



FSC®-CERTIFIED PRODUCTS AVAILABLE

Refer to the *Construction Guide for Nordic Lam™* for additional information.
APA PRODUCT REPORT PR-L294

www.nordicwp.com





PRODUCT WARRANTY

Chantiers Chibougamau guarantees that, in accordance with our specifications, Nordic products are free from manufacturing defects in material and workmanship.

Furthermore, Chantiers Chibougamau warrants that our products, when utilized in accordance with our handling and installation instructions, will meet or exceed our specifications for the lifetime of the structure.

MULTIPLE MEMBER CONNECTIONS - BEAMS

TOP-LOADED BEAMS

- 1-3/4" Width Pieces:**
- Minimum of 2 rows 16d common wire nails (0.162 x 3-1/2 inches) at 12" o.c. for beam depths less than 14"
 - Minimum of 3 rows 16d common wire nails (0.162 x 3-1/2 inches) at 12" o.c. for 14" to 18" beam depths
 - Nailed connections require an additional row of nails when nail size is smaller than specified above (minimum 0.128 x 3")
 - 4-ply beams shall be attached with minimum of 2 rows 1/2-inch-diameter bolts or 1/4 x 6-inch wood screws at 24" o.c.

- 3-1/2" Width Pieces:**
- Minimum of 2 rows 1/2-inch-diameter bolts or 1/4 x 6-inch wood screws at 24" o.c. staggered

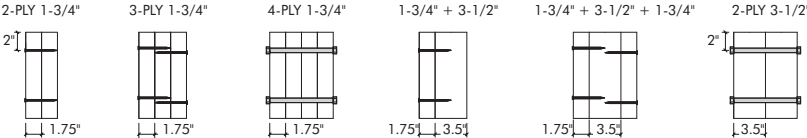
SIDE-LOADED BEAMS

Maximum allowable uniform load (plf) applied to either outside member			2-PLY 1-3/4"	3-PLY 1-3/4"	4-PLY 1-3/4"	1-3/4" + 3-1/2"	1-3/4" + 3-1/2" + 1-3/4"	2-PLY 3-1/2"
Connectors	Spacing	Rows	Nails or screws One Side or Through Bolts	Nails or screws Both Sides or Through Bolts	Screws One or Both Sides or Through Bolts	Nails or screws One Side or Through Bolts	Nails or screws Both Sides or Through Bolts	Screws One or Both Sides or Through Bolts
Common Wire Nails	12" o.c.	2 rows 3 rows	465 700	350 525	N/A N/A	350 525	310 465	N/A N/A
	6" o.c.	2 rows 3 rows	935 1400	700 1050	N/A N/A	700 1050	620 930	N/A N/A
A307 Bolts	24" o.c.	2 rows	375	280	250	280	250	740
	12" o.c.	2 rows	755	565	505	565	505	1480
1/4" SDW Screws	24" o.c.	2 rows	800	600	535	600	535	800
	16" o.c.	2 rows	1200	900	800	900	800	1200
1/4" USP SDS Screws	24" o.c.	2 rows	490	365	325	365	325	490
	18" o.c.	2 rows	650	490	430	490	430	650
	12" o.c.	2 rows	970	730	650	730	650	970

