

Chapter 12 - Windows and Doors

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Things to Consider

- **Windows and doors must be installed properly to prevent air and water leaks.**

Components

Windows
 Exterior doors
 Weather seals

Timing & Prerequisites

- The window phase of the project cannot begin until the framing and exterior insulation is complete. The door phase should occur after the framing is complete and before the exterior insulation.
- It is preferred that this phase is not started until the roofing system is complete.
- This phase must be completed before the siding can begin.
- The House/Project Lead will work with the Construction Superintendent to coordinate these volunteer activities.

Materials Needed

<i>Windows</i>	<i>Doors</i>
3-0 – 5-2 Windows	3-0 Exterior Doors
3-0 – 3-0 Windows	1" x 1 ½" Jamb Extensions
4" Weathermate™ Flashing tape	2 ½" Galvanized Casing Nails
6" Weathermate™ Flashing tape	Shims
Weathermate™ Sill Pans	2 ½" Brass Screws for Doors Hinges
Shims	Window & Door Caulking
3" Exterior Screws	2" straight pneumatic finish nails
Window & Door Caulking	Lexan Door Covers
2" roof nails	3" Exterior Screws for Lexan door cover
Lexan Window Covers	
3/8x12" Bolts with washers and Nuts	

Phase Specific Tools Needed

Description:	Quantity:
○ <i>Extension Ladder</i>	2
○ <i>6' Step Ladder</i>	2
○ <i>Nail Set</i>	1
○ <i>Heat Gun (Winter Builds)</i>	1

Verifying Windows and Doors Order

Critical Issues

- Lexan security doors and windows will be installed over the first floor doors and windows until the house is complete and the family is ready to move in.

1. Refer to the prints to determine the proper location of the doors based on the swing of the door. If both the front and back doors have the same swing, the doors may be interchangeable.
 - a) The swing of the door can be determined by standing in the doorway with your back to the hinged side of the frame.
 - b) If the door hinges to your right it is a “right-hand hinge”. If the door hinges to your left it is a “left-hand hinge”.
2. Verify the correct number and size of doors and windows have been received.
3. Store the windows and doors in a secure location until they are ready for installation.

