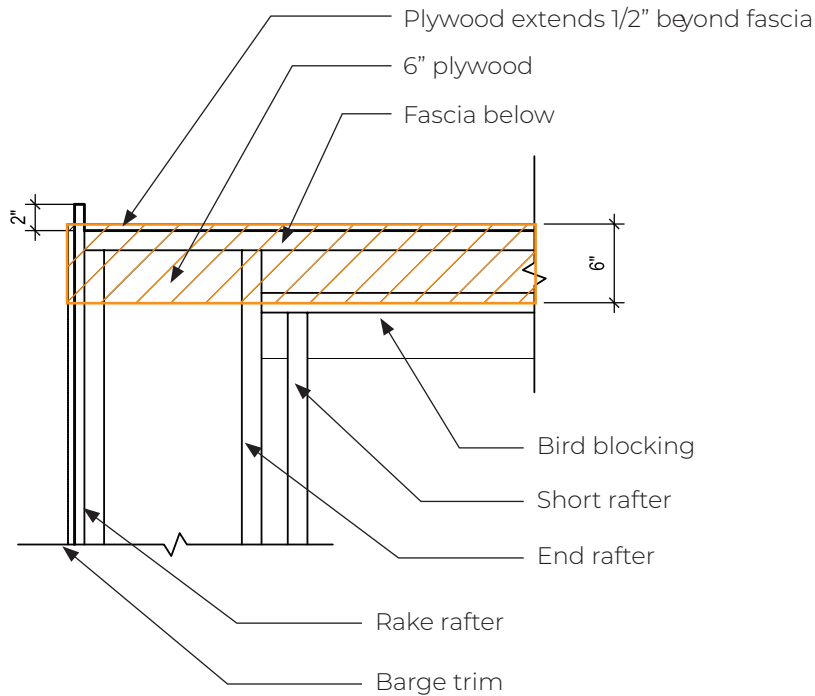
36. The 1x6 barge trim will extend about 2" beyond the 2x4 eave fascia. **See Roof Sheathing & Trim Detail schematic on page 28. See photo, Barge Trim Overhang.**
37. Install barge trim with 7D galvanized siding nails secured to the rake rafter. Nail two nails every 12" along face. **See Roof Sheathing and Trim Detail, page 28.**

STEP 20: ROOF SHEATHING



Materials: 15/32" CDX plywood; 8d galvanized common nails;

Refer to the material and cut lists for details.



ROOF SHEATHING & TRIM DETAIL

38. Rip 4 lengths of 1/2" plywood @6" wide by 96" long.
 39. Measure up 5 1/2" from the outside of the eave fascia on the tops of the two barge rafters; then snap a chalk line. Do this on both sides of the roof.
 40. Place one 6" x 96" starter sheathing strip so that one end falls at the center of the middle rafter. **See detail on Roof Framing and Sheathing plan, page 20.** Be sure that the top edge of the plywood follows the chalk line and that the bottom edge of this plywood strip overhangs the 2x4 eave fascia by 1/2". **See photo Roof Sheathing Starter Strip.**
 41. Fasten the starter strip to each rafter using 2:8D galvanized common nails. **See Photo, Roof Sheathing Starter Strip.** Let the end of the plywood "run wild" beyond the rake rafters and barge trim.
- NOTE:** The roof sheathing will be trimmed at the edges after all sheathing is installed.
42. **Repeat steps 40-41** so that the second 6" x 96" starter strip butts the first one.
 43. **Repeat steps 40-42** on the opposite roof side.

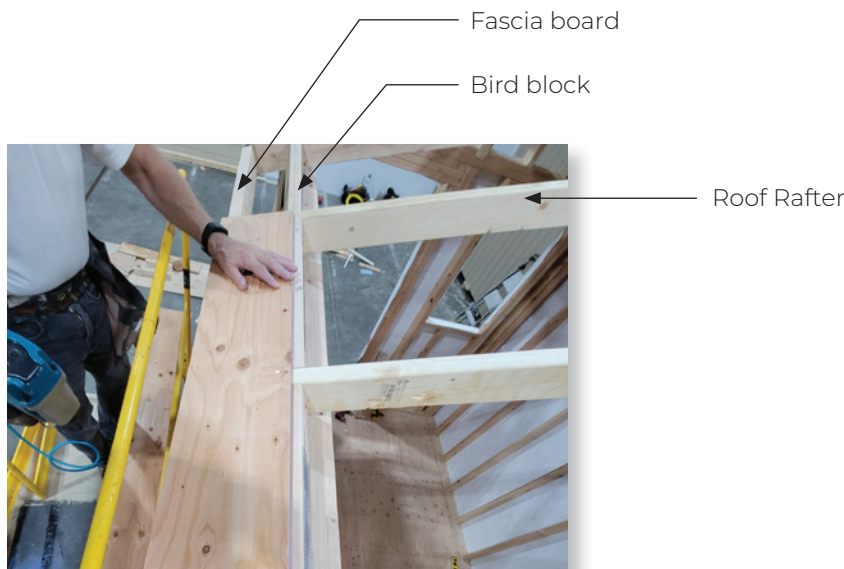


Photo: Roof Sheathing Starter Strip

STEP 20: ROOF SHEATHING (CONT.)

 **Materials:** 15/32" CDX plywood; 8D galvanized common nails;
 x2 Refer to the material and cut lists for details.



Nailing, 12" on center

Nailing, 6" on center at
all plywood edges

6" starter strip

Nailing, 6" on center

Photo: Roof Sheathing & Nailing

44. Install a full sheet (4'x8') of the plywood sheathing on top of framed rafters, placing the bottom edge of the full sheet of plywood against the top edge of the 6" plywood starter strip.

45. **Refer to the Roof Framing & Sheathing Plan on page 20:** Use the middle rafter as the judge for the first full sheet on each side.

► **NOTE:** Be sure that the plywood edge hits the middle ($\frac{3}{4}$ ") of this rafter. Nail this edge of plywood first, being sure that it splits the center of the rafter along the full length. Push rafter in and out as needed. **See photo, Roof Sheathing & Nailing.**

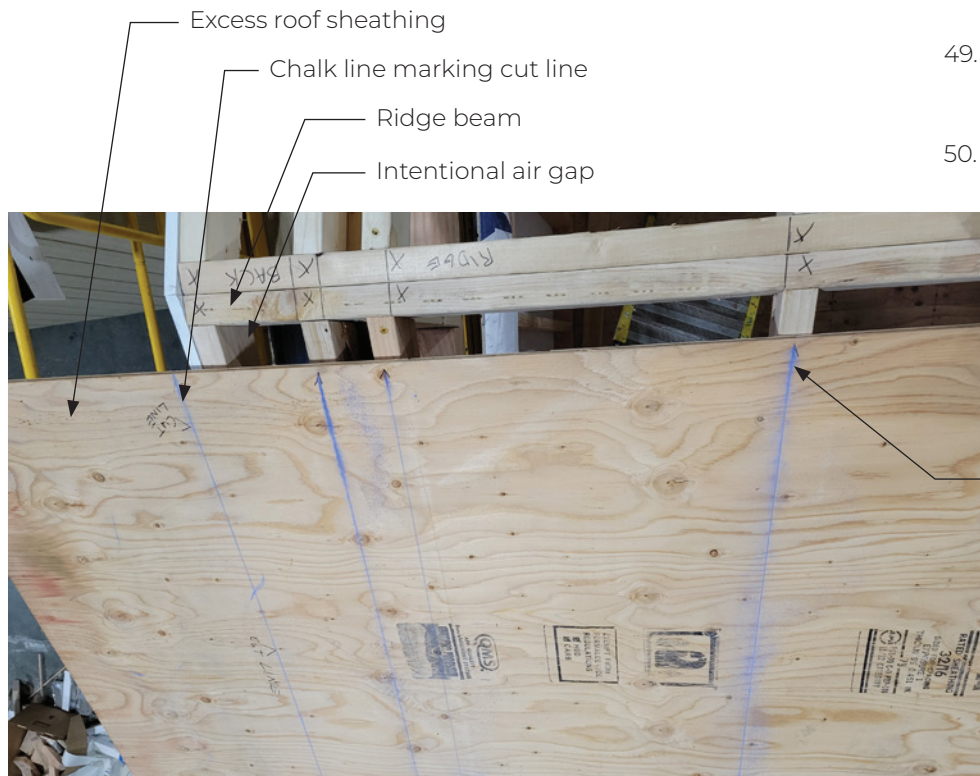
46. Install the second full sheet of plywood so that the 4' edge butts the first 4' edge, along the middle rafter. **See Roof Framing & Sheathing Plan, page 20.**

47. These two sheets of plywood will extend beyond the roof edges on the front and back of house. It will be trimmed after all (4) sheets of plywood are installed. **See sub-steps 52-53.**

48. Using a chalk box, snap lines for the location of the rafter centers, at the top and bottom of the plywood sheathing. **See photo, Chalking Line for Rafters.**

49. Nail sheathing 6 inches on center along the edges and 12 inch on center field.

50. **Repeat sub-steps 44-49** on the other side of the roof.



Excess roof sheathing

Chalk line marking cut line

Ridge beam

Intentional air gap

Typical chalk line to
center of rafter

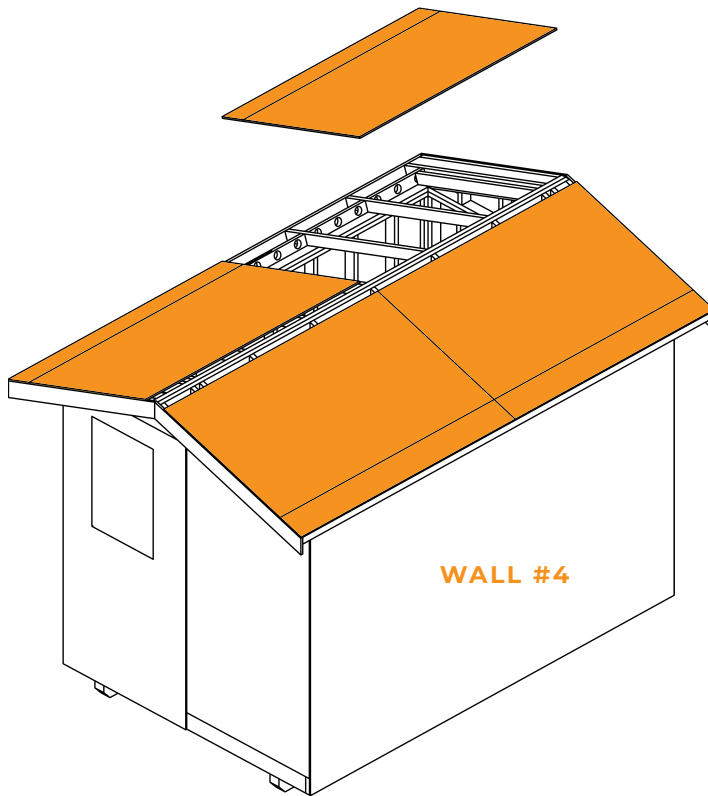
Photo: Chalking Line for Rafters

STEP 21: ROOF SHEATHING & RIDGE VENT



Materials: 15/32" CDX plywood; 8d galvanized common nails;

Refer to the material and cut lists for details.



51. **NOTE:** There will be a 1" to 2" gap at the top of the roof sheathing. This is important for ventilation through the roof ridge vents, which will be installed as a final step of the roofing process. **See photo Ridge Air Gap.**
52. At the top and the bottom of the sheathing on one side of the roof, measure and mark 1/2" beyond the face of the barge trim and chalk a line down the full length of sheet. **See photo Chalking Line for a Rake Cut.**
53. Using a circular saw (skill saw) cut along this line. This will leave a 1/2" overhang at all the rake edges of the roof.
 - **NOTE:** Be very careful when completing this task.
54. **Complete sub-steps 52-53** on all four edges of the roof.