- NOTES:**
1. Verify adequacy of beam in uniform load tables or design software prior to using values listed above.
 2. Glulam beams are assumed to be full length, have adequate lateral bracing to avoid buckling, have the same stiffness and bending capacity, and have adequate bearing at supports to carry the applied load. Concentrated loads require special consideration.
 3. Capacities given are for multiple-beam connections under normal (10-yr.) load duration. Increases for other load durations are permitted.
 4. Nails shall conform to ASTM F1667 and have a minimum yield strength of 90,000 psi. Nails shall be located a minimum of 2 inches from the top and bottom of the member with a minimum spacing of 2 inches between rows. The end distance shall not be less than 3 inches. Multiply tabulated connection capacities by 0.83 for 12d common wire nails (0.148 x 3-1/4 inches).
 5. Bolts shall conform to ASTM A307 and have a minimum yield strength of 45,000 psi. Bolt holes are recommended to be not more than 1/32 inch greater than the diameter of the bolts and shall be located a minimum of 2 inches away from the glulam end and edges. Standard cut washers shall be used between head and nut of the bolt and the glulam.
 6. Simpson SDW Screws: All screw pattern to be installed from one side only. Screws shall be installed with the screw head in the loaded ply. If beam loaded on screw tip side, lower tabulated values for 1-3/4" 3-ply and 3-1/2" 2-ply beams by 25%. Required screw lengths: 1-3/4" 2-ply beam = 3-3/8", 1-3/4" 3-ply beam = 5", 4-ply 1-3/4" and 2-ply 3-1/2" beams = 6-3/4". Minimum required fastener distances: to beam end: 6"; vertically to top/bottom edges: 1-7/16"; vertically between screws: 4" (staggered).
 7. USP SDS Screws: Screws to be installed from both sides always, except in case of 1-3/4" 2-ply and 1-3/4"+3.5" beams. If installed on one side only, screws shall be installed with the screw head in the loaded ply. Required screw lengths: 3-1/2" for all combinations, except for 1-3/4" 4-ply beams and 3-1/2" 2-ply beams, where the screw length shall be 6". Minimum required fastener distances: to beam end: 4"; vertically from top/bottom edges: 1-1/2"; vertically inbetween screws: 2-1/2" (staggered).
 8. 4-ply beams are recommended to be used only when loads are applied to both sides, or if the beam is not fully loaded. The lesser load should be at least 25% of the higher load on the opposite side.
 9. Offset connector spacing so that protruding fasteners do not interfere with intersecting side members. Stagger all fasteners installed from opposite side.

CONNECTION PATTERN WITH NAILS AND BOLTS

(For screw connections, see the notes above.)



ALLOWABLE HOLES IN BEAMS

HORIZONTAL HOLES

Horizontal holes in glued laminated timbers are limited in size and location to maintain the structural integrity of the beam. The figure below shows the zones of a uniformly loaded, simply supported beam where the field drilling of holes may be considered. These non-critical zones are located in portions of the beam stressed to less than 50 percent of design bending stress and less than 50 percent of design shear stress. For beams of more complex loading or other than simple spans, similar diagrams may be developed.

Field-drilled horizontal holes should be used for access only and should not be used as attachment points for brackets or other load bearing hardware unless specifically designed as such by the engineer or designer. These field drilled horizontal holes should meet the following guidelines:

1. **Hole size:** The hole diameter should not exceed 1-1/2 inches or 1/10 the beam depth, whichever is smaller.
2. **Hole location:** The hole should have a minimum clear distance, as measured from the edge of the hole to the nearest edge of the beam, of 4 hole diameters to the top or bottom face of the beam and 8 hole diameters from the end of the beam. Note that the horizontal hole should not be drilled in the moment-critical zone, as defined in the figure below, unless approved by an engineer or architect qualified in engineered timber design.
3. **Hole spacing:** The minimum clear spacing between adjacent holes, as measured between the nearest edge of the holes, should be 8 hole diameters based on the largest diameter of any adjacent hole in the beam.
4. **Number of holes:** The maximum number of holes should not exceed 1 hole per 5 feet of beam length. In other words, the maximum number of holes should not exceed 4 for a 20-foot-long beam. The hole spacing limitation, as given above, should be satisfied separately.