Windows

Prepare the Window Openings

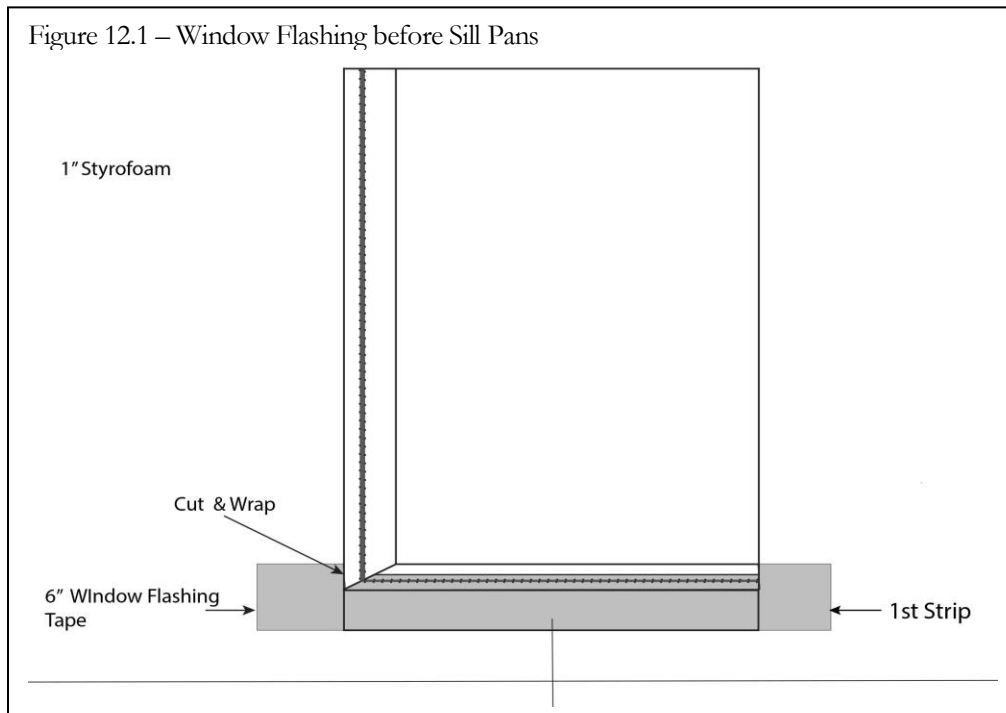
Critical Issues

- Notify the HFH Superintendent immediately of any damaged, broken, or missing parts.
- In cold temperatures, the Weathermate™ flashing tape will not seal. Heat the tape with a heat gun before applying to the Styrofoam exterior insulation.
- Install the sill pans before applying the WeatherMate flashing on the side of the window opening.

Safety Issues

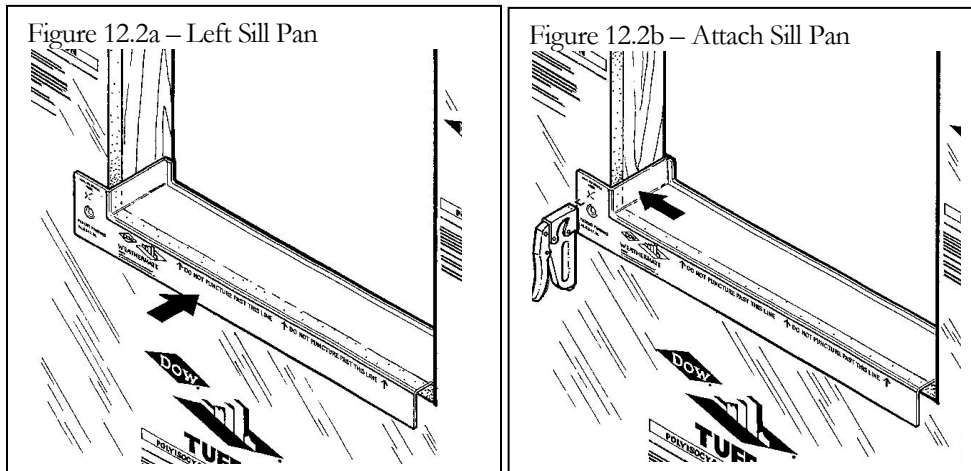
- Installing second floor windows above porch and lower roofs requires the use of fall protection.

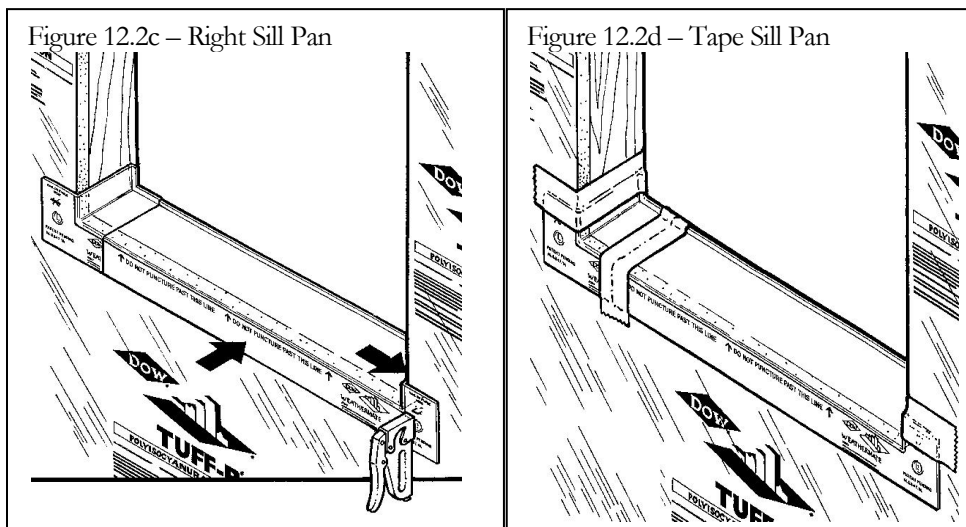
1. Measure the openings to ensure the window will fit; measure both the height and width. Check the sill to ensure it is nearly plumb.
2. Install Weathermate™ flashing tape on the bottom of the opening. (See Figure 12.1)



- Cut a piece of 6" wide Weathermate tape which is 6" longer than the window is wide.
- The strip will extend 4" below the window opening and 2" into the window opening.

