

**Building Materials List for Behm Design Plan # 1224-1**  
1-800-210-6776

~ Local building code approved substitutions may be made to this list ~  
Variations in construction methods and materials can require modification of this list. Every attempt is made for greatest accuracy, but typographical or human error is possible. Quantities verification by the materials supplier is recommended before materials package is finalized and/or shipped.

**Rough Framing**

2 x 4 x 92-1/2" HF/DF exterior "stud" wall framing ----- 105 pcs.  
2 x 4 HF/DF No. 2 wall top plate material ----- 232 lf  
2 x 4 x 144" HF/DF No. 2 lookouts material ----- 12 pcs.  
2 x 4 HF/DF No. 2 pressure-treated bottom plate ----- 116 lf  
3-1/2 x 11-1/4 LVL Header 2950Fb 2.0E --- 23'-9" length..... 1 piece  
2 x 6 DF No. 1 Header ----- 8' length --- 3 pcs.  
2 x 4 x 22-1/2" Roof Eave Blocking with screened vent holes ----- 22 pcs.  
3/4" T&G APA plywood ext. glue for attic floor ----- 4 x 8 sheets ----- 14 shts.  
2 x 12 HF/DF No. 2 stair stringer ----- 16' length --- 4 pcs.  
1 x 11.5 o.s.b. BN stair tread material 8' length --- 6 pcs.  
2 x 4 x 96" HF/DF No. 2 landing joists material ----- 4 pcs.  
Trusses : 12 in 12 slope, 24' span: (2) end, (14) attic-strg.,  
(1) double(girder) truss (see planset)

**Sheathing Materials**

7/16" o.s.b. wall sheathing ----- 4 x 8 sheet --- 40 sheets  
15/32" Roof C-D APA Plywood, ext. glue P.I. 24/0 ----- 4 x 8 sheet --- 50 sheets

**Vapor Barrier**

Roof 15# bituminous felt paper in 36" wide roll----- 550 lf  
Wall 7# bituminous felt paper in 40" wide roll ----- 400 lf  
Floor .006" black polyethylene membrane----- 856 sf

**Siding Materials**

8" textured o.s.b. siding boards with 1" lap ----- 1046 sf siding area  
[(alternate) 7/16" o.s.b. text. (or 5/8" T1-11 plyw' 4 x 8 sheet 40 sheets  
Trim: 5/4 x 3 (for alt. siding, use 1x thk. tr 8' length 4 pcs.  
Trim: 5/4 x 4 ----- 8' length 15 pcs.  
Trim: 5/4 x 4 ----- 9' length 4 pcs.  
Trim: 5/4 x 4 ----- 10' length 2 pcs.  
Fascia: 1 x 6 ----- 72 lf  
Rakeboard: 2 x 6 ----- 20' length 4 pcs.

**Roofing Materials**

Composition Roofing Shingles----- 1373 sf roof area  
Ridgevent material----- 34 lf

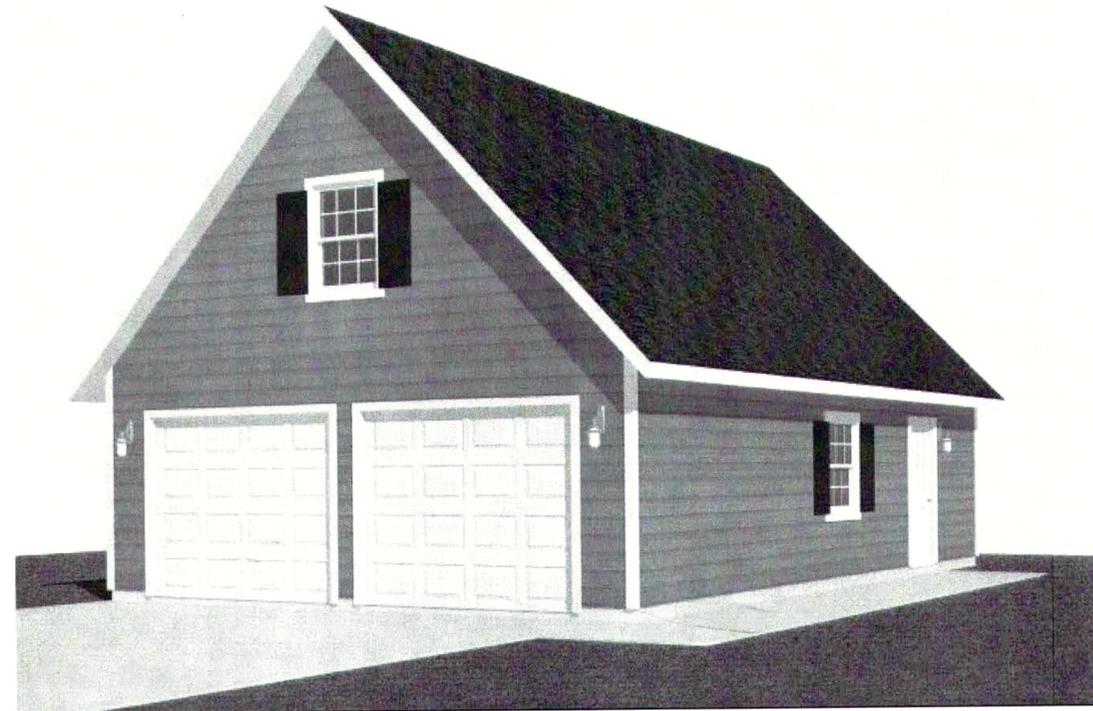
**Window and Door Assemblies**

3040 single-hung window(s)----- 4 ea.  
9'-0" x 7'-0" sectional garage door----- 2 ea.  
3068 exterior door----- 1 ea.

**Metal Parts & Misc.**

Anchor bolts: 1/2" dia. x 10" ASTM A-307. ( w/ hex nut 21 pcs.  
Flat washer for 1/2" dia. x 2" square x 3/16" thick std. pl.----- 21 pcs.  
Anchor bolts: 5/8" dia. x 14" ASTM A-307/A-325, type X w/ hex nut 2 pcs.  
Flat washer for 5/8" dia. x 2" square x 3/16" thick std. pl.----- 2 pcs.  
Simpson H10 connectors ----- 30 pcs.  
Simpson STHD8 hold-down straps ----- 2 pcs.  
Simpson STHD14 hold-down straps ----- 4 pcs.  
Simpson MST24 nailing strap ----- 2 pcs.  
Simpson ST2122 nailing strap ----- 2 pcs.  
16d sinker nails ----- 50 lbs.  
8d common nails @ 145 nails / lb. ----- 50 lbs.  
Drip flashing for window/door heads----- 33 lf

~ To advise corrections, call 1-800-210-6776 Thank you.~  
(note: electrical components and finishing materials not included in this list)



**GARAGE PLAN #1224-1**

**Truss Requirements**

2303.4.1 Truss design drawings. Truss construction documents shall be prepared by a registered design professional and shall be provided to the building official and approved prior to installation. These construction documents shall include, at a minimum, the information specified below. Truss shop drawings shall be provided with the shipment of trusses delivered to the job site.

1. Slope or depth, span and spacing;
2. Location of joints;
3. Required bearing widths;
4. Design loads as applicable;
5. Top chord live load (including snow loads);
6. Top chord dead load;
7. Bottom chord live load;
8. Bottom chord dead load;
9. Concentrated loads and their points of application;
10. Controlling wind and earthquake loads;
11. Adjustments to lumber and metal connector plate design value for conditions of use;
12. Each reaction force and direction;
13. Metal connector plate type, size, thickness or gage, and the dimensioned location of each metal connector plate except where symmetrically located relative to the joint interface;
14. Lumber size, species and grade for each member;
15. Connection requirements for:
  - 15.1. Truss to truss girder;
  - 15.2. Truss ply to ply; and
  - 15.3. Field splices.
16. Calculated deflection ratio or maximum deflection for live and total load;
17. Maximum axial compression forces in the truss members to design the size, connections and anchorage of the permanent continuous lateral bracing. Forces shall be shown on the truss construction documents or on supplemental documents; and
18. Required permanent truss member bracing location.

**Building Code Compliance**

This planset was prepared to comply with the requirements of the International Residential Code (IRC) 2015

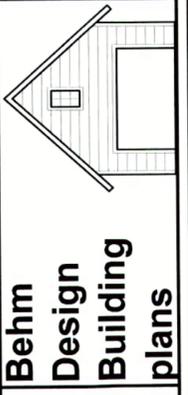
**Parameters For Design**

Wind Speed: 115 MPH ULTIMATE  
Wind Exposure: "B"  
Seismic Category: A, B and C  
Snow Load: 30# / sq. ft.

**Building Categories and Data**

Occupancy Classification: "U"  
Grade-To-Ridge Height: 21'-10"  
Floor Area: 816 sq. ft.  
Attic area: 408 + sq. ft.  
Gross Building Area: 1224 sq. ft.

CONVENTIONAL LIGHT WOOD FRAME CONSTRUCTION



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PLAN NO.

1224-1

DESIGN BY: JB

DATE: 08/18 UPDATED

SHEET CONTENTS:

Pictorial View Of Design

Project Data

Building Materials List

SHEET

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ALTERNATE FOUNDATION SHOWN IN THIS CORNER IS MONOLITHIC-POURED, THICKENED EDGE SLAB/FOOTING. VERIFY IF IT IS LOCALLY ACCEPTABLE. SEE DETAIL