Photo: Ridge Air Gap

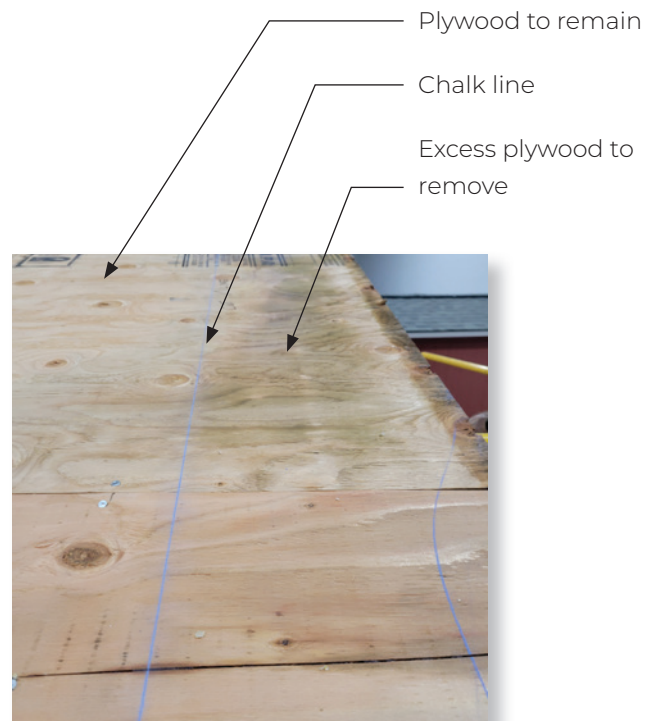


Photo: Chalking Line for Rake Cut

STEP 22: TRIANGULAR GABLE WALL SIDING



Materials: Primed T1-11 siding panels; 7d siding nails; metal Z-flashing; Refer to the material and cut lists for details.

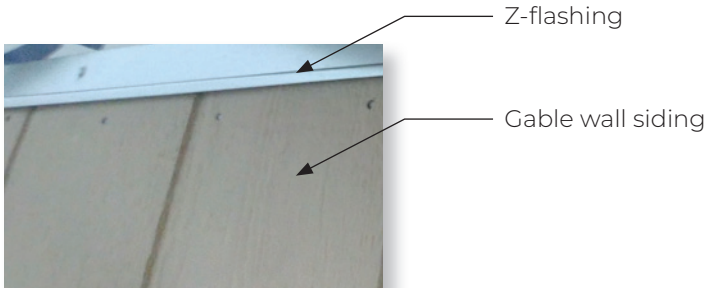


Photo: Z-flashing on top siding



Photo: Pattern Layout on Wrap



Photo: Pattern Layout on Sheathing



Photo: Wrap Installed



Photo: Measuring for Blocking Cut-out



Photo: Ridge Post Cut-out



Photo: Left Side Sheathing Installed

55. Measure the top edge of siding on the gable wall. Cut a length of Z-flashing at this length and install this with roofing nails to "cap" the top edge of main wall T-1-11 siding. **See photo, Z-flashing on top siding.**
 56. Measure and layout shape of the upper (triangular) section of the front gable wall on a piece of paper. Break out each wall section into left and right side sections.
- NOTE:** CHECK MEASUREMENTS AND ANGLES 3 TIMES.
57. Layout the pattern for the entire section on the building wrap and cut the wrap. **See photo, Pattern Layout on Wrap.**
 58. Install bottom edge of building wrap over the top flange of the Z-flashing. Do not extend over flashing and siding below. **See photo, Wrap Installed.**
 59. Measure and layout the first (left side) of sheathing on a sheet. **See photo, Pattern Layout on Sheathing.**
 60. For the front gable wall siding there are several measurements you need to take: the upper dimension (under sheathing), the side dimensions (at walls), and the lower dimension (that sits on Z-flashing.). **See photos, Measuring for Blocking Cutout, Ridge Post Cut-out.**
 61. TRIPLE check all measurements, then transfer to the plywood sheet.
 62. When completed with this (left) side of upper wall section, do a "dry run" to be sure it fits. Adjust/trim as needed. For a sample of how the completed left side section will look, **see photo, Left Side Sheathing Installed.**

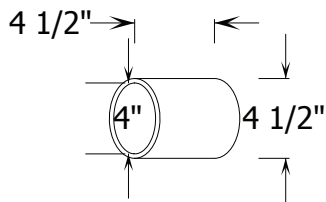
STEP 23: GABLE WALL IAQ VENT



Materials: IAQ vent kits; Refer to the material and cut lists for details.

NOTE:

- ▶ LIHI can install IAQ vent after house is delivered if needed. Confirm intent with LIHI building representative.



IAQ Vent Kit Schematic

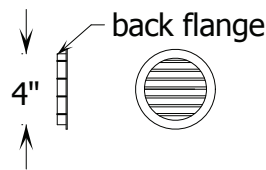


Photo: Tracing Vent Circle on Plywood



Photo: Cutting Vent Hole



Photo: Wall #2 Upper Sheathing with Vent Hole



Photo: Caulking Vent Hole

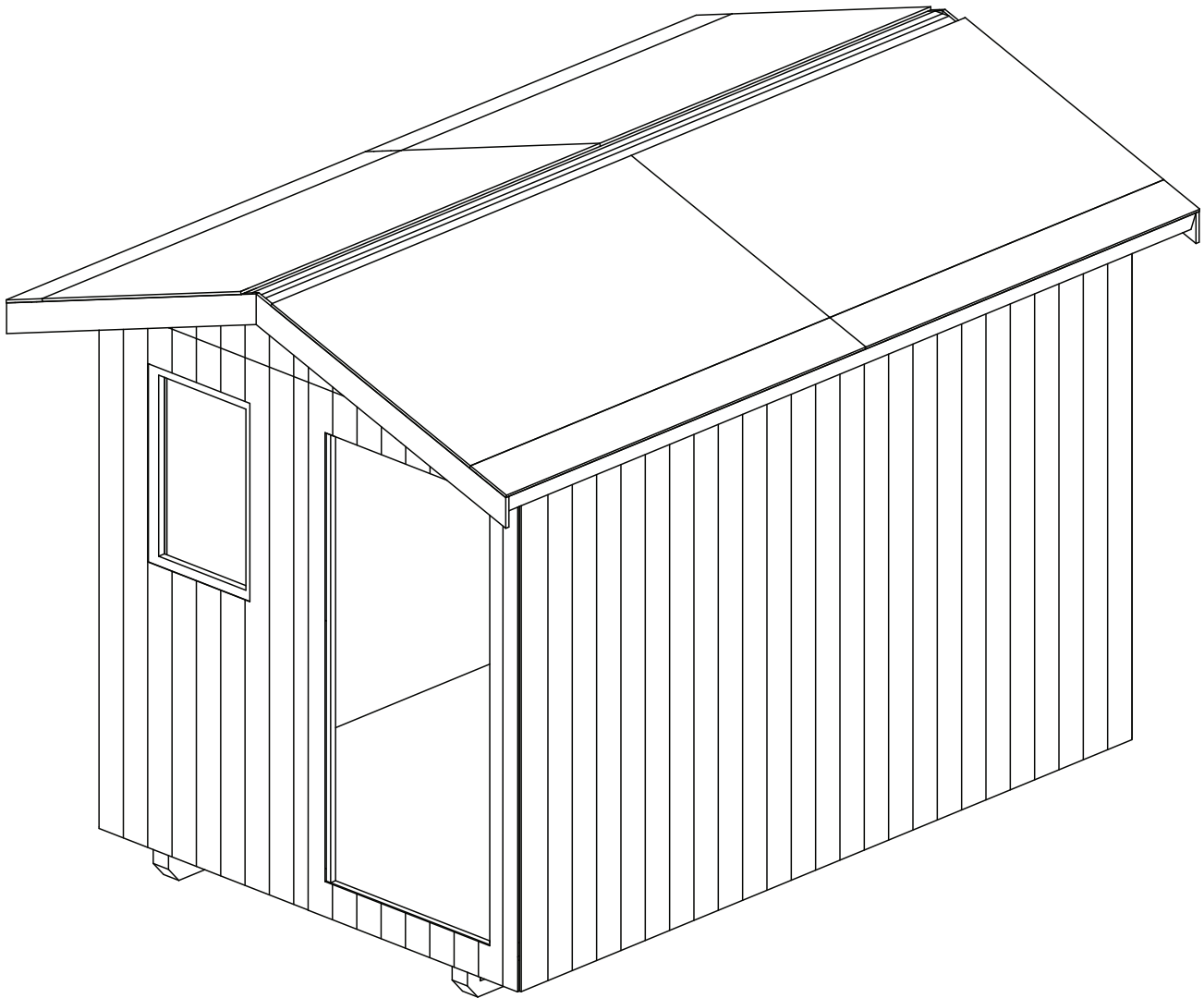


Photo: Louvered Vent on Wall #2 Exterior

63. If you are installing the IAQ vents, open up the two kits. In each kit you will find 1: 4.5" outside diameter x 4.5" long pipe AND 2: 4" louvered circular vents. **See Schematic, IAQ Vent Kit.**
64. Before installing the right triangular panel on wall #3, trace a circle around the 4 1/2" OD pipe. For placement of this hole, see Schematic IAQ Location. **See Photo, Tracing Vent Circle on Plywood.**
65. First drill pilot holes at the four quadrants of this circle—for saw bald access. Using a saber saw, cut the hole for the vent IAQ pipe. **See photo, Cutting Vent Hole.**
66. Install this triangular panel on framed wall. **See photo, Wall #2 Upper Sheathing with Vent Hole.**
67. Push one of the louvered vents onto the pipe. Be sure it fits tight.
68. Apply caulking to inside edges of the cutout hole on sheathing. **See photo, Caulking Vent Hole.**
69. Insert the pipe and louvered vent into the hole, so that it is flush on the outside. Apply more caulking if needed.
70. Repeat **sub-steps 66-71** for wall #2 exterior panel BUT cut out this vent hole on the left triangular panel. That way, the vents are across from each other from the inside of the house. **See photo, Louvered Vent on Wall #2 Exterior.**
71. Put aside the second louvered vent for final installation on the inside of the house as described in Section "INTERIOR WALL COVERINGS" of this manual.

PROGRESS: COMPLETED SIDING & ROOF FRAMING

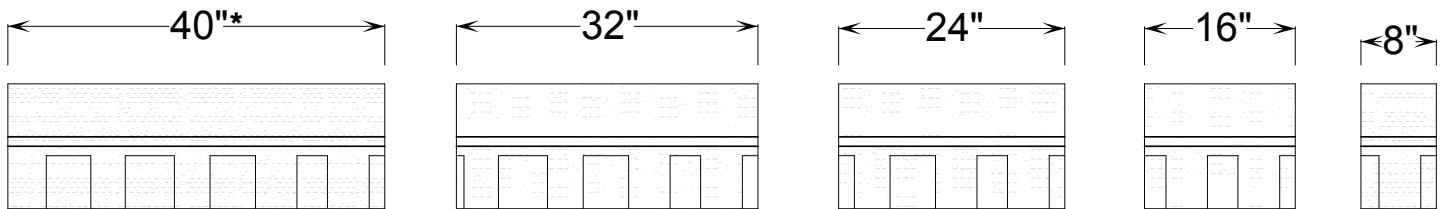
Completed floor, walls and roof framing



WEATHER PROOFING ROOF

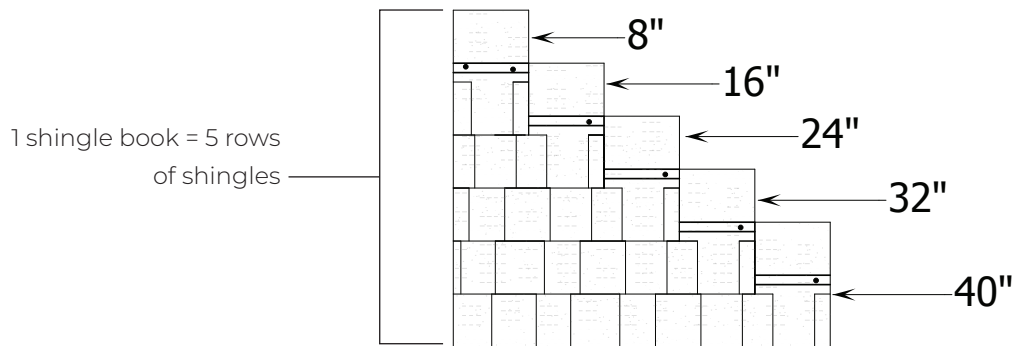
NOTE: For further details on roofing layout and process, see *Tiny Home Construction Manual Dropbox*

- STEP 24 ROOF EDGE FLASHING & ROOF FELT
- STEP 25 ROOF RAKE FLASHING
- STEP 26 ROOFING
- STEP 27 RIDGE VENT CAP

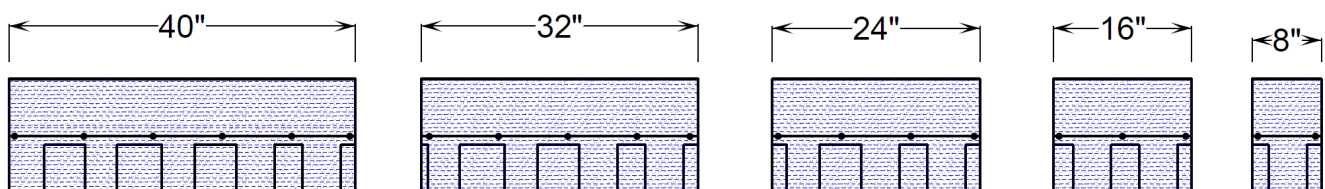


40" shingle is a full (uncut) shingle

*Actual length of a full shingle may vary depending on the manufacturer



Roof Shingle Layout Schematic – "Shingle Book & Layout"



Roof Shingle Nailing Schematic

STEP 24: ROOF EAVE FLASHING & ROOF FELT

 **Materials:** 3" 110-degree eave flashing; 2" 90-degree drip edge flashing; 1-¼" roofing nails; ⅜" T50 staples; Refer to the material and cut lists for details.