- Center the strip across the bottom of the window opening and attach it to the window opening.
 - Slice the flashing tape along the vertical edges of the window opening extending up at a 90 degree angle at each corner, then wrap the flashing tape into the opening.
3. Install the Weathermate™ sill pans.
- **Note: The sill pans must be installed before the flashing on the sides of the window opening.**
 - For each single window, install a left and right pan.
 - Position either the left or right pan into the window opening over the flashing tape with the flange overhanging the sides. With the pan held tightly into the window opening corner, nail the pan in place with one 2" roofing nail through the flange. Nail only in the area marked on the pan.
 - Apply a bead of Window and Door caulk on the first pan in the area which will be overlapped by the second pan.
 - Position the second pan into the opposite corner of the window opening. Press the pan into the caulking and into the corner. Attach the pan with a 2" roofing nail as above.
 - Tape the pans together using 4" Weathermate flashing tape. (See Figures 12.2a – 12.2d)

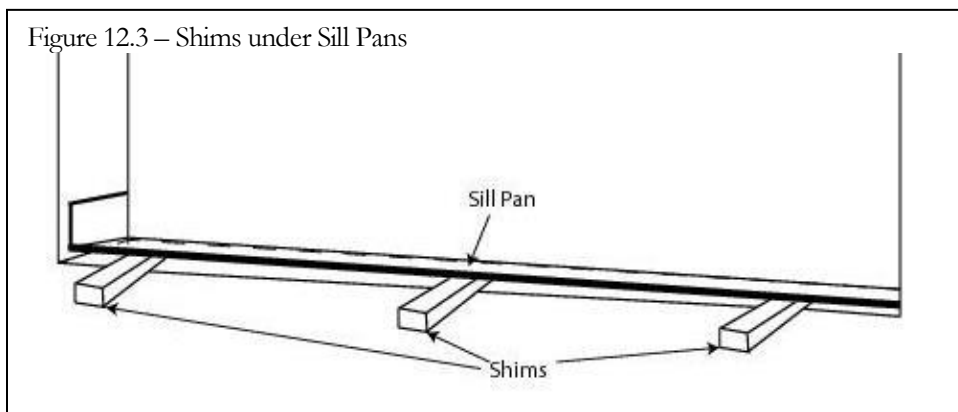




