PRE-BUILD

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Safety Talk

Basic Construction Safety

1. Drink plenty of water and watch for dehydration!
2. When you are tired - Rest!
3. Know where the First Aid Kit is - if you are hurt see your House Leader or Site Host immediately. Our Accident Procedure is in the Site Host book, please follow it.
4. Fill out an Incident Report any time the First Aid Kit is opened.
5. Keep a name tag on at all times.
6. Use Common Sense! Keep an eye on your own safety and the safety of others.
7. Concentrate -- especially if you are on a ladder or roof.
8. Watch for trip hazards wherever you are going.
9. Help keep the site safe by picking up and moving things that are in the way.
10. If you see something unsafe tell your House Leader or a Staff Member.
11. Hardhats are required to be worn at all times through the completion of drywall lids.
12. Safety glasses must be worn when mixing mortar, when grouting, when using mechanical equipment and when spraying paint.
13. Rebar caps must be used on all vertical rebar and replaced if removed.
14. Please refrain from using ear buds on site, as they caused distraction and are a safety hazard.
15. Do not use cell phones or other electronic devices while working as they create safety hazards.

Lifting and Carrying

1. Bend your knees and lift with your legs not your back.
2. If something is too heavy, get help - don't hesitate to ask!
3. Make sure you can see over what you are carrying.
4. When carrying something longer than 8 feet have a person on each end.

Ladders

9. At the beginning of each day inspect all ladders for any structural defects that would make them unsafe. If any defects are found, mark the ladder(s) and set it aside for the Site Supervisor's disposition.
10. Use the right size ladder and place it on a solid footing
11. Never lean an A-frame ladder against anything, always use it fully opened.
12. Never stand on the top step or back side of a ladder.
13. Don't stretch/lean too far – always keep your belt buckle between the ladder uprights - take the time to move the ladder with your work!
14. Get someone to steady your ladder if needed.
15. Only one person on a ladder at a time.
16. The 4 to 1 rule: For every 4 feet of height, move extension ladders one foot away from the wall.

Power Tools

1. Make sure you know how to use a power tool and don't disable safety features.
2. Wear safety glasses when using power saws and other power tools that create flying debris.

3. Take off gloves when working with saws.
4. Watch fingers near moving parts and tie back long hair.
5. Secure all loose clothing (shirt cuffs, nail pouches, etc.)
6. Watch the power cord when cutting and don't carry a power tool by its cord.
7. Get help when cutting large/ long pieces of material.

Efficient Material Usage

Lumber:

- All headers, sills and built-up beams are to be made from lineal lumber.
- Make all trimmers and lower cripples from stud material.
- Upper cripples, blocking and ladder "rungs" can be made from any appropriately sized available scrap lumber.

Efficient Use of Pressure Treated Green Plate is Critical!

- Green plate is to be used for bottom plates only.
- Start by laying out the longest wall sections first, then use cut pieces for shorter walls.

Overview

For our House Leaders, Pre-Build needs to start even before the slab is laid out. The first step after being assigned a house is to contact your Site Supervisor to find out his exact schedule leading up to the first Saturday of work. Get your copy of the plans from him and familiarize yourself with them. Consider hi-lighting information that applies to your build, crossing out those things which don't, color coding details on your plans and detail sheets, and using your plan set (blueprints) to make notes and cross off completed details. Ask any questions that you have before starting work on the house.

If the House Leader is not doing the layout, he should find out who is and when they will be doing it. He also needs to confirm that the container Shelf Units and Racking are being built, and when they, and the tools, will be in place.

If the House Leader is going to be involved in the above mentioned activities, he needs to make sure that he and his team are scheduled to be on the site at the correct times, that the necessary tools and equipment have been moved to the site in advance of the activities for which they will be needed, that no special changes need to be made on this house, and that he has the Layout Package, Cut Sheets and other supporting documents.

The following items need to be on site before any work can be begun.

EQUIPMENT	TOOLS	SUPPLIES
Brooms (both types)	100' tape measures	8d & 10d collated nails
Dust pans	25' tape measures	8d & 10d hand drive nails
Electrical cords	Air hoses	Bucket
Electrical splitters	Chalk lines	Chalk
Generator	Chop saws	Clear coat spray
Pipe clamps	Circular saws	Drinking water & cups
Sawhorses	Compressors	Erasers
Shovels (one of each)	Framing nailers	Gasoline
Trash cans	Hammers	Ladder hooks & cord ropes
Water hoses	House Leader's Toolbox	Pencils
Ladders	Speed squares	Rags
	Utility Knives	Refillable felt markers
		All hardware per plan

Container Shelves & Rack

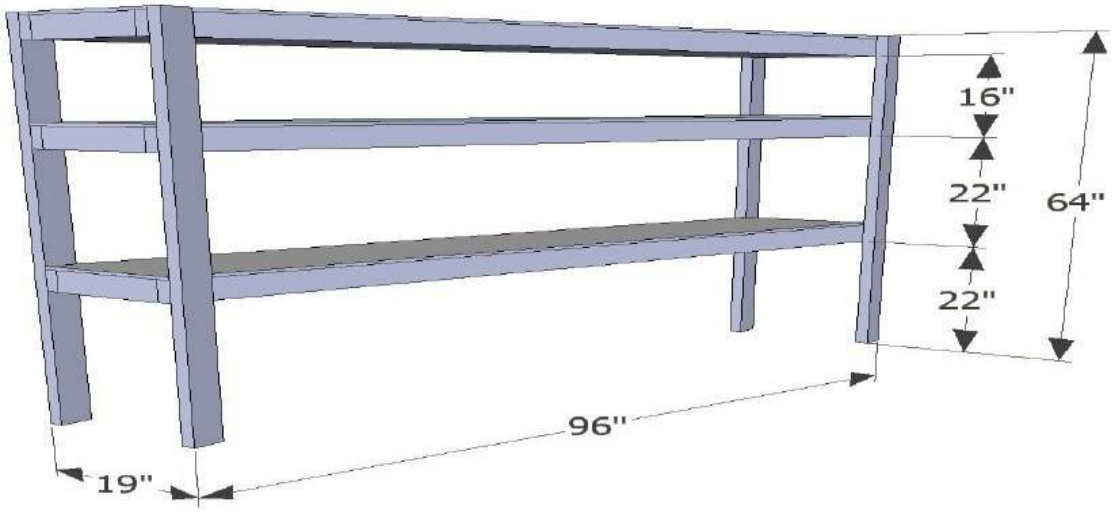
Build one or two of each depending on container size.

