

FROM PLAN DATED: AUG 26 2018

BUILDER: GREENPARK HOMES

SITE: LAMBERTS LANE

MODEL: PRESTON 12

ELEVATION: 1

LOT: 14

CITY: CALEDON

SALESMAN: M D

DESIGNER: PL

REVISION:

NOTES:

REFER TO THE NORDIC INSTALLATION GUIDE FOR PROPER STORAGE AND INSTALLATION.

SQUASH BLOCKS OF 2x4, 2x6, 2x8 #2 S.P.F REQ'D UNDER INTERIOR UNIFORM LOAD BEARING WALLS. MULTIPLE SQUASH BLOCKS REQ'D UNDER CONCENTRATED LOADS. SEE FIGURE 1. CANTILEVERED JOISTS INCLUDING CANT' OVER BRICK REQ. I-JOIST BLOCKING ALONG BEARING AND RIMBOARD CLOSURE AT ENDS. SEE FIGURES 4 & 5 FOR REINFORCEMENT REQUIREMENTS. FOR HOLES INCLUDING DUCT CHASE AND FIELD CUT OPENINGS SEE FIGURE 7, TABLES 1 & 2. CERAMIC TILE APPLICATION AS PER O.B.C 9.30.6.

LOADING:

DESIGN LOADS: L/480.000

LIVE LOAD: 40.0 lb/ft<sup>2</sup>

DEAD LOAD: 15.0 lb/ft<sup>2</sup>

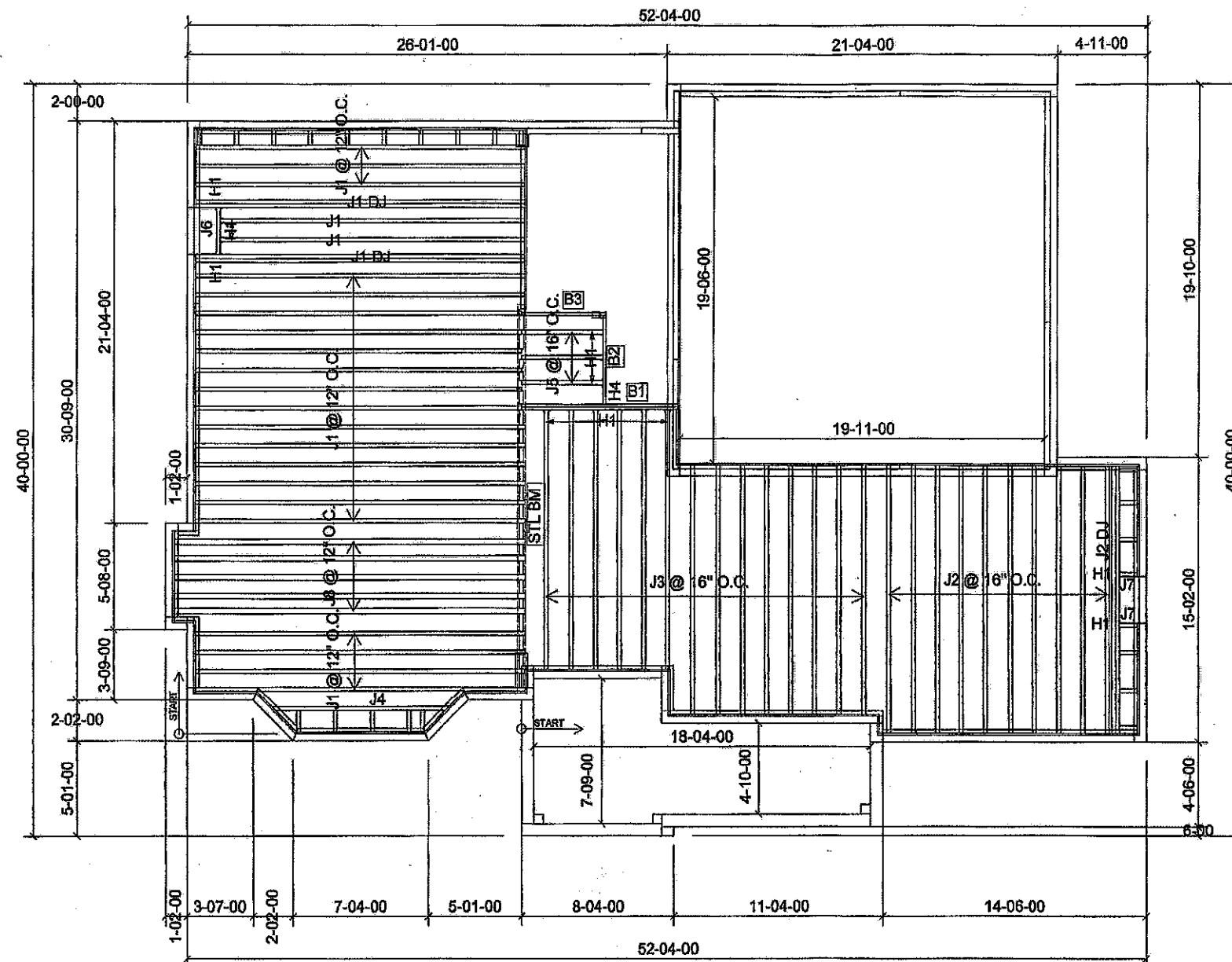
TILED AREAS: 20 lb/ft<sup>2</sup>

SUBFLOOR: 3/4" GLUED AND NAILED

DATE: 2019-03-28

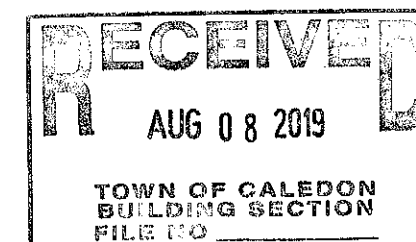
1st FLOOR

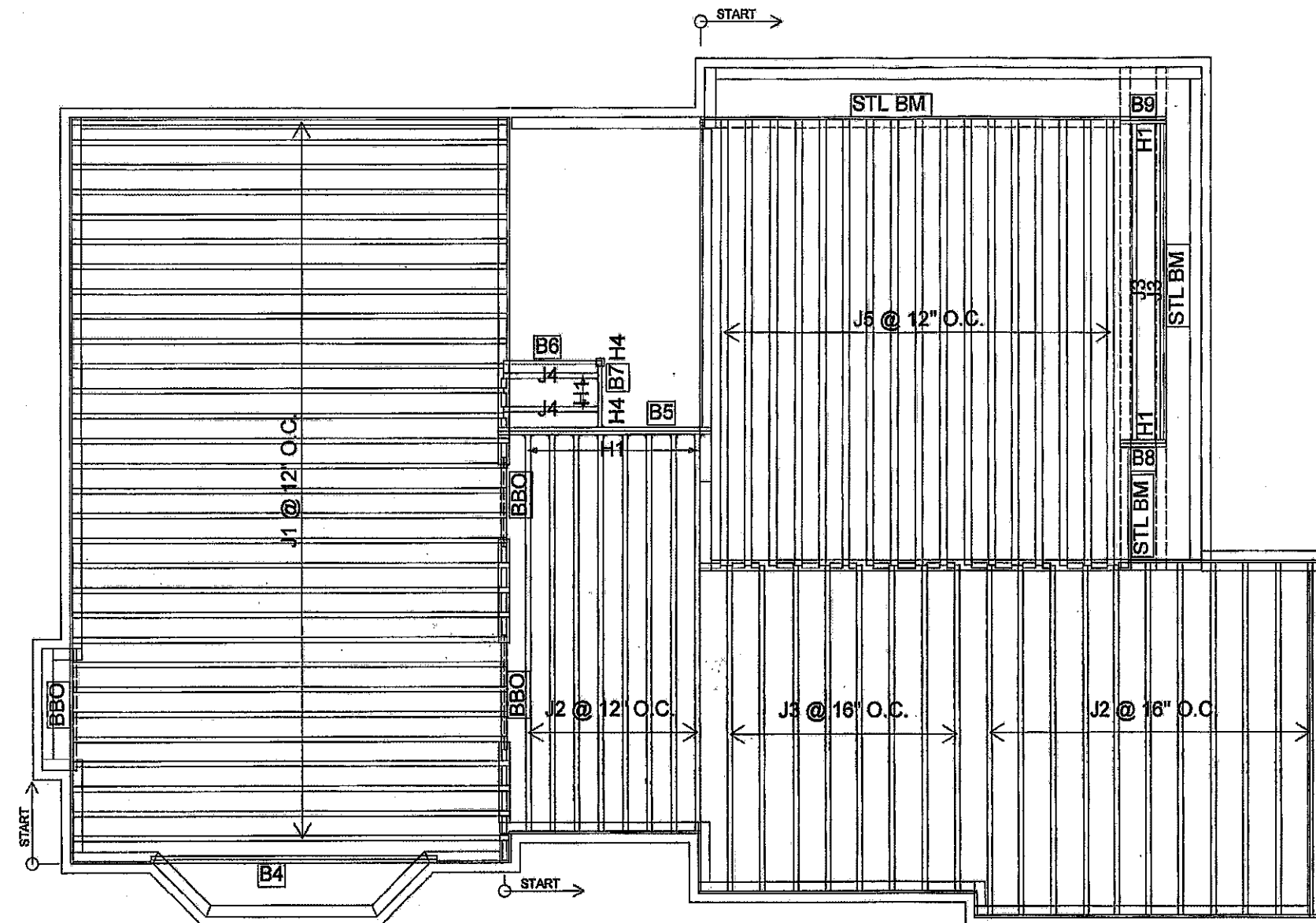
STANDARD & DECK OPTION



| Products |          |                                         |       |         |
|----------|----------|-----------------------------------------|-------|---------|
| PlotID   | Length   | Product                                 | Plies | Net Qty |
| J1       | 18-00-00 | 11 7/8" NI-40x                          | 1     | 23      |
| J1 DJ    | 18-00-00 | 11 7/8" NI-40x                          | 2     | 4       |
| J2       | 16-00-00 | 11 7/8" NI-40x                          | 1     | 10      |
| J2 DJ    | 16-00-00 | 11 7/8" NI-40x                          | 2     | 2       |
| J3       | 14-00-00 | 11 7/8" NI-40x                          | 1     | 14      |
| J4       | 10-00-00 | 11 7/8" NI-40x                          | 1     | 1       |
| J5       | 6-00-00  | 11 7/8" NI-40x                          | 1     | 3       |
| J6       | 4-00-00  | 11 7/8" NI-40x                          | 1     | 1       |
| J7       | 2-00-00  | 11 7/8" NI-40x                          | 1     | 2       |
| J8       | 20-00-00 | 11 7/8" NI-80                           | 1     | 5       |
| B1       | 10-00-00 | 1-3/4" x 11-7/8" VERSA-LAM® 2.0 3100 SP | 2     | 2       |
| B2       | 6-00-00  | 1-3/4" x 11-7/8" VERSA-LAM® 2.0 3100 SP | 1     | 1       |
| B3       | 6-00-00  | 1-3/4" x 11-7/8" VERSA-LAM® 2.0 3100 SP | 1     | 1       |

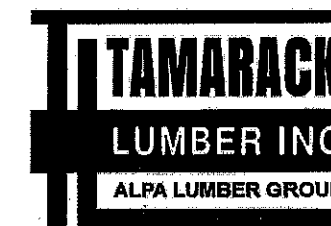
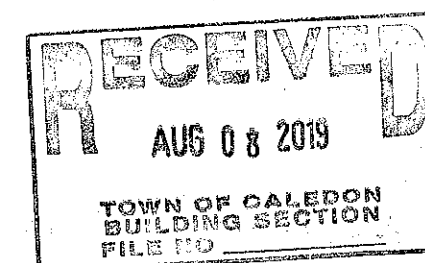
| Connector Summary |       |               |
|-------------------|-------|---------------|
| Qty               | Manuf | Product       |
| 3                 | H1    | IUS2.56/11.88 |
| 6                 | H1    | IUS2.56/11.88 |
| 4                 | H1    | IUS2.56/11.88 |
| 2                 | H1    | IUS2.56/11.88 |
| 1                 | H4    | HUS1.81/10    |





| Products |          |                                         |       |         |
|----------|----------|-----------------------------------------|-------|---------|
| PlotID   | Length   | Product                                 | Plies | Net Qty |
| J1       | 18-00-00 | 11 7/8" NI-40x                          | 1     | 30      |
| J2       | 16-00-00 | 11 7/8" NI-40x                          | 1     | 19      |
| J3       | 14-00-00 | 11 7/8" NI-40x                          | 1     | 10      |
| J4       | 4-00-00  | 11 7/8" NI-40x                          | 1     | 2       |
| J5       | 18-00-00 | 11 7/8" NI-80                           | 1     | 17      |
| B4       | 12-00-00 | 1-3/4" x 11-7/8" VERSA-LAM® 2.0 3100 SP | 2     | 2       |
| B5       | 10-00-00 | 1-3/4" x 11-7/8" VERSA-LAM® 2.0 3100 SP | 2     | 2       |
| B6       | 6-00-00  | 1-3/4" x 11-7/8" VERSA-LAM® 2.0 3100 SP | 1     | 1       |
| B7       | 4-00-00  | 1-3/4" x 11-7/8" VERSA-LAM® 2.0 3100 SP | 1     | 1       |
| B8       | 2-00-00  | 1-3/4" x 11-7/8" VERSA-LAM® 2.0 3100 SP | 2     | 2       |
| B9       | 2-00-00  | 1-3/4" x 11-7/8" VERSA-LAM® 2.0 3100 SP | 2     | 2       |

| Connector Summary |       |               |
|-------------------|-------|---------------|
| Qty               | Manuf | Product       |
| 2                 | H1    | IUS2.56/11.88 |
| 10                | H1    | IUS2.56/11.88 |
| 1                 | H4    | HUS1.81/10    |
| 1                 | H4    | HUS1.81/10    |



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**NOTES:**  
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**LOADING:**

DESIGN LOADS: L/480.000

LIVE LOAD: 40.0 lb/ft<sup>2</sup>

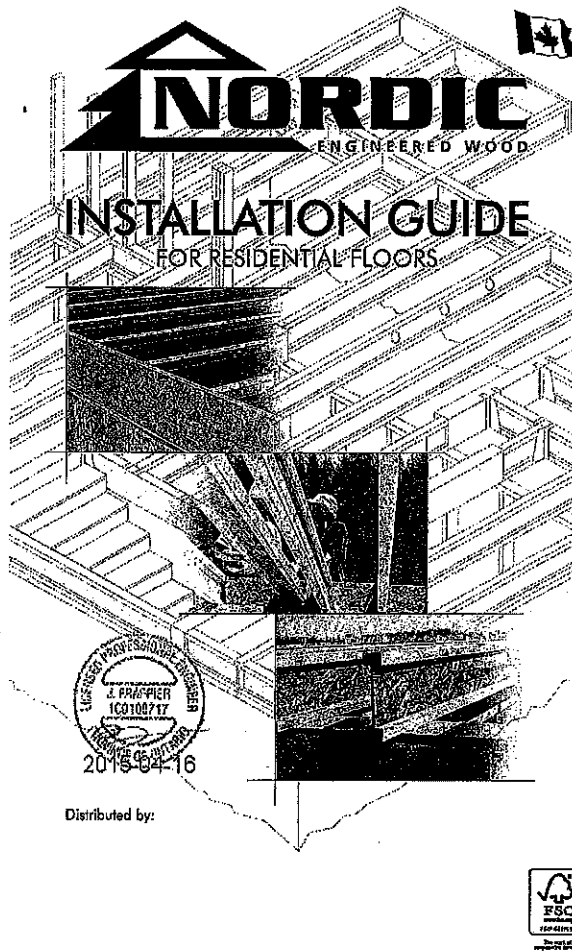
DEAD LOAD: 15.0 lb/ft<sup>2</sup>

TILED AREAS: 20 lb/ft<sup>2</sup>

**SUBFLOOR:** 5/8" GLUED AND NAILED

DATE: 2019-03-28

2nd FLOOR



# INSTALLATION GUIDE FOR RESIDENTIAL FLOORS



Distributed by:

11/2017 / November 2017

### SAFETY AND CONSTRUCTION PRECAUTIONS

**WARNING**  
I-joists are not stable until completely installed, and will not carry any load until fully braced and sheathed.

**Avoid Accidents by Following these Important Guidelines:**

1. Brace and nail each I-joist as it is installed, using hangers, blocking panels, rim board, and/or cross-bracing of joist ends. When I-joists are applied continuously over interior supports and a load-bearing wall is planned at final location, blocking will be required of the interior support.
2. When the building is completed, the floor sheathing will provide lateral support for the top flanges of the I-joists. Until this sheathing is applied, temporary bracing, often called struts, or temporary sheathing must be applied to prevent I-joist rollover or buckling.
  - Temporary bracing or struts must be 1x4 inch minimum, at least 8 feet long and spaced no more than 8 feet on center, and must be secured with a minimum of two 2-1/2" nails fastened to the top surface of each I-joist. Nail the bracing to a lateral restraint at the end of each bay. Lap ends of adjoining bracing over at least two I-joists.
  - Or, sheathing (temporary or permanent) can be nailed to the top flange of the first 4 feet of I-joists at the end of the bay.
3. For cantilevered I-joists, brace top and bottom flanges, and brace ends with closure panels, rim board, or cross-bracing.
4. Install and fully nail permanent sheathing to each I-joist before placing loads on the floor system. Then, stack building materials over beams or walls only.
5. Never install a damaged I-joist.

Improper storage or installation, failure to follow applicable building codes, failure to follow span ratings for Nordic I-joists, failure to follow allowable hole sizes and locations, or failure to use web stiffeners when required can result in serious accidents. Follow these installation guidelines carefully.

### STORAGE AND HANDLING GUIDELINES

1. Bundle wrap can be slippery when wet. Avoid walking on wrapped bundles.
2. Store, stack, and handle I-joists vertically and level only.
3. Always stack and handle I-joists in the upright position only.
4. Do not store I-joists in direct contact with the ground and/or flatwise.
5. Protect I-joists from weather, and use spacers to separate bundles.
6. Bundled units should be kept intact until time of installation.
7. When handling I-joists with a crane on the job site, take a few simple precautions to prevent damage to the I-joists and injury to your work crew.
  - Pick I-joists in bundles as shipped by the supplier.
  - Orient the bundles so that the webs of the I-joists are vertical.
  - Pick the bundles at the 5th points, using a spreader bar if necessary.
8. Do not handle I-joists in a horizontal orientation.
9. NEVER USE OR TRY TO REPAIR A DAMAGED I-JOIST.

### MAXIMUM FLOOR SPANS

1. Maximum clear spans applicable to simple-span or multiple-span residential floor construction with a design load of 40 psf and dead load of 15 psf. The ultimate limit states are based on the factored loads of 1.5DL + 1.75L. The serviceability limit states include the consideration for floor vibration and a live load deflection limit of L/480. For multiple-span applications, the end spans shall be 40% or more of the adjacent span.
2. Spans are based on a composite floor with glued-nailed oriented strand board (OSB) sheathing with a minimum thickness of 5/8 inch for a joist spacing of 19.2 inches or less, or 3/4 inch for joist spacing of 24 inches. Additive shall meet the requirements given in CGS-21.26 Standard. No concrete topping or bridging element was assumed. Increased spans may be achieved with the use of gypsum and/or a row of blocking at mid-span.
3. Minimum bearing length shall be 1-3/4 inches for the end bearings, and 3-1/2 inches for the intermediate bearings.
4. Bearing stiffeners are not required when I-joists are used with the spans and spacings given in this table, except as required for hangers.
5. This span chart is based on uniform loads. For applications with other than uniform loads, an engineering analysis may be required based on the use of the design properties.
6. Tables are based on Limit States Design per CAN/CSA C86-09 Standard, and NBC 2010.
7. SI units conversion: 1 inch = 25.4 mm  
1 foot = 0.305 m

### MAXIMUM FLOOR SPANS FOR NORDIC I-JOISTS

#### SIMPLE AND MULTIPLE SPANS

| Joist Depth | Joist Series | Simple spans      |        |        | Multiple spans    |        |        |
|-------------|--------------|-------------------|--------|--------|-------------------|--------|--------|
|             |              | On center spacing | 12"    | 16"    | On center spacing | 12"    | 16"    |
| 10"         | N1-10        | 15'-1"            | 14'-2" | 13'-9" | 16'-3"            | 15'-4" | 14'-7" |
| 10"         | N1-10E       | 16'-1"            | 15'-2" | 14'-9" | 17'-3"            | 16'-4" | 15'-7" |
| 10"         | N1-10S       | 17'-1"            | 16'-2" | 15'-9" | 18'-3"            | 17'-4" | 16'-7" |
| 10"         | N1-10T       | 18'-1"            | 17'-2" | 16'-9" | 19'-3"            | 18'-4" | 17'-7" |
| 12"         | N2-12        | 18'-1"            | 17'-2" | 16'-9" | 20'-0"            | 19'-1" | 18'-4" |
| 12"         | N2-12E       | 19'-1"            | 18'-2" | 17'-9" | 21'-0"            | 20'-1" | 19'-4" |
| 12"         | N2-12S       | 20'-1"            | 19'-2" | 18'-9" | 22'-0"            | 21'-1" | 20'-4" |
| 12"         | N2-12T       | 21'-1"            | 20'-2" | 19'-9" | 23'-0"            | 22'-1" | 21'-4" |
| 14"         | N3-14        | 20'-1"            | 19'-2" | 18'-9" | 22'-0"            | 21'-1" | 20'-4" |
| 14"         | N3-14E       | 21'-1"            | 20'-2" | 19'-9" | 23'-0"            | 22'-1" | 21'-4" |
| 14"         | N3-14S       | 22'-1"            | 21'-2" | 20'-9" | 24'-0"            | 23'-1" | 22'-4" |
| 14"         | N3-14T       | 23'-1"            | 22'-2" | 21'-9" | 25'-0"            | 24'-1" | 23'-4" |
| 16"         | N4-16        | 22'-1"            | 21'-2" | 20'-9" | 23'-0"            | 22'-1" | 21'-4" |
| 16"         | N4-16E       | 23'-1"            | 22'-2" | 21'-9" | 24'-0"            | 23'-1" | 22'-4" |
| 16"         | N4-16S       | 24'-1"            | 23'-2" | 22'-9" | 25'-0"            | 24'-1" | 23'-4" |
| 16"         | N4-16T       | 25'-1"            | 24'-2" | 23'-9" | 26'-0"            | 25'-1" | 24'-4" |

### I-JOIST HANGERS

1. Hangers shown illustrate the three most commonly used metal hangers to support I-joists.
2. All nailing must meet the hanger manufacturer's recommendations.
3. Hangers should be selected based on the joist depth, flange width and load capacity based on the maximum spans.
4. Web stiffeners are required when the sides of the hangers do not laterally brace the top flange of the I-joist.

### WEB STIFFENERS

**RECOMMENDATIONS:**

- A bearing stiffener is required in all engineered applications with factored loads greater than shown in the I-joist properties table found in the I-joist Construction Guide (C101). The gap between the stiffener and the flange is at the top.
- A bearing stiffener is required when the I-joist is supported in a hanger and the sides of the hanger do not extend up to, and support, the top flange. The gap between the stiffener and flange is at the top.
- A load stiffener is required at locations where a factored concentrated load greater than 2,370 lbs is applied to the top flange between supports, or in the case of a cantilever, anywhere between the cantilever tip and the support. These values are for standard term load duration, and may be adjusted for other load durations as permitted by the code. This gap between the stiffener and the flange is at the bottom.

SI units conversion: 1 inch = 25.4 mm

**FIGURE 2 WEB STIFFENER INSTALLATION DETAILS**

**STIFFENER SIZE REQUIREMENTS**

| Flange Width | Web Stiffener Size Each Side of Web |
|--------------|-------------------------------------|
| 2-1/2"       | 2 x 2-1/2" x 5/16" minimum width    |
| 3-1/2"       | 1-1/2" x 2-5/16" minimum width      |

### NORDIC I-JOIST SERIES

Champion Chibougamau Ltd. harvests its own trees, which enables Nordic products to adhere to strict quality control procedures throughout the manufacturing process. Every phase of the operation, from the selection of the finished product, reflects our commitment to quality.

Nordic Engineered Wood I-joists use only finger-jointed black spruce lumber in their flanges, ensuring consistent quality, superior strength and longer span carrying capacity.

### INSTALLING NORDIC I-JOISTS

1. Before laying out floor system components, verify that I-joist flange widths match hanger widths. If not, consult supplier.
2. Except for cutting to length, I-joist flanges should never be cut, drilled, or notched.
3. Install I-joists so that top and bottom flanges are within 1/2 inch of true vertical alignment.
4. I-joists must be anchored securely to supports before floor sheathing is attached, and supports for multiple spans must be level.
5. Minimum bearing lengths: 1-3/4 inches for end bearings and 3-1/2 inches for intermediate bearings.
6. When using hangers, seal I-joists firmly in hanger bottoms to minimize settlement.
7. Leave a 1/16-inch gap between the I-joist end and a header.
8. Concentrated loads greater than those that can normally be expected in residential construction should only be applied to the top surface of the top flange. Normal concentrated loads include track lighting fixtures, audio equipment and security cameras. Never suspend unusual or heavy loads from the I-joist's bottom flange. Whenever possible, suspend all concentrated loads from the top of the I-joist. Or, attach the load to blocking that has been securely fastened to the I-joist webs.
9. Never install I-joists where they will be permanently exposed to weather, or where they will remain in direct contact with concrete or masonry.
10. Restrain ends of floor joists to prevent rollover. Use rim board, rim joists or I-joist blocking panels.
11. For I-joists installed over and beneath bearing walls, use full depth blocking panels, rim board, or squabs blocks (cripple members) to transfer gravity loads through the floor system to the wall or foundation below.
12. Due to shrinkage, common framing lumber set an edge may never be used as blocking or rim boards. I-joist blocking panels or other engineered wood products – such as rim board – must be cut to fit between the I-joists, and on I-joist-compatible depth selected.
13. Provide permanent lateral support of the bottom flange of all I-joists at interior supports of multiple-span joists. Similarly, support the bottom flange of all cantilevered I-joists at the end support next to the cantilever extension. In the completed structure, the gypsum wallboard ceiling provides this lateral support. Until the final finished ceiling is applied, temporary bracing or struts must be used.
14. If square-edge panels are used, edges must be supported between I-joists with 2x4 blocking. Glue panels to blocking to minimize squeaks. Blocking is not required under structural finish flooring, such as wood strip flooring, or if a separate underlayment layer is installed.
15. Nail spacing: Space nails installed to the flange's top face in accordance with the applicable building code requirements or approved building plans.

### FIGURE 1 TYPICAL NORDIC I-JOIST FLOOR FRAMING AND CONSTRUCTION DETAILS

Some framing requirements such as reaction bracing and blocking panels have been omitted for clarity.

Notes: 3, 4 or 5  
Holes may be cut in web for plumbing, wiring and duct work. See Tables 1, 2 and Figure 7.  
NOTE: Never cut or notch flanges.  
Nordic Lam or Structural Composite Lumber (SCL)  
Nordic Lam or SCL  
Use hangers recognized in current code evaluation reports.  
All nails shown in the above details are assumed to be common wire nails unless otherwise noted. 3" (Ø 122.4) common spiral nails may be substituted for 2-1/2" (Ø 128) common wire nails. Framing lumber assumed to be Spruce-Pine-Fir No. 2 or better. Individual components not shown to scale for clarity.

1a Transfer load from above to bearing below. Install squabs blocks per detail 1d. Match bearing area of blocks below to post above.