4. Shim up the sill pans. (See Figure 12.3)

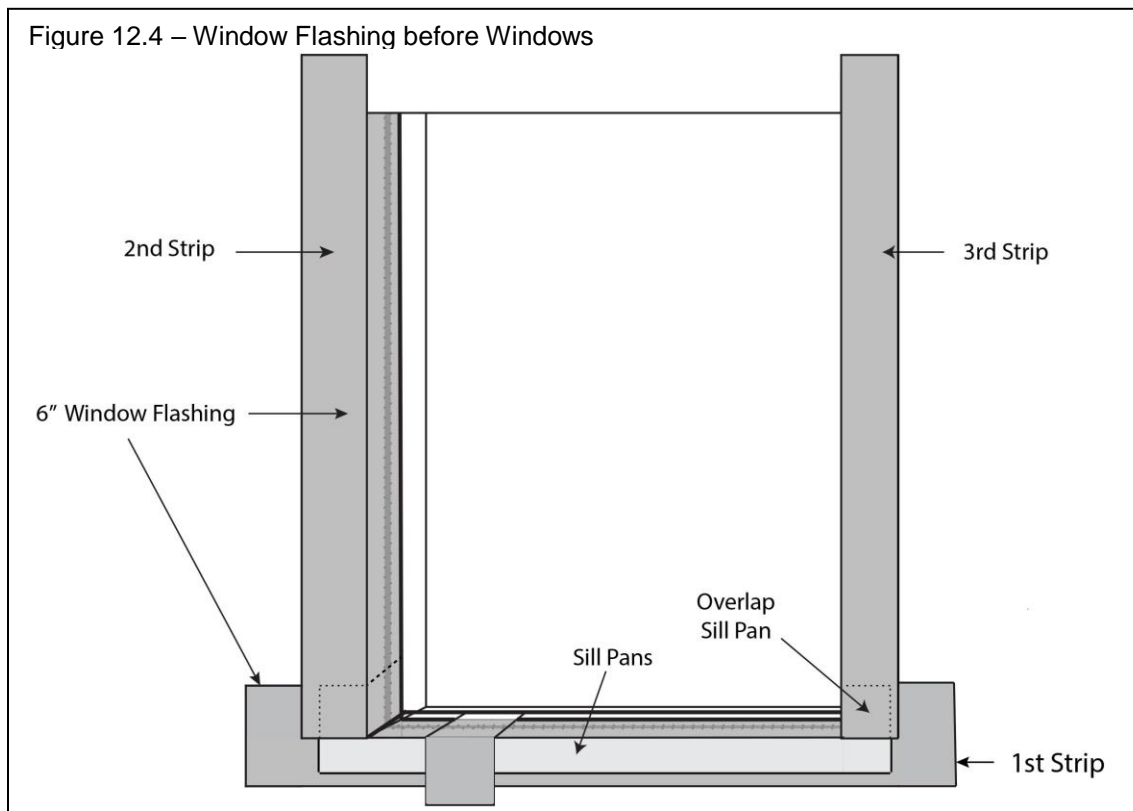
Note: Weathermate™ Sill Pan works best when sloped to the exterior.

- Insert the narrow end of a shim under the middle and each end of the sill pan to pitch it up enough to divert any water to the outside.



5. Flash the sides of the window opening. (See Figure 12.4).

- Cut 2 pieces of 6" wide Weathermate™ flashing tape which is 3" longer than the window is high.
- The strip will extend from 3" above the window opening, down over the sill pans, and 2" into the window opening.
- Ensure the wood surfaces are clean and dry. If the temperature is below freezing, warm the surfaces with a heat gun before installing the flashing.
- Starting at the bottom corner of the window opening, position the flashing over the sill pan. Then run it up the side of the opening. Press the tape onto the Styrofoam.
- Slice the tape at the top corner along the top edge of the opening.
- Wrap the flashing tape into the opening.



Install the windows

Critical Issues

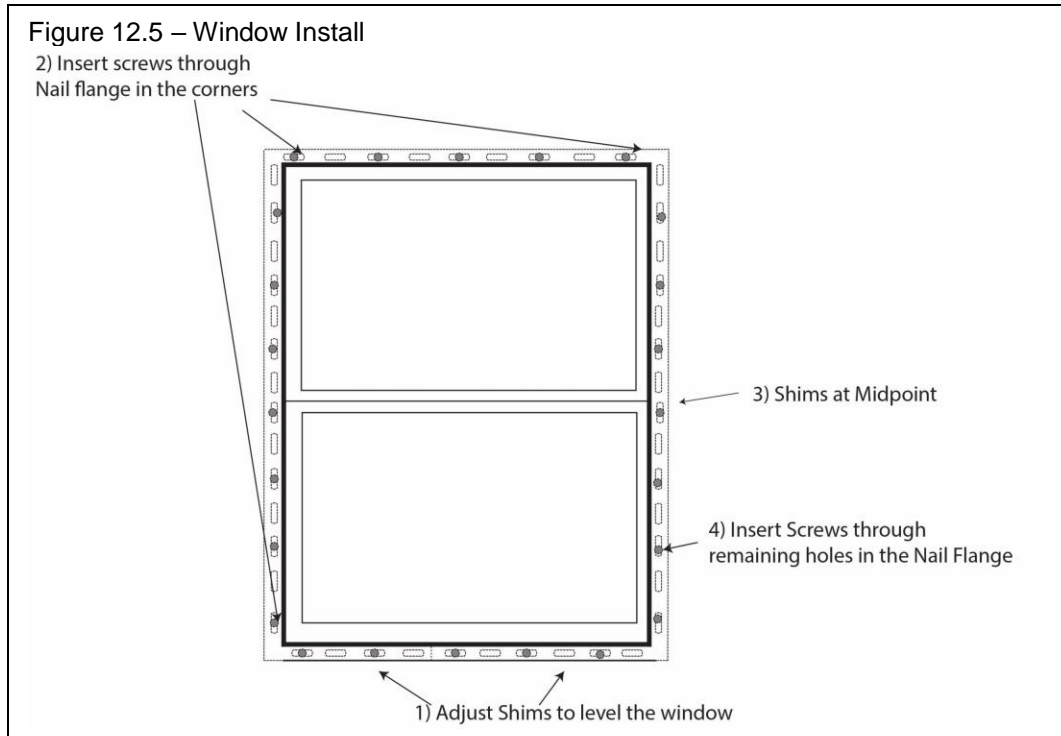
- Install the window with the window locked.
- Install the windows with vanes in the front of the house.