Materials to build one 8’ Shelf Unit:

- One sheet of OSB cut into 3 pieces @ 16”x96”
- Three 2x4x16s cut into 6 pieces @ 96”
- Two 2x4x16s cut into 4 pieces @ 64”
- One 2x4x16 cut into 9 pieces @ 13”

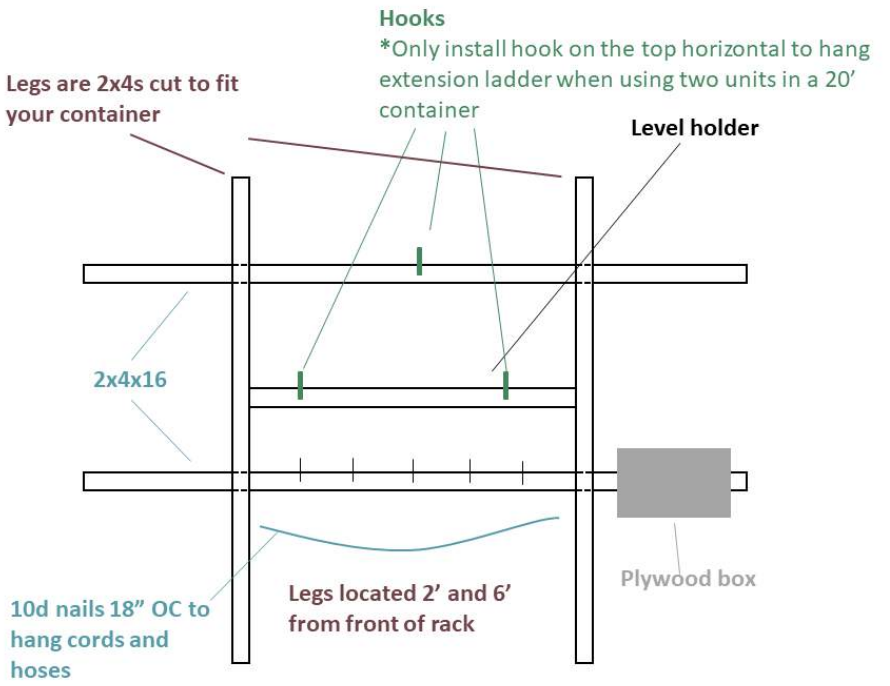
Materials to build one 8’ Cord/Hose Rack:

- One 2x4x16 cut in half
- Three 2x4 studs cut to fit
- Ladder hooks
- Cord ropes



Level holder:

The Level Holder shown on the drawing is only needed on one rack per container and can be built by using a piece of 2x4 long enough to span between the legs of the Rack, and two ladder hooks. Space the hooks no more than 3’ apart and the rack can hold all three sizes of levels.



Container Maintenance

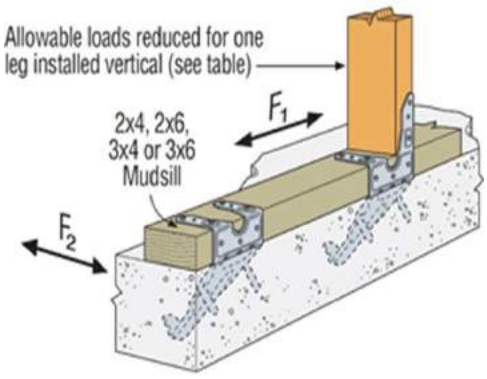
Container Maintenance is the responsibility of the House Leader and his team. We suggest that this housekeeping duty be assigned to one Team Leader each day and that they use general volunteers to make sure that everything is stored properly and neatly at the end of each workday.

Cut Table

We are no longer building cut tables as all sites are being provided with stand mounted chop saws.

Post-Tensioned Slab

All our new homes will be built on Post Tensioned Slabs.



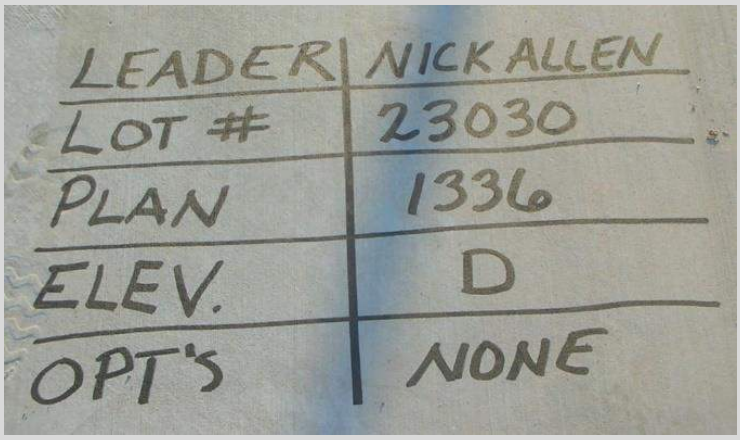
YOU NEED TO BECOME FAMILIAR WITH THE DETAIL PAGES OF YOUR PLAN SET AND THE CONSTRUCTION MANUAL. Remember, if there are any disparities between the two, the Plan Set is always the final authority. Ask your Site Supervisor if you have any questions.