Photo: Eave Flashing

HOW TO WEATHERPROOF THE ROOF

1. Install the eave metal flashing flush to the bottom edge of the roof sheathing using the 1-¼" roofing nails placed every 12 inches. For the first piece, use the full 10' length of metal flashing. Then cut to fit the second piece, lapping 2" over the first piece. **See photo, Eave Flashing.**
2. Size and cut felt, measuring across sheathing from one end to the other.
3. Start the felt from the lower edge of the roof eave.
4. Staple the felt with the ⅜" T50 staples every 6 inches at edges and every 12 inches at interiors.
5. Run this first row of the felt the full length of the roof (~13'-8 ½").
6. Install the second row of felt with the top edge flush to the top edge of the plywood sheathing and with the bottom edge overlapping the first row, so that the ridge vent air gap remains open. **See photo Felt at Top.**
7. **Repeat sub-steps 1-6** for the opposite side of the roof.



Maintain gap
for ridge vent

Photo: Felt at Top

STEP 25: ROOF RAKE FLASHING

 **Materials:** 2" drip edge flashing; Roofing nails; Refer to the material and cut lists for details.



Flashing cut prior to bend in flashing

Photo: Drip Edge Flashing Ridge Cut

8. Once both sides of the roof are felted, install the drip edge metal flashing continuously at the gable ends and over the felt and eave flashing. Nail every 12". Be sure to cut and bend the flashing over at the ridge. **See photos, Drip Edge Flashing Ridge cut, Drip Edge Flashing Bend, Drip Edge Flashing Finished.**

NOTE: Now that the felt and metal flashing are completed, the next phase involves preparation for installing the roofing shingles. On pages 37-38 you will pre-cut the "shingle books" on the ground and then stage the books with the starter strips and shingle bundles for installation.



Photo: Drip Edge Flashing Bend



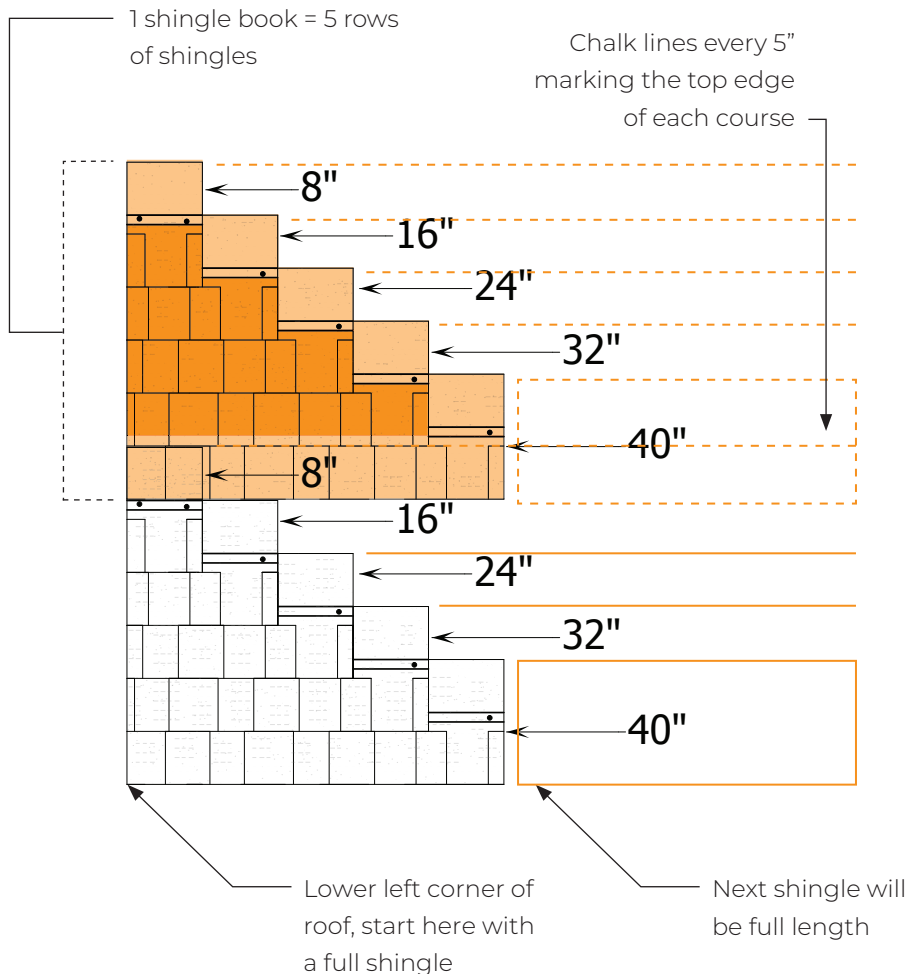
Photo: Drip Edge Flashing Finished



Photo: Starter Strips Installed

STEP 26: ROOFING

Materials: Laminated architectural asphalt shingles; Roofing starter shingles; 1-1/4" roofing nails; Tube of asphalt mastic; Refer to the material and cut lists for details.



NOTES: Each side of the roof should have 11 rows of shingles:

- 10 rows of shingles will be full height.
- The top row of shingles will be cut down to keep the roof vent clear.
- Two shingle books are needed for each side of the roof.

- First, read and review the shingle installation instructions provided by the manufacturer on the back side of the shingle bundle. In addition, **watch the video by scanning the QR code below.** It is a helpful visual and includes the minimum codes for roofing installation. However, please follow our specific instructions for the tiny home roofing installation. **These instructions are located on pages 37-39 of this manual. Visual demonstrations are located in the Dropbox folder, which you can access via the QR code below.**
- Using the laminated architectural asphalt shingles, pre-cut 4 full "books" of shingles **per Roof Shingle Layout schematic on page 34.** These are the first shingles to install on the left side of each row ("course"). Full shingles follow the first until you reach the right side of the roof, where the last shingle must be cut to fit. **See videos #2-10 for a demonstration for cutting shingle books.**

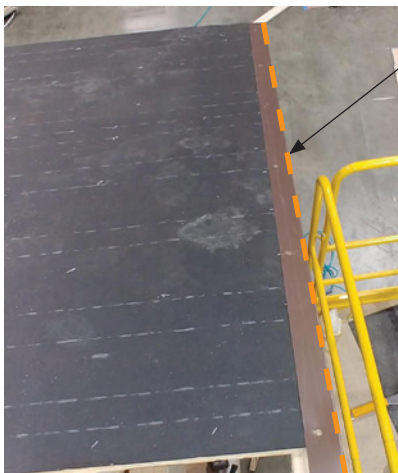
IMPORTANT:

For these books (only) be sure to measure from the right side of a full shingle and cut on the left side, for each shingle of the book. **See schematic on page 34, Shingle Book & Layout.**

Save remaining pieces that are cut off from the book shingles to use at the end of each course (i.e. the right side of the roof). Trim these as needed in the field.

- Using the starter strips install the first course along the roof eave with roofing nails, ensuring that the bottom edge is flush with the bottom edge of the eave metal flashing.

NOTE: for the first starter strip, remove 6 1/2" off the left side. This will stagger joints for the regular shingles on top. **See photo on page 36, Starter Strips Installed, and watch Video #1 for installation demonstration.**



Per step #12, bead of mastic along top of the rake flashing



Scan QR code to watch a Manufacturer's Shingle Installation video



Scan QR code to access LIHI's installation demonstration videos

STEP 26: ROOFING (CONT.)

 **Materials:** Laminated architectural asphalt shingles; Roofing starter shingles; Ridge shingles; Ridge vent; 1-3/4" roofing nails; Tube of asphalt mastic; Refer to the material and cut lists for details.



Photo: Roofing Complete One Side

Starter strip along
rake course

1/4" overhang of
shingles at both front
and back of roof

5" exposure



Photo: First Shingle Book Installed

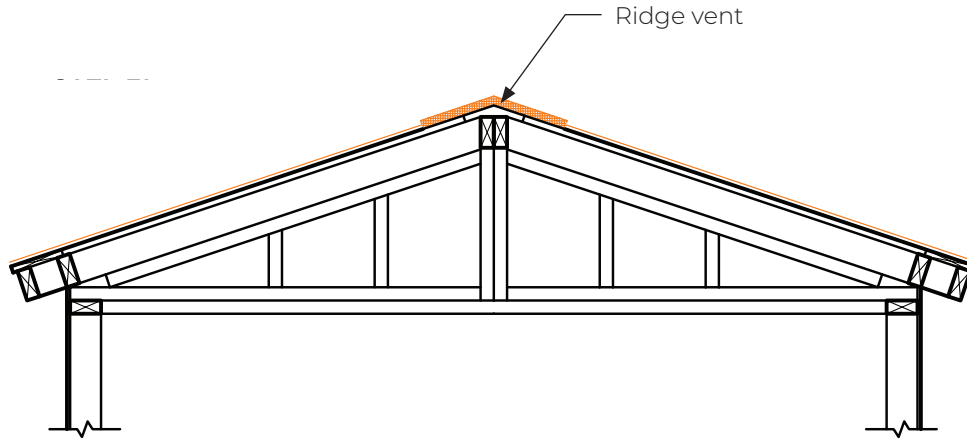
12. Run a bead of asphalt mastic on top of the rake flashing. Next, install the starter strips along the rake sides of the roof. **See photo on page 36, Starter Strips Installed.**
13. Where there is mastic missing on top of the starter strips, apply a bead. **See video #14 for demonstration.** Measure up from the eave edge 12" at the front and back of the roof and chalk a line on the felt. **Refer to video #11 for demonstration.**
14. Measure up 5" from the top edge of the first course of regular shingles and chalk a line. Do this 10 more times up the roof to mark for the top edges of 10 of the 11 courses of shingles, i.e. at 5", 10", 15", etc. This will allow for a 5" exposure of shingles. For an example of these chalk lines, **see photo First Shingle Book Installed and videos #12 & 13 for demonstration.**
15. Install the first course of regular roof shingles, allowing the shingles to hang over at the eave edge by 1" and ensuring that the top shingle edge aligns with the chalk line. Use 6 nails for every full shingle. **See video #15 for demonstration.**
NOTE: Be sure to allow for a 1/4" overhang of the shingles past the drip edge flashing at both rake edges.
16. Nail the remaining 4 shingles in the book on the left side of the roof for the next 4 courses. Use the chalk line for reference. **See photo, First Shingle Book Installed and videos #16-17 for demonstration.**
17. Once the shingle book is installed, add full shingles until reaching the right side of the roof. Cut last shingle here per field measurement. Complete installation of shingle on the remaining 4 courses of book #1 before installing book #2. Add full shingles per directions on book #1. **See videos #19-20 for demonstration.**

Starter
shingle
course

STEP 27: RIDGE VENT CAP



Materials: Ridge vent; Ridge cap shingles; 2" roofing nails;
 Tube of asphalt mastic; Refer to the material and cut lists for details.