Safety Issues

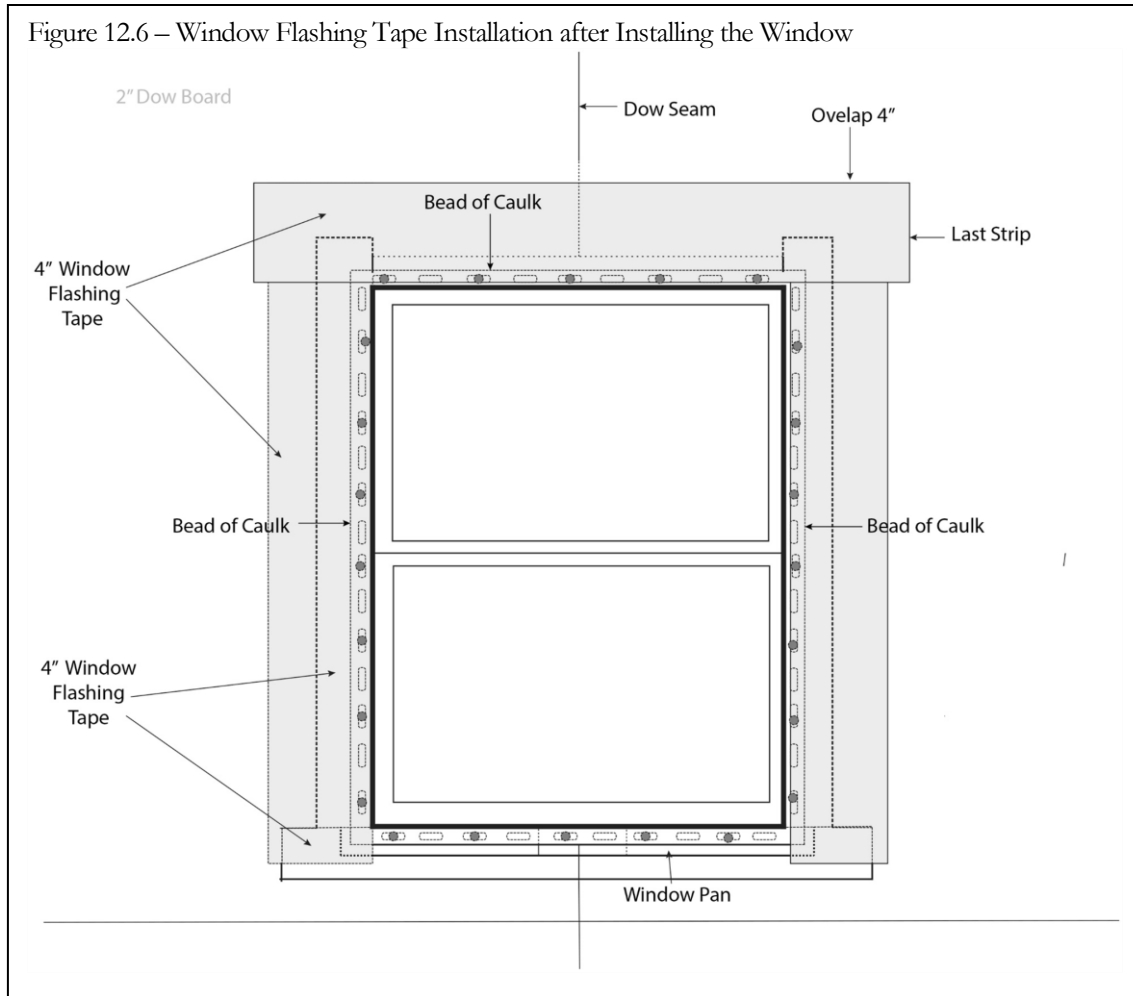
- Fall protection must be worn when installing windows above porch or lower roofs.