LINES OF CONTINUOUS CONCRETE FOUNDATION BELOW - SEE DETAIL

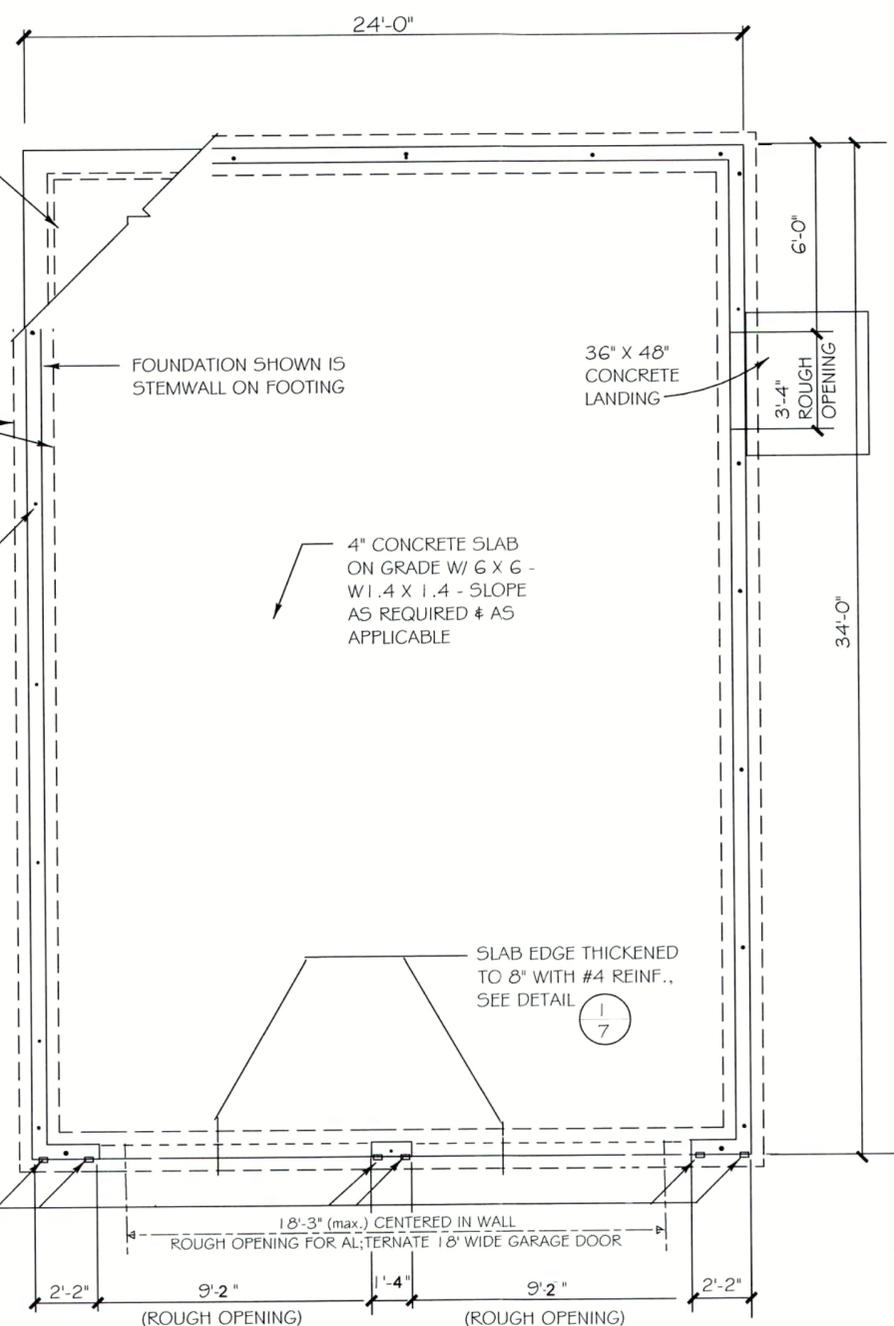
NOTE: PROVIDE 1/2" DIA. X 10" ANCHOR BOLTS W/ 7" EMBEDMENT @ MAX. 6 FT. O.C. SPACING AND MIN. 12" FROM WALL ENDS AND CORNERS

EMBEDDED HOLDDOWNS REQUIRED, SEE ALTERNATE BRACED WALL PANEL DETAIL & DOOR SEPARATOR DETAIL

1/2" DIA. X 10" ANCHOR BOLTS @ MAX. 6 FT. O.C. SPACING W/ 2" SQ. X 3/16" THK. 5TL. PL. WASHERS

NOTE: FOR SLAB AND FOOTING SEE "TYPICAL WALL SECTION @ EAVE" DETAIL

TOP COURSE BOND BEAM W/ (1) #5 CONT.  
8" C.M.U. FOUNDATION WALL W/ FILLED CELLS  
#5 VERTICAL @ 4'-0" O.C. MAX. SPACING  
6" HOOK  
BEARING SOIL

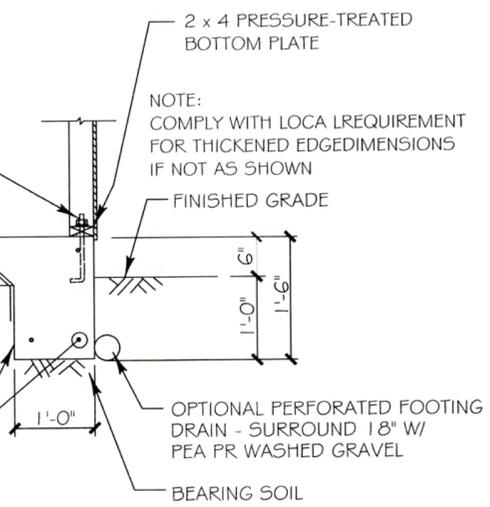


**FOUNDATION PLAN**  
SCALE: 1/4" = 1'-0"

1/2" DIA. X 10" ANCHOR BOLTS @ MAX. 6 FT. O.C. SPACING w/ 2" sq. x 3/16" thk. washers

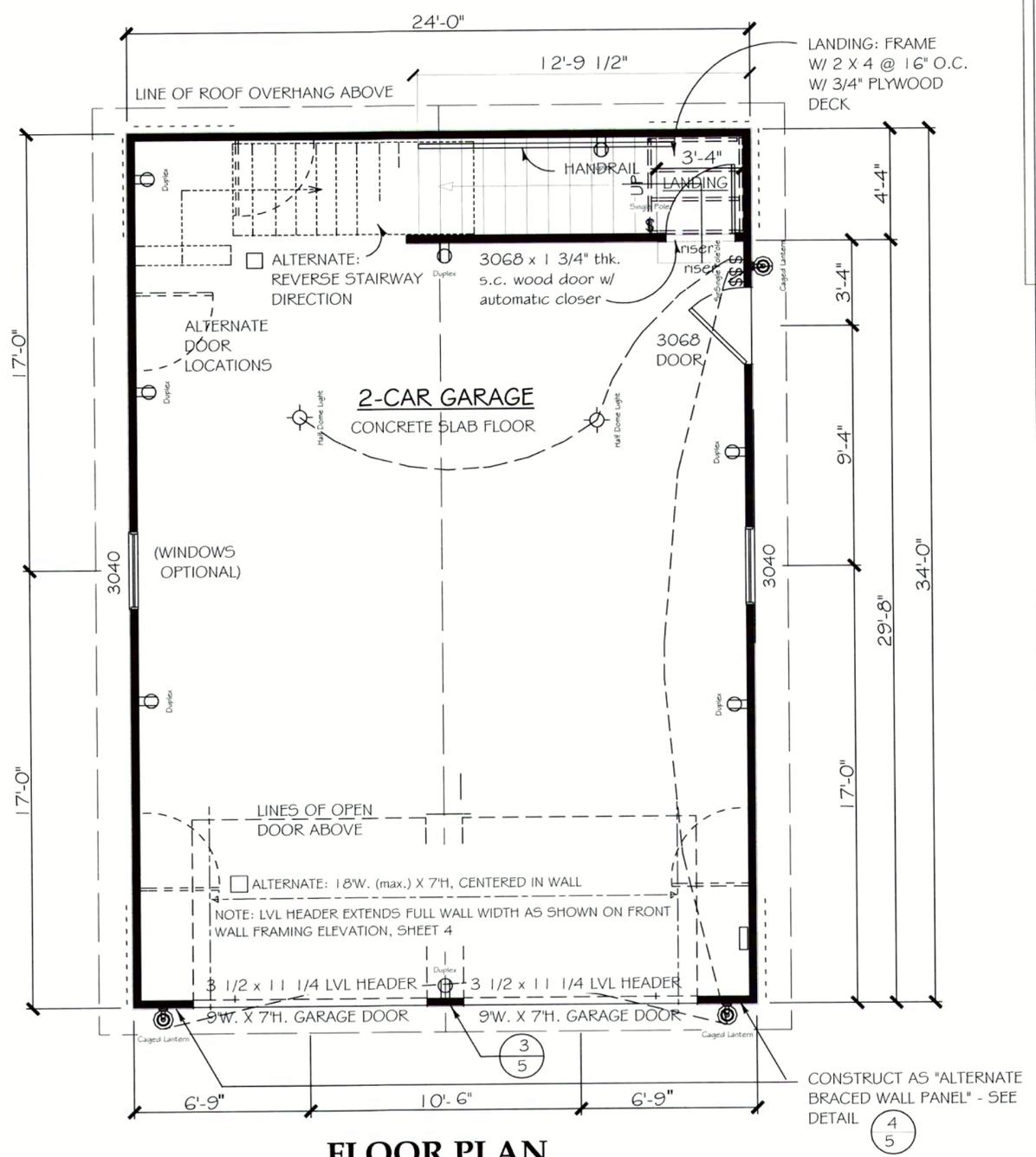
4" CONCRETE SLAB  
.006" POLYETHYLENE VAPOR BARRIER  
GRAVEL BASE AS REQ'D.

MONOLITHIC-POURED, THICKENED EDGE CONCRETE FOOTING W/ (3) #4 REINF. BARS, CONT.



**1 MONOLITHIC-POURED, THICKENED EDGE FOUNDATION DETAIL**

**2 CONCRETE BLOCK FOUNDATION WALL DETAIL**



**FLOOR PLAN**  
SCALE: 1/4" = 1'-0"

NOTE: FOUNDATION PLAN DIMENSIONS ARE TO FACE OF CONCRETE OR CENTERLINE OF BEARING, AS SHOWN  
NOTE: SEE EXTERIOR ELEVATIONS FOR SIZES AND FUNCTION  
NOTE: DOOR AND WINDOW HEADERS SHALL BE 2- 2 X 6 UNLESS OTHERWISE NOTED

BRACED WALLS AS PER IRC R602.10 AS APPLICABLE FOR LOCAL CODES "CONVENTIONAL LIGHT WOOD FRAME CONSTRUCTION" METHODS CS-WSP and PFH

EFFECTIVE BRACED WALLS PANELS - (SHOWN: - - - - -)  
NAIL SIDING PANELS OR SHEATHING W/ 8d @ 6" o.c., EDGES AND @ 12" O.C., FIELD TO WALL FRAMING (MIN. LENGTH 54" / 3 STUD SPACES)