RIDGE VENT CAP SECTION

18. **Repeat steps 11-17** for the opposite side of the roof. When you get to the top of the roof and need to cut down the height of the shingles, be sure to cut them such that the ridge opening remains. **See photo, Ridge Vent Installation. See video #23-24 for a demonstration of cutting and installing the last course.**

19. Read and review the manufacturer's instructions for the roof ridge vent installation. Install the roof ridge vent per the manufacturer's instructions. **See photo, Ridge Vent Installation. See videos #26-28 for demonstration**

20. After the ridge vents are installed, install the ridge cap shingles along the full length of the roof, allowing for a maximum of 5" exposure. Apply roof mastic under the last ridge caps. **See photo, Ridge Vent with Ridge Shingles, See videos #29-30 for demonstration.**



Photo: Ridge Vent Installation

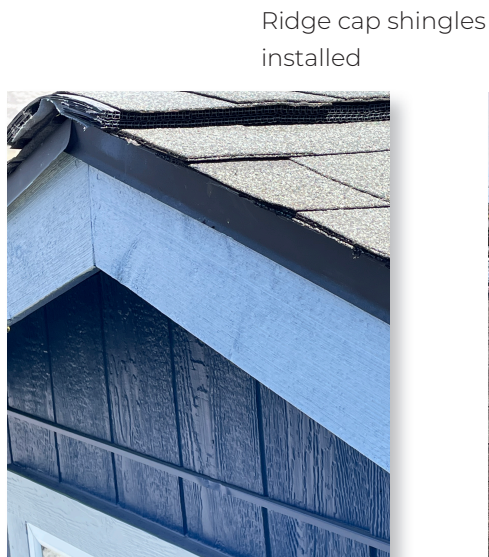


Photo: Ridge Vent with Ridge Shingles

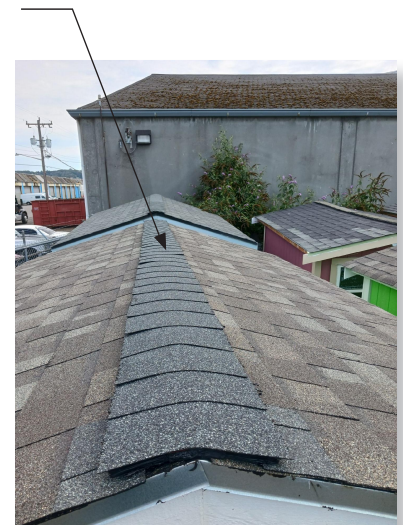
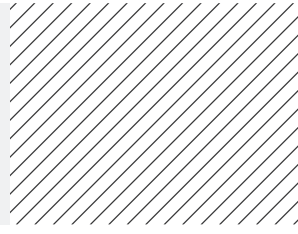


Photo: Completed Ridge - Closeup

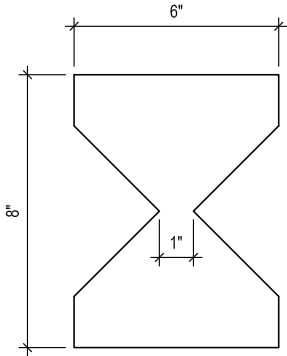
WINDOWS & INSULATION



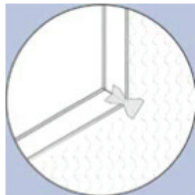
- STEP 28 WINDOW & FLASHING
- STEP 29 WALL INSULATION
- STEP 30 ROOF INSULATION & BAFFLES

STEP 28: WINDOW AND FLASHING INSTALL

 **Materials:** 6" membrane flashing; caulking; 24"W x 36"T vinyl vertical sliding window; 36"W x 24"T horizontal sliding window; 2" roofing nails; Refer to the material and cut lists for details.



A) Plan View - Bowtie



Window Bowtie Specs



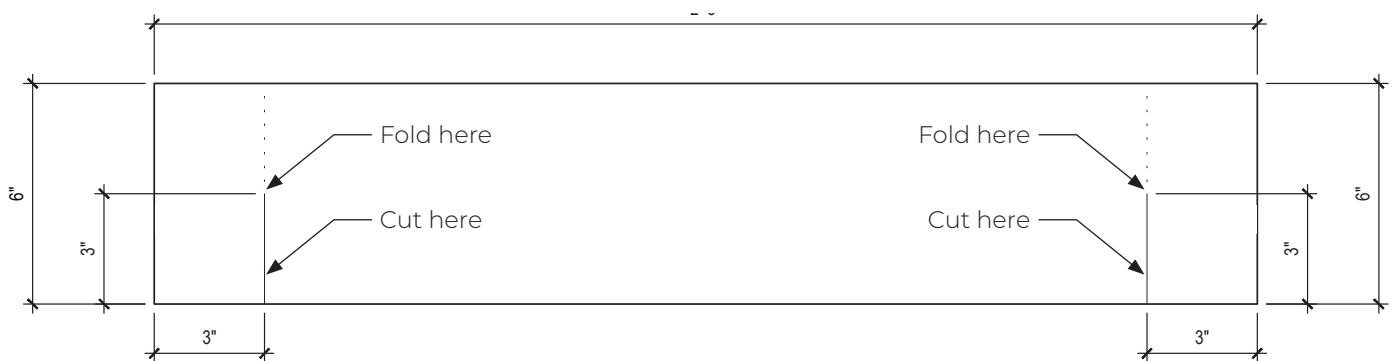
Photo: Bowtie Close Up



Photo: Window Sill Flashing Installed

HOW TO WEATHERPROOF THE WINDOWS & DOORS

1. **BEST PRACTICE:** It is critical that when flashing a window or door to always ensure that the lower flashing piece is covered fully by the one above it.
2. Starting with the front wall window opening, use the 6" membrane flashing, cut 2 "bowties" for application to the bottom inside corners of the window. For exact dimensions and cuts, **see detail A**.
3. Peel off the backing of the bowtie flashing and attach to each of the 2 bottom corners of the window opening. **See photo, Bowtie Close Up**.
4. Using the 6" membrane flashing, measure 30" and cut to fit the bottom opening of the window frame. **See schematic, Window Sill Flashing Specs**.
5. Peel and stick this window sill flashing over the siding at the bottom of the window sill frame and fold up on the inside of the left and right studs. Be sure that this sill flashing laps completely over the corner bowtie flashing pieces. **See photo, Window Sill Flashing Installed**.
6. Review the window manufacturer's instructions — usually pasted to the glass.



Window Sill Flashing Specs

STEP 28: WINDOW AND FLASHING INSTALL (CONT.)



Materials: 6" membrane flashing; caulking; 24"W x 36"T vinyl vertical sliding window; 36"W x 24"T horizontal sliding window; 2" roofing nails;

Refer to the material and cut lists for details.



Photo: Caulking Behind Window Installation



Photo: Window Top Membrane Flashing



Photo: Window Membrane Flashing Complete

Locate weep holes to the bottom of the window

16. Peel and stick the second 3" x 30" membrane flashing piece at the top of the window, over the top window flange and covering the window leg flashings on each side of the window. Be sure to cut this flashing long enough to fully cover the window side flashing pieces. **See Photo, Window Top Membrane Flashing.**

17. Adjust the flashing dimensions for the second window (36"W x 24"T) and repeat steps 02-16 for the other window.

Sill Flashing = 6" x 42"

Window Bottom Flashing = 3" x 42"

Window Side Flashing = 3" x 30" (2)

Window Top Flashing = 3" x 42"

7. Complete a "dry run" by placing the window in the framed opening, and problem solve as needed.
8. With the window removed, apply a bead of caulking on the siding before installing the window. **See Photo, Caulking Behind Window Installation.**
9. Set the window in the opening. Be sure to level and plumb the window before you nail down flanges.
10. Nail window flange into the siding and framing with 2" roofing nails through the window flange slots.
11. Measure and cut the membrane flashing @30" long. Then fold the flashing at the middle of its (6") width. Cut at this crease to create 2: 3" wide x 30" long strips.
12. Peel and stick the 3" x 30" membrane flashing over the bottom flange, being sure to extend the flashing beyond the left and right sides of the window edges 3" on each side. NOTE: Do NOT extend this more than 3" so that the window trim will cover all. **See example in photo, Window Membrane Flashing complete.**
13. Measure and cut the membrane flashing @42" long. Then fold the flashing at the middle of its (6") width. Cut at this crease to create 2: 3" wide x 42" long strips.
14. Peel and stick one 3" x 42" flashing piece over the window side flange and onto the siding.
 - **NOTE:** the inside edge of this side flashing should fit snugly against the window frame edge. **See Photo, Window Membrane Flashing Complete.**
15. Repeat step 14 for the opposite side of this window.

STEP 29: WALL INSULATION



Materials: 14.5" batt insulation; $\frac{3}{8}$ " T50 staples; Refer to the material and cut lists for details.

NOTE:

- Prior to installation of insulation, mark the location of each wall stud on the top plate and the floor below each stud. This will make it easier to locate the studs when installing the interior wood panels.

INSULATION NOTES:

- Wear safety glasses, gloves and dust mask for insulation work.
- See **step 21** for best practices and safety.



Photo: Wall Batt Insulation

HOW TO INSULATE THE WALLS

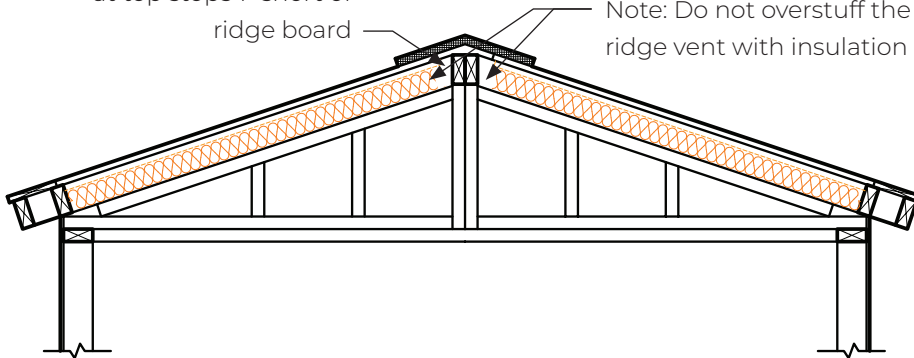
18. Measure, cut and install the batt insulation between studs (inside stud cavity's) being sure that the paper face is facing into the room and that the batt fills the entire cavity. **See sub-step 21 for cutting method.**
19. Fold out the paper flange of one side of the insulation. Position the flange flat against the outside edge of the wall stud. Staple the flange to the framing member with staples spaced every 12". Complete this on both sides of the batt insulation flanges. **See photo, Wall Batt Insulation.**
20. Use off cuts to fill small irregular cavities..
21. An easy way to cut batt insulation: after you have measured and marked the paper side of the batt, place the insulation on top of the house floor sheathing; at your cut mark, lay a piece of plywood over the insulation batt; stand on the plywood; using a sharp utility knife, cut deep through compressed insulation. When working with fiberglass insulation **ALWAYS** wear a particulate mask, long sleeves, eye protection, and work gloves.
22. For the small wall cavities: measure, mark and cut batt to the appropriate width and length. Squeeze these small pieces into the cavities.
23. For the area around the IAQ pipes, use small pieces of insulation and carefully place them around pipe. Be sure you do not block louvered vent.

STEP 30: ROOF INSULATION & BAFFLES

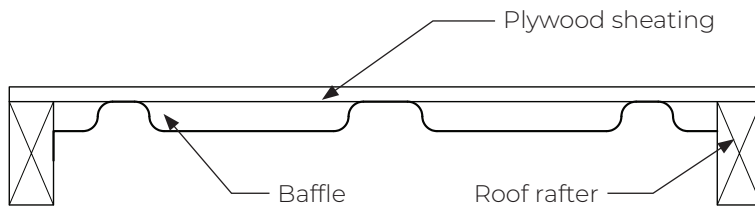
 **Materials:** 22.5" batt insulation; 22.5" insulation baffles; $\frac{3}{8}$ " T50 staples;
 Refer to the material and cut lists for details.

Be sure that insulation
 at top stops 1" short of
 ridge board

Note: Do not overstuff the
 ridge vent with insulation



ROOF SECTION - INSULATION



B) SECTION THROUGH RAFTER BAY

HOW TO INSULATE THE ROOF

24. Install the baffles in each ceiling cavity using $\frac{3}{8}$ " T50 staples to secure. Be sure that the baffle is tight against the bottom side of the roof sheathing and pushed onto the top of the wall top plates.
See photo, Completed Baffle Installation and detail B.

Note: Beware of roof nails poking through sheathing.

25. Measure and cut lengths of the batt insulation to fit the inside of rafter cavities, allowing a 1" gap at the top side for adequate ventilation.
 26. Install batts using $\frac{3}{8}$ " T50 staples between the rafter cavities.
 27. Fold out the paper flange of one side of the insulation. Position the flange flat against the outside edge of the rafter. Staple the flange to the framing member with staples spaced every 8". Complete this on both sides of the batt. **See photo, Ceiling Batt Insulation.**

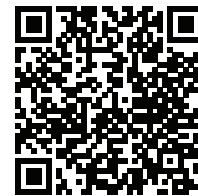


Photo: Completed Baffle Installation

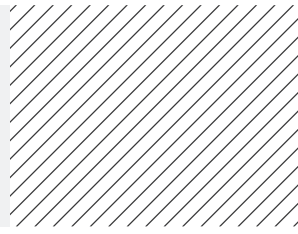


Photo: Ceiling Batt Insulation

Scan the QR code below to watch a "how-to" video on how to install insulation baffles..