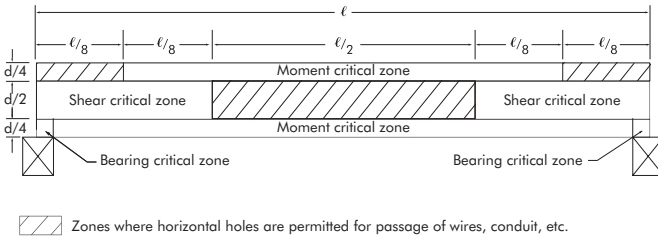
For glulam members that have been oversized, the guidelines given above may be relaxed based on an engineering analysis. Regardless of the hole location, holes drilled horizontally through a member should be positioned and sized with the understanding that the beam will deflect over a period of time under in-service loading conditions. This deflection could cause distress to supported equipment or piping unless properly considered.

VERTICAL HOLES

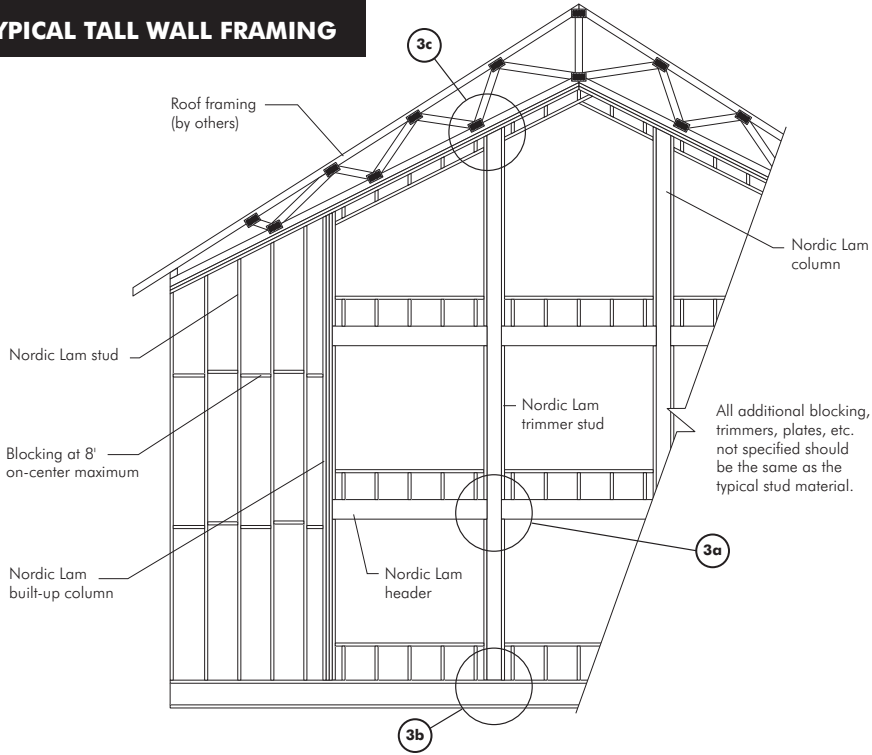
Whenever possible, avoid drilling vertical holes through glulam beams. As a rule of thumb, vertical holes drilled through the depth of a glulam beam cause a reduction in the capacity at that location directly proportional to the ratio of 1-1/2 times the diameter of the hole to the width of the beam. For example, a 1-inch hole drilled in a 6-inch-wide beam would reduce the capacity of the beam at that section by approximately (1 x 1-1/2) / 6 = 25%.

For this reason, when it is necessary to drill vertical holes through a glulam member, the holes should be positioned in areas of the member that are stressed to less than 50 percent of design in bending. In a simply supported, uniformly loaded beam, this area would be located from the end of the beam inward approximately 1/8 of the beam span. In all cases, the minimum clear edge distance, as measured from either side of the member to the nearest edge of the vertical hole, should be 2-1/2 times the hole diameter. Use a drill guide to minimize "wandering" of the bit as it passes through knots or material of varying density, and to ensure a true alignment of the hole through the depth of the beam.