1b Wall sheathing, as required. Rim board may be used in lieu of I-joists. Backer is not required when rim board is used. Bracing per code shall be carried to the foundation.

1c Load bearing wall above shall align vertically with the bearing below. Other conditions, such as offset bearing walls, are covered by this detail.

1d 2-1/2" nails at 6" o.c. to top plate.

1e 2x plate flush with inside face of wall or beam. 1/8" overhang allowed past inside face of wall or beam.

1f Multiple I-joist header with full depth filler block shown. Nordic Lam or SCL headers may also be used. Verify double I-joist capacity to support concentrated loads.

1g 2-1/2" nails at 6" o.c. to top plate.

1h Blocking required over all interior supports under load-bearing walls or when floor joists are not continuous over support.

1i Backer block (use if hanger load exceeds 360 lbs). Before installing a backer block to a double I-joist, drive three additional 3" nails through the webs and filler block where the backer block will fit. Clinch, install backer right to top flange. Use twelve 3" nails, clinched when possible. Maximum factored resistance for hanger for this detail = 1,620 lbs.

1j Double I-joist header.

1k Top- or face-mount hanger installed per manufacturer's recommendations.

1l 2x plate flush with inside face of wall or beam. 1/8" overhang allowed past inside face of wall or beam.

1m Filler block per detail 1p.

1n Do not bevel-cut joist beyond inside face of wall.

1o Attach I-joist per detail 1b.

1p Note: Blocking required of bearing for lateral support, not shown for clarity.

### BACKER BLOCKS

Backer blocks must be long enough to permit required nailing without splitting.

| Flange Width | Material Thickness Required* | Minimum Depth** |
|--------------|------------------------------|-----------------|
| 2-1/2"       | 1"                           | 5-1/2"          |
| 3-1/2"       | 1-1/2"                       | 7-1/4"          |

\* Minimum grade for backer block material shall be S-P-F No. 2 or better for solid sawn lumber and wood structural panels conforming to CAN/CSA-C325 or CAN/CSA-O437 Standard.  
\*\* For face-mount hangers use net joist depth minus 3-1/4" for joists with 1-1/2" thick flanges. For 2" thick flanges use net depth minus 4-1/4".

1a Attach I-joist to top plate per detail 1b.

2-1/2" nails at 6" o.c. to top plate (when used for lateral shear transfer, nail to bearing plate with same nailing as required for decking).

| Blocking Panel or Rim Joist | Maximum Factored Uniform Vertical Load* (plf) |
|-----------------------------|-----------------------------------------------|
| N1 Joist                    | 3,300                                         |

\*The uniform vertical load is limited to a joist depth of 16 inches or less and based on standard term load duration. It shall not be used in the design of a bending member, such as joist, header, or rafter. For concentrated vertical load transfer, see detail 1d.

1b Rim board.

One 2-1/2" face nail at each side of bearing.

Attach rim board to top plate using 2-1/2" wire or spiral nail at top and bottom flange.

To avoid splitting flange, start nails at least 1-1/2" from end of I-joist. Nails may be driven at an angle to avoid splitting of bearing plate.

Minimum bearing length shall be 1-3/4" for the end bearings, and 3-1/2" for the intermediate bearings when applicable.

| Blocking Panel or Rim Joist | Maximum Factored Uniform Vertical Load* (plf) |
|-----------------------------|-----------------------------------------------|
| 1-1/8" Rim Board Plus       | 5,090                                         |

\*The uniform vertical load is limited to a rim board depth of 16 inches or less and is based on standard term load duration. It shall not be used in the design of a bending member, such as joist, header, or rafter. For concentrated vertical load transfer, see detail 1d.

1c Attach rim joist to floor joist with one nail at top and bottom. Nail must provide 1 inch minimum penetration into floor joist. Top-nailing may be used.

Attach rim joist per detail 1a.

Attach I-joist per detail 1b.

Minimum 1-3/4" bearing required.

| Pair of Squabs Blocks | Maximum Factored Uniform Vertical Load* (plf) |
|-----------------------|-----------------------------------------------|
| 2x Lumber             | 5,500                                         |
| 1-1/8" Rim Board Plus | 4,300                                         |

Provide lateral bracing per detail 1a, 1b, or 1c.

### FILLER BLOCK REQUIREMENTS FOR DOUBLE I-JOIST CONSTRUCTION

| Flange Size     | Joist Depth | Filler Block Size |
|-----------------|-------------|-------------------|
| 2-1/2" x 1-1/2" | 9-1/2"      | 2-1/8" x 6"       |
|                 | 11-7/8"     | 2-1/8" x 8"       |
|                 | 14"         | 2-1/8" x 10"      |
|                 | 16"         | 2-1/8" x 12"      |
| 3-1/2" x 1-1/2" | 9-1/2"      | 3" x 6"           |
|                 | 11-7/8"     | 3" x 8"           |
|                 | 14"         | 3" x 10"          |
|                 | 16"         | 3" x 12"          |
| 4" x 1-1/2"     | 9-1/2"      | 3" x 7"           |
|                 | 11-7/8"     | 3" x 9"           |
|                 | 14"         | 3" x 11"          |

Options: Minimum 1x4 inch strap applied to underside of joist at blocking line or 1/2 inch minimum gypsum ceiling attached to underside of joists.

1d One 2-1/2" nails at top and bottom flange.

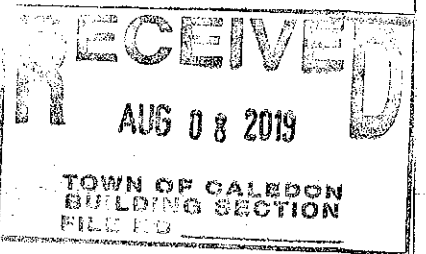
Two 2-1/2" nails from each web to lumber piece.

2x4 min. (1/8" gap minimum)

One 2-1/2" nails one side only.

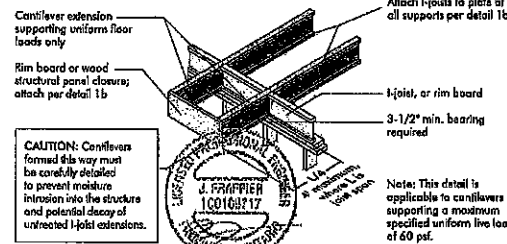
Two 2-1/2" nails of 6" o.c.

Notes:  
• In some local codes, blocking is prescriptively required in the first joist space (or first end zone joist space) next to the header joist. Where required, nail to ceiling joists per spacing of the blocking.  
• All nails are common spiral nails in this detail.

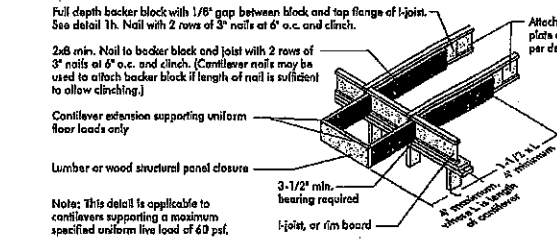


# CANTILEVER DETAILS FOR BALCONIES (NO WALL LOAD)

## 1-JOIST CANTILEVER DETAIL FOR BALCONIES (No Wall Load)

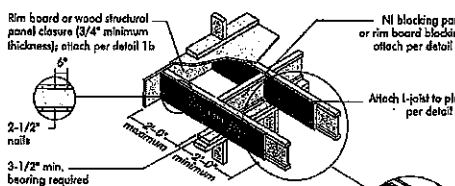


## LUMBER CANTILEVER DETAIL FOR BALCONIES (No Wall Load)

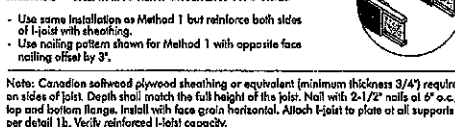


# CANTILEVER DETAILS FOR VERTICAL BUILDING OFFSET (CONCENTRATED WALL LOAD)

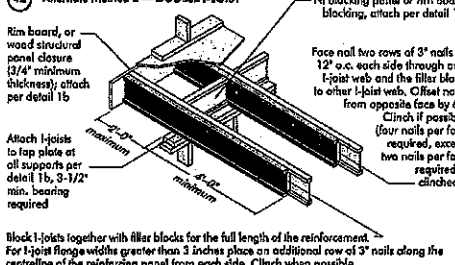
## Method 1 — SHEATHING REINFORCEMENT ONE SIDE



## Method 2 — SHEATHING REINFORCEMENT TWO SIDES



## Alternate Method 2 — DOUBLE I-JOIST



## FIGURE 4 (continued)



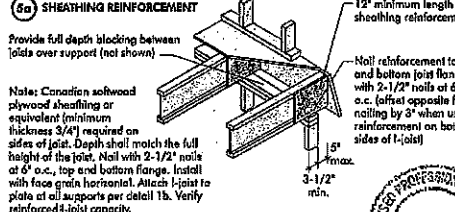
## CANTILEVER REINFORCEMENT METHODS ALLOWED

| JOIST DEPTH (in.) | ROOF TRUSS SPAN (ft.) | LL = 30 psf, DL = 15 psf |    |      |    | LL = 40 psf, DL = 15 psf |    |      |    | LL = 50 psf, DL = 15 psf |    |      |    |
|-------------------|-----------------------|--------------------------|----|------|----|--------------------------|----|------|----|--------------------------|----|------|----|
|                   |                       | 12                       | 16 | 19.2 | 24 | 12                       | 16 | 19.2 | 24 | 12                       | 16 | 19.2 | 24 |
| 12                | 12                    | N                        | N  | 1    | 2  | N                        | 1  | 2    | X  | N                        | 2  | X    | X  |
| 12                | 16                    | N                        | 1  | 2    | X  | N                        | 1  | 2    | X  | N                        | 2  | X    | X  |
| 12                | 19.2                  | N                        | 1  | 2    | X  | N                        | 2  | X    | X  | N                        | 2  | X    | X  |
| 12                | 24                    | N                        | 1  | 2    | X  | N                        | 2  | X    | X  | N                        | 2  | X    | X  |
| 16                | 12                    | N                        | N  | 1    | 2  | N                        | 1  | 2    | X  | N                        | 2  | X    | X  |
| 16                | 16                    | N                        | 1  | 2    | X  | N                        | 1  | 2    | X  | N                        | 2  | X    | X  |
| 16                | 19.2                  | N                        | 1  | 2    | X  | N                        | 2  | X    | X  | N                        | 2  | X    | X  |
| 16                | 24                    | N                        | 1  | 2    | X  | N                        | 2  | X    | X  | N                        | 2  | X    | X  |
| 19.2              | 12                    | N                        | N  | 1    | 2  | N                        | 1  | 2    | X  | N                        | 2  | X    | X  |
| 19.2              | 16                    | N                        | 1  | 2    | X  | N                        | 1  | 2    | X  | N                        | 2  | X    | X  |
| 19.2              | 19.2                  | N                        | 1  | 2    | X  | N                        | 2  | X    | X  | N                        | 2  | X    | X  |
| 19.2              | 24                    | N                        | 1  | 2    | X  | N                        | 2  | X    | X  | N                        | 2  | X    | X  |
| 24                | 12                    | N                        | N  | 1    | 2  | N                        | 1  | 2    | X  | N                        | 2  | X    | X  |
| 24                | 16                    | N                        | 1  | 2    | X  | N                        | 1  | 2    | X  | N                        | 2  | X    | X  |
| 24                | 19.2                  | N                        | 1  | 2    | X  | N                        | 2  | X    | X  | N                        | 2  | X    | X  |
| 24                | 24                    | N                        | 1  | 2    | X  | N                        | 2  | X    | X  | N                        | 2  | X    | X  |

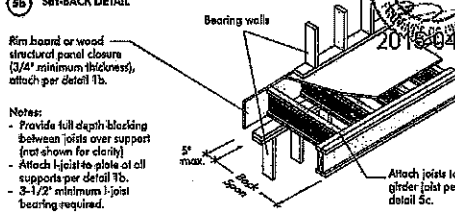
- N = No reinforcement required.
- N1 reinforced with 3/4\"/>

# BRICK CANTILEVER DETAILS FOR VERTICAL BUILDING OFFSET (CONCENTRATED WALL LOAD)

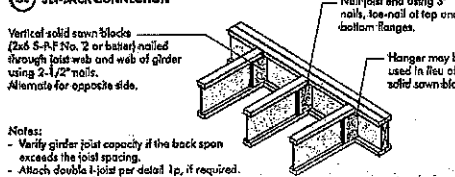
## SHEATHING REINFORCEMENT



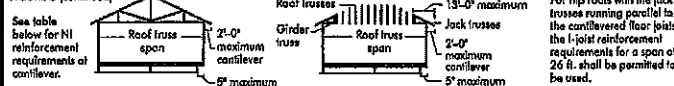
## SET-BACK DETAIL



## SET-BACK CONNECTION



## FIGURE 5 (continued)



## BRICK CANTILEVER REINFORCEMENT METHODS ALLOWED

| JOIST DEPTH (in.) | ROOF TRUSS SPAN (ft.) | LL = 30 psf, DL = 15 psf |    |      |    | LL = 40 psf, DL = 15 psf |    |      |    | LL = 50 psf, DL = 15 psf |    |      |    |
|-------------------|-----------------------|--------------------------|----|------|----|--------------------------|----|------|----|--------------------------|----|------|----|
|                   |                       | 12                       | 16 | 19.2 | 24 | 12                       | 16 | 19.2 | 24 | 12                       | 16 | 19.2 | 24 |
| 12                | 12                    | N                        | N  | 1    | 2  | N                        | 1  | 2    | X  | N                        | 2  | X    | X  |
| 12                | 16                    | N                        | 1  | 2    | X  | N                        | 1  | 2    | X  | N                        | 2  | X    | X  |
| 12                | 19.2                  | N                        | 1  | 2    | X  | N                        | 2  | X    | X  | N                        | 2  | X    | X  |
| 12                | 24                    | N                        | 1  | 2    | X  | N                        | 2  | X    | X  | N                        | 2  | X    | X  |
| 16                | 12                    | N                        | N  | 1    | 2  | N                        | 1  | 2    | X  | N                        | 2  | X    | X  |
| 16                | 16                    | N                        | 1  | 2    | X  | N                        | 1  | 2    | X  | N                        | 2  | X    | X  |
| 16                | 19.2                  | N                        | 1  | 2    | X  | N                        | 2  | X    | X  | N                        | 2  | X    | X  |
| 16                | 24                    | N                        | 1  | 2    | X  | N                        | 2  | X    | X  | N                        | 2  | X    | X  |
| 19.2              | 12                    | N                        | N  | 1    | 2  | N                        | 1  | 2    | X  | N                        | 2  | X    | X  |
| 19.2              | 16                    | N                        | 1  | 2    | X  | N                        | 1  | 2    | X  | N                        | 2  | X    | X  |
| 19.2              | 19.2                  | N                        | 1  | 2    | X  | N                        | 2  | X    | X  | N                        | 2  | X    | X  |
| 19.2              | 24                    | N                        | 1  | 2    | X  | N                        | 2  | X    | X  | N                        | 2  | X    | X  |
| 24                | 12                    | N                        | N  | 1    | 2  | N                        | 1  | 2    | X  | N                        | 2  | X    | X  |
| 24                | 16                    | N                        | 1  | 2    | X  | N                        | 1  | 2    | X  | N                        | 2  | X    | X  |
| 24                | 19.2                  | N                        | 1  | 2    | X  | N                        | 2  | X    | X  | N                        | 2  | X    | X  |
| 24                | 24                    | N                        | 1  | 2    | X  | N                        | 2  | X    | X  | N                        | 2  | X    | X  |

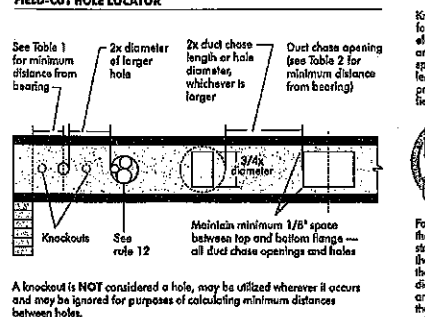
- N = No reinforcement required.
- N1 reinforced with 3/4\"/>

# WEB HOLES

## RULES FOR CUTTING HOLES AND DUCT CHASE OPENINGS:

- The distance between the inside edge of the support and the centreline of any hole or duct chase opening shall be in compliance with the requirements of Table 1 or 2, respectively.
- I-joist top and bottom flanges must NEVER be cut, notched, or otherwise modified. Whenever possible, field-cut holes should be centred on the middle of the web.
- The maximum size hole or the maximum depth of a duct chase opening that can be cut into an I-joist web shall equal the clear distance between the flanges of the I-joist minus 1/4 inch. A minimum of 1/8 inch should always be maintained between the top or bottom of the hole or opening and the adjacent I-joist flange.
- The sides of square holes or longest sides of rectangular holes should not exceed 3/4 of the diameter of the maximum round hole permitted at that location.
- Where more than one hole is necessary, the distance between adjacent hole edges shall exceed twice the diameter of the largest round hole or twice the size of the largest square hole (or twice the length of the longest side of the longest rectangular hole or duct chase opening) and each hole and duct chase opening shall be sized and located in compliance with the requirements of Tables 1 and 2, respectively.
- A knockout is not considered a hole, may be utilized anywhere it occurs, and may be ignored for purposes of calculating minimum distances between holes and/or duct chase openings.
- Holes measuring 1-1/2 inches or smaller shall be permitted anywhere in a cantilevered section of a joist. Holes of greater size may be permitted subject to verification.
- A 1-1/2 inch hole or smaller can be placed anywhere in the web provided that it meets the requirements of rule number 6 above.
- All holes and duct chase openings shall be cut in a workman-like manner in accordance with the restrictions listed above and as illustrated in Figure 7.
- Limit three maximum size holes per span, of which one may be a duct chase opening.
- A group of round holes at approximately the same location shall be permitted if they meet the requirements for a single round hole circumscribed around them.

## FIGURE 7 FIELD-CUT HOLE LOCATOR



A knockout is NOT considered a hole, may be utilized wherever it occurs and may be ignored for purposes of calculating minimum distances between holes.

TABLE 1 LOCATION OF CIRCULAR HOLES IN JOIST WEBS Simple or Multiple Span for Dead Loads up to 16 psf and Live Loads up to 40 psf

| Joist Depth | Joist Series | Minimum distance from inside face of any support to centre of hole (ft-in.) |      |       |       |       |       |       |       |       |       |       |        | Span adjustment Factor |       |        |       |
|-------------|--------------|-----------------------------------------------------------------------------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|------------------------|-------|--------|-------|
|             |              | Round hole diameter (in.)                                                   |      |       |       |       |       |       |       |       |       |       |        |                        |       |        |       |
|             |              | 2                                                                           | 3    | 4     | 5     | 6     | 6-1/2 | 7     | 8     | 8-5/8 | 9     | 10    | 10-3/4 | 11                     | 12    | 12-3/4 |       |
| 12          | N1           | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N2           | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N3           | 2'                                                                          | 1-3" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N4           | 2'                                                                          | 1-3" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N5           | 2'                                                                          | 1-3" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N6           | 2'                                                                          | 1-3" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N7           | 2'                                                                          | 1-3" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N8           | 2'                                                                          | 1-3" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N9           | 2'                                                                          | 1-3" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N10          | 2'                                                                          | 1-3" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
| 16          | N11          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N12          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N13          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N14          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N15          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N16          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N17          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N18          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N19          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N20          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
| 20          | N21          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N22          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N23          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N24          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N25          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N26          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N27          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N28          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N29          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N30          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
| 24          | N31          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N32          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N33          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N34          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N35          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N36          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N37          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N38          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N39          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N40          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
| 30          | N41          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N42          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N43          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N44          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N45          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N46          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N47          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N48          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N49          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N50          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
| 36          | N51          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N52          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N53          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N54          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N55          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N56          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N57          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N58          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N59          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N60          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
| 42          | N61          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N62          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N63          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N64          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N65          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N66          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N67          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N68          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N69          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |
|             | N70          | 2'                                                                          | 1-6" | 2'-0" | 2'-6" | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" | 6'-6"  | 7'-0"                  | 7'-6" | 8'-0"  | 8'-6" |





Refer to the Installation Guide for Residential Floors for additional information.  
CCMC EVALUATION REPORT 13032-R

### WEB HOLE SPECIFICATIONS

RULES FOR CUTTING HOLES AND DUCT CHASE OPENINGS:

- The distance between the inside edge of the support and the centreline of any hole or duct chase opening shall be in compliance with the requirements of Table 1 or 2, respectively.
- I-joint top and bottom flanges must NEVER be cut, notched, or otherwise modified.
- Whenever possible, field-cut holes should be centred on the middle of the web.
- The maximum size hole or the maximum depth of a duct chase opening that can be cut into an I-joint web shall equal the clear distance between the flanges of the I-joint minus 1/4 inch. A minimum of 1/8 inch shall always be maintained between the top or bottom of the hole or opening and the adjacent I-joint flange.

- The sides of square holes or longest side of rectangular holes should not exceed 3/4 of the diameter of the maximum round hole permitted at that location.
- Where more than one hole is necessary, the distance between adjacent hole edges shall exceed twice the diameter of the largest round hole or twice the size of the largest square hole for twice the length of the longest side of the largest rectangular hole or duct chase opening and each hole and duct chase opening shall be sized and located in compliance with the requirements of Tables 1 and 2, respectively.
- A knockout is not considered a hole, may be utilized anywhere it occurs, and may be ignored for purposes of calculating minimum distances between holes and/or duct chase openings.
- Holes measuring 1-1/2 inches or smaller are permitted anywhere in a cantilevered section of a joist. Holes of greater size may be permitted subject to verification.

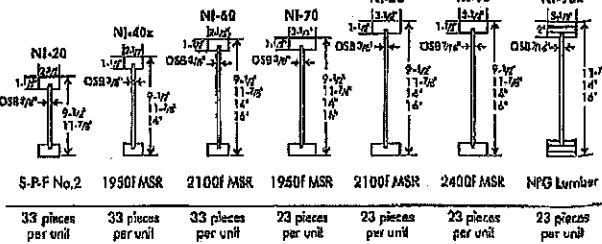
- A 1-1/2 inch hole or smaller can be placed anywhere in the web provided that it meets the requirements of rule number 6 above.
- All holes and duct chase openings shall be cut in a workman-like manner in accordance with the restrictions listed above and as illustrated in Figure 7.
- Utilize three maximum size holes per span, of which one may be a duct chase opening.
- A group of round holes at approximately the same location shall be permitted if they meet the requirements for a single round hole circumscribed around them.

**TABLE 1  
LOCATION OF CIRCULAR HOLES IN JOIST WEBS**

Simple or Multiple Span for Dead Loads up to 15 psf and Live Loads up to 40 psf

| Joist Depth | Joist Series | Minimum Distance from Inside Face of Any Support to Centre of Hole (ft - in.) |      |       |      |      |       |      |      |       |      |       |        |     |
|-------------|--------------|-------------------------------------------------------------------------------|------|-------|------|------|-------|------|------|-------|------|-------|--------|-----|
|             |              | Round Hole Diameter (in.)                                                     |      |       |      |      |       |      |      |       |      |       |        |     |
|             |              | 2                                                                             | 3    | 4     | 5    | 6    | 6-1/4 | 7    | 8    | 8-5/8 | 9    | 10    | 10-3/4 | 11  |
| 9-1/2"      | NL-20        | 0-7"                                                                          | 1-6" | 2-10" | 4-3" | 5-8" | 6-0"  | ---  | ---  | ---   | ---  | ---   | ---    | --- |
|             | NL-40x       | 0-7"                                                                          | 1-6" | 2-10" | 4-4" | 6-0" | 6-4"  | ---  | ---  | ---   | ---  | ---   | ---    | --- |
|             | NL-60        | 1-5"                                                                          | 2-6" | 4-0"  | 5-4" | 7-0" | 7-5"  | ---  | ---  | ---   | ---  | ---   | ---    | --- |
|             | NL-70        | 2-0"                                                                          | 3-4" | 4-9"  | 6-3" | 8-0" | 8-4"  | ---  | ---  | ---   | ---  | ---   | ---    | --- |
|             | NL-80        | 2-8"                                                                          | 3-6" | 5-0"  | 6-6" | 8-2" | 8-8"  | ---  | ---  | ---   | ---  | ---   | ---    | --- |
| 11-7/8"     | NL-20        | 0-7"                                                                          | 0-8" | 1-0"  | 2-4" | 3-8" | 4-0"  | 3-0" | 6-6" | 7-0"  | ---  | ---   | ---    | --- |
|             | NL-40x       | 0-7"                                                                          | 0-8" | 1-0"  | 2-5" | 4-0" | 4-4"  | 5-8" | 7-0" | 8-4"  | ---  | ---   | ---    | --- |
|             | NL-60        | 0-7"                                                                          | 0-8" | 1-0"  | 2-5" | 4-0" | 4-4"  | 5-8" | 7-0" | 8-4"  | ---  | ---   | ---    | --- |
|             | NL-70        | 0-7"                                                                          | 0-8" | 1-0"  | 2-5" | 4-0" | 4-4"  | 5-8" | 7-0" | 8-4"  | ---  | ---   | ---    | --- |
|             | NL-80        | 0-7"                                                                          | 0-8" | 1-0"  | 2-5" | 4-0" | 4-4"  | 5-8" | 7-0" | 8-4"  | ---  | ---   | ---    | --- |
| 14"         | NL-20        | 0-7"                                                                          | 0-8" | 0-9"  | 2-4" | 3-9" | 3-0"  | 5-2" | 6-0" | 6-8"  | 8-3" | 10-3" | ---    | --- |
|             | NL-40x       | 0-7"                                                                          | 0-8" | 0-9"  | 2-4" | 3-9" | 3-0"  | 5-2" | 6-0" | 6-8"  | 8-3" | 10-3" | ---    | --- |
|             | NL-60        | 0-7"                                                                          | 0-8" | 0-9"  | 2-4" | 3-9" | 3-0"  | 5-2" | 6-0" | 6-8"  | 8-3" | 10-3" | ---    | --- |
|             | NL-70        | 0-7"                                                                          | 0-8" | 0-9"  | 2-4" | 3-9" | 3-0"  | 5-2" | 6-0" | 6-8"  | 8-3" | 10-3" | ---    | --- |
|             | NL-80        | 0-7"                                                                          | 0-8" | 0-9"  | 2-4" | 3-9" | 3-0"  | 5-2" | 6-0" | 6-8"  | 8-3" | 10-3" | ---    | --- |
| 16"         | NL-20        | 0-7"                                                                          | 0-8" | 0-9"  | 2-4" | 3-9" | 3-0"  | 5-2" | 6-0" | 6-8"  | 8-3" | 10-3" | 12-3"  | --- |
|             | NL-40x       | 0-7"                                                                          | 0-8" | 0-9"  | 2-4" | 3-9" | 3-0"  | 5-2" | 6-0" | 6-8"  | 8-3" | 10-3" | 12-3"  | --- |
|             | NL-60        | 0-7"                                                                          | 0-8" | 0-9"  | 2-4" | 3-9" | 3-0"  | 5-2" | 6-0" | 6-8"  | 8-3" | 10-3" | 12-3"  | --- |
|             | NL-70        | 0-7"                                                                          | 0-8" | 0-9"  | 2-4" | 3-9" | 3-0"  | 5-2" | 6-0" | 6-8"  | 8-3" | 10-3" | 12-3"  | --- |
|             | NL-80        | 0-7"                                                                          | 0-8" | 0-9"  | 2-4" | 3-9" | 3-0"  | 5-2" | 6-0" | 6-8"  | 8-3" | 10-3" | 12-3"  | --- |

- Above table may be used for I-joint spacing of 24 inches on centre or less.
- Hole location distance is measured from inside face of support to centre of hole.
- Distances in this chart are based on uniformly loaded joists.
- The above table is based on the I-joints being used at their maximum spans. The minimum distance as given above may be reduced for shorter spans; contact your local distributor.