INTERIOR / EXTERIOR FINISHES



STEP 31	INTERIOR CEILING PANELS
STEP 32	INTERIOR WALL PANELS
STEP 33	INTERIOR WALL PREP
STEP 34	VINYL FLOORING
STEP 35	DOOR & FLASHING
STEP 36	INTERIOR TRIM
STEP 37	EXTERIOR TRIM

STEP 31: INTERIOR CEILING PANELS



Materials: $1\frac{5}{32}$ " AC plywood; 7d galvanized siding nails; Refer to the material and cut lists for details.

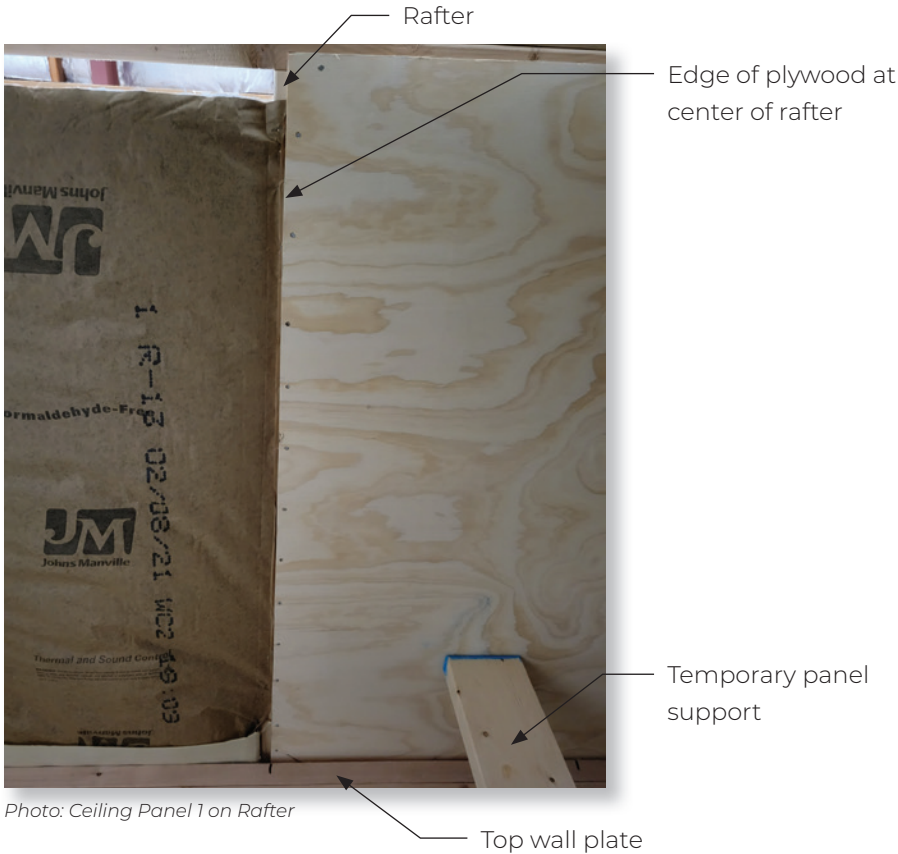


Photo: Ceiling Panel 1 on Rafter

HOW TO INSTALL INTERIOR FINISHES

28. Measure the width and length for the first sheet of plywood. Subtract $\frac{1}{4}$ " from these dimensions and cut evenly. Install this ceiling panel so that the factory edge lays at the center of the rafter, the bottom edge hits the wall, the top edge hits the bottom of the ridge beams, and the A surface is facing the inside. **See photo, Ceiling Panel 1 on Rafter, and Ceiling Panel Plan (next page).**

NOTES:

- ▶ Use 7d galvanized siding nails and nail at 6" on center along the edges and 10" on center in the field.
- ▶ AC plywood has a "better" side to it – that has fewer knots and/or the knots are filled, and the surface is smoother. This side is referenced here as the "A" side and should always be the surface facing the inside of the building.
- ▶ Before installing the first ceiling panel, pre-cut temporary braces that will hold panel up while positioning and nailing the panel in place. **See photo.**
- ▶ Make note of the marks made earlier on top wall plates, and the locations of the rafters at the ridge beam, to help guide the nailing of these ceiling panels.

STEP 31: INTERIOR CEILING PANELS (CONT.)

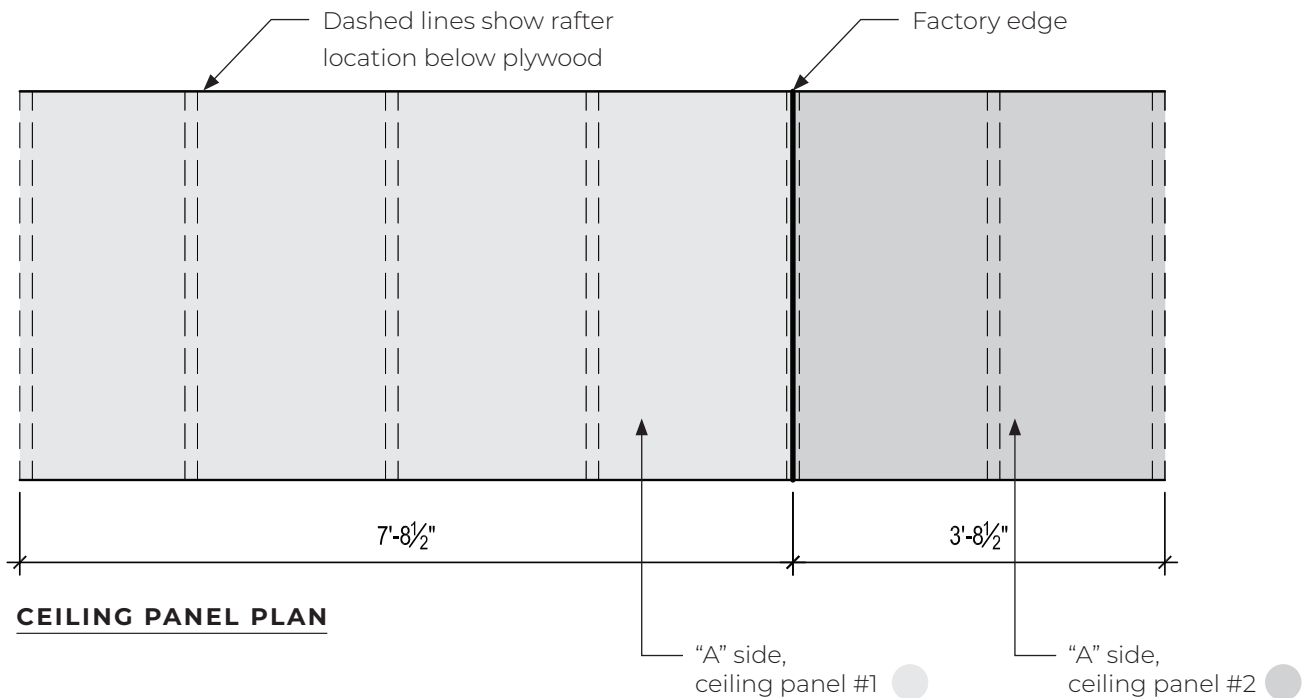
 **Materials:** $\frac{15}{32}$ " AC plywood; 7d galvanized siding nails; Refer to the material and cut lists for details.



Photo: Ceiling Panels Joined

HOW TO INSTALL INTERIOR FINISHES

29. Measure and cut the second ceiling panel. Install the second panel so that its factory edge butts the first one, centered on the rafter. **See Ceiling Panel Plan.**
30. Be sure that the factory edges of panels 1 & 2 join at the center of the rafter. **See photo, Ceiling Panels Joined.**
31. Use 7D galvanized siding nails at 6" on edges and 10" in the field.
32. Repeat steps 28-31 on opposite ceiling side.
33. Inspect all nailing on plywood and be sure that nails are tight to panels (and not protruding.)



STEP 32: INTERIOR WALL PANELS



Materials: 15/32 AC plywood; 7d galvanized siding nails; Refer to the material and cut lists for details.



Photo: Interior Panels 1 & 2 Installed



Photo: Seattle Skills Center Student

► **NOTE:** AC plywood has a “better” side to it—that has fewer knots and/or the knots are filled, and the surface is smoother. This side is referenced here as the “A” side and should always be the surface facing the inside of the building.

34. Start with wall #1. Measure the height inside the house, from the plywood floor to the inside corner of the ceiling above. Subtract $\frac{1}{4}$ " from this measurement. Using a full (4' x 8') sheet of plywood, cut for length.

35. Install this first panel in the center of the wall. For location and sequence of panel installations, **refer to the schematic, Wall #1 & 4 – Panel Plan.**

36. Using 7D galvanized siding nails, nail every 6" at edges and 10" in the interior of the panels.

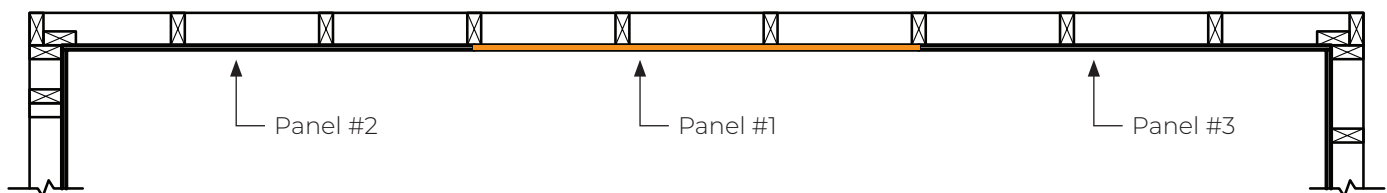
37. For Panels 2 and 3, measure and cut for widths ($-\frac{1}{4}$ "") and lengths ($-\frac{1}{4}$ ""). Be sure that the factory edge butts Panel 1 factory edges and nail into the studs.

► **NOTE:** it is important that these edges butt each other snugly AND it is okay if there are gaps at the corners of the room. (This will be covered later by trim). **See photo, Interior Panel 1 & 2 Installed.**

38. Be sure that the plywood side edges are placed at the center of each stud and that the top edge butts against the ceiling panels.

TIP: Use flat pry bars to lift the panels up so that they are snug against ceiling. Then double-check that the vertical seam splits the stud evenly. **See photo, Lifting Interior Panels.**

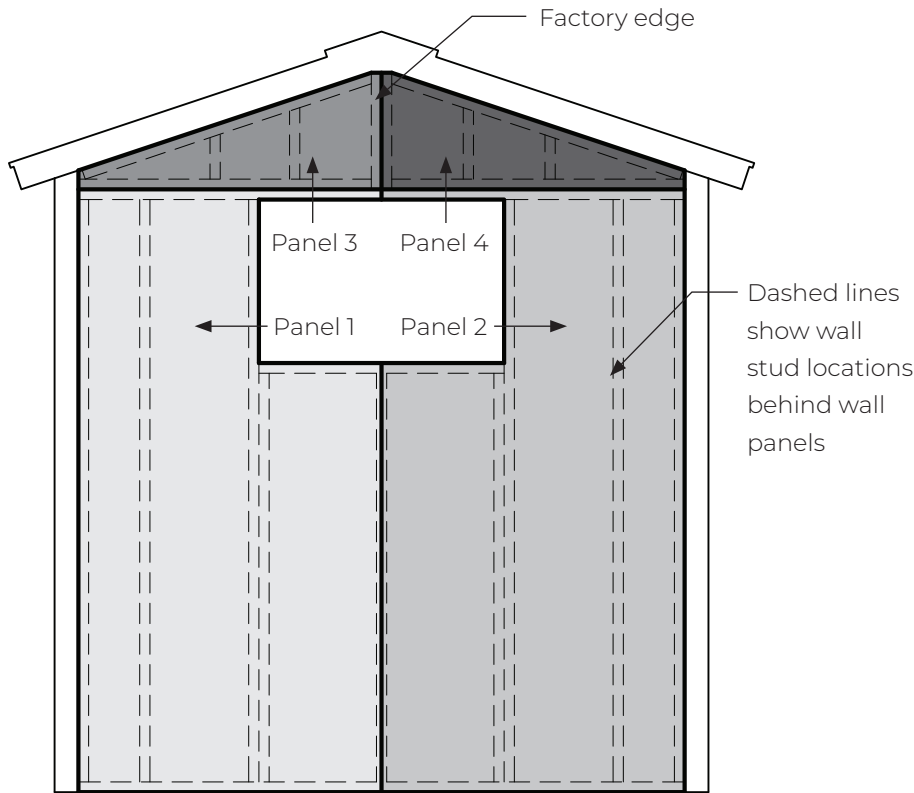
39. **Repeat steps 34-38** for the opposite side wall.