ZONES WHERE SMALL HORIZONTAL HOLES ARE PERMITTED IN A UNIFORMLY LOADED, SIMPLY SUPPORTED BEAM



TYPICAL TALL WALL FRAMING

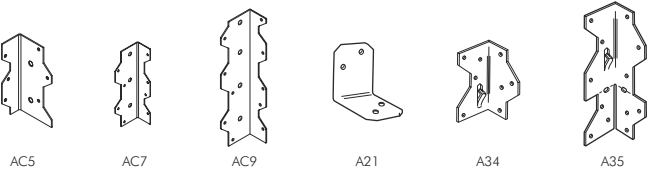


FRAMING CONNECTORS

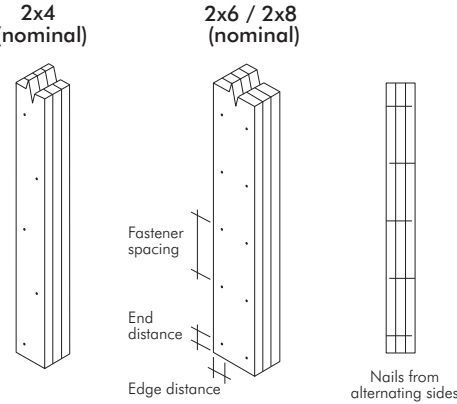
LATERAL CONNECTIONS — NAILS

Type	Diameter	Allowable Load (lbs)	
		End Grain	Toe Nail
8d (2-1/2") Box	0.113"	61	76
10d (3") Box	0.128"	78	97
12d (3-1/4") Box	0.128"	78	97
16d (3-1/2") Box	0.135"	87	108
16d (3-1/2") Pneumatic	0.131"	82	101

- NOTES:**
1. Tables are based on a load duration factor of 1.60.
 2. Connection values based on a specific gravity of 0.42.
 3. For end grain connections, a 0.67 factor was used (NDS 2012).
 4. For toe-nail connections, a 0.83 factor was used (NDS 2012).



MULTIPLE MEMBER CONNECTIONS - COLUMNS



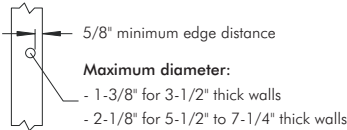
BUILT-UP COLUMNS FASTENER PATTERN

Column	Nails and Bolts			Nails		Bolts	
	Fastener Size	Maximum Fastener Spacing	Number of Rows	Minimum Edge Distance	Minimum End Distance	Minimum Edge Distance	Minimum End Distance
2-ply, 2x4 2-ply, 2x6 2-ply, 2x8	10d (0.148") nails or 1/2" bolts	9"	1 2 2	3/4"	2-1/3"	3/4"	3-1/2"
3-ply, 2x4 3-ply, 2x6 3-ply, 2x8	30d (0.207") nails or 1/2" bolts	9"	1 2 2	1"	3-1/8"	3/4"	3-1/2"
4-ply, 2x4 4-ply, 2x6 4-ply, 2x8	60d (0.263") nails or 1/2" bolts	9"	1 2 2	1-1/2"	4"	3/4"	3-1/2"

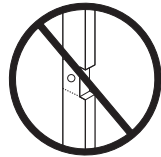
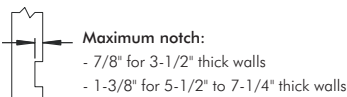
- NOTES:**
1. Connection patterns shown are those required per NDS 2012. Capacities shall be calculated per NDS 2012.
 2. Individual studs assumed to be continuous over the full height of the built-up column and of the same grade.
 3. Verify bearing capacity of the supporting member.
 4. Nails are common wire nails, shall conform to ASTM F1667 and have a minimum yield strength of 90,000 psi.
 5. Bolts shall conform to ASTM A307 and have a minimum yield strength of 45,000 psi. Bolt holes are recommended to be not more than 1/32 inch greater than the diameter of the bolts. Standard cut washers shall be used between head and nut of the bolt and the glulam.
 6. Install one row staggered, or two rows parallel in vertical direction.
 7. Nails shall be driven alternately from either face along the member's length.

