

FROM PLAN DATED:

BUILDER: ROYAL PINE HOMES

SITE: CENTREFIELD WEST GORMLEY

MODEL: 2010

ELEVATION: A,B

LOT:

CITY: RICHMOND HILL

SALESMAN: MARIO DICIANO

DESIGNER: AJ

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** RE 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 TIL** APPLICATION AS PER O.B.C 9.30.6.

LOADING:

DESIGN LOADS: L/480.000

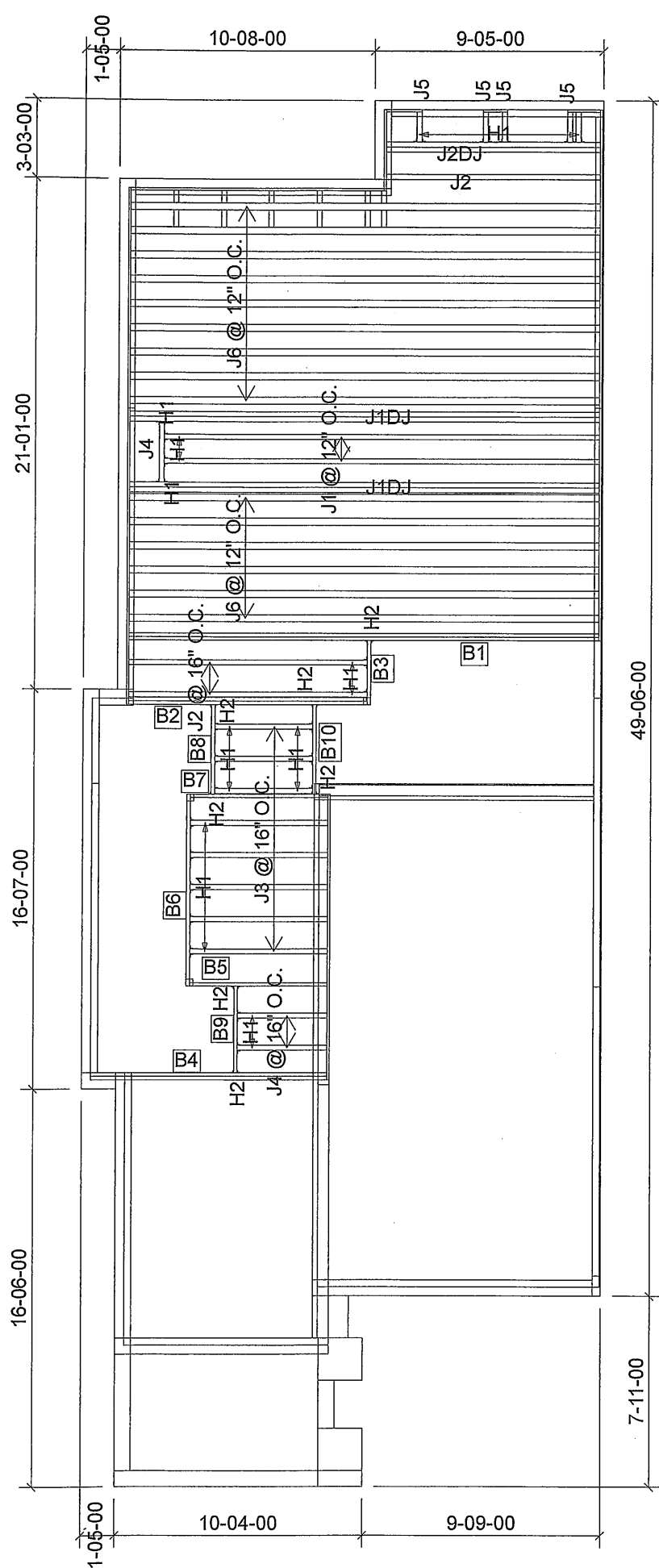
LIVE LOAD: 40.0 lb/ft²

DEAD LOAD: 20.0 lb/ft²

SUBFLOOR: 3/4" GLUED AND NAILED

DATE: 2020-08-06

1st FLOOR



| Products |          |                                         |       |         |
|----------|----------|-----------------------------------------|-------|---------|
| PlotID   | Length   | Product                                 | Plies | Net Qty |
| J1       | 20-00-00 | 11 7/8" NI-40x                          | 1     | 2       |
| J1DJ     | 20-00-00 | 11 7/8" NI-40x                          | 2     | 4       |
| J2       | 10-00-00 | 11 7/8" NI-40x                          | 1     | 3       |
| J2DJ     | 10-00-00 | 11 7/8" NI-40x                          | 2     | 2       |
| J3       | 6-00-00  | 11 7/8" NI-40x                          | 1     | 8       |
| J4       | 4-00-00  | 11 7/8" NI-40x                          | 1     | 3       |
| J5       | 2-00-00  | 11 7/8" NI-40x                          | 1     | 4       |
| J6       | 20-00-00 | 11 7/8" NI-80                           | 1     | 15      |
| B1       | 20-00-00 | 1-3/4" x 11-7/8" VERSA-LAM® 2.0 3100 SP | 2     | 2       |
| B2       | 10-00-00 | 1-3/4" x 11-7/8" VERSA-LAM® 2.0 3100 SP | 2     | 2       |
| B4       | 10-00-00 | 1-3/4" x 11-7/8" VERSA-LAM® 2.0 3100 SP | 2     | 2       |
| B6       | 8-00-00  | 1-3/4" x 11-7/8" VERSA-LAM® 2.0 3100 SP | 1     | 1       |
| B5       | 6-00-00  | 1-3/4" x 11-7/8" VERSA-LAM® 2.0 3100 SP | 1     | 1       |
| B7       | 6-00-00  | 1-3/4" x 11-7/8" VERSA-LAM® 2.0 3100 SP | 1     | 1       |
| B10      | 4-00-00  | 1-3/4" x 11-7/8" VERSA-LAM® 2.0 3100 SP | 1     | 1       |
| B3       | 4-00-00  | 1-3/4" x 11-7/8" VERSA-LAM® 2.0 3100 SP | 1     | 1       |
| B8       | 4-00-00  | 1-3/4" x 11-7/8" VERSA-LAM® 2.0 3100 SP | 1     | 1       |
| B9       | 4-00-00  | 1-3/4" x 11-7/8" VERSA-LAM® 2.0 3100 SP | 1     | 1       |

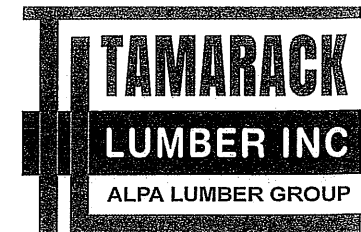
| Connector Summary |       |               |
|-------------------|-------|---------------|
| Qty               | Manuf | Product       |
| 15                | H1    | IUS2.56/11.88 |
| 7                 | H1    | IUS2.56/11.88 |
| 2                 | H1    | IUS2.56/11.88 |
| 3                 | H2    | HUS1.81/10    |
| 4                 | H2    | HUS1.81/10    |

CITY OF RICHMOND HILL  
BUILDING DIVISION

07/20/2021

RECEIVED

Per: jocelyn.aguilar



FROM PLAN DATED:

BUILDER: ROYAL PINE HOMES

SITE: CENTREFIELD WEST GORMLEY

MODEL: 2010

ELEVATION: A,B

LOT:

CITY: RICHMOND HILL

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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 ALSO BEARING AND RIMBOARD CLOSURE AT ENDS. SEE FIGURE 7 TABLES 4 & 5 FOR REINFORCEMENT REQUIREMENTS. FOR **HOLES** INCLUDING **DUCT CHASE** AND **FIELD CUT OPENINGS** SEE FIGURE 7 TABLES 1 & 2 OF THE INSTALLATION GUIDE. **CERAMIC TILE** APPLICATION AS PER O.B.C. 9.30.6

LOADING:

DESIGN LOADS: L/480.000

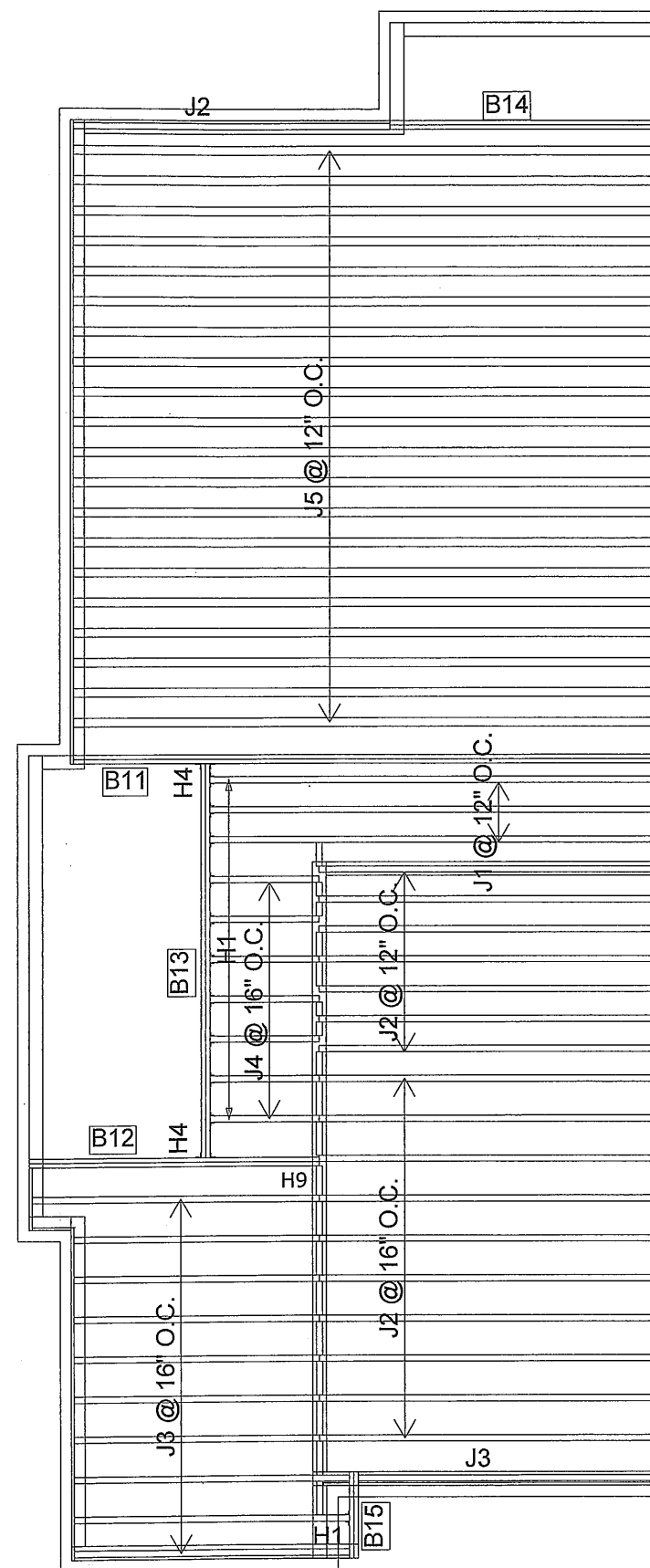
LIVE LOAD: 40.0 lb/ft²

DEAD LOAD: 20.0 lb/ft²

SUBFLOOR: 5/8" GLUED AND NAILED

DATE: 2020-07-27

2nd FLOOR



| Products |          |                                         |       |         |
|----------|----------|-----------------------------------------|-------|---------|
| PlotID   | Length   | Product                                 | Plies | Net Qty |
| J1       | 16-00-00 | 11 7/8" NI-40x                          | 1     | 3       |
| J2       | 12-00-00 | 11 7/8" NI-40x                          | 1     | 18      |
| J3       | 10-00-00 | 11 7/8" NI-40x                          | 1     | 11      |
| J4       | 4-00-00  | 11 7/8" NI-40x                          | 1     | 7       |
| J5       | 20-00-00 | 11 7/8" NI-80                           | 1     | 20      |
| B11      | 20-00-00 | 1-3/4" x 11-7/8" VERSA-LAM® 2.0 3100 SP | 2     | 2       |
| B13      | 14-00-00 | 1-3/4" x 11-7/8" VERSA-LAM® 2.0 3100 SP | 2     | 2       |
| B12      | 10-00-00 | 1-3/4" x 11-7/8" VERSA-LAM® 2.0 3100 SP | 2     | 2       |
| B14      | 10-00-00 | 1-3/4" x 11-7/8" VERSA-LAM® 2.0 3100 SP | 2     | 2       |
| B15      | 4-00-00  | 1-3/4" x 11-7/8" VERSA-LAM® 2.0 3100 SP | 2     | 2       |

| Connector Summary |       |               |
|-------------------|-------|---------------|
| Qty               | Manuf | Product       |
| 11                | H1    | IUS2.56/11.88 |
| 2                 | H4    | HGUS410       |

CITY OF RICHMOND HILL  
BUILDING DIVISION

07/20/2021

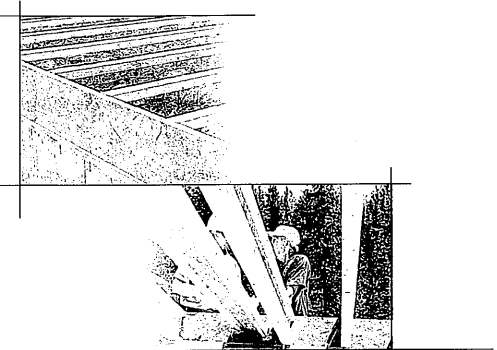
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Per: jocelyn.aguilar





## INSTALLATION GUIDE FOR RESIDENTIAL FLOORS

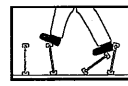


Distributed by:

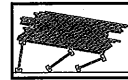


N-C201 / November 2014

### SAFETY AND CONSTRUCTION PRECAUTIONS



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



Never stack building materials over unsheathed I-joists. Once sheathed, do not over-stress I-joist with concentrated loads from building materials.

#### WARNING

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

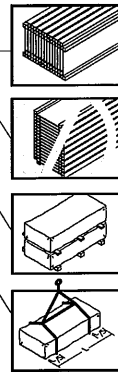
#### Avoid Accidents by Following these Important Guidelines:

- Brace and nail each I-joist as it is installed, using hangers, blocking panels, rim board, and/or cross-bridging at joist ends. When I-joists are applied continuous 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-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. Top 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.
- For cantilevered I-joists, brace top and bottom flanges, and brace ends with closure panels, rim board, or cross-bridging.
- 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.
- 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

- Bundle wrap can be slippery when wet. Avoid walking on wrapped bundles.
- Store, stack, and handle I-joists vertically and level only.
- Always stack and handle I-joists in the upright position only.
- Do not store I-joists in direct contact with the ground and/or flatwise.
- Protect I-joists from weather, and use spacers to separate bundles.
- Bundled units should be kept intact until time of installation.
- 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.
- Do not handle I-joists in a horizontal orientation.
- NEVER USE OR TRY TO REPAIR A DAMAGED I-JOIST.