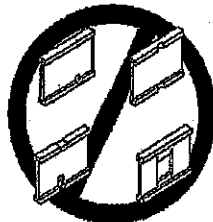
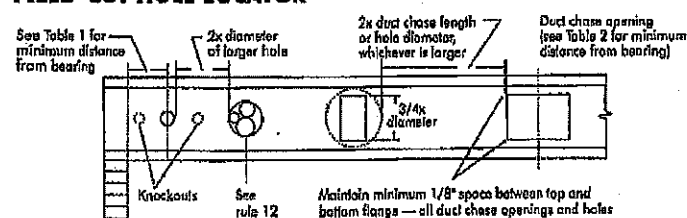


**TABLE 2  
DUCT CHASE OPENING SIZES AND LOCATIONS**  
Simple Span Only

| Joist Depth | Joist Series | Minimum distance from inside face of support to centre of opening (ft - in.) |       |       |       |       |       |       |       |       |  |  |  |  |
|-------------|--------------|------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|--|--|--|--|
|             |              | Duct Chase Length (in.)                                                      |       |       |       |       |       |       |       |       |  |  |  |  |
|             |              | 8                                                                            | 10    | 12    | 14    | 16    | 18    | 20    | 22    | 24    |  |  |  |  |
| 9-1/2"      | NL-20        | 4-1"                                                                         | 4-5"  | 4-10" | 5-4"  | 5-8"  | 6-1"  | 6-6"  | 7-1"  | 7-5"  |  |  |  |  |
|             | NL-40x       | 5-3"                                                                         | 5-8"  | 6-2"  | 6-7"  | 6-8"  | 7-1"  | 7-5"  | 8-0"  | 8-4"  |  |  |  |  |
|             | NL-60        | 6-4"                                                                         | 6-9"  | 7-3"  | 7-8"  | 7-9"  | 8-2"  | 8-6"  | 9-0"  | 9-4"  |  |  |  |  |
|             | NL-70        | 7-5"                                                                         | 8-0"  | 8-4"  | 8-9"  | 9-0"  | 9-3"  | 9-7"  | 10-1" | 10-5" |  |  |  |  |
|             | NL-80        | 8-6"                                                                         | 9-1"  | 9-5"  | 10-0" | 10-1" | 10-4" | 10-8" | 11-2" | 11-6" |  |  |  |  |
| 11-7/8"     | NL-20        | 5-3"                                                                         | 5-8"  | 6-2"  | 6-7"  | 7-1"  | 7-5"  | 8-0"  | 8-4"  | 8-8"  |  |  |  |  |
|             | NL-40x       | 6-4"                                                                         | 6-9"  | 7-3"  | 7-8"  | 8-2"  | 8-6"  | 9-0"  | 9-4"  | 9-8"  |  |  |  |  |
|             | NL-60        | 7-5"                                                                         | 8-0"  | 8-4"  | 8-9"  | 9-3"  | 9-7"  | 10-1" | 10-5" | 10-9" |  |  |  |  |
|             | NL-70        | 8-6"                                                                         | 9-1"  | 9-5"  | 10-0" | 10-4" | 10-8" | 11-2" | 11-6" | 12-0" |  |  |  |  |
|             | NL-80        | 9-7"                                                                         | 10-2" | 10-6" | 11-0" | 11-4" | 11-8" | 12-2" | 12-6" | 13-0" |  |  |  |  |
| 14"         | NL-20        | 6-4"                                                                         | 6-9"  | 7-3"  | 7-8"  | 8-2"  | 8-6"  | 9-0"  | 9-4"  | 9-8"  |  |  |  |  |
|             | NL-40x       | 7-5"                                                                         | 8-0"  | 8-4"  | 8-9"  | 9-3"  | 9-7"  | 10-1" | 10-5" | 10-9" |  |  |  |  |
|             | NL-60        | 8-6"                                                                         | 9-1"  | 9-5"  | 10-0" | 10-4" | 10-8" | 11-2" | 11-6" | 12-0" |  |  |  |  |
|             | NL-70        | 9-7"                                                                         | 10-2" | 10-6" | 11-0" | 11-4" | 11-8" | 12-2" | 12-6" | 13-0" |  |  |  |  |
|             | NL-80        | 10-8"                                                                        | 11-3" | 11-7" | 12-1" | 12-5" | 12-9" | 13-3" | 13-7" | 14-1" |  |  |  |  |
| 16"         | NL-20        | 7-5"                                                                         | 8-0"  | 8-4"  | 8-9"  | 9-3"  | 9-7"  | 10-1" | 10-5" | 10-9" |  |  |  |  |
|             | NL-40x       | 8-6"                                                                         | 9-1"  | 9-5"  | 10-0" | 10-4" | 10-8" | 11-2" | 11-6" | 12-0" |  |  |  |  |
|             | NL-60        | 9-7"                                                                         | 10-2" | 10-6" | 11-0" | 11-4" | 11-8" | 12-2" | 12-6" | 13-0" |  |  |  |  |
|             | NL-70        | 10-8"                                                                        | 11-3" | 11-7" | 12-1" | 12-5" | 12-9" | 13-3" | 13-7" | 14-1" |  |  |  |  |
|             | NL-80        | 11-9"                                                                        | 12-4" | 12-8" | 13-2" | 13-6" | 14-0" | 14-4" | 14-8" | 15-2" |  |  |  |  |

- Above table may be used for I-joint spacing of 24 inches on centre or less.
- Duct chase opening location distance is measured from inside face of support to centre of opening.
- The above table is based on simple span joists only. For other applications, contact your local distributor.
- Distances are based on uniformly loaded floor joists that meet the span requirements for a design live load of 40 psf and dead load of 15 psf, and a live load deflection limit of L/480.
- The above table is based on the I-joints being used at their maximum spans. The minimum distance as given above may be reduced for shorter spans; contact your local distributor.

**FIGURE 7  
FIELD-CUT HOLE LOCATOR**



Knockouts are predrilled holes provided for the contractor's convenience to install electrical or small plumbing lines. They are 1-1/2 inches in diameter, and are spaced 15 inches on centre along the length of the I-joint. Where possible, it is preferable to use knockouts instead of field-cut holes.

Never drill, cut or notch the flange, or over-cut the web.

Holes in webs should be cut with a sharp saw.  
For rectangular holes, avoid over-cutting the corners, as this can cause unnecessary stress concentrations. Slightly rounding the corners is recommended. The rectangular hole by drilling a 1-inch diameter hole in each of the four corners and then making the cuts between the holes is another good method to minimize damage to the I-joint.

### SAFETY AND CONSTRUCTION PRECAUTIONS



Do not walk on I-joints until fully braced and sheathed, or serious injuries can result.



Never stack building materials over unbraced I-joints. Once sheathed, do not over-stress I-joints with concentrated loads from building materials.

**WARNING:** I-joints are not stable until completely installed, and will not carry any load until fully braced and sheathed.

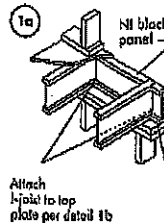
**AVOID ACCIDENTS BY FOLLOWING THESE IMPORTANT GUIDELINES:**

- Brace and nail each I-joint as it is installed, using hangers, blocking panels, rim board, and/or cross-bracing at joist ends. When I-joints are applied continuously over interior supports and a load-bearing wall is planned at that location, blocking will be required at the interior support.
- When the building is completed, the floor sheathing will provide lateral support for the top flanges of the I-joints. Until this sheathing is applied, temporary bracing, often called struts, or temporary sheathing must be applied to prevent I-joint rollover or buckling.
- Temporary bracing or struts must be 1x4 inch minimum, at least 8 feet long and spaced no more than 8 feet on centre, and must be secured with a minimum of two 2-1/2" nails fastened to the top web of each I-joint. Nail the bracing to a lateral restraint at the end of each bay. Lap ends of adjoining bracing over at least two I-joints.
- Or, sheathing (temporary or permanent) can be nailed to the top flange of the first 4 feet of I-joints at the end of the bay.
- For cantilevered I-joints, brace top and bottom flanges, and brace ends with closure panels, rim board, or cross-bracing.
- Install and fully nail permanent sheathing to each I-joint before placing loads on the floor system. Then, stack building materials over beams or walls only.
- Never install a damaged I-joint.

Improper storage or installation, failure to follow applicable building codes, failure to follow span ratings for Nordic I-joints, failure to follow allowable hole sizes and locations, or failure to use web stiffeners when required can result in serious accidents. Follow these installation guidelines carefully.

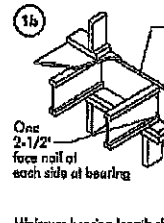
### PRODUCT WARRANTY

Charters Chikoumang guarantees that, in accordance with our specifications, Nordic products are free from manufacturing defects in material and workmanship.  
Furthermore, Charters Chikoumang 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.



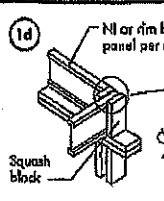
| Blocking Panel or Rim Joist | Maximum Factored Uniform Vertical Load* (psf) |
|-----------------------------|-----------------------------------------------|
| Ni Joist                    | 3,300                                         |

\*The uniform vertical load is limited to a joist depth of 16 inches or less and is based on standard term load duration. It shall not be used in the design of a bending member, such as joist, header, or rafter. For concentrated vertical load transfer, see detail 1d.



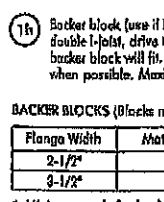
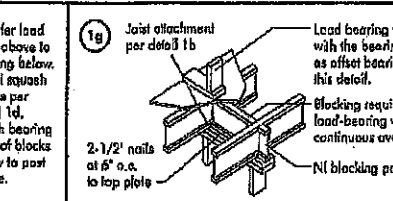
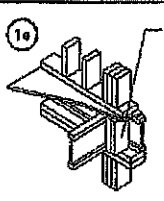
| Blocking Panel or Rim Joist | Maximum Factored Uniform Vertical Load* (psf) |
|-----------------------------|-----------------------------------------------|
| 1-1/8" Rim Board Plus       | 6,090                                         |

\*The uniform vertical load is limited to a rim board depth of 16 inches or less and is based on standard term load duration. It shall not be used in the design of a bending member, such as joist, header, or rafter. For concentrated vertical load transfer, see detail 1d.



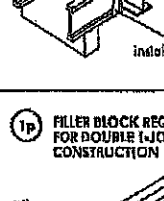
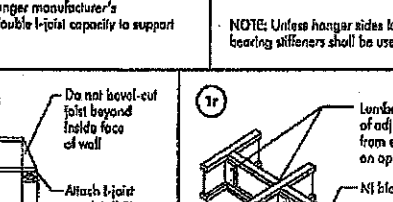
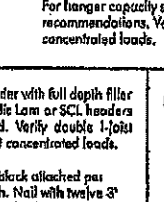
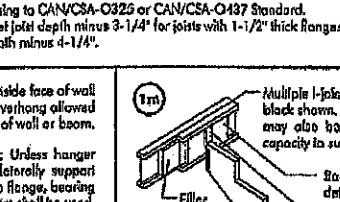
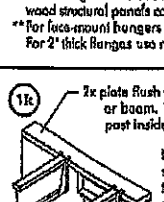
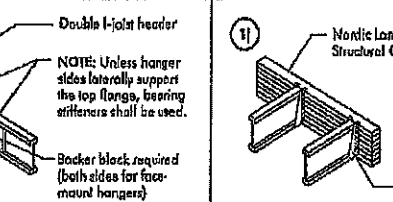
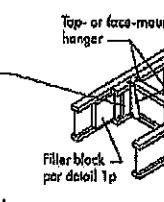
| Pair of Squash Blocks | Maximum Factored Vertical Load per Pair of Squash Blocks (lbs) |
|-----------------------|----------------------------------------------------------------|
| 2x Lumber             | 3,125                                                          |
| 1-1/8" Rim Board Plus | 6,090                                                          |

Provide lateral bracing per detail 1a or 1b.

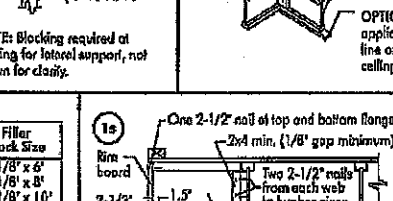
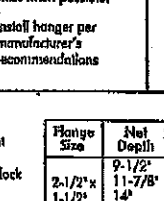


| Flange Width | Material Thickness Required* | Minimum Depth** |
|--------------|------------------------------|-----------------|
| 2-1/2"       | 1"                           | 5-1/2"          |
| 3-1/2"       | 1-1/2"                       | 7-1/4"          |

\* Minimum grade for backer block material shall be S-P-F No. 2 or better for solid sawn lumber and wood structural panels conforming to CAN/CSA-C308 or CAN/CSA-O437 Standard.  
\*\* For face-mount hangers use net joist depth minus 3-1/4" for joists with 1-1/2" thick flanges. For 2" thick flanges use net depth minus 4-1/4".



| Flange Size     | Net Depth | Filler Block Size |
|-----------------|-----------|-------------------|
| 2-1/2" x 1-1/2" | 9-1/2"    | 2-1/8" x 6"       |
|                 | 11-7/8"   | 2-1/8" x 8"       |
|                 | 14"       | 2-1/8" x 10"      |
|                 | 16"       | 2-1/8" x 12"      |
| 3-1/2" x 1-1/2" | 9-1/2"    | 3" x 6"           |
|                 | 11-7/8"   | 3" x 8"           |
|                 | 14"       | 3" x 10"          |
|                 | 16"       | 3" x 12"          |
| 3-1/2" x 2"     | 11-7/8"   | 3" x 7"           |
|                 | 14"       | 3" x 9"           |
|                 | 16"       | 3" x 11"          |

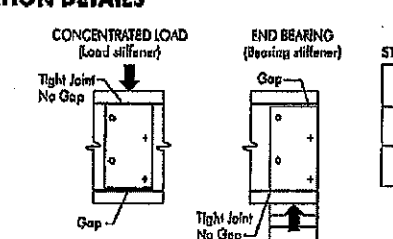
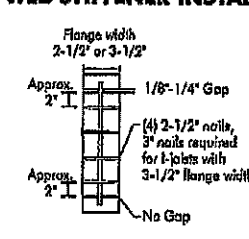


### WEB STIFFENERS

RECOMMENDATIONS:

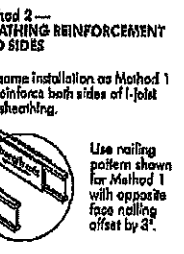
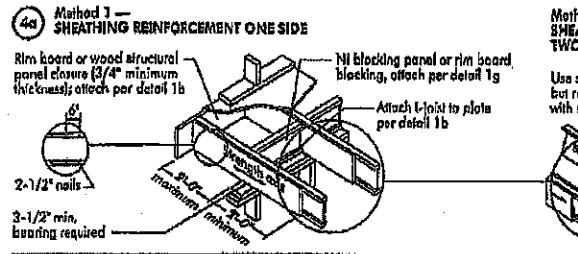
- A bearing stiffener is required in all engineered applications with factored reactions greater than those shown in the I-joint properties table found in the Joist Construction Guide (C101). The gap between the stiffener and the flange is at the top.
- A bearing stiffener is required when the I-joint is supported in a hanger and the sides of the hanger do not extend up to, and support, the top flange. The gap between the stiffener and flange is at the top.
- A load stiffener is required at locations where a factored concentrated load greater than 2,370 lbs is applied to the top flange between supports, or in the case of a cantilever, anywhere between the cantilever tip and the support. These values are for standard term load duration, and may be adjusted for other load durations as permitted by the code. The gap between the stiffener and the flange is at the bottom.

**FIGURE 2  
WEB STIFFENER INSTALLATION DETAILS**

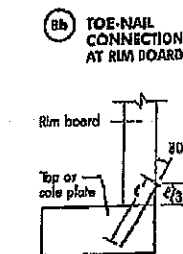
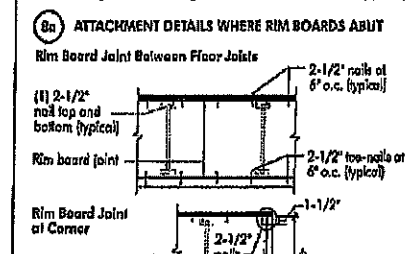


| Flange Width | Web Stiffener Size Each Side of Web |
|--------------|-------------------------------------|
| 2-1/2"       | 1" x 2-3/16" minimum width          |
| 3-1/2"       | 1-1/2" x 2-5/16" minimum width      |

### CANTILEVER DETAILS FOR VERTICAL BUILDING OFFSET



### RIM BOARD INSTALLATION DETAILS



# NORDIC STRUCTURES

COMPANY  
TAMARACK LUMBER INC.  
3269 NORTH SERVICE ROAD  
BURLINGTON ONTARIO  
Nov. 3, 2018 09:40

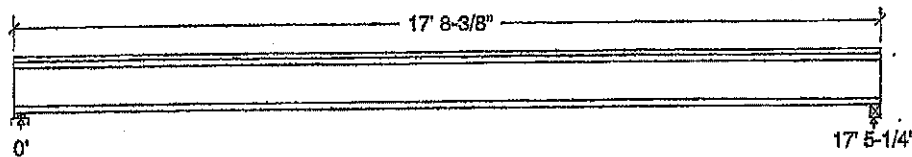
PROJECT  
J1 1ST FLOOR

## Design Check Calculation Sheet Nordic Sizer - Canada 7.1

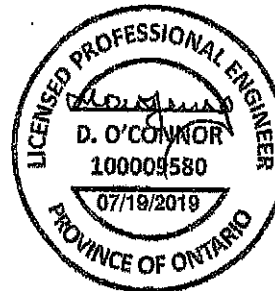
### Loads:

| Load  | Type | Distribution | Pat-tern | Location [ft]<br>Start End | Magnitude<br>Start End | Unit |
|-------|------|--------------|----------|----------------------------|------------------------|------|
| Load1 | Dead | Full Area    |          |                            | 20.00                  | psf  |
| Load2 | Live | Full Area    |          |                            | 40.00                  | psf  |

### Maximum Reactions (lbs), Bearing Resistances (lbs) and Bearing Lengths (in) :



|             |       |  |       |
|-------------|-------|--|-------|
| Unfactored: |       |  |       |
| Dead        | 174   |  | 174   |
| Live        | 349   |  | 349   |
| Factored:   |       |  |       |
| Total       | 741   |  | 741   |
| Bearing:    |       |  |       |
| Resistance  |       |  | 2119  |
| Joist       | 2102  |  | -     |
| Support     | 3981  |  | -     |
| Des ratio   |       |  | 0.35  |
| Joist       | 0.35  |  | -     |
| Support     | 0.19  |  | #2    |
| Load case   | #2    |  | 2-1/2 |
| Length      | 2-3/8 |  | 1-3/4 |
| Min req'd   | 1-3/4 |  | No    |
| Stiffener   | No    |  | 1.00  |
| KD          | 1.00  |  | -     |
| KB support  | 1.00  |  | -     |
| fcp sup     | 769   |  | -     |
| Kzcp sup    | 1.09  |  | -     |



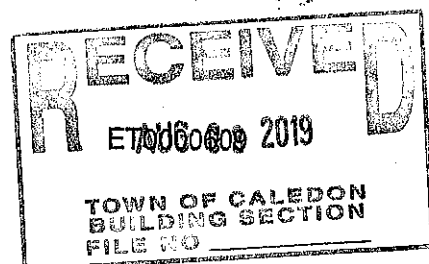
DESIGN CONFORMS TO OBC2012

### Nordic Joist 11-7/8" NI-40x Floor Joist @ 12" o.c.

Supports: 1 - Lumber Sill plate, No.1/No.2; 2 - Steel Beam, W;  
Total length: 17' 8-3/8"; Clear span: 17' 3-1/2"; 3/4" nailed and glued OSB sheathing  
This section PASSES the design code check.

### Limit States Design using CSA O86-14 and Vibration Criterion:

| Criterion    | Analysis Value | Design Value | Unit   | Analysis/Design |
|--------------|----------------|--------------|--------|-----------------|
| Shear        | Vf = 741       | Vr = 2336    | lbs    | Vf/Vr = 0.32    |
| Moment (+)   | Mf = 3231      | Mr = 6255    | lbs-ft | Mf/Mr = 0.52    |
| Perm. Defl'n | 0.11 = < L/999 | 0.58 = L/360 | in     | 0.18            |
| Live Defl'n  | 0.21 = L/990   | 0.44 = L/480 | in     | 0.48            |
| Total Defl'n | 0.32 = L/660   | 0.87 = L/240 | in     | 0.36            |
| Bare Defl'n  | 0.25 = L/844   | 0.58 = L/360 | in     | 0.43            |
| Vibration    | Lmax = 17'-5.3 | Lv = 19'-6.3 | ft     | 0.89            |
| Defl'n       | = 0.026        | = 0.036      | in     | 0.74            |



**Additional Data:**

| FACTORS: | f/B           | KD   | KH   | KZ | KL    | KT | KS | KN | LC# |
|----------|---------------|------|------|----|-------|----|----|----|-----|
| Vr       | 2336          | 1.00 | 1.00 | -  | -     | -  | -  | -  | #2  |
| Mrt      | 6255          | 1.00 | 1.00 | -  | 1.000 | -  | -  | -  | #2  |
| EI       | 371.1 million | -    | -    | -  | -     | -  | -  | -  | #2  |

**CRITICAL LOAD COMBINATIONS:**

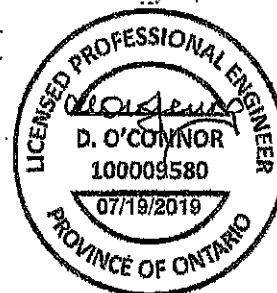
Shear : LC #2 = 1.25D + 1.5L  
 Moment(+) : LC #2 = 1.25D + 1.5L  
 Deflection: LC #1 = 1.0D (permanent)  
               LC #2 = 1.0D + 1.0L (live)  
               LC #2 = 1.0D + 1.0L (total)  
               LC #2 = 1.0D + 1.0L (bare joist)  
 Bearing : Support 1 - LC #2 = 1.25D + 1.5L  
               Support 2 - LC #2 = 1.25D + 1.5L  
 Load Types: D=dead W=wind S=snow H=earth,groundwater E=earthquake  
               L=live(use,occupancy) Ls=live(storage,equipment) f=fire  
 Load Patterns: s=S/2 L=L+Ls \_\_=no pattern load in this span  
 All Load Combinations (LCs) are listed in the Analysis output

**CALCULATIONS:**

Deflection: El<sub>eff</sub> = 443e06 lb-in<sup>2</sup> K= 6.18e06 lbs  
 "Live" deflection = Deflection from all non-dead loads (live, wind, snow...)

**Design Notes:**

1. WoodWorks analysis and design are in accordance with the 2015 National Building Code of Canada (NBC), Division B, Part 4, and the CSA O86-14 Engineering Design in Wood standard, Update No. 2 (June 2017).
2. Please verify that the default deflection limits are appropriate for your application.
3. Refer to Nordic Structures technical documentation for installation guidelines and construction details.
4. Nordic I-joists are listed in CCMC evaluation report 13032-R.
5. Joists shall be laterally supported at supports and continuously along the compression edge.
6. The design assumptions and specifications have been provided by the client. Any damages resulting from faulty or incorrect information, specifications, and/or designs furnished, and the correctness or accuracy of this information is their responsibility. This analysis does not constitute a record of the structural integrity of the building nor suitability of the design assumptions made. Nordic Structures is responsible only for the structural adequacy of this component based on the design criteria and loadings shown.



DESIGN CONFORMS TO OBC2012

ET0000610

# NORDIC STRUCTURES

COMPANY  
TAMARACK LUMBER INC.  
3269 NORTH SERVICE ROAD  
BURLINGTON ONTARIO  
Nov. 3, 2018 09:41

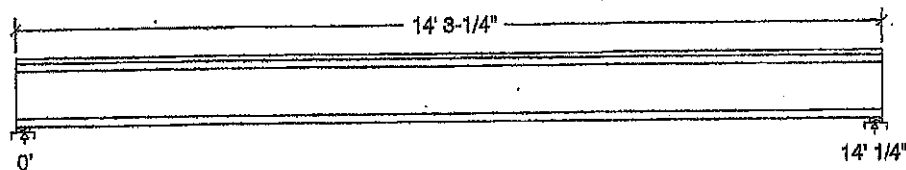
PROJECT  
J2 1ST FLOOR

## Design Check Calculation Sheet Nordic Sizer - Canada 7.1

### Loads:

| Load  | Type | Distribution | Pat-tern | Location [ft]<br>Start End | Magnitude<br>Start End | Unit |
|-------|------|--------------|----------|----------------------------|------------------------|------|
| Load1 | Dead | Full Area    |          |                            | 20.00                  | psf  |
| Load2 | Live | Full Area    |          |                            | 40.00                  | psf  |

### Maximum Reactions (lbs), Bearing Resistances (lbs) and Bearing Lengths (in) :



|             |       |  |       |
|-------------|-------|--|-------|
| Unfactored: |       |  |       |
| Dead        | 187   |  | 187   |
| Live        | 374   |  | 374   |
| Factored:   |       |  |       |
| Total       | 794   |  | 794   |
| Bearing:    |       |  |       |
| Resistance  |       |  |       |
| Joist       | 2102  |  | 2102  |
| Support     | 3981  |  | 3981  |
| Des ratio   |       |  |       |
| Joist       | 0.38  |  | 0.38  |
| Support     | 0.20  |  | 0.20  |
| Load case   | #2    |  | #2    |
| Length      | 2-3/8 |  | 2-3/8 |
| Min req'd   | 1-3/4 |  | 1-3/4 |
| Stiffener   | No    |  | No    |
| KD          | 1.00  |  | 1.00  |
| KB support  | 1.00  |  | 1.00  |
| fcp sup     | 769   |  | 769   |
| Kzcp sup    | 1.09  |  | 1.09  |



DESIGN CONFORMS TO OBC2012

Nordic Joist 11-7/8" NI-40x Floor Joist @ 16" o.c.

Supports: All - Lumber Sill plate, No.1/No.2

Total length: 14' 3-1/4"; Clear span: 13' 10-1/2"; 3/4" nailed and glued OSB sheathing

This section PASSES the design code check.