ALLOWABLE HOLES AND NOTCHES

One hole may be cut anywhere along the length of the stud or column but must be no closer than 5/8" from the edge.



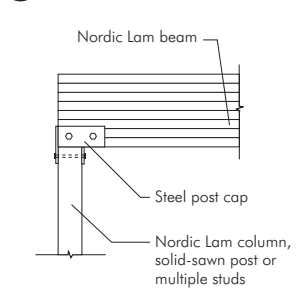
One notch may be cut anywhere except the middle 1/3 of the length of the stud or column.



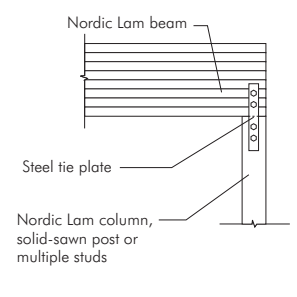
Bored holes shall not be located in the same section as a cut or notch in stud.

FLOOR FRAMING DETAILS

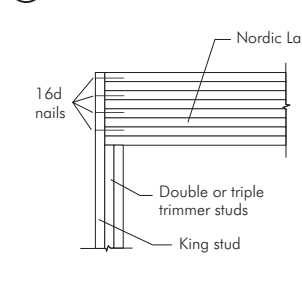
1a BEAM BEARING AT END WALL



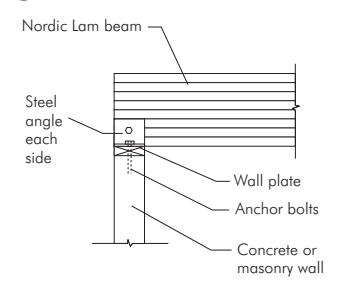
1b BEAM BEARING AT END WALL



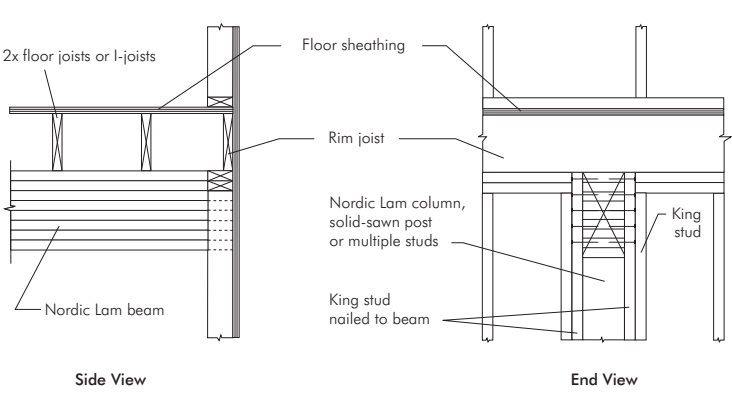
1c BEAM BEARING AT END WALL



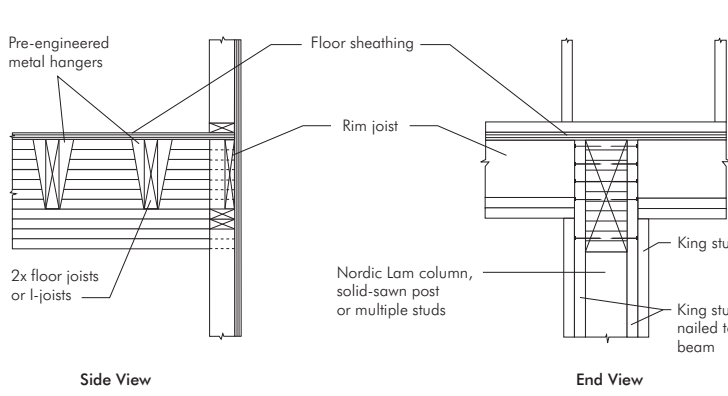
1d BEAM BEARING AT MASONRY WALL



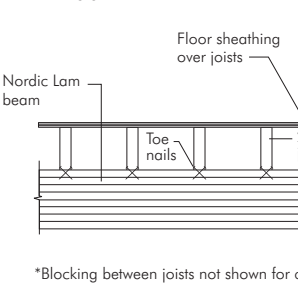
1e BEAM SUPPORT AT END WALL WITH FLOOR JOISTS OVER BEAM