### MAXIMUM FLOOR SPANS

- Maximum clear spans applicable to simple-span or multiple-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 and a live load deflection limit of 1/480. For multiple-span applications, the end spans shall be 40% or more of the adjacent span.
- 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. Adhesive shall meet the requirements given in CBCS-71.26 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.
- Minimum bearing length shall be 1-3/4 inches for the end bearings, and 3-1/2 inches for the intermediate 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 uniform loads, an engineering analysis may be required based on the use of the design properties.
- Tables are based on Limit States Design per CAN/CSA O86-09 Standard, and NRC 2010.
- 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 Spacing | Joist Size | Simple Span |         |         |         | Multiple Span |         |         |         |
|---------------|------------|-------------|---------|---------|---------|---------------|---------|---------|---------|
|               |            | 12'         | 12'     | 12'     | 12'     | 12'           | 12'     | 12'     | 12'     |
| 9'-1/2"       | NI-20      | 15'-1"      | 14'-2"  | 13'-5"  | 12'-3"  | 15'-1"        | 14'-1"  | 13'-5"  | 12'-3"  |
|               | NI-40x     | 16'-1"      | 15'-2"  | 14'-5"  | 13'-2"  | 16'-1"        | 15'-1"  | 14'-5"  | 13'-2"  |
|               | NI-60      | 16'-3"      | 15'-4"  | 14'-10" | 14'-11" | 17'-7"        | 16'-7"  | 16'-0"  | 16'-1"  |
|               | NI-70      | 17'-1"      | 16'-1"  | 15'-6"  | 15'-7"  | 18'-7"        | 17'-4"  | 16'-9"  | 16'-10" |
| 11'-7/8"      | NI-80      | 17'-3"      | 16'-3"  | 15'-8"  | 15'-9"  | 18'-10"       | 17'-4"  | 16'-11" | 17'-0"  |
|               | NI-40x     | 18'-1"      | 17'-0"  | 16'-5"  | 16'-6"  | 20'-0"        | 18'-6"  | 17'-9"  | 17'-7"  |
|               | NI-60      | 18'-4"      | 17'-3"  | 16'-7"  | 16'-9"  | 20'-3"        | 18'-9"  | 18'-0"  | 18'-1"  |
|               | NI-70      | 19'-4"      | 18'-0"  | 17'-4"  | 17'-5"  | 21'-4"        | 19'-11" | 19'-2"  | 19'-1"  |
| 14'           | NI-80      | 19'-9"      | 18'-3"  | 17'-6"  | 17'-7"  | 21'-9"        | 20'-2"  | 19'-3"  | 19'-4"  |
|               | NI-90      | 20'-2"      | 18'-7"  | 17'-10" | 17'-11" | 22'-3"        | 20'-7"  | 19'-8"  | 19'-9"  |
|               | NI-90x     | 20'-4"      | 18'-9"  | 17'-11" | 18'-0"  | 22'-5"        | 20'-9"  | 19'-10" | 19'-11" |
|               | NI-40x     | 20'-1"      | 18'-7"  | 17'-10" | 17'-11" | 22'-2"        | 20'-4"  | 19'-5"  | 19'-4"  |
| 16'           | NI-60      | 20'-5"      | 18'-11" | 18'-1"  | 18'-2"  | 22'-7"        | 20'-11" | 20'-0"  | 20'-1"  |
|               | NI-70      | 21'-7"      | 20'-0"  | 19'-1"  | 19'-2"  | 23'-10"       | 22'-1"  | 21'-1"  | 21'-2"  |
|               | NI-80      | 21'-11"     | 20'-3"  | 19'-4"  | 19'-5"  | 24'-3"        | 22'-5"  | 21'-5"  | 21'-6"  |
|               | NI-90      | 22'-5"      | 20'-8"  | 19'-9"  | 19'-10" | 24'-9"        | 22'-10" | 21'-10" | 21'-10" |
| 16'           | NI-90x     | 22'-7"      | 20'-11" | 19'-11" | 20'-0"  | 25'-0"        | 23'-1"  | 22'-0"  | 22'-2"  |
|               | NI-60      | 22'-3"      | 20'-8"  | 19'-9"  | 19'-10" | 24'-7"        | 22'-9"  | 21'-9"  | 21'-10" |
|               | NI-70      | 23'-6"      | 21'-9"  | 20'-9"  | 20'-10" | 26'-0"        | 24'-0"  | 22'-11" | 23'-0"  |
|               | NI-80      | 23'-11"     | 22'-11" | 21'-1"  | 21'-2"  | 26'-5"        | 24'-5"  | 23'-3"  | 23'-4"  |
| 16'           | NI-90      | 24'-5"      | 22'-4"  | 21'-5"  | 21'-6"  | 26'-11"       | 24'-10" | 23'-9"  | 23'-9"  |
|               | NI-90x     | 24'-8"      | 22'-9"  | 21'-9"  | 21'-10" | 27'-3"        | 25'-2"  | 24'-0"  | 24'-1"  |

CCMC EVALUATION REPORT 13032-R

### WEB STIFFENERS

#### RECOMMENDATIONS:

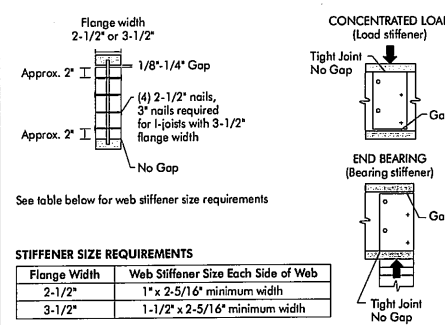
A bearing stiffener is required in all engineered applications with factored reactions greater than shown in the I-joist properties table found in the I-joist Construction Guide (C101). The gap between the stiffener and the flange is at the top.

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. The 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



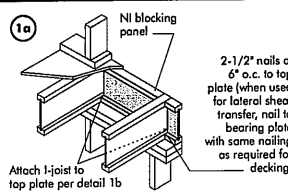
See table below for web stiffener size requirements

#### STIFFENER SIZE REQUIREMENTS

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

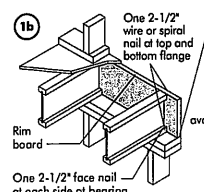
### INSTALLING NORDIC I-JOISTS

- Before laying out floor system components, verify that I-joist flange widths match hanger widths. If not, consult your supplier.
- Except for cutting to length, I-joist flanges should never be cut, drilled, or notched.
- Install I-joists so that top and bottom flanges are within 1/2 inch of true vertical alignment.
- I-joists must be anchored securely to supports before floor sheathing is attached, and supports for multiple span joists must be level.
- Minimum bearing lengths: 1-3/4 inches for end bearings and 3-1/2 inches for intermediate bearings.
- When using hangers, seat I-joists firmly in hanger bottoms to minimize settlement.
- Leave a 1/16-inch gap between the I-joist end and a header.
- 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.
- Never install I-joists where they will be permanently exposed to weather, or where they will remain in direct contact with concrete or masonry.
- Restrain ends of floor joists to prevent rollover. Use rim board, rim joists or I-joist blocking panels.
- For I-joists installed over and beneath bearing walls, use full depth blocking panels, rim board, or squash blocks (cripple members) to transfer gravity loads through the floor system to the wall or foundation below.
- Due to shrinkage, common framing lumber set on 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 an I-joist-compatible depth selected.
- 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.
- 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.
- Nail spacing: Space nails installed to the flange's top face in accordance with the applicable building code requirements or approved building plans.



| Blocking Panel or Rim Joist | Maximum Factored Uniform Vertical Load* (plf) |
|-----------------------------|-----------------------------------------------|
| NI Joists                   | 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.

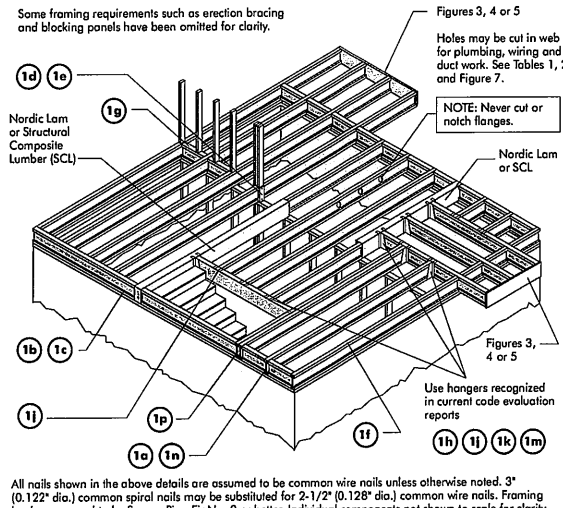


| Blocking Panel or Rim Joist | Maximum Factored Uniform Vertical Load* (plf) |
|-----------------------------|-----------------------------------------------|
| 1-1/8" Rim Board Plus       | 8,090                                         |

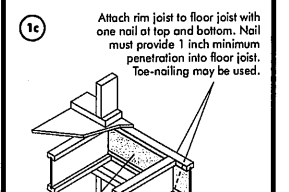
\*The uniform vertical load is limited to a rim board depth of 16 inches or less and is based on standard term load duration. It shall not be used in the design of a bending member, such as joist, header, or rafter. For concentrated vertical load transfer, see detail 1d.



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

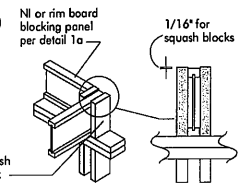


All nails shown in the above details are assumed to be common wire nails unless otherwise noted. 3" (0.125" dia.) common spiral nails may be substituted for 2-1/2" (0.125" dia.) common wire nails. Framing lumber assumed to be Spruce-Pine-Fir No. 2 or better. Individual components not shown to scale for clarity.



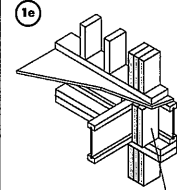
| Pair of Squash Blocks | Maximum Factored Vertical per Pair of Squash Blocks (lbs) |
|-----------------------|-----------------------------------------------------------|
| 2x Lumber             | 5,500                                                     |
| 1-1/8" Rim Board Plus | 4,300                                                     |

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

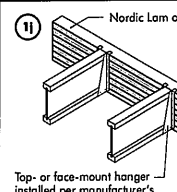


| Pair of Squash Blocks | Maximum Factored Vertical per Pair of Squash Blocks (lbs) |
|-----------------------|-----------------------------------------------------------|
| 2x Lumber             | 5,500                                                     |
| 1-1/8" Rim Board Plus | 4,300                                                     |

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



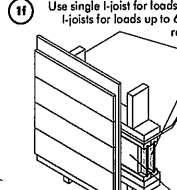
Transfer load from above to bearing below. Install squash blocks per detail 1d. Match bearing area of blocks below to post above.



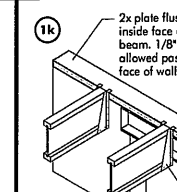
Top- or face-mount hanger installed per manufacturer's recommendations

For nailing schedules for multiple beams, see the manufacturer's recommendations.

Note: Unless hanger sides laterally support the top flange, bearing stiffeners shall be used.

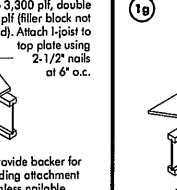


Use single I-joist for loads up to 3,300 plf, double I-joists for loads up to 6,600 plf (filler block not required). Attach I-joist to top plate using 2-1/2" nails at 6" o.c.

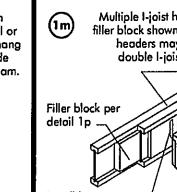


Top-mount hanger installed per manufacturer's recommendations

Note: Unless hanger sides laterally support the top flange, bearing stiffeners shall be used.



Load bearing wall above shall align vertically with the bearing below. Other conditions, such as offset bearing walls, are not covered by this detail.



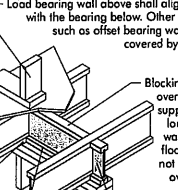
Blocking required over all interior supports under load-bearing walls or when floor joists are not continuous over support

NI blocking panel per detail 1a

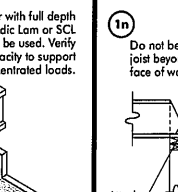
2-1/2" nails at 6" o.c. to top plate

Joist attachment per detail 1b

Maximum support capacity = 1,620 lbs.



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.



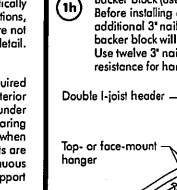
Filler block per detail 1p

Install hanger per manufacturer's recommendations

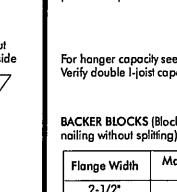
Backer block attached per detail 1h. Nail with twelve 3" nails, clinch when possible.

Maximum support capacity = 1,620 lbs.

Backer block attached per detail 1h. Nail with twelve 3" nails, clinch when possible.



Do not bevel-cut joist beyond inside face of wall



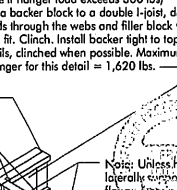
Attach I-joist per detail 1b

Note: Blocking required at bearing for lateral support, not shown for clarity.

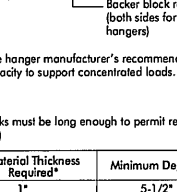
Maximum support capacity = 1,620 lbs.

Maximum support capacity = 1,620 lbs.

Maximum support capacity = 1,620 lbs.



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 tight to top flange. Use twelve 3" nails, clinch when possible. Maximum factored resistance for hanger for this detail = 1,620 lbs.



Double I-joist header

Top- or face-mount hanger

Filler block per detail 1p

Backer block required (both sides for face-mount hangers)

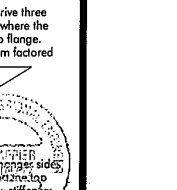
For hanger capacity see hanger manufacturer's recommendations. Verify double I-joist capacity to support concentrated loads.

BACKER BLOCKS (Blocks must be long enough to permit required nailing without splitting)

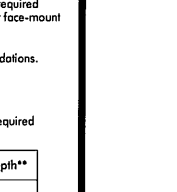
| Flange Width | Material Thickness Required* | Minimum Depth** |
|--------------|------------------------------|-----------------|
| 2-1/2"       | 1"                           | 5-1/2"          |
| 3-1/2"       | 1-1/2"                       | 7-1/4"          |

\* 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-Q325 or CAN/CSA-Q437 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".



Attach I-joist to top plate per detail 1b



Attach I-joist to top plate per detail 1b

Attach I-joist to top plate per detail 1b

Attach I-joist to top plate per detail 1b

Attach I-joist to top plate per detail 1b

Attach I-joist to top plate per detail 1b

Attach I-joist to top plate per detail 1b

Attach I-joist to top plate per detail 1b

Attach I-joist to top plate per detail 1b

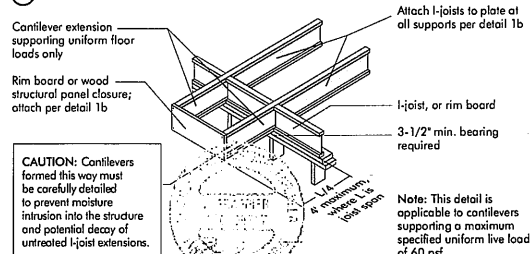
Attach I-joist to top plate per detail 1b

Attach I-joist to top plate per detail 1b

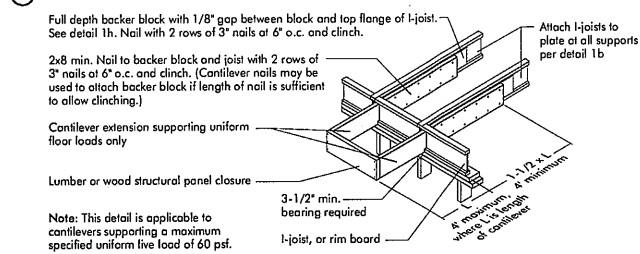


## CANTILEVER DETAILS FOR BALCONIES (NO WALL LOAD)

### 3a I-JOIST CANTILEVER DETAIL FOR BALCONIES (No Wall Load)

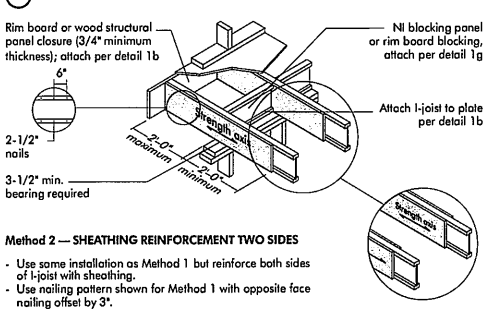


### 3b LUMBER CANTILEVER DETAIL FOR BALCONIES (No Wall Load)

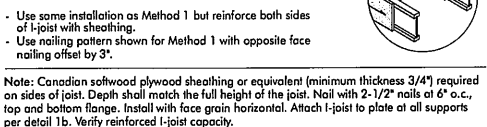


## CANTILEVER DETAILS FOR VERTICAL BUILDING OFFSET (CONCENTRATED WALL LOAD)

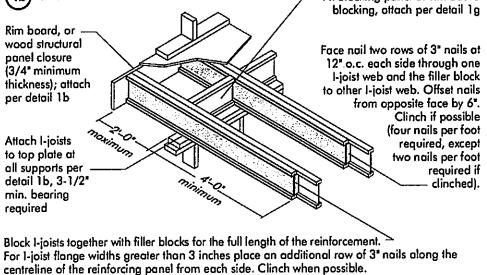
### 4a Method 1 — SHEATHING REINFORCEMENT ONE SIDE



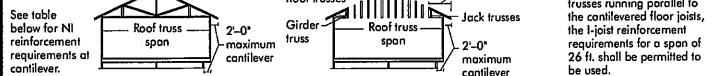
### Method 2 — SHEATHING REINFORCEMENT TWO SIDES



### 4b Alternate Method 2 — DOUBLE I-JOIST



### FIGURE 4 (continued)



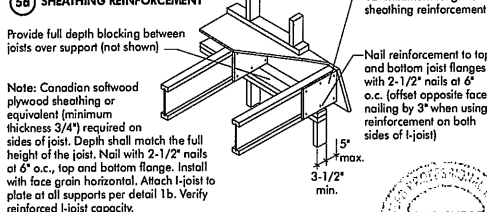
### CANTILEVER REINFORCEMENT METHODS ALLOWED

| JOIST DEPTH (in) | ROOF TRUSS SPAN (ft) | ROOF LOADING (UNFACTORED) |    |    |    |                          |    |    |    |
|------------------|----------------------|---------------------------|----|----|----|--------------------------|----|----|----|
|                  |                      | LL = 30 psf, DL = 15 psf  |    |    |    | LL = 40 psf, DL = 15 psf |    |    |    |
|                  |                      | 12                        | 16 | 20 | 24 | 12                       | 16 | 20 | 24 |
| 9-1/2"           | 26                   | N                         | N  | 1  | 2  | N                        | 1  | 2  | X  |
|                  | 28                   | N                         | N  | 1  | 2  | N                        | 1  | 2  | X  |
|                  | 30                   | N                         | 1  | 1  | X  | N                        | 1  | 2  | X  |
|                  | 32                   | N                         | 1  | 2  | X  | N                        | 2  | X  | X  |
|                  | 34                   | N                         | 1  | 2  | X  | N                        | 2  | X  | X  |
| 11-7/8"          | 26                   | N                         | N  | 1  | 2  | N                        | 1  | 2  | X  |
|                  | 28                   | N                         | N  | 1  | 2  | N                        | 1  | 2  | X  |
|                  | 30                   | N                         | N  | 1  | 2  | N                        | 1  | 2  | X  |
|                  | 32                   | N                         | N  | 1  | 2  | N                        | 1  | 2  | X  |
|                  | 34                   | N                         | N  | 1  | 2  | N                        | 1  | 2  | X  |
| 14"              | 26                   | N                         | N  | 1  | 2  | N                        | 1  | 2  | X  |
|                  | 28                   | N                         | N  | 1  | 2  | N                        | 1  | 2  | X  |
|                  | 30                   | N                         | N  | 1  | 2  | N                        | 1  | 2  | X  |
|                  | 32                   | N                         | N  | 1  | 2  | N                        | 1  | 2  | X  |
|                  | 34                   | N                         | N  | 1  | 2  | N                        | 1  | 2  | X  |
| 16"              | 26                   | N                         | N  | 1  | 2  | N                        | 1  | 2  | X  |
|                  | 28                   | N                         | N  | 1  | 2  | N                        | 1  | 2  | X  |
|                  | 30                   | N                         | N  | 1  | 2  | N                        | 1  | 2  | X  |
|                  | 32                   | N                         | N  | 1  | 2  | N                        | 1  | 2  | X  |
|                  | 34                   | N                         | N  | 1  | 2  | N                        | 1  | 2  | X  |

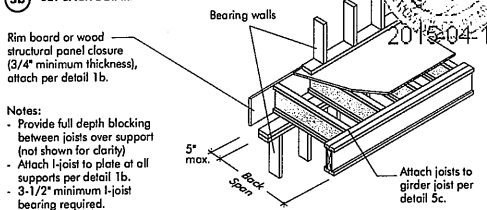
- N = No reinforcement required.
- 1 = NI reinforced with 3/4" wood structural panel on one side only.
- 2 = NI reinforced with 3/4" wood structural panel on both sides, or double I-joist.
- X = Try a deeper joist or closer spacing.
- Maximum design load shall be: 15 psf roof dead load, 55 psf floor total load, and 80 psf wall load. Wall load is based on 3-0" maximum width window or door openings.
- For larger openings, or multiple 3-0" width openings spaced less than 6-0" o.c., additional joists beneath the opening's cripple studs may be required.
- Table applies to joists 12" to 24" o.c. that meet the floor 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. Use 12" o.c. requirements for lesser spacing.
- For conventional roof construction using a ridge beam, the Roof Truss Span column above is equivalent to the distance between the supporting wall and the ridge beam. When the roof is framed using a ridge board, the Roof Truss Span is equivalent to the distance between the supporting walls as if a truss is used.
- Cantilevered joists supporting girder trusses or roof beams may require additional reinforcing.