Slab Layout

Remember to always use a 100' tape whenever the dimension exceeds 25'. Adding multiple dimensions from shorter tapes almost always introduces errors.

Before you begin laying out the slab remember to do the following:

1. Assemble all the documents and tools that you will need.
2. Remove the foam & cardboard wrap from the plumbing penetrations. Do this before cleaning the slab as it makes a mess.
    a. Tap edges of concrete with hammer to loosen foam.
    b. Try to remove wrap in one piece.
    c. Repeat process with tub boxes.
    d. Remove extra dirt from tub openings.
3. Sweep and clean the slab. Hosing it off a day ahead of time creates a great surface.
4. Mark house information on slab inside of the front door. See picture below left.



Typically, longer walls and walls with doors run long because you do not want to create a hinge point. Mark these walls on the slab with arrows as shown above right.

This layout incorrectly creates a hinge point.

This layout properly avoids creating a hinge.

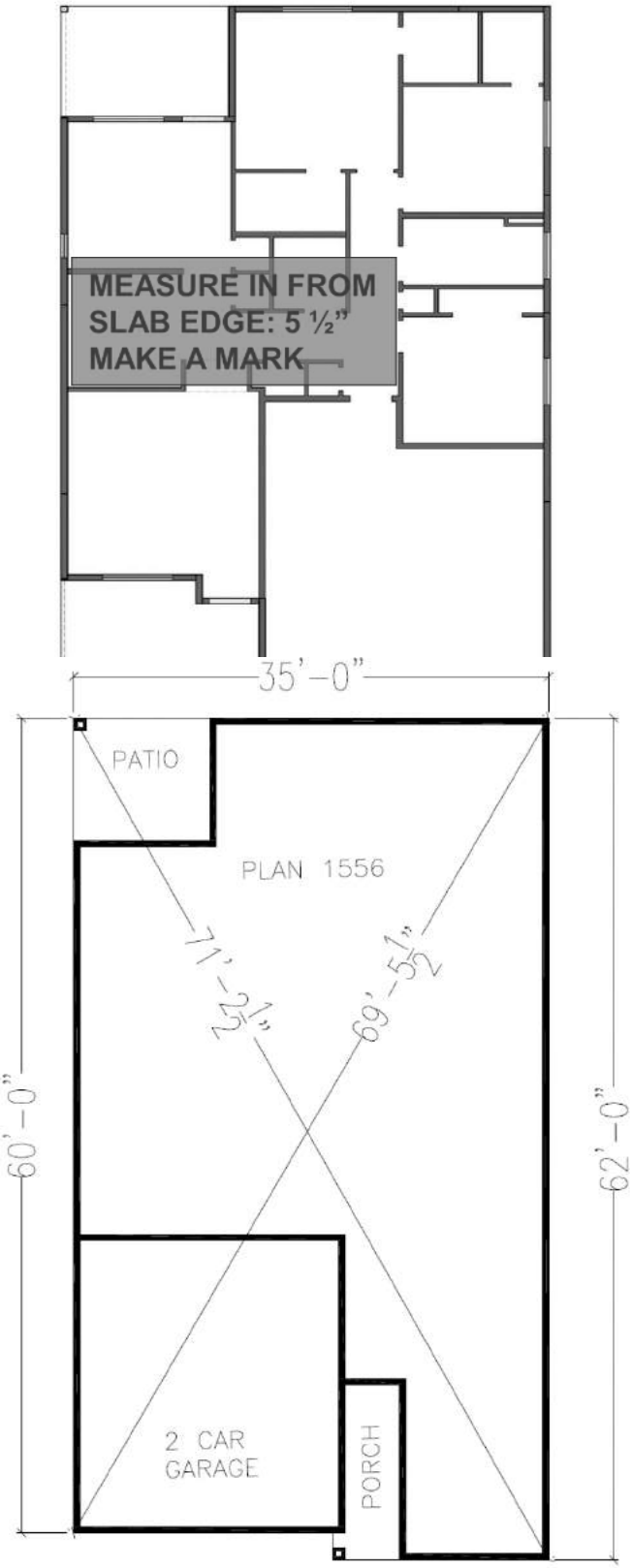
A Few Things to Remember:

- Dimensional lumber is not truly the nominal size it is called, i.e., a 2x4 is really 1 1/2x3 1/2.
- Red markers are only to be used for marking individual pieces of wood.
- Always use black markers to mark anything on the slab, except use pencil in areas where concrete will remain exposed. Red markers will fade out. Our markers are refillable! Do not throw them away when they run dry, refill them.
- Always verify slab dimensions and squareness before laying out any walls.
- Exterior walls are to be laid out before the interior walls.

Measure the outside dimensions of the slab. Do the dimensions match the plans? Do adjustments need to be made? Never shorten the wall lengths! If the slab is either too small or too big, center the house on the slab. Make sure that the plates hang over or are inset equally on both sides of the slab.

1. To create your control line, make marks at each end of the slab 5-1/2" (adjust this dimension accordingly if your slab size is off) in from the edge (picture below left), and then snap a line between these points. To snap the line, pull the chalk line the full length of the slab, put it down on your marks, stretch it as tightly as you can, have someone hold down the middle of the line, and then lift each half of the line straight up 1" at about the middle of its section and let it snap down. Lines over 30' long will probably be faint and need to be snapped again in shorter sections. Always use red chalk in your chalk lines because it doesn't fade as badly as other colors. Because it stays so well, be careful to never fill/spill your chalk box on the slab. Also, be certain of where you want your lines before you snap them as the chalk is difficult to wash off.