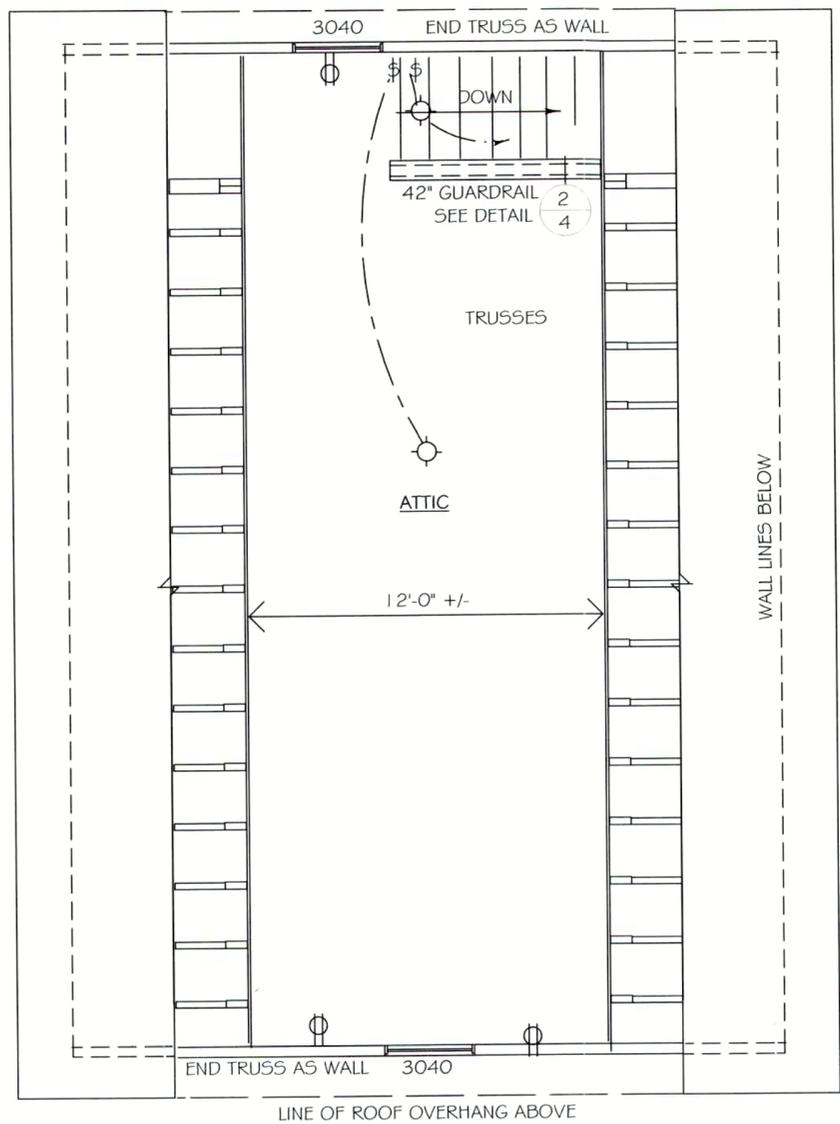
**LEGEND**

- ⊞ SWITCH LOCATION
- ⊙ CEILING MOUNTED LIGHT FIXTURE
- ⊕ 110 VOLT DUPLEX OUTLET
- ⊙ EXTERIOR WALL-MTD. LIGHT FIXTURE
- ⊞ ELECTRIC PANEL OR SUB-PANEL LOCATION, INSTALL PER LOCAL CODES

NOTE: FLOOR PLAN DIMENSIONS ARE TO FACE OF FRAMING OR CENTERLINE OF BEARING, TYP. AS SHOWN

LANDING: FRAME W/ 2 X 4 @ 16" O.C. W/ 3/4" PLYWOOD DECK

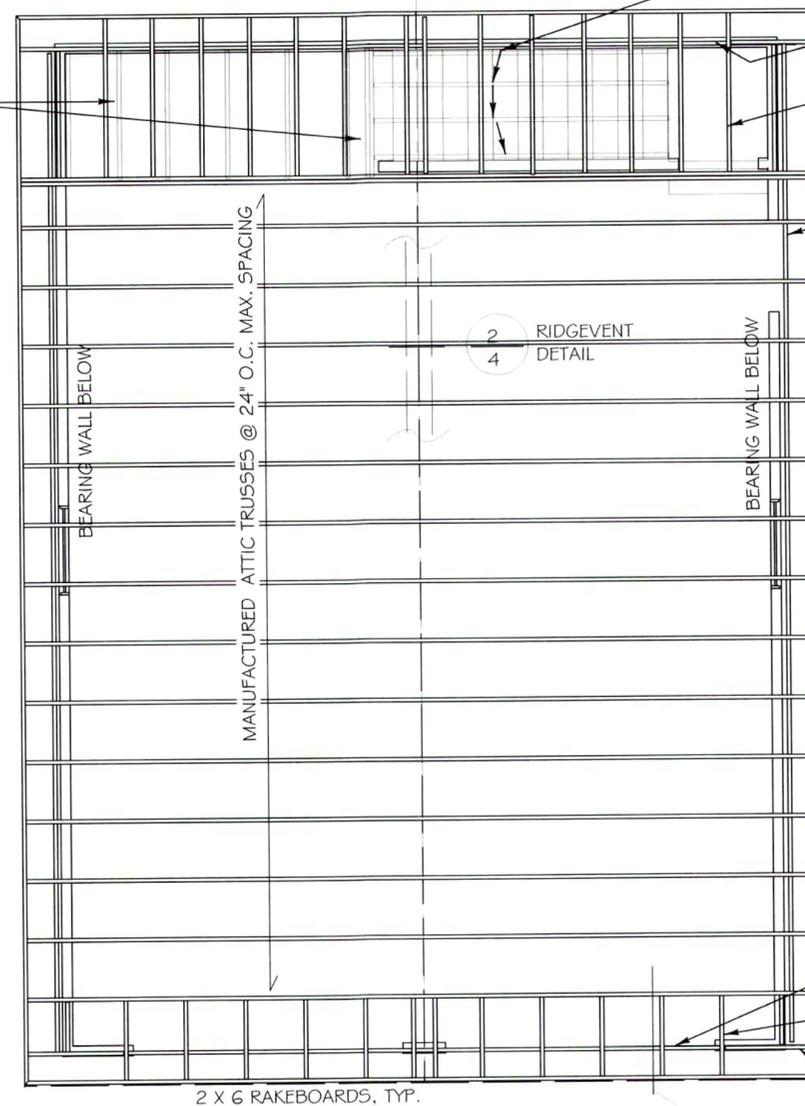
CONSTRUCT AS "ALTERNATE BRACED WALL PANEL" - SEE DETAIL 4/5



**ATTIC FLOOR PLAN**

SCALE: 1/4" = 1'-0"

TRUSS BOTTOM CHORD "LADDER" FRAMING AS REQUIRED, DOUBLE AT STRINGER SUPPORT



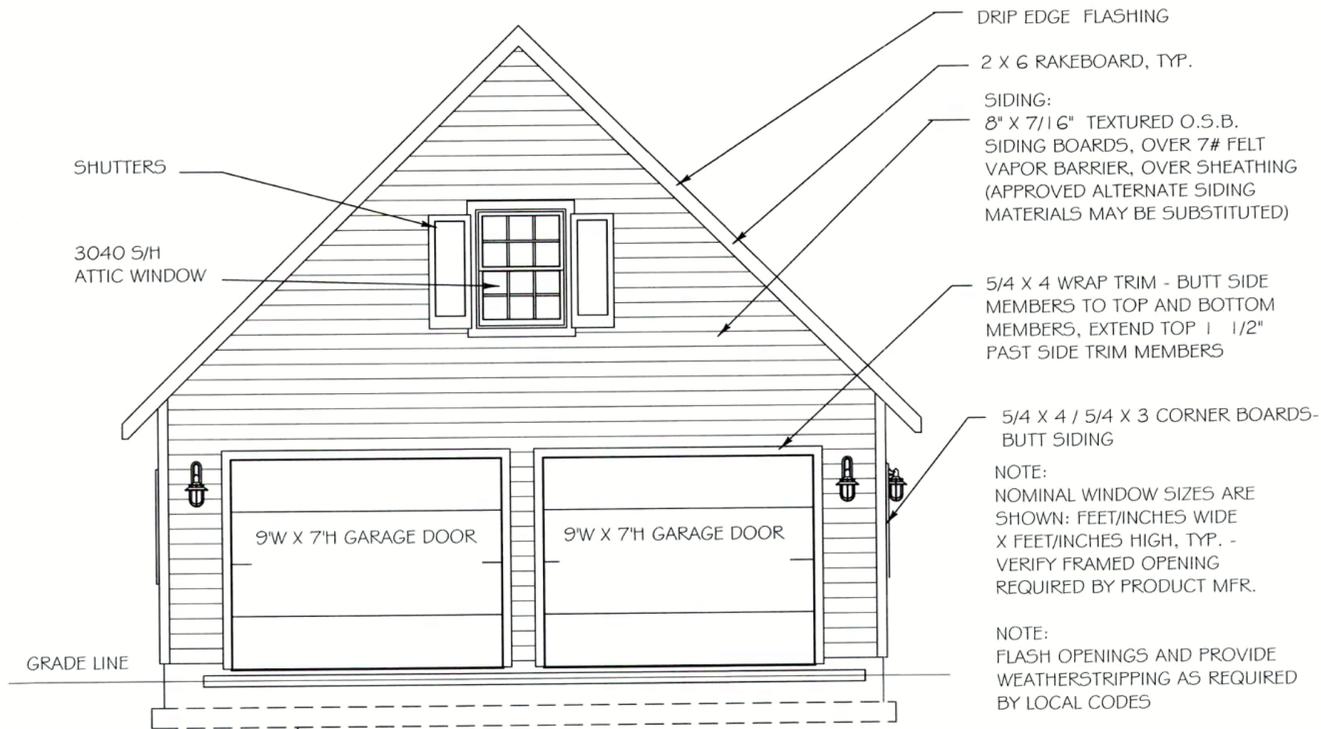
**ROOF FRAMING PLAN**

SCALE: 1/4" = 1'-0"

(4) 2 X 12 STRINGERS BELOW FOR STAIRWAY

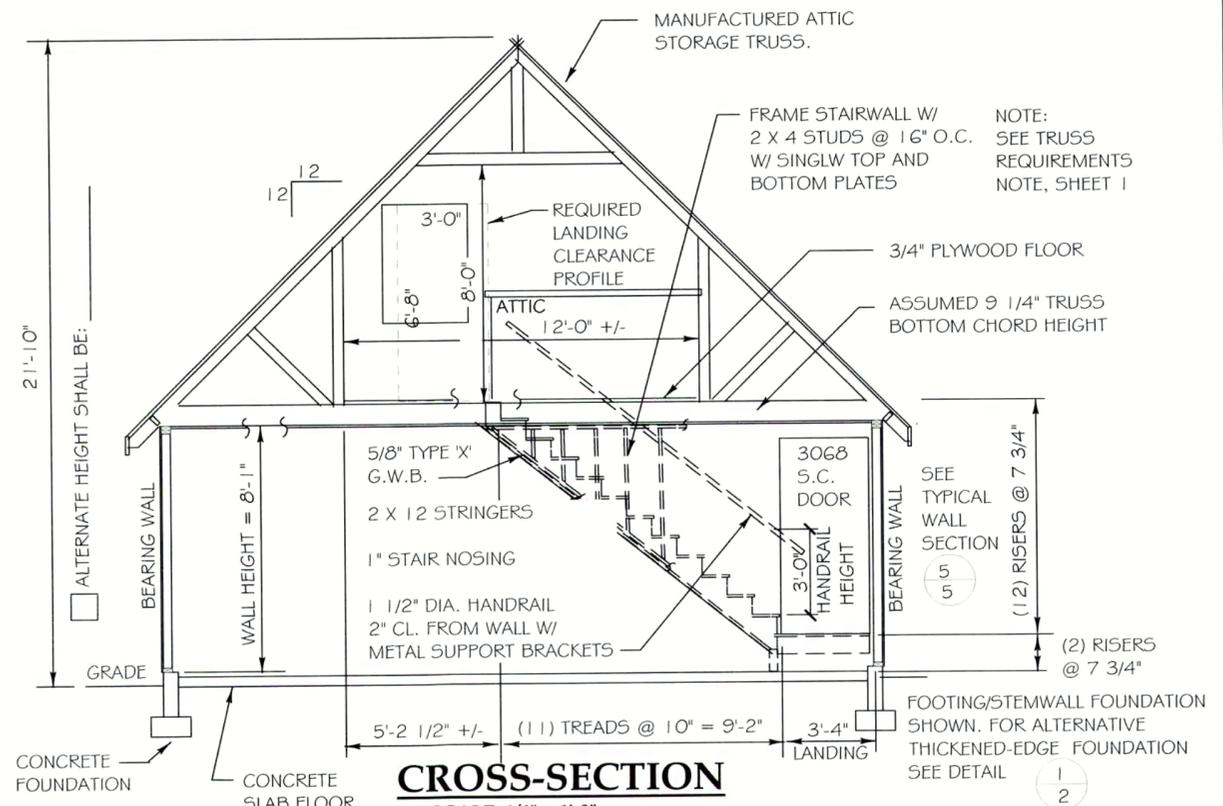
NOTE: ARROW LINE INDICATES EXTENT OF SPANNING MEMBERS, NOT THE DIRECTION OF SPAN