### Limit States Design using CSA O86-14 and Vibration Criterion:

| Criterion    | Analysis Value | Design Value | Unit   | Analysis/Design |
|--------------|----------------|--------------|--------|-----------------|
| Shear        | Vf = 794       | Vr = 2336    | lbs    | Vf/Vr = 0.34    |
| Moment (+)   | Mf = 2785      | Mr = 6255    | lbs-ft | Mf/Mr = 0.45    |
| Perm. Defl'n | 0.06 = < L/999 | 0.47 = L/360 | in     | 0.13            |
| Live Defl'n  | 0.12 = < L/999 | 0.35 = L/480 | in     | 0.35            |
| Total Defl'n | 0.18 = < L/925 | 0.70 = L/240 | in     | 0.26            |
| Bare Defl'n  | 0.15 = < L/999 | 0.47 = L/360 | in     | 0.31            |
| Vibration    | Lmax = 14'-0.3 | Lv = 18'-1.3 | ft     | 0.77            |
| Defl'n       | = 0.021        | = 0.048      | in     | 0.45            |

ET0000611



**Additional Data:**

| FACTORS: | F/E           | KD   | KH   | KZ | KL    | KT | KS | KN | LC# |
|----------|---------------|------|------|----|-------|----|----|----|-----|
| Vr       | 2336          | 1.00 | 1.00 | -  | -     | -  | -  | -  | #2  |
| Mr+      | 6255          | 1.00 | 1.00 | -  | 1.000 | -  | -  | -  | #2  |
| EI       | 371.1 million | -    | -    | -  | -     | -  | -  | -  | #2  |

**CRITICAL LOAD COMBINATIONS:**

Shear : LC #2 = 1.25D + 1.5L

Moment (+) : LC #2 = 1.25D + 1.5L

Deflection: LC #1 = 1.0D (permanent)

LC #2 = 1.0D + 1.0L (live)

LC #2 = 1.0D + 1.0L (total)

LC #2 = 1.0D + 1.0L (bare joist)

Bearing : Support 1 - LC #2 = 1.25D + 1.5L

Support 2 - LC #2 = 1.25D + 1.5L

Load Types: D=dead W=wind S=snow H=earth, groundwater E=earthquake

L=live (use, occupancy) Ls=live (storage, equipment) f=fire

Load Patterns: s=S/2 L=L+Ls \_=no pattern load in this span

All Load Combinations (LCs) are listed in the Analysis output

**CALCULATIONS:**Deflection: E<sub>ieff</sub> = 460e06 lb-in<sup>2</sup> K = 6.18e06 lbs

"Live" deflection = Deflection from all non-dead loads (live, wind, snow...)

**Design Notes:**

1. WoodWorks analysis and design are in accordance with the 2015 National Building Code of Canada (NBC), Division B, Part 4, and the CSA O86-14 Engineering Design in Wood standard, Update No. 2 (June 2017).
2. Please verify that the default deflection limits are appropriate for your application.
3. Refer to Nordic Structures technical documentation for installation guidelines and construction details.
4. Nordic I-joists are listed in CGMC evaluation report 13032-R.
5. Joists shall be laterally supported at supports and continuously along the compression edge.
6. The design assumptions and specifications have been provided by the client. Any damages resulting from faulty or incorrect information, specifications, and/or designs furnished, and the correctness or accuracy of this information is their responsibility. This analysis does not constitute a record of the structural integrity of the building nor suitability of the design assumptions made. Nordic Structures is responsible only for the structural adequacy of this component based on the design criteria and loadings shown.



DESIGN CONFORMS TO OBC2012

ET0000612

# NORDIC STRUCTURES

**COMPANY**  
TAMARACK LUMBER INC.  
3269 NORTH SERVICE ROAD  
BURLINGTON ONTARIO  
Nov. 3, 2018 09:43

**PROJECT**  
J8 1ST FLOOR

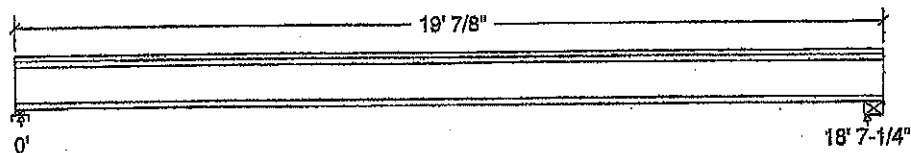
## Design Check Calculation Sheet

Nordic Sizer - Canada 7.1

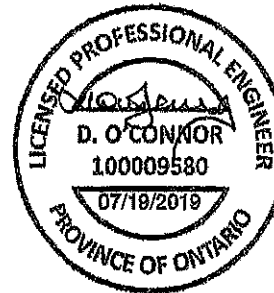
### Loads:

| Load  | Type | Distribution | Pat-tern | Location [ft]<br>Start End | Magnitude<br>Start End | Unit |
|-------|------|--------------|----------|----------------------------|------------------------|------|
| Load1 | Dead | Full Area    |          |                            | 20.00                  | psf  |
| Load2 | Live | Full Area    |          |                            | 40.00                  | psf  |

### Maximum Reactions (lbs), Bearing Resistances (lbs) and Bearing Lengths (in) :



|             |       |  |       |
|-------------|-------|--|-------|
| Unfactored: |       |  |       |
| Dead        | 186   |  | 186   |
| Live        | 372   |  | 372   |
| Factored:   |       |  |       |
| Total       | 791   |  | 791   |
| Bearing:    |       |  |       |
| Resistance  |       |  |       |
| Joist       | 2187  |  | 2336  |
| Support     | 5559  |  | -     |
| Des ratio   |       |  |       |
| Joist       | 0.36  |  | 0.34  |
| Support     | 0.14  |  | -     |
| Load case   | #2    |  | #2    |
| Length      | 2-3/8 |  | 5     |
| Min req'd   | 1-3/4 |  | 1-3/4 |
| Stiffener   | No    |  | No    |
| KD          | 1.00  |  | 1.00  |
| KB support  | 1.00  |  | -     |
| fcp sup     | 769   |  | -     |
| Kzcp sup    | 1.09  |  | -     |

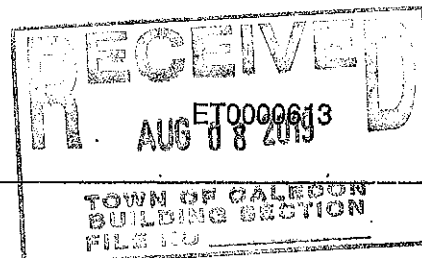


DESIGN CONFORMS TO OBC2012

**Nordic Joist 11-7/8" NI-80 Floor joist @ 12" o.c.**  
Supports: 1 - Lumber Sill plate, No.1/No.2; 2 - Steel Beam, W;  
Total length: 19' 7/8"; Clear span: 18' 5-1/2"; 3/4" nailed and glued OSB sheathing  
This section PASSES the design code check.

### Limit States Design using CSA 086-14 and Vibration Criterion:

| Criterion    | Analysis Value | Design Value | Unit   | Analysis/Design |
|--------------|----------------|--------------|--------|-----------------|
| Shear        | Vf = 791       | Vr = 2336    | lbs    | Vf/Vr = 0.34    |
| Moment (+)   | Mf = 3678      | Mr = 11609   | lbs-ft | Mf/Mr = 0.32    |
| Perm. Defl'n | 0.10 = < L/999 | 0.62 = L/360 | in     | 0.16            |
| Live Defl'n  | 0.20 = < L/999 | 0.47 = L/480 | in     | 0.43            |
| Total Defl'n | 0.30 = < L/746 | 0.93 = L/240 | in     | 0.32            |
| Bare Defl'n  | 0.22 = < L/996 | 0.62 = L/360 | in     | 0.36            |
| Vibration    | Lmax = 18'-7.3 | Lv = 21'-2.7 | ft     | 0.88            |
| Defl'n       | = 0.024        | = 0.034      | in     | 0.72            |



**Additional Data:**

| FACTORS: | f/E           | KD   | KH   | KZ | KL    | KT | KS | KN | LC# |
|----------|---------------|------|------|----|-------|----|----|----|-----|
| Vr       | 2336          | 1.00 | 1.00 | -  | -     | -  | -  | -  | #2  |
| Mrt      | 11609         | 1.00 | 1.00 | -  | 1.000 | -  | -  | -  | #2  |
| EI       | 547.1 million | -    | -    | -  | -     | -  | -  | -  | #2  |

**CRITICAL LOAD COMBINATIONS:**

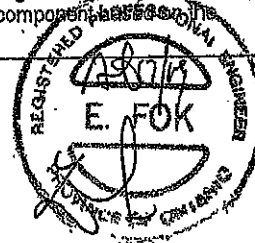
Shear : LC #2 = 1.25D + 1.5L  
 Moment (+) : LC #2 = 1.25D + 1.5L  
 Deflection: LC #1 = 1.0D (permanent)  
               LC #2 = 1.0D + 1.0L (live)  
               LC #2 = 1.0D + 1.0L (total)  
               LC #2 = 1.0D + 1.0L (bare joist)  
 Bearing : Support 1 - LC #2 = 1.25D + 1.5L  
               Support 2 - LC #2 = 1.25D + 1.5L  
 Load Types: D=dead W=wind S=snow H=earth, groundwater E=earthquake  
               L=live (use, occupancy) Ls=live (storage, equipment) f=fire  
 Load Patterns: s=S/2 L=L+Ls =no pattern load in this span  
 All Load Combinations (LCs) are listed in the Analysis output

**CALCULATIONS:**

Deflection:  $EI_{eff} = 625e06 \text{ lb-in}^2$   $K = 6.18e06 \text{ lbs}$   
 "Live" deflection = Deflection from all non-dead loads (live, wind, snow...)

**Design Notes:**

1. WoodWorks analysis and design are in accordance with the 2015 National Building Code of Canada (NBC), Division B, Part 4, and the CSA O86-14 Engineering Design in Wood standard, Update No. 2 (June 2017).
2. Please verify that the default deflection limits are appropriate for your application.
3. Refer to Nordic Structures technical documentation for installation guidelines and construction details.
4. Nordic Joists are listed in CCMC evaluation report 13032-R.
5. Joists shall be laterally supported at supports and continuously along the compression edge.
6. The design assumptions and specifications have been provided by the client. Any damages resulting from faulty or incorrect information, specifications, and/or designs furnished, and the correctness or accuracy of this information is their responsibility. This analysis does not constitute a record of the structural integrity of the building nor suitability of the design assumptions made. Nordic Structures is responsible only for the structural adequacy of this component based on the design criteria and loadings shown.



DESIGN CONFORMS  
TO OBC 2012

ET0000614

# NORDIC STRUCTURES

**COMPANY**  
TAMARACK LUMBER INC.  
3269 NORTH SERVICE ROAD  
BURLINGTON ONTARIO  
Nov. 3, 2018 09:41

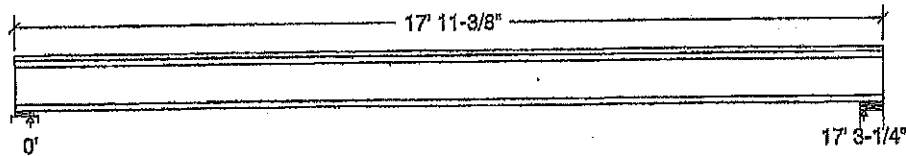
**PROJECT**  
J1 2ND FLOOR

## Design Check Calculation Sheet Nordic Sizer - Canada 7.1

### Loads:

| Load  | Type | Distribution | Pat-tern | Location [ft]<br>Start End | Magnitude<br>Start End | Unit |
|-------|------|--------------|----------|----------------------------|------------------------|------|
| Load1 | Dead | Full Area    |          |                            | 20.00                  | psf  |
| Load2 | Live | Full Area    |          |                            | 40.00                  | psf  |

### Maximum Reactions (lbs), Bearing Resistances (lbs) and Bearing Lengths (in) :



|             |       |  |       |
|-------------|-------|--|-------|
| Unfactored: |       |  |       |
| Dead        | 173   |  | 173   |
| Live        | 345   |  | 345   |
| Factored:   |       |  |       |
| Total       | 734   |  | 734   |
| Bearing:    |       |  |       |
| Resistance  |       |  |       |
| Joist       | 2336  |  | 2336  |
| Support     | 7735  |  | 9724  |
| Des ratio   |       |  |       |
| Joist       | 0.31  |  | 0.31  |
| Support     | 0.09  |  | 0.08  |
| Load case   | #2    |  | #2    |
| Length      | 4-3/8 |  | 5-1/2 |
| Min req'd   | 1-3/4 |  | 1-3/4 |
| Stiffener   | No    |  | No    |
| KD          | 1.00  |  | 1.00  |
| KB support  | 1.00  |  | 1.00  |
| Fcp sup     | 769   |  | 769   |
| Kzcp sup    | 1.15  |  | 1.15  |



Bearing for wall supports is perpendicular-to-grain bearing on top plate.

DESIGN CONFORMS TO OBC2012

### Nordic Joist 11-7/8" N1-40x Floor Joist @ 12" o.c.

Supports: 1 - Lumber Sill plate, No.1/No.2; 2 - Lumber Wall, No.1/No.2;

Total length: 17' 11-3/8"; Clear span: 17' 1-1/2"; 5/8" nailed and glued OSB sheathing with 1/2" gypsum ceiling

This section PASSES the design code check.

### Limit States Design using CSA O86-14 and Vibration Criterion:

| Criterion    | Analysis Value | Design Value  | Unit   | Analysis/Design |
|--------------|----------------|---------------|--------|-----------------|
| Shear        | Vf = 734       | Vr = 2336     | lbs    | Vf/Vr = 0.31    |
| Moment (+)   | Mf = 3169      | Mr = 8255     | lbs-ft | Mf/Mr = 0.38    |
| Perm. Defl'n | 0.10 = < L/999 | 0.58 = L/360  | in     | 0.18            |
| Live Defl'n  | 0.21 = L/995   | 0.43 = L/480  | in     | 0.48            |
| Total Defl'n | 0.31 = L/663   | 0.96 = L/240  | in     | 0.36            |
| Bare Defl'n  | 0.24 = L/867   | 0.58 = L/360  | in     | 0.42            |
| Vibration    | Lmax = 17'-3.3 | Lv = 18'-11.1 | ft     | 0.91            |
| Defl'n       | = 0.028        | = 0.036       | in     | 0.78            |

ET0000615

**Additional Data:**

| FACTORS: | f/E           | KD   | KH   | KZ | KL    | KT | KS | KN | LC# |
|----------|---------------|------|------|----|-------|----|----|----|-----|
| Vr       | 2336          | 1.00 | 1.00 | -  | -     | -  | -  | -  | #2  |
| Mr+      | 6255          | 1.00 | 1.00 | -  | 1.000 | -  | -  | -  | #2  |
| EI       | 371.1 million | -    | -    | -  | -     | -  | -  | -  | #2  |

**CRITICAL LOAD COMBINATIONS:**

Shear : LC #2 = 1.25D + 1.5L

Moment (+) : LC #2 = 1.25D + 1.5L

Deflection: LC #1 = 1.0D (permanent)

LC #2 = 1.0D + 1.0L (live)

LC #2 = 1.0D + 1.0L (total)

LC #2 = 1.0D + 1.0L (bare joist)

Bearing : Support 1 - LC #2 = 1.25D + 1.5L

Support 2 - LC #2 = 1.25D + 1.5L

Load Types: D=dead W=wind S=snow H=earth, groundwater E=earthquake

L=live (use, occupancy) Ls=live (storage, equipment) f=fire

Load Patterns: s=S/2 L=L+Ls \_=no pattern load in this span

All Load Combinations (LCs) are listed in the Analysis output

**CALCULATIONS:**Deflection: E<sub>ieff</sub> = 433e06 lb-in<sup>2</sup> K= 6.18e06 lbs

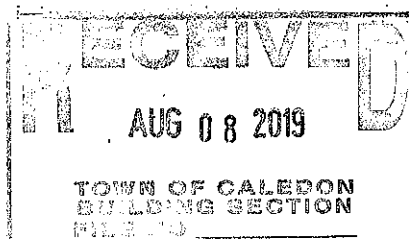
"Live" deflection = Deflection from all non-dead loads (live, wind, snow...)

**Design Notes:**

1. WoodWorks analysis and design are in accordance with the 2015 National Building Code of Canada (NBC), Division B, Part 4, and the CSA O86-14 Engineering Design in Wood standard, Update No. 2 (June 2017).
2. Please verify that the default deflection limits are appropriate for your application.
3. Refer to Nordic Structures technical documentation for installation guidelines and construction details.
4. Nordic I-joists are listed in CCMC evaluation report 13032-R.
5. Joists shall be laterally supported at supports and continuously along the compression edge.
6. The design assumptions and specifications have been provided by the client. Any damages resulting from faulty or incorrect information, specifications, and/or designs furnished, and the correctness or accuracy of this information is their responsibility. This analysis does not constitute a record of the structural integrity of the building nor suitability of the design assumptions made. Nordic Structures is responsible only for the structural adequacy of this component based on the design criteria and loadings shown.



DESIGN CONFORMS TO OBC2012



ET0000616



# NORDIC STRUCTURES

**COMPANY**  
TAMARACK LUMBER INC.  
3289 NORTH SERVICE ROAD  
BURLINGTON ONTARIO  
Nov. 8, 2018 15:10

**PROJECT**  
J2 2ND FLOOR

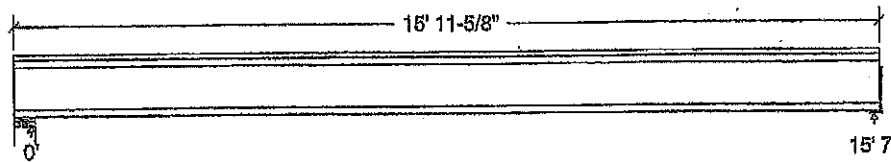
## Design Check Calculation Sheet

Nordic Sizer - Canada 7.1

### Loads:

| Load  | Type | Distribution | Pat-tern | Location (ft)<br>Start End | Magnitude<br>Start End | Unit |
|-------|------|--------------|----------|----------------------------|------------------------|------|
| Load1 | Dead | Full Area    |          |                            | 20.00                  | psf  |
| Load2 | Live | Full Area    |          |                            | 40.00                  | psf  |

### Maximum Reactions (lbs), Bearing Resistances (lbs) and Bearing Lengths (in) :



|             |       |  |      |
|-------------|-------|--|------|
| Unfactored: |       |  |      |
| Dead        | 156   |  | 156  |
| Live        | 312   |  | 312  |
| Factored:   |       |  |      |
| Total       | 662   |  | 662  |
| Bearing:    |       |  |      |
| Resistance  |       |  |      |
| Joist       | 2336  |  | 2048 |
| Support     | 7735  |  | -    |
| Des ratio   |       |  |      |
| Joist       | 0.28  |  | 0.32 |
| Support     | 0.09  |  | -    |
| Load case   | #2    |  | #2   |
| Length      | 4-3/8 |  | 2    |
| Min req'd   | 1-3/4 |  | -3/4 |
| Stiffener   | No    |  | No   |
| KD          | 1.00  |  | 1.00 |
| KB support  | 1.00  |  | -    |
| fcp sup     | 769   |  | -    |
| Kzcp sup    | 1.15  |  | -    |



Bearing for wall supports is perpendicular-to-grain bearing on top plate.

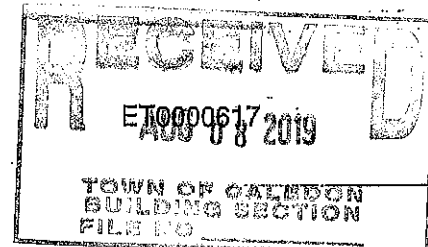
DESIGN CONFORMS TO OBC2012

**Nordic Joist 11-7/8" NI-40x Floor joist @ 12" o.c.**

Supports: 1 - Lumber Wall, No.1/No.2; 2 - Hanger;

Total length: 15' 11-5/8"; Clear span: 15' 5-1/4"; 5/8" nailed and glued OSB sheathing with 1/2" gypsum ceiling

**This section PASSES the design code check.**



## Limit States Design using CSA O86-14 and Vibration Criterion:

| Criterion    | Analysis Value | Design Value   | Unit   | Analysis/Design |
|--------------|----------------|----------------|--------|-----------------|
| Shear        | Vf = 662       | Vr = 2336      | lbs    | Vf/Vr = 0.28    |
| Moment (+)   | Mf = 2580      | Mr = 6255      | lbs-ft | Mf/Mr = 0.41    |
| Perm. Defl'n | 0.07 = < L/999 | 0.52 = L/360   | in     | 0.14            |
| Live Defl'n  | 0.14 = < L/999 | 0.39 = L/480   | in     | 0.36            |
| Total Defl'n | 0.21 = L/881   | 0.78 = L/240   | in     | 0.27            |
| Bare Defl'n  | 0.16 = < L/999 | 0.52 = L/360   | in     | 0.31            |
| Vibration    | Lmax = 15'-7"  | Lv = 18'-11.1" | ft     | 0.82            |
| Defl'n       | = 0.024        | = 0.042        | in     | 0.56            |

## Additional Data:

| FACTORS: | f/E           | KD   | KH   | KZ | KL    | KT | KS | KN | LC# |
|----------|---------------|------|------|----|-------|----|----|----|-----|
| Vr       | 2336          | 1.00 | 1.00 | -  | -     | -  | -  | -  | #2  |
| Mr+      | 6255          | 1.00 | 1.00 | -  | 1.000 | -  | -  | -  | #2  |
| EI       | 371.1 million | -    | -    | -  | -     | -  | -  | -  | #2  |

## CRITICAL LOAD COMBINATIONS:

Shear : LC #2 = 1.25D + 1.5L

Moment (+) : LC #2 = 1.25D + 1.5L

Deflection: LC #1 = 1.0D (permanent)

LC #2 = 1.0D + 1.0L (live)

LC #2 = 1.0D + 1.0L (total)

LC #2 = 1.0D + 1.0L (bare joist)

Bearing : Support 1 - LC #2 = 1.25D + 1.5L

Support 2 - LC #2 = 1.25D + 1.5L

Load Types: D=dead W=wind S=snow H=earth, groundwater E=earthquake

L=live (use, occupancy) Ls=live (storage, equipment) f=fire

Load Patterns: s=S/2 L=L+Ls \_=no pattern load in this span

All Load Combinations (LCs) are listed in the Analysis output

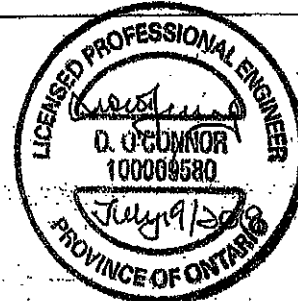
## CALCULATIONS:

Deflection: E<sub>l</sub>eff = 433e06 lb-in<sup>2</sup> K= 6.18e06 lbs

"Live" deflection = Deflection from all non-dead loads (live, wind, snow...)

## Design Notes:

1. WoodWorks analysis and design are in accordance with the 2015 National Building Code of Canada (NBCC), Part 4, and the CSA O86-14 Engineering Design in Wood standard, Update No. 2 (June 2017).
2. Please verify that the default deflection limits are appropriate for your application.
3. Refer to Nordic Structures technical documentation for installation guidelines and construction details.
4. Nordic I-joists are listed in CCMC evaluation report 13032-R.
5. Joists shall be laterally supported at supports and continuously along the compression edge.
6. The design assumptions and specifications have been provided by the client. Any damages resulting from faulty or incorrect information, specifications, and/or designs furnished, and the correctness or accuracy of this information is their responsibility. This analysis does not constitute a record of the structural integrity of the building nor suitability of the design assumptions made. Nordic Structures is responsible only for the structural adequacy of this component based on the design criteria and loadings shown.



DESIGN CONFORMS  
TO CBC 2012

ET0000618

# NORDIC STRUCTURES

**COMPANY**  
TAMARACK LUMBER INC.  
3269 NORTH SERVICE ROAD  
BURLINGTON ONTARIO  
Nov. 3, 2018 09:42

**PROJECT**  
J5 2ND FLOOR ABOVE GARAGE

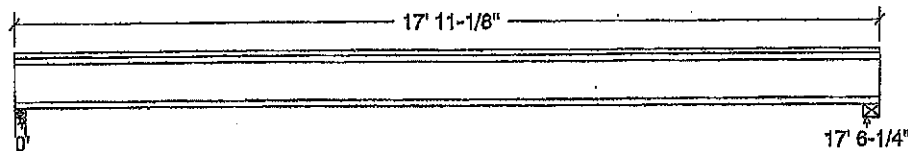
## Design Check Calculation Sheet

Nordic Sizer - Canada 7.1

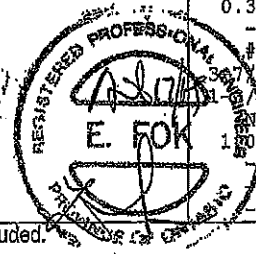
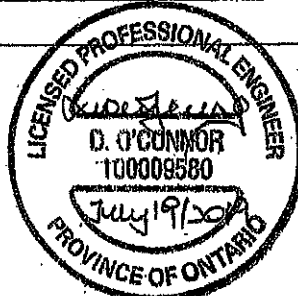
### Loads:

| Load  | Type | Distribution | Pat-tern | Location [ft]<br>Start End | Magnitude<br>Start End | Unit |
|-------|------|--------------|----------|----------------------------|------------------------|------|
| Load1 | Dead | Full Area    |          |                            | 20.00                  | psf  |
| Load2 | Live | Full Area    |          |                            | 40.00                  | psf  |

### Maximum Reactions (lbs), Bearing Resistances (lbs) and Bearing Lengths (in) :



|             |       |  |       |
|-------------|-------|--|-------|
| Unfactored: |       |  |       |
| Dead        | 175   |  | 175   |
| Live        | 350   |  | 350   |
| Factored:   |       |  |       |
| Total       | 745   |  | 745   |
| Bearing:    |       |  |       |
| Resistance  |       |  |       |
| Joist       | 2221  |  | 2323  |
| Support     | 6659  |  | -     |
| Des ratio   |       |  |       |
| Joist       | 0.34  |  | 0.32  |
| Support     | 0.11  |  | -     |
| Load case   | #2    |  | #2    |
| Length      | 2-3/4 |  | 347/8 |
| Min req'd   | 1-3/4 |  | 1-3/4 |
| Stiffener   | No    |  | 1-3/4 |
| KD          | 1.00  |  | 1.00  |
| KB support  | 1.00  |  | 1.00  |
| fop sup     | 769   |  | 1.00  |
| Ktop sup    | 1.13  |  | 1.00  |



DESIGN CONFORMS  
TO OBC 2012

Bearing for wall supports is perpendicular-to-grain bearing on top plate. No stud design included.

Nordic Joist 11-7/8" NI-80 Floor Joist @ 12" o.c.

Supports: 1 - Lumber Wall, No.1/No.2; 2 - Steel Beam, W;

Total length: 17' 11-1/8"; Clear span: 17' 4-1/2"; 5/8" nailed and glued OSB sheathing

This section PASSES the design code check.

### Limit States Design using CSA O86-14 and Vibration Criterion:

| Criterion    | Analysis Value | Design Value | Unit   | Analysis/Design |
|--------------|----------------|--------------|--------|-----------------|
| Shear        | Vf = 745       | Vr = 2336    | lbs    | Vf/Vr = 0.32    |
| Moment (+)   | Mf = 3262      | Mr = 11609   | lbs-ft | Mf/Mr = 0.28    |
| Perm. Defl'n | 0.08 = < L/999 | 0.58 = L/360 | in     | 0.14            |
| Live Defl'n  | 0.16 = < L/999 | 0.44 = L/480 | in     | 0.37            |
| Total Defl'n | 0.24 = L/864   | 0.88 = L/240 | in     | 0.28            |
| Bare Defl'n  | 0.18 = < L/999 | 0.58 = L/360 | in     | 0.31            |
| Vibration    | Lmax = 17'-6.3 | Lv = 19'-11  | ft     | 0.68            |
| Defl'n       | = 0.026        | = 0.036      | in     | 0.72            |

ET0000619

**Additional Data:**

| FACTORS: | f/E           | KD   | KH   | KZ | KL    | KT | KS | KN | LC# |
|----------|---------------|------|------|----|-------|----|----|----|-----|
| Vr       | 2336          | 1.00 | 1.00 | -  | -     | -  | -  | -  | #2  |
| Mr+      | 11609         | 1.00 | 1.00 | -  | 1.000 | -  | -  | -  | #2  |
| EI       | 547.1 million | -    | -    | -  | -     | -  | -  | -  | #2  |

**CRITICAL LOAD COMBINATIONS:**

Shear : LC #2 = 1.25D + 1.5L

Moment (+) : LC #2 = 1.25D + 1.5L

Deflection: LC #1 = 1.0D (permanent)

LC #2 = 1.0D + 1.0L (live)

LC #2 = 1.0D + 1.0L (total)

LC #2 = 1.0D + 1.0L (bare joist)

Bearing : Support 1 - LC #2 = 1.25D + 1.5L

Support 2 - LC #2 = 1.25D + 1.5L

Load Types: D=dead W=wind S=snow H=earth, groundwater E=earthquake

L=live (use, occupancy) Ls=live (storage, equipment) f=fire

Load Patterns: s=S/2 L=L+Ls \_=no pattern load in this span

All Load Combinations (LCs) are listed in the Analysis output

**CALCULATIONS:**Deflection: E<sub>leff</sub> = 613e06 lb-in<sup>2</sup> K= 6.18e06 lbs

"Live" deflection = Deflection from all non-dead loads (live, wind, snow...)

