Exterior/Interior Framing
Approved Methods
August 25, 2020

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Introduction to The Framing Section

This chapter covers the framing process for exterior and interior walls. A separate chapter is devoted to the process of installing the roofing including the trusses, roof covering and the gable build and install.

This Section Includes

- Recommended schedule and crew assignment
- Task Lists Safety Review
- Tool, Equipment and Material List
- Material Description
- Construction Details and Drawings

Schedule: Framing Days 1, 2 & 3

The Framing Tasks begin with the floor slab (or wood floor) in place, lines for the walls charked off, and wall plates cut, marked and laid in place. The primary task for the first day of Framing is to construct, erect, plumb, straighten, sheathe, and brace the exterior walls of the house. The primary tasks for the second day of Framing are to erect the interior walls of the house, plumb and brace these. On the third day, windows, doors and any miscellaneous blocking are completed as well as the roughing in of the porch beams.

When the Framing portion of the job is finished, the house is completely “dried-in” and ready for the framing inspection and all subcontractor work (plumbers, electricians, HVAC).

Crew Assignments

It is suggested that approximately 20 volunteers, including one task leader and 4 crew leaders, be recruited for Framing. Divide the crews up by distributing the experience level among the crew leaders. Each crew is then assigned to certain tasks. For example, all of the assigned crews can begin the first day by assembling and erecting the exterior walls. Later, one crew can be assigned to the task of trimming out the gable trusses while the others complete the interior wall framing.

As the work progresses, the Task Leader can better determine the skill and energy levels of the various crews and can assign future tasks accordingly. The most important consideration is to keep all of the crews safe and actively involved by dividing the tasks as evenly as possible and monitoring the progress.
Framing Safety Guidelines

Review these guidelines with each crew member at the start of the day or as they arrive on site.

“NO JOB IS SO IMPORTANT THAT IT CAN’T BE DONE SAFELY”

Speak up if something looks unsafe. An observer can spot danger quicker than a worker.

Know where water & first aid kit are located. Tell the site supervisor about any injury immediately.

It is critical to brace the gable trusses properly.

Habitat requires safety glasses not just when using power saws, but at all times.

Habitat requires hard hats be worn by everyone on site during framing.

Utility knives - keep your hand out of the blade’s path. Retract blade when not in immediate use. A sharp blade is safer than a dull one. Safely dispose of used blades.

Power Saws:

- Only crew members with power saw experience can use them. A busy work day is not the time to teach saw skills nor is it the time to learn saw skills.
- Habitat requires that ear and eye protection be used when using power saws. Don’t bind the blade of any saw – listen for it. Back off and resupport lumber. Keep electric cords out of the way of the saw and out from underfoot.
- Don’t cross hands over to stabilize material on the miter saw. Find another way or get help.
- Guards on saws must be in place & operating.

Keep the entire work area, inside and out, free of trip and fall hazards.

Keep tools not in use in your tool belt at all times. Select the correct tool for your work. Carry only those you need.

Remove nails before discarding lumber. Discarded material must be placed in the designated area.

Keep tools not in use in your tool belt at all times. Select the correct tool for your work. Carry only those you need.

No loose clothing or hair that can get caught in power tools.

Wear appropriate clothing for the task including work boots that protect from falling objects, have a nonskid sole & resist nail penetrations. No open toed shoes allowed.

Tools must be in a safe condition (meet OSHA standards, i.e. no nicks in cords or missing grounding prongs.)

Think & concentrate on your task. If you are uncertain about how to do a task, or how to operate a power tool, ask your crew leader.

Additional Ladder, Scaffolding & Roof Safety
• Use a **ladder** that will reach the work. An extension ladder should reach 3 feet above the step off point. Move the ladder with your work. For every 4 feet of height, move the bottom of the ladder one foot away from the wall. Place ladders on solid footing. Block extension ladders at the top to prevent sideways movement.

• **Scaffolding** - See the site supervisor for the numerous safety requirements for scaffolding (i.e. using triple widths of walkboards, placing scaffolding on solid footing, and guardrail requirements).

• Don’t leave loose objects on scaffolding, ladders or **roof decks**.
Task List - Wall Framing

Staffing

House Leader
Framing Task Leader
4 Crew Leaders
15 Additional Volunteers

Tasks to Be Completed and Crew Sizes

<table>
<thead>
<tr>
<th>Task Description</th>
<th>Crew Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crown studs</td>
<td>2 to 3 people</td>
</tr>
<tr>
<td>Flash porches</td>
<td>1 crew</td>
</tr>
<tr>
<td>Assemble exterior walls</td>
<td>All crews</td>
</tr>
<tr>
<td>Raise Exterior Walls</td>
<td>2-3 Crews</td>
</tr>
<tr>
<td>Square and brace exterior wall corners</td>
<td>1 crew</td>
</tr>
<tr>
<td>Set Bathtub(s) in Bathrooms &amp; Protect</td>
<td>1 crew</td>
</tr>
<tr>
<td>Build and Raise interior walls</td>
<td>2 to 3 crews</td>
</tr>
<tr>
<td>Install wall cap plates</td>
<td>1 to 2 crews</td>
</tr>
<tr>
<td>Straighten and brace all walls</td>
<td>1 crew</td>
</tr>
<tr>
<td>Construct and install porch beam</td>
<td>1 crew</td>
</tr>
<tr>
<td>Trim-out gable trusses including boxing returns</td>
<td>1 crew</td>
</tr>
<tr>
<td>Confirm layoff for roof trusses</td>
<td>1 crew</td>
</tr>
<tr>
<td>Install dead wood for drywall</td>
<td>1 crew</td>
</tr>
<tr>
<td>Attic Floor</td>
<td>1 crew</td>
</tr>
<tr>
<td>Blue board sheathing on exterior</td>
<td>1 crew</td>
</tr>
<tr>
<td>Install windows</td>
<td>1 to 2 crews</td>
</tr>
<tr>
<td>Install second layer of Window Flashing</td>
<td>1 crew</td>
</tr>
<tr>
<td>Flash exterior doors</td>
<td>1 crew</td>
</tr>
<tr>
<td>Install exterior doors</td>
<td>1 crew</td>
</tr>
<tr>
<td>Install exterior door locks</td>
<td>1 person</td>
</tr>
<tr>
<td>Insulate and thermoply behind the bathtub(s)</td>
<td>1 person</td>
</tr>
<tr>
<td>Remove all temporary bracing</td>
<td>1 crew</td>
</tr>
<tr>
<td>Clean up Site, put away tools and equipment</td>
<td>All crews</td>
</tr>
</tbody>
</table>