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

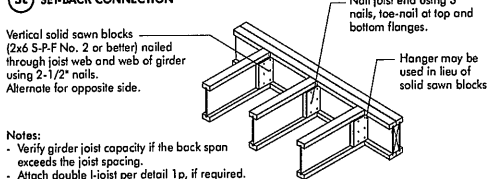
### 5a SHEATHING REINFORCEMENT



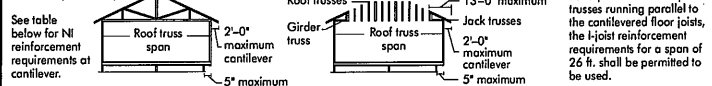
### 5b SET-BACK DETAIL



### 5c SET-BACK CONNECTION



### FIGURE 5 (continued)



### BRICK CANTILEVER REINFORCEMENT METHODS ALLOWED

| JOIST DEPTH (in) | ROOF TRUSS SPAN (ft) | ROOF LOADING (UNFACTORED) |    |    |    |                          |    |    |    |
|------------------|----------------------|---------------------------|----|----|----|--------------------------|----|----|----|
|                  |                      | LL = 30 psf, DL = 15 psf  |    |    |    | LL = 40 psf, DL = 15 psf |    |    |    |
|                  |                      | 12                        | 16 | 20 | 24 | 12                       | 16 | 20 | 24 |
| 9-1/2"           | 26                   | 1                         | X  | X  | X  | 2                        | X  | X  | X  |
|                  | 28                   | 1                         | X  | X  | X  | 2                        | X  | X  | X  |
|                  | 30                   | 1                         | X  | X  | X  | 2                        | X  | X  | X  |
|                  | 32                   | 2                         | X  | X  | X  | 2                        | X  | X  | X  |
|                  | 34                   | 2                         | X  | X  | X  | 2                        | X  | X  | X  |
| 11-7/8"          | 26                   | 1                         | X  | X  | X  | 2                        | X  | X  | X  |
|                  | 28                   | 1                         | X  | X  | X  | 2                        | X  | X  | X  |
|                  | 30                   | 1                         | X  | X  | X  | 2                        | X  | X  | X  |
|                  | 32                   | 1                         | X  | X  | X  | 2                        | X  | X  | X  |
|                  | 34                   | 1                         | X  | X  | X  | 2                        | X  | X  | X  |
| 14"              | 26                   | 1                         | X  | X  | X  | 2                        | X  | X  | X  |
|                  | 28                   | 1                         | X  | X  | X  | 2                        | X  | X  | X  |
|                  | 30                   | 1                         | X  | X  | X  | 2                        | X  | X  | X  |
|                  | 32                   | 1                         | X  | X  | X  | 2                        | X  | X  | X  |
|                  | 34                   | 1                         | X  | X  | X  | 2                        | X  | X  | X  |
| 16"              | 26                   | 1                         | X  | X  | X  | 2                        | X  | X  | X  |
|                  | 28                   | 1                         | X  | X  | X  | 2                        | X  | X  | X  |
|                  | 30                   | 1                         | X  | X  | X  | 2                        | X  | X  | X  |
|                  | 32                   | 1                         | X  | X  | X  | 2                        | X  | X  | X  |
|                  | 34                   | 1                         | X  | X  | X  | 2                        | X  | X  | X  |

- N = No reinforcement required.
- 1 = NI reinforced with 3/4" wood structural panel on one side only.
- 2 = NI reinforced with 3/4" wood structural panel on both sides, or double I-joist.
- X = Try a deeper joist or closer spacing.
- Maximum design load shall be: 15 psf roof dead load, 55 psf floor total load, and 80 psf wall load. Wall load is based on 3-0" maximum width window or door openings.
- For larger openings, or multiple 3-0" width openings spaced less than 6-0" o.c., additional joists beneath the opening's cripple studs may be required.
- Table applies to joists 12" to 24" o.c. that meet the floor 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. Use 12" o.c. requirements for lesser spacing.
- For conventional roof construction using a ridge beam, the Roof Truss Span column above is equivalent to the distance between the supporting wall and the ridge beam. When the roof is framed using a ridge board, the Roof Truss Span is equivalent to the distance between the supporting walls as if a truss is used.
- Cantilevered joists supporting girder trusses or roof beams may require additional reinforcing.

## 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.

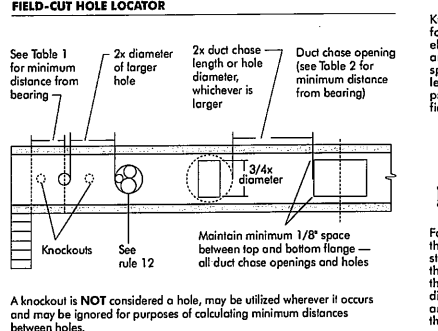
TABLE 1  
LOCATION OF CIRCULAR HOLES IN JOIST WEBS  
Single or Multiple Span for Dead Loads up to 15 psf and Live Loads up to 40 psf

| JOIST DEPTH (in) | JOIST SPACING (in) | Minimum distance from centre of any support to centre of hole (in) |     |     |     |     |     |     |      |      |      |      |      | Span (ft) |
|------------------|--------------------|--------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|------|------|------|------|------|-----------|
|                  |                    | 3                                                                  | 6   | 9   | 12  | 15  | 18  | 21  | 24   | 27   | 30   | 33   | 36   |           |
| 9-1/2"           | N120               | 0.7                                                                | 1.6 | 2.1 | 4.3 | 5.8 | 6.0 | ... | ...  | ...  | ...  | ...  | ...  | 13.6      |
|                  | N140               | 0.7                                                                | 1.6 | 3.0 | 4.4 | 6.0 | 6.4 | ... | ...  | ...  | ...  | ...  | ...  | 14.9      |
|                  | N160               | 1.3                                                                | 2.6 | 4.0 | 4.3 | 7.9 | 8.3 | ... | ...  | ...  | ...  | ...  | ...  | 16.1      |
|                  | N170               | 2.0                                                                | 3.4 | 4.9 | 6.3 | 8.0 | 8.4 | ... | ...  | ...  | ...  | ...  | ...  | 15.7      |
|                  | N180               | 2.3                                                                | 3.6 | 5.0 | 6.6 | 8.2 | 8.8 | ... | ...  | ...  | ...  | ...  | ...  | 15.9      |
| 11-7/8"          | N120               | 0.7                                                                | 0.8 | 1.0 | 4.3 | 4.8 | 4.0 | 5.0 | 6.4  | 8.9  | ...  | ...  | ...  | 17.1      |
|                  | N140               | 0.7                                                                | 0.8 | 1.3 | 2.8 | 4.0 | 4.4 | 5.5 | 7.0  | 8.4  | ...  | ...  | ...  | 16.6      |
|                  | N160               | 0.7                                                                | 1.8 | 4.3 | 5.8 | 6.0 | 7.3 | 8.1 | 10.7 | ...  | ...  | ...  | ...  | 16.9      |
|                  | N170               | 1.3                                                                | 2.6 | 4.0 | 5.4 | 6.9 | 7.2 | 8.4 | 10.0 | 11.2 | ...  | ...  | ...  | 17.5      |
|                  | N180               | 1.6                                                                | 2.1 | 4.2 | 5.6 | 7.0 | 7.5 | 8.6 | 10.3 | 11.4 | ...  | ...  | ...  | 17.7      |
| 14"              | N120               | 0.7                                                                | 0.8 | 1.3 | 2.2 | 4.1 | 5.4 | 6.9 | 8.9  | 10.2 | ...  | ...  | ...  | 17.1      |
|                  | N140               | 0.7                                                                | 0.8 | 0.9 | 2.5 | 4.4 | 4.5 | 5.5 | 7.2  | 8.5  | ...  | ...  | ...  | 18.0      |
|                  | N160               | 0.7                                                                | 0.8 | 0.8 | 1.0 | 2.4 | 2.9 | 3.9 | 5.2  | 6.0  | 8.8  | 9.3  | ...  | 18.2      |
|                  | N170               | 0.8                                                                | 1.1 | 3.0 | 4.5 | 5.1 | 6.2 | 7.3 | 8.9  | 10.4 | 12.0 | 13.4 | ...  | 19.2      |
|                  | N180               | 0.10                                                               | 2.0 | 3.4 | 4.9 | 6.2 | 6.5 | 9.0 | 10.7 | 12.4 | 15.9 | ...  | ...  | 19.5      |
| 16"              | N120               | 0.7                                                                | 0.8 | 1.0 | 2.5 | 4.0 | 4.5 | 5.9 | 7.5  | 8.8  | 9.4  | 11.4 | 12.1 | ...       |
|                  | N140               | 0.7                                                                | 0.8 | 0.8 | 2.0 | 3.9 | 4.2 | 5.5 | 7.3  | 8.5  | 9.2  | ...  | ...  | 19.9      |
|                  | N160               | 0.7                                                                | 0.8 | 0.8 | 1.2 | 1.0 | 2.2 | 4.2 | 7.3  | 8.4  | 10.2 | 11.6 | 12.0 | ...       |
|                  | N170               | 0.7                                                                | 1.0 | 2.3 | 3.6 | 4.1 | 5.3 | 6.3 | 7.8  | 8.6  | 9.2  | 10.8 | 12.4 | 13.9      |
|                  | N180               | 0.7                                                                | 0.3 | 1.6 | 3.1 | 3.9 | 5.4 | 6.4 | 8.9  | 9.5  | 11.0 | 12.3 | 14.9 | 16.0      |

- Above table may be used for I-joist 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.

**OPTIONAL:**  
The above table is based on the I-joists used at their maximum span. If the I-joists are placed at less than their full maximum span (see Maximum Span Table), the minimum distance from the centreline of the hole to the face of any support (D) as given above may be reduced as follows:  
Reduced =  $\frac{\text{Actual} \times D}{\text{Max Span}}$   
Where: Reduced = Distance from the inside face of any support to centre of hole, reduced for less-than-maximum span applications (ft). The reduced distance shall not be less than 6 inches from the face of the support to edge of the hole.  
Actual = The actual measured span distance between the inside faces of supports (ft).  
D = Span Adjustment Factor given in this table.  
S = The minimum distance from the inside face of any support to centre of hole from this table.  
If Actual is greater than 1, use 1 in the above calculation for Actual.  
SAF

### FIGURE 7 FIELD-CUT HOLE LOCATOR



Knockouts are preformed 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-joist. Where possible, it is preferable to use knockouts instead of field-cut holes.

Never drill, cut or notch the web, 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. Starting 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-joist.

### TABLE 2 DUCT CHASE OPENING SIZES AND LOCATIONS — Simple Span Only

| JOIST CHASE OPENINGS SIZES AND LOCATIONS - Simple span only |                  |                                                                            |     |     |     |     |      |      |      |      |      |      |
|-------------------------------------------------------------|------------------|----------------------------------------------------------------------------|-----|-----|-----|-----|------|------|------|------|------|------|
| JOIST<br>DEPTH                                              | JOIST<br>SPACING | Minimum distance from inside face of any support to center of opening (in) |     |     |     |     |      |      |      |      |      |      |
|                                                             |                  | JOIST CHASE OPENING SIZE (in)                                              |     |     |     |     |      |      |      |      |      |      |
|                                                             |                  | 3                                                                          | 6   | 9   | 12  | 15  | 18   | 21   | 24   | 27   | 30   | 33   |
| 9-1/2"                                                      | N120             | 0.7                                                                        | 1.6 | 4.5 | 4.0 | 6.0 | 6.5  | 6.10 | 7.1  | 7.8  | 8.2  | 8.6  |
|                                                             | N140             | 0.7                                                                        | 1.6 | 5.8 | 5.0 | 6.0 | 6.5  | 6.10 | 7.1  | 7.8  | 8.2  | 8.6  |
|                                                             | N160             | 1.3                                                                        | 2.6 | 6.0 | 5.0 | 6.0 | 6.5  | 6.10 | 7.1  | 7.8  | 8.2  | 8.6  |
|                                                             | N170             | 2.0                                                                        | 3.4 | 5.5 | 5.0 | 6.0 | 6.5  | 6.7  | 7.1  | 7.6  | 8.1  | 8.4  |
|                                                             | N180             | 2.3                                                                        | 3.6 | 5.0 | 5.0 | 6.0 | 6.5  | 6.7  | 7.1  | 7.6  | 8.1  | 8.4  |
| 11-7/8"                                                     | N120             | 0.7                                                                        | 0.8 | 6.0 | 6.0 | 6.5 | 7.1  | 5.10 | 6.7  | 8.3  | 8.8  | 8.8  |
|                                                             | N140             | 0.7                                                                        | 0.8 | 7.2 | 7.6 | 6.5 | 6.5  | 6.6  | 9.1  | 9.6  | 10.1 | 10.1 |
|                                                             | N160             | 0.7                                                                        | 0.8 | 7.5 | 7.6 | 6.5 | 6.5  | 6.6  | 9.1  | 9.6  | 10.1 | 10.1 |
|                                                             | N170             | 1.3                                                                        | 2.1 | 7.4 | 7.6 | 7.6 | 8.3  | 8.7  | 9.1  | 9.6  | 10.1 | 10.1 |
|                                                             | N180             | 1.6                                                                        | 2.1 | 7.4 | 7.6 | 7.6 | 8.3  | 8.7  | 9.1  | 9.6  | 10.1 | 10.1 |
| 14"                                                         | N120             | 0.7                                                                        | 0.8 | 7.1 | 7.1 | 8.4 | 8.4  | 9.2  | 9.2  | 10.1 | 10.7 | 10.7 |
|                                                             | N140             | 0.7                                                                        | 0.8 | 7.1 | 7.1 | 8.4 | 8.4  | 9.2  | 9.2  | 10.1 | 10.7 | 10.7 |
|                                                             | N160             | 0.7                                                                        | 0.8 | 7.1 | 7.1 | 8.4 | 8.4  | 9.2  | 9.2  | 10.1 | 10.7 | 10.7 |
|                                                             | N170             | 0.8                                                                        | 1.1 | 8.7 | 9.0 | 9.0 | 9.6  | 10.1 | 10.7 | 11.2 | 12.0 | 12.0 |
|                                                             | N180             | 0.8                                                                        | 1.1 | 8.7 | 9.0 | 9.0 | 9.6  | 10.1 | 10.7 | 11.2 | 12.0 | 12.0 |
| 16"                                                         | N120             | 0.7                                                                        | 0.8 | 9.3 | 9.3 | 9.3 | 10.1 | 10.7 | 11.2 | 11.2 | 12.0 | 12.0 |
|                                                             | N140             | 0.8                                                                        | 1.1 | 9.3 | 9.3 | 9.3 | 10.1 | 10.7 | 11.2 | 11.2 | 12.0 | 12.0 |
|                                                             | N160             | 0.8                                                                        | 1.1 | 9.3 | 9.3 | 9.3 | 10.1 | 10.7 | 11.2 | 11.2 | 12.0 | 12.0 |
|                                                             | N170             | 0.8                                                                        | 1.1 | 9.3 | 9.3 | 9.3 | 10.1 | 10.7 | 11.2 | 11.2 | 12.0 | 12.0 |
|                                                             | N180             | 0.8                                                                        | 1.1 | 9.3 | 9.3 | 9.3 | 10.1 | 10.7 | 11.2 | 11.2 | 12.0 | 12.0 |





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CONSTRUCTION DETAILS FOR RESIDENTIAL FLOORS

N-C303 / April 2014

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-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 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.
- 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.