2. Lay out all exterior walls parallel to your control line by measuring from the control line to each end of each of the parallel lines. Determine the length of each line and snap out only that length.
3. Now lay out the secondary control line, which is perpendicular to the original control line, and runs the full width of the house. If the diagonal measurement is not on your plans, use the triangle measurement method (based on the Pythagorean Theory) to verify that the slab and the secondary control line are in square. These dimensions can be determined from your plans. Slabs are very rarely so far out of square that it matters. A variance of up to 1" is acceptable. If yours is off by more than that, talk to your Site Supervisor.
4. Lay out all exterior walls parallel to your secondary control line by measuring from that line to each end of each of the parallel lines. Snap out only the portions of those lines that are needed.
5. Lay out all interior walls parallel to your control line by measuring from the control line to each end of each of the parallel lines. Determine the length of each line and snap out only that length.
6. Lay out all interior walls parallel to your secondary control line by measuring from that line to each end of each of the parallel lines. Snap out only the portions of those lines that are needed.



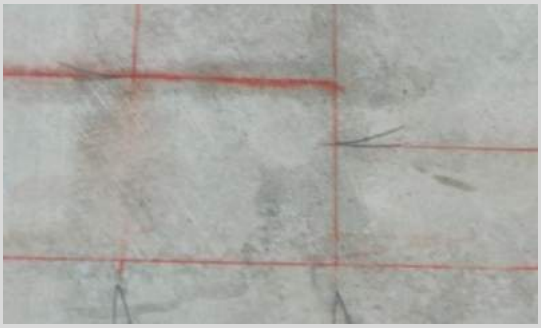
Double check that walls where cabinets will be installed are perpendicular to each other.

If any walls in your house transition from 2x4 to 2x6 make sure that the proper side aligns (following photo). Have someone go around with a wet rag and water bucket to remove any mistakes or "extra" lines (i.e. at corners) that have not already been removed. Complete all snapping

before doing any marking. **Do Not** seal lines with clear coat until after all marking has been completed and verified.

Marking the Slab

Write info for openings and details directly on the slab using a large black marker (see below left). **Do not use a marker** on concrete that will be permanently visible (garage and porch areas), make notes in those areas using a pencil.



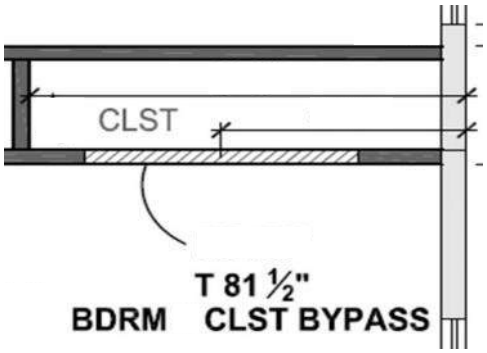
Openings are all doors and windows. Details are the info relating to ladders, beam pockets, shear panels, etc.

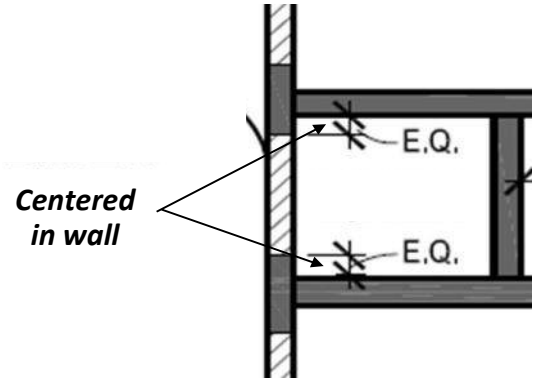
Never guess about the placement of an opening. If there is conflicting or unclear information, talk to your Site Supervisor.

Remember the plans are the final authority. Almost always windows are located from a centerline dimension from a perpendicular wall. Doors are located from a centerline dimension, or most commonly with one edge of the rough opening 3" from a perpendicular wall (use dimensions from plans). See the details on the next page.

First determine whether the location of the opening is based off a centerline or an edge location (usually a door). For a centerline location, mark the centerline for each opening, and then mark the edges of the opening. For an edge location, work from that edge to the centerline and then to the far edge. When labeling any rough opening the width is always listed first. Additional info written on the slab includes special trimmer heights (anything other than the standard 81" size) and the specific name of the opening. You will find similar information on the corresponding module when it comes time to build the wall (see below right).

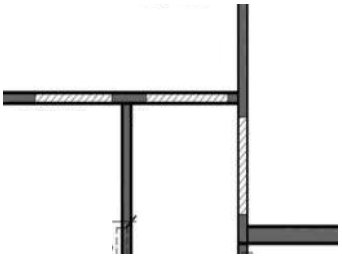
Plate breaks should be marked at this time. Locate the plate breaks on all exterior walls that are longer than 16’-0”. They are to be placed at 16’-0” from the corner, and at every multiple of 16’-0” for the length of the wall. Mark medicine cabinet, tub backing and beam pocket locations on the slab.





Walk the house now to look for any errors or omissions, correct any if found.

It is now time to protect all markings by spraying them with clear coat.



Rough Door Opening 3” from perpendicular wall

Shear Panels

Since we are no longer shearing all exterior walls, working from your plans mark the location of all of the shear panels on the slab. Remember to use pencil on all exposed areas of the slab.

Cutting Plates

Before starting to work on plates, always take a few minutes to review the slab layout. This will allow you to re-familiarize yourself with everything and give you one more opportunity to spot any errors before they cause problems.

If it has not already been done by the site supervisor, now is the time to count/verify the lumber package. The best time to count everything is while you are separating the various lumber items by type and length before any lumber is moved, put on the slab, or cut up. If you have been given the lumber take-off by the site supervisor use this to check off the material on hand. If not, there should be a delivery ticket from the supplier with the order that can be used to check off the material on hand. If neither of those lists is available to you, please make a list. Make sure that any unusual items intended for a specific use (i.e. 2x6x12s [for porch rafters]) are marked and set aside to avoid misuse.