Quality Checkpoints

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stud crowns all turned the same way</td>
<td></td>
</tr>
<tr>
<td>Bottom plates nailed with two nails between each stud</td>
<td></td>
</tr>
<tr>
<td>Two nails on each side of door openings in bottom plates</td>
<td></td>
</tr>
<tr>
<td>Windows, doors, tees, ladder tees and corners located according to plan</td>
<td></td>
</tr>
<tr>
<td>Bathtub(s) placed inside bathrooms</td>
<td></td>
</tr>
<tr>
<td>Bathtub completely protected with cardboard and poly</td>
<td></td>
</tr>
<tr>
<td>Exterior and interior walls plumbed, straightened and braced</td>
<td></td>
</tr>
<tr>
<td>OSB installed on exterior corners and center of long walls and nailed per</td>
<td></td>
</tr>
<tr>
<td>specifications</td>
<td></td>
</tr>
<tr>
<td>Porch beam level and straight</td>
<td></td>
</tr>
</tbody>
</table>
Cap plates installed flush with top plates, joints staggered minimum of 4’, nailed as directed

Temporary beam (to support trusses across living area) installed if required

Blue board sheathing installed and all joints taped

Wall sheathing installed/check nailing pattern

All blocking installed flush with front of studs in correct locations

Attic floor framing and decking properly installed and nailed

Blocking for bathrooms (towel bars, toothbrush holder, toilet paper holder, bathtub(s), medicine cabinet), attic stairs, ceiling fans

All materials restacked, site cleaned, tools accounted for and put away

Framing Tool, Equipment & Material List

Tools Each Framing Crew Member Will Need

Hammer (16 oz. Minimum)
Nail Apron
Retractable Utility Knife (With Extra Blades)
Measuring Tape (16’Minimum)
Square (Speedsquare® or Combination)
Two Pencils
Safety Glasses
Work Gloves
Hard Hat
Water

Tools Each Framing Crew Will Need

Circular Saw (7¼" with extra blade)
50' Grounded Drop Cord
30' Measuring Tape
4' Level (& 6’ if available)
Framing Square
Hand Saw
Two Chalk Boxes (Blue and Red)
Cats Paw (Nail Puller)
Wood Chisel
Two Red Lumber
Marking Crayons
Hook Blades for Utility Knives (5 blades)
Nail guns, compressor and air hoses, and proper nails for use of nail gun

Framing Tools and Equipment Needed On Site

Ear Protection/Glasses/Hard Hats
100' Grounded Drop Cord
Drop Light
3 or 4-Way Heavy Duty Electrical Box/Splitter
8# Sledge Hammer
Electric Miter Saw (10" or 12")
Reciprocating Saw (with Extra Blades)
16' Extension Ladder
Two 8' Step Ladders
Two 6' Step Ladders
Handy Bar/Crow Bar
Siding Snips
30' (Minimum) Measuring Tape
Nylon String (300 Yards)
Rope
Push-Sticks Broom
Caulking Gun
Saw Horses (Two Pair)
Saw Table
Stapler & staples
Nail Punch

**Material List**

**Lumber**
2x4s and 2x6s
Porch Beams
OSB (Walls)
OSB 3/4" t&g or use 2 layers of ½” OSB (for attic floor)
2x6 Fascia board
2x4x12 Attic Bracing
OSB Shims for Exterior Doors
2x10 Attic Stair Blocking
2x6 Attic Flooring “joists”

**Components**
Ladder Tees (both sizes)
Standard Tees
Door & Window Frames
Trusses
Boxing Returns
Nails/Screws/Bolts
16d Nails
8d Nails
10d Nails
Roof Nails 1"
1" button caps
1 ½" Siding Nails (Wall Sheathing)
Cut Nails
Screw Shank Vent Nails
5/8" 8" Bolts, Washers, & Nuts
16d Galvanized Finish Nails
10d hurricane clip nails
Anchor bolt washers & nuts
Drip Edge

Other
Approved Mending Plate (if necessary)
Caulk (Exterior)
Exterior Sheathing (Blue Board)
Black Plastic Flashing
Silver Tape Flashing
Windows and Exterior Doors
Galvanized Flashing (Porches, Doors)
Shims (½" and tapered)
Locks and Deadbolts
Temporary or Permanent Steps
Hurricane Clips
Step Flashing
Wall Insulation (tub)
Vapor Barrier (tub)
Thermoply (tub)(¼" foil sheathing)
Bathtub Unit
Homeowner Sign
Framing Material

Top and Bottom Wall Plates

2x4s cut to length and marked off for locations of studs, tees and ladder tees, corners, window and door units, etc.

Wall Studs

2x4x93” and 2x6x93” framing lumber which has been pre-cut and end trimmed

Exterior Wall Corner Posts

For exterior corner posts: Three 2x4 studs nailed solidly together to form a post measuring 3½"x4½"x93" in length long. To be used on exterior corners. For interior corner posts: Two 2x4 studs nailed together with scrap 2x4s in between them to form a post measuring 3½"x4½"x93" in length. To be used on interior corners.

Interior Wall Corner Posts

Two 2x4 studs nailed together with scrap 2x4s in between them to form a post measuring 3½"x4½"x93" long. To be used on interior corners.

Ladder “Tees”

Pre-built “ladders” made of studs and “rungs” either 24” o.c., used to join two perpendicular wall sections.

Regular Tees

Three 2x4 studs nailed together to form a “U” shaped framing member used to join two perpendicular wall sections (There are also 2x6 “tees” needed for some plans)

Exterior Door Frames (2 sizes)

Pre-assembled framing units consisting of studs, jacks and headers, which are sized for each exterior door opening

Window Frames (2 sizes)

Pre-assembled framing units consisting of studs, jacks, headers, sills and cripples which are sized for each window opening

Misc. 2x4 Lumber

2x4s in 10, 12 or 14 foot lengths to be used for cap plates, fascia boards and bracing

Mending Plate

An approved metal connector used to strengthen and stiffen lumber that has been weakened or spliced.

OSB Sheathing Boards
4' by 8' by ½" oriented strand board used to sheath roofs, house corners, around doors and on the middle of long walls (over 40')

**Foam Insulating Sheathing (blue board)**
4' by 8' by ½" polystyrene sheathing panels

**Porch Beam Material**
Microlam, 2x8 or 2x10 beams, and Box beams

**Bathtub Units**
Combination bathtub and shower units

**Hurricane Clips**
Metal Ties used to strengthen the connection between the roof trusses and the exterior walls

**OSB Nailing Strips**
Pieces of OSB placed between the trusses at the exterior cap plates. The top piece of siding is nailed into them. On the porches they also keep the insulation from falling into the soffit area.

**Step Flashing**
Metal L-shaped pieces used to flash between shingles and siding on small gable roofs

**Boxing Returns**
Usually pre-made components used to return a gable overhang to a vertical surface

**Exterior Doors**
Steel clad doors with wood jambs and aluminum sills (36" front door and 32" rear door)

**Window Units**
Pre-finished window units with insulated glass and external nailing flange

**Shims**
Cedar or spruce shimming shingles to be used as spacers around doors, etc.

**Fiberglass Wall Insulation**
3 ½’x15" unfaced batts for insulating behind the tubs

**Poly Film**
8' wide by 100' roll of 4 mil. poly film used as a vapor barrier on walls when insulation is not backed with Kraft Paper

**Thermoply**
¼" thick foil sheathing used as an air barrier behind the bathtub unit(s), where there is no drywall)
Exterior Door Locks

One Habitat construction lock for the front door and one homeowner lock for the rear door

Attic Stair Blocking

2x10x22½” block and 2x6x22½” block

General Instructions for Framing

Habitat uses a framing package to match the drawing for the house plans. Your site supervisor will advise you as to which type of house is being constructed as well as share with you the house blue prints.