**Design Notes:**

1. WoodWorks analysis and design are in accordance with the 2015 National Building Code of Canada (NBC), Division B, Part 4, and the CBA O86-14 Engineering Design in Wood standard, Update No. 2 (June 2017).
2. Please verify that the default deflection limits are appropriate for your application.
3. Refer to Nordic Structures technical documentation for installation guidelines and construction details.
4. Nordic Joists are listed in CCMC evaluation report 13032-R.
5. Joists shall be laterally supported at supports and continuously along the compression edge.
6. The design assumptions and specifications have been provided by the client. Any damages resulting from faulty or incorrect information, specifications, and/or designs furnished, and the correctness or accuracy of this information is their responsibility. This analysis does not constitute a record of the structural integrity of the building nor suitability of the design assumptions made. Nordic Structures is responsible only for the structural adequacy of this component based on the design criteria and loadings shown.



DESIGN CONFORMS TO OBC2012

ET0000620

# NORDIC STRUCTURES

COMPANY  
TAMARACK LUMBER INC.  
3269 NORTH SERVICE ROAD  
BURLINGTON ONTARIO  
Nov. 6, 2018 13:07

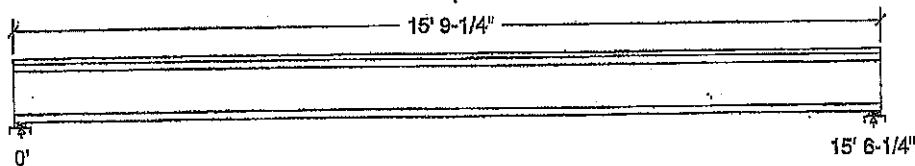
PROJECT  
J2 1ST FLOOR ELEV 2

## Design Check Calculation Sheet Nordic Sizer -- Canada 7.1

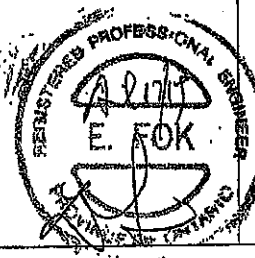
### Loads:

| Load  | Type | Distribution | Pat-tern | Location [ft]<br>Start End | Magnitude<br>Start End | Unit |
|-------|------|--------------|----------|----------------------------|------------------------|------|
| Load1 | Dead | Full Area    |          |                            | 20.00                  | psf  |
| Load2 | Live | Full Area    |          |                            | 40.00                  | psf  |

### Maximum Reactions (lbs), Bearing Resistances (lbs) and Bearing Lengths (in) :



|             |       |  |  |       |
|-------------|-------|--|--|-------|
| Unfactored: |       |  |  |       |
| Dead        | 207   |  |  | 207   |
| Live        | 414   |  |  | 414   |
| Factored:   |       |  |  |       |
| Total       | 879   |  |  | 879   |
| Bearing:    |       |  |  |       |
| Resistance  |       |  |  |       |
| Joist       | 2101  |  |  | 2102  |
| Support     | 3651  |  |  | 3659  |
| Des ratio   |       |  |  |       |
| Joist       | 0.42  |  |  | 0.42  |
| Support     | 0.24  |  |  | 0.24  |
| Load case   | #2    |  |  | #2    |
| Length      | 2-3/8 |  |  | 2-3/8 |
| Min req'd   | 1-3/4 |  |  | 3/4   |
| Stiffener   | No    |  |  | No    |
| KD          | 1.00  |  |  | 1.00  |
| KB support  | 1.00  |  |  | 1.00  |
| Kcp sup.    | 769   |  |  | 769   |
| Kzcp sup    | 1.00  |  |  | 1.00  |



Nordic Joist 11-7/8" NI-40x Floor joist @ 16" o.c.

Supports: All - Lumber Sill plate, No.1/No.2

Total length: 15' 9-1/4"; Clear span: 15' 4-1/2"; 3/4" nailed and glued OSB sheathing

This section PASSES the design code check.

### Limit States Design using CSA 086-14 and Vibration Criterion:

| Criterion    | Analysis Value | Design Value | Unit   | Analysis/Design |
|--------------|----------------|--------------|--------|-----------------|
| Shear        | Vf = 879       | Vr = 2336    | lbs    | Vf/Vr = 0.38    |
| Moment (+)   | Mf = 3413      | Mr = 6255    | lbs-ft | Mf/Mr = 0.55    |
| Perm. Defl'n | 0.09 = < L/999 | 0.52 = L/360 | in     | 0.17            |
| Live Defl'n  | 0.18 = < L/999 | 0.39 = L/480 | in     | 0.45            |
| Total Defl'n | 0.26 = L/703   | 0.78 = L/240 | in     | 0.34            |
| Bare Defl'n  | 0.21 = L/876   | 0.52 = L/360 | in     | 0.41            |
| Vibration    | Lmax = 15'-6.3 | Lv = 18'-1.3 | ft     | 0.86            |
| Defl'n       | = 0.026        | = 0.042      | in     | 0.62            |

ET0000621

**Additional Data:**

| FACTORS: | f/E           | KD   | KH   | KE | KL    | KT | KS | KN | LC# |
|----------|---------------|------|------|----|-------|----|----|----|-----|
| Vr       | 2336          | 1.00 | 1.00 | -  | -     | -  | -  | -  | #2  |
| Mr+      | 6255          | 1.00 | 1.00 | -  | 1.000 | -  | -  | -  | #2  |
| EI       | 371.1 million | -    | -    | -  | -     | -  | -  | -  | #2  |

**CRITICAL LOAD COMBINATIONS:**

Shear : LC #2 = 1.25D + 1.5L

Moment (+) : LC #2 = 1.25D + 1.5L

Deflection: LC #1 = 1.0D (permanent)

LC #2 = 1.0D + 1.0L (Live)

LC #2 = 1.0D + 1.0L (total)

LC #2 = 1.0D + 1.0L (bare joist)

Bearing : Support 1 - LC #2 = 1.25D + 1.5L

Support 2 - LC #2 = 1.25D + 1.5L

Load Types: D=dead W=wind S=snow H=earth, groundwater E=earthquake

L=live (use, occupancy) Ls=live (storage, equipment) f=fire

Load Patterns: s=S/2 L=L+Ls no pattern load in this span

All Load Combinations (LCs) are listed in the Analysis output

**CALCULATIONS:**Deflection: E<sub>ieff</sub> = 460e06 lb-in<sup>2</sup> K = 6.18e06 lbs

"Live" deflection = Deflection from all non-dead loads (live, wind, snow...)

**Design Notes:**

1. WoodWorks analysis and design are in accordance with the 2015 National Building Code of Canada (NBC), Division B, Part 4, and the CSA O86-14 Engineering Design in Wood standard, Update No. 2 (June 2017).
2. Please verify that the default deflection limits are appropriate for your application.
3. Refer to Nordic Structures technical documentation for installation guidelines and construction details.
4. Nordic I-joists are listed in CCMC evaluation report 13032-R.
5. Joists shall be laterally supported at supports and continuously along the compression edge.
6. The design assumptions and specifications have been provided by the client. Any damages resulting from faulty or incorrect information, specifications, and/or designs furnished, and the correctness or accuracy of this information is their responsibility. This analysis does not constitute a record of the structural integrity of the building nor suitability of the design assumptions made. Nordic Structures is responsible only for the structural adequacy of this component based on the design criteria and loadings shown.



DESIGN CONFORMS TO OBC2012

ET0000622

# NORDIC STRUCTURES

COMPANY  
TAMARACK LUMBER INC.  
3269 NORTH SERVICE ROAD  
BURLINGTON ONTARIO  
Nov. 7, 2018 13:21

PROJECT  
J2 2ND FLOOR ELEV 2 CANT

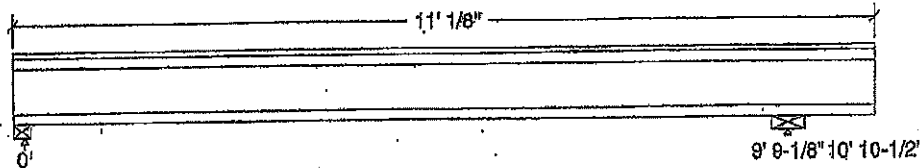
## Design Check Calculation Sheet Nordic Sizer - Canada 7.1

### Loads:

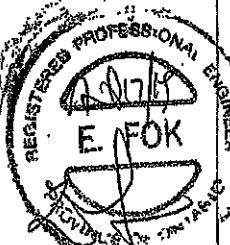
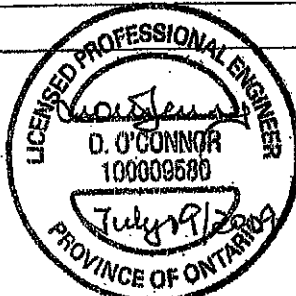
| Load    | Type | Distribution | Pat-tern | Location [ft]<br>Start End | Magnitude<br>Start End | Unit |
|---------|------|--------------|----------|----------------------------|------------------------|------|
| Load1   | Dead | Full Area    | No       |                            | 20.00                  | psf  |
| Load2   | Live | Full Area    | Yes      |                            | 40.00                  | psf  |
| WALL    | Dead | Point        | No       | 11.01                      | 133                    | lbs  |
| ROOF D  | Dead | Point        | No       | 11.01                      | 40                     | lbs  |
| ROOF L  | Live | Point        | Yes      | 11.01                      | 44                     | lbs  |
| ROOF SN | Snow | Point        | Yes      | 11.01                      | 127                    | lbs  |

Load magnitude does not include Normal Importance factor from O86 Table 5.2.3.2, which is applied during analysis.

### Maximum Reactions (lbs), Bearing Resistances (lbs) and Bearing Lengths (in) :



|             |       |  |       |  |
|-------------|-------|--|-------|--|
| Unfactored: |       |  |       |  |
| Dead        | 109   |  | 354   |  |
| Live        | 260   |  | 372   |  |
| Snow        | -15   |  | 142   |  |
| Factored:   |       |  |       |  |
| Total       | 526   |  | 1143  |  |
| Bearing:    |       |  |       |  |
| Resistance  |       |  | 4063  |  |
| Joist       | 1867  |  | -     |  |
| Support     | -     |  | -     |  |
| Des ratio   |       |  | 0.28  |  |
| Joist       | 0.28  |  | -     |  |
| Support     | -     |  | -     |  |
| Load case   | #10   |  | #4    |  |
| Length      | 2-1/2 |  | 5     |  |
| Min req'd   | 1-3/4 |  | 1-1/2 |  |
| Stiffener   | No    |  | No    |  |
| KD          | 1.00  |  | 1.00  |  |
| KB support  | -     |  | -     |  |
| fcp sup     | -     |  | -     |  |
| Kzcp sup    | -     |  | -     |  |



DESIGN CONFORMS  
TO DBC 2012

Maximum reaction on at least one support is from a different load combination than the critical one for bearing design, shown here, due to KD factor. See Analysis results for reaction from critical load combination.

Nordic Joist 9-1/2" NI-40x Floor Joist @ 16" o.c.

Supports: All - Steel Beam, W

Total length: 11' 1/8"; Clear span: 9' 5-3/4", 0' 10-7/8"; 3/4" nailed and glued OSB sheathing

This section PASSES the design code check.

ET0000623



## Limit States Design using CSA O86-14 and Vibration Criterion:

| Criterion     | Analysis Value            | Design Value             | Unit   | Analysis/Design |
|---------------|---------------------------|--------------------------|--------|-----------------|
| Shear         | Vf = 607                  | Vr = 1895                | lbs    | Vf/Vr = 0.32    |
| Moment (+)    | Mf = 1222                 | Mr = 4824                | lbs-ft | ME/Mr = 0.25    |
| Moment (-)    | Mf = 556                  | Mr = 4680                | lbs-ft | Mf/Mr = 0.12    |
| Deflection:   |                           |                          |        |                 |
| Interior Perm | 0.02 = < L/999            | 0.33 = L/360             | in     | 0.05            |
| Live          | 0.05 = < L/999            | 0.24 = L/480             | in     | 0.21            |
| Total         | 0.07 = < L/999            | 0.49 = L/240             | in     | 0.14            |
| Cantil. Perm  | -0.00 = < L/999           | 0.07 = L/180             | in     | 0.03            |
| Live          | -0.01 = L/926             | 0.06 = L/240             | in     | 0.26            |
| Total         | -0.02 = L/817             | 0.11 = L/120             | in     | 0.15            |
| Bare Defl'n   | -0.02 = L/733             | 0.07 = L/180             | in     | 0.25            |
| Vibration     | L <sub>max</sub> = 9'-9.1 | L <sub>v</sub> = 16'-2.1 | ft     | 0.60            |
| Defl'n        | = 0.015                   | = 0.079                  | in     | 0.19            |

## Additional Data:

| FACTORS: | F/E           | KD   | KH   | KZ | KL    | KT | KS | KN | LC# |
|----------|---------------|------|------|----|-------|----|----|----|-----|
| Vr       | 1895          | 1.00 | 1.00 | -  | -     | -  | -  | -  | #4  |
| Mr+      | 4824          | 1.00 | 1.00 | -  | 1.000 | -  | -  | -  | #10 |
| Mr-      | 4824          | 0.97 | 1.00 | -  | 1.000 | -  | -  | -  | #5  |
| ET       | 218.1 million | -    | -    | -  | -     | -  | -  | -  | #10 |

## CRITICAL LOAD COMBINATIONS:

Shear : LC #4 = 1.25D + 1.5L + (1.0)1.0S  
 Moment (+) : LC #10 = 1.25D + 1.5L (pattern: L)  
 Moment (-) : LC #5 = 1.25D + (1.0)1.5S + 1.0L  
 Deflection: LC #1 = 1.0D (permanent)  
 LC #10 = 1.0D + 1.0L (pattern: L) (live)  
 LC #10 = 1.0D + 1.0L (pattern: L) (total)  
 LC #10 = 1.0D + 1.0L (pattern: L) (bare joist)  
 Bearing : Support 1 - LC #4 = 1.25D + 1.5L + (1.0)1.0S  
 Support 2 - LC #0 = 1.4D

Load Types: D=dead W=wind S=snow H=earth, groundwater E=earthquake  
 L=live (use, occupancy) Ls=live (storage, equipment) f=fire

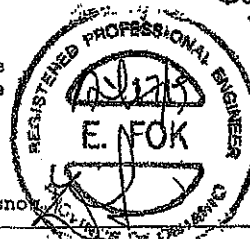
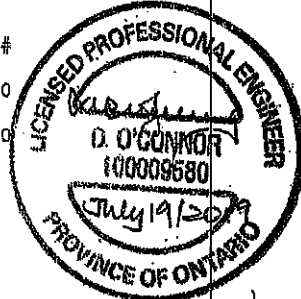
Load Patterns: s=S/2 L=L+Ls no pattern load in this span  
 All Load Combinations (LCs) are listed in the Analysis output

## CALCULATIONS:

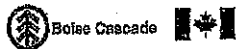
Deflection: E<sub>l</sub>eff = 276e06 lb-in<sup>2</sup> K= 4.94e06 lbs  
 "Live" deflection = Deflection from all non-dead loads (live, wind, snow)

## Design Notes:

1. WoodWorks analysis and design are in accordance with the 2015 National Building Code of Canada (NBC), Division B, Part 4, and the CSA O86-14 Engineering Design in Wood standard, Update No. 2 (June 2017).
2. Please verify that the default deflection limits are appropriate for your application.
3. Refer to Nordic Structures technical documentation for Installation guidelines and construction details.
4. Nordic Joists are listed in CCMC evaluation report 13032-R.
5. Joists shall be laterally supported at supports and continuously along the compression edge.
6. The design assumptions and specifications have been provided by the client. Any damages resulting from faulty or incorrect information, specifications, and/or designs furnished, and the correctness or accuracy of this information is their responsibility. This analysis does not constitute a record of the structural integrity of the building nor suitability of the design assumptions made. Nordic Structures is responsible only for the structural adequacy of this component based on the design criteria and loadings shown.



DESIGN CONFORMS  
 TO OBC 2012



Single 1-3/4" x 11-7/8" VERSA-LAM® 2.0 3100 SP  
1ST FLOOR FRAMING\Flush Beams\B3(13459)

PASSED

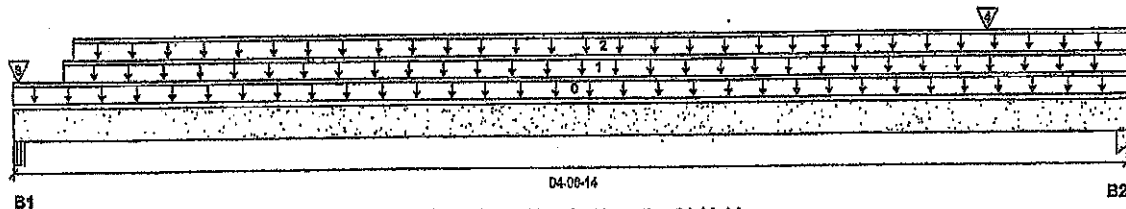
BC CALC® Member Report  
Build 6475

Dry | 1 span | No cant.

November 6, 2018 15:13:49

Job name:  
Address:  
City, Province, Postal Code: CALEDON  
Customer:  
Code reports: CCMC 12472-R

File name: PRESTON 12.mxd  
Description: 1ST FLOOR FRAMING\Flush Beams\B3(13459)  
Specifier:  
Designer: PL  
Company:



Reaction Summary (Down / Uplift) (lbs)

| Bearing    | Live      | Dead    | Snow | Wind |
|------------|-----------|---------|------|------|
| B1, 2-1/2" | 765 / 0   | 420 / 0 |      |      |
| B2, 3-1/2" | 1,149 / 0 | 682 / 0 |      |      |

Load Summary

| Tag | Description        | Load Type         | Ref. | Start    | End      | Loc. | Live | Dead | Snow | Wind | Tributary |
|-----|--------------------|-------------------|------|----------|----------|------|------|------|------|------|-----------|
| 0   | Self-Weight        | Unf. Lin. (lb/ft) | L    | 00-00-00 | 04-06-14 | Top  | 1.00 | 0.65 | 1.00 | 1.15 | 00-00-00  |
| 1   | STAIRS             | Unf. Lin. (lb/ft) | L    | 00-02-08 | 04-06-14 | Top  | 240  | 120  |      |      | n/a       |
| 2   | FC1 Floor Material | Unf. Lin. (lb/ft) | L    | 00-03-00 | 04-06-14 | Top  | 21   | 10   |      |      | n/a       |
| 3   | 5(1258)            | Conc. Pt. (lbs)   | L    | 00-00-04 | 00-00-04 | Top  | 174  | 108  |      |      | n/a       |
| 4   | PBO3(1263)         | Conc. Pt. (lbs)   | L    | 04-00-00 | 04-00-00 | Top  | 591  | 397  |      |      | n/a       |

Controls Summary

|                       | Factored Demand | Factored Resistance | Demand/Resistance | Case | Location |
|-----------------------|-----------------|---------------------|-------------------|------|----------|
| Pos. Moment           | 1,485 ft-lbs    | 17,696 ft-lbs       | 8.4%              | 1    | 02-05-05 |
| End Shear             | 868 lbs         | 7,232 lbs           | 12.0%             | 1    | 03-03-08 |
| Total Load Deflection | L/999 (0.007")  | n/a                 | n/a               | 4    | 02-03-12 |
| Live Load Deflection  | L/999 (0.005")  | n/a                 | n/a               | 5    | 02-03-12 |
| Max Defl.             | 0.007"          | n/a                 | n/a               | 4    | 02-03-12 |
| Span / Depth          | 4.2             |                     |                   |      |          |

| Bearing Supports | Dim. (LxW)      | Demand    | Demand/Resistance Support | Demand/Resistance Member | Material    |
|------------------|-----------------|-----------|---------------------------|--------------------------|-------------|
| B1 Beam          | 2-1/2" x 1-3/4" | 1,657 lbs | 70.9%                     | 31.1%                    | Unspecified |
| B2 Column        | 3-1/2" x 1-3/4" | 2,677 lbs | 51.8%                     | 34.5%                    | Unspecified |

Notes

Design meets Code minimum (L/240) Total load deflection criteria.  
Design meets Code minimum (L/360) Live load deflection criteria.  
Calculations assume member is fully braced.  
Resistance Factor phi has been applied to all presented results per CSA O86.  
BC CALC® analysis is based on Canadian Limit States Design, as per NBCC 2015 and CSA O86.  
Design based on Dry Service Condition.  
Importance Factor: Normal Part code: Part 9

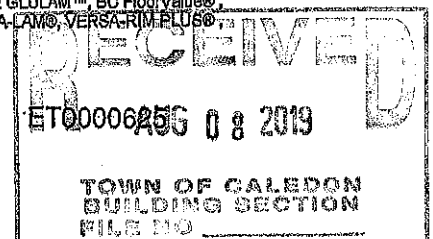


DESIGN CONFORMS TO OBC2012

Disclosure

Use of the Boise Cascade Software is subject to the terms of the End User License Agreement (EULA).  
Completeness and accuracy of input must be reviewed and verified by a qualified engineer or other appropriate expert to assure its adequacy, prior to anyone relying on such output as evidence of suitability for a particular application. The output here is based on building code-accepted design properties and analysis methods.  
Installation of Boise Cascade engineered wood products must be in accordance with current installation Guide and applicable building codes. To obtain installation Guide or ask questions, please call (800)232-0788 before installation.

BC CALC®, BC FRAMER®, AJS™, ALLJOIST®, BC RIM BOARD™, BCI®, BOISE GLULAM™, BC FloorValue®, VERSA-LAM®, VERSA-RIM PLUS®





Double 1-3/4" x 11-7/8" VERSA-LAM® 2.0 3100 SP  
2ND FLOOR FRAMING\Flush Beams\B4(12896)

PASSED

BC CALC® Member Report

Dry | 1 span | No cant.

November 6, 2018 15:13:49

Build 8476

Job name:

File name: PRESTON 12.mxd

Address:

Description: 2ND FLOOR FRAMING\Flush Beams\B4(12896)

City, Province, Postal Code: CALEDON

Specifier:

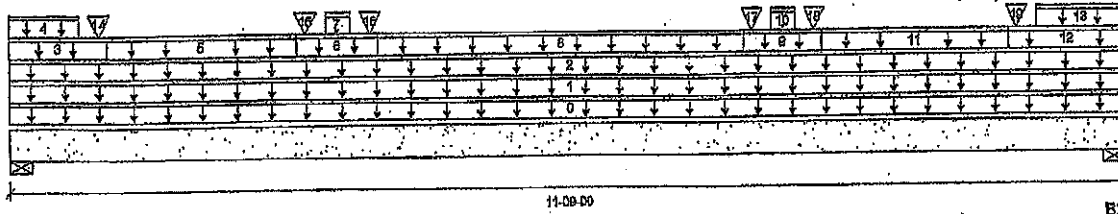
Customer:

Designer: PL

Code reports:

CGMC 12472-R

Company:



B1

Total Horizontal Product Length = 11-09-00

B2

Reaction Summary (Down / Uplift) (lbs)

| Bearing    | Live    | Dead    | Snow      | Wind |
|------------|---------|---------|-----------|------|
| B1, 7-1/4" | 498 / 0 | 857 / 0 | 1,182 / 0 |      |
| B2, 9-1/2" | 513 / 0 | 887 / 0 | 1,217 / 0 |      |

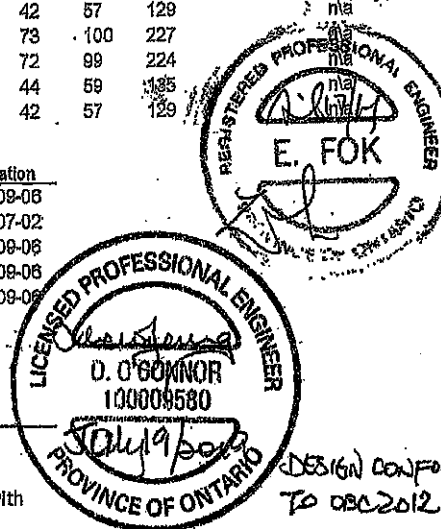
Load Summary

| Tag | Description        | Load Type         | Ref. | Start    | End      | Loc. | Live<br>1.00 | Dead<br>0.65 | Snow<br>1.00 | Wind<br>1.15 | Tributary |
|-----|--------------------|-------------------|------|----------|----------|------|--------------|--------------|--------------|--------------|-----------|
| 0   | Self Weight        | Unf. Lin. (lb/ft) | L    | 00-00-00 | 11-09-00 | Top  |              | 12           |              |              | 00-00-00  |
| 1   | LOW ROOF           | Unf. Lin. (lb/ft) | L    | 00-00-00 | 11-09-00 | Top  | 33           | 30           | 102          |              | n/a       |
| 2   | FC2 Floor Material | Unf. Lin. (lb/ft) | L    | 00-00-00 | 11-09-00 | Top  | 20           | 10           |              |              | n/a       |
| 3   | E26(12887)         | Unf. Lin. (lb/ft) | L    | 00-00-00 | 01-09-08 | Top  |              | 81           |              |              | n/a       |
| 4   | E26(12887)         | Unf. Lin. (lb/ft) | L    | 00-00-00 | 00-08-14 | Top  | 33           | 30           | 102          |              | n/a       |
| 5   | E27(12888)         | Unf. Lin. (lb/ft) | L    | 01-00-06 | 03-00-06 | Top  |              | 41           |              |              | n/a       |
| 6   | E28(12889)         | Unf. Lin. (lb/ft) | L    | 03-00-06 | 03-10-06 | Top  |              | 81           |              |              | n/a       |
| 7   | E28(12889)         | Unf. Lin. (lb/ft) | L    | 03-03-14 | 03-06-14 | Top  |              |              | 102          |              | n/a       |
| 8   | E29(12890)         | Unf. Lin. (lb/ft) | L    | 03-10-06 | 07-08-06 | Top  |              | 41           |              |              | n/a       |
| 9   | E30(12891)         | Unf. Lin. (lb/ft) | L    | 07-08-06 | 08-06-06 | Top  |              | 81           |              |              | n/a       |
| 10  | E30(12891)         | Unf. Lin. (lb/ft) | L    | 07-11-14 | 08-02-14 | Top  |              |              | 102          |              | n/a       |
| 11  | E31(12892)         | Unf. Lin. (lb/ft) | L    | 08-06-06 | 10-06-06 | Top  |              | 41           |              |              | n/a       |
| 12  | E25(12884)         | Unf. Lin. (lb/ft) | L    | 10-06-06 | 11-09-00 | Top  |              | 81           |              |              | n/a       |
| 13  | E25(12884)         | Unf. Lin. (lb/ft) | L    | 10-09-14 | 11-09-00 | Top  | 33           | 30           | 102          |              | n/a       |
| 14  | E26(12887)         | Conc. Pt. (lbs)   | L    | 00-11-06 | 00-11-06 | Top  | 44           | 59           | 135          |              | n/a       |
| 15  | E28(12889)         | Conc. Pt. (lbs)   | L    | 03-01-06 | 03-01-06 | Top  | 42           | 57           | 129          |              | n/a       |
| 16  | E28(12889)         | Conc. Pt. (lbs)   | L    | 03-09-06 | 03-09-06 | Top  | 73           | 100          | 227          |              | n/a       |
| 17  | E30(12891)         | Conc. Pt. (lbs)   | L    | 07-09-06 | 07-09-06 | Top  | 72           | 99           | 224          |              | n/a       |
| 18  | E30(12891)         | Conc. Pt. (lbs)   | L    | 08-05-06 | 08-05-06 | Top  | 44           | 59           | 135          |              | n/a       |
| 19  | E25(12884)         | Conc. Pt. (lbs)   | L    | 10-07-06 | 10-07-06 | Top  | 42           | 57           | 129          |              | n/a       |

| Controls Summary      | Factored Demand | Factored Resistance | Demand/Resistance | Case | Location |
|-----------------------|-----------------|---------------------|-------------------|------|----------|
| Pos. Moment           | 7,379 ft-lbs    | 35,392 ft-lbs       | 20.8%             | 13   | 05-09-06 |
| End Shear             | 2,505 lbs       | 14,464 lbs          | 17.3%             | 13   | 01-07-02 |
| Total Load Deflection | L/999 (0.117")  | n/a                 | n/a               | 35   | 05-09-06 |
| Live Load Deflection  | L/999 (0.077")  | n/a                 | n/a               | 51   | 05-09-06 |
| Max Defl.             | 0.117"          | n/a                 | n/a               | 35   | 05-09-06 |
| Span / Depth          | 10.8            |                     |                   |      |          |

| Bearing Supports | Dim. (LxW)                 | Demand    | Demand/Resistance Support | Demand/Resistance Member | Material    |
|------------------|----------------------------|-----------|---------------------------|--------------------------|-------------|
| B1               | Wall/Plate 7-1/4" x 3-1/2" | 3,342 lbs | 24.7%                     | 10.8%                    | Unspecified |
| B2               | Wall/Plate 9-1/2" x 3-1/2" | 3,447 lbs | 19.4%                     | 8.5%                     | Unspecified |