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"      | NI-20        | 0'-7"                                                                         | 1'-6"  | 2'-10" | 4'-3"  | 5'-8"  | 6'-0"  | ---   | ---    | ---    | ---    | ---    | ---    | ---    |
|             | NI-40x       | 0'-7"                                                                         | 1'-6"  | 3'-0"  | 4'-4"  | 6'-0"  | 6'-4"  | ---   | ---    | ---    | ---    | ---    | ---    | ---    |
|             | NI-60        | 1'-3"                                                                         | 2'-6"  | 4'-0"  | 5'-4"  | 7'-0"  | 7'-5"  | ---   | ---    | ---    | ---    | ---    | ---    | ---    |
|             | NI-70        | 2'-0"                                                                         | 3'-4"  | 4'-9"  | 6'-3"  | 8'-0"  | 8'-4"  | ---   | ---    | ---    | ---    | ---    | ---    | ---    |
|             | NI-80        | 2'-3"                                                                         | 3'-6"  | 5'-0"  | 6'-6"  | 8'-2"  | 8'-8"  | ---   | ---    | ---    | ---    | ---    | ---    | ---    |
| 11-7/8"     | NI-20        | 0'-7"                                                                         | 0'-8"  | 1'-0"  | 2'-4"  | 3'-8"  | 4'-0"  | 5'-0" | 6'-6"  | 7'-9"  | ---    | ---    | ---    | ---    |
|             | NI-40x       | 0'-7"                                                                         | 0'-8"  | 1'-3"  | 2'-8"  | 4'-0"  | 4'-4"  | 5'-5" | 7'-0"  | 8'-4"  | ---    | ---    | ---    | ---    |
|             | NI-60        | 0'-7"                                                                         | 1'-8"  | 3'-0"  | 4'-3"  | 5'-9"  | 6'-0"  | 7'-3" | 8'-10" | 10'-0" | ---    | ---    | ---    | ---    |
|             | NI-70        | 1'-3"                                                                         | 2'-6"  | 4'-0"  | 5'-4"  | 6'-9"  | 7'-2"  | 8'-4" | 10'-0" | 11'-2" | ---    | ---    | ---    | ---    |
|             | NI-80        | 1'-6"                                                                         | 2'-10" | 4'-2"  | 5'-6"  | 7'-0"  | 7'-5"  | 8'-6" | 10'-3" | 11'-4" | ---    | ---    | ---    | ---    |
| 14"         | NI-20        | 0'-7"                                                                         | 0'-8"  | 1'-5"  | 3'-2"  | 4'-10" | 5'-4"  | 6'-9" | 8'-9"  | 10'-2" | ---    | ---    | ---    | ---    |
|             | NI-40x       | 0'-7"                                                                         | 0'-8"  | 0'-9"  | 2'-5"  | 4'-4"  | 4'-9"  | 6'-3" | ---    | ---    | ---    | ---    | ---    | ---    |
|             | NI-60        | 0'-7"                                                                         | 0'-8"  | 0'-8"  | 1'-0"  | 2'-4"  | 2'-9"  | 3'-9" | 5'-2"  | 6'-0"  | 6'-6"  | 8'-3"  | 10'-2" | ---    |
|             | NI-70        | 0'-7"                                                                         | 0'-8"  | 1'-8"  | 3'-0"  | 4'-3"  | 4'-8"  | 5'-8" | 7'-2"  | 8'-0"  | 8'-8"  | 10'-4" | 11'-9" | ---    |
|             | NI-80        | 0'-8"                                                                         | 1'-10" | 3'-0"  | 4'-5"  | 5'-10" | 6'-2"  | 7'-3" | 8'-9"  | 10'-4" | 12'-0" | 13'-5" | ---    | ---    |
| 16"         | NI-20        | 0'-7"                                                                         | 0'-8"  | 0'-8"  | 1'-6"  | 2'-10" | 3'-2"  | 4'-2" | 5'-6"  | 6'-4"  | 7'-0"  | 8'-5"  | 9'-8"  | ---    |
|             | NI-40x       | 0'-7"                                                                         | 0'-8"  | 0'-8"  | 1'-6"  | 2'-10" | 3'-2"  | 4'-2" | 5'-6"  | 6'-4"  | 7'-0"  | 8'-5"  | 9'-8"  | ---    |
|             | NI-60        | 0'-7"                                                                         | 0'-8"  | 1'-0"  | 2'-3"  | 3'-6"  | 4'-10" | 5'-3" | 6'-3"  | 7'-8"  | 8'-6"  | 9'-2"  | 10'-8" | 12'-0" |
|             | NI-70        | 0'-7"                                                                         | 1'-3"  | 2'-6"  | 3'-10" | 5'-3"  | 5'-6"  | 6'-6" | 8'-0"  | 9'-0"  | 9'-5"  | 11'-0" | 12'-3" | 12'-9" |
|             | NI-80        | 0'-7"                                                                         | 0'-8"  | 0'-8"  | 1'-9"  | 3'-3"  | 3'-8"  | 4'-9" | 6'-5"  | 7'-5"  | 8'-0"  | 9'-10" | 11'-3" | 11'-9" |

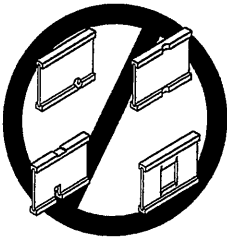
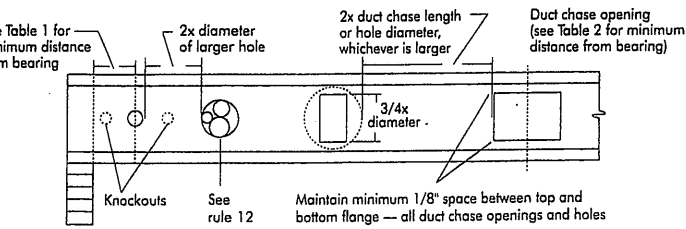
- Above table may be used for I-joist spacing of 24 inches on centre or less.
- Hole location distance is measured from inside face of supports to centre of hole.
- Distances in this chart are based on uniformly loaded joists.
- The above table is based on the I-joists being used at their maximum spans. 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 supports to centre of opening (ft - in.) |        |        |        |         |        |        |        |         |     |     |     |     |
|-------------|--------------|-------------------------------------------------------------------------------|--------|--------|--------|---------|--------|--------|--------|---------|-----|-----|-----|-----|
|             |              | Duct Chase Length (in.)                                                       |        |        |        |         |        |        |        |         |     |     |     |     |
|             |              | 8                                                                             | 10     | 12     | 14     | 16      | 18     | 20     | 22     | 24      | --- | --- | --- | --- |
| 9-1/2"      | NI-20        | 4'-1"                                                                         | 4'-5"  | 4'-10" | 5'-4"  | 5'-8"   | 6'-1"  | 6'-6"  | 7'-1"  | 7'-5"   | --- | --- | --- | --- |
|             | NI-40x       | 5'-3"                                                                         | 5'-8"  | 6'-2"  | 6'-5"  | 6'-10"  | 7'-3"  | 7'-8"  | 8'-2"  | 8'-6"   | --- | --- | --- | --- |
|             | NI-60        | 5'-4"                                                                         | 5'-9"  | 6'-3"  | 6'-7"  | 7'-1"   | 7'-5"  | 8'-0"  | 8'-4"  | 8'-9"   | --- | --- | --- | --- |
|             | NI-70        | 5'-11"                                                                        | 5'-5"  | 5'-10" | 6'-3"  | 6'-7"   | 7'-1"  | 7'-6"  | 8'-1"  | 8'-4"   | --- | --- | --- | --- |
|             | NI-80        | 5'-3"                                                                         | 5'-8"  | 6'-2"  | 6'-5"  | 6'-10"  | 7'-3"  | 7'-8"  | 8'-2"  | 8'-6"   | --- | --- | --- | --- |
| 11-7/8"     | NI-20        | 5'-0"                                                                         | 4'-2"  | 6'-6"  | 7'-1"  | 7'-5"   | 7'-9"  | 8'-3"  | 8'-9"  | 9'-4"   | --- | --- | --- | --- |
|             | NI-40x       | 6'-8"                                                                         | 7'-2"  | 7'-6"  | 8'-1"  | 8'-6"   | 9'-1"  | 9'-6"  | 10'-1" | 10'-9"  | --- | --- | --- | --- |
|             | NI-60        | 7'-3"                                                                         | 7'-8"  | 8'-0"  | 8'-6"  | 9'-0"   | 9'-3"  | 9'-9"  | 10'-3" | 11'-0"  | --- | --- | --- | --- |
|             | NI-70        | 7'-1"                                                                         | 7'-4"  | 7'-9"  | 8'-3"  | 8'-7"   | 9'-1"  | 9'-6"  | 10'-1" | 10'-4"  | --- | --- | --- | --- |
|             | NI-80        | 7'-2"                                                                         | 7'-7"  | 8'-0"  | 8'-5"  | 8'-10"  | 9'-3"  | 9'-8"  | 10'-2" | 10'-8"  | --- | --- | --- | --- |
| 14"         | NI-20        | 7'-6"                                                                         | 7'-11" | 8'-4"  | 8'-9"  | 9'-2"   | 9'-7"  | 10'-1" | 10'-7" | 10'-11" | --- | --- | --- | --- |
|             | NI-40x       | 7'-7"                                                                         | 8'-1"  | 8'-5"  | 8'-10" | 9'-4"   | 9'-8"  | 10'-2" | 10'-8" | 11'-2"  | --- | --- | --- | --- |
|             | NI-60        | 8'-1"                                                                         | 8'-7"  | 9'-0"  | 9'-6"  | 10'-1"  | 10'-7" | 11'-2" | 12'-0" | 12'-8"  | --- | --- | --- | --- |
|             | NI-70        | 8'-9"                                                                         | 9'-3"  | 9'-8"  | 10'-1" | 10'-6"  | 11'-1" | 11'-6" | 13'-3" | 13'-0"  | --- | --- | --- | --- |
|             | NI-80        | 8'-7"                                                                         | 9'-1"  | 9'-5"  | 9'-10" | 10'-4"  | 10'-8" | 11'-2" | 11'-7" | 12'-3"  | --- | --- | --- | --- |
| 16"         | NI-20        | 9'-0"                                                                         | 9'-3"  | 9'-9"  | 10'-1" | 10'-7"  | 11'-1" | 11'-6" | 12'-1" | 12'-6"  | --- | --- | --- | --- |
|             | NI-40x       | 9'-2"                                                                         | 9'-8"  | 10'-0" | 10'-6" | 10'-11" | 11'-5" | 11'-9" | 12'-4" | 12'-11" | --- | --- | --- | --- |
|             | NI-60        | 9'-4"                                                                         | 9'-9"  | 10'-3" | 10'-7" | 11'-1"  | 11'-7" | 12'-1" | 12'-7" | 13'-2"  | --- | --- | --- | --- |
|             | NI-70        | 10'-3"                                                                        | 10'-8" | 11'-2" | 11'-6" | 12'-1"  | 12'-6" | 13'-2" | 14'-1" | 14'-10" | --- | --- | --- | --- |
|             | NI-80        | 10'-1"                                                                        | 10'-5" | 11'-0" | 11'-4" | 11'-10" | 12'-3" | 12'-8" | 13'-3" | 14'-0"  | --- | --- | --- | --- |

- Above table may be used for I-joist spacing of 24 inches on centre or less.
- Duct chase opening location distance is measured from inside face of supports 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-joists 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 prescored 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-joist. 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. Starting 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-joist.

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:

- Brace and nail each I-joist as it is installed, using hangers, blocking panels, rim board, and/or cross-bridging at joist ends. When I-joists are applied continuous 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-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 centre, 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. Top 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.
- For cantilevered I-joists, brace top and bottom flanges, and brace ends with closure panels, rim board, or cross-bridging.
- 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.
- 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.



PRODUCT WARRANTY

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

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

1a

NI blocking panel

Attach I-joist to top plate per detail 1b

| Blocking Panel or Rim Joist | Maximum Factored Uniform Vertical Load* (plf) |
|-----------------------------|-----------------------------------------------|
| NI Joists                   | 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.

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)

1b

Rim board

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

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       | 8,090                                         |

\*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.

One 2-1/2" wire or spiral nail at top and bottom flange

Attach rim board to top plate using 2-1/2" wire or spiral toe-nails at 6" o.c.

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.

1d

NI or rim board blocking panel per detail 1a

Squash block

Pair of Squash Blocks

Maximum Factored Uniform Vertical Load per Pair of Squash Blocks (lbs)

|                       | 3-1/2" wide | 5-1/2" wide |
|-----------------------|-------------|-------------|
| 2x Lumber             | 5,500       | 8,500       |
| 1-1/8" Rim Board Plus | 4,300       | 6,600       |

Provide lateral bracing per detail 1a or 1b

1e

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

1g

Joist attachment per detail 1b

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

Load bearing wall above shall align vertically with the bearing below. Other conditions, such as offset bearing walls, are not covered by this detail.

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

NI blocking panel per detail 1a

1h

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 tight to top flange. Use twelve 3" nails, clinched when possible. Maximum factored resistance for hanger for this detail = 1,620 lbs.

BACKER BLOCKS (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-O325 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".

Top- or face-mount hanger

Double I-joist header

NOTE: Unless hanger sides laterally support the top flange, bearing stiffeners shall be used.

Backer block required (both sides for face-mount hangers)

For hanger capacity see hanger manufacturer's recommendations. Verify double I-joist capacity to support concentrated loads.

1i

Nordic Lam or Structural Composite Lumber (SCL)

For nailing schedules for multiple beams, see the manufacturer's recommendations.

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

NOTE: Unless hanger sides laterally support the top flange, bearing stiffeners shall be used.

1k

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

NOTE: Unless hanger sides laterally support the top flange, bearing stiffeners shall be used.

Top-mount hanger installed per manufacturer's recommendations

1m

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.

Backer block attached per detail 1h. Nail with twelve 3" nails, clinch when possible.

Filler block per detail 1p

Maximum support capacity = 1,620 lbs.

Install hanger per manufacturer's recommendations

1n

Do not bevel-cut joist beyond inside face of wall

Attach I-joist per detail 1b

NOTE: Blocking required at bearing for lateral support, not shown for clarity.

1r

Lumber 2x4 min., extend block to face of adjacent web. Two 2-1/2" spiral nails from each web to lumber piece, alternate on opposite side.

NI blocking panel

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

1p

FILLER BLOCK REQUIREMENTS FOR DOUBLE I-JOIST CONSTRUCTION

Filler block

Offset nails from opposite face by 6"

1/8" to 1/4" gap between top flange and filler block

1s

One 2-1/2" nail at top and bottom flange

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

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

I-joist blocking panel

One 2-1/2" nail one side only

NOTE: In some local codes, blocking is prescriptively required in the first joist space (or first and second joist space) next to the starter joist. Where required, see local code requirements for spacing of the blocking. All nails are common spiral in this detail.

All nails shown in the above details are assumed to be common wire nails unless otherwise noted. 3" (0.122" dia.) common spiral nails may be substituted for 2-1/2" (0.128" dia.) common wire nails. Framing lumber assumed to be Spruce-Pine-Fir No. 2 or better. Individual components not shown to scale for clarity.

WEB STIFFENERS

RECOMMENDATIONS:

- A **bearing stiffener** is required in all engineered applications with factored reactions greater than shown in the I-joist properties table found of 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. 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 2-5/16" 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**  
July 22, 2020 10:56

**PROJECT**  
J4 2ND FLOOR.wwb

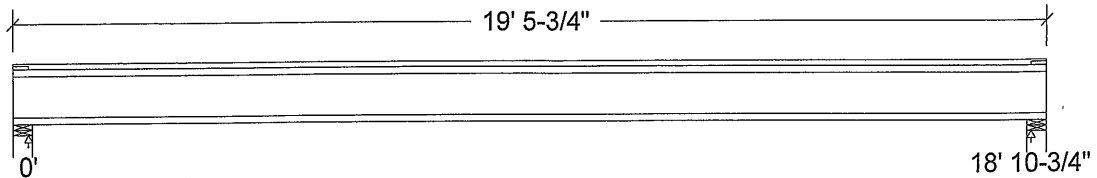
## Design Check Calculation Sheet

Nordic Sizer – Canada 7.2

### Loads:

| Load  | Type | Distribution | Pat-<br>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) and Support Bearing (in):



|             |       |  |       |
|-------------|-------|--|-------|
| Unfactored: |       |  |       |
| Dead        | 189   |  | 189   |
| Live        | 378   |  | 378   |
| Factored:   |       |  |       |
| Total       | 803   |  | 803   |
| Bearing:    |       |  |       |
| Capacity    |       |  |       |
| Joist       | 2336  |  | 2336  |
| Support     | 10841 |  | 10841 |
| Des ratio   |       |  |       |
| Joist       | 0.34  |  | 0.34  |
| Support     | 0.07  |  | 0.07  |
| Load case   | #2    |  | #2    |
| Length      | 4-3/8 |  | 4-3/8 |
| Min req'd   | 1-3/4 |  | 1-3/4 |
| Stiffener   | No    |  | No    |
| KD          | 1.00  |  | 1.00  |
| KB support  | -     |  | -     |
| fcg sup     | 769   |  | 769   |
| Kzcp sup    | -     |  | -     |

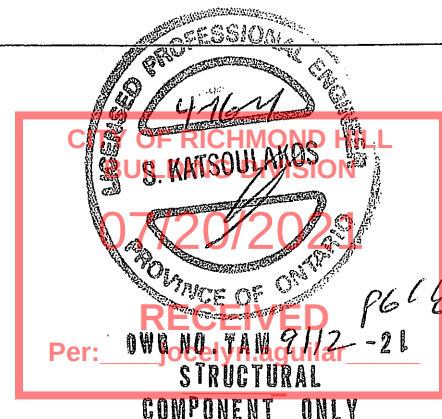
Bearing for wall supports is perpendicular-to-grain bearing on top plate. No stud design included.