Key points of the house plans are:

- Vinyl cedar shakes may be on the front gable
- Porch beams bottoms are capped in painted aluminum material
- All porches have hand and guard rails, regardless of height
- Straight columns on rear/side porches
- Tapered columns on front porch
- Side/rear porches steps are brick.
- Porch rails and picket are treated wood.
Construction Details - Wall Framing

Crown Studs

Since most 2x4 lumber is not perfectly straight (some deflection in the 3½” dimension), it is necessary to “crown” all the studs that will be used for wall framing. To crown a stud, simply sight down the length of the board and mark the convex side (crown side) with a red squiggle line. When the wall is being assembled, turn all the crowns face up. If the crown determination is not clear, pick one side and mark it.

1. Pick up precut 2x4x93” stud. Hold with wide side parallel to ground.
2. Look down length of stud identify direction in which it is bowed, i.e., left or right.
3. Mark a red squiggle (~) on outside of curvature of stud (1-1/2” face).
4. Discard studs bowed more than 3/8”. Rotate stud 90 degrees so narrow face is parallel to ground. Sight down the length of the stud. Discard any studs bowed more than 3/4” to either side.

Crowning Studs

Verify that studs are cut to length and crown them

Confirm that wall framing material has been cut to stud length. Studs are as specified in the house plan. Crown the studs and stack them on the house floor. Keep the best studs for use in the kitchen and bath walls. Set aside any studs that are badly bowed or twisted as these will be used for short pieces or blocking. See “Appendix” for setting up a circular saw jig for this purpose. Another solution is to secure a stop block on a miter saw table 93” from the saw blade. Taper or rabbet the stop block as shown in the appendix. Make test cuts before proceeding with the entire framing order.

“NO JOB IS SO IMPORTANT THAT IT CAN’T BE DONE SAFELY”

Power Saws

- Only crew members with power saw experience can use them. A busy work day is not the time to teach saw skills nor is it the time to learn saw skills.
- Habitat requires that ear and eye protection be used when using power saws.
- Don’t bind the blade of any saw – listen for it. Back off and resupport lumber.
- Keep electric cords out of the way of the saw and not underfoot.
- Don’t cross hands over to stabilize material on the miter saw. Find another way or get help.
- Guards on saws must be in place & operating.
Exterior Walls

Assemble Exterior Walls

At the beginning of the day, the top and bottom wall plates have already been cut to length and tack nailed together. The plates will be on site and marked for placement on the floor. Marks will show the locations for all the studs and components. Identify with lettering the bottom and top plates.

Beginning with the longest walls first, each crew should separate the plates for the walls they are assigned to build. To separate the plates, pull the temporary tack nails and move plates apart about eight feet. The top plates are marked for trusses. The nearer the wall is built to where it will be finally positioned, the better.

Keep in mind that on long exterior walls the difficulty of raising such a long wall may require separating the length into separate sections. The separation should not be at the same location on the top and bottom plates. Instead they should be offset by at least the 16” or 32”. Double up studs at the plate section seams.

Top plates can break over a window header or on stud.

Place the wall pieces exactly as marked on the plates. Before nailing the parts together, check the direction of ladders and tees and confirm that the red “crown” marks on the studs are visible to insure that the crowns are facing in the same direction. Nail each stud with two 16d common nails through both the top and bottom plates.

Keep studs and components flush with the plates. Likewise, nail each wall component with two 16d common nails into all of its 2x4s. Make sure that the stud is square to the plate prior to nailing.

Bottom plates will be of treated lumber if the house is built on a slab. All nails penetrating treated lumber must be galvanized.

Hint: Use a floor plan or check the chalk lines on the actual floor to see which direction a tee or ladder should face.

If not already on the site, make the porch corner post components that are used to create the beam pocket. Nail together three studs, the outside two of which are shortened by 9.5”. Check with the site supervisor to confirm these dimensions. The porch beams will bear on the beam pocket. (Cap plates are used, which is why there is a difference in the notch depth.) (See “Porch Beams”)

After you install all the studs, window components and door components it is time to square the exterior wall while it is on the floor. Toenail the wall so it can be square, as follows:

a. On the bottom plate, toenail the bottom face of the bottom plate into the wooden deck with 8d nail approximately every 8’.

b. With a long tape square up the wall by make sure that the measurements diagonally are no more than 1/16” off. When the wall is squared, toenail the upper plate to the deck with 3 or 4 16d duplex nails through the top face so the wall will not go out of square.

OSB sheathing can now be applied to the wall

In assembling walls over a wood floor, some of the OSB sheeting is nailed on the exterior side of the exterior wall, exterior side of sheeting to the outside. The OSB should extend from the top plate (not the cap plate) down to the bottom plate. OSB filler will be used to cover the balance of the bottom rim
board, extending about .5”. Leave the nailing of the OSB over the corners for after the walls are raised and in place. OSB filler will be used to fill in from the bottom of the cap plate into the openings where the trusses extend out, these are the nailing strips between the trusses. These strips serve the purpose of nailing strips for the top piece of siding under the eaves.

**Assemble Components (based on layout on the top and bottom plates)**

Door headers can be assembled for exterior doors as well as for interior doors.

Ladders and blocking that support intersecting interior walls can be assembled and installed on the exterior wall.

All exterior door openings use double king studs on each side of the opening and a jack stud. Assemble these ahead of time.

All window openings can be cut and assembled.
Key point to remember:

a. Layout walls to be: Exterior Walls -24” On Center; Interior Walls – 24” On Center.
b. Studs layout should be marked so that OSB will break on stud pattern without being cut (mark first stud at 16 ¼”)
c. Door Openings should be marked so that Rough Opening is 2” larger than the door size (36” door = 38” Rough Opening).
d. Window Openings should be marked to fall on stud pattern, if possible, and should be marked so that the Rough Opening is the same as the window size. (a 3’0”x5’0” window fits in a Rough Opening of 3’0”x5’0”)
e. Label Top Plate, Bottom Plate on ALL wall sections so that when removed you can easily identify where each wall should be placed.
f. Using the markings on the bottom and top plates, install with 16D nails all wall studs, window opening, door openings and blocking for intersecting interior walls (crown side up).