Nail one ply to another with  
3 1/2" spiral nails @ (2")  
o.c. staggered in 2 rows



DESIGN CONFORMS  
TO CBC 2012



Single 1-3/4" x 11-7/8" VERSA-LAM® 2.0 3100 SP  
2ND FLOOR FRAMING\Flush Beams\B6(13367)

PASSED

November 6, 2018 15:13:49

BC CALC® Member Report

Build 8475

Job name:

Address:

City, Province, Postal Code: CALEDON

Customer:

Code reports: CCMC 12472-R

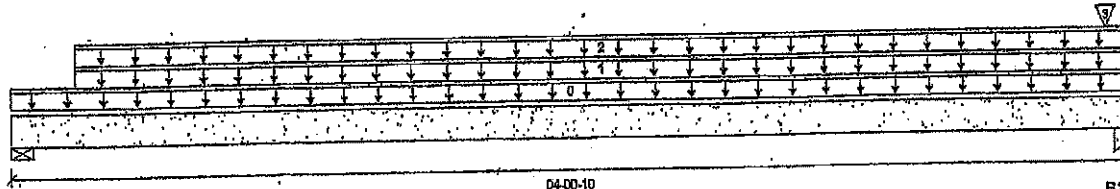
File name: PRESTON 12.mxd

Description: 2ND FLOOR FRAMING\Flush Beams\B6(13367)

Specifier:

Designer: PL

Company:



Total Horizontal Product Length = 04-00-10

Reaction Summary (Down / Uplift) (lbs)

| Bearing    | Live    | Dead    | Snow | Wind |
|------------|---------|---------|------|------|
| B1, 2-3/4" | 462 / 0 | 238 / 0 |      |      |
| B2, 2-7/8" | 601 / 0 | 320 / 0 |      |      |

Load Summary

| Tag | Description        | Load Type         | Ref. | Start    | End      | Loc. | Live<br>1.00 | Dead<br>0.65 | Snow<br>1.00 | Wind<br>1.15 | Tributary |
|-----|--------------------|-------------------|------|----------|----------|------|--------------|--------------|--------------|--------------|-----------|
| 0   | Self-Weight        | Unf. Lin. (lb/ft) | L    | 00-00-00 | 04-00-10 | Top  |              | 6            |              |              | 00-00-00  |
| 1   | STAIRS             | Unf. Lin. (lb/ft) | L    | 00-02-12 | 04-00-10 | Top  | 240          | 120          |              |              | n/a       |
| 2   | FC2 Floor Material | Unf. Lin. (lb/ft) | L    | 00-02-12 | 04-00-10 | Top  | 12           | 6            |              |              | n/a       |
| 3   | B7(13353)          | Conc. Pt. (lbs)   | L    | 03-11-12 | 03-11-12 | Top  | 89           | 62           |              |              | n/a       |

Controls Summary

|                       | Factored Demand | Factored Resistance | Demand/Resistance | Case | Location |
|-----------------------|-----------------|---------------------|-------------------|------|----------|
| Pos. Moment           | 934 ft-lbs      | 17,696 ft-lbs       | 5.3%              | 1    | 02-00-04 |
| End Shear             | 436 lbs         | 7,232 lbs           | 6.0%              | 1    | 01-02-10 |
| Total Load Deflection | L/999 (0.003")  | n/a                 | n/a               | 4    | 02-00-04 |
| Live Load Deflection  | L/999 (0.002")  | n/a                 | n/a               | 5    | 02-00-04 |
| Max Defl.             | 0.003"          | n/a                 | n/a               | 4    | 02-00-04 |
| Span / Depth          | 3.7             |                     |                   |      |          |

| Bearing Supports | Dim. (LxW)                 | Demand    | Demand/Resistance Support | Demand/Resistance Member | Material    |
|------------------|----------------------------|-----------|---------------------------|--------------------------|-------------|
| B1               | Wall/Plate 2-3/4" x 1-3/4" | 976 lbs   | 38.0%                     | 16.6%                    | Unspecified |
| B2               | Column 2-7/8" x 1-3/4"     | 1,301 lbs | 32.2%                     | 21.4%                    | Unspecified |

Notes

Design meets Code minimum (L/240) Total load deflection criteria.  
Design meets Code minimum (L/360) Live load deflection criteria.  
Calculations assume member is fully braced.  
Resistance Factor phi has been applied to all presented results per CSA O86.  
BC CALC® analysis is based on Canadian Limit States Design, as per NBCC 2015 and CSA O86.  
Design based on Dry Service Condition.  
Importance Factor: Normal Part code: Part 8

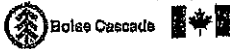


DESIGN CONFORMS TO OBC2012

Disclosure

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BC CALC®, BC FRAMER®, AJIS®, ALLJOIST®, BC RIM BOARD™, BOISE GLULAM™, BC FloorValue®, VERSA-LAM®, VERSA-RIM PLUS®



# Single 1-3/4" x 11-7/8" VERSA-LAM® 2.0 3100 SP

**PASSED**

2ND FLOOR FRAMING\Flush Beams\B7(I3353)

Dry | 1 span | No cant.

November 6, 2018 16:13:49

BC CALC® Member Report

Build 6476

Job name:

Address:

City, Province, Postal Code: CALEDON

Customer:

Code reports: CCMC 12472-R

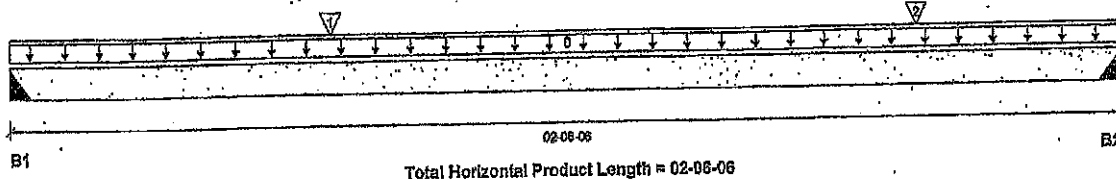
File name: PRESTON 12.mmdl

Description: 2ND FLOOR FRAMING\Flush Beams\B7(I3353)

Specifier:

Designer: PL

Company:



## Reaction Summary (Down / Uplift) (lbs)

| Bearing | Live   | Dead   | Snow | Wind |
|---------|--------|--------|------|------|
| B1, 3"  | 77 / 0 | 46 / 0 |      |      |
| B2, 3"  | 90 / 0 | 53 / 0 |      |      |

## Load Summary

| Tag | Description | Load Type         | Ref. | Start    | End      | Loc. | Live<br>1.00 | Dead<br>0.65 | Snow<br>1.00 | Wind<br>1.15 | Tributary |
|-----|-------------|-------------------|------|----------|----------|------|--------------|--------------|--------------|--------------|-----------|
| 0   | Self-Weight | Unf. Lin. (lb/ft) | L    | 00-00-00 | 02-06-06 | Top  |              | 8            |              |              | 00-00-00  |
| 1   | J4(I3371)   | Conc. Pt. (lbs)   | L    | 00-08-12 | 00-08-12 | Top  | 89           | 46           |              |              | n/a       |
| 2   | J4(I3330)   | Conc. Pt. (lbs)   | L    | 02-00-12 | 02-00-12 | Top  | 78           | 39           |              |              | n/a       |

## Controls Summary

|                       | Factored Demand | Factored Resistance | Demand/Resistance | Case | Location |
|-----------------------|-----------------|---------------------|-------------------|------|----------|
| Pos. Moment           | 92 ft-lbs       | 17,696 ft-lbs       | 0.5%              | 1    | 00-06-12 |
| End Shear             | 66 lbs          | 7,282 lbs           | 0.9%              | 1    | 01-02-14 |
| Total Load Deflection | L/999 (0")      | n/a                 | n/a               | 4    | 01-02-14 |
| Live Load Deflection  | L/999 (0")      | n/a                 | n/a               | 5    | 01-02-14 |
| Max Defl.             | 0"              | n/a                 | n/a               | 4    | 01-02-14 |
| Span / Depth          | 2.2             |                     |                   |      |          |

| Bearing Supports | Dim. (LxW)  | Demand  | Demand/Resistance Support | Demand/Resistance Member | Material   |
|------------------|-------------|---------|---------------------------|--------------------------|------------|
| B1 Hanger        | 3" x 1-3/4" | 173 lbs | n/a                       | 2.7%                     | HUS1.81/10 |
| B2 Hanger        | 3" x 1-3/4" | 201 lbs | n/a                       | 3.1%                     | HUS1.81/10 |

## Cautions

Header for the hanger HUS1.81/10 at B1 is a Double 1-3/4" x 11-7/8" VERSA-LAM® 1.7 2400 DF. Hanger model HUS1.81/10 and seat length were input by the user.

Header for the hanger HUS1.81/10 at B2 is a Single 1-3/4" x 11-7/8" VERSA-LAM® 1.7 2400 DF.

## Notes

Design meets Code minimum (L/240) Total load deflection criteria.  
Design meets Code minimum (L/360) Live load deflection criteria.  
Calculations assume member is fully braced.  
Hanger Manufacturer: Unassigned  
Resistance Factor phi has been applied to all presented results per CSA O86.  
BC CALC® analysis is based on Canadian Limit States Design, as per NBCC 2015 and CSA O86.  
Design based on Dry Service Condition.  
Importance Factor: Normal Part code: Part 9



DESIGN CONFORMS TO OBC2012

## Disclosure

Use of the Boise Cascade Software is subject to the terms of the End User License Agreement (EULA). Completeness and accuracy of input must be reviewed and verified by a qualified engineer or other appropriate expert to assure its adequacy, prior to anyone relying on such output as evidence of suitability for a particular application. The output here is based on building code-accepted design properties and analysis methods. Installation of Boise Cascade engineered wood products must be in accordance with current installation Guide and applicable building codes. To obtain installation Guide or ask questions, please call (800)292-0788 before installation.

BC CALC®, BC FRAMER®, AJS™, ALLJOIST®, BC RIM BOARD™, BC®, BOISE GLULAM™, BC FloorValue®, VERSA-LAM®, VERSA-RIM PLUS®,



**Double 1-3/4" x 11-7/8" VERSA-LAM® 2.0 3100 SP**  
**2ND FLOOR FRAMING\Flush Beams\B8(13570)**

**PASSED**

BC CALCO Member Report

Dry | 1 span | No cant.

February 19, 2019 11:21:55

Build 6766

Job name:

Address:

City, Province, Postal Code: CALEDON

Customer:

Code reports: CCMC 12472-R

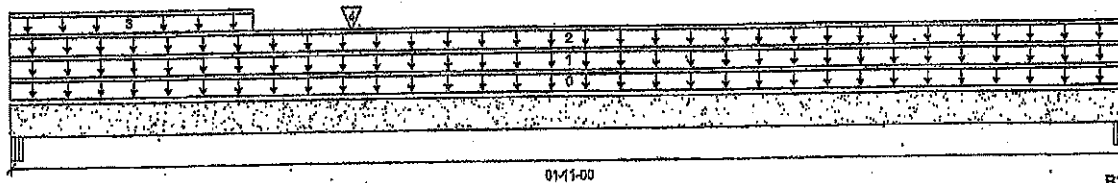
File name: PRESTON 12 ELEV 1.mmdl

Description: 2ND FLOOR FRAMING\Flush Beams\B8(13570)

Specifier:

Designer: PL

Company:



Total Horizontal Product Length = 01-11-00

**Reaction Summary (Down / Uplift) (lbs)**

| Bearing | Live    | Dead    | Snow    | Wind |
|---------|---------|---------|---------|------|
| B1, 5"  | 332 / 0 | 302 / 0 | 358 / 0 |      |
| B2, 5"  | 166 / 0 | 219 / 0 | 358 / 0 |      |

**Load Summary**

| Tag | Description        | Load Type         | Ref. | Start    | End      | Loc. | Live<br>1.00 | Dead<br>0.65 | Snow<br>1.00 | Wind<br>1.16 | Tributary |
|-----|--------------------|-------------------|------|----------|----------|------|--------------|--------------|--------------|--------------|-----------|
| 0   | Self-Weight        | Unf. Lin. (lb/ft) | L    | 00-00-00 | 01-11-00 | Top  |              | 12           |              |              | 00-00-00  |
| 1   | 8(12888)           | Unf. Lin. (lb/ft) | L    | 00-00-00 | 01-11-00 | Top  | 88           | 161          |              |              | n/a       |
| 2   | LOW ROOF           | Unf. Lin. (lb/ft) | L    | 00-00-00 | 01-11-00 | Top  | 33           | 30           | 102          |              | n/a       |
| 3   | FC2 Floor Material | Unf. Lin. (lb/ft) | L    | 00-00-00 | 00-05-00 | Top  | 12           |              |              |              | n/a       |
| 4   | J3(13564)          | Conc. Pt. (lbs)   | L    | 00-07-00 | 00-07-00 | Top  | 260          | 130          |              |              | n/a       |

**Controls Summary**

|                       | Factored Demand | Factored Resistance | Demand/Resistance | Case | Location |
|-----------------------|-----------------|---------------------|-------------------|------|----------|
| Pos. Moment           | 222 ft-lbs      | 35,392 ft-lbs       | 0.6%              | 13   | 00-10-06 |
| End Shear             | 428 lbs         | 14,464 lbs          | 3.0%              | 13   | 01-04-14 |
| Total Load Deflection | L/999 (0")      | n/a                 | n/a               | 35   | 00-11-03 |
| Max Defl.             | 0"              | n/a                 | n/a               | 35   | 00-11-03 |
| Span / Depth          | 1.2             |                     |                   |      |          |

| Bearing Supports | Dim. (LxW)  | Demand    | Demand/Resistance Support | Demand/Resistance Member | Material    |
|------------------|-------------|-----------|---------------------------|--------------------------|-------------|
| B1 Beam          | 5" x 3-1/2" | 1,247 lbs | 13.3%                     | 5.8%                     | Unspecified |
| B2 Beam          | 5" x 3-1/2" | 978 lbs   | 10.4%                     | 4.6%                     | Unspecified |

**Notes**

Design meets Code minimum (L/240) Total load deflection criteria.  
 Calculations assume member is fully braced.  
 Resistance Factor phi has been applied to all presented results per CSA O86.  
 BC CALCO analysis is based on Canadian Limit States Design, as per NBCC 2015 and CSA O86.  
 Unbalanced snow loads determined from building geometry were used in selected product's verification.  
 Design based on Dry Service Condition.  
 Importance Factor : Normal Part code : Part 9  
 Connection design assumes point load is top-loaded. For connection design of side-loaded point loads, please consult a technical representative or professional of Record.  
 Nail one ply to another with 3 1/2" spiral nails @ 4" o.c, staggered in 2 rows



DESIGN CONFORMS TO OBC2012



# Double 1-3/4" x 11-7/8" VERSA-LAM® 2.0 3100 SP

**PASSED**

## 2ND FLOOR FRAMING\Flush Beams\B9\I3571

Dry | 1 span | No cant.

February 19, 2019 11:21:55

BC CALC® Member Report

Build 6766

Job name:

Address:

City, Province, Postal Code: CALEDON

Customer:

Code reports: CCMC 12472-R

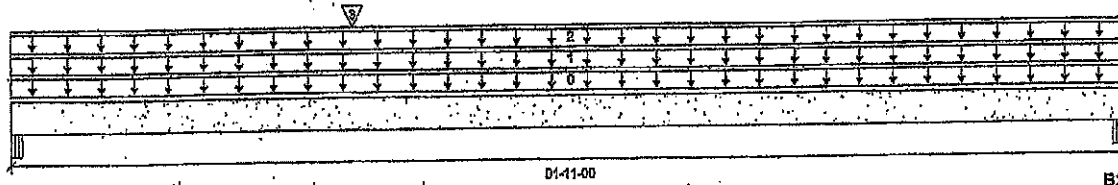
File name: PRESTON 12 ELEV 1.mmdl

Description: 2ND FLOOR FRAMING\Flush Beams\B9\I3571

Specifier:

Designer: .PL

Company:



Total Horizontal Product Length = 01-11-00

### Reaction Summary (Down / Uplift) (lbs)

| Bearing | Live    | Dead    | Snow    | Wind |
|---------|---------|---------|---------|------|
| B1, 5"  | 329 / 0 | 301 / 0 | 358 / 0 |      |
| B2, 5"  | 168 / 0 | 219 / 0 | 358 / 0 |      |

### Load Summary

| Tag | Description | Load Type         | Ref. | Start    | End      | Loc. | Live | Dead | Snow | Wind | Tributary |
|-----|-------------|-------------------|------|----------|----------|------|------|------|------|------|-----------|
| 0   | Self-Weight | Unf. Lin. (lb/ft) | L    | 00-00-00 | 01-11-00 | Top  | 1.00 | 0.65 | 1.00 | 1.16 | 00-00-00  |
| 1   | 7(I2685)    | Unf. Lin. (lb/ft) | L    | 00-00-00 | 01-10-15 | Top  | 88   | 161  | 272  |      | n/a       |
| 2   | LOW ROOF    | Unf. Lin. (lb/ft) | L    | 00-00-00 | 01-11-00 | Top  | 33   | 30   | 102  |      | n/a       |
| 3   | J3(I3584)   | Conc. Pt. (lbs)   | L    | 00-07-00 | 00-07-00 | Top  | 263  | 132  |      |      | n/a       |

### Controls Summary

|                       | Factored Demand | Factored Resistance | Demand/Resistance | Case | Location |
|-----------------------|-----------------|---------------------|-------------------|------|----------|
| Pos. Moment           | 223 ft-lbs      | 35,382 ft-lbs       | 0.6%              | 13   | 00-10-06 |
| End Shear             | 429 lbs         | 14,464 lbs          | 3.0%              | 13   | 01-04-14 |
| Total Load Deflection | L/999 (0")      | n/a                 | n/a               | 35   | 00-11-03 |
| Max Defl.             | 0"              | n/a                 | n/a               | 35   | 00-11-03 |
| Span / Depth          | 1.2             |                     |                   |      |          |

| Bearing Supports | Dim. (LxW)  | Demand    | Demand/Resistance Support | Demand/Resistance Member | Material    |
|------------------|-------------|-----------|---------------------------|--------------------------|-------------|
| B1 Beam          | 5" x 3-1/2" | 1,242 lbs | 13.3%                     | 5.8%                     | Unspecified |
| B2 Beam          | 5" x 3-1/2" | 977 lbs   | 10.5%                     | 4.6%                     | Unspecified |

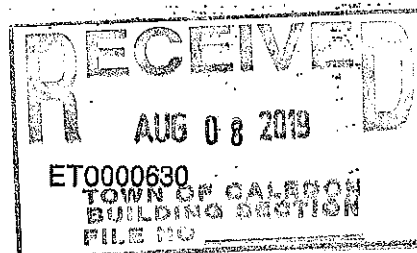
### Notes

Design meets Code minimum (L/240) Total load deflection criteria.  
 Calculations assume member is fully braced.  
 Resistance Factor  $\phi$  has been applied to all presented results per CSA O86.  
 BC CALC® analysis is based on Canadian Limit States Design, as per NBCC 2015 and CSA O86.  
 Unbalanced snow loads determined from building geometry were used in selected product's verification.  
 Design based on Dry Service Condition.  
 Importance Factor: Normal Part code: Part 9  
 Connection design assumes point load is top-loaded. For connection design of side-loaded point loads, please consult a technical representative or professional of Record.

Nail one ply to another with  
 3 1/2" spiral nails @ 4"  
 o.c, staggered in 2 rows



DESIGN CONFORMS TO OBC2012





# Single 1-3/4" x 11-7/8" VERSA-LAM® 2.0 3100 SP

**PASSED**

BC CALC® Member Report

1ST FLOOR FRAMING\Flush Beams\B2\3530

Dry | 1 span | No cant.

November 8, 2018 15:13:49

Build 6475

Job name:

File name: PRESTON 12.mmdl

Address:

Description: 1ST FLOOR FRAMING\Flush Beams\B2\3530

City, Province, Postal Code: CALEDON

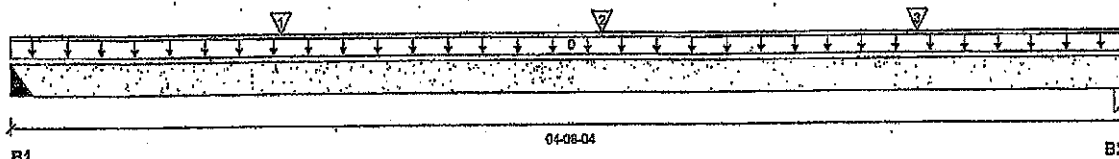
Specifier:

Customer:

Designer: PL

Code reports: CCMC 12472-R

Company:



Total Horizontal Product Length = 04-08-04

## Reaction Summary (Down / Uplift) (lbs)

| Bearing    | Live    | Dead   | Snow | Wind |
|------------|---------|--------|------|------|
| B1, 3"     | 189 / 0 | 98 / 0 |      |      |
| B2, 1-3/4" | 173 / 0 | 99 / 0 |      |      |

## Load Summary

| Tag | Description | Load Type         | Ref. | Start    | End      | Loc. | Live | Dead | Snow | Wind | Tributary |
|-----|-------------|-------------------|------|----------|----------|------|------|------|------|------|-----------|
| 0   | Self-Weight | Unf. Lin. (lb/ft) | L    | 00-00-00 | 04-08-04 | Top  | 6    |      |      |      | 00-00-00  |
| 1   | J5(3502)    | Conc. Pt. (lbs)   | L    | 01-01-10 | 01-01-10 | Top  | 118  | 58   |      |      | n/a       |
| 2   | J5(35497)   | Conc. Pt. (lbs)   | L    | 02-05-10 | 02-05-10 | Top  | 119  | 59   |      |      | n/a       |
| 3   | J5(35516)   | Conc. Pt. (lbs)   | L    | 03-09-10 | 03-09-10 | Top  | 105  | 52   |      |      | n/a       |

## Controls Summary

|                       | Factored Demand | Factored Resistance | Demand/Resistance | Case | Location |
|-----------------------|-----------------|---------------------|-------------------|------|----------|
| Pos. Moment           | 503 ft-lbs      | 17,696 ft-lbs       | 2.8%              | 1    | 02-05-10 |
| End Shear             | 341 lbs         | 7,232 lbs           | 4.7%              | 1    | 01-02-14 |
| Total Load Deflection | L/899 (0.002")  | n/a                 | n/a               | 4    | 02-04-11 |
| Live Load Deflection  | L/999 (0.002")  | n/a                 | n/a               | 5    | 02-04-11 |
| Max Defl.             | 0.002"          | n/a                 | n/a               | 4    | 02-04-11 |
| Span / Depth          | 4,5             |                     |                   |      |          |

| Bearing Supports | Dim. (LxW)      | Demand  | Demand/Resistance Support | Demand/Resistance Member | Material    |
|------------------|-----------------|---------|---------------------------|--------------------------|-------------|
| B1 Hanger        | 3" x 1-3/4"     | 376 lbs | n/a                       | 5.9%                     | HUS1.81/10  |
| B2 Column        | 1-3/4" x 1-3/4" | 383 lbs | 15.4%                     | 10.3%                    | Unspecified |

## Cautions

Header for the hanger HUS1.81/10 at B1 is a Double 1-3/4" x 11-7/8" VERSA-LAM® 1.7 2400 DF. Hanger model HUS1.81/10 and seat length were input by the user.

## Notes

Design meets Code minimum (L/240) Total load deflection criteria.  
Design meets Code minimum (L/360) Live load deflection criteria.  
Calculations assume member is fully braced.  
Hanger Manufacturer: Unassigned  
Resistance Factor phi has been applied to all presented results per CSA O86.  
BC CALC® analysis is based on Canadian Limit States Design, as per NBCC 2015 and CSA O86.  
Design based on Dry Service Condition.  
Importance Factor: Normal Part code: Part 9



DESIGN CONFORMS TO OBC2012

## Disclosure

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BC CALC®, BC FRAMER®, AISI™, ALLJOIST®, BC RIM BOARD™, BC®, BOISE GLULAM™, BC Floor/Value®, VERSA-LAM®, VERSA-RIM PLUS®,





Double 1-3/4" x 11-7/8" VERSA-LAM® 2.0 3100 SP

**PASSED**

2ND FLOOR FRAMING\Flush Beams\B12\13816

Dry | 1 span | No cant.