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

Supports: All - Lumber Wall, No.1/No.2

Total length: 19' 5-3/4"; Clear span: 18' 9"; 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        | $V_f = 803$          | $V_r = 2336$    | lbs    | $V_f/V_r = 0.34$ |
| Moment(+)    | $M_f = 3793$         | $M_r = 11609$   | lbs-ft | $M_f/M_r = 0.33$ |
| Perm. Defl'n | $0.11 = < L/999$     | $0.63 = L/360$  | in     | 0.17             |
| Live Defl'n  | $0.21 = < L/999$     | $0.47 = L/480$  | in     | 0.45             |
| Total Defl'n | $0.32 = L/703$       | $0.94 = L/240$  | in     | 0.34             |
| Bare Defl'n  | $0.24 = L/954$       | $0.63 = L/360$  | in     | 0.38             |
| Vibration    | $L_{max} = 18'-10.8$ | $L_v = 20'-5.8$ | ft     | 0.92             |
| Defl'n       | $= 0.027$            | $= 0.033$       | in     | 0.82             |

**Additional Data:**

|          |               |      |      |    |       |    |    |    |     |
|----------|---------------|------|------|----|-------|----|----|----|-----|
| FACTORS: | f/E           | KD   | KH   | KZ | KL    | KT | KS | KN | LC# |
| $V_r$    | 2336          | 1.00 | 1.00 | -  | -     | -  | -  | -  | #2  |
| $M_r$    | 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:**

$EI_{eff} = 613.27 \text{ lb-in}^2$   $K = 6.18e06 \text{ lbs}$

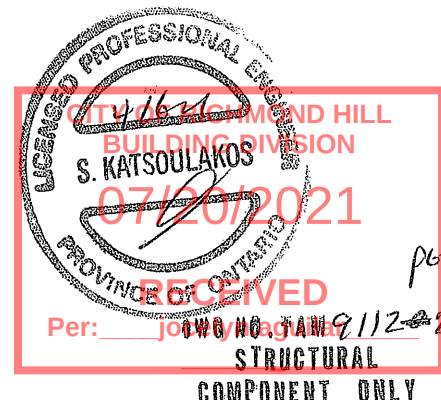
"Live" deflection is due to all non-dead loads (live, wind, snow...)

CONFORMS TO OBC 2012

**Design Notes:**

AMENDED 2020

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.



# NORDIC STRUCTURES

**COMPANY**  
July 22, 2020 08:23

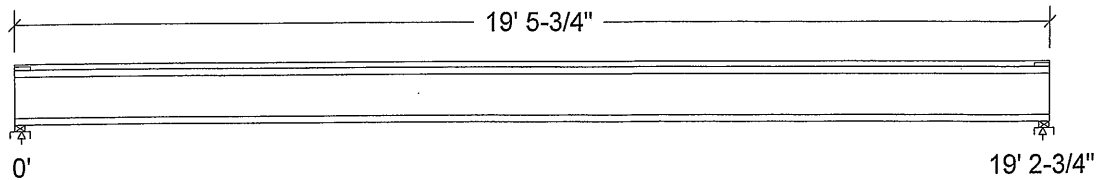
**PROJECT**  
J5 1ST FLOOR.wwb

## Design Check Calculation Sheet Nordic Sizer – Canada 7.2

### 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) and Support Bearing (in):



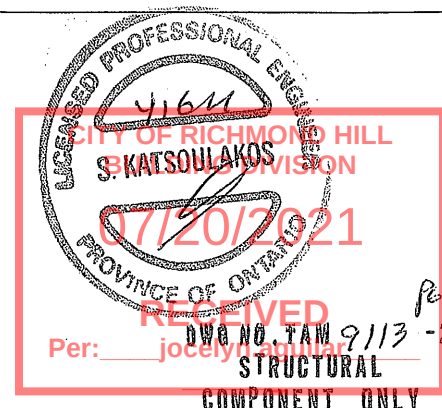
|             |       |  |       |
|-------------|-------|--|-------|
| Unfactored: |       |  |       |
| Dead        | 192   |  | 192   |
| Live        | 385   |  | 385   |
| Factored:   |       |  |       |
| Total       | 817   |  | 817   |
| Bearing:    |       |  |       |
| Capacity    |       |  |       |
| Joist       | 2188  |  | 2188  |
| Support     | 5573  |  | 5573  |
| Des ratio   |       |  |       |
| Joist       | 0.37  |  | 0.37  |
| Support     | 0.15  |  | 0.15  |
| 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  |

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

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

Total length: 19' 5-3/4"; Clear span: 19' 1"; 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        | $V_f = 817$         | $V_r = 2336$    | lbs    | $V_f/V_r = 0.35$ |
| Moment(+)    | $M_f = 3928$        | $M_r = 11609$   | lbs-ft | $M_f/M_r = 0.34$ |
| Perm. Defl'n | $0.11 = < L/999$    | $0.64 = L/360$  | in     | 0.18             |
| Live Defl'n  | $0.23 = < L/999$    | $0.48 = L/480$  | in     | 0.47             |
| Total Defl'n | $0.34 = L/682$      | $0.96 = L/240$  | in     | 0.35             |
| Bare Defl'n  | $0.25 = L/909$      | $0.64 = L/360$  | in     | 0.40             |
| Vibration    | $L_{max} = 19'-2.8$ | $L_v = 21'-2.7$ | ft     | 0.91             |
| Defl'n       | $= 0.026$           | $= 0.033$       | in     | 0.78             |

**Additional Data:**

|          |               |      |      |    |       |    |    |    |     |
|----------|---------------|------|------|----|-------|----|----|----|-----|
| FACTORS: | f/E           | KD   | KH   | KZ | KL    | KT | KS | KN | LC# |
| $V_r$    | 2336          | 1.00 | 1.00 | -  | -     | -  | -  | -  | #2  |
| $M_r$    | 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:**

$EI_{eff} = 625.37 \text{ lb-in}^2$   $K = 6.18e06 \text{ lbs}$

"Live" deflection is due to all non-dead loads (live, wind, snow...) **CONFORMS TO OBC 2012**

**Design Notes:**

AMENDED 2020

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.





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

**PASSED**

## 1ST FLR FRAMING\Flush Beams\B1(i670) (Flush Beam)

BC CALC® Member Report

Dry | 1 span | No cant.

July 27, 2020 08:27:40

Build 7493

Job name:

File name: UNIT 2010 EL A,B.mmdl

Address:

Description: 1ST FLR FRAMING\Flush Beams\B1(i670)

City, Province, Postal Code: RICHMOND HILL

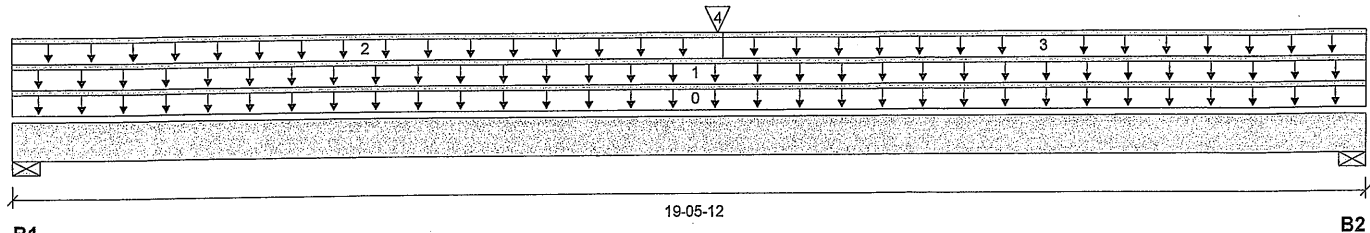
Specifier:

Customer:

Designer: AJ

Code reports: CCMC 12472-R

Company:



Total Horizontal Product Length = 19-05-12

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

| Bearing    | Live    | Dead    | Snow | Wind |
|------------|---------|---------|------|------|
| B1, 2-3/8" | 397 / 0 | 319 / 0 |      |      |
| B2, 2-3/8" | 325 / 0 | 283 / 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 | 19-05-12 | Top  |              | 12           |              |              | 00-00-00  |
| 1   | FC1 Floor Material | Unf. Lin. (lb/ft) | L    | 00-00-00 | 19-05-12 | Top  | 15           | 8            |              |              | n/a       |
| 2   | FC1 Floor Material | Unf. Lin. (lb/ft) | L    | 00-00-00 | 10-01-06 | Top  | 21           | 11           |              |              | n/a       |
| 3   | FC1 Floor Material | Unf. Lin. (lb/ft) | L    | 10-01-06 | 19-05-12 | Top  | 6            | 3            |              |              | n/a       |
| 4   | B3(i674)           | Conc. Pt. (lbs)   | L    | 10-00-08 | 10-00-08 | Top  | 152          | 83           |              |              | n/a       |

### Controls Summary

|                       | Factored Demand | Factored Resistance | Demand/Resistance | Case | Location |
|-----------------------|-----------------|---------------------|-------------------|------|----------|
| Pos. Moment           | 5155 ft-lbs     | 35392 ft-lbs        | 14.6%             | 1    | 10-00-08 |
| End Shear             | 883 lbs         | 14464 lbs           | 6.1%              | 1    | 01-02-04 |
| Total Load Deflection | L/971 (0.237")  | n/a                 | 24.7%             | 4    | 09-09-02 |
| Live Load Deflection  | L/1747 (0.132") | n/a                 | 20.6%             | 5    | 09-09-02 |
| Max Defl.             | 0.237"          | n/a                 | n/a               | 4    | 09-09-02 |
| Span / Depth          | 19.4            |                     |                   |      |          |

| Bearing Supports | Dim. (LxW)                 | Demand  | Demand/Resistance Support | Demand/Resistance Member | Material        |
|------------------|----------------------------|---------|---------------------------|--------------------------|-----------------|
| B1               | Wall/Plate 2-3/8" x 3-1/2" | 993 lbs | 19.4%                     | 9.8%                     | Spruce-Pine-Fir |
| B2               | Wall/Plate 2-3/8" x 3-1/2" | 842 lbs | 16.5%                     | 8.3%                     | Spruce-Pine-Fir |

### 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

CONFORMS TO CBC 2012

AMENDED 2020



CITY OF RICHMOND HILL  
BUILDING DEPARTMENT

07/20/2021

DWG NO. YAW 9/14-21

RECEIVED STRUCTURAL  
COMPONENT ONLY

Per: jocelyn.aguilera





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

PASSED

1ST FLR FRAMING\Flush Beams\B1(i670) (Flush Beam)

Dry | 1 span | No cant.

July 27, 2020 08:27:40

BC CALC® Member Report

Build 7493

Job name:

Address:

City, Province, Postal Code: RICHMOND HILL

Customer:

Code reports: CCMC 12472-R

File name: UNIT 2010 EL A,B.mmdl

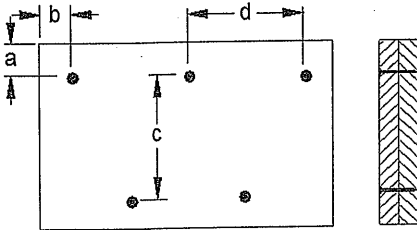
Description: 1ST FLR FRAMING\Flush Beams\B1(i670)

Specifier:

Designer: AJ

Company:

## Connection Diagram: Full Length of Member



a minimum = 2"      c = 7-7/8"  
b minimum = 3"      d = 24" 8"

Calculated Side Load = 165.9 lb/ft

Connectors are: Nails

3 1/2" ARDOX SPIRAL



OWG NO. TAM 9/14 -21  
STRUCTURAL  
COMPONENT ONLY

## 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®, AJST™, ALLJOIST®, BC RIM BOARD™, BCI®, BOISE GLULAM™, BC FloorValue®, VERSA-LAM®, VERSA-RIM PLUS®,

Per: jocelyn.aguiar

BC CALC® Member Report

Build 7493

Job name:

Address:

City, Province, Postal Code: RICHMOND HILL

Customer:

Code reports: CCMC 12472-R

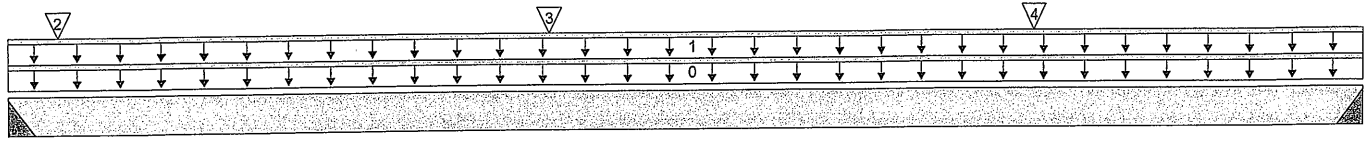
File name: UNIT 2010 EL A,B.mmdl

Description: 1ST FLR FRAMING\Flush Beams\B10(i496)

Specifier:

Designer: AJ

Company:



B1 03-08-10 B2  
Total Horizontal Product Length = 03-08-10

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

| Bearing | Live    | Dead    | Snow | Wind |
|---------|---------|---------|------|------|
| B1, 2"  | 387 / 0 | 205 / 0 |      |      |
| B2, 2"  | 349 / 0 | 186 / 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 | 03-08-10 | Top  |              | 6            |              |              | 00-00-00  |
| 1   | STAIR       | Unf. Lin. (lb/ft) | L    | 00-00-00 | 03-08-10 | Top  | 120          | 60           |              |              | n/a       |
| 2   | J2(i149)    | Conc. Pt. (lbs)   | L    | 00-01-10 | 00-01-10 | Top  | 68           | 34           |              |              | n/a       |
| 3   | J2(i143)    | Conc. Pt. (lbs)   | L    | 01-05-10 | 01-05-10 | Top  | 117          | 59           |              |              | n/a       |
| 4   | J2(i174)    | Conc. Pt. (lbs)   | L    | 02-09-10 | 02-09-10 | Top  | 105          | 53           |              |              | n/a       |

### Controls Summary

|                       | Factored Demand | Factored Resistance | Demand/<br>Resistance | Case | Location |
|-----------------------|-----------------|---------------------|-----------------------|------|----------|
| Pos. Moment           | 669 ft-lbs      | 17696 ft-lbs        | 3.8%                  | 1    | 01-08-01 |
| End Shear             | 399 lbs         | 7232 lbs            | 5.5%                  | 1    | 02-06-12 |
| Total Load Deflection | L/999 (0.002")  | n/a                 | n/a                   | 4    | 01-10-02 |
| Live Load Deflection  | L/999 (0.001")  | n/a                 | n/a                   | 5    | 01-10-02 |
| Max Defl.             | 0.002"          | n/a                 | n/a                   | 4    | 01-10-02 |
| Span / Depth          | 3.5             |                     |                       |      |          |

### Bearing Supports

|           | Dim. (LxW)  | Demand  | Demand/<br>Resistance<br>Support | Demand/<br>Resistance<br>Member | Material   |
|-----------|-------------|---------|----------------------------------|---------------------------------|------------|
| B1 Hanger | 2" x 1-3/4" | 837 lbs | n/a                              | 19.6%                           | HUS1.81/10 |
| B2 Hanger | 2" x 1-3/4" | 757 lbs | n/a                              | 17.7%                           | HUS1.81/10 |

### Cautions

Header for the hanger HUS1.81/10 is a Single 1-3/4" x 11-7/8" LVL Beam.  
Hanger model HUS1.81/10 and seat length were input by the user. Hanger has not been analyzed for adequate capacity.  
Header for the hanger HUS1.81/10 is a Double 1-3/4" x 11-7/8" LVL Beam.