Framing parts – cut sheet

<table>
<thead>
<tr>
<th>QUANTITY</th>
<th>ITEM</th>
<th>LENGTH</th>
<th>EXAMPLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>________</td>
<td>LADDER WALL TEE</td>
<td>__. 2”x 4”x93”</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>___ 2”x 4”x14 ½” Spacer</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>___ 2”x 8”x14 ½” Spacer</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>On 8’ high walls: center down from top plate: 24”, 48”, 72”;</td>
<td></td>
</tr>
<tr>
<td>________</td>
<td>INTERIOR WALL TEE</td>
<td>__. 2”x 4”x93”</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>___ 2”x 4”x16” Spacer</td>
<td></td>
</tr>
<tr>
<td>________</td>
<td>BEAM POCKET</td>
<td>__. 2”x 4”x93”</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>___ 2”x 4”x 83 ½”</td>
<td></td>
</tr>
<tr>
<td>________</td>
<td>INTERIOR CORNER</td>
<td>__. 2”x 4”x93”</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>___ 2”x 4”x16” Spacer</td>
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</tbody>
</table>
| ______. | EXTERIOR DOOR JACK | _____. 2”x 4”x93” or King *2  
| ______. | EXTERIOR DOOR HEADERS | _____. 2”x 8” x 41” (36” door)  
| ______. | WINDOW JACKS | _____. 2”x 4”x93”  
| ______. | WINDOW HEADERS | _____. 2”x 8” x 39” for 3’x5’ window  
| ______. | WINDOW SILL PLATES | _____. 2”x 4” x 36” for 3’x5’ window  
| ______. | WINDOW CRIPLE STUDS | Measure cripples for top of header and under sill after assembly of other components.  
| ______. | INTERIOR DOOR JACKS | _____. 2”x4”x 93”  
| ______. | INTERIOR DOOR HEADERS | 2 headers with a .5” spacer  
| ______. | | _____. 2”x4”x 41” (3/0)  
| | | _____. 2”x4”x 37” (2/8)  
| | | _____. 2”x4”x 29” (2/0)  
| | | _____. 2”x4”x 65” (5/0)  
| | | _____. 2”x4”x 33” (2/4)  
| | | _____. 2”x4”x _________.
Raise Exterior Walls

After all the studs and components are nailed in place and the edges of all boards are flush and checked by the Crew Leader, the wall is ready to be raised into position. With the guidance of a single leader, use plenty of people to raise the walls, especially long walls. Key point to make sure that raising the wall is safe:

- On a concrete slab, there should be a line that has been marked 4” in from the perimeter of the floor system and chalk a line all the way around the floor (to mark where the inside of the walls will be).
- Have stakes and bracing readily available.
- Raise the top plate a few inches with a flat bar and slip a scrap 2x4 under it so that volunteers can put their hands under the top part of the wall. It also gives you leverage to heft the wall up.
- On a house with a wood floor and a crawl space we need to take sure that wall does not slip off the floor when it is being raised and we want it to be in position with the intersecting exterior wall. To prevent the wall from slipping off the floor, move the bottom plate of the wall to be flush with the 3.5” chalk line on the floor, then from inside of the plate, toe nails the bottom plate into the floor using 8d nails every 24”. Now when you raise the walls these nails will bend but will hold the wall on the line and prevent it from slipping off the floor. After the walls are braced and secured these nails can be removed. Another technique is to nail 2x4 braces to the outside of the floor (the rim board) so that it acts as a stop when the wall is raised.
- On a concrete slab you will have to raise the exterior wall over anchor bolts or plumbing, positions the wall so the bottom plate is on the chalk line and then raise it up to go over the bolts and let it drop down on the concrete slab.

After raising the wall, position it precisely on the chalked line, taking into account not just the end of the wall, but the intersecting wall locations as well. The goal is to get as many intersecting walls to match up as possible which means the bottom plates must be brought tight to one another. On exterior walls, take note as to which wall goes long to the corner.

When the crew leader is satisfied that the wall is accurately in place, it is time for the crew to “nail it”.

For concrete floors, nail the bottom plate to the floor by staggering two galvanized cut masonry nails between each stud. (At a minimum, one nail is necessary on exterior walls.) You will need to place the washers and nuts over the anchor bolts and tighten these with a wrench so the plate and wall is secured.

For wood floors use pairs of 16d common nails, nailing into a floor joist whenever possible. On all floor types, do not nail in door openings, but double nail adjacent to these openings.

Attach the hurricane straps to the walls with 10d galvanized nails in the top of the strap and on the side nail all holes. If anchor bolts are used in lieu of straps, install and tighten the washers and nuts.

Plates are joined as follows:

- Joints over tees or studs – nail each plate into the tee or stud
- Joints over door headers- both lengths of top plate are nailed into the header, taking care that the plates are tight to one another. Bottom plates are removed in doorways, so there is no need to nail there.
- Joints over window headers - both top plates are nailed into the header, taking care that the plates are tight to one another. Joints in the bottom plate are spliced at a cripple or can have a scrap of 2x4 nailed over the joint.
Plates and floors are marked. F-1 is the cap plate number (used when caps are pre-cut). F3/F4 is the name of the wall section.

Get your crew off to the right start regarding accurate nailing patterns. Site supervisor TA Smith (right) and the city’s building inspector were all smiles after this house passed the framing inspection.
Typically the exterior walls will be squared by measuring the diagonals and only then nailing the osb to the studs, flush to the bottom plate. Nails (8d) are 6-8” on center around periphery and 12” spacing in middle field. Always make sure to nail into a stud or header. OSB sheets should be separated by an 8d nail diameter since sheets are not 48” wide. This is done only if there are sufficient volunteers on site to raise the wall with OSB on it and wall is able to be squared. There are times when it is not possible to square the wall because other walls constrain it.
Bottom Plate Bolted to Concrete Floor

**Anchor Bolt**
- With nut and washer at exterior walls

**Stagger Two Galv Masonry Nails Between Studs**
- As permanent anchor for all interior walls

**Exterior Walls**
- Receive bolts or straps in addition to masonry nails
- Therefore, only one nail needed between studs

**Slab Floors**
Example wall showing several situations

**Door**
- Do not nail in doors openings

**Use Two 16d Nails Between Studs for Interior and Exterior Studs**
- Nail into joists below if possible

**Use Two Additional 16d If Floor Joist Below Falls Between Studs**

**Use an Extra Nail Into Joists Near Door Openings**

**Wood Floors**
Example wall showing several situations

**Attaching Bottom Plates to the Floor**
Square and Brace Exterior Corners

Using a 4’ level, check each intersecting wall at an exterior corner for plumb in each direction. Nail a 12’ 2x4 as a temporary brace to the inside of each intersecting wall, beginning at the top plate and extending at an angle to the bottom plate. Make sure the top of the brace does not extend more than 1½” above the top plate so that it does not interfere with your roof trusses. There is no need to check interior walls at this time.

After the walls are plumbed and braced, nail 4x8 sheets of OSB sheathing to the outside of each corner of the house in both directions as permanent bracing. Attach the panels to the wall framing using 8d common nails at 6” o.c. along the edges and 12” o.c. on each interior stud. Nails penetrating treated lumber must be galvanized (i.e. into treated band joists or plates at bottom of OSB).

For wood floor houses, the top of the OSB lines up at the cap plate/top plate joint. On wood floors a smaller piece of OSB covers the band joist and hang down ½” from the top of the concrete blocks. Use scrap OSB to fill in this space. OSB corners should not extend past the corner framing.

OSB around Rear Door
For security and strength, all houses receive one or two full sheets of OSB centered on the rear door.