February 19, 2019 11:23:10

BC CALC® Member Report

Build 6766

Job name:

Address:

City, Province, Postal Code: CALEDON

Customer:

Code reports: CCMC 12472-R

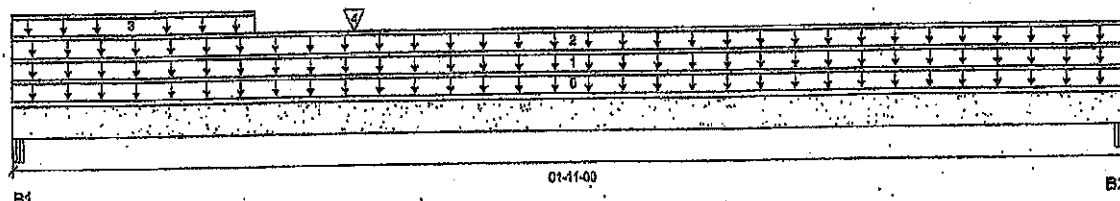
File name: PRESTON 12 ELEV 2.mxd

Description: 2ND FLOOR FRAMING\Flush Beams\B12\13816

Specifier:

Designer: PL

Company:



Total Horizontal Product Length = 01-11-00

### Reaction Summary (Down / Uplift) (lbs)

| Bearing | Live    | Dead    | Snow    | Wind |
|---------|---------|---------|---------|------|
| B1, 5"  | 250 / 0 | 253 / 0 | 293 / 0 |      |
| B2, 5"  | 130 / 0 | 193 / 0 | 293 / 0 |      |

### Load Summary

| Tag | Description        | Load Type         | Ref. | Start    | End      | Loc. | Live | Dead | Snow | Wind | Tributary |
|-----|--------------------|-------------------|------|----------|----------|------|------|------|------|------|-----------|
| 0   | Self-Weight        | Unf. Lin. (lb/ft) | L    | 00-00-00 | 01-11-00 | Top  |      | 12   |      |      | 00-00-00  |
| 1   | 8(12886)           | Unf. Lin. (lb/ft) | L    | 00-00-00 | 01-11-00 | Top  | 66   | 141  | 204  |      | n/a       |
| 2   | LOW ROOF           | Unf. Lin. (lb/ft) | L    | 00-00-00 | 01-11-00 | Top  | 33   | 30   | 102  |      | n/a       |
| 3   | FC2 Floor Material | Unf. Lin. (lb/ft) | L    | 00-00-00 | 00-05-00 | Top  | 12   |      |      |      | n/a       |
| 4   | J4(13823)          | Conc. Pt. (lbs)   | L    | 00-07-00 | 00-07-00 | Top  | 185  | 93   |      |      | n/a       |

### Controls Summary

|              | Factored Demand | Factored Resistance | Demand/Resistance | Case | Location |
|--------------|-----------------|---------------------|-------------------|------|----------|
| Pos. Moment  | 180 ft-lbs      | 35,392 ft-lbs       | 0.5%              | 13   | 00-10-09 |
| End Shear    | 358 lbs         | 14,464 lbs          | 2.5%              | 13   | 01-04-14 |
| Span / Depth | 1.2             |                     |                   |      |          |

### Bearing Supports

|         | Dim. (LxW)  | Demand    | Demand/Resistance Support | Demand/Resistance Member | Material    |
|---------|-------------|-----------|---------------------------|--------------------------|-------------|
| B1 Beam | 5" x 3-1/2" | 1,006 lbs | 10.8%                     | 4.7%                     | Unspecified |
| B2 Beam | 5" x 3-1/2" | 811 lbs   | 8.7%                      | 3.8%                     | Unspecified |

### Notes

Calculations assume member is fully braced.

Resistance Factor phi has been applied to all presented results per CSA O86.

BC CALC® analysis is based on Canadian Limit States Design, as per NBCC 2015 and CSA O86.

Unbalanced snow loads determined from building geometry were used in selected product's verification.

Design based on Dry Service Condition.

Importance Factor: Normal Part code: Part 9

Connection design assumes point load is top-loaded. For connection design of side-loaded point loads, please consult a technical representative or professional of Record.

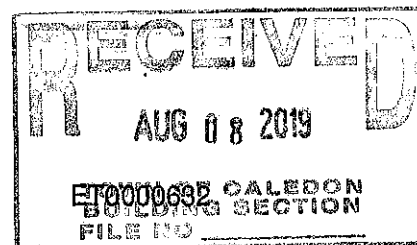
Nail one ply to another with

3 1/2" spiral nails @ 4'

o.c., staggered in 2 rows



DESIGN CONFORMS TO OBC2012





**Double 1-3/4" x 11-7/8" VERSA-LAM® 2.0 3100 SP**  
**2ND FLOOR FRAMING\Flush Beams\B10\I3514**

**PASSED**

BC CALC® Member Report

Dry | 1 span | No cant.

November 6, 2018 13:14:39

Build 6475

Job name:

Address:

City, Province, Postal Code: CALEDON

Customer:

Code reports: COMC 12472-R

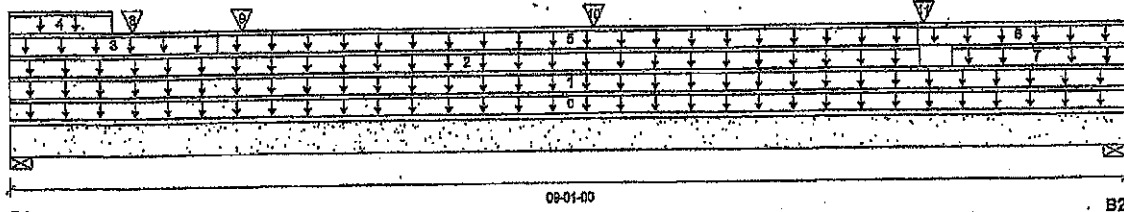
File name: PRESTON 12 ELEV 2.mmd

Description: 2ND FLOOR FRAMING\Flush Beams\B10\I3514

Specifier:

Designer: PL

Company:



Total Horizontal Product Length = 08-01-00

**Reaction Summary (Down / Uplift) (lbs)**

| Bearing    | Live      | Dead      | Snow      | Wind |
|------------|-----------|-----------|-----------|------|
| B1, 5-1/2" | 1,707 / 0 | 1,437 / 0 | 1,250 / 0 |      |
| B2, 5-1/2" | 1,326 / 0 | 1,150 / 0 | 951 / 0   |      |

**Load Summary**

| Tag | Description   | Load Type         | Ref. | Start    | End      | Loc. | Live | Dead | Snow | Wind | Tributary |
|-----|---------------|-------------------|------|----------|----------|------|------|------|------|------|-----------|
| 0   | Self-Weight   | Unf. Lin. (lb/ft) | L    | 00-00-00 | 08-01-00 | Top  | 12   |      |      |      | 00-00-00  |
| 1   | LOW ROOF      | Unf. Lin. (lb/ft) | L    | 00-00-00 | 08-01-00 | Top  | 33   | 30   | 102  |      | n/a       |
| 2   | Smoothed Load | Unf. Lin. (lb/ft) | L    | 00-00-00 | 07-04-12 | Top  | 181  | 122  |      |      | n/a       |
| 3   | E42(I3526)    | Unf. Lin. (lb/ft) | L    | 00-00-00 | 01-08-08 | Top  |      | 81   |      |      | n/a       |
| 4   | E42(I3526)    | Unf. Lin. (lb/ft) | L    | 00-00-00 | 00-10-00 | Top  |      | 35   | 104  |      | n/a       |
| 5   | E43(I3527)    | Unf. Lin. (lb/ft) | L    | 01-08-08 | 07-04-08 | Top  |      | 41   |      |      | n/a       |
| 6   | E41(I3525)    | Unf. Lin. (lb/ft) | L    | 07-04-08 | 08-01-00 | Top  |      | 81   |      |      | n/a       |
| 7   | E41(I3525)    | Unf. Lin. (lb/ft) | L    | 07-08-00 | 08-01-00 | Top  | 33   | 30   | 102  |      | n/a       |
| 8   | E42(I3526)    | Conc. Pt. (lbs)   | L    | 01-00-00 | 01-00-00 | Top  |      |      | 388  |      | n/a       |
| 9   |               | Conc. Pt. (lbs)   | L    | 01-10-14 | 01-10-14 | Top  | 383  | 182  | 320  |      | n/a       |
| 10  | J3(I3391)     | Conc. Pt. (lbs)   | L    | 04-08-12 | 04-08-12 | Top  | 383  | 182  |      |      | n/a       |
| 11  |               | Conc. Pt. (lbs)   | L    | 07-05-02 | 07-05-02 | Top  | 486  | 332  | 318  |      | n/a       |

**Controls Summary**

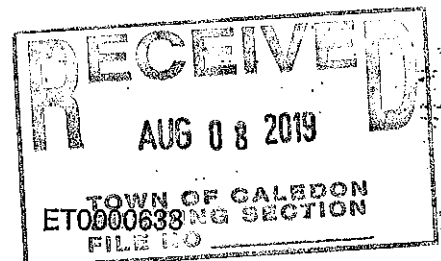
|                       | Factored Demand | Factored Resistance | Demand/Resistance | Case | Location |
|-----------------------|-----------------|---------------------|-------------------|------|----------|
| Pos. Moment           | 8,646 ft-lbs    | 35,392 ft-lbs       | 24.4%             | 1    | 04-08-12 |
| End Shear             | 4,101 lbs       | 14,464 lbs          | 28.4%             | 1    | 01-05-08 |
| Total Load Deflection | L/999 (0.085")  | n/a                 | n/a               | 35   | 04-06-12 |
| Live Load Deflection  | L/999 (0.057")  | n/a                 | n/a               | 61   | 04-06-12 |
| Max Defl.             | 0.085"          | n/a                 | n/a               | 35   | 04-06-12 |
| Span / Depth          | 8.4             |                     |                   |      |          |

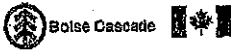
| Bearing Supports | Dim. (LxW)                 | Demand    | Demand/Resistance Support | Demand/Resistance Member | Material    |
|------------------|----------------------------|-----------|---------------------------|--------------------------|-------------|
| B1               | Wall/Plate 5-1/2" x 3-1/2" | 5,606 lbs | 54.6%                     | 23.9%                    | Unspecified |
| B2               | Wall/Plate 5-1/2" x 3-1/2" | 4,378 lbs | 42.6%                     | 18.6%                    | Unspecified |

Nail one ply to another with  
 3 1/2" spiral nails @ 4"  
 o.c. staggered in 2 rows



DESIGN CONFORMS TO OBC2012





# Double 1-3/4" x 11-7/8" VERSA-LAM® 2.0 3100 SP

PASSED

## 2ND FLOOR FRAMING Flush Beams B13(13831)

Dry | 1 span | No cant.

February 19, 2019 11:23:10

BC CALC® Member Report

Build 6786

Job name:

Address:

City, Province, Postal Code: CALEDON

Customer:

Code reports: CCMC 12472-R

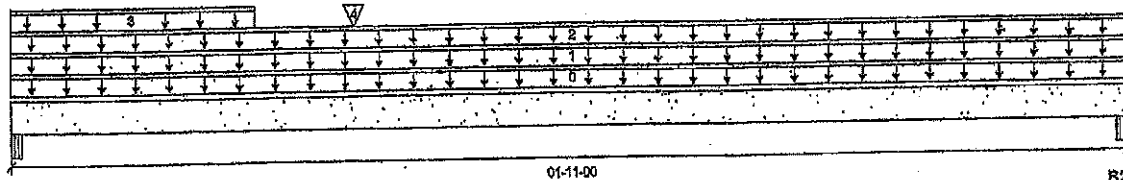
File name: PRESTON 12 ELEV 2.mmdl

Description: 2ND FLOOR FRAMING Flush Beams B13(13831)

Specifier:

Designer: PL

Company:



Total Horizontal Product Length = 01-11-00

### Reaction Summary (Down / Uplift) (lbs)

| Bearing | Live    | Dead    | Snow    | Wind |
|---------|---------|---------|---------|------|
| B1, 5"  | 250 / 0 | 253 / 0 | 293 / 0 |      |
| B2, 5"  | 130 / 0 | 193 / 0 | 293 / 0 |      |

### Load Summary

| Tag | Description        | Load Type         | Ref. | Start    | End      | Loc. | Live | Dead | Snow | Wind | Tributary |
|-----|--------------------|-------------------|------|----------|----------|------|------|------|------|------|-----------|
| 0   | Self-Weight        | Unf. Lin. (lb/ft) | L    | 00-00-00 | 01-11-00 | Top  | 12   |      |      |      | 00-00-00  |
| 1   | 7(12685)           | Unf. Lin. (lb/ft) | L    | 00-00-00 | 01-10-16 | Top  | 86   | 141  | 204  |      | n/a       |
| 2   | LOW ROOF           | Unf. Lin. (lb/ft) | L    | 00-00-00 | 01-11-00 | Top  | 33   | 30   | 102  |      | n/a       |
| 3   | FC2 Floor Material | Unf. Lin. (lb/ft) | L    | 00-00-00 | 00-05-00 | Top  | 12   |      |      |      | n/a       |
| 4   | J4(13823)          | Conc. Pt. (lbs)   | L    | 00-07-00 | 00-07-00 | Top  | 185  | 93   |      |      | n/a       |

### Controls Summary

|              | Factored Demand | Factored Resistance | Demand/Resistance | Case | Location |
|--------------|-----------------|---------------------|-------------------|------|----------|
| Pcs. Moment  | 180 ft-lbs      | 35,392 ft-lbs       | 0.5%              | 13   | 00-10-09 |
| End Shear    | 358 lbs         | 14,464 lbs          | 2.5%              | 13   | 01-04-14 |
| Span / Depth | 1.2             |                     |                   |      |          |

### Bearing Supports

|         | Dim. (LxW)  | Demand    | Demand/Resistance Support | Demand/Resistance Member | Material    |
|---------|-------------|-----------|---------------------------|--------------------------|-------------|
| B1 Beam | 5" x 3-1/2" | 1,008 lbs | 10.8%                     | 4.7%                     | Unspecified |
| B2 Beam | 5" x 3-1/2" | 810 lbs   | 8.7%                      | 3.8%                     | Unspecified |

### Notes

Calculations assume member is fully braced.

Resistance Factor phi has been applied to all presented results per CSA O86.

BC CALC® analysis is based on Canadian Limit States Design, as per NBCC 2015 and CSA O86.

Unbalanced snow loads determined from building geometry were used in selected products verification.

Design based on Dry Service Condition.

Importance Factor: Normal Part code: Part 9

Connection design assumes point load is top-loaded. For connection design of side-loaded point loads, please consult a technical representative or professional of Record.

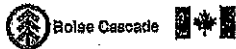
Nail one ply to another with

3 1/2" spiral nails @ 4"

O.C. staggered in 2 rows



DESIGN CONFORMS TO OBC2012

**Double 1-3/4" x 11-7/8" VERSA-LAM® 2.0 3100 SP****PASSED****2ND FLOOR FRAMING\Flush Beams\B5(13498)**

Dry | 1 span | No cant.

November 6, 2018 15:13:49

BC CALC® Member Report

Build 8475

Job name:

Address:

City, Province, Postal Code: CALEDON

Customer:

Code reports: CCMC 12472-R

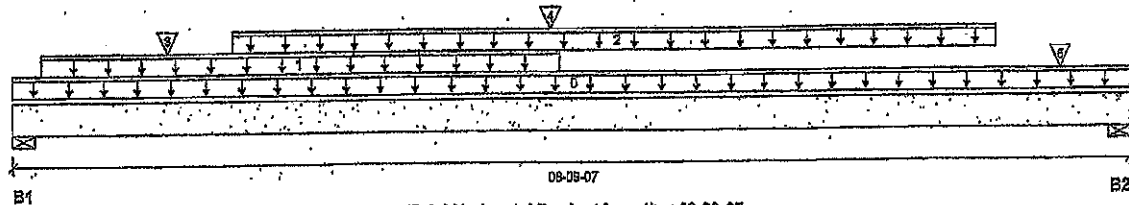
File name: PRESTON 12.mmd

Description: 2ND FLOOR FRAMING\Flush Beams\B5(13498)

Specifier:

Designer: PL

Company:



Total Horizontal Product Length = 08-09-07

**Reaction Summary (Down / Uplift) (lbs)**

| Bearing     | Live      | Dead    | Snow | Wind |
|-------------|-----------|---------|------|------|
| B1, 6-1/2"  | 1,338 / 0 | 727 / 0 |      |      |
| B2, 6-7/16" | 1,496 / 0 | 805 / 0 |      |      |

**Load Summary**

| Tag | Description        | Load Type         | Ref. | Start    | End      | Loc. | Live<br>1.00 | Dead<br>0.65 | Snow<br>1.00 | Wind<br>1.15 | Tributary |
|-----|--------------------|-------------------|------|----------|----------|------|--------------|--------------|--------------|--------------|-----------|
| 0   | Self-Weight        | Unf. Lin. (lb/ft) | L    | 00-00-00 | 08-09-07 | Top  |              | 12           |              |              | 00-00-00  |
| 1   | FG2 Floor Material | Unf. Lin. (lb/ft) | L    | 00-02-12 | 04-03-08 | Top  | 18           | 9            |              |              | n/a       |
| 2   | Smoothed Load      | Unf. Lin. (lb/ft) | L    | 01-08-12 | 07-08-12 | Top  | 322          | 181          |              |              | n/a       |
| 3   | J2(13327)          | Conc. Pt. (lbs)   | L    | 01-02-12 | 01-02-12 | Top  | 393          | 196          |              |              | n/a       |
| 4   | B7(13353)          | Conc. Pt. (lbs)   | L    | 04-02-08 | 04-02-08 | Top  | 78           | 47           |              |              | n/a       |
| 5   | J2(13642)          | Conc. Pt. (lbs)   | L    | 08-02-12 | 08-02-12 | Top  | 355          | 177          |              |              | n/a       |

**Controls Summary**

|                       | Factored Demand | Factored Resistance | Demand/Resistance | Case | Location |
|-----------------------|-----------------|---------------------|-------------------|------|----------|
| Pos. Moment           | 8,204 ft-lbs    | 35,392 ft-lbs       | 17.5%             | 1    | 04-02-12 |
| End Shear             | 2,664 lbs       | 14,464 lbs          | 18.4%             | 1    | 01-05-06 |
| Total Load Deflection | L/999 (0.051")  | n/a                 | n/a               | 4    | 04-04-12 |
| Live Load Deflection  | L/999 (0.033")  | n/a                 | n/a               | 5    | 04-04-12 |
| Max Defl.             | 0.051"          | n/a                 | n/a               | 4    | 04-04-12 |
| Span / Depth          | 8.1             |                     |                   |      |          |

| Bearing Supports | Dim. (LxW)                  | Demand    | Demand/Resistance Support | Demand/Resistance Member | Material    |
|------------------|-----------------------------|-----------|---------------------------|--------------------------|-------------|
| B1               | Wall/Plate 6-1/2" x 3-1/2"  | 2,916 lbs | 28.4%                     | 12.4%                    | Unspecified |
| B2               | Wall/Plate 6-7/16" x 3-1/2" | 3,250 lbs | 31.9%                     | 13.9%                    | Unspecified |

**Notes**

Design meets Code minimum (L/240) Total load deflection criteria.

Design meets Code minimum (L/360) Live load deflection criteria.

Calculations assume member is fully braced.

Resistance Factor phi has been applied to all presented results per CSA O86.

BC CALC® analysis is based on Canadian Limit States Design, as per NBCC 2015 and CSA O86.

Design based on Dry Service Condition.

Importance Factor: Normal Part code: Part 9

Connection design assumes point load is top-loaded. For connection design of side-loaded point loads, please consult a technical representative or professional of Record.

Nail one ply to another with  
3 1/2" spiral nails @ 10"  
o.c. staggered in 2 rows

DESIGN CONFORMS TO OBC2012



Double 1-3/4" x 11-7/8" VERSA-LAM® 2.0 3100 SP

**PASSED**

1ST FLOOR FRAMING Flush Beams B1 (13449)

Dry | 1 span | No cant.

November 6, 2018 15:13:49

BC CALC® Member Report

Build 6475

Job name:

Address:

City, Province, Postal Code: CALEDON

Customer:

Code reports: CCMC 12472-R

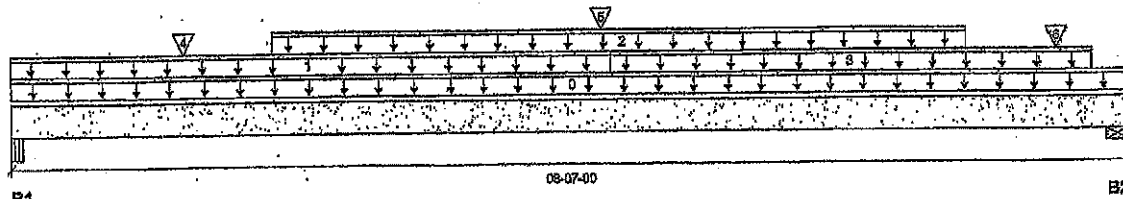
File name: PRESTON 12.mmdl

Description: 1ST FLOOR FRAMING Flush Beams B1 (13449)

Specifier:

Designer: PL

Company:



B1

Total Horizontal Product Length = 08-07-00

B2

### Reaction Summary (Down / Uplift) (lbs)

| Bearing    | Live      | Dead      | Snow | Wind |
|------------|-----------|-----------|------|------|
| B1, 2-1/2" | 1,470 / 0 | 791 / 0   |      |      |
| B2, 3-1/2" | 2,025 / 0 | 1,095 / 0 |      |      |

### Load Summary

| Tag | Description        | Load Type         | Ref. | Start    | End      | Loc. | Live<br>1.00 | Dead<br>0.85 | Snow<br>1.00 | Wind<br>1.15 | Tributary |
|-----|--------------------|-------------------|------|----------|----------|------|--------------|--------------|--------------|--------------|-----------|
| 0   | Self-Weight        | Unf. Lin. (lb/ft) | L    | 00-00-00 | 08-07-00 | Top  |              | 12           |              |              | 00-00-00  |
| 1   | FC1 Floor Material | Unf. Lin. (lb/ft) | L    | 00-00-00 | 04-08-14 | Top  | 26           | 13           |              |              | n/a       |
| 2   | Smoothed Load      | Unf. Lin. (lb/ft) | L    | 02-00-00 | 07-04-00 | Top  | 280          | 140          |              |              | n/a       |
| 3   | STAIRS             | Unf. Lin. (lb/ft) | L    | 04-08-14 | 08-03-08 | Top  | 240          | 120          |              |              | n/a       |
| 4   | J3(13483)          | Conc. Pt. (lbs)   | L    | 01-04-00 | 01-04-00 | Top  | 478          | 239          |              |              | n/a       |
| 5   | B2(13530)          | Conc. Pt. (lbs)   | L    | 04-08-00 | 04-08-00 | Top  | 162          | 94           |              |              | n/a       |
| 6   |                    | Conc. Pt. (lbs)   | L    | 08-00-03 | 08-00-03 | Top  | 330          | 189          |              |              | n/a       |

### Controls Summary

|                       | Factored Demand | Factored Resistance | Demand/Resistance | Case | Location |
|-----------------------|-----------------|---------------------|-------------------|------|----------|
| Pos. Moment           | 8,142 ft-lbs    | 35,392 ft-lbs       | 23.0%             | 1    | 04-06-00 |
| End Shear             | 3,342 lbs       | 14,464 lbs          | 23.1%             | 1    | 07-03-10 |
| Total Load Deflection | L/999 (0.071")  | n/a                 | n/a               | 4    | 04-04-08 |
| Live Load Deflection  | L/999 (0.046")  | n/a                 | n/a               | 5    | 04-04-08 |
| Max Defl.             | 0.071"          | n/a                 | n/a               | 4    | 04-04-08 |
| Span / Depth          | 8.3             |                     |                   |      |          |

| Bearing Supports | Dim. (LxW)      | Demand    | Demand/Resistance Support | Demand/Resistance Member | Material    |
|------------------|-----------------|-----------|---------------------------|--------------------------|-------------|
| B1 Beam          | 2-1/2" x 3-1/2" | 3,194 lbs | 68.4%                     | 29.9%                    | Unspecified |
| B2 Wall/Plate    | 3-1/2" x 3-1/2" | 4,408 lbs | 67.4%                     | 29.5%                    | Unspecified |

### Notes

Design meets Code minimum (L/240) Total load deflection criteria.

Design meets Code minimum (L/360) Live load deflection criteria.

Calculations assume member is fully braced.

Resistance Factor phi has been applied to all presented results per CSA O86.

BC CALC® analysis is based on Canadian Limit States Design, as per NBCC 2015 and CSA O86.

Design based on Dry Service Condition.

Importance Factor: Normal Part code: Part c

Connection design assumes point load is top-loaded. For connection design of side-loaded point loads, please consult a technical representative or professional of Record.

Nail one ply to another with  
3 1/2" spiral nails @ 10"  
o.c. staggered in 2 rows



DESIGN CONFORMS TO OBC2012



Double 1-3/4" x 11-7/8" VERSA-LAM® 2.0 3100 SP

PASSED

2ND FLOOR FRAMING\Flush Beams\B11\13421

BC CALC® Member Report

Dry | 1 span | No cant.