1. Position two (2) volunteers outside the window and two (2) volunteers inside the window.
 - For 1st floor windows, a straight or shelf ladder may be required for the outside volunteers to secure the window.
 - For 2nd floor windows not over a lower roof, a pair of extension ladders will be required; one for each volunteer.
 - For 2nd floor windows over porch or lower roofs, each of the outside volunteers must wear a harness and life-line attached to one of the straps installed on the gable end truss.
2. Locate the correct size and correct style of window and carefully move it to the room in which it will be installed.

- Windows with vanes or grids will be installed on the front of the house.
 - 3-0 x 3-0 windows will be installed in baths, kitchens and some hallways.
3. Unpack the windows
 - Remove the packing material and place in the trash.
 - Inspect the window for damage.
 - Remove the screens and store them in a safe place for the Cleanup Phase.
 4. Test fit the window into the opening to ensure the opening is big enough for the window. There should be at least $\frac{1}{4}$ " of clearance on each side and at the top.
 - The two inside volunteers will hand the window out through the window opening; pass the top out first.
 - The two outside volunteers will right the window and put it in place.
 - If the window fits, pass the window back inside and set aside.
 5. Seal the window.
 - Apply a bead of Window & Door caulk across the top and down the 2 sides of the window opening, about $\frac{1}{4}$ " from the edge.
 6. Install the window in the opening. (see figure 12.5),
 - The outside volunteers will place the window back in place. The inside volunteers will ensure the window is centered in the opening.
 - The inside volunteers will check the level of the bottom sill and check if the sides are plumb. Adjust the shims under the sill pans on either side to level and plumb the window. Keep the shims under the sill pan.
 - Compare the diagonal dimensions of the window to ensure the window is not racked. Slide the top to the left or right to equal out the diagonal measurements.
 - The outside volunteers will attach the window at the corners using 3" exterior screws through the slots in the nail flange in each of the corners of the window; 1 screw in each corner.
 - Recheck the window for plumb and level. If necessary, reset the window.
 - Install shims at the center rail. Do not bow the frame.
 - Re-check the window. Ensure it opens easily.
 - Install the remaining 3" exterior screws through the nail flange; 1 screw in every other opening.



7. Apply Weathermate™ flashing tape over the nailing flanges on the sides of the window. (See Figure 12.6).
 - Cut 2 pieces of 4" wide Weathermate™ flashing tape which is 6" longer than the window is high.
 - The strips will extend from 3" above the window to 3" below the window covering the nail flange; the flashing tape installed before the window was installed and the ends of the window pans.
 - Center the strips along each side of the window and attach them to the window's nail flange.
 - Smooth the flashing over the Styrofoam insulation.
8. Apply Weathermate™ flashing tape over the nailing flanges on the top of the window.
 - Cut a piece of 4" wide Weathermate™ flashing tape which is 8" longer than the window is wide.
 - Center the strip across the top of the window and attach it to the window's nail flange.
 - Smooth the flashing tape over the Dow Board.