OSB on Long Walls
To meet code, if the house length is greater than 40’, it will need an extra piece (or two), depending on length of OSB near the center of the long walls, placed at a 4’ o.c. interval from the corner bracing’s edge. OSB in a window or door, where its strength is cut out, does not count for additional bracing. No more than five consecutive pieces of blue board may be used on houses longer than 40’.
Hold OSB Up from Masonry by Spacing with a 16d nail. OSB does not extend past framing.

Complete the installation of all exterior OSB. Inspect for any visible nails that have been used on the outside OSB sheathing and have missed the studs. These will need to be pushed back and re-nailing will need to be done so the new nail catches the stud.
**Interior Walls**

*Set Bathtub(s) in Bathrooms and Protect*

Place the bathtub unit(s) in the bath room before the interior walls are erected. Do not fasten in place. Cover the tub completely with cardboard or blue board and poly to keep scratch free throughout the building process.

![Interior Walls Set Bathtub(s) in Bathrooms and Protect](image1)

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**Build and Raise Interior Walls**

After the exterior walls are erected and braced, construct and raise the interior walls into position, beginning with the longest walls (usually the hall walls). Position the interior walls so that the bottom plates are lined up with the chalk lines on the floor. Position intersecting walls in line with marks found on top plates above ladders and tees. (Set to the lines, the walls will be plumbed as a unit with exterior walls.) Don’t drive nails tight until corners are plumb and square and walls are straightened. This will make adjustment easier should it be necessary.

Use a 12” o.c. nailing pattern for wall intersections.

**Interior Door Blocking**

Install 10” blocks at the top of either side of all interior door openings while the walls are being assembled. Door headers will consist of the bottom plates that will later be removed between each door. A third 10” block is nailed in the center of standard doorways. On bi-fold doors, place blocking at 2’ o.c.
Typical Wall intersections. Ladders (not shown) work much the same way as Tees (right drawing).
Cap Plates

Ideally cap plates are cut and marked during layout, when top and bottom plates are marked. They can also be made during framing.

Beginning with the exterior walls and continuing with the interior walls, cut 2x4 cap plates to fit on top of all the wall top plates. Overlap any inline (or splice) joints in the top plates a minimum of 4’. Lap the corners and intersections in the opposite direction from the top plates. Nail cap plates to the top plate using 16d common nails, two at each end and two above each stud. Remember, joints in the cap plate and top plate CAN NOT be directly above one another and must be staggered by 4’.

Use a 2x6 cap plate to overlap the 2x4 walls when a 2x6 plumbing wall contacts 2x4 walls. Use a 2x4 cap plate and fill over the 2x6 top plate with a 2x2 when a 2x6 is not available.

Method to complete cap plates from a 2x6 inter wall when additional 2x6 is not available
Cap plate for wall is marked F1

Cap Plates get two 16d nails over every stud and at each end. Use four nails over wall joints.

Gable Deadwood (shown here with gable in place). It secures the gable as well as provides deadwood for the ceilings.

Lap the joints in Cap Plates and Top Plates.
**Gable Deadwood**
On walls that receive a gable truss, install a row of solid deadwood (full lengths of 2x4 or 2x6) that will fit tight against the bottom chord of the gable truss once it is installed. Leave room for the gable by positioning the deadwood in 1½" from the outside of the cap plate by using a 12" scrap of 2x4 turned on edge. Nail the deadwood securely to the cap plate above each stud using 16d nails.

**Straighten and Brace All Walls**

When all the exterior and interior walls have been erected, the cap plates installed, and the exterior corners braced, straighten the walls. Beginning with the longest exterior walls, attach a gauge block to the side of the cap plate at each end of the house and stretch a string line along the length of the house.

Use another gauge block to check the wall against the string line at least every 10' and at each intersecting interior wall. Push the wall in or out to bring it in line with the string and brace it in this position using 12' 2x4 braces. Nail braces along each perpendicular interior wall, beginning at the top plate of the exterior wall and extending at an angle to the bottom plate of the interior wall. Nail into each stud. If a brace is needed where there is no nearby interior wall, nail the brace to the side of a stud near the top of the wall (or inside a window frame) and to the side of a 2x4 block nailed to the floor. On concrete floors use masonry nails to secure the floor block.

If all the interior walls were attached as marked on the plates of the exterior wall, they should be plumbed automatically when the exterior walls are plumbed and straightened to the string line. Some free standing walls may require additional bracing to hold them plumb while the trusses are being installed. Plumb and brace these as necessary, using the same methodology as used for the exterior walls.

It is necessary to check interior walls for plumb. Check at a rough door opening within the wall. An unlevel floor will make it almost impossible to plumb all walls. Additionally, some walls might not be sitting exactly on their layout lines and plates in long walls might not be tight to one another. If all the walls are not brought into a plumb position when the outside walls are straightened, see the site supervisor for the best possible resolution. It will be necessary to take into account and prioritize such choices as plumb door jambs vs. soffit width consistency.
Straighten and then brace exterior walls.

Shown is an interior wall intersecting a ladder with a diagonal brace holding the exterior wall straight.

For long exterior walls, temporarily nail a block to the floor where there are no interior walls to brace.

After exterior walls are plumbed and straightened, walls are checked with a level to determine if adjustments are necessary.
STRAIGHTENING EXTERIOR WALLS

Straighten Exterior Walls with the Aid of a String and Gauge Block
Porch Beams

Porch Beams using microlam beam

All Habitat plans include a covered front porch. Porches are supported by three beams.

- A **2x10 load bearing short beam** is built on site and extends from the house wall to the box beam. ½" OSB is placed between the two 2x10s and along the width of the bottom. This beam sits on jack studs in a pocket in the wall. The beam will be 9¼" after it is installed and the cap plate is run over it.
- A pre-manufactured 9¼" **microlam beam** (two @ 1¾" wide) is placed on the side of the house and carries the truss load. It too sits on jack studs in a pocket in the wall. It has no cap plate. The jack studs have ½" OSB placed between them to build the pocket out to 3½".

Cut two wall studs short, creating jack studs, to form a pocket for the end of each beam. Place OSB in between the jack studs to build them out to the width of the microlam. The pocket depth will be equal to the size of the beams, in this case 9¼" measured from the top plate. Attach each beam with eight 16d nails toe-nailed into the wall.

To determine beam lengths for a porch, measure from the inside of the wall’s framing to the edge of the porch cement wall. Do this in both directions. Measuring from the inside of the wall takes into consideration that the beam sits on jack studs.
Temporary Support for Load Bearing Beams

Use temporary posts (two 2x4s nailed together) in from the outside corners of each porch beam to support and hold it in a level position. Apply diagonal bracing to each support, starting on the post and extended about 3’ out on the beam.

The Microlam Beam sits in a wall pocket. The cap plate does not go over the beam. (Deadwood for a gable is shown in above photo.)

A 2x Beam seen from inside the house. (In this case the cap plate was not run over the beam.)

Two directional diagonal bracing holds temporary posts stable on active job sites such Habitat’s.