All walls for single story houses and all first-floor walls for multi-story houses require a bottom plate of pressure treated lumber (this is green or brown in color and is generally called green board) and a top plate of regular lumber (referred to as white board). We call these 16' long pieces of lumber lineal. For upper story walls both the top and bottom plates are cut from white board.

Cut plates for one wall at a time to avoid confusion. Complete and verify each wall before beginning the next. **Efficient use of green board is very important**. Always place the crown of the plate material to the inside of the house.

Start with the longest walls, and always use the straightest available lumber. Save all leftover plate pieces for use in shorter walls. All exterior wall plates are 2x6. Always mark the top of both plates with the word TOP so that they will not accidentally get flipped during the building of the wall panels. It is imperative that the top and bottom plates be the same length. The following process will ensure this happening.

1. Line up one end of a pair of plates and nail them together near that end. Use a 10d nail and leave the head protruding slightly so that it will be easier to remove later.
2. Measure and mark the top plate to the proper length.
3. After making sure that the depth of cut on your saw has been set to its maximum, cut the assembled plates to length. This first cut will cut the top plate and score the bottom one.
4. Pivot the upper plate out of the way and complete the cut through the lower plate.
5. Pivot the plates back together and nail them together in a couple more places. **Remember to leave the heads exposed.**

Longer wall sections will require two to four lengths of plate. Try not to end wall sections within doors and windows. Ideal cuts will leave 1/8" between wall panels, which allows installation without the panels binding. After cutting all sections for a wall, lay them in place to verify proper fit before moving on to the next wall. As needed, cut notches in the bottom plates for plumbing pipes and the Ufer (photo above).

Marking Plates

Some general things to remember:

- Exterior doors must be kept a minimum of 4- 1/2" from intersecting exterior walls.
- Exterior doors and windows (other than sidelights) must be separated by at least 24".
- **Do not** transfer centerline marks to plates using a marker, **use a pencil**.
- Some openings (i.e. garage doors) may need additional Trimmers and Studs, always check your plans.
- Mark the inner edges of openings first and then work out from there.

For windows:

- Slab markings are the same dimension as plans.
- Working out from the edge of the opening, add 1- 1/2" for Trimmers and another 1- 1/2" for King Studs on both sides.

For doors:

- Slab markings are rough opening (RO) not the true dimension.
- For hinged doors the RO is actual dimension plus 2".
- For bypass doors the RO equals the actual dimension.
- Working out from the edge of the opening add 1- 1/2" for Trimmers and another 1- 1/2" for King Studs.
- Always use a 100' tape if the wall is longer than 25'.

In order to maintain proper stud spacing, if any exterior wall runs short, be sure to burn (also called cut) 5-1/2" from your measurement. This means that the 5- 1/2" mark on the tape will be laid at the end of the wall. All plate layout is done in pencil. The layout starting point is based on the keyed truss layout.

Make sure that the green board is on the outside of all exterior wall plate sets when they are set on edge for marking.

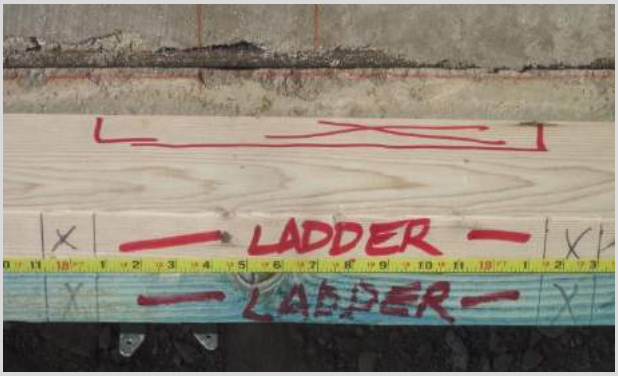
1. Once all plates are cut and temporarily nailed together, begin by marking one wall at a time. With each section of the wall lying on its edge, confirm one more time that the entire wall fits correctly.
2. Transfer the centerline marks from the slab to the plates. Measure 1/2 of the rough opening width to either side of the centerline and draw those lines. Measure that the distance between the lines is exactly the RO. If it is not, make the needed correction. All studs are marked on the plates as 1- 1/2" wide. Unless it is a special situation noted on the plans, each opening will have one Trimmer (to support the Header) and one King (full height) Stud on each side. Therefore, you will draw a line at 1- 1/2" and 3" on both sides of the rough opening. The marking between each pair of lines will indicate what goes there. King Studs are shown with an "X", Trimmers with a "T" and Cripples with a "C". If there is plumbing in the way of a King/trimmer location for a window, there are two options to solving the problem:
    a. If doing so does not affect anything else, simply move the opening over enough to clear the plumbing.
    b. If moving the window would affect something (i.e. cabinetry), move the assembly to the outside of the plumbing. Note that you will now need a longer Header and Sills. When

the wall is framed, use two Cripples between the header and Sills to reduce the RO to the correct size.

3. Lay out Beam Pockets as follows. For Beam Pockets at the end of the wall mark one or two Trimmers (per your plan) and a King on the inside end of the pocket (see picture below). Site measure the beam to determine the exact height of the trimmers. If the pocket is wider than the beam, the gap will be filled with shims when the beam is installed. Go over all of the pocket

marks with a red marker and write "Beam Pocket" on top of the plates (see the above picture on the left).