NOTE: ALL CONNECTORS SPECIFIED SHALL BE SIMPSON STRONG-TIE OR EQUAL



**FRONT ELEVATION**

SCALE: 1/4" = 1'-0"



**CROSS-SECTION**

SCALE: 1/4" = 1'-0"

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1224-1

PLAN NO.

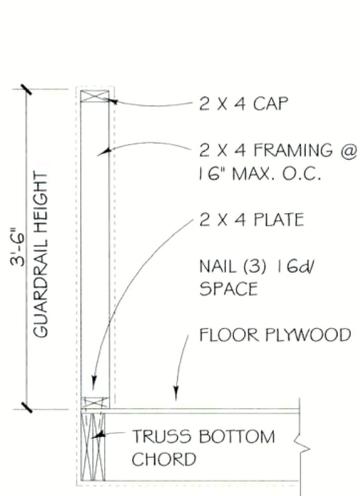
DESIGN BY: JB

DATE: 04/08

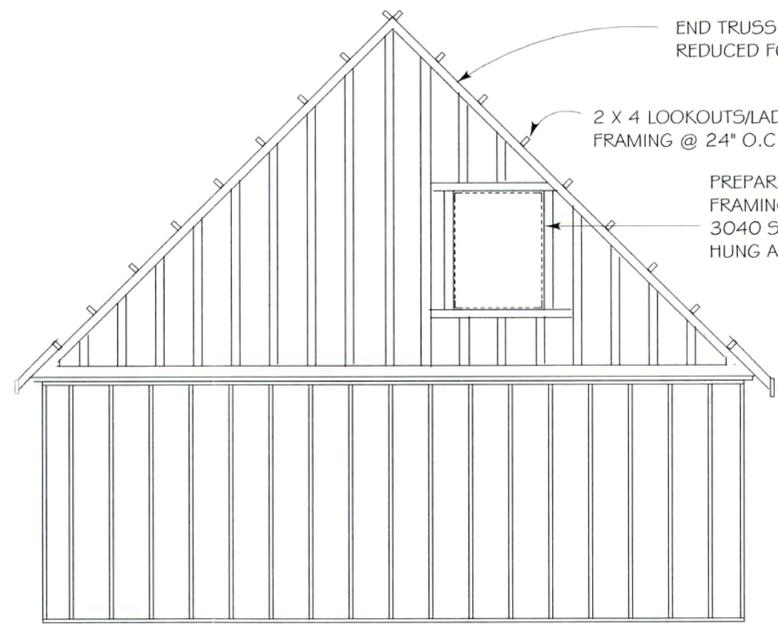
SHEET CONTENTS:  
ROOF FRAMING PLAN  
ATTIC FLOOR PLAN  
CROSS-SECTION  
FRONT ELEVATION

SHEET

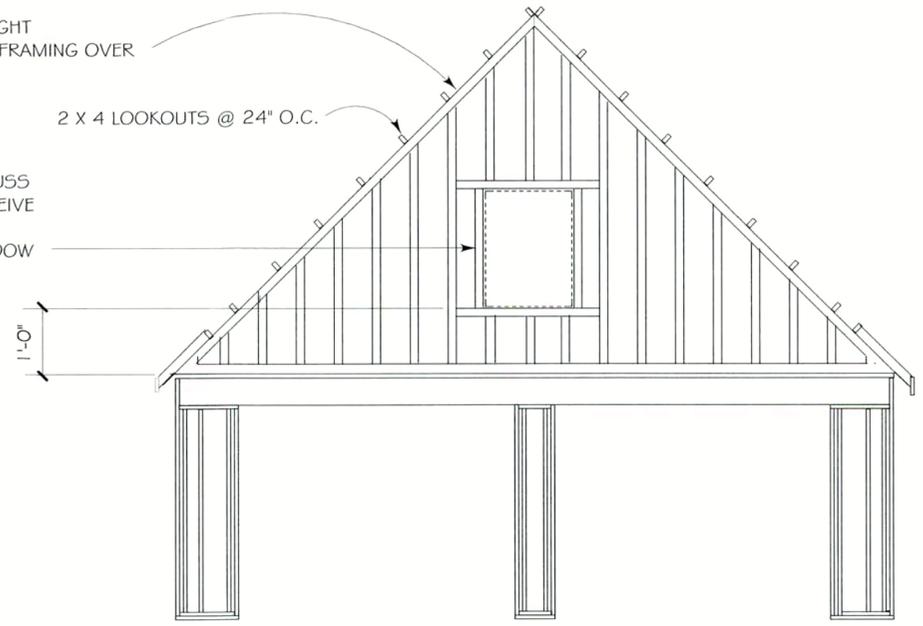
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**2 INTERIOR GUARDRAIL DETAIL**

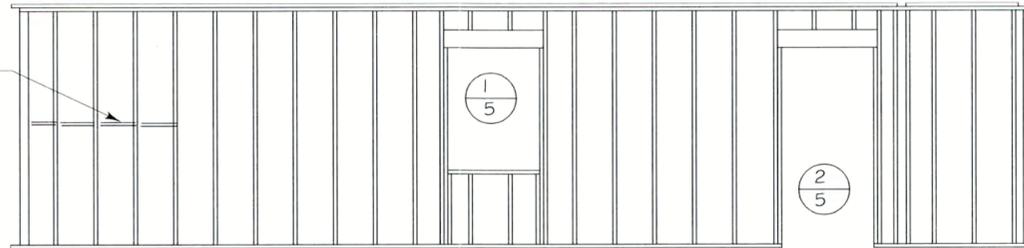


**REAR WALL FRAMING ELEVATION**

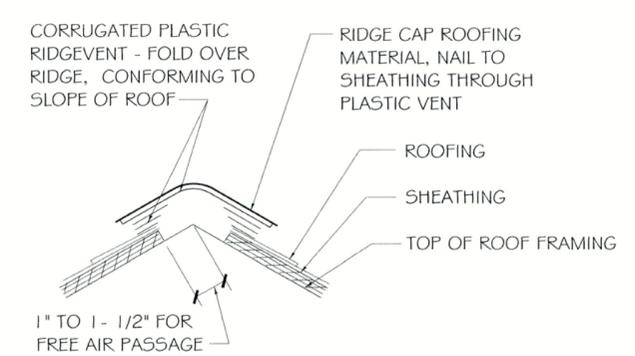


**FRONT WALL FRAMING ELEVATION**

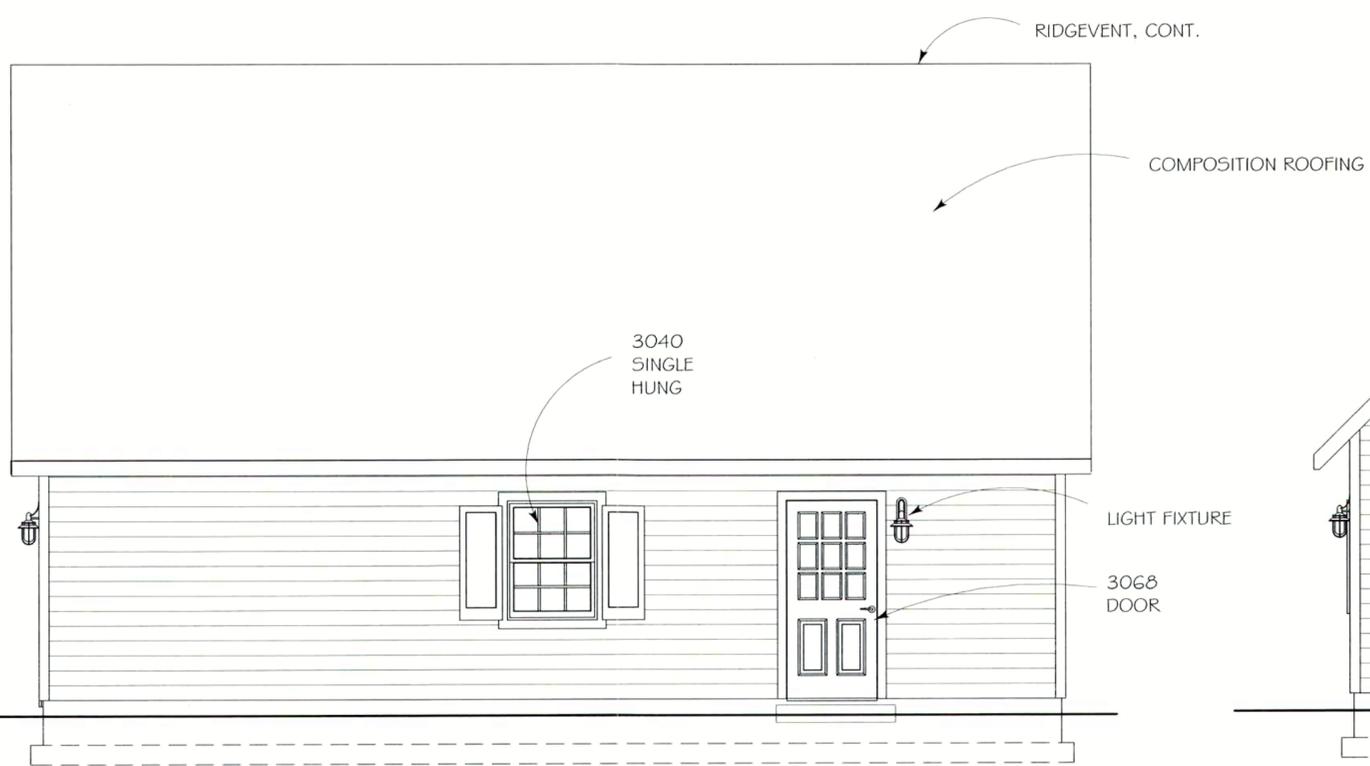
NOTE: WALL BLOCKING IS REQUIRED AT SHEATHING PANEL JOINTS BETWEEN STUDS - IN BRACED WALL AREAS ONLY, SEE FLOOR PLAN FOR LOCATIONS