The Microlam Beam (right) holds the weight of the roof. The Box Beam (front) is not load bearing.
Microlam Plan View

Microlam Beam/Front Wall Detail
2x8 Beam/Box Beam Intersection Detail

FRONT WALL'S CAP PLATE RUNS CONTINUOUS OVER 2X BEAM DON'T CUT IT.

CAP PLATE
TOP PLATE

2X8 BEAM ASSEMBLY SUPPORTED BY JACK STUDS, STUDS SPACED WITH OSB

3/4" SPACE

CORNER POST

BOTTOM PLATE

16X16 BRICK COLUMN

8" OUTSIDE WALL TO CL BEAM

NOTE: CAP PLATE (NOT SHOWN) ON BOX BEAM COVERS 2X8 BEAM

COLUMN BASE

5'-4"
C/L BEAM TO OSB

NOTE: CAP PLATE NOT SHOWN

2x8 Beam/Front Wall Intersection
**Bracing the Box Beam**

The Box Beam has a tendency to sag. Use temporary braces under the beam to remove any sag. A tight string line on the beam’s lower edge can be used to check for straightness. Bracing should not interfere with OSB application.

The Box Beam has a tendency to bow out or in. Use temporary braces from the front wall to the box beam to straighten the beam. A tight string line on the outside face of the beam and a tape measure, used to check the margin along the length of the string, can be used. This is similar to straightening and bracing exterior walls.

Bracing should not interfere with OSB application.

Skin the outside of the box beam with OSB using 8d common nails at 6” o.c.. Skin the inside and outside of the beam after it is securely fastened to the truss.
Gable Nailing Boards

When small gable roofs join gable sidewalls it necessary to install a nailing board onto the larger gable. Do this by tracing the shape of the smaller gable into position. Hold the larger gable’s ladder \( \frac{3}{4}'' \) back from the nailing strip to give room for sheathing and flashing.

Cabarrus uses 13 \( \frac{1}{2}'' \) blocks between the each of the gable ladders. This give a 16 \( \frac{1}{2}'' \) wide overhang from the OSB sheathing. Use 16D nails and deck screws to secure the blocks and the ladder.

Gable ladder stops \( \frac{3}{4}'' \) short of the nailing strip.

The large gable has 2x4s in place and ready to support roof’s sheathing.

Another example of a nailing board.
End of ladder is cut to match roof pitch.
Boxing Returns
Attach Boxing Returns to the bottom of the gable overhang (ladder framing) with 16d common nails and toe nail to the gable wall with 8d common nails. Set the boxing return so the bottom is flush with the bottom edge of the fascia board. Use a Speedsquare® to get it square to the house. A typical boxing return will be 10” wide from the OSB (using 7” blocks plus the 3” for the 2 sides of the ladder).

It is important that the boxing return be ½’’ shy of the edge of the porch beam framing (or ¼’’ past the beam’s 1x trim). This can be calculated in advance or once the gable is hung, the boxing return can be built out with shims. This placement allows J-Channel to run across the porch beam on the front of the house and straight up the boxing return for an aesthetically pleasing siding job.

![Boxing return priorities. The tips can be cut off.]

Lay Off for Roof Trusses
Marks for roof trusses are typically added to the top plates during layout and later transferred to the cap plates. If truss layout occurs during framing, the following method is used.

After all the walls are erected, plumbed, straightened and braced, and cap plates installed, lay off for the roof trusses. Beginning at the back of the house, pull a tape from the end of the house on top of the cap plate and make a mark every 24”, placing an “X” or “T” on the forward side of the line.

NOTE: If truss plan is other than the normal front-to-back gable plan, refer to the manufacturer’s truss plan for lay-off details.

Make a notation on the cap plate to show locations for special trusses. Check the truss order to see if this is necessary (i.e. trusses with extra load bearing qualities for front porches).
Porch Roof for Gable End (Shed Style)

A shed style porch roof, including posts, goes over the back door if the door is on the gable end of the house. The structure is pre-built and will come as a component.

Fascia Boards

Before installing the fascia board, sight the outer edge of the truss bottom chords to insure that they are in line with the string line. If there are minor variations, use shims behind the fascia board to make an adjustment as this will affect the appearance of the aluminum fascia when it is installed later.

The fascia board is a 2x4 (S) nailed to the outer edge of the truss bottom chords forming a continuous band along the edge of the roof. Hold 2x4 fascia boards flush with the bottom of the truss chord and nail to the end of each truss with two 16d common nails. All joints should occur over trusses.

When a fascia board on the front gable joins the side wall of the larger gable, leave a space \( \frac{1}{8} \)" between the wall and the fascia board. This will allow room for flashing to install between the house and the end of the fascia board.
Porch Roof at Gable End

2x6 Fascia Board installed with smaller truss heel
Leave a 1/8" gap between fascia board and side wall for siding crew to install flashing.
OSB Nailing Strips

While the scaffolding is in place for the fascia board installation, it is a good time to install OSB nailing strips between the trusses. These strips serve the purpose of nailing strips for the top piece of siding under the eaves. If time does not allow for installation, store the material on site for siding crew.

Cut scrap OSB sheathing strips between 22" wide by 3-½" tall to 22" wide by 6" tall. (Tall enough to use as a nailer, short enough to allow soffit to vent.) Count the bays, usually about forty, for an accurate count. Strips install between the trusses at the top of the exterior sidewalls of the house. 16" tall pieces, cut in widths of either 22" (between trusses), 4’ and 8’ pieces (for walls parallel to trusses) are for porches, where the OSB strips serve the additional role of keeping the insulation in place. (Strips on porches extend 12” above the cap plate and will serve as baffle boards for the insulation.) Use #8d nails.

Extension Ladder Setup

“NO JOB IS SO IMPORTANT THAT IT CAN’T BE DONE SAFELY”

Use a ladder that will reach the work. An extension ladder should reach 3 feet above the step off point. Move the ladder with your work. For every 4 feet of height, move the bottom of the ladder one foot away from the wall. Place ladders on solid footing. Block extension ladders at the top to prevent sideways movement.

Scaffolding - See the site supervisor for the numerous safety requirements for scaffolding (i.e. using triple widths of walkboards, placing scaffolding on solid footing, and guardrail requirements).

Keep the entire work area, inside and out,
Diagonal Bracing

A second type of bracing is a 2x4x10 that is nailed to the bottom or top side of the truss webbing. It is sometimes referred to as “Wind Bracing”, “Web Bracing” or “Diagonal Bracing”. (Webbing is an integral part of the truss system used to tie the bottom and top truss chords together.)

Each piece of diagonal bracing starts at the top of the gable and runs down the webbings at a 45-degree diagonal, ending near the bottom chord and spanning at least four trusses. Each side of the truss receives this bracing at each end of the house for a total of 4 boards (plus those in the center of a house for those with three gable trusses). Be careful that it does not interfere with the disappearing attic stair opening or the attic floor. (See house plan for stair location.)

It is important to have a strong tie between the interior trusses and the gable. To do this, connect the gable truss to the first interior truss near the peak by using a 2x4 approximately 26” long securely nailed to the underneath side of both top chords. Proceed with diagonal bracing starting on the first interior truss.