### 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



OWG NO. YAM 9115-21  
STRUCTURAL  
COMPONENT ONLY

### 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.

CONFORMS TO CBC 2012

AMENDED 2020

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

Per: jocelyn.aguilar

BC CALC® Member Report

Build 7493

Job name:

Address:

City, Province, Postal Code: RICHMOND HILL

Customer:

Code reports: CCMC 12472-R

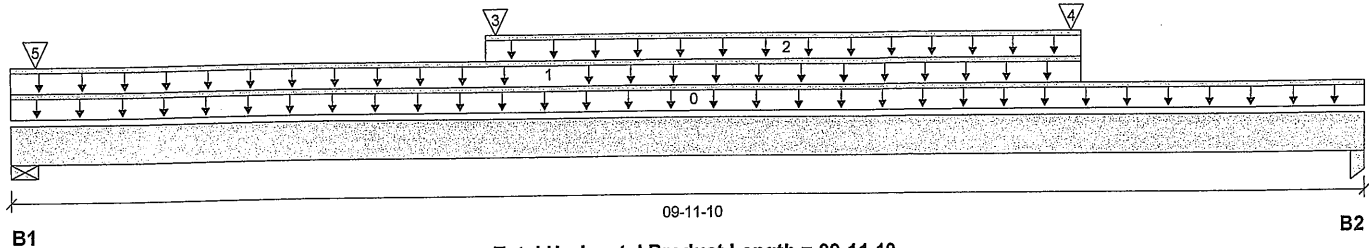
File name: UNIT 2010 EL A,B.mmdl

Description: 1ST FLR FRAMING\Flush Beams\B2(i705)

Specifier:

Designer: AJ

Company:



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

| Bearing    | Live     | Dead     | Snow | Wind |
|------------|----------|----------|------|------|
| B1, 2-3/8" | 1902 / 0 | 1537 / 0 |      |      |
| B2, 1-3/4" | 483 / 0  | 315 / 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 | 09-11-10 | Top  |              | 12           |              |              | 00-00-00  |
| 1   | FC1 Floor Material | Unf. Lin. (lb/ft) | L    | 00-00-00 | 07-10-04 | Top  | 5            | 3            |              |              | n/a       |
| 2   | FC1 Floor Material | Unf. Lin. (lb/ft) | L    | 03-05-08 | 07-10-04 | Top  | 21           | 11           |              |              | n/a       |
| 3   | B8(i146)           | Conc. Pt. (lbs)   | L    | 03-06-06 | 03-06-06 | Top  | 348          | 186          |              |              | n/a       |
| 4   | B10(i496)          | Conc. Pt. (lbs)   | L    | 07-09-06 | 07-09-06 | Top  | 348          | 186          |              |              | n/a       |
| 5   | E4(i127)           | Conc. Pt. (lbs)   | L    | 00-02-03 | 00-02-03 | Top  | 1515         | 1273         |              |              | n/a       |

**Controls Summary**

|                       | Factored Demand | Factored Resistance | Demand/Resistance | Case | Location |
|-----------------------|-----------------|---------------------|-------------------|------|----------|
| Pos. Moment           | 2853 ft-lbs     | 35392 ft-lbs        | 8.1%              | 1    | 03-09-09 |
| End Shear             | 1080 lbs        | 14464 lbs           | 7.5%              | 1    | 08-10-00 |
| Total Load Deflection | L/999 (0.036")  | n/a                 | n/a               | 4    | 04-11-15 |
| Live Load Deflection  | L/999 (0.022")  | n/a                 | n/a               | 5    | 04-11-15 |
| Max Defl.             | 0.036"          | n/a                 | n/a               | 4    | 04-11-15 |
| Span / Depth          | 9.9             |                     |                   |      |          |

**Bearing Supports**

|    | Dim. (LxW)                 | Demand   | Demand/Resistance Support | Demand/Resistance Member | Material        |
|----|----------------------------|----------|---------------------------|--------------------------|-----------------|
| B1 | Wall/Plate 2-3/8" x 3-1/2" | 4775 lbs | 93.4%                     | 47.1%                    | Spruce-Pine-Fir |
| B2 | Column 1-3/4" x 3-1/2"     | 1117 lbs | 22.5%                     | 15.0%                    | 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.

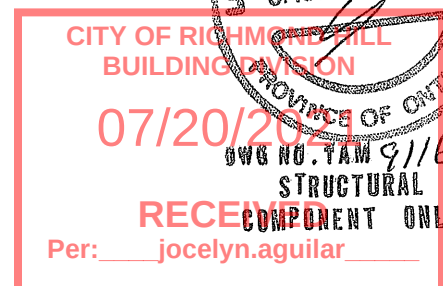
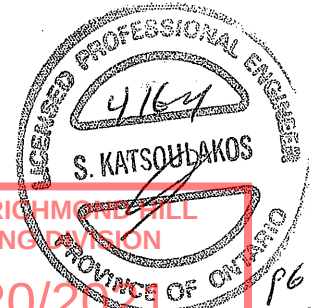
BC CALC® analysis is based on Canadian Limit States Design, as per NBCC 2015 and CSA O86.

Design based on Dry Service Condition.

Importance Factor : Normal Part code : Part 9

CONFORMS TO CBC 2012

AMENDED 2020







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

PASSED

## 1ST FLR FRAMING\Flush Beams\B2(i705) (Flush Beam)

Dry | 1 span | No cant.

July 27, 2020 08:27:40

BC CALC® Member Report

Build 7493

Job name:

Address:

City, Province, Postal Code: RICHMOND HILL

Customer:

Code reports: CCMC 12472-R

File name: UNIT 2010 EL A,B.mmdl

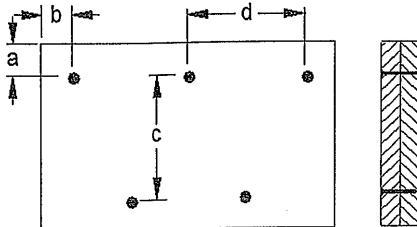
Description: 1ST FLR FRAMING\Flush Beams\B2(i705)

Specifier:

Designer: AJ

Company:

### Connection Diagram: Full Length of Member



a minimum = 2"      c = 7-7/8"  
b minimum = 3"      d = 2-1/4"

Calculated Side Load = 377.3 lb/ft  
Connectors are: 16d Nails

3 1/2" ARDOX SPIRAL



DWG NO. YAW 9116 -21  
STRUCTURAL  
COMPONENT ONLY

### Disclosure

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

Per: jocelyn.aguilar



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

PASSED

## 1ST FLR FRAMING\Flush Beams\B3(i674) (Flush Beam)

Dry | 1 span | No cant.

July 27, 2020 08:27:40

BC CALC® Member Report

Build 7493

Job name:

File name: UNIT 2010 EL A,B.mmdl

Address:

Description: 1ST FLR FRAMING\Flush Beams\B3(i674)

City, Province, Postal Code: RICHMOND HILL

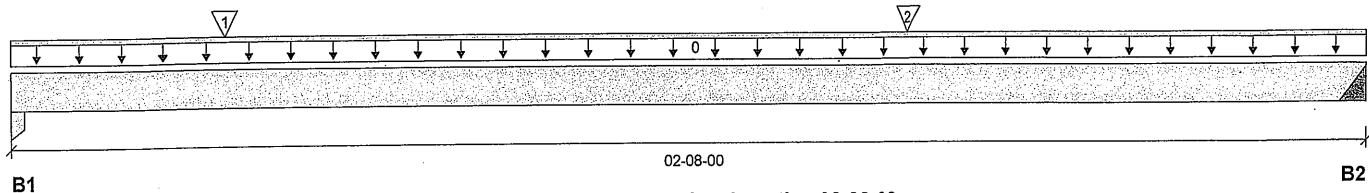
Specifier:

Customer:

Designer: AJ

Code reports: CCMC 12472-R

Company:



Total Horizontal Product Length = 02-08-00

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

| Bearing    | Live    | Dead    | Snow | Wind |
|------------|---------|---------|------|------|
| B1, 3-1/2" | 240 / 0 | 128 / 0 |      |      |
| B2, 2"     | 172 / 0 | 93 / 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 | 02-08-00 | Top  | 1.00 | 0.65 | 1.00 | 1.15 | 00-00-00  |
| 1   | J1(i675)    | Conc. Pt. (lbs)   | L    | 00-05-00 | 00-05-00 | Top  | 169  | 84   |      |      | n/a       |
| 2   | J1(i688)    | Conc. Pt. (lbs)   | L    | 01-09-00 | 01-09-00 | Top  | 243  | 121  |      |      | n/a       |

### Controls Summary

|                       | Factored Demand | Factored Resistance | Demand/Resistance | Case | Location |
|-----------------------|-----------------|---------------------|-------------------|------|----------|
| Pos. Moment           | 301 ft-lbs      | 17696 ft-lbs        | 1.7%              | 1    | 01-09-00 |
| End Shear             | 241 lbs         | 7232 lbs            | 3.3%              | 1    | 01-06-02 |
| Total Load Deflection | L/999 (0")      | n/a                 | n/a               | 4    | 01-05-07 |
| Live Load Deflection  | L/999 (0")      | n/a                 | n/a               | 5    | 01-05-07 |
| Max Defl.             | 0"              | n/a                 | n/a               | 4    | 01-05-07 |
| Span / Depth          | 2.4             |                     |                   |      |          |

### Bearing Supports

|                  |            |                 | Demand/Resistance Support | Demand/Resistance Member |          |             |
|------------------|------------|-----------------|---------------------------|--------------------------|----------|-------------|
| Bearing Supports | Dim. (LxW) | Demand          |                           |                          | Material |             |
| B1               | Column     | 3-1/2" x 1-3/4" | 520 lbs                   | 10.4%                    | 7.0%     | Unspecified |
| B2               | Hanger     | 2" x 1-3/4"     | 375 lbs                   | n/a                      | 8.8%     | HUS1.81/10  |

### Cautions

Header for the hanger HUS1.81/10 is a Double 1-3/4" x 11-7/8" LVL Beam.

Hanger model HUS1.81/10 and seat length were input by the user. Hanger has not been analyzed for adequate capacity.

### 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

CONFORMS TO CBC 2012

AMENDED 2020

### Disclosure

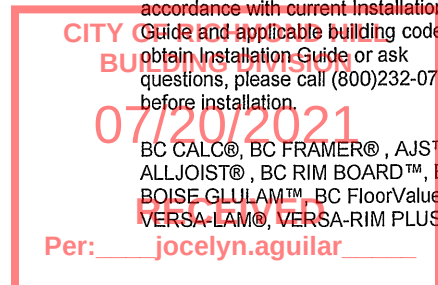
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Per: jocelyn.aguilar



OWG NO. TAW 9/17 -21  
STRUCTURAL  
COMPONENT ONLY



BC CALC® Member Report

Build 7493

Job name:

File name: UNIT 2010 EL A,B.mmdl

Address:

Description: 1ST FLR FRAMING\Flush Beams\B4(i712)

City, Province, Postal Code: RICHMOND HILL

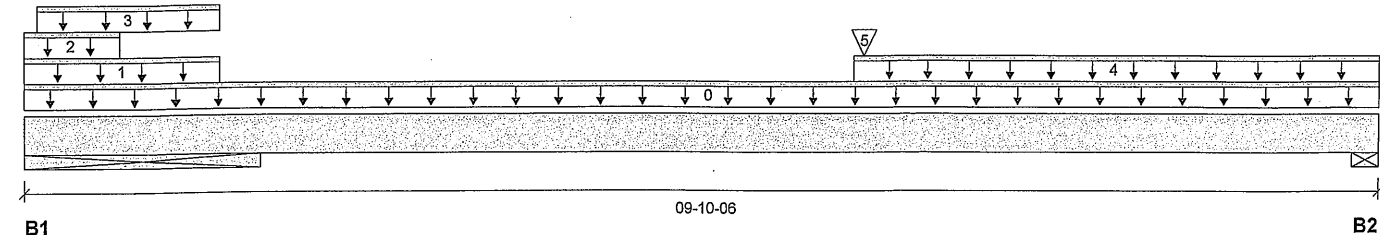
Specifier:

Customer:

Designer: AJ

Code reports: CCMC 12472-R

Company:



Total Horizontal Product Length = 09-10-06

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

| Bearing     | Live    | Dead    | Snow | Wind |
|-------------|---------|---------|------|------|
| B1, 20-1/2" | 192 / 0 | 418 / 0 |      |      |
| B2, 4-3/8"  | 260 / 0 | 187 / 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 | 09-10-06 | Top  |              | 12           |              |              | 00-00-00  |
| 1   | E2(i125)           | Unf. Lin. (lb/ft) | L    | 00-00-00 | 01-05-00 | Top  |              | 92           |              |              | n/a       |
| 2   | E2(i125)           | Unf. Lin. (lb/ft) | L    | 00-00-00 | 00-08-04 | Top  |              | 12           |              |              | n/a       |
| 3   | E2(i125)           | Unf. Lin. (lb/ft) | L    | 00-01-02 | 01-05-00 | Top  | 20           | 94           |              |              | n/a       |
| 4   | FC1 Floor Material | Unf. Lin. (lb/ft) | L    | 05-11-10 | 09-10-06 | Top  | 27           | 13           |              |              | n/a       |
| 5   | B9(i680)           | Conc. Pt. (lbs)   | L    | 06-00-08 | 06-00-08 | Top  | 320          | 171          |              |              | n/a       |

### Controls Summary

|                       | Factored Demand | Factored Resistance | Demand/<br>Resistance | Case | Location |
|-----------------------|-----------------|---------------------|-----------------------|------|----------|
| Pos. Moment           | 1676 ft-lbs     | 32585 ft-lbs        | 5.1%                  | 1    | 06-00-08 |
| End Shear             | 527 lbs         | 14464 lbs           | 3.6%                  | 1    | 08-06-02 |
| Total Load Deflection | L/999 (0.011")  | n/a                 | n/a                   | 4    | 05-09-03 |
| Live Load Deflection  | L/999 (0.007")  | n/a                 | n/a                   | 5    | 05-09-03 |
| Max Defl.             | 0.011"          | n/a                 | n/a                   | 4    | 05-09-03 |
| Span / Depth          | 8.0             |                     |                       |      |          |
| Dist. Load (B1)       | 277.34 lb/ft    | 37469.25 lb/ft      | 0.7%                  |      |          |
| Conc. Load (B1)       | 1 lbs           | 10929 lbs           | n/a                   |      |          |

### Bearing Supports

|    | Dim. (LxW)                  | Demand  | Demand/<br>Resistance<br>Support | Demand/<br>Resistance<br>Member | Material        |
|----|-----------------------------|---------|----------------------------------|---------------------------------|-----------------|
| B1 | Wall/Plate 20-1/2" x 3-1/2" | 585 lbs | 2.0%                             | 1.0%                            | Spruce-Pine-Fir |
| B2 | Wall/Plate 4-3/8" x 3-1/2"  | 624 lbs | 6.6%                             | 3.3%                            | Spruce-Pine-Fir |

### Notes

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

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

Calculations assume unbraced length of Top: 04-01-02, Bottom: 04-01-02.

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

CONFORMS TO OBC 2012

AMENDED 2020



RECEIVED  
Per: jocelyn.aguiar





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

PASSED

## 1ST FLR FRAMING\Flush Beams\B4(i712) (Flush Beam)

Dry | 1 span | No cant.

July 27, 2020 08:27:40

BC CALC® Member Report

Build 7493

Job name:

File name: UNIT 2010 EL A,B.mmdl

Address:

Description: 1ST FLR FRAMING\Flush Beams\B4(i712)

City, Province, Postal Code: RICHMOND HILL

Specifier:

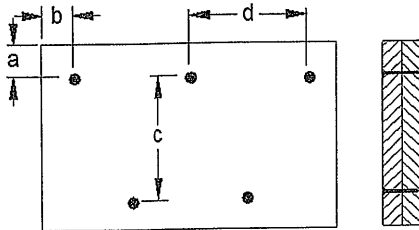
Customer:

Designer: AJ

Code reports: CCMC 12472-R

Company:

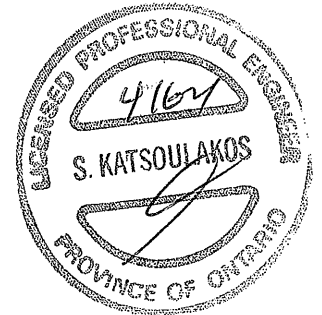
### Connection Diagram: Full Length of Member



a minimum = 2"      c = 7-7/8"  
 b minimum = 3"      d = 2-0"  $\frac{1}{4}$ "

Calculated Side Load = 346.9 lb/ft  
 Connectors are: 16d  $\frac{1}{4}$ " Nails

3 1/2" ARDOX SPIRAL



DWG NO. TAM 9110-21  
 STRUCTURAL  
 COMPONENT ONLY

### Disclosure

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

Per: jocelyn.aguilar



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

PASSED

## 1ST FLR FRAMING\Flush Beams\B5(i681) (Flush Beam)

Dry | 1 span | No cant.

July 27, 2020 08:27:40

BC CALC® Member Report

Build 7493

Job name:

File name: UNIT 2010 EL A,B.mmdl

Address:

Description: 1ST FLR FRAMING\Flush Beams\B5(i681)

City, Province, Postal Code: RICHMOND HILL

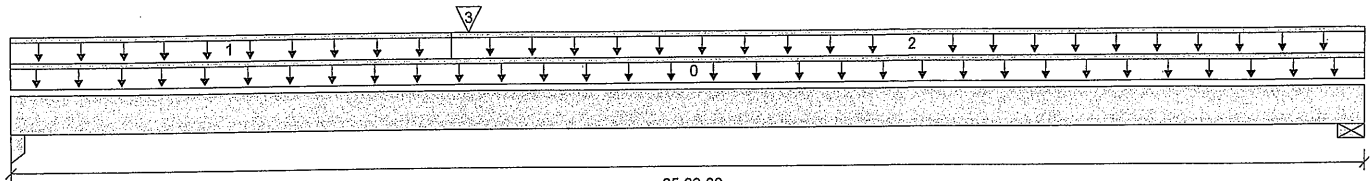
Specifier:

Customer:

Designer: AJ

Code reports: CCMC 12472-R

Company:



B1

Total Horizontal Product Length = 05-09-00

B2

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

| Bearing    | Live    | Dead    | Snow | Wind |
|------------|---------|---------|------|------|
| B1, 1-3/4" | 312 / 0 | 180 / 0 |      |      |
| B2, 4-3/8" | 258 / 0 | 151 / 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 | 05-09-00 | Top  |              | 6            |              |              | 00-00-00  |
| 1   | FC1 Floor Material | Unf. Lin. (lb/ft) | L    | 00-00-00 | 01-10-04 | Top  | 29           | 14           |              |              | n/a       |
| 2   | FC1 Floor Material | Unf. Lin. (lb/ft) | L    | 01-10-04 | 05-09-00 | Top  | 53           | 27           |              |              | n/a       |
| 3   | B9(i680)           | Conc. Pt. (lbs)   | L    | 01-11-02 | 01-11-02 | Top  | 309          | 166          |              |              | n/a       |

### Controls Summary

|                       | Factored Demand | Factored Resistance | Demand/Resistance | Case | Location |
|-----------------------|-----------------|---------------------|-------------------|------|----------|
| Pos. Moment           | 1151 ft-lbs     | 17696 ft-lbs        | 6.5%              | 1    | 01-11-02 |
| End Shear             | 615 lbs         | 7232 lbs            | 8.5%              | 1    | 01-01-10 |
| Total Load Deflection | L/999 (0.008")  | n/a                 | n/a               | 4    | 02-07-07 |
| Live Load Deflection  | L/999 (0.005")  | n/a                 | n/a               | 5    | 02-07-07 |
| Max Defl.             | 0.008"          | n/a                 | n/a               | 4    | 02-07-07 |
| Span / Depth          | 5.4             |                     |                   |      |          |

### Bearing Supports

|    | Dim. (LxW)                 | Demand  | Demand/Resistance Support | Demand/Resistance Member | Material        |
|----|----------------------------|---------|---------------------------|--------------------------|-----------------|
| B1 | Column 1-3/4" x 1-3/4"     | 694 lbs | 27.9%                     | 18.6%                    | Unspecified     |
| B2 | Wall/Plate 4-3/8" x 1-3/4" | 576 lbs | 12.2%                     | 6.2%                     | Spruce-Pine-Fir |

### 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. AMENDED 2020

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



OWG NO. YAM 9/1/9 -21  
STRUCTURAL  
COMPONENT ONLY

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Per: jocelyn.aguilar

CONFORMS TO UBC 2012

CITY OF RICHMOND HILL  
BUILDING DIVISION

07/20/2021



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

PASSED

## 1ST FLR FRAMING\Flush Beams\B6(i707) (Flush Beam)

Dry | 1 span | No cant.