**RIGHT SIDE WALL FRAMING ELEVATION**

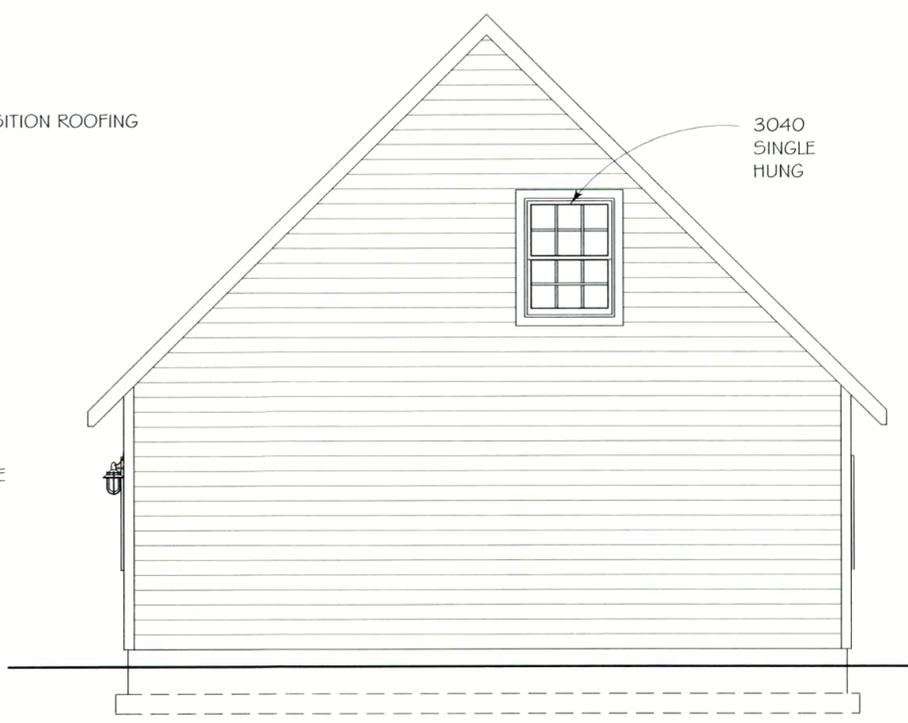


**1 RIDGE VENT DETAIL**



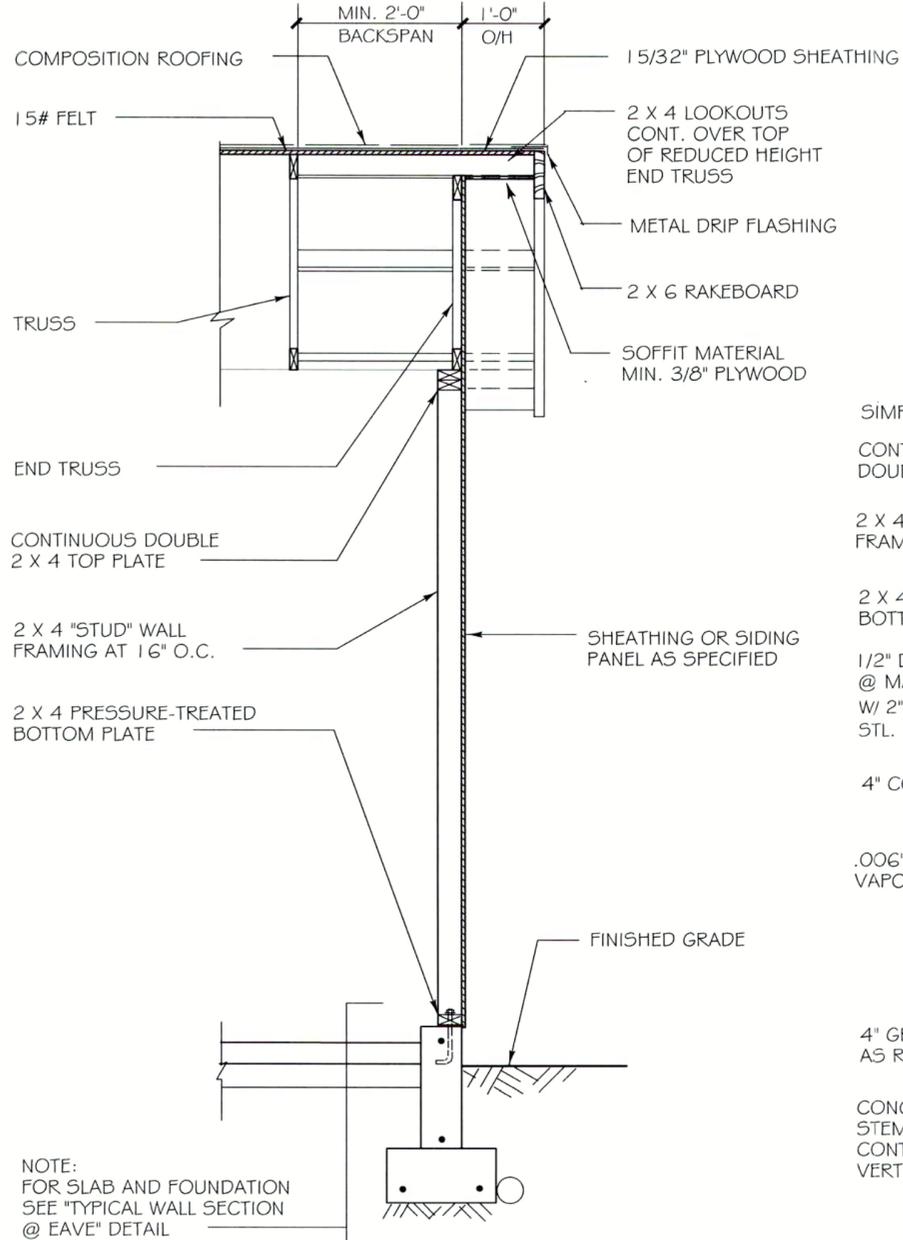
**RIGHT SIDE ELEVATION (LEFT SIMILAR)**

SCALE: 1/4" = 1'-0"

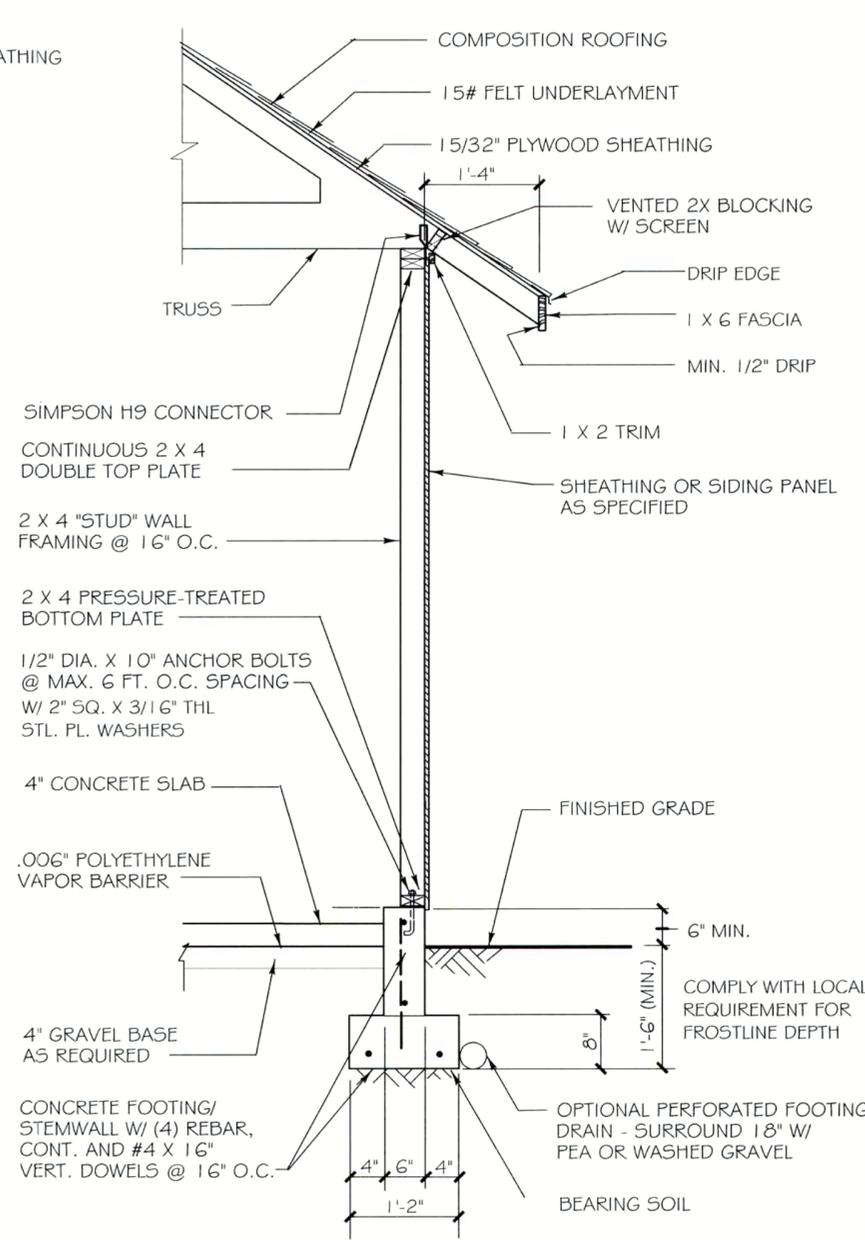


**REAR ELEVATION**

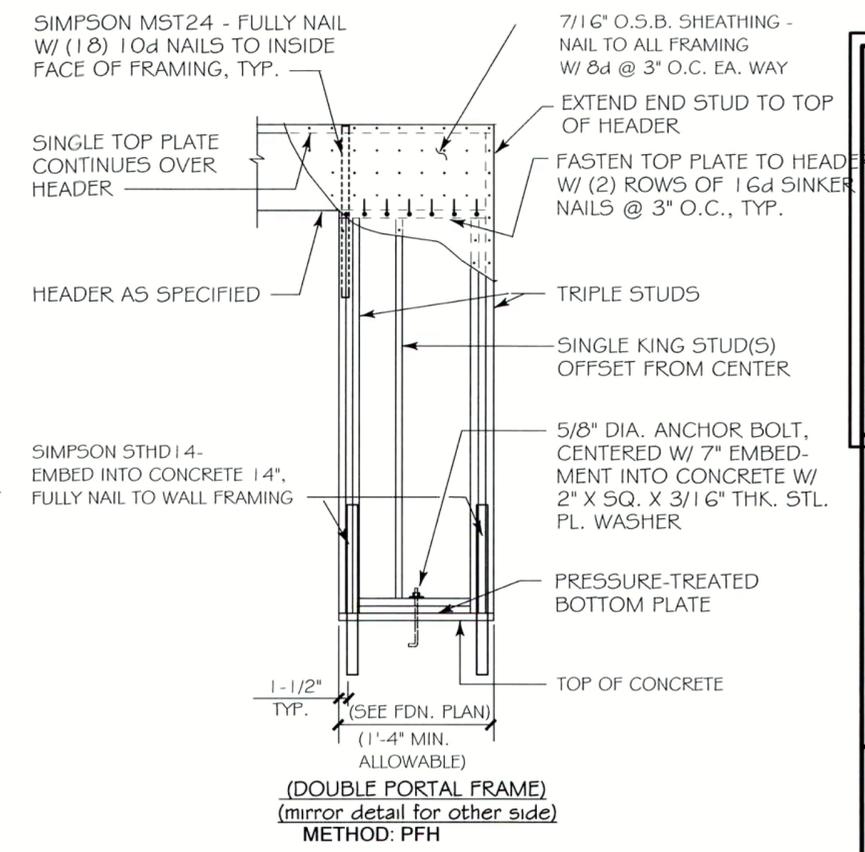
SCALE: 1/4" = 1'-0"