If gable and truss webbing does not match it will be impossible to tie them together with diagonal bracing. Secure the gable to the first interior truss as shown above. If in doubt, add this short brace.

There must be a firm connection between diagonal bracing and Gable Truss. Do this by mitering the end of the 2x4 for full contact with the webbing (flush with sheathing).
**Attic Floor**

The attic flooring consists of 6 pieces of 3/4” tongue and groove 4’x8’ OSB (or doubled ½” OSB) sheathing supported by 2”x6”x10” framing. The floored attic area is installed in the center of the house. It takes thirteen 2x6’s to create joists for 24’ of attic floor. The joists are nailed on each end to the truss webbing with four 16d common nails and they are supported by the bottom chord truss bracing.

In the attic access bay, add a block to support the floor at the landing.

After the attic floor framing is installed, cover the area with 3/4” t&g OSB sheathing (or doubled ½” OSB). Install 4’x8’ pieces of OSB with the long edge perpendicular to the trusses. Add a ripped strip to complete the floor. Nail the sheathing in place using 8d common nails at 8” o.c. on the edges and 12” o.c. in the interior.

Note: Check with the truss manufacturer before installing attic floors.
Remove Bottom Plates at Door Openings

Remove the portion of the bottom wall plate that extends into all interior and exterior door openings by sawing through the plate along each side of the opening with a reciprocating saw or hand saw.

Door Headers

2-2x4’s turned on their side are used for the header on interior doors. These are nailed on top of the jacks on either side of the door. Cripples are nailed on layout between the header and the top plate. These are measured to fit.

Hurricane Clips

One hurricane clip is used to tie each end of each truss to the top plate. Use 10d joist hanger nails for this job. Position the clips high enough to avoid interfering with the drywall installation. By manufacture’s specifications, each hole requires a nail.
Blue Board Sheathing on Exterior

Nail foam sheathing to the outside of all exterior walls using 1 3/4” galvanized cap nails spaced every 12” along each stud. Use full sheets whenever possible, extending over any window or door openings. (These areas are easily cut out later with a utility knife.) The wall studs should have been laid-out so that the edges of the sheathing panels will fall on the middle of a stud when the panels are laid out from back to front for the side walls and from left to right for the end walls. Add cripples to window components continuing at 24” o.c. for blue board support.

Tape all seams with 3” Weathermate™ Construction tape.

Cripple added to catch joint
Blocking

Intersecting walls blocking
Install 2x4 blocking wherever two interior walls intersect and there is no stud at the point of intersection. Place the 2x4 blocking with the wide side flush with the interior surface of the studs of the wall being intersected and the top edge 50” off the floor. HAND NAIL with two 16d nails or two 2½” deck screws through the side of each stud into the ends of the 2x4 blocking.

Attic Stair Blocking
Blocking for the attic stairs consists of one 2x10 (hinge side) and one 2x4 (each 22½” long) which are nailed between two adjacent bottom chords of the roof trusses, creating a box in which the attic stairway can be installed. The rough opening needed for the stairway is 22½”x54”. See floor plan for location. Baffle boards should be installed in order to keep the insulation in the attic. With scrap 2x4s, block all edges of the OSB flooring at the top of stairs paying particular attention to the landing.
Attic Stair Blocking

**Bathroom Blocking**

Center 2x4 blocks at 54" above the floor on all bathroom walls but not behind the tub. Put blocking for the toilet paper dispenser centered at 24" above the floor. The toothbrush/soap dish will be installed at 40" above the floor.
Kitchen Blocking

Measure 14” down from the bottom of the trusses to centerline of the 2x4 upper cabinet blocking. Measure 34” up from the floor to the centerline of the 2x4 blocking for lower cabinets.

Kitchen Upper Cabinet Blocking

Kitchen Lower Cabinet Blocking

Two 2x4s set on bottom plates are used as a temporary jig to support blocking while it is nailed into place. Kitchen supports are cut at 30 3/4” and bathroom blocks at 50 1/4” (for 40” and 54” centers).
Short walls for open kitchen style

Short walls that accommodate the open concept to support the kitchen sink base cabinets, dishwasher and a bar stool height countertop are erected with a top and bottom plate that are 42” in height. With a 1” counter top above this wall the height rises to about 43”. The figure below illustrates the typical bar height guides. These short walls will also accommodate horizontally placed electrical outlets above the sink countertop.
Cabinet Blocking Guidelines:

1. Measure and mark block locations, at centerline, at 34”, 54” and 84” according to size and style of the cabinet.
2. Nail the 2x4 into the wall system according to the previously marked locations, trying to keep blocking flush with the inside edge of studs.
3. Install blocking at the top of all base cabinets, and at the top and bottom of all wall cabinets.

Linen Closet & Pantry Blocking

1. Measure and mark block locations, at centerline, at 39”, 55” and 71” for linen closet and 35”, 49” and 63” for Pantry.
2. Nail the 2x4 into the wall system according to the previously marked locations, trying to keep blocking flush with the inside edge of studs.
3. Install blocking at the top of all base cabinets, and at the top and bottom of all wall cabinets.

Closet & Laundry Room Blocking

1. Measure and mark block locations, at centerline, at 65” for closet and 57” for laundry room.
2. Nail the 2x4 into the wall system according to the previously marked locations, trying to keep blocking flush with the inside edge of studs.
3. Install blocking at the top of all base cabinets, and at the top and bottom of all wall cabinets.
Deadwood for Drywall

As necessary, install deadwood on walls that are parallel with the trusses. Deadwood is needed only where there is a gap between the wall and truss.

There was a gap between this truss and the closet wall. Deadwood was added to the wall’s cap plate.
Windows
Windows require two layers of flashing. The first is an approved sealant membrane installed after framing for the window but before the window is installed. The second layer is waterproof membrane tape installed on the exterior of the window after the window is in place.

Before the windows are installed, install flashing using roofing felt or black plastic, cut into 12” wide strips. Flashing is installed first on the bottom, then the sides, and finally on top of the window opening. The flashing should but cut in the corners and each piece folded into the window’s opening, completely covering the framing. Cut the flashing so that the vertical pieces overlap the corners of the jamb.

Beginning below the window, nail a strip of flashing across the width of the window, extending approximately 9” beyond on each side. Nail with siding nails in the jamb area. The purpose of this flashing is to keep water off the window framing.

**Window Flashing Detail**

**Bottom and Side plastic in place. Cut to protect jamb.**

**Proper cut for side piece.**
Window Installation

The windows are sized to fit into the frame openings. Check the fit before applying caulk to the flange. Use a liberal or double bead of caulk under the nailing flange. (If the window must be removed and repositioned, apply a fresh bead of caulk.)

Attach each window by nailing through the nailing flange approximately every 8" around the window. (Use 1½" or 2" galvanized siding nails.) Install the window plumb and level, and equally spaced between the sides of the rough opening.