July 27, 2020 08:27:40

BC CALC® Member Report

Build 7493

Job name:

File name: UNIT 2010 EL A,B.mmdl

Address:

Description: 1ST FLR FRAMING\Flush Beams\B6(i707)

City, Province, Postal Code: RICHMOND HILL

Specifier:

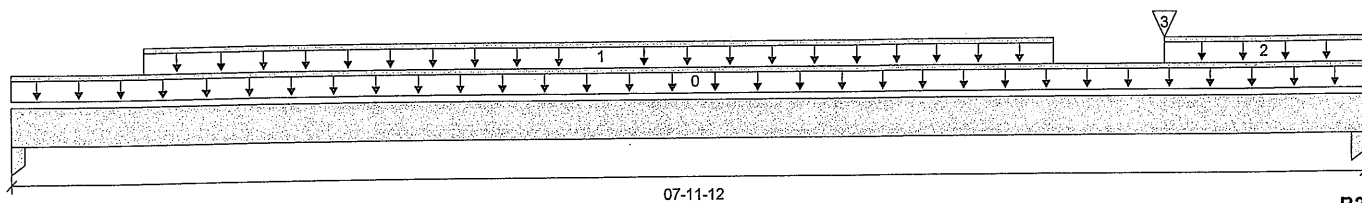
Customer:

Designer: AJ

Code reports:

CCMC 12472-R

Company:



B1

Total Horizontal Product Length = 07-11-12

B2

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

| Bearing    | Live    | Dead    | Snow | Wind |
|------------|---------|---------|------|------|
| B1, 3-1/2" | 372 / 0 | 211 / 0 |      |      |
| B2, 3-1/2" | 413 / 0 | 231 / 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 | 07-11-12 | Top  | 1.00 | 0.65 | 1.00 | 1.15 | 00-00-00  |
| 1   | Smoothed Load      | Unf. Lin. (lb/ft) | L    | 00-09-06 | 06-01-06 | Top  | 116  | 58   |      |      | n/a       |
| 2   | FC1 Floor Material | Unf. Lin. (lb/ft) | L    | 06-09-06 | 07-11-12 | Top  | 40   | 20   |      |      | n/a       |
| 3   | J2(i723)           | Conc. Pt. (lbs)   | L    | 06-09-06 | 06-09-06 | Top  | 120  | 60   |      |      | n/a       |

### Controls Summary

|                       | Factored Demand | Factored Resistance | Demand/Resistance | Case | Location |
|-----------------------|-----------------|---------------------|-------------------|------|----------|
| Pos. Moment           | 1800 ft-lbs     | 17696 ft-lbs        | 10.2%             | 1    | 04-01-06 |
| End Shear             | 852 lbs         | 7232 lbs            | 11.8%             | 1    | 06-08-06 |
| Total Load Deflection | L/999 (0.026")  | n/a                 | n/a               | 4    | 04-00-06 |
| Live Load Deflection  | L/999 (0.017")  | n/a                 | n/a               | 5    | 04-00-06 |
| Max Defl.             | 0.026"          | n/a                 | n/a               | 4    | 04-00-06 |
| Span / Depth          | 7.6             |                     |                   |      |          |

|                  |            |                 |         | Demand/<br>Resistance<br>Support | Demand/<br>Resistance<br>Member |             |
|------------------|------------|-----------------|---------|----------------------------------|---------------------------------|-------------|
| Bearing Supports | Dim. (LxW) | Demand          |         |                                  |                                 | Material    |
| B1               | Column     | 3-1/2" x 1-3/4" | 822 lbs | 16.5%                            | 11.0%                           | Unspecified |
| B2               | Column     | 3-1/2" x 1-3/4" | 908 lbs | 18.3%                            | 12.2%                           | 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.

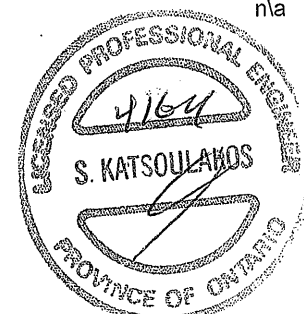
BC CALC® analysis is based on Canadian Limit States Design, as per NBCC 2015 and CSA O86.

Design based on Dry Service Condition.

Importance Factor : Normal Part code : Part 9

CONFORMS TO CBC 2012

AMENDED 2020



OWB NO. YAM 9/20-21

STRUCTURAL

COMPONENT ONLY

### Disclosure

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Per: jocelyn.aguilar

CITY OF RICHMOND HILL  
BUILDING DIVISION  
07/20/2021



BC CALC® Member Report

Build 7493

Job name:

File name: UNIT 2010 EL A,B.mmdl

Address:

Description: 1ST FLR FRAMING\Flush Beams\B7(i683)

City, Province, Postal Code: RICHMOND HILL

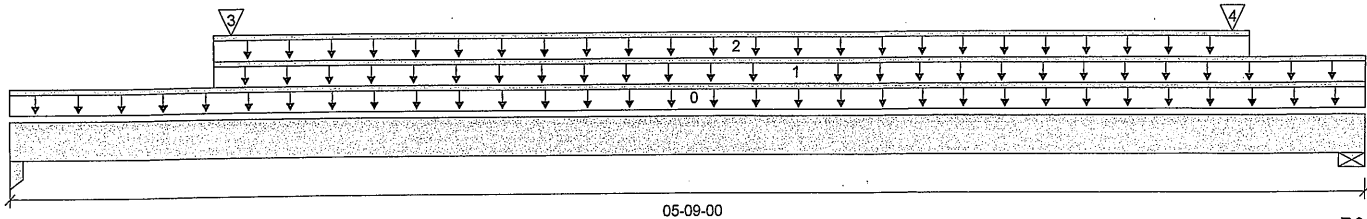
Specifier:

Customer:

Designer: AJ

Code reports: CCMC 12472-R

Company:



Total Horizontal Product Length = 05-09-00

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

| Bearing    | Live    | Dead    | Snow | Wind |
|------------|---------|---------|------|------|
| B1, 1-3/4" | 399 / 0 | 227 / 0 |      |      |
| B2, 4-3/8" | 507 / 0 | 285 / 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 | 05-09-00 | Top  | 6    |      |      |      | 00-00-00  |
| 1   | FC1 Floor Material | Unf. Lin. (lb/ft) | L    | 00-10-04 | 05-09-00 | Top  | 22   | 11   |      |      | n/a       |
| 2   | FC1 Floor Material | Unf. Lin. (lb/ft) | L    | 00-10-04 | 05-03-00 | Top  | 4    | 2    |      |      | n/a       |
| 3   | B8(i146)           | Conc. Pt. (lbs)   | L    | 00-11-02 | 00-11-02 | Top  | 388  | 206  |      |      | n/a       |
| 4   | B10(i496)          | Conc. Pt. (lbs)   | L    | 05-02-02 | 05-02-02 | Top  | 388  | 206  |      |      | n/a       |

### Controls Summary

|                       | Factored Demand | Factored Resistance | Demand/Resistance | Case | Location |
|-----------------------|-----------------|---------------------|-------------------|------|----------|
| Pos. Moment           | 748 ft-lbs      | 17696 ft-lbs        | 4.2%              | 1    | 01-04-11 |
| End Shear             | 697 lbs         | 7232 lbs            | 9.6%              | 1    | 01-01-10 |
| Total Load Deflection | L/999 (0.006")  | n/a                 | n/a               | 4    | 02-07-15 |
| Live Load Deflection  | L/999 (0.004")  | n/a                 | n/a               | 5    | 02-07-15 |
| Max Defl.             | 0.006"          | n/a                 | n/a               | 4    | 02-07-15 |
| Span / Depth          | 5.4             |                     |                   |      |          |

### Bearing Supports

|    | Dim. (LxW)                 | Demand   | Demand/Resistance Support | Demand/Resistance Member | Material        |
|----|----------------------------|----------|---------------------------|--------------------------|-----------------|
| B1 | Column 1-3/4" x 1-3/4"     | 882 lbs  | 35.5%                     | 23.6%                    | Unspecified     |
| B2 | Wall/Plate 4-3/8" x 1-3/4" | 1116 lbs | 23.7%                     | 12.0%                    | Spruce-Pine-Fir |

### 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.

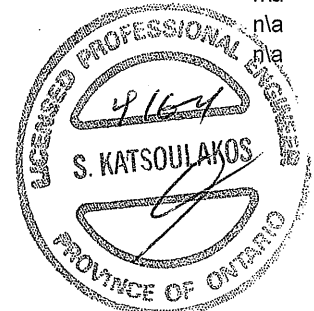
BC CALC® analysis is based on Canadian Limit States Design, as per NBCC 2015 and CSA O86.

Design based on Dry Service Condition.

Importance Factor : Normal Part code : Part 9

CONFORMS TO CBC 2012

AMENDED 2020



DWG NO. YAM 9121-21

STRUCTURAL  
COMPONENT ONLY

### Disclosure

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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®,

Per: jocelyn.aguilar



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

PASSED

## 1ST FLR FRAMING\Flush Beams\B8(i146) (Flush Beam)

Dry | 1 span | No cant.

July 27, 2020 08:27:40

BC CALC® Member Report

Build 7493

Job name:

File name: UNIT 2010 EL A,B.mmdl

Address:

Description: 1ST FLR FRAMING\Flush Beams\B8(i146)

City, Province, Postal Code: RICHMOND HILL

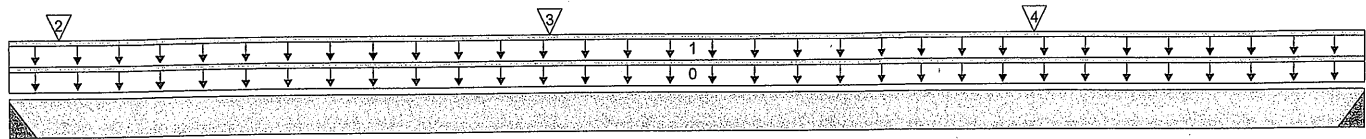
Specifier:

Customer:

Designer: AJ

Code reports: CCMC 12472-R

Company:



03-08-10

B1

B2

Total Horizontal Product Length = 03-08-10

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

| Bearing | Live    | Dead    | Snow | Wind |
|---------|---------|---------|------|------|
| B1, 2"  | 387 / 0 | 205 / 0 |      |      |
| B2, 2"  | 349 / 0 | 186 / 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 | 03-08-10 | Top  | 6    |      |      |      | 00-00-00  |
| 1   | STAIR       | Unf. Lin. (lb/ft) | L    | 00-00-00 | 03-08-10 | Top  | 120  | 60   |      |      | n/a       |
| 2   | J2(i149)    | Conc. Pt. (lbs)   | L    | 00-01-10 | 00-01-10 | Top  | 68   | 34   |      |      | n/a       |
| 3   | J2(i143)    | Conc. Pt. (lbs)   | L    | 01-05-10 | 01-05-10 | Top  | 117  | 59   |      |      | n/a       |
| 4   | J2(i174)    | Conc. Pt. (lbs)   | L    | 02-09-10 | 02-09-10 | Top  | 105  | 53   |      |      | n/a       |

### Controls Summary

|                       | Factored Demand | Factored Resistance | Demand/Resistance | Case | Location |
|-----------------------|-----------------|---------------------|-------------------|------|----------|
| Pos. Moment           | 669 ft-lbs      | 17696 ft-lbs        | 3.8%              | 1    | 01-08-01 |
| End Shear             | 399 lbs         | 7232 lbs            | 5.5%              | 1    | 02-06-12 |
| Total Load Deflection | L/999 (0.002")  | n/a                 | n/a               | 4    | 01-10-02 |
| Live Load Deflection  | L/999 (0.001")  | n/a                 | n/a               | 5    | 01-10-02 |
| Max Defl.             | 0.002"          | n/a                 | n/a               | 4    | 01-10-02 |
| Span / Depth          | 3.5             |                     |                   |      |          |

### Bearing Supports

|    | Dim. (LxW)         | Demand  | Demand/Resistance Support | Demand/Resistance Member | Material   |
|----|--------------------|---------|---------------------------|--------------------------|------------|
| B1 | Hanger 2" x 1-3/4" | 837 lbs | n/a                       | 19.6%                    | HUS1.81/10 |
| B2 | Hanger 2" x 1-3/4" | 757 lbs | n/a                       | 17.7%                    | HUS1.81/10 |

### Cautions

Header for the hanger HUS1.81/10 is a Single 1-3/4" x 11-7/8" LVL Beam.

Hanger model HUS1.81/10 and seat length were input by the user. Hanger has not been analyzed for adequate capacity.

Header for the hanger HUS1.81/10 is a Double 1-3/4" x 11-7/8" LVL Beam.

### Notes

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

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

Calculations assume unbraced length of Top: 00-00-00, Bottom: 00-00-00.

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



OWG NO. YAM 9/22-21

STRUCTURAL  
COMPONENT ONLY

### Disclosure

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

Per: jocelyn.aguilar



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

PASSED

## 1ST FLR FRAMING\Flush Beams\B9(i680) (Flush Beam)

Dry | 1 span | No cant.

July 27, 2020 08:27:40

BC CALC® Member Report

Build 7493

Job name:

File name: UNIT 2010 EL A,B.mmdl

Description: 1ST FLR FRAMING\Flush Beams\B9(i680)

Address:

Specifier:

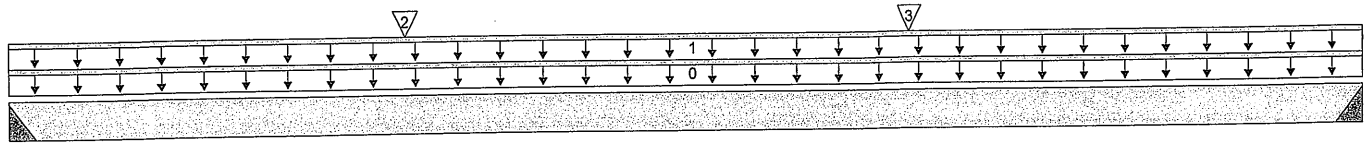
City, Province, Postal Code: RICHMOND HILL

Designer: AJ

Customer:

Company:

Code reports: CCMC 12472-R



B1

03-07-02

B2

Total Horizontal Product Length = 03-07-02

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

| Bearing | Live    | Dead    | Snow | Wind |
|---------|---------|---------|------|------|
| B1, 2"  | 320 / 0 | 171 / 0 |      |      |
| B2, 2"  | 309 / 0 | 165 / 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 | 03-07-02 | Top  | 1.00 | 0.65 | 1.00 | 1.15 | 00-00-00  |
| 1   | STAIR       | Unf. Lin. (lb/ft) | L    | 00-00-00 | 03-07-02 | Top  | 120  | 60   |      |      | n/a       |
| 2   | J3(i669)    | Conc. Pt. (lbs)   | L    | 01-00-08 | 01-00-08 | Top  | 100  | 50   |      |      | n/a       |
| 3   | J3(i716)    | Conc. Pt. (lbs)   | L    | 02-04-08 | 02-04-08 | Top  | 98   | 49   |      |      | n/a       |

### Controls Summary

|                       | Factored Demand | Factored Resistance | Demand/Resistance | Case | Location |
|-----------------------|-----------------|---------------------|-------------------|------|----------|
| Pos. Moment           | 592 ft-lbs      | 17696 ft-lbs        | 3.3%              | 1    | 01-10-02 |
| End Shear             | 367 lbs         | 7232 lbs            | 5.1%              | 1    | 02-05-04 |
| Total Load Deflection | L/999 (0.002")  | n/a                 | n/a               | 4    | 01-09-10 |
| Live Load Deflection  | L/999 (0.001")  | n/a                 | n/a               | 5    | 01-09-10 |
| Max Defl.             | 0.002"          | n/a                 | n/a               | 4    | 01-09-10 |
| Span / Depth          | 3.4             |                     |                   |      |          |

| Bearing Supports | Dim. (LxW)         | Demand  | Demand/Resistance Support | Demand/Resistance Member | Material   |
|------------------|--------------------|---------|---------------------------|--------------------------|------------|
| B1               | Hanger 2" x 1-3/4" | 694 lbs | n/a                       | 16.3%                    | HUS1.81/10 |
| B2               | Hanger 2" x 1-3/4" | 670 lbs | n/a                       | 15.7%                    | HUS1.81/10 |

### Cautions

Header for the hanger HUS1.81/10 is a Double 1-3/4" x 11-7/8" LVL Beam.