WALL #1 & 4 – WALL PANEL PLAN

STEP 32: INTERIOR WALL PANELS (CONT.)

 **Materials:** 15/32 AC plywood; 7d galvanized siding nails; Refer to the material and cut lists for details.



WALL #2 INTERIOR PANEL ELEVATION

40. Move to wall #2 and measure from the inside vertical corner to the center of the short stud under the window sill. Subtract $\frac{3}{4}$ " from this measurement and cut for the width of this panel.
41. Then measure from the floor to the line between the two top wall plates, subtract $\frac{3}{4}$ " and cut this panel (Panel 1) for height (this should be about 7'-4 $\frac{1}{2}$ "). **See Wall #2 Interior Panel Elevation.**
42. Install this Panel 1 with the cut for the height facing the floor, and the other cut side for width facing the side wall panel. Once installed, cut out for window opening.
43. **Repeat steps 40-42** for Panel 2 on the wall #2. Be sure that the top edges of these two panels align. **See photo, Wall #2 in Process.**
 - **NOTE:** The upper section of wall #2 is similar to the exterior upper triangular section. (See Roof Sheathing & Gable Wall section of manual.)
 - **NOTE:** Remember to layout the triangular panels (Panels 3 & 4) so that the vertical joints between the panels are factory edges, and the cut edges are against the ceiling and side wall panels.
44. Measure, layout and cut Panels 3 & 4.



Photo: Wall #2 in Process

STEP 32: INTERIOR WALL PANELS (CONT.)



Materials: 15/32 AC plywood; Caulking; 7d galvanized siding nails; Refer to the material and cut lists for details.



Photo: Cutting Vent Hole



Photo: Louvered Vent on Wall #2



Photo: Louvered Vent on Wall #3 Interior



Photo: Wall #3 Interior Covering Completed

45. IAQ Vent Installation:

- a. Before installing Panel 4, the right triangular section on wall #2, trace a circle on the back-side of this plywood around the protruding 4 1/2" pipe
 - b. First drill pilot holes at the four quadrants of this circle – for saw blade access. Using a saber saw, cut the hole for the vent IAQ pipe. **See photo, Cutting Vent Hole.**
 - c. Install this triangular panel on framed wall.
 - d. Apply caulking and install the second louvered vent over the pipe
 - **NOTE:** you may need a second person on the outside of the wall, to apply pressure on the exterior louvered vent. Be sure all vent parts are secure. **See photo, Louvered Vent on Wall #2 Interior.**
 - e. **Repeat steps 51a-d** for wall #4 BUT the hole cut out will be on the left triangular panel. That way, the vents are opposite each other from the inside of the house. **See photo, Louvered Vent on Wall #3 Interior.**
52. For wall #3, use similar guidelines as above for wall #2 to measure and layout the 4 panels for this wall.
 - **NOTE:** We recommend that builders use a full sheet for the right panel (which includes the window opening), and then use leftover plywood pieces to fill around the door and the upper triangular sections.
 53. Install all panels using 7d siding nails placed every 8". **See photo, Wall #3 Covering Completed.**
 54. Inspect all nailing on plywood and be sure that nails are tight to panels (and not protruding.)

STEP 33: INTERIOR WALL PREP & PAINT



Materials: Spackle; Caulking; Paint; Paint tool kit; Panel seam tape;
Refer to the material list for details.

BEST PRACTICES:

- ▶ Cover any items or areas that should not be painted. Do all brush work first and then roll over surfaces. NEVER dip your brush fully into the paint; dip ½" -1" on to the paint bristles. Inspect continuously for drips and streaking, and correct as needed.
- ▶ When completed painting for the day, clean all brushes and roller covers so these can be reused for the finish paint application. AS AN ALTERNATIVE: Wrap a wet brush or a wet roller in plastic, squeeze out all air, and store in a refrigerator for use the next day, if available.
- ▶ Cover windows with paper or cardboard and painter's tape (frame and glass) prior to painting.



Photo: Caulking the Interior



Photo: Seam Tape Applied with Primer



Photo: Primed Interior

55. Apply caulking as needed to all gaps and inside corners of ceiling and walls. **See photo, Caulking the Interior.**
56. Apply spackle as needed to plywood. Fill all nail holes and surface "blemishes." Allow spackle to dry before applying primer paint.
57. Apply the seam tape to all vertical plywood seams on walls and ceilings. **See photo, Seam Tape Applied with Primer.**
58. Apply a primer sealer coat of paint to all interior ceilings and walls.
 - ▶ **NOTE:** The window and door trim do NOT need any paint because their color is "baked" into the vinyl. These will remain white.
59. Allow primer to dry at least 24 hours. **See photo, Primed Interior.**
60. After the primer is dry, apply a finish coat of paint to the ceiling and walls.
61. Clean up all as needed.

STEP 34: VINYL FLOORING



Materials: Vinyl plank flooring; Flooring tool kit;
Refer to the material and cut lists for details.

NOTE:

- Before you begin, read the instructions located in the flooring box and **watch the flooring installation video at the Lowes website – QR code below.**
- Cutout the remaining bottom wall plate from the doorway. **See photo, Cut-out Doorway Plate.** The finish flooring will cover this area, and the door threshold will sit on top of the flooring here.



Photo: Flooring Layout



Photo: Finished Flooring Pattern



Photo: Flooring Completed

62. Floor Installation

- a. Open the flooring kit. Use the spacers provided and place them against the left side wall and the back wall for the first row. Continue using a spacer along the left side wall for all subsequent rows.
- b. For the first row and all **odd-numbered rows**, lay a full plank down on the left side of these rows. Measure and cut the right side of the second plank on these rows.
- c. Snap the left and right planks into place for the first row.
 - **NOTE:** Be sure that all edges snap into place before proceeding to the next row. Do NOT proceed to the next row if edges are not secured.
- d. Pre-cut all started planks for the next row and for all even-numbered rows (i.e. 2-4-6, etc.) of flooring by removing 8" from the left side of plank. This will result in an even layout of staggered flooring joints at the middle of the room. **See photo, Flooring Layout.**
- e. Follow this pattern for the remaining rows of flooring. **See photo, Finished Flooring Pattern.**
- f. When completed, the flooring side joints should be staggered, the top surfaces flush and joints snapped in place. **See photo, Flooring Completed.**
 - **NOTE:** Refer to the Interior Trim Section of the manual to install the baseboard over the finished flooring, as well as other interior trim.



STEP 35: DOOR AND FLASHING



Materials: 6" membrane flashing; 3'-0" x 6'-8" in swinging right-hand pre-hung door; lever keyed lockset; Refer to the material and cut lists for details.



Photo: Cut-out Doorway Plate

For flooring install
see step 34

2x4 bottom plate
cut locations



Photo: Door Lower Flashing

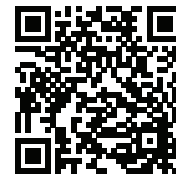


Photo: Door Flashing

44" top of door
flashing overlaps
the door jamb
(side) flashing

2" max. overlap on
siding on all sides
of door opening

63. Start by cutting flashing for the door threshold (door lower flashing). Using the 6" membrane flashing, cut the length to 38". Crease the flashing at the middle (3"). At the door opening, peel and wrap it over the edge of the floor sheathing and on top the siding. **See photo, Door Lower Flashing.**
64. For the door sides, cut 2 strips of the 6" membrane flashing at the full height of the door opening (i.e. the door trimmer stud length.) Crease the flashing so that there is a 2" fold. Peel and wrap this flashing over the outside corners of the trimmer studs so that NO MORE THAN 2" extends over on to the plywood siding. **See photo, Door Flashing.**
65. For the door head (top) cut a piece of the 6" membrane flashing to 44" long. Then make two sides cuts at 3" from each end (**this cut is similar to schematic, Window Sill Flashing Specs**). Wrap the 6" membrane flashing at the top (header) side of the door framing so that NO MORE THAN 2" extends on to the plywood siding. This should lap over the door leg flashing at both sides. **See photo, Door Flashing.**
- **NOTE:** Be sure that all lower flashing pieces are covered by the flashing pieces above it.
66. Read and review the door manufacturer's specifications and instructions for installation. **Scan the QR code below to watch a "how-to" video that generally reviews the steps.**



STEP 35: DOOR AND FLASHING (CONT.)

 **Materials:** 3'-0" x 6'-8" in swinging right-hand pre-hung door; lever keyed lockset; Refer to the material and cut lists for details.



Photo: Checking with Level on Door Frame



Photo: Checking with Level on Door Frame Top

67. The tools you will need for hanging a door include: a framing square, a 2' level, a 4' level, an impact driver.
68. Using the levels, check for plumb on the the door frame sides and for level on the floor and top of door frame. **See photos, Checking with Level on Door Frame and Checking with Level on Door Frame Top.**
69. Do a "dry run" and set the pre-hung door inside the frame to check for fit. Remove the door.
70. Run a bead of caulking on the backside of the brick mould (exterior trim.)
71. Set the door inside the frame so that the exterior brick moulding is snug against the siding.
72. Hold the door snug against the house so that it does not fall out while at the same time pushing the hinge side jamb tightly against the adjacent (trimmer) stud.
73. Open the door about 30-degrees, while keeping pressure on the hinge-side jamb to keep it flush to trimmer stud.

NOTES:

- Be sure that the door swings to the inside and that lockset hole is on your left side when looking at the door from the outside.
- It is advisable to have 2 people to complete the door installation: One should be on the inside of the house with a level and shims. The other person should be on the outside of the house with a framing square, level, impact driver and 3" screws.

STEP 35: DOOR AND FLASHING (CONT.)

 **Materials:** 3'-0" x 6'-8" in swinging right-hand pre-hung door; lever keyed lockset; Refer to the material and cut lists for details.



Cut back
remaining
membrane flashing

Photo: Checking Door for Square



Photo: Aligning Strike Holes

74. Use the framing square to check for square on top inside corners of the door jamb. On the outside use the 4' level against the jamb to check for plumb. Adjust as needed. **See photo Checking Door for Square.**
75. The person inside should check that the manufacturer's spacers between the door edges and jamb are still in place. This will ensure that there is the necessary gap (~ $\frac{1}{8}$ ") for the door to open and close properly.
76. As needed, use the tapered shims to fill gaps between door jamb legs and framing. Locate the screws just below the shims
 - **NOTE:** Check both jamb legs for plumb, the top jamb for level, and square to sides.
77. Using a speed square or other straight edge, be sure that inside jamb edges on all sides are flush to the interior sheathing surface.
78. Starting with the hinge side of the door, screw the hinge jamb leg through the thick part of the jamb (on outside) into the trimmer stud
 - **NOTE:** Be sure that the hinge side of door is plumb first.
79. Check again for the gap between the door edges and the jamb, and for square at the top of the jamb. Adjust as needed.
 - **NOTE:** Cut back any remaining revealed flashing at the corner. Move to the opposite jamb leg (latch side) and repeat steps #76-78. Be sure that the door latch strike hole aligns with the jamb latch hole. **See photo Aligning Strike Holes.** Once the jambs are secured, install the door lockset per the manufacturer's written instructions. **See photo Completed Lockset Installation.**



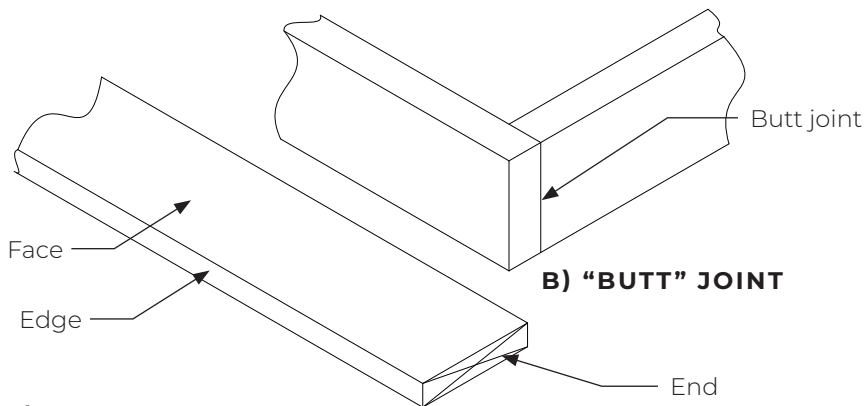
Photo: Completed Lockset Installation

STEP 36: INTERIOR TRIM

 **Materials:** 1x6 vinyl/PVC trim; 1x4 vinyl/PVC trim;
1x2 vinyl/PVC trim; 8d galvanized finish nails; Caulking;
Refer to the material and cut lists for details.