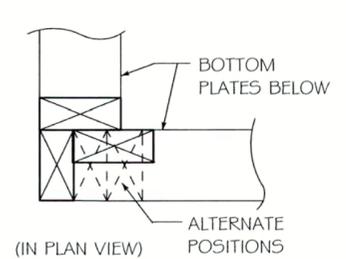
**6 TYPICAL WALL SECTION AT GABLE**



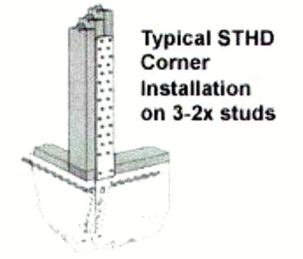
**5 TYPICAL WALL SECTION AT EAVE**



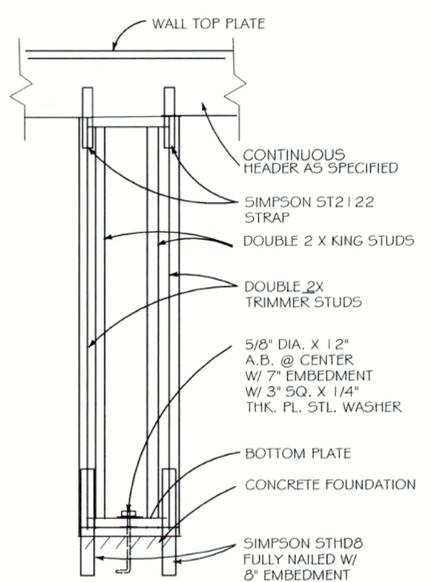
**4 ALTERNATE BRACED WALL PANEL DETAIL**



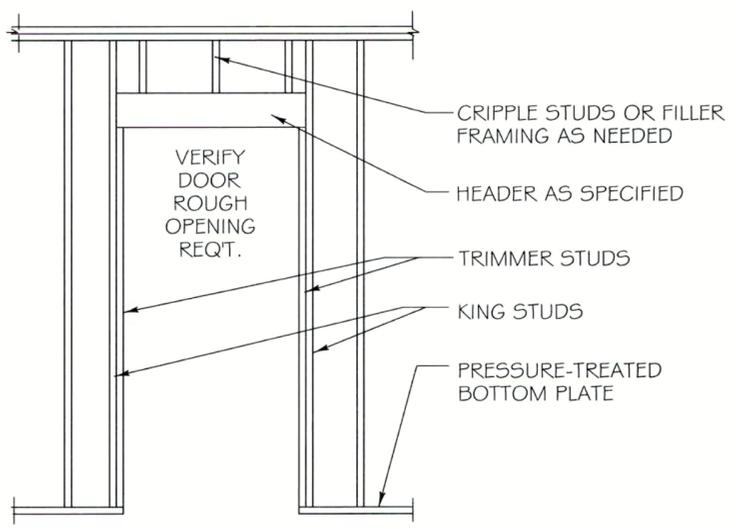
**STUDS @ CORNER**



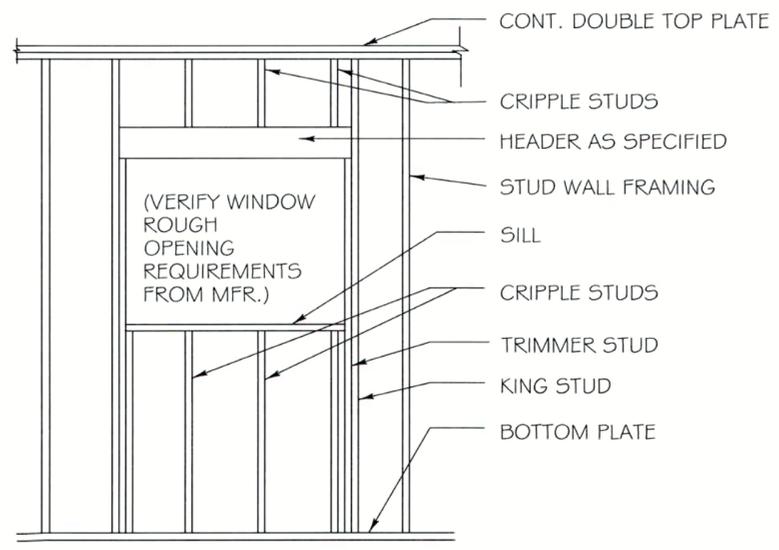
**STHD10 HOLDDOWNS**



**3 GARAGE DOOR SEPARATOR DETAIL**



**2 DOOR OPENING DETAIL**



**1 WINDOW OPENING DETAIL**

# STRUCTURAL/GENERAL NOTES & SPECIFICATIONS

## A. General

The following notes shall clarify and supplement the working drawings.

## B. Codes & Standards

International Residential Code (IRC)  
/ ACI-318; ACI SP-15 / M.B.M.A Manual  
(and comply with all local applicable codes as required by Building Official)

## C. Live Loads

Roof.....30 lbs/sf  
Floors.....40 lbs/sf  
Stairs & Exist ..... 100 lbs/sf  
Wind..... 115 MPH, EXP. B  
Seismic zone.....A, B, C  
Earth Pressure .....30lbs/cf equiv. Fluid pressure

## D. Soil & Foundation Data

- Soil bearing data not available. Assumed soil bearing capacity = 1500 lbs/sf.
- Extend all footings down to undisturbed soil of the specified strength with a minimum depth of 1'-6" below adjacent grade, or as required by local building official, based on local frost line depth.
- Center all footings on columns and walls unless specifically dimensioned otherwise.
- Compacted fill to be well graded and granular with not more than 5% passing a 200 sieve. Place in 8-inch loose lifts and compact to 95% modified AASHTO density at optimum moisture.

## E. Cast-In-Place Concrete and Reinforcing Steel

- Concrete of the following 28-day strength: 5 sack cement/cy (min. 2500 psi); max. 6 gal water/sack for all structural concrete, including foundations and slabs on grade. Maximum sized aggregate 3/4". Maximum slump 4". Add Master Builders Pozzolith per manufacturer's recommendations to all concrete except footings. Concrete for exterior walks to be air entrained (5% air).
- Reinforcing steel ASTM A-615 grade 40/60. Use grade 40 for temperature steel, stirrups and dowels. Detail, fabricate and place in accordance with the latest edition of A.C.I. "Manual Of Standard Practice".
- Concrete cover on reinforcing steel (clear dimensions):  
Suspended slabs.....3/4"  
Beams & columns (to ties).....1 1/2"  
Non-exposed vertical faces.....1"  
Vertical faces exposed to earth or weather.....2"  
Bottom of footings.....3"  
Slabs-on-grade (from top).....1 1/2"
- Lap all field splices 24 diameters with minimum of 12". Bend outer wall footing bars 12 inches or use corner bars at all corners and wall intersections.
- Provide min. one continuous #4 bar at top and bottom of foundation walls w/ #4 at 12" o.c. where wall height exceed two feet. Provide min. two continuous #4 bars in footings. Dowel foundation walls to footings w/ #4 x 1'-6" long @ 16" o.c. Embedded 6" into footing. (No shear keys required)
- Reinforce around wall and slab openings, with sides of 12" or greater, with two #5 bars extending 24" beyond corners on all four sides. Provide one extra #5 diagonal bar, 4'-0" long, at each corner.
- Slabs-on-grade: Roll sub grade and moisten before pour. Saw cut crack control joints within 24 hours of pour or install Zip-Strip, with maximum of 12'-0" for 4" non-reinforced slabs and 40'-0" for reinforced slabs. (min. reinforcing: w6 x 6 - w1.4 x 1.4, supported)
- Vibrate all concrete. Segregation of materials to be prevented. Test cylinders not required.
- Place no fill against foundation or basement walls until floors are in place or walls have been adequately shored to resist lateral earth pressures.

## F. Masonry (as applicable)

- Hollow masonry units: F'M=1350 (half & half c.m.u.)  
Mortar type S: 1 pc, 1/2 lime putty, 4 sand  
Grout: 2000 psi pea gravel concrete (7 sack)
- Reinforcing steel: ASTM A-615, grade 40.
- Place grout in lifts no greater than 4'-0" height.
- Wall reinforcing:  
.....6" walls: #4 vertical @ 48" o.c. w/ #9 wire horiz. Joint reinf. @ 8" o.c.  
.....8" walls: #5 vertical @ 48" o.c. w/ 3/16" dia. wire horiz. Joint reinf. @ 8" o.c.  
Install two bars in corners, wall intersections, wall endings and around openings. Lap all bars 20 inches and joint reinforcing, 12 inches. Use corner bars for outer bars in bond beams and at intersecting walls.
- Anchor brick veneer to wood framed wall as detailed with 22 ga. X 7/8" x 7" galvanized corrugated wall ties @ 16" o.c. ea. Way with one Simpson n20a nail.