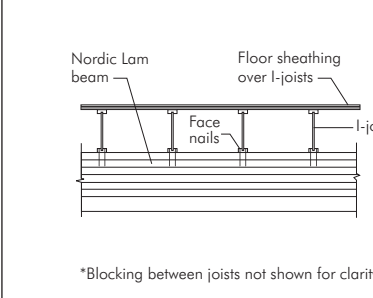
1f BEAM SUPPORT AT END WALL WITH FLOOR JOISTS FLUSH WITH BEAM



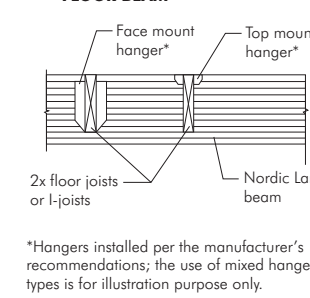
1g LUMBER JOISTS BEARING ON FLOOR BEAM



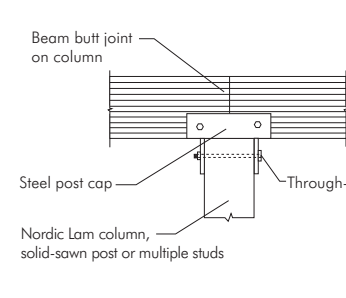
1h I-JOISTS BEARING ON FLOOR BEAM



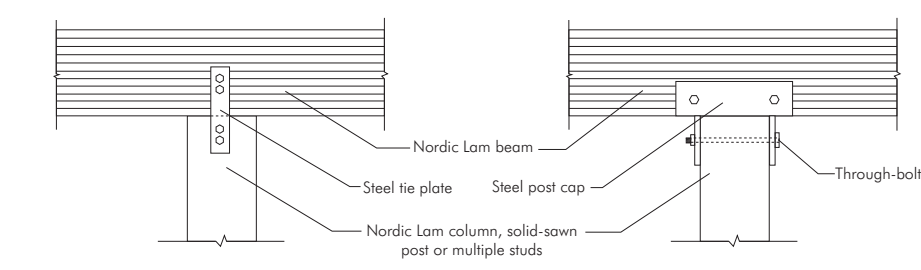
1i JOISTS MOUNTED FLUSH WITH FLOOR BEAM



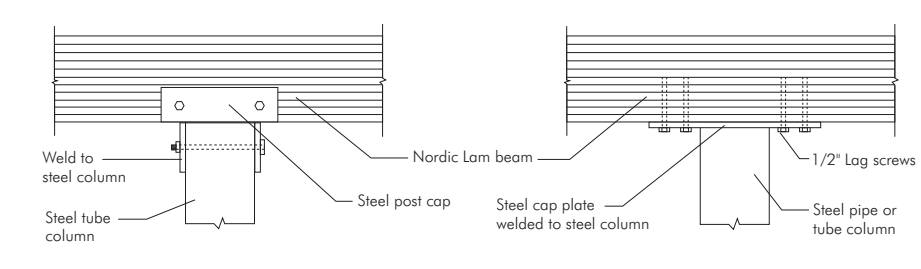
1k BEAM BUTTING OVER INTERMEDIATE WOOD SUPPORT



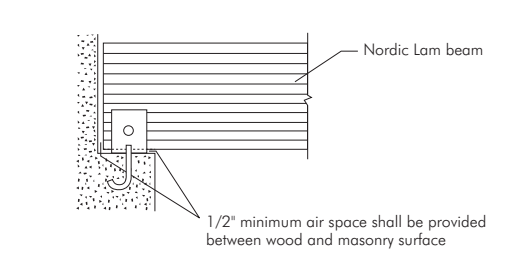
1m CONTINUOUS FLOOR BEAM OVER INTERMEDIATE WOOD SUPPORTS