BEST PRACTICES & DEFINITIONS FOR TRIM WORK:

- ▶ Milled lumber has 3 sides to it: the edge, the face and the end.
See detail A.
- ▶ When installing finish trim, there are multiple methods and ways to join boards. In this manual the term “square cut” means a 90-degree or standard cut on a power saw. “Angled cuts” refer to an adjustment on the power saw angle.
- ▶ When two pieces of trim that have square cut ends meet each other, this is called “butting” one piece to the other.
See detail B.
- ▶ The term “rip” usually refers to making a cut down the length of a board along its face so that the width of the board is changed.
- ▶ If need be: when hand-nailing this (vinyl) trim, the builder can pre-drill a hole. Use a $\frac{1}{8}$ ” twist drill bit and drill into the trim before nailing.



A) LUMBER FEATURES

Outside trim edge
flush to wall surface



Photo: Window Casing Top Piece

80. Window Trim:

81. Measure the inside depth of both window openings, from the vinyl window frame to the face of the interior plywood panel, and rip 2: 1x4x8' boards to the depth. If there is variation of less than $\frac{1}{8}$ " on a window frame, use the shorter dimension for ripping. These boards will be used for the window casing.
- ▶ **NOTE:** For an overview of window trim, **see photo Interior Window Trim Components on page 57.**
- ▶ **NOTE:** Be sure that the outside edge of the “window casing” top and side pieces are flush to the inside surface of the wall coverings. When installing this trim, the smooth face of the board should face outwards, and the ripped edge of the board should face inside against the vinyl window edge.
- b. Measure the inside length at top of window. Cut the ripped 1x4 to this length and install this trim against the window top frame, using 2: 8d galvanized casing nails placed every 8." **See photo, Window Casing Top Piece.**
- c. Measure the inside lengths of left and right sides of window. Cut the ripped 1x4 to these lengths and install these to the window side frames using 2: 8d galvanized casing nails spaced every 8." **See photo, Window Casing Side Pieces.**

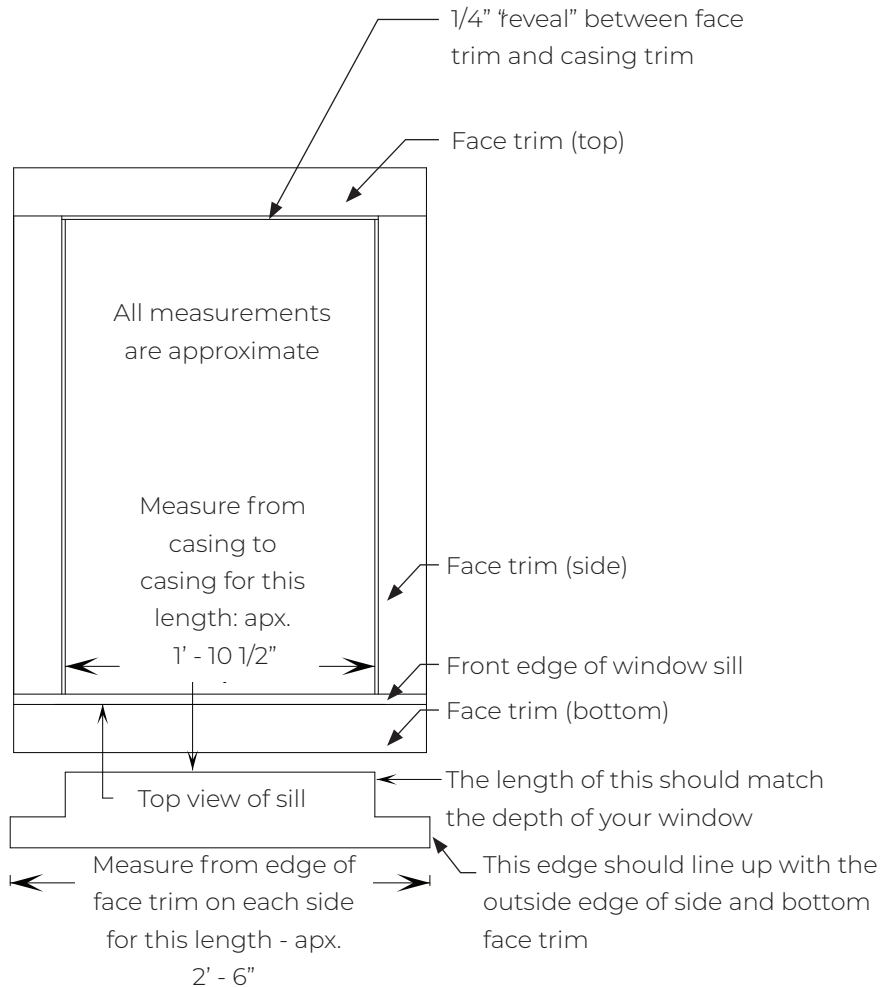


Photo: Window Casing Side Pieces

STEP 36: INTERIOR TRIM (CONT.)



Materials: 1x6 vinyl/PVC trim; 1x4 vinyl/PVC trim;
1x2 vinyl/PVC trim; 8d galvanized finish nails; Caulking;
Refer to the material and cut lists for details.



- For the window sill, use the 1x6 vinyl trim. Measure the inside dimension (at the bottom of window finished opening, measure from one casing leg to the other). Add 7-1/2" to the overall length.
 - Cut out left and right corners of this "window sill" so that this piece slides into window opening while also protruding about 2" into room interior. Check for square as needed. For cutout dimensions, **see Wall #3 Window Sill Plan & Trim Elevation**.
 - Install this sill so that it is evenly spaced inside the finished window opening using 2: 8D galvanized casing nails spaced every 8". **See photo, Interior Trim Window Sill Detail**.
- **NOTE:** For the window trim work discussed above, the face trim is installed after the casing trim. This face trim will have a "reveal" of 1/4" past the casing edges.
- Using the final measurement of the window sill length (apx. 2'-6" for front window; apx. 3'-6" for back window) cut 2: 1x4 boards to this length. One of these boards will be used for the top face trim, the other is the window bottom face trim and will be installed below the window sill.

WALL #3 WINDOW SILL PLAN & TRIM ELEVATION



Photo: Interior Trim Window Sill Detail

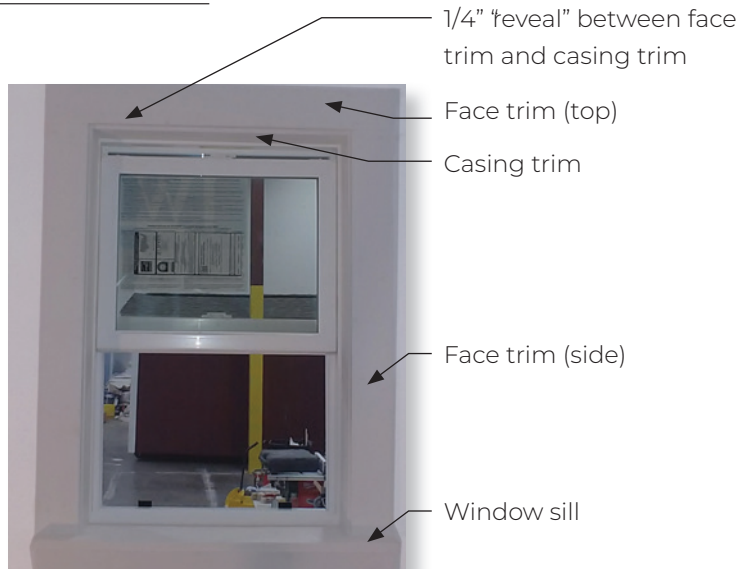


Photo: Window Sill

STEP 36: INTERIOR TRIM (CONT.)



Materials: 1x6 vinyl/PVC trim; 1x4 vinyl/PVC trim;
1x2 vinyl/PVC trim; 8d galvanized finish nails; Caulking;
Refer to the material and cut lists for details.



Photo: Window Head & Side Trim

- h. Install the top face trim centered in the window opening using 2: 8d galvanized casing nails spaced every 8". **See photo, Window Head & Side Trim.**
 - i. Install the bottom face trim snugly under the window sill and centered in the window opening. **See photo, Front Window Interior Trim Completed.**
 - j. For the side trim pieces, measure from the top of the window sill to the bottom edge of the top face trim. Cut 2 of these lengths from the 1x4 boards.
 - k. Install these side trim boards on both sides of the window. **See photos, Window Head & Side Trim, Front Window Interior Trim Completed, Back Window Interior Trim Completed.**
- 8l. Apply caulking to all gaps between window trim pieces. Push caulking into gaps and then clean off excess as needed.



Photo: Back Window Interior Trim Completed



Photo: Front Window Interior Trim Completed

STEP 36: INTERIOR TRIM (CONT.)

 **Materials:** 1x2 vinyl/PVC trim; 8d galvanized finish nails; Caulking;
 Refer to the material and cut lists for details.

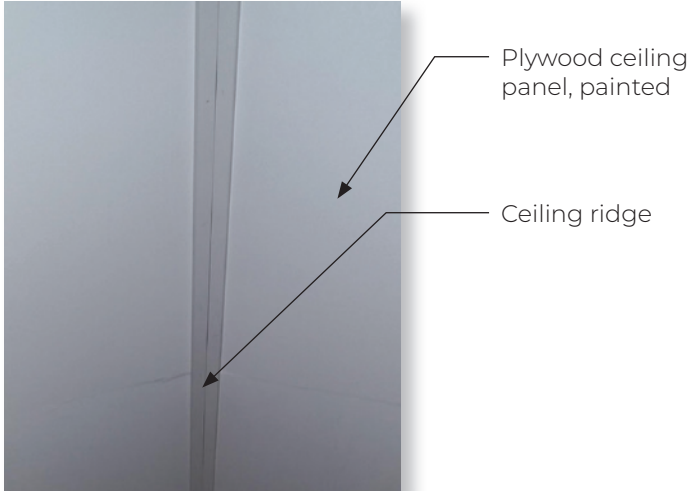
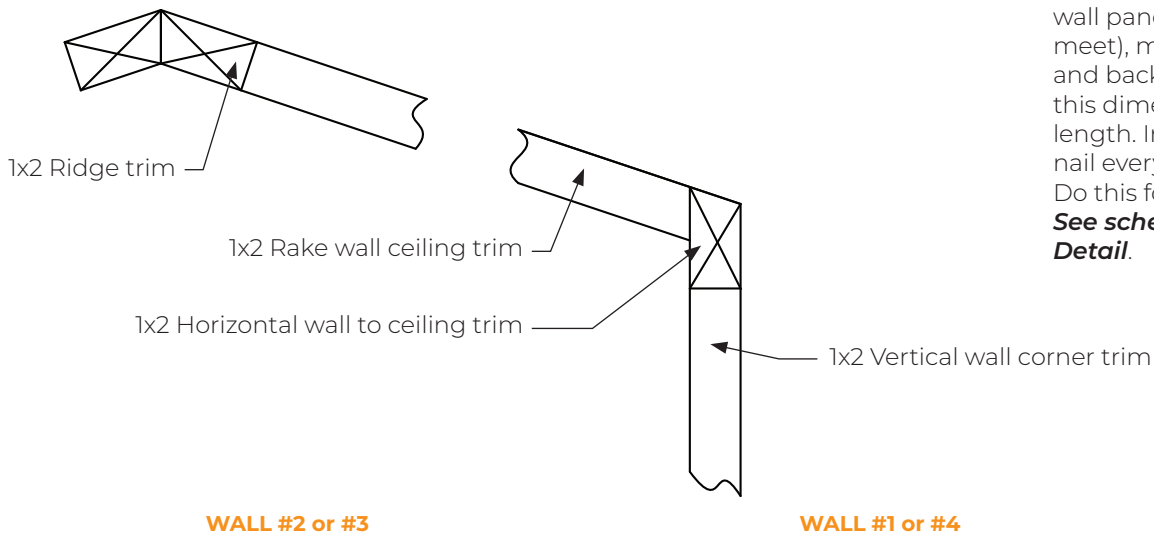


Photo: Ridge Ceiling Trim



CORNER TRIM DETAIL

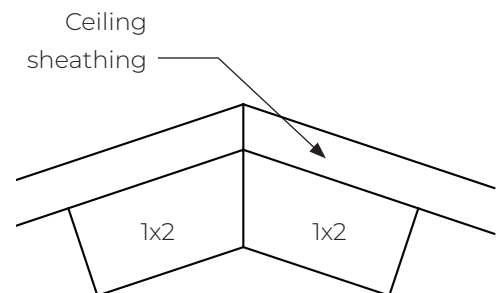
82. Ceiling & Wall Trim:

a. Ridge Trim

For the trim at the ceiling ridge, use the 1x2x12' boards. If possible, rip one edge of each of the boards at a 19-degree angle. **See schematic, Ridge Trim Corner Detail.** Using a ladder, measure the ridge length inside the house. Subtract 1/8" off this measurement and cut these two boards to length. Butt the two boards together at the angled edges and nail through the face of the trim at each rafter. Use 1: 8d nail at each rafter (if not possible to rip at an angle, just butt these two boards together at the ridge and caulking will later cover this joint). **See photo, Ridge Ceiling Trim.**

b. Horizontal Wall-to-Ceiling Trim

For the horizontal trim between ceiling and walls #1 & #4, use the two 1x2x12' boards. If possible, rip one edge of each board at a 19-degree angle. At the upper corner of a side wall (where the wall panels and ceiling panels meet), measure between the front and back walls. Subtract 1/8" from this dimension and cut boards to length. Install this trim using 1: 8d nail every 8" through wall panels. Do this for the opposite side wall. **See schematics Corner Trim Detail.**



RIDGE TRIM CORNER DETAIL

STEP 36: INTERIOR TRIM (CONT.)