Lexan Security Window Covers

1. Raise the lower sash and lower the upper sash.
2. Place the Lexan security window over the outside of the window, covering the window frame.
3. From the outside, thread four (4) $\frac{3}{8}$ " x 12" bolts with washers through the holes in the Lexan window and through the window opening. Two bolts at the top of the window opening and two bolts at the bottom of the window opening.
4. Slide two (2) 2x4 security blocks over the bolts. Each block will slide over two bolts and will extend horizontally above and below the window sashes. The ends for each piece will be supported by the window frame. There must be enough room on each side to allow for drywall installation. (see figure 12.7).
5. Attach the nuts to the bolts and tighten.

Figure 12.7 – Lexan over the windows



Cutoff Window Pans

After the windows have been installed, cut off the window pan along the back of the window.

Egress Windows

1. When the foundation was poured, the concrete contractor built and installed a window frame for the egress window. The egress window will fit in this opening without any additional framing.
2. Remove the temporary cover and grate from the window well.
3. Install the egress window into the frame and install the T-track which holds it in place. No caulking is required.
4. Install the egress window ladder by hooking it over the window well.
5. Re-install the window grate and temporary cover.

Glass Block Windows (Contractor)

Habitat will also hire a contractor to install the basement glass block windows.

Exterior Doors

Critical Issues

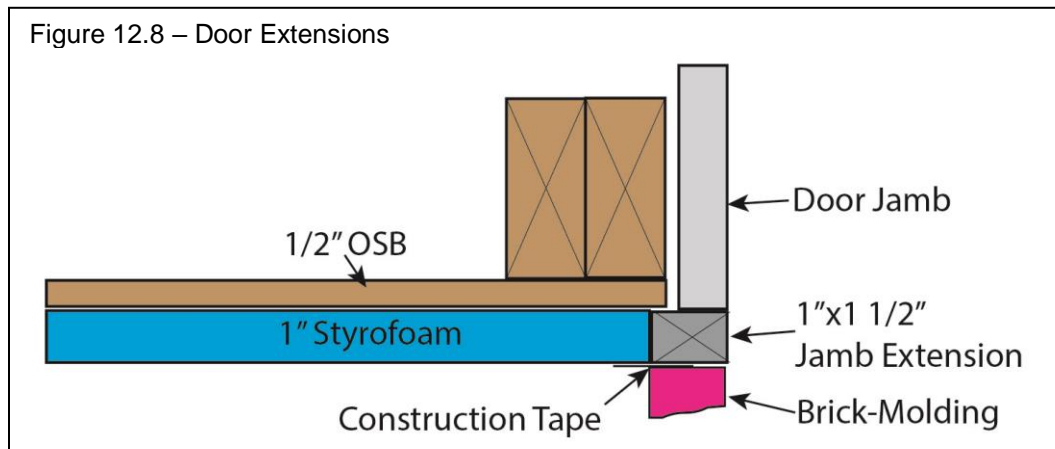
- All exterior doors will be zero step entry doors.
- Jamb Extensions will be added to the outside of the door frames; between the door jamb and the brick-molding.

Safety Issues

- Two volunteers are required to lift, move and install the doors.
- One volunteer must be assigned to hold the door in place until it is secured.

Installing Exterior Doors

The exterior doors should be installed with the brick-molding still attached and against the OSB sheathing. After the door is plumbed and secured, remove the brick-molding; install the jamb extensions; and re-install the brick-molding over the jamb extensions. (see figure 12.8)



1. Remove the 1" Styrofoam behind the brick-molding

- If the 1" exterior Styrofoam has been installed, enough of the Styrofoam will need to be removed from the edges around the door opening to allow for the brick-molding to rest on the OSB.
- Mark a line 1" in from the two sides and the top edge of the door opening. Cut through the 1" Styrofoam along this line with a knife.
- Remove the pieces of Styrofoam which have been cut away. Remove any nails which were holding the pieces.
- Reattach the remaining Styrofoam, if necessary.

2. Unpack the door.

- Remove the packing material and place in the trash can. Do not remove the lock block which holds the door to the jamb.
- Tap in staples in the jamb to allow the door to fit into the opening.