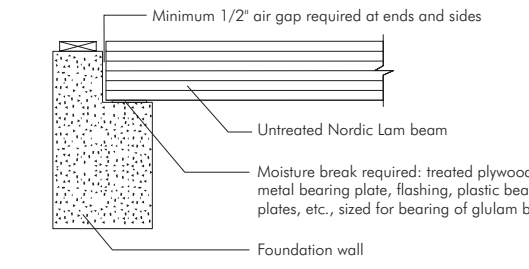
1n CONTINUOUS BEAM OVER INTERMEDIATE STEEL COLUMN



1o BEAM SITTING IN CONCRETE OR MASONRY WALL POCKET

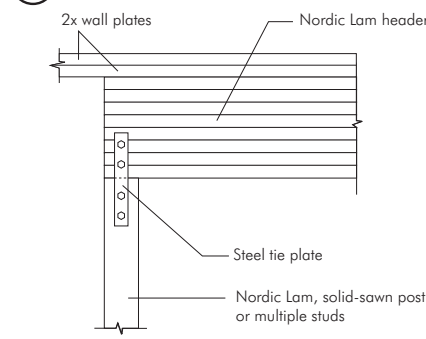


1p FOUNDATION BEAM-POCKET DETAILS

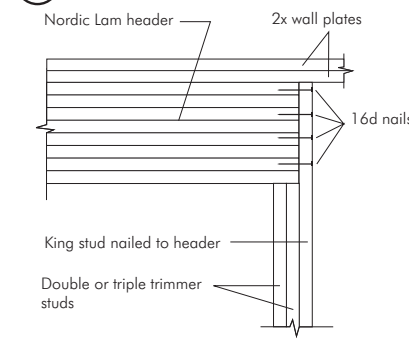


HEADER FRAMING DETAILS

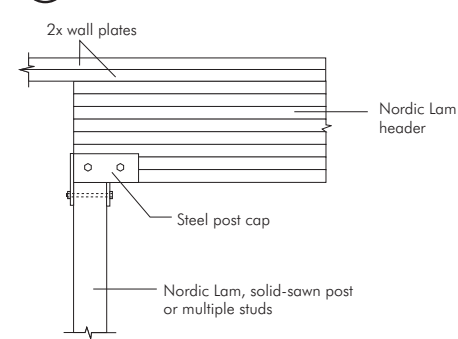
2a HEADER TO END WALL



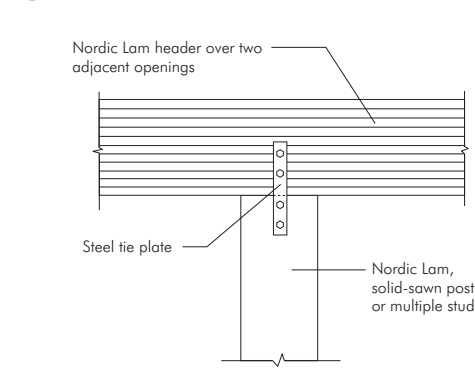
2b HEADER TO END WALL



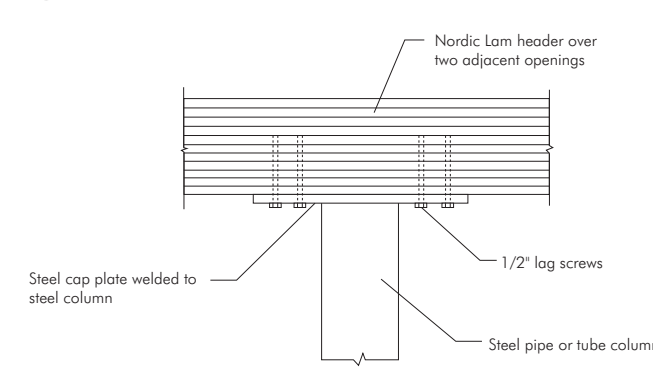
2c GARAGE DOOR HEADER TO END WALL



2d HEADER OVER INTERMEDIATE SUPPORT