 **Materials:** 1x4 vinyl/PVC trim; 1x2 vinyl/PVC trim; 8d galvanized finish nails; Caulking; Refer to the material and cut lists for details.



Photo: Interior Ceiling Trim Front Wall



Photo: Close Up Ceiling Trim



Photo: Front Wall Trim Complete

c. Rake Wall Ceiling Trim

For the rake wall ceiling trim located between the ridge trim and adjacent horizontal wall-to-ceiling trim. Use the 1x2x8' boards. Measure and cut the inside sloped corners of the ceiling. If possible, cut the face the lower end of the board at 19-degrees. Install this trim against the ceiling panel with 1: 8d nail every 8" into the rafter behind the panel. Do this for the front and the back walls of the house. **See photos, Interior Ceiling Trim Front Wall, Close Up Ceiling Trim and Front Wall Trim Completed.**

d. Door Trim

- **NOTE:** These trim boards will "butt" each other and therefore all cuts are square cuts (90 degrees).

At the top of the door, measure the width of the door, from the left inside jamb edge to the right inside jamb edge. Add 7-1/2" to this measurement and cut a 1x4 to this length. Center this trim board above the door and allow for a 1/4" reveal along the top of the door jamb edge. Install the head trim using 2: 8d casing nails every 8". The top of the door head trim should be set 1/4" above the bottom edge of the door frame. This creates a 1/4" reveal. **See photo, Door Trim Reveal.** Along the door jamb (sides), measure from the floor to the bottom edge of the head trim, at both sides of the door. Subtract 1/8" from these measurements. Cut 2: 1x4's at these lengths for the side trim boards. Install the side trim using 2: 8d casing nails every 8" and leaving a 1/4" reveal on each door jamb edge.

1/4" reveal



Photo: Door Trim Reveal

STEP 36: INTERIOR TRIM (CONT.)

 **Materials:** 1x4 vinyl/PVC trim; 1x2 vinyl/PVC lumber; 8d galvanized finish nails; Caulking; Refer to the material and cut lists for details.



Baseboard trim

Photo: Baseboard Installed Over Flooring



Side vertical corner trim

Photo: Vertical Wall Corner Trim



Photo: Interior Corner Back Wall

e. **Baseboard Trim**

Take measurements at the bottom of the side walls. Subtract 1/8" from these dimensions and cut these lengths from 2: 1x4x12' vinyl boards. Install this baseboard trim using 2: 8d casing nails at each stud. **See photo, Baseboard Installed Over Flooring.** Using the 1x4x8' vinyl boards, measure wall #2 length between the side wall baseboard trim. Subtract 1/8" from this measurement. Cut this to length and install using 2: 8d casing nails at each stud. Measure the distance from the right door leg trim edge to the corner of the room. Subtract 1/8" from this measurement and then cut a 1x4x8' to length. Install using 2: 8d casing nails.

- **NOTE:** These trim boards will "butt" each other and therefore all cuts are square cuts (90-degrees).

f. **Vertical Wall Corner Trim**

Use the 1x2x8' boards for the 3 inside vertical corners. Measure from the top of the baseboard to the bottom edge of the horizontal wall-to ceiling trim. Subtract 1/8" from this measurement. Cut both ends at 90-degrees. Install this board using 1:8d nail every 8". Repeat for the other 2 corners. **See photos, Vertical Wall Corner Trim and Interior Corner Back Wall.**

- **NOTE:** There is no corner trim needed at the 4th corner located at the door.

STEP 36: INTERIOR TRIM (CONT.)



Materials: 1x2 vinyl/PVC trim

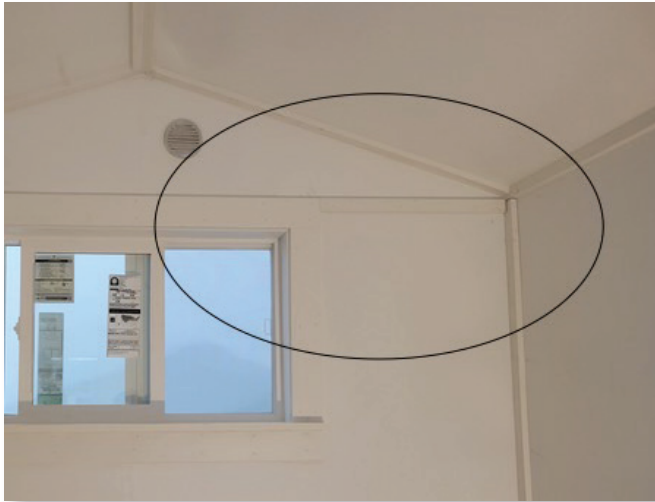


Photo: Interior Trim Complete Back Wall

g. Rake Wall Plywood Seam Trim

For Wall #2 (back wall) measure from the edge of the window side trim, to the vertical wall corner trim. Cut a 1x2 board to this length and install it on the wall so that it covers the plywood seam. Align the top edge of this seam trim with the top edge of window head trim. Level with the floor as needed. Do this for both sides of the window.

See photo Interior Trim Complete Back Wall.

For Wall #3 (front wall) first measure, cut and add a short length of 1x2 vertical trim to the left side of wall – just above the door head trim and butting the horizontal wall-to-ceiling trim. Next, measure from this new short vertical trim on the left side of Wall #3, to the existing full-length vertical corner trim on the right side of Wall #3. **See photo, Interior Trim Above Door Detail.** Install so that this horizontal trim is parallel to floor and equidistant above door head trim.



Photo: Interior Trim Above Door Detail

STEP 37: EXTERIOR TRIM



Materials: 1x4 primed engineered lumber; 8d galvanized casing nails; Caulking; 2x2" metal drip cap; Spackle; Refer to the material and cut lists for details.

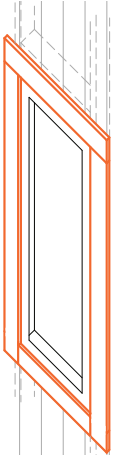


Photo: Wall #3 Window Exterior Trim



Photo: Window Z-flashing Detail

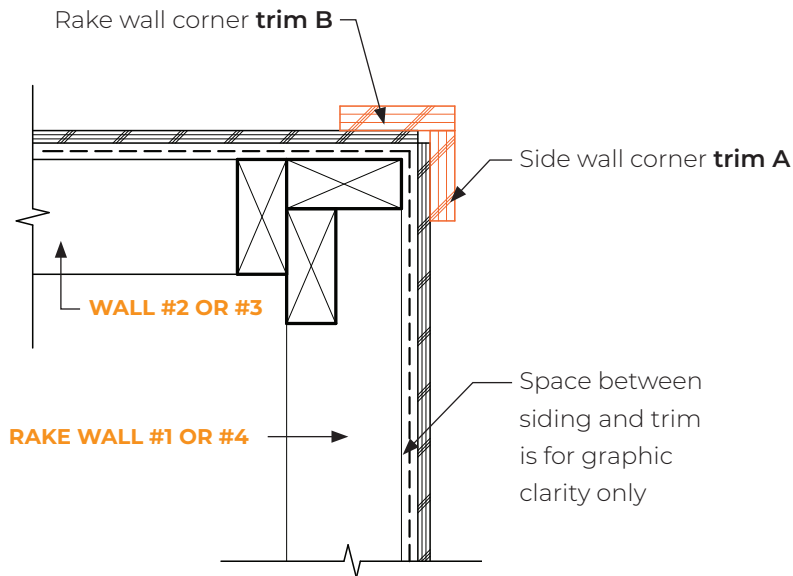
83. WINDOWS:

- a. Measure the top of the window from outside edge to outside edge. Add 7-1/2" to this measurement and cut this length from a 1x4x8' board. This is the head trim.
- b. Cut the Z-bar metal flashing to the same length as the head trim. Install this flashing over the window flange and on top of the window. Be sure the flashing is centered with the center of the window. **See Photo, Window Z-flashing Detail**
- c. Apply a bead of caulking at the inside corner of the metal flashing piece. Then install the head trim over this, using 2:8D galvanized casing nails placed every 8".
- d. Measure from the bottom edge of the head trim, to the bottom of the window. Add 3-3/4" to this measurement and cut two 1x4's at this length. These are the side trim pieces. Install the side trim using 2:8D galvanized casing nails placed every 8".
- e. At the bottom of the window, measure between the two side trim pieces and cut to length from a 1x4x8' trim board. **See Photo, Wall #3 Window Exterior Trim.**
- f. Repeat steps 83a-83e for the second window.

STEP 37: EXTERIOR TRIM (CONT.)



Materials: Refer to the material and cut lists for details.



EXTERIOR CORNER TRIM



Photo: Flashing Exterior Corners B4 Trim



Photo: Exterior Corner Trim Boards



Photo: Exterior Corner Trim Up Close

84. OUTSIDE CORNERS:

- Apply 6" membrane flashing around the corners, to seal the outside corner joints. **See photo, Flashing Exterior Corners B4 Trim.**
 - At the corner of wall #1 or #4, measure from the bottom of the corner rafter to the bottom edge of the wall panel below. Using this dimension, cut both ends of a 1x4x8' board. **See photo Exterior Corner Trim Up Close.**
 - Install **trim A** on wall #1 & #4 flush to the outside surface of the sheathing. Use 2:8d galvanized nails placed every 8". **See Photo, Exterior Corner Trim Boards.**
 - For the **trim B** at the same corner, cut a 1x4x8' board at 19-degrees at the top end.
 - Measure from the bottom side of roof sheathing, to the bottom of the siding.
 - Use this dimension, measure from the long angle of the first cut on your trim board (step 88e) and make a square cut at the bottom end of the 1x4.
 - Install this corner **trim B**, flush to the outside face of corner **trim A**, and snug to the bottom side of the roof sheathing. **See Photo, Exterior Corner Trim Up Close.**
- **NOTE:** You will need to cut exposed edge of Z-flashing so that this trim will lay flush to the siding. Use 2:8d galvanized nails placed every 8".
- Repeat steps 84a-84g for the remaining three corners.

STEP 37: EXTERIOR TRIM (CONT.)



Materials: Caulking; Spackle; Refer to the material and cut lists for details.

89. Paint/Prep Exterior:

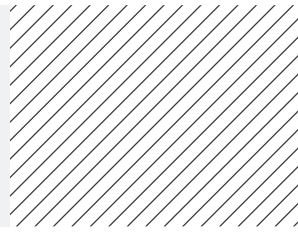
- a. Apply caulking as needed to all gaps and corners. This is especially important at areas around door and window trim, and at siding seams and corners, to protect from water and air infiltration.
 - b. Use spackle to fill all nail holes and surface blemishes. Allow spackle to dry before applying primer paint.
 - c. Clean up all as needed.
- **NOTE:** The finish paint will be applied to the exterior by others at a later time.



Photo: LUV Tiny Homes

TINY HOME MANUAL

KEY TEAM MEMBERS



LIHI Construction Crew: (Pictured from left) Abdul Jones, Guy Astley, Stephanie Colbert, James Raye



LIHI Construction Crew: (Pictured from left) Bradford Gerber, Becca Finkes



LIHI Prototype Tiny Home Carpenters: (Pictured from left) Tom Highland, Abdul Jones



Jackson | Main Architecture: (Pictured from left) Dani Karr, Katerina Prochaska, Meghan Craig

THANK YOU FOR HELPING TO CONTINUE THIS WORK



Photo: Lake Union Tiny Home Village



Photo: Georgetown Tiny Home Village



Photo: True Hope Tiny Home Village



Photo: Spirit Village Tiny Homes



Photo: Interbay Tiny Home Village



Photo: Othello Tiny Home Village



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