4. Exterior corners have a King Stud at the end of a short wall, and a 1/2 California Corner (Cal Corner) at the end of a long wall. A 1/2 Cal Corner is an "L" shaped nailer made from two pieces of 2x. Draw the Cal Corner layout on the top of the plates as well as showing the 1- 1/2", 3- 1/2" or 5- 1/2" spacings on the edge of the plates (see photo above). Retrace all the markings with a red marker and write 1/2CC on top of the plates.
5. Position your tape measure, either with the end of the tape at the end of the wall (for a wall that runs long) or with the 5- 1/2" mark at the end of the wall (for a wall that runs short). Now mark the regular pattern of king studs on the wall by drawing a line 3/4" before and after every 2' mark. It is crucial that these marks be exactly centered every 24". This gives you the 1- 1/2" space for each stud and positions them in the proper place for the sheathing joints. Place an "X" in all spaces that don't fall in an opening, a "C" in all spaces above and below window openings, and a "C" only on the top plate at door openings (erase all marks from the bottom plate that fall in door openings).
6. By following the above procedure each wall will start with a full 48" wide piece of sheathing.
7. Find all locations where an interior wall intersects the exterior wall and mark the location for ladder blocking on both plates. Also verify that the ladder location has been previously marked on the slab.



8. Repeat this process for all remaining exterior wall panels. Once all of the exterior walls have been completed, begin the interior walls.
9. The process for marking stud locations on interior walls is the same as for exterior walls. We use 1/2 Cal Corners where two interior walls form a corner.
    a. Remember that interior doors are located in three different ways and verify on your plans which method applies where.
10. There are some additional items that need to be marked on interior walls:
    a. Standard tubs need 1/2 Cal Corners from 35- 1/2" and go from the corner on their short sides.
    b. Medicine cabinets are 14" wide, located on the side of the vanity, and need to be at least 3" from the corner.
11. Walk the entire house and verify that everything (including doors and windows) marked on the slab has been transferred to the plates.
12. After all the walls have been completed, label each one, and its corresponding location on the slab, with its unique ID and a directional arrow. Interior walls are labeled numerically, and exterior walls are labeled alphabetically.
13. Move all interior plates off the slab and neatly stack them out of the way.
14. Make sure everything is neat and organized for the next day of work.

Cut Lists

The purpose of a Cut List is to know what needs to be cut, and the best way to do it. Using this tool saves time and money (less waste), as our houses require over 500 major pieces of wood be cut to the correct sizes.

When creating a Cut List, all the needed window and door module dimensions can be found in your plan set, on either the floor plan or roof framing plan pages. For a door module you need King Studs (standard pre-cut size), Trimmers (standard size 81"), Header (RO width of door plus 3") and Upper Cripples (King Stud minus Trimmer, minus Header height). For a window module you need the same items as for a door (but trimmers are 82- ½"), plus 2 Sills (RO width) and Lower Cripples (Trimmer minus RO height minus 3").

List the needed components by material size (i.e. 2x4) and then within each size by the longest pieces first (see the following examples). This allows you to use the cut-offs for the shorter components. Label all components (using a red marker) with what they are and their length (i.e. S [for sill] 48). Precision in cutting at this stage is even more important than usual as you will normally be cutting multiple pieces at each size.

	Cut From	Description	QTY	Comments
Trimmers	Studs	2x4 @ 81"	16	
		2x4 @ 81-1/2"	4	
Headers	Lineal	2x4 @ 63"	4	Bi-Passs
		2x4 @ 65"	2	Double Hinge Laundry
		2x4 @ 41"	7	

ASSEMBLY LIST

Modules – Doors

Size	Room	Trimmer	QTY	Header	Comments	QTY
RO 38	MBDR WIC	2x4 @ 81"	2	2x4 @ 41"		1
RO 60	BDRM 2 CLST BIPASS	2x4 @ 81-1/2"	2	2x4 @ 63"	*Sandwich; add osb*	2
RO 60	BDRM 3 CLST BIPASS	2x4 @ 81-1/2"	2	2x4 @ 63"	*Sandwich; add osb*	2
RO 62	LNDRY DBL HINGED	2x4 @ 81"	2	2x4 @ 65"	Sandwich; add osb	2
RO 38	BTH 2	2x4 @ 81"	2	2x4 @ 41"		1
RO 38	MSTR BR	2x4 @ 81"	2	2x4 @ 41"		1
RO 38	BDRM 2	2x4 @ 81"	2	2x4 @ 41"		1
RO 38	BDRM 3	2x4 @ 81"	2	2x4 @ 41"		1
RO 38	MBATH	2x4 @ 81"	2	2x4 @ 41"		1
RO 38	PNTRY	2x4 @ 81"	2	2x4 @ 41"		1
RO 60	BDRM 4 CLST BIPASS	2x4 @ 81-1/2"	0	2x4 @ 63"	Sandwich; add osb	0
RO 38	BDRM 4	2x4 @ 81"	0	2x4 @ 41"		0
RO 38	COAT	2x4 @ 81"	0	2x4 @ 41"		0
RO 38	LAUNDRY	2x4 @ 81"	0	2x4 @ 41"		0

1556 Interior Cut List for Post-Tensioned Slab

	Cut From	Description	QTY
Trimmers	Studs	2x6 @ 81"	4
		2x6 @ 78 1/2"	2
		2x6 @ 82 1/2"	18
Headers	Lineal	2x4 @ 63"	3
		2x4 @ 27"	6
		2x4 @ 39"	12
		2x6 @ 99"	3
		2x6 @ 41"	1
		2x6 @ 63"	6

	Cut From	Description	QTY
Sills	Lineal	2x6 @ 60"	6
		2x6 @ 36"	8
		2x6 @ 24"	4
Cripples	Studs	2x6 @ 55 1/2"	4
		2x6 @ 19 1/2"	24