The window can sit directly on a level sill. If it is not level, plumb and level the window as you work. The easiest way to do this is for two crew members, one on each side of the window, to position the window in the opening from the outside. The third member of the crew, standing inside the house, can hold the window while one of the outside crew members plumbs it using a 4' level and another nails it in place. Finish nailing the window securely to the house being careful not to bend or dent the flange. Remove any nails that do not hit solid wood.

To prevent air infiltration, run another heavy bead of caulk, this time between the black plastic and the wall sheathing. Apply it near the edge of the plastic will help hold the plastic in place.

On double windows, plumb the first window but then use a tape measure to set the second one parallel to the first.
Flash Windows with Flashing Tape

After the window is installed, a second layer of flashing is installed at the top. Apply a strip of silver flashing tape or black plastic covering the nailing flange and extending over the side.

Flash Porches

Wood floors need to be flashed with metal flashing at exterior doors and wherever the porches/steps will abut the band joist of the floor. Flashing should cover the concrete block by two inches and extend up onto the floor three inches. Overlap the bottom piece with another piece if the flashing is not wide enough. Use as few galvanized siding nails as possible to hold in place.
Exterior Doors
Exterior metal doors are complete, pre-hung units which are sized to fit easily into the frame openings. First, remove any packing materials around the door unit, and any temporary wood strips nailed across the bottom of the door frame. Without removing the nails or aluminum clips that hold the door in the door frame, position the door in the opening to make sure it will fit.

Check to make sure that the top of the door unit is not more than 1” below the header. If necessary, remove the unit and install additional blocking.

Typically door panels are secured to the frame for shipping. Remove the shipping nails by opening the door and pulling the nails. If a clip is used, it can be removed after the door is installed.

- Make sure the metal flashing has been installed on all wood floor houses. Caulk heavily under the threshold.
- If the hinge side of the opening is plumb, the door can be placed directly against this side. If not, use shims and a 4’ level to plumb the hinge side.
- Drive a 16d galvanized finish nail through the exterior (brick) molding near the upper corner on the hinge side. (Leave the head of the nail exposed.) Before driving any more nails, check the margin (space between the door and the jamb) at the top of the door from the inside.
- Re-check for plumb and raise either the hinge side or lock side jamb so that the margin is the same across the top of the door. The door sweep should close snugly but smoothly and should not bind on the threshold. (An unlevel floor can be the cause of binding.)
- Nail near the bottom of the brick molding on the same side. Verify that the door hits the weather strip around the entire perimeter of the door. If the wall is not plumb across the plane of the rough opening, it will not contact the weather-strip, and will need to be adjusted. Consult the site supervisor for troubleshooting if this should occur.
- Finish nailing the door securely to the frame of the house using 16d galvanized finish nails (approximately 16” apart) around the edge of the brick mould.
- Once the door is nailed in place, check the margins again and shim between the door jambs and the rough framing at each hinge location and at four locations on the lock side of the door (see note below).
- Use decking screws (2 ½” – 3”) through the jambs (and shims) into the framing at each shim location. Peel back the weather stripping to hide the screws.
- If the door is pre-drilled for the knob set and deadbolt, shim directly above and below the holes and between the deadbolt and knob.
- On some exterior doors, the outside casing has a J-channel built in to the casing.

NOTE: For doors that are not pre-drilled for deadbolts: Shims or nails CANNOT be placed between 33” and 43” from the floor or they will interfere with the deadbolt installation. They must be located just below the 33” mark and just above the 44” mark to support the lock.
STACK SHIMS AS SHOWN BELOW.
THIS PROVIDES A MORE SECURE
SHIM AND KEEPS THE JAMB
FROM TWISTING.

THIS WAY

NOT THIS WAY

QUICK GUIDE:
PLACE THE 1ST AND 2ND NAILS IN BRICK
MOLD
GET AN EVEN REVEAL AT THE TOP
PLACE 3RD NAIL IN BRICK MOLD
CHECK TO SEE IF JAMB IS IN PLANE
SHIM AS NECESSARY
NAIL JAMB AT HINGES
FINISH NAILING

PLEASE CHECK SHIM
LOCATION AND 3/16
MARGIN BEFORE DEAD
BOLTS ARE INSTALLED
SEE NOTE BELOW

NOTE:
READ INSTRUCTIONS
THAT COME WITH
LOCK SET

TRY TO PUT
HINGE SIDE
OF DOOR
AGAINST
FRAMING
IF NOT FLUSH
TO JACK,
SHIM AT EACH
HINGE

NOTE: MARGIN BETWEEN DOOR AND JAMB SHOULD BE
3/16" AT TOP AND SIDES.

LEGEND:

SHOW STARTING ORDER OF BRICK MOLD NAILS, DO THESE FIRST.

SHOWS ORDER OF JAMB NAILS.

Exterior Door Detail
Finish nails in jamb area on lock side

Shimming a pre-drilled door

Finish nails in jamb area on either side of hinge
Exterior Door Locks

Install a Habitat construction lock on the front door and one of the permanent homeowner locks on the rear door following manufacturer’s instructions included with the lock. (Give all but one of the permanent keys (not construction keys) to the homeowner and the others to the Site Supervisor.)

Insulation Behind the Bathtub

Install faced fiberglass insulation batts between the exterior wall studs in the area behind the bathtub. Cover with Thermo-ply to provide an air barrier behind the tub.

Remove Temporary Bracing

Remove all temporary 2x4 bracing from inside and outside of the house, pull any nails and restack the material. Do not remove roof bracing until after sheathing is installed. Do not remove Exterior Wall Bracing until after corners are braced with sheathing and interior walls are in place. Temporary Gable bracing can be removed after sheathing is completed and permanent diagonal bracing is in place. Interior wall bracing after trusses are installed.

Clean up House and Site

Sweep out house, put trash and debris in a pile near the street, re-stack all unused materials and protect from the weather. Make sure all tools and equipment are accounted for and properly stored.
Framing Appendix

Ceiling Fans

If requested by the site supervisor, install a vertical 2x6 block between two adjacent trusses near the center of every room (except baths, hall and laundry) to support a future ceiling fan. Nail the blocks flush with the bottom of the trusses, using two 16d common nails, nailed through the side of the bottom truss chord into each end of the blocking. Determine the center of a room by stretching two string lines from opposite corners of the room and marking the place where they intersect.

Bathroom Medicine Cabinets

Habitat Cabarrus provides bathroom mirrors. If requested by the site supervisor, bathroom medicine cabinet blocking can be installed for future use. It consists of two studs turned to the side (expose the face) and nailed flush with the plates on the inside of the bathroom. Leave 11” clear between these two studs. They will be the blocking for the flush mounted cabinets, soap dish, and the toothbrush holder.

Twin Windows

Metal flashing is be installed over all exposed twin windows (those not covered by a porch.) that are not flashed at the factory or installed as separate windows. Check with the site supervisor to see if flashing is necessary. Cut flashing out of fascia material and bend on the brake for neat edges. It should extend 1” beyond each side of the window edge. Pre-formed drip cap can be used if available.

Framing Jig

It may be necessary to cut framing to 93” stud length