## G. Timber and Wood Framing

- Substitution of wood species identified herein may be as approved by local Building Official and material strength and capacities shall equal or exceed that of the species identified herein.
- All lumber to be graded per book 16 of the West Coast Lumber Inspection Bureau:  
HF/DF no. 2 for joists, rafters, light framing, plates and bracing  
DF no. 1 for posts and beams  
HF/DF "stud" for stud wall framing
- Joists and rafters (lumber) shall have 2" nominal thick solid blocking at supports.
- Comply with the latest edition of the NFPA "National Design Specification" as modified by the applicable code for all structural timber requirements.
- Spike laminated members together w/ 10d nails @ 12" o.c., staggered. Splice laminations at supports only.
- Provide cut washers for all bolts bearing on wood.
- All nails shall be common wire nails.
- Glue-laminated timbers, Douglas Fir, A.I.T.C. grading: combination 24F-V3 for simple spans; 24F-V8 for cantilevered spans. Dry conditions of use. Architectural appearance grade where exposed to view. Fabrication plant A.I.T.C. inspected./ Wrap individual members.
- Plywood: Roof sheathing to be 15/32" C-D int-apa plywood with exterior glue, P.I. 24/0 (use 5-ply for panelized roofs) Nailing 8d @ 6" o.c. at panel edges and 8d @ 12" o.c. at intermediate supports. Sub-flooring to be 3/4" C-D-apa plywood with exterior glue, P.I. 32/16. Use T&G if no underlayment. Glue and nail with 10d @ 6" o.c. at panel edges and @ 10' at intermediate supports.
- Pre-fabricated trussed members to be designed by applicable state licensed engineer in accordance with requirements shown in the drawings. Contractor shall verify as-framed dimensions and conditions prior to truss fabrication and coordinate as required. All engineering data shall be made available for submittal to the Building Official as required.

## H. Structural Steel

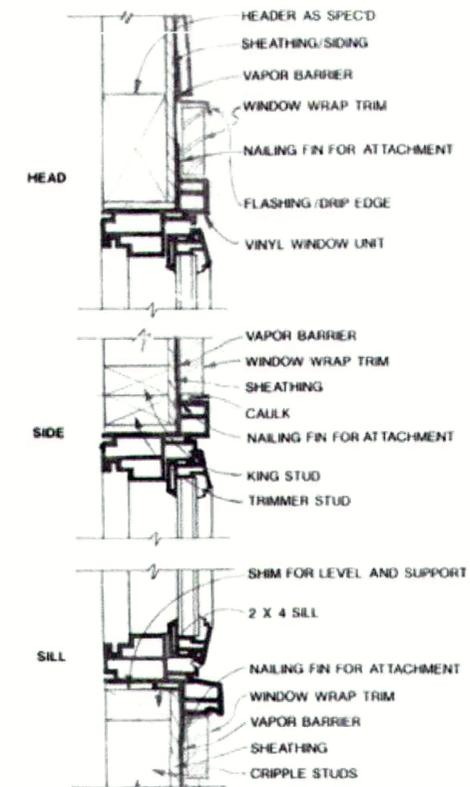
- All steel, except tubing: ASTM A-36. Pipe: ASTM A-53, Type E or S, grade B. Tubular section: ASTM A500, grade B. All bolts: ASTM A-307.
- All fabrication, erection and detailing shall be in accordance with the latest edition of the "Manual Of Steel Construction" of the American Institute Of Steel Construction.
- All welding by WABO certified welders in accordance with the "Welding Handbook" by the American Welding Society.
- All welds 3/16" min. continuous fillet welds using ASWA5, E70XX electrodes.
- Provide washers on all bolted connections.
- All steel not embedded in concrete or masonry shall receive one shop coat of an approved primer paint. Apply two coats of heavy asphaltic paint to all steel exposed to earth.
- Furnish complete shop drawings prior to fabrication.

## I. Miscellaneous

- Contractor shall verify all site conditions and dimensions in field.
- Provide temporary bracing as required until all permanent connections and stiffening have been installed.
- Verify size and locations of all openings in floor, roof and walls and coordinate with electrical and mechanical work.
- Pre-fabricated items shall be handled and installed in accordance with manufacturers' recommendations. Pre-fabricated

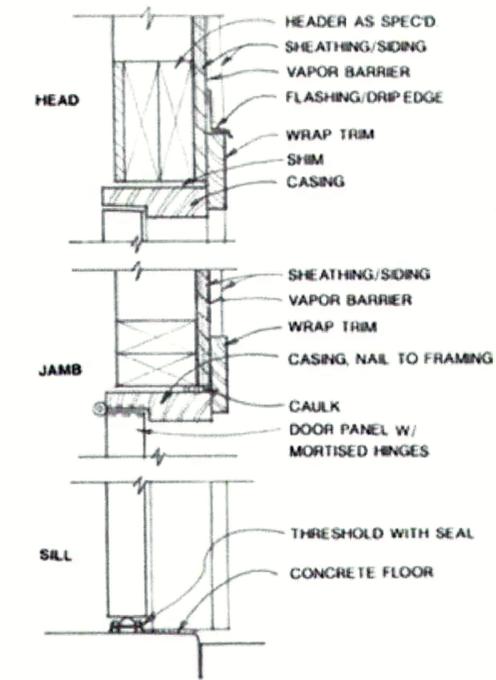
assemblies shall be coordinated with any as-built conditions by the contractor regarding dimensions, clearance and applicable building code requirements.

- All HVAC equipment shall be determined by owner and/or contractor specific to this project and comply with all applicable codes. Performance data and distribution layout shall be provided by mechanical subcontractor. Submittals shall be coordinated by the contractor as required by the Building Official.
- It is the intent of these drawings and specifications to comply with the requirements of the applicable Building Code and all other relevant codes and ordinances. Any discrepancies, omissions or errors shall be brought to the attention of the designer for clarification or correction before beginning the work. It is the responsibility of the general contractor to seek clarification or correction if needed.



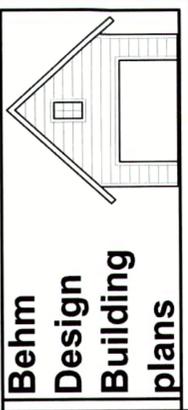
## 1 WINDOW DETAILS

(NOT TO SCALE)



## 2 DOOR DETAILS

(NOT TO SCALE)



QUESTIONS?...CALL  
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PLAN NO.  
**1224-1**

DESIGN BY: JUB  
DATE:

SHEET CONTENTS:  
STRUCTURAL/GENERAL NOTES  
WINDOW DETAILS  
DOOR DETAILS

SHEET  
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OF 7

# - FASTENING REQUIREMENTS -

**TABLE R602.3(3)**  
REQUIREMENTS FOR WOOD STRUCTURAL PANEL WALL SHEATHING USED TO RESIST WIND PRESSURES<sup>a,b</sup>

MINIMUM NAIL	MINIMUM WOOD STRUCTURAL PANEL SPAN RATING	MINIMUM NOMINAL PANEL THICKNESS (inches)	MAXIMUM WALL STUD SPACING (inches)	PANEL NAIL SPACING		MAXIMUM WIND SPEED (mph)			
				Edges (inches o.c.)	Field (inches o.c.)	Wind exposure category			
Size	Penetration (inches)					B	C	D	
6d Common (2.0" x 0.113")	1.5	24/0	3/8	16	6	12	110	90	85
8d Common (2.5" x 0.131")	1.75	24/16	7/16	16	6	12	130	110	105
				24	6	12	110	90	85

For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.  
 a. Panel strength axis parallel or perpendicular to supports. Three-ply plywood sheathing with studs spaced more than 16 inches on center shall be applied with panel strength axis perpendicular to supports.  
 b. Table is based on wind pressures acting toward and away from building surfaces per Section R301.2. Lateral bracing requirements shall be in accordance with Section R602.10.  
 c. Wood Structural Panels with span ratings of Wall-16 or Wall-24 shall be permitted as an alternate to panels with a 24/0 span rating. Plywood siding rated 16 oc or 24 oc shall be permitted as an alternate to panels with a 24/16 span rating. Wall-16 and Plywood siding 16 oc shall be used with studs spaced a maximum of 16 inches on center.

**TABLE R602.3(4)**  
ALLOWABLE SPANS FOR PARTICLEBOARD WALL SHEATHING<sup>a</sup>

THICKNESS (inch)	GRADE	STUD SPACING (inches)	
		When siding is nailed to studs	When siding is nailed to sheathing
3/8	M-1 Exterior glue	16	—
1/2	M-2 Exterior glue	16	16

For SI: 1 inch = 25.4 mm.  
 a. Wall sheathing not exposed to the weather. If the panels are applied horizontally, the end joints of the panel shall be offset so that four panels corners will not meet. All panel edges must be supported. Leave a 1/8-inch gap between panels and nail no closer than 1/2 inch from panel edges.

**TABLE R602.3(1)**  
FASTENER SCHEDULE FOR STRUCTURAL MEMBERS

ITEM	DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER <sup>a,b,c</sup>	SPACING OF FASTENERS	
			Edges (inches)	Intermediate supports <sup>d,e</sup> (inches)
<b>Roof</b>				
1	Blocking between joists or rafters to top plate, toe nail	3-8d (2 1/2" x 0.113")	—	—
2	Ceiling joists to plate, toe nail	3-8d (2 1/2" x 0.113")	—	—
3	Ceiling joists not attached to parallel rafter, laps over partitions, face nail	3-10d	—	—
4	Collar tie rafter, face nail or 1 1/4" x 20 gage ridge strap	3-10d (3" x 0.128")	—	—
5	Rafter to plate, toe nail	2-16d (3 1/2" x 0.135")	—	—
6	Roof rafters to ridge, valley or hip rafters: toe nail face nail	4-16d (3 1/2" x 0.135") 3-16d (3 1/2" x 0.135")	—	—
<b>Wall</b>				
7	Built-up corner studs	10d (3" x 0.128")	24" o.c.	—
8	Built-up header, two pieces with 1/2" spacer	16d (3 1/2" x 0.135")	16" o.c. along each edge	—
9	Continued header, two pieces	16d (3 1/2" x 0.135")	16" o.c. along each edge	—
10	Continuous header to stud, toe nail	4-8d (2 1/2" x 0.113")	—	—
11	Double studs, face nail	10d (3" x 0.128")	24" o.c.	—
12	Double top plates, face nail	10d (3" x 0.128")	24" o.c.	—
13	Double top plates, minimum 48-inch offset of end joints, face nail in lapped area	8-16d (3 1/2" x 0.135")	—	—
14	Sole plate to joist or blocking, face nail	16d (3 1/2" x 0.135")	16" o.c.	—
15	Sole plate to joist or blocking at braced wall panels	3-16d (3 1/2" x 0.135")	16" o.c.	—
16	Stud to sole plate, toe nail	3-8d (2 1/2" x 0.113") or 2-16d (3 1/2" x 0.135")	—	—
17	Top or sole plate to stud, end nail	2-16d (3 1/2" x 0.135")	—	—
18	Top plates, laps at corners and intersections, face nail	2-10d (3" x 0.128")	—	—
19	1" brace to each stud and plate, face nail	2-8d (2 1/2" x 0.113") 2 staples 1 1/4"	—	—
20	1" x 6" sheathing to each bearing, face nail	2-8d (2 1/2" x 0.113") 2 staples 1 1/4"	—	—
21	1" x 8" sheathing to each bearing, face nail	2-8d (2 1/2" x 0.113") 3 staples 1 1/4"	—	—
22	Wider than 1" x 8" sheathing to each bearing, face nail	3-8d (2 1/2" x 0.113") 4 staples 1 1/4"	—	—
<b>Floor</b>				
23	Joist to sill or girder, toe nail	3-8d (2 1/2" x 0.113")	—	—
24	1" x 6" subfloor or less to each joist, face nail	2-8d (2 1/2" x 0.113") 2 staples 1 1/4"	—	—
25	2" subfloor to joist or girder, blind and face nail	2-16d (3 1/2" x 0.135")	—	—
26	Rim joist to top plate, toe nail (roof applications also)	8d (2 1/2" x 0.113")	6" o.c.	—
27	2" planks (plank & beam - floor & roof)	2-16d (3 1/2" x 0.135")	at each bearing	—
28	Built-up girders and beams, 2-inch lumber layers	10d (3" x 0.128")	Nail each layer as follows: 32" o.c. at top and bottom and staggered. Two nails at ends and at each splice.	—
29	Ledger strip supporting joists or rafters	3-16d (3 1/2" x 0.135")	At each joist or rafter	—