November 6, 2018 13:14:39

Build 6476

Job name:

File name: PRESTON 12 ELEV 2.mmdl

Address:

Description: 2ND FLOOR FRAMING\Flush Beams\B11\13421

City, Province, Postal Code: CALEDON

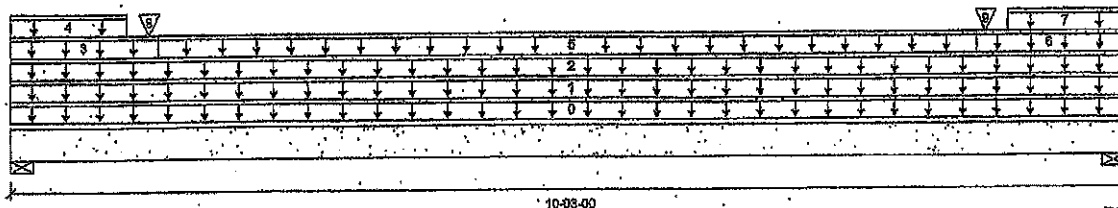
Specifier:

Customer:

Designer: PL

Code reports: CCMC 12472-R

Company:



Total Horizontal Product Length = 10-03-00

### Reaction Summary (Down / Uplift) (lbs)

| Bearing    | Live    | Dead    | Snow      | Wind |
|------------|---------|---------|-----------|------|
| B1, 5-1/2" | 441 / 0 | 746 / 0 | 1,046 / 0 |      |
| B2, 5-1/2" | 440 / 0 | 746 / 0 | 1,046 / 0 |      |

### Load Summary

| Tag | Description        | Load Type         | Ref. | Start    | End      | Loc. | Live<br>1.00 | Dead<br>0.85 | Snow<br>1.00 | Wind<br>1.15 | Tributary |
|-----|--------------------|-------------------|------|----------|----------|------|--------------|--------------|--------------|--------------|-----------|
| 0   | Self-Weight        | Unf. Lin. (lb/ft) | L    | 00-00-00 | 10-03-00 | Top  |              | 12           |              |              | 00-00-00  |
| 1   | LOW ROOF           | Unf. Lin. (lb/ft) | L    | 00-00-00 | 10-03-00 | Top  | 33           | 30           | 102          |              | n/a       |
| 2   | FC2 Floor Material | Unf. Lin. (lb/ft) | L    | 00-00-00 | 10-03-00 | Top  | 20           | 10           |              |              | n/a       |
| 3   | E44(13529)         | Unf. Lin. (lb/ft) | L    | 00-00-00 | 01-04-08 | Top  |              | 81           |              |              | n/a       |
| 4   | E44(13529)         | Unf. Lin. (lb/ft) | L    | 00-00-00 | 01-01-00 | Top  | 33           | 30           | 102          |              | n/a       |
| 5   | E46(13530)         | Unf. Lin. (lb/ft) | L    | 01-04-08 | 08-10-08 | Top  |              | 41           |              |              | n/a       |
| 6   | E26(12687)         | Unf. Lin. (lb/ft) | L    | 08-10-08 | 10-03-00 | Top  |              | 81           |              |              | n/a       |
| 7   | E26(12687)         | Unf. Lin. (lb/ft) | L    | 08-02-00 | 10-03-00 | Top  | 33           | 30           | 102          |              | n/a       |
| 8   | E44(13529)         | Conc. Pt. (lbs)   | L    | 01-03-08 | 01-03-08 | Top  | 184          | 182          | 413          |              | n/a       |
| 9   | E26(12687)         | Conc. Pt. (lbs)   | L    | 08-11-08 | 08-11-08 | Top  | 133          | 182          | 411          |              | n/a       |

### Controls Summary

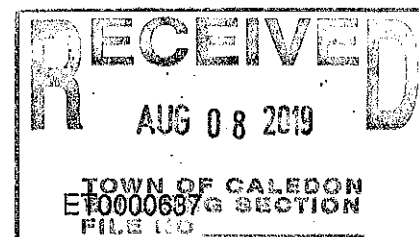
|                       | Factored Demand | Factored Resistance | Demand/<br>Resistance | Case | Location |
|-----------------------|-----------------|---------------------|-----------------------|------|----------|
| Pos. Moment           | 4,658 ft-lbs    | 35,392 ft-lbs       | 12.9%                 | 13   | 05-01-08 |
| End Shear             | 2,245 lbs       | 14,464 lbs          | 15.5%                 | 13   | 01-05-08 |
| Total Load Deflection | L/899 (0.06")   | n/a                 | n/a                   | 35   | 05-01-08 |
| Live Load Deflection  | L/899 (0.039")  | n/a                 | n/a                   | 51   | 05-01-08 |
| Max Defl.             | 0.06"           | n/a                 | n/a                   | 35   | 05-01-08 |
| Span / Depth          | 9.6             |                     |                       |      |          |

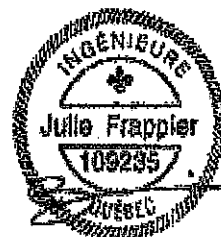
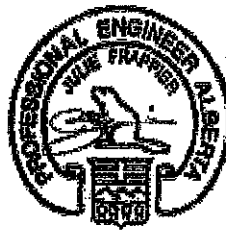
| Bearing Supports | Dim. (LxW)                 | Demand    | Demand/<br>Resistance<br>Support | Demand/<br>Resistance<br>Member | Material    |
|------------------|----------------------------|-----------|----------------------------------|---------------------------------|-------------|
| B1               | Wall/Plate 5-1/2" x 3-1/2" | 2,942 lbs | 28.6%                            | 12.6%                           | Unspecified |
| B2               | Wall/Plate 5-1/2" x 3-1/2" | 2,940 lbs | 28.6%                            | 12.5%                           | Unspecified |

Nail one ply to another with  
3 1/2" spiral nails @ 12"  
o.c. staggered in 2 rows



DESIGN CONFORMS TO OBC2012





## Maximum Floor Spans

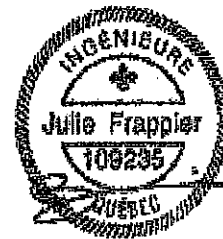
Live Load = 40 psf, Dead Load = 30 psf  
Simple Spans, L/480 Deflection Limit  
3/4" OSB G&N Sheathing

| Depth   | Series | Bare              |         |         |         | 1/2" Gypsum Ceiling |         |         |         |
|---------|--------|-------------------|---------|---------|---------|---------------------|---------|---------|---------|
|         |        | On Centre Spacing |         |         |         | On Centre Spacing   |         |         |         |
|         |        | 12"               | 16"     | 19.2"   | 24"     | 12"                 | 16"     | 19.2"   | 24"     |
| 9-1/2"  | NI-20  | 15'-7"            | 14'-2"  | 13'-4"  | 12'-4"  | 15'-7"              | 14'-2"  | 13'-4"  | 12'-4"  |
|         | NI-40x | 17'-0"            | 16'-0"  | 15'-1"  | 13'-11" | 17'-5"              | 16'-1"  | 15'-1"  | 13'-11" |
|         | NI-60  | 17'-2"            | 16'-2"  | 15'-5"  | 14'-3"  | 17'-6"              | 16'-5"  | 15'-5"  | 14'-3"  |
|         | NI-70  | 18'-0"            | 16'-11" | 16'-3"  | 15'-6"  | 18'-5"              | 17'-3"  | 16'-7"  | 15'-6"  |
|         | NI-80  | 18'-3"            | 17'-4"  | 16'-5"  | 15'-9"  | 18'-8"              | 17'-5"  | 16'-9"  | 15'-10" |
| 11-7/8" | NI-20  | 17'-10"           | 16'-10" | 16'-0"  | 14'-10" | 18'-6"              | 17'-1"  | 16'-0"  | 14'-10" |
|         | NI-40x | 19'-4"            | 17'-11" | 17'-3"  | 15'-10" | 19'-11"             | 18'-6"  | 17'-9"  | 15'-10" |
|         | NI-60  | 19'-7"            | 18'-2"  | 17'-5"  | 16'-9"  | 20'-2"              | 18'-9"  | 17'-11" | 17'-1"  |
|         | NI-70  | 20'-9"            | 19'-2"  | 18'-3"  | 17'-5"  | 21'-4"              | 19'-9"  | 18'-10" | 17'-10" |
|         | NI-80  | 21'-1"            | 19'-5"  | 18'-6"  | 17'-7"  | 21'-7"              | 20'-0"  | 19'-0"  | 18'-0"  |
| 14"     | NI-90x | 21'-8"            | 20'-0"  | 19'-1"  | 18'-0"  | 22'-2"              | 20'-6"  | 19'-6"  | 18'-6"  |
|         | NI-40x | 21'-5"            | 19'-10" | 18'-11" | 17'-5"  | 22'-1"              | 20'-6"  | 19'-6"  | 17'-5"  |
|         | NI-60  | 21'-10"           | 20'-2"  | 19'-3"  | 18'-2"  | 22'-5"              | 20'-10" | 19'-11" | 18'-10" |
|         | NI-70  | 23'-0"            | 21'-3"  | 20'-3"  | 19'-2"  | 23'-8"              | 21'-11" | 20'-10" | 19'-9"  |
|         | NI-80  | 23'-5"            | 21'-7"  | 20'-7"  | 19'-5"  | 24'-0"              | 22'-3"  | 21'-2"  | 20'-0"  |
| 16"     | NI-90x | 24'-1"            | 22'-3"  | 21'-2"  | 20'-0"  | 24'-8"              | 22'-10" | 21'-9"  | 20'-7"  |
|         | NI-60  | 23'-9"            | 22'-0"  | 20'-11" | 19'-10" | 24'-6"              | 22'-9"  | 21'-8"  | 20'-6"  |
|         | NI-70  | 25'-1"            | 23'-2"  | 22'-0"  | 20'-10" | 25'-9"              | 23'-10" | 22'-9"  | 21'-6"  |
|         | NI-80  | 25'-6"            | 23'-6"  | 22'-4"  | 21'-2"  | 26'-1"              | 24'-2"  | 23'-1"  | 21'-10" |
|         | NI-90x | 26'-4"            | 24'-3"  | 23'-1"  | 21'-10" | 26'-11"             | 24'-11" | 23'-8"  | 22'-5"  |

| Depth   | Series | Mid-Span Blocking |         |        |         | Mid-Span Blocking and 1/2" Gypsum Ceiling |         |         |         |
|---------|--------|-------------------|---------|--------|---------|-------------------------------------------|---------|---------|---------|
|         |        | On Centre Spacing |         |        |         | On Centre Spacing                         |         |         |         |
|         |        | 12"               | 16"     | 19.2"  | 24"     | 12"                                       | 16"     | 19.2"   | 24"     |
| 9-1/2"  | NI-20  | 15'-7"            | 14'-2"  | 13'-4" | 12'-4"  | 15'-7"                                    | 14'-2"  | 13'-4"  | 12'-4"  |
|         | NI-40x | 17'-9"            | 16'-1"  | 15'-1" | 13'-11" | 17'-9"                                    | 16'-1"  | 15'-1"  | 13'-11" |
|         | NI-60  | 18'-1"            | 16'-5"  | 15'-5" | 14'-3"  | 18'-1"                                    | 16'-5"  | 15'-5"  | 14'-3"  |
|         | NI-70  | 19'-10"           | 17'-11" | 16'-9" | 15'-6"  | 19'-10"                                   | 17'-11" | 16'-9"  | 15'-6"  |
|         | NI-80  | 20'-2"            | 18'-3"  | 17'-1" | 15'-10" | 20'-2"                                    | 18'-3"  | 17'-1"  | 15'-10" |
| 11-7/8" | NI-20  | 18'-10"           | 17'-1"  | 16'-0" | 14'-10" | 18'-10"                                   | 17'-1"  | 16'-0"  | 14'-10" |
|         | NI-40x | 21'-3"            | 19'-3"  | 17'-9" | 15'-10" | 21'-3"                                    | 19'-3"  | 17'-9"  | 15'-10" |
|         | NI-60  | 21'-9"            | 19'-8"  | 18'-5" | 17'-1"  | 21'-9"                                    | 19'-8"  | 18'-5"  | 17'-1"  |
|         | NI-70  | 23'-4"            | 21'-5"  | 20'-1" | 18'-6"  | 23'-8"                                    | 21'-5"  | 20'-1"  | 18'-6"  |
|         | NI-80  | 23'-7"            | 21'-10" | 20'-5" | 18'-11" | 24'-1"                                    | 21'-10" | 20'-5"  | 18'-11" |
| 14"     | NI-90x | 24'-3"            | 22'-6"  | 21'-3" | 19'-7"  | 24'-8"                                    | 22'-7"  | 21'-3"  | 19'-7"  |
|         | NI-40x | 24'-2"            | 21'-5"  | 19'-6" | 17'-5"  | 24'-2"                                    | 21'-5"  | 19'-6"  | 17'-5"  |
|         | NI-60  | 24'-9"            | 22'-5"  | 21'-0" | 19'-6"  | 24'-9"                                    | 22'-5"  | 21'-0"  | 19'-6"  |
|         | NI-70  | 26'-1"            | 24'-3"  | 22'-9" | 21'-0"  | 26'-8"                                    | 24'-3"  | 22'-9"  | 21'-0"  |
|         | NI-80  | 26'-6"            | 24'-7"  | 23'-3" | 21'-6"  | 27'-1"                                    | 24'-10" | 23'-3"  | 21'-6"  |
| 16"     | NI-90x | 27'-3"            | 25'-4"  | 24'-1" | 22'-4"  | 27'-9"                                    | 25'-10" | 24'-3"  | 22'-4"  |
|         | NI-60  | 27'-3"            | 24'-11" | 23'-5" | 21'-7"  | 27'-6"                                    | 24'-11" | 23'-5"  | 21'-7"  |
|         | NI-70  | 28'-8"            | 26'-8"  | 25'-3" | 23'-4"  | 29'-3"                                    | 26'-11" | 25'-3"  | 23'-4"  |
|         | NI-80  | 29'-1"            | 27'-0"  | 25'-9" | 23'-10" | 29'-8"                                    | 27'-6"  | 25'-10" | 23'-10" |
|         | NI-90x | 29'-11"           | 27'-10" | 26'-6" | 24'-10" | 30'-6"                                    | 28'-5"  | 26'-11" | 24'-10" |

- Maximum clear span applicable to simple-span residential floor construction with a design live load of 40 psf and dead load of 30 psf. The ultimate limit states are based on the factored loads of  $1.50L + 1.25D$ . The serviceability limit states include the consideration for floor vibration, a live load deflection limit of  $L/480$  and a total load deflection limit of  $L/240$ .
- Spans are based on a composite floor with glued-nailed oriented strand board (OSB) sheathing with a minimum thickness of 3/4 inch for a joist spacing of 24 inches or less. The composite floor may include 1/2 inch gypsum ceiling and/or one row of blocking at mid-span with strapping. Strapping shall be minimum 1x4 inch strap applied to underside of joists at blocking line or 1/2 inch gypsum ceiling attached to joists.
- Minimum bearing length shall be 1-3/4 inches for the end bearings.
- Bearing stiffeners are not required when I-joists are used with the spans and spacings given in this table, except as required for hangers.
- This span chart is based on uniform loads. For applications with other than uniformly distributed loads, an engineering analysis may be required based on the use of the design properties. Tables are based on Limit States Design per CSA O86-09, NBC 2010, and OBC 2012.
- Joists shall be laterally supported at supports and continuously along the compression edge. Refer to technical documentation for installation guidelines and construction details. Nordic I-joists are listed in CCMC evaluation report L3032-R and APA Product Report PR-L274C.



### Maximum Floor Spans

Live Load = 40 psf, Dead Load = 15 psf  
Simple Spans, L/480 Deflection Limit  
5/8" OSB G&N Sheathing

| Depth   | Series | Bare              |         |         |     | 1/2" Gypsum Ceiling |         |         |     |
|---------|--------|-------------------|---------|---------|-----|---------------------|---------|---------|-----|
|         |        | On Centre Spacing |         |         |     | On Centre Spacing   |         |         |     |
|         |        | 12"               | 16"     | 19.2"   | 24" | 12"                 | 16"     | 19.2"   | 24" |
| 9-1/2"  | NI-20  | 15'-1"            | 14'-2"  | 13'-9"  | N/A | 15'-7"              | 14'-8"  | 14'-2"  | N/A |
|         | NI-40x | 16'-1"            | 15'-2"  | 14'-8"  | N/A | 16'-7"              | 15'-7"  | 15'-1"  | N/A |
|         | NI-60  | 16'-3"            | 15'-4"  | 14'-10" | N/A | 16'-8"              | 15'-9"  | 15'-3"  | N/A |
|         | NI-70  | 17'-1"            | 16'-1"  | 15'-6"  | N/A | 17'-5"              | 16'-5"  | 15'-10" | N/A |
|         | NI-80  | 17'-3"            | 16'-3"  | 15'-8"  | N/A | 17'-8"              | 16'-7"  | 16'-0"  | N/A |
| 11-7/8" | NI-20  | 16'-11"           | 16'-0"  | 15'-5"  | N/A | 17'-6"              | 16'-6"  | 16'-0"  | N/A |
|         | NI-40x | 18'-1"            | 17'-0"  | 16'-5"  | N/A | 18'-9"              | 17'-6"  | 16'-11" | N/A |
|         | NI-60  | 18'-4"            | 17'-3"  | 16'-7"  | N/A | 19'-0"              | 17'-8"  | 17'-1"  | N/A |
|         | NI-70  | 19'-6"            | 18'-0"  | 17'-4"  | N/A | 20'-1"              | 18'-7"  | 17'-9"  | N/A |
|         | NI-80  | 19'-9"            | 18'-3"  | 17'-6"  | N/A | 20'-4"              | 18'-10" | 17'-11" | N/A |
| 14"     | NI-90x | 20'-4"            | 18'-9"  | 17'-11" | N/A | 20'-10"             | 19'-3"  | 18'-5"  | N/A |
|         | NI-40x | 20'-1"            | 18'-7"  | 17'-10" | N/A | 20'-10"             | 19'-4"  | 18'-6"  | N/A |
|         | NI-60  | 20'-5"            | 18'-11" | 18'-1"  | N/A | 21'-2"              | 19'-7"  | 18'-9"  | N/A |
|         | NI-70  | 21'-7"            | 20'-0"  | 19'-1"  | N/A | 22'-3"              | 20'-7"  | 19'-8"  | N/A |
|         | NI-80  | 21'-11"           | 20'-3"  | 19'-4"  | N/A | 22'-7"              | 20'-11" | 20'-0"  | N/A |
| 16"     | NI-90x | 22'-7"            | 20'-11" | 19'-11" | N/A | 23'-3"              | 21'-6"  | 20'-6"  | N/A |
|         | NI-60  | 22'-3"            | 20'-8"  | 19'-9"  | N/A | 23'-1"              | 21'-5"  | 20'-6"  | N/A |
|         | NI-70  | 23'-6"            | 21'-9"  | 20'-9"  | N/A | 24'-3"              | 22'-5"  | 21'-5"  | N/A |
|         | NI-80  | 23'-11"           | 22'-1"  | 21'-1"  | N/A | 24'-8"              | 22'-10" | 21'-9"  | N/A |
|         | NI-90x | 24'-8"            | 22'-9"  | 21'-9"  | N/A | 25'-4"              | 23'-5"  | 22'-4"  | N/A |

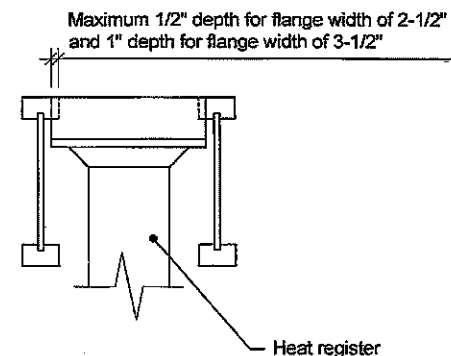
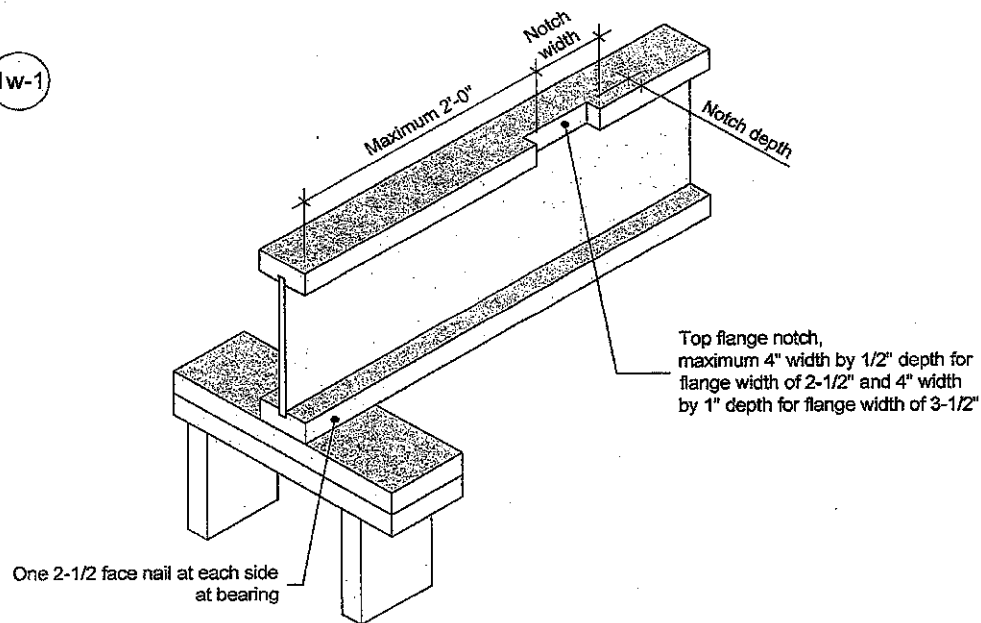
  

| Depth   | Series | Mid-Span Blocking |         |         |     | Mid-Span Blocking and 1/2" Gypsum Ceiling |         |         |     |
|---------|--------|-------------------|---------|---------|-----|-------------------------------------------|---------|---------|-----|
|         |        | On Centre Spacing |         |         |     | On Centre Spacing                         |         |         |     |
|         |        | 12"               | 16"     | 19.2"   | 24" | 12"                                       | 16"     | 19.2"   | 24" |
| 9-1/2"  | NI-20  | 16'-8"            | 15'-3"  | 14'-5"  | N/A | 16'-8"                                    | 15'-3"  | 14'-5"  | N/A |
|         | NI-40x | 17'-11"           | 16'-11" | 16'-1"  | N/A | 18'-5"                                    | 17'-1"  | 16'-1"  | N/A |
|         | NI-60  | 18'-2"            | 17'-1"  | 16'-4"  | N/A | 18'-7"                                    | 17'-4"  | 16'-4"  | N/A |
|         | NI-70  | 19'-2"            | 17'-10" | 17'-2"  | N/A | 19'-7"                                    | 18'-3"  | 17'-7"  | N/A |
|         | NI-80  | 19'-5"            | 18'-0"  | 17'-4"  | N/A | 19'-10"                                   | 18'-5"  | 17'-8"  | N/A |
| 11-7/8" | NI-20  | 19'-6"            | 18'-1"  | 17'-3"  | N/A | 19'-11"                                   | 18'-3"  | 17'-3"  | N/A |
|         | NI-40x | 21'-0"            | 19'-6"  | 18'-8"  | N/A | 21'-7"                                    | 20'-2"  | 19'-2"  | N/A |
|         | NI-60  | 21'-4"            | 19'-9"  | 18'-11" | N/A | 21'-11"                                   | 20'-4"  | 19'-6"  | N/A |
|         | NI-70  | 22'-6"            | 20'-10" | 19'-11" | N/A | 23'-0"                                    | 21'-5"  | 20'-5"  | N/A |
|         | NI-80  | 22'-9"            | 21'-1"  | 20'-1"  | N/A | 23'-3"                                    | 21'-7"  | 20'-8"  | N/A |
| 14"     | NI-90x | 23'-4"            | 21'-8"  | 20'-8"  | N/A | 23'-10"                                   | 22'-2"  | 21'-2"  | N/A |
|         | NI-40x | 23'-7"            | 21'-11" | 20'-11" | N/A | 24'-3"                                    | 22'-7"  | 21'-7"  | N/A |
|         | NI-60  | 24'-0"            | 22'-3"  | 21'-3"  | N/A | 24'-8"                                    | 22'-11" | 21'-11" | N/A |
|         | NI-70  | 25'-3"            | 23'-4"  | 22'-3"  | N/A | 25'-10"                                   | 24'-0"  | 22'-11" | N/A |
|         | NI-80  | 25'-7"            | 23'-8"  | 22'-7"  | N/A | 26'-2"                                    | 24'-4"  | 23'-2"  | N/A |
| 16"     | NI-90x | 26'-4"            | 24'-4"  | 23'-3"  | N/A | 26'-10"                                   | 24'-11" | 23'-9"  | N/A |
|         | NI-60  | 26'-5"            | 24'-6"  | 23'-4"  | N/A | 27'-2"                                    | 25'-3"  | 24'-2"  | N/A |
|         | NI-70  | 27'-9"            | 25'-8"  | 24'-6"  | N/A | 28'-5"                                    | 26'-5"  | 25'-2"  | N/A |
|         | NI-80  | 28'-2"            | 26'-1"  | 24'-10" | N/A | 28'-10"                                   | 26'-9"  | 25'-6"  | N/A |
|         | NI-90x | 29'-0"            | 26'-10" | 25'-7"  | N/A | 29'-7"                                    | 27'-5"  | 26'-2"  | N/A |

- Maximum clear span applicable to simple-span residential floor construction with a design live load of 40 psf and dead load of 15 psf. The ultimate limit states are based on the factored loads of 1.50L + 1.25D. The serviceability limit states include the consideration for floor vibration, a live load deflection limit of L/480 and a total load deflection limit of L/240.
- Spans are based on a composite floor with glued-nailed oriented strand board (OSB) sheathing with a minimum thickness of 5/8 inch for a joist spacing of 19.2 inches or less. The composite floor may include 1/2 inch gypsum ceiling and/or one row of blocking at mid-span with strapping. Strapping shall be minimum 1x4 inch strap applied to underside of joists at blocking line or 1/2 inch gypsum ceiling attached to joists.
- Minimum bearing length shall be 1-3/4 inches for the end bearings.
- Bearing stiffeners are not required when I-joists are used with the spans and spacings given in this table, except as required for hangers.
- This span chart is based on uniform loads. For applications with other than uniformly distributed loads, an engineering analysis may be required based on the use of the design properties. Tables are based on Ultimate States Design per CSA O86-09, NBC 2010, and OBC 2012.
- Joists shall be laterally supported at supports and continuously along the compression edge. Refer to technical documentation for installation guidelines and construction details. Nordic I-joists are listed in CCMC evaluation report 13032-R and APA Product Report PR-L274C.



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**Notes:**

1. Blocking required at bearing for lateral support, not shown for clarity.
2. The maximum dimensions for a notch on the side of the top flange are 4-inch width by 1/2-inch depth for flange width of 2-1/2 inches, and 4-inch width by 1-inch depth for flange width of 3-1/2 inches.
3. This detail applies to simple-span joists and multiple-span joists where the notch is located at the end half-span.
4. For other applications, contact Nordic Structures.

This document supersedes all previous versions. If the document has been in effect for more than one year, consult [nordic.ca](http://nordic.ca) or contact Nordic Structures.  
All nails shown in the details are assumed to be common nails unless otherwise noted. Nails shall have a diameter not less than 0.128 inch for 2-1/2-inch nails, or 0.144 inch for 3-inch nails. Individual components not shown to scale for clarity.

**NORDIC  
STRUCTURES**

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**TITLE**

Notch in I-joist for Heat Register

**CATEGORY**

I-joist - Typical Floor Framing and Construction Details

**DOCUMENT**

-

**DATE**

2018-04-10

**NUMBER**

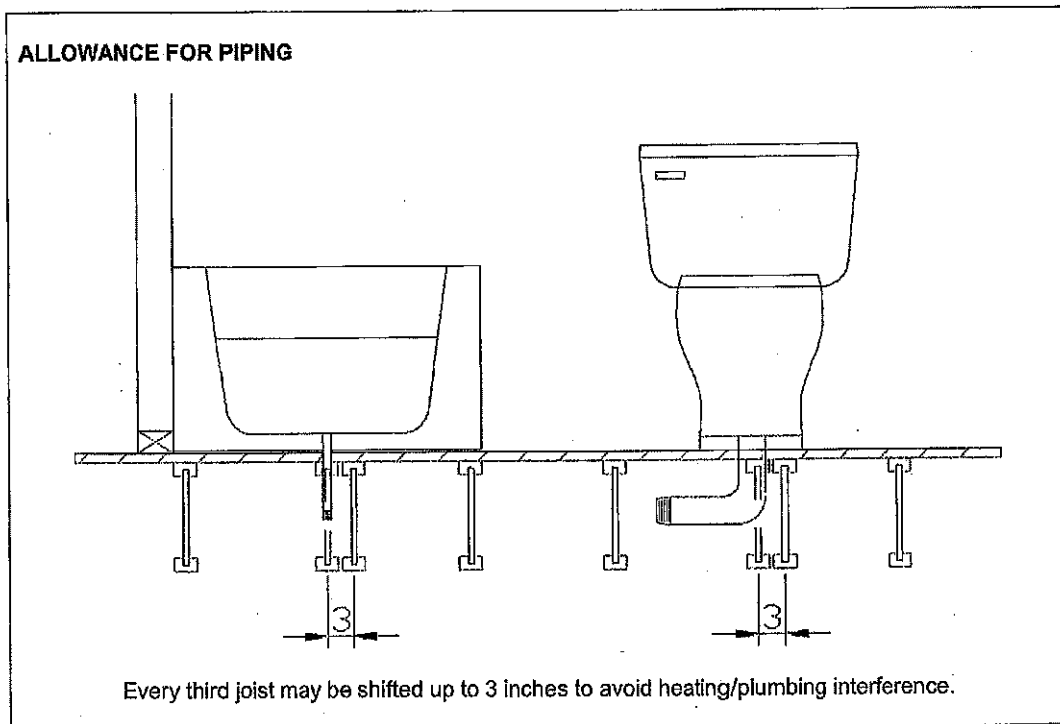
1w-1

## Allowance for Piping (Installation Notes)

The floor layouts have usually not been checked for heating and/or plumbing interference. On-site adjustment of joists of up to 3 inches is permitted to avoid interferences. When moving a joist, the subfloor thickness shall be checked with code requirements when the joist spacing exceeds 19.2 inches. Except for cutting to length, I-joist flanges should never be cut, drilled, or notched.

Installation of Nordic I-joists shall be as per *Nordic Joist Installation Guide for Residential Floors*. Refer to Tables 1 and 2 for maximum web hole and duct chase openings, respectively. These tables are based on the I-joists being used at their maximum spans. The minimum distance given may be reduced for shorter spans; contact your distributor for additional information.

The detail below shows the 3-inch allowance for piping. Every third joist may be shifted up to 3 inches to avoid heating/plumbing interference. For other applications, please contact your distributor.



Revised April 12, 2012