2e HEADER OVER INTERMEDIATE SUPPORT

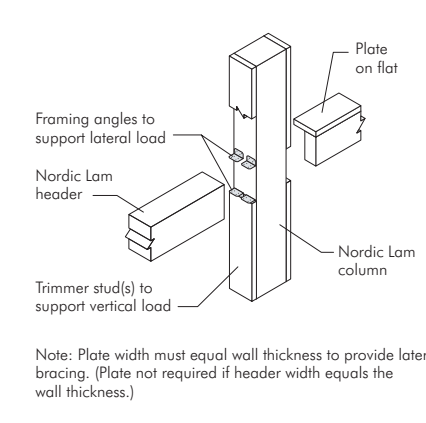


NOTE: PROVIDE ADEQUATE BEARING LENGTH AND BEARING ACROSS THE FULL WIDTH TO SUPPORT GLULAM HEADER.

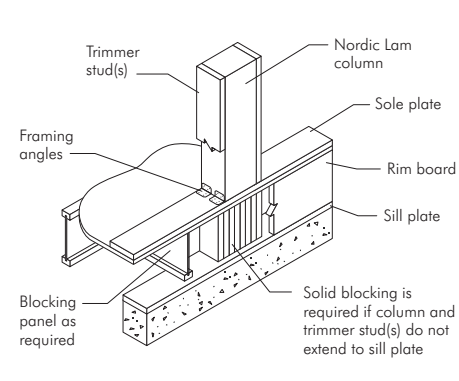
SEE 'BEARING LENGTH REQUIREMENTS' IN THE NORDIC LAM CONSTRUCTION GUIDE AND CONSULT LOCAL BUILDING CODE FOR SPECIFIC REQUIREMENTS.

WALL FRAMING DETAILS

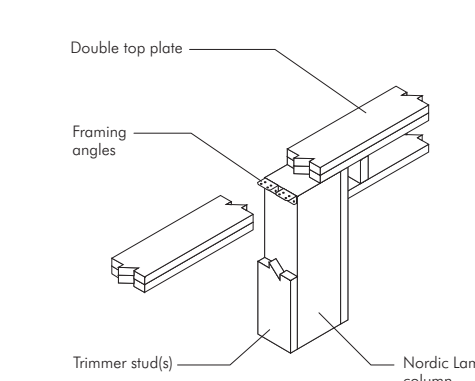
3a HEADER TO COLUMN



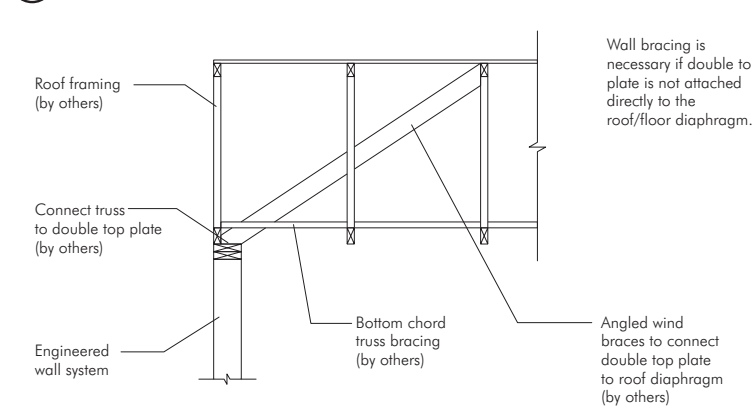
3b COLUMN TO BOTTOM PLATE



3c COLUMN TO TOP PLATE



3j WIND BRACE



3k ROOF OUTLOOKER