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s; 1 ksi = 6.895 MPa.  
 a. All nails are smooth-common, box or deformed shanks except where otherwise stated. Nails used for framing and sheathing connections shall have minimum average bending yield strengths as shown: 80 ksi for shank diameter of 0.192 inch (20d common nail), 90 ksi for shank diameters larger than 0.142 inch but not larger than 0.177 inch, and 100 ksi for shank diameters of 0.142 inch or less.  
 b. Staples are 16 gage wire and have a minimum 1/16-inch on diameter crown width.  
 c. Nails shall be spaced at not more than 6 inches on center at all supports where spans are 48 inches or greater.  
 d. Four-foot-by-8-foot or 4-foot-by-9-foot panels shall be applied vertically.  
 e. Spacing of fasteners not included in this table shall be based on Table R602.3(2).  
 f. For regions having basic wind speed of 110 mph or greater, 8d deformed (2 1/2" x 0.120") nails shall be used for attaching plywood and wood structural panel roof sheathing to framing within minimum 48-inch distance from gable end walls, if mean roof height is more than 25 feet, up to 35 feet maximum.  
 g. For regions having basic wind speed of 100 mph or less, nails for attaching wood structural panel roof sheathing to gable end wall framing shall be spaced 6 inches on center. When basic wind speed is greater than 100 mph, nails for attaching panel roof sheathing to intermediate supports shall be spaced 6 inches on center for minimum 48-inch distance from ridges, eaves and gable end walls; and 4 inches on center to gable end wall framing.  
 h. Gypsum sheathing shall conform to ASTM C 1396 and shall be installed in accordance with GA 253. Fiberboard sheathing shall conform to ASTM C 208.  
 i. Spacing of fasteners on floor sheathing panel edges applies to panel edges supported by framing members and required blocking and at all floor perimeters only. Spacing of fasteners on roof sheathing panel edges applies to panel edges supported by framing members and required blocking. Blocking of roof or floor sheathing panel edges perpendicular to the framing members need not be provided except as required by other provisions of this code. Floor perimeter shall be supported by framing members or solid blocking.

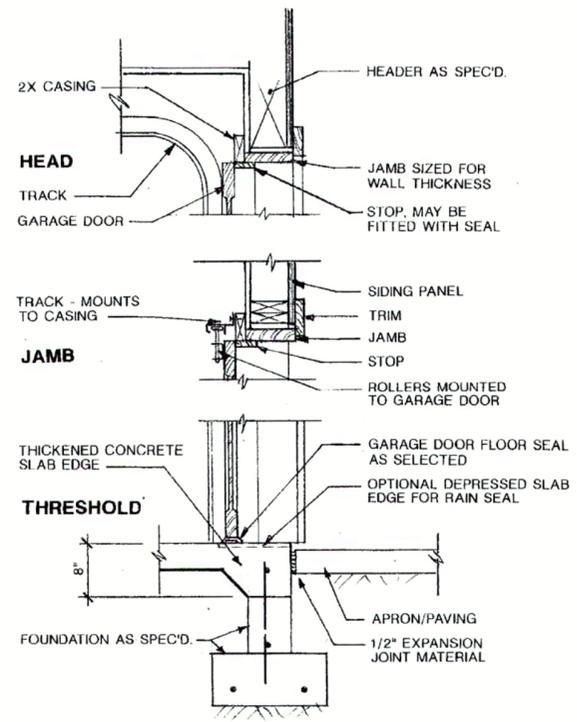
**TABLE R602.3(2)**  
ALTERNATE ATTACHMENTS

NOMINAL MATERIAL THICKNESS (inches)	DESCRIPTION <sup>a,b</sup> OF FASTENER AND LENGTH (inches)	SPACING <sup>c</sup> OF FASTENERS (inches)	
		Edges (inches)	Intermediate supports (inches)
<b>Wood structural panels subfloor, roof and wall sheathing to framing and particleboard wall sheathing to framing<sup>f</sup></b>			
up to 1/2	Staple 15 ga. 1 1/4"	4	8
	0.097 - 0.099 Nail 2 1/4"	3	6
	Staple 16 ga. 1 1/4"	3	6
	0.113 Nail 2"	3	6
19/32 and 3/8	Staple 15 and 16 ga. 2"	4	8
	0.097 - 0.099 Nail 2 1/4"	4	8
23/32 and 1/4	Staple 14 ga. 2"	4	8
	Staple 15 ga. 1 1/2"	3	6
1	0.097 - 0.099 Nail 2 1/4"	4	8
	Staple 16 ga. 2"	4	8
	Staple 14 ga. 2 1/4"	4	8
	0.113 Nail 2 1/4"	3	6
0.200	Staple 15 ga. 2 1/4"	4	8
	0.097 - 0.099 Nail 2 1/2"	4	8
<b>SPACING<sup>c</sup> OF FASTENERS</b>			
<b>Floor underlayment; plywood-hardboard-particleboard<sup>d</sup></b>			
<b>Plywood</b>			
1/4 and 5/16	1 1/4 ring or screw shank nail—minimum 12 1/2 ga. (0.099") shank diameter	3	6
	Staple 18 ga., 7/8, 3/16 crown width	2	5
11/32, 3/8, 15/32, and 1/2	1 1/4 ring or screw shank nail—minimum 12 1/2 ga. (0.099") shank diameter	6	8 <sup>e</sup>
	1 1/2 ring or screw shank nail—minimum 12 1/2 ga. (0.099") shank diameter	6	8
19/32, 7/8, 23/32 and 3/4	Staple 16 ga. 1 1/2"	6	8
	<b>Hardboard<sup>d</sup></b>		
0.200	1 1/2 long ring-grooved underlayment nail	6	6
	4d cement-coated sinker nail	6	6
1/4	Staple 18 ga., 7/8 long (plastic coated)	3	6
	<b>Particleboard</b>		
1/4	4d ring-grooved underlayment nail	3	6
	Staple 18 ga., 7/8 long, 3/16 crown	3	6
3/8	6d ring-grooved underlayment nail	6	10
	Staple 16 ga., 1 1/4 long, 3/8 crown	3	6
1/2, 3/4	6d ring-grooved underlayment nail	6	10
	Staple 16 ga., 1 1/4 long, 7/8 crown	3	6

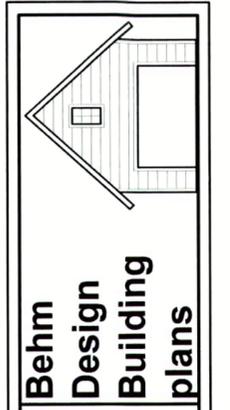
For SI: 1 inch = 25.4 mm.  
 a. Nail is a general description and may be T-head, modified round head or round head.  
 b. Staples shall have a minimum crown width of 1/16 inch on diameter except as noted.  
 c. Nails or staples shall be spaced at not more than 6 inches on center at all supports where spans are 48 inches or greater. Nails or staples shall be spaced at not more than 12 inches on center at intermediate supports for floors.  
 d. Fasteners shall be placed in a grid pattern throughout the body of the panel.  
 e. For 5-ply panels, intermediate nails shall be spaced not more than 12 inches on center each way.  
 f. Hardboard underlayment shall conform to ANSI/AHA A135.4.

ITEM	DESCRIPTION OF BUILDING MATERIALS	DESCRIPTION OF FASTENER <sup>a,b,c</sup>	SPACING OF FASTENERS	
			Edges (inches)	Intermediate supports <sup>d,e</sup> (inches)
<b>Wood structural panels, subfloor, roof and interior wall sheathing to framing and particleboard wall sheathing to framing</b>				
30	3/8" - 1/2"	6d common (2" x 0.113") nail (subfloor wall) <sup>f</sup> 8d common (2 1/2" x 0.131") nail (roof)	6	12 <sup>g</sup>
31	5/16" - 1/2"	6d common (2" x 0.113") nail (subfloor, wall) <sup>f</sup> 8d common (2 1/2" x 0.131") nail (roof) <sup>f</sup>	6	12 <sup>g</sup>
32	19/32" - 1"	8d common nail (2 1/2" x 0.131")	6	12 <sup>g</sup>
33	1 1/8" - 1 1/4"	10d common (3" x 0.148") nail or 8d (2 1/2" x 0.131") deformed nail	6	12
<b>Other wall sheathing<sup>h</sup></b>				
34	1/2" structural cellulose fiberboard sheathing	1 1/2" galvanized roofing nail, 7/16" crown or 1" crown staple 16 ga., 1 1/4" long	3	6
35	23/32" structural cellulose fiberboard sheathing	1 3/4" galvanized roofing nail, 7/16" crown or 1" crown staple 16 ga., 1 1/4" long	3	6
36	1/2" gypsum sheathing <sup>i</sup>	1 1/2" galvanized roofing nail; staple galvanized, 1 1/2" long; 1 1/4" screws, Type W or S	7	7
37	3/8" gypsum sheathing <sup>i</sup>	1 3/4" galvanized roofing nail; staple galvanized, 1 3/4" long; 1 1/4" screws, Type W or S	7	7
<b>Wood structural panels, combination subfloor underlayment to framing</b>				
38	3/4" and less	6d deformed (2" x 0.120") nail or 8d common (2 1/2" x 0.131") nail	6	12
39	7/8" - 1"	8d common (2 1/2" x 0.131") nail or 8d deformed (2 1/2" x 0.120") nail	6	12
40	1 1/8" - 1 1/4"	10d common (3" x 0.148") nail or 8d deformed (2 1/2" x 0.120") nail	6	12

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## 1 GARAGE DOOR DETAILS



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SHEET CONTENTS:  
 CODE REQUIREMENTS FOR FASTENINGS AND SHEATHING  
 GARAGE DOOR DETAILS

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