3. Dry-fit the Door.

- Test fit the door into the opening to ensure the opening is big enough for the door.
- There should be at least ½” of clearance on each side and at the top. Adjust the opening, if needed.
- Check the threshold to make sure it is level. If the threshold is not level, shims will need to be added under the jamb when the door is installed.
- Remove the door.

4. Add shims to plumb the hinge side of the door frame.

- Using a 6’ level, add shims to the hinge side of the door frame to create a plumb vertical surface for the hinge jamb. Attach the shims with 1” roofing nails. Pre-drilling the shims will prevent splitting.

5. Caulk under the door.

- Apply a wide bead of silicone caulk to the subfloor just inside of the opening where the door will sit.
- Apply a bead of silicone caulk to the seam between the subfloor and the door framing.

6. Install the door.

- Set the door into the opening. One volunteer must be assigned to hold the door until it is secured.
- Recheck the wide side of the hinge jamb for plumb and adjust the shims as needed.
- Recheck the head jamb for level. Add shims under the threshold as needed to level the head jamb.
- Check the narrow side of the hinge jamb for plumb. Add shims behind the brickmold trim as needed.

7. Set the Hinge Jamb.

- Keep the door closed with one volunteer on each side of the door.
- Place two (2) opposing shims between the jamb and the stud at the middle, top and bottom hinges. Add new shims; do not remove the shims from before. Place a 2 ½” finish nail through the center of the jamb just above the shims.

- Re-check the jamb to ensure it is plumb on both the wide and narrow edges. Adjust the shims, if needed.
- Place 2 ½” finish nails through the jamb and through each set of shims; one nail on each side of the jamb.

8. Set the Latch and Head Jambs.

- Keep the door closed.
- Starting at the top of the latch jamb, place five (5) sets of opposing shims spaced down the length of the latch jamb to hold it evenly spaced at 1/8” from the door.
- Place a 2 ½” finish nail through the center of the jamb just above each set of shims.
- After all shims are installed, check the space between the door and the latch and head jambs. Check to be sure the door swings freely. Adjust the shims as needed.
- Place 2 ½” finish nails through the latch jamb and through each set of shims; one nail on each side of the jamb.
- Set 2 ½” galvanized casing nails through the latch and hinge jambs behind the weather strip; 1 nail every 16”.
- Remove one screw from each hinge and set a 2 ½” screw in its place.

9. Add Jamb Extensions

- Remove the brick-molding.
- Remove the nails/staples from the brick-molding.
- Cut 1” x 1 ½” jamb extensions from a piece of 2x4.
- Cut the jamb extensions to fit up the sides of the door opening and along the top.
- Apply a bead of silicone caulk to the edges of the opening where the jamb extension will be installed.
- Install the jamb extension with 2 ½” finish nails.

10. Reinstall the Brick-Molding

- Apply a bead of silicone caulk to the jamb extension where the brick mold will be attached.
- Re-install the brick-molding over the jamb-extensions with 2 ½” finish nails. Then insert 2 ½” galvanized casing nails through the brickmold; 1 nail every 12” of the brickmold trim.

11. Set all nails.

Lexan Security Door

After installing the exterior door, cover the door with a Lexan security door. (See Figures 12.9 and 12.10). This door will be left on until the house is finished.

- Attach the security door hinge to the exterior door jamb with 2" exterior wood screws; 1 screw through each hole (Approximately 6 screws).
- Attach three (3) security door hasps to the exterior door jamb with 2" exterior wood screws; 3 screws per hasp. Ensure the hasps are aligned with the holes in the Lexan security door.
- When locking up the house, pass the hasp through the security door and lock with a puck lock.

Figure 12.9 – Lexan Hasp



Figure 12.10 – Lexan Hinge



Install Door Hardware

Critical Issues

- **The long screws for the dead bolt strike plate must be installed into the 2x4 framing.**
- Install per manufacturer's instructions.
- Place the keys in a lockbox.

Quality Assurance Checklist

- Ensure the windows operate properly.
- Ensure the doors close and latch. Ensure there are no gaps in the seals around the door.
- Ensure the windows with vanes/grills are installed on the windows facing the street.
- Ensure all window screens are stored in a secure location for the duration of the construction phases.