ASSEMBLY LIST

Modules – Windows

size	Room	Trimmer	QTY	Header	QTY	Sill	QTY	Cripple	QTY
2-0x2-0	BATH 1	2x6 @ 82 1/2"	2	2x4 @ 27"	3	2x6 @ 24"	2	2x6 @ 55 1/2"	2
2-0x2-0	BATH 2	2x6 @ 82 1/2"	2	2x4 @ 27"	3	2x6 @ 24"	2	2x6 @ 55 1/2"	2
3-0x5-0	GREAT RM (1)	2x6 @ 82 1/2"	2	2x4 @ 39"	3	2x6 @ 36"	2	2x6 @ 19 1/2"	3
3-0x5-0	GREAT RM (2)	2x6 @ 82 1/2"	2	2x4 @ 39"	3	2x6 @ 36"	2	2x6 @ 19 1/2"	3
3-0x5-0	MSTR BR WNDW (1)	2x6 @ 82 1/2"	2	2x4 @ 39"	3	2x6 @ 36"	2	2x6 @ 19 1/2"	3
3-0x5-0	MSTR BR WNDW (2)	2x6 @ 82 1/2"	2	2x4 @ 39"	3	2x6 @ 36"	2	2x6 @ 19 1/2"	3
5-0x5-0	BDRM 2 WNDW	2x6 @ 82 1/2"	2	2x6 @ 63"	3	2x6 @ 60"	2	2x6 @ 19 1/2"	4
5-0x5-0	BDRM 3 WNDW	2x6 @ 82 1/2"	2	2x4 @ 63"	3	2x6 @ 60"	2	2x6 @ 19 1/2"	4
5-0x5-0	BDRM 4 WNDW	2x6 @ 82 1/2"	2	2x6 @ 63"	3	2x6 @ 60"	2	2x6 @ 19 1/2"	4

Modules – Doors

Size	Room	Trimmer	QTY	Header	QTY	Comments
RO 38	FRNT DR	2x6 @ 81"	2	2x4 @ 41"	3	
RO 96	REAR SGD DR	2x6 @ 78 1/2"	2	2x6 @ 99"	3	
RO 38	GRG DR	2x6 @ 81"	2	2x6 @ 41"	1	Flat Header

1556 Exterior Cut List for Post-Tensioned Slab

The format of the Cut List shown above shows what pieces need to be cut in the top section. Remember that you will also have to cut one piece of 1" foam the size of each exterior header. The bottom section gives you all the information (location, size, and the parts required and their size) you will need to build the modules. If you are able to use an existing Cut List you are ready to go, however if you have to create one the following info should be helpful.

1. All standard door Trimmers are 81" except for by-pass doors in carpeted rooms (81- 1/2"), and other special applications.
2. You need two Sills for each window.
3. Cripple sizes for under windows are as follows: for a window height of 5' the Cripples are 19 - 1/2", for a 4' window Cripples are 31- 1/2", for a 3' window Cripples are 43- 1/2", for a 2' window Cripples are 55- 1/2".
4. Headers are 3" longer than the RO width unless there are multiple Trimmers per side.
5. Sills are always RO width.
6. All exterior Headers are Sandwich Headers (3-2xs and 1 piece of 1" foam).
7. Interior Headers are single Flat Headers for openings of 38" and less and are Sandwich Headers (2@ 2x and 1-piece 1/2" plywood) for all larger openings. Always make the plywood spacers about 1/2" smaller in each dimension than the Headers to ease assembly.

All Trimmers and Lower Cripples are to be cut from stud material, and all Headers and Sills are to be cut from lineal material. Upper Cripples, Ladder "rungs" and blocking can be cut from any appropriately sized leftovers. When those leftovers are used up any parts still needed should be cut from lineal material.

Outriggers are 2x4s, and the length is determined by the roof overhang. That dimension and the quantity needed can be found on the roof framing plan. For a 12" overhang the Outriggers should be 36" long, for a 16" overhang they should be 40" long, and for a 24" overhang they should be 47- 3/4" long. These are rough dimensions to optimize lumber usage when they are cut from lineal material and are long enough to allow the outriggers to be cut to final length from a line snapped after installation.

Once you have cut all the pieces for the window and door modules you can use the scraps to make some of the smaller items that will be needed, i.e. blocking and Ladder "rungs". These items will vary in length for each house.

Measure the actual width of each Ladder as laid out on the plates and cut the "rungs accordingly.

Each Ladder will need five "rungs", 4 of 2x4 and 1 of 2x6.

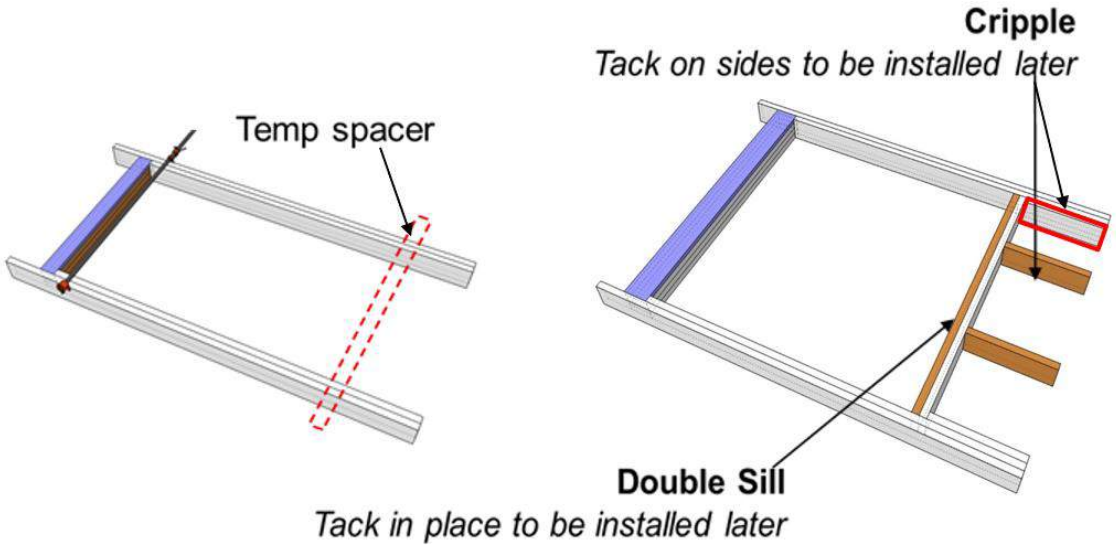
Put leftovers in organized piles based on length. Automatically dispose of any pieces less than 8" in length. Once the walls have been built these leftovers will be used for cabinet and drywall blocking.

Building Modules

The first step in building modules is to take some of the pieces that have been cut and assemble them into components (using 10d nails). All the pieces already cut should be labeled with the letter number system (T81, C19- 1/2, etc.).

It is crucial to preventing problems that the bottoms of the King and Trimmer be exactly even, and that the sides line up all the way from the bottom to the top. If any piece (for any component) is twisted or too warped to straighten, throw it in the scrap pile and get a good replacement before nailing the pieces together. **Reverse crown trimmer sets and any other vertical built-up members**. The proper nail pattern for assembling the King/Trimmer components is two 10d nails @ 16" o.c. for the 2x4 units and three 10d nails @ 16" o.c. for the 2x6 units. Assemble all of the King/Trimmer components making sure that the Trimmer length is visible. It is a good idea to segregate any odd sized components into separate piles until the modules are assembled.

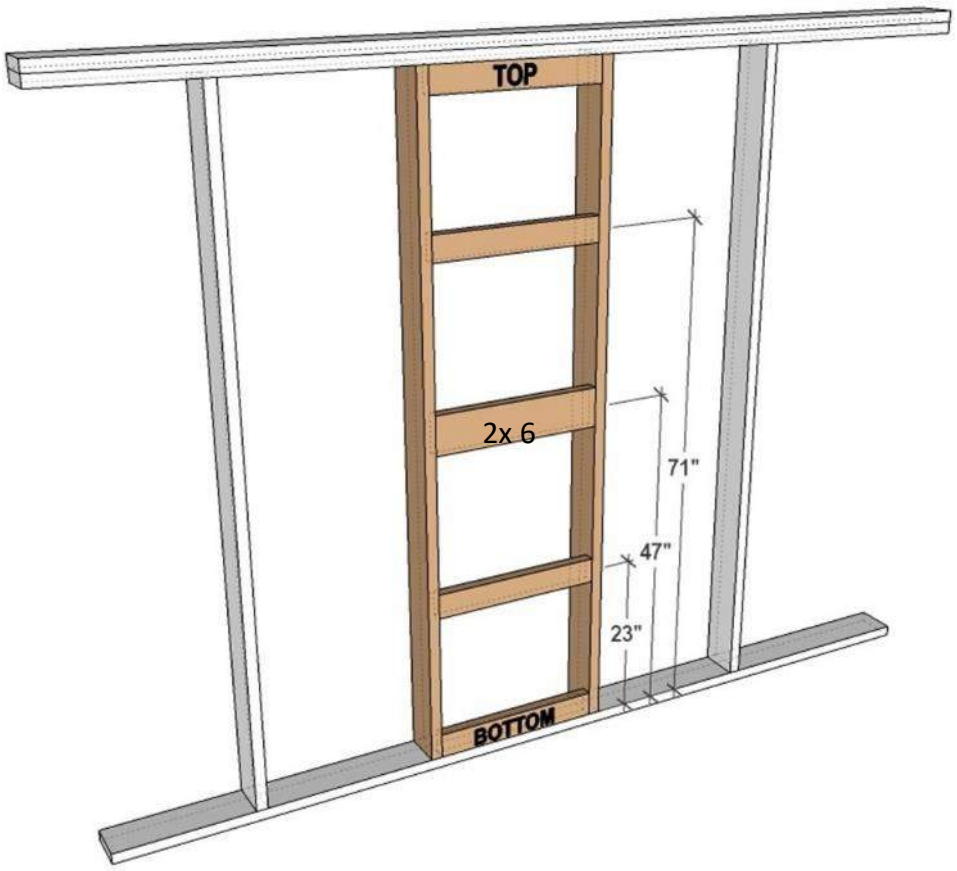
Also, completely assemble all the Headers (including the foam which is attached with 8d nails) making sure that the lengths are still visible. Proper nail pattern for assembling Headers is two 10d nails (for 2x4 units), three 10d nails for 2x6 units, and four 10d nails (for units 2x8 and larger) @ 12" o.c. Alternate rows of nails should be driven from opposite sides of the Header. Now is the time to label each Header with its location information (header size, module location and verbal description], and RO.



Once all the components have been built it is time to assemble the modules. The basic nailing rules of two, three or four 10d nails per joint (based on the size of the material) still apply. When attaching the Sandwich Headers, after the nails have been driven through the King into the Header, drive a toe-nail through each piece of the Header into the King Stud. These extra nails will help keep the module tightly together when it is moved around. As the modules are completed, move the exterior modules to their final location, and neatly pile the interior modules on the ground away from the slab for use later.

Once all the door and window modules have been assembled and moved to their proper locations the next step is building Ladder modules. A standard Ladder module is made up of two King Studs, four 2x4 rungs and one 2x6 rung. The pieces should be placed and assembled as shown in the diagram using two 10d nails in each end of the 2x4 rungs, and three for the 2x6 rung in the middle. The location of the 2x6 rung is the most critical as it serves as the anchor point for both the upper and lower drywall sheets.

There may be some Ladders that attach on one side to something other than standard single stud. You would build these with only one leg and rungs, and then attach the loose ends of the rungs to their adjacent component as the wall is built.



Once all the modules are built and put in their proper locations, walk the house one last time verifying everything. Make sure that every room has a door and window, and that all closets have a door. Look for any ladders that haven't been built. Sweep up any remaining debris.

Congratulations! You are now ready for your first general volunteer workday.