Hanger model HUS1.81/10 and seat length were input by the user. Hanger has not been analyzed for adequate capacity.

Header for the hanger HUS1.81/10 is a Single 1-3/4" x 11-7/8" LVL Beam.

### 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



UWG NO. TAM 9/23 -21  
STRUCTURAL  
COMPONENT ONLY

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CONFORMS TO UBC 2012

AMENDED 2020

07/20/2021

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

Per: jocelyn.aguilar



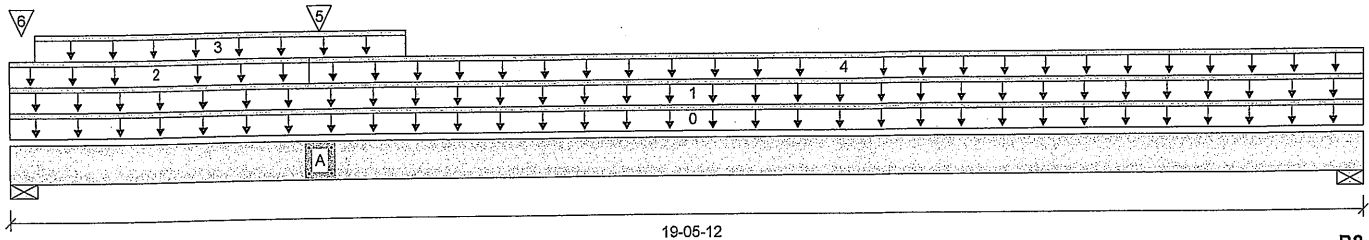
BC CALC® Member Report  
Build 7493

Dry | 1 span | No cant.

July 27, 2020 08:27:40

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

File name: UNIT 2010 EL A,B.mmdl  
Description: 2ND FLR FRAMING\Flush Beams\B11(i701)  
Specifier:  
Designer: AJ  
Company:



B1  
Total Horizontal Product Length = 19-05-12  
B2

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

| Bearing    | Live     | Dead     | Snow | Wind |
|------------|----------|----------|------|------|
| B1, 4-3/8" | 1501 / 0 | 1233 / 0 |      |      |
| B2, 2-3/8" | 686 / 0  | 521 / 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 | 19-05-12 | Top  |              | 12           |              |              | 00-00-00  |
| 1   | FC2 Floor Material | Unf. Lin. (lb/ft) | L    | 00-00-00 | 19-05-12 | Top  | 25           | 12           |              |              | n/a       |
| 2   | FC2 Floor Material | Unf. Lin. (lb/ft) | L    | 00-00-00 | 04-03-06 | Top  | 6            |              |              |              | n/a       |
| 3   | WALL               | Unf. Lin. (lb/ft) | L    | 00-04-06 | 05-07-13 | Top  |              | 60           |              |              | n/a       |
| 4   | FC2 Floor Material | Unf. Lin. (lb/ft) | L    | 04-03-06 | 19-05-12 | Top  | 14           | 7            |              |              | n/a       |
| 5   | B13(i664)          | Conc. Pt. (lbs)   | L    | 04-05-02 | 04-05-02 | Top  | 1475         | 816          |              |              | n/a       |
| 6   | E27(i316)          | Conc. Pt. (lbs)   | L    | 00-02-03 | 00-02-03 | Top  |              | 30           |              |              | n/a       |

### Controls Summary

|                       | Factored Demand | Factored Resistance | Demand/Resistance | Case | Location |
|-----------------------|-----------------|---------------------|-------------------|------|----------|
| Pos. Moment           | 14092 ft-lbs    | 35392 ft-lbs        | 39.8%             | 1    | 04-05-02 |
| End Shear             | 3573 lbs        | 14464 lbs           | 24.7%             | 1    | 01-04-04 |
| Total Load Deflection | L/381 (0.599")  | n/a                 | 62.9%             | 4    | 09-00-02 |
| Live Load Deflection  | L/662 (0.345")  | n/a                 | 54.4%             | 5    | 09-00-02 |
| Max Defl.             | 0.599"          | n/a                 | n/a               | 4    | 09-00-02 |
| Span / Depth          | 19.2            |                     |                   |      |          |

### Bearing Supports

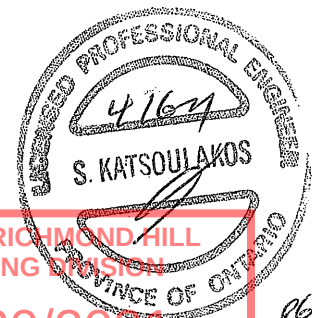
|    | Dim. (LxW)                 | Demand   | Demand/Resistance Support | Demand/Resistance Member | Material        |
|----|----------------------------|----------|---------------------------|--------------------------|-----------------|
| B1 | Wall/Plate 4-3/8" x 3-1/2" | 3793 lbs | 40.3%                     | 20.3%                    | Spruce-Pine-Fir |
| B2 | Wall/Plate 2-3/8" x 3-1/2" | 1681 lbs | 32.9%                     | 16.6%                    | Spruce-Pine-Fir |

### 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

CONFORMS TO CBC 2012

AMENDED 2020



CITY OF RICHMOND HILL  
BUILDING DIVISION

07/20/2021

OWG NO. TAM 9/24 -21

RECEIVED  
STRUCTURAL  
COMPONENT ONLY

Per: jocelyn.aguilar

BC CALC® Member Report

Build 7493

Job name:

Address:

City, Province, Postal Code: RICHMOND HILL

Customer:

Code reports: CCMC 12472-R

File name: UNIT 2010 EL A,B.mmdl

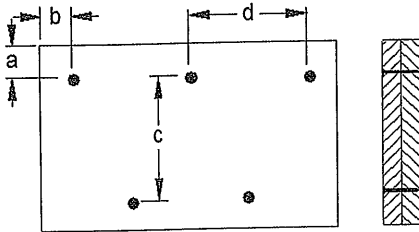
Description: 2ND FLR FRAMING\Flush Beams\B11(i701)

Specifier:

Designer: AJ

Company:

### Connection Diagram: Full Length of Member



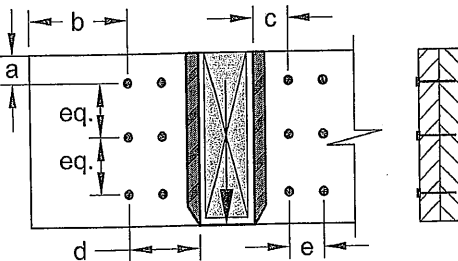
a minimum = 2"  
b minimum = 3"

c = 7-7/8"  
d = 20" 8"

Connectors are: 1 3/4" ARDOX SPIRAL Nails

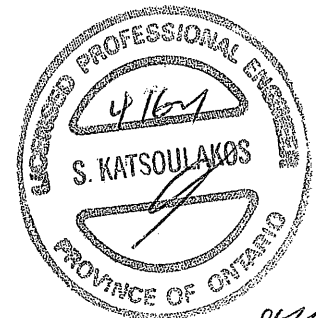
### Connection Diagrams: Concentrated Side Loads

Connection Tag: A Applies to load tag(s): 6



a minimum = 2"  
b minimum = 4"  
c minimum = 4"  
d maximum = 12"  
e minimum = 4"  
Connectors are:  
Nails

1 3/4" ARDOX SPIRAL



096 NO. TAM 9/24 -21  
STRUCTURAL  
COMPONENT ONLY

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

Per: jocelyn.aguiar

CITY OF RICHMOND HILL  
BUILDING DIVISION  
07/20/2021

BC CALC® Member Report

Dry | 1 span | No cant.

July 27, 2020 08:27:40

Build 7493

Job name:

File name: UNIT 2010 EL A,B.mmdl

Address:

Description: 2ND FLR FRAMING\Flush Beams\B12(i686)

City, Province, Postal Code: RICHMOND HILL

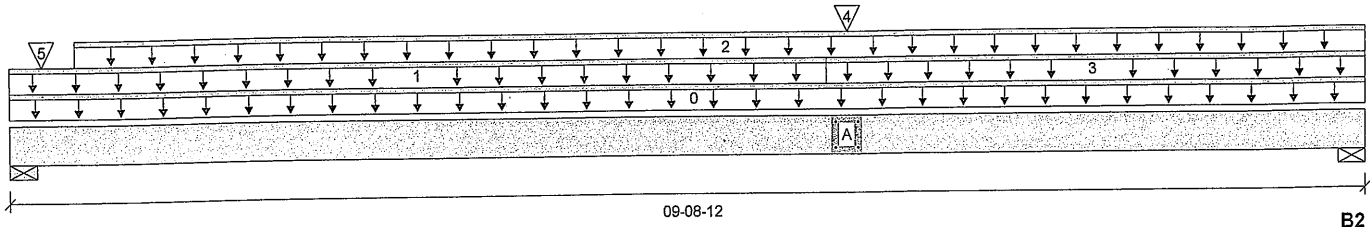
Specifier:

Customer:

Designer: AJ

Code reports: CCMC 12472-R

Company:



Total Horizontal Product Length = 09-08-12

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

| Bearing    | Live    | Dead     | Snow | Wind |
|------------|---------|----------|------|------|
| B1, 5-1/2" | 406 / 0 | 1678 / 0 |      |      |
| B2, 2-3/4" | 593 / 0 | 685 / 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 | 09-08-12 | Top  |              | 12           |              |              | 00-00-00  |
| 1   | FC2 Floor Material | Unf. Lin. (lb/ft) | L    | 00-00-00 | 05-09-08 | Top  | 28           | 14           |              |              | n/a       |
| 2   | WALL               | Unf. Lin. (lb/ft) | L    | 00-05-08 | 09-08-12 | Top  |              | 60           |              |              | n/a       |
| 3   | FC2 Floor Material | Unf. Lin. (lb/ft) | L    | 05-09-08 | 09-08-12 | Top  | 53           | 27           |              |              | n/a       |
| 4   | B13(i664)          | Conc. Pt. (lbs)   | L    | 05-11-04 | 05-11-04 | Top  | 630          | 392          |              |              | n/a       |
| 5   | E26(i312)          | Conc. Pt. (lbs)   | L    | 00-02-12 | 00-02-12 | Top  |              | 1113         |              |              | n/a       |

### Controls Summary

|                       | Factored Demand | Factored Resistance | Demand/Resistance | Case | Location |
|-----------------------|-----------------|---------------------|-------------------|------|----------|
| Pos. Moment           | 4872 ft-lbs     | 35392 ft-lbs        | 13.8%             | 1    | 05-11-04 |
| End Shear             | 1498 lbs        | 14464 lbs           | 10.4%             | 1    | 08-06-02 |
| Total Load Deflection | L/999 (0.048")  | n/a                 | n/a               | 4    | 05-01-06 |
| Live Load Deflection  | L/999 (0.023")  | n/a                 | n/a               | 5    | 05-03-00 |
| Max Defl.             | 0.048"          | n/a                 | n/a               | 4    | 05-01-06 |
| Span / Depth          | 9.3             |                     |                   |      |          |

### Bearing Supports

|    | Dim. (LxW)                 | Demand   | Demand/Resistance Support | Demand/Resistance Member | Material        |
|----|----------------------------|----------|---------------------------|--------------------------|-----------------|
| B1 | Wall/Plate 5-1/2" x 3-1/2" | 2349 lbs | 30.5%                     | 15.4%                    | Spruce-Pine-Fir |
| B2 | Wall/Plate 2-3/4" x 3-1/2" | 1746 lbs | 29.5%                     | 14.9%                    | Spruce-Pine-Fir |

### 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.

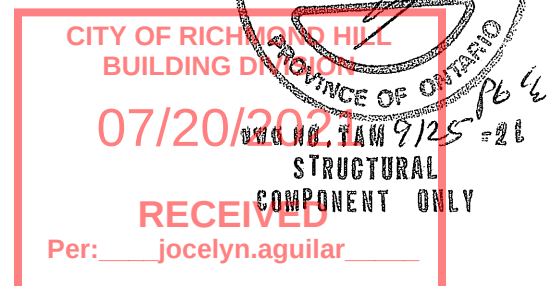
BC CALC® analysis is based on Canadian Limit States Design, as per NBCC 2015 and CSA O86.

Design based on Dry Service Condition.

Importance Factor : Normal Part code : Part 9

CONFORMS TO OBC 2012

AMENDED 2020







**Double 1-3/4" x 11-7/8" VERSA-LAM® 2.0 3100 SP**  
**2ND FLR FRAMING\Flush Beams\B12(i686) (Flush Beam)**

**PASSED**

BC CALC® Member Report  
Build 7493

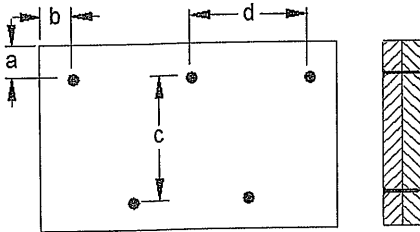
Dry | 1 span | No cant.

July 27, 2020 08:27:40

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

File name: UNIT 2010 EL A,B.mmdl  
Description: 2ND FLR FRAMING\Flush Beams\B12(i686)  
Specifier:  
Designer: AJ  
Company:

**Connection Diagram: Full Length of Member**

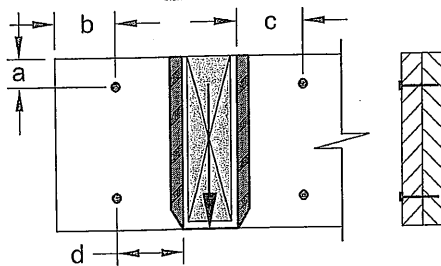


a minimum = 2"  
b minimum = 3"  
c = 7-7/8"  
d = 20 5/8"

Connectors are: 1 Nails

**3 1/2" ARDOX SPIRAL**  
**Connection Diagrams: Concentrated Side Loads**

Connection Tag: A Applies to load tag(s): 5



a minimum = 2"  
b minimum = 4"  
c minimum = 4"  
d maximum = 12"  
Connectors are: 16d 1 Nails  
**3 1/2" ARDOX SPIRAL**



OWB NO. TAM 9125 -21  
**STRUCTURAL  
COMPONENT ONLY**

**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®,

Per: jocelyn.aguilar

BC CALC® Member Report

Build 7493

Job name:

Address:

City, Province, Postal Code: RICHMOND HILL

Customer:

Code reports: CCMC 12472-R

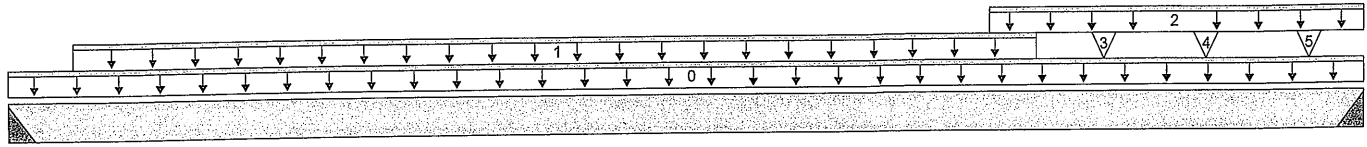
File name: UNIT 2010 EL A,B.mmdl

Description: 2ND FLR FRAMING\Flush Beams\B13(i664)

Specifier:

Designer: AJ

Company:



B1 13-02-00 B2  
Total Horizontal Product Length = 13-02-00

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

| Bearing | Live     | Dead    | Snow | Wind |
|---------|----------|---------|------|------|
| B1, 4"  | 614 / 0  | 384 / 0 |      |      |
| B2, 4"  | 1491 / 0 | 824 / 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 | 13-02-00 | Top  |              | 12           |              |              | 00-00-00  |
| 1   | Smoothed Load | Unf. Lin. (lb/ft) | L    | 00-07-08 | 09-11-08 | Top  | 82           | 41           |              |              | n/a       |
| 2   | STAIR         | Unf. Lin. (lb/ft) | L    | 09-05-14 | 13-02-00 | Top  | 120          | 60           |              |              | n/a       |
| 3   | J1(i668)      | Conc. Pt. (lbs)   | L    | 10-07-08 | 10-07-08 | Top  | 331          | 165          |              |              | n/a       |
| 4   | J1(i700)      | Conc. Pt. (lbs)   | L    | 11-07-08 | 11-07-08 | Top  | 307          | 154          |              |              | n/a       |
| 5   | J1(i735)      | Conc. Pt. (lbs)   | L    | 12-07-08 | 12-07-08 | Top  | 259          | 130          |              |              | n/a       |

### Controls Summary

|                       | Factored Demand | Factored Resistance | Demand/Resistance | Case | Location |
|-----------------------|-----------------|---------------------|-------------------|------|----------|
| Pos. Moment           | 5624 ft-lbs     | 35392 ft-lbs        | 15.9%             | 1    | 07-11-08 |
| End Shear             | 2474 lbs        | 14464 lbs           | 17.1%             | 1    | 11-10-02 |
| Total Load Deflection | L/999 (0.119")  | n/a                 | n/a               | 4    | 06-09-08 |
| Live Load Deflection  | L/999 (0.075")  | n/a                 | n/a               | 5    | 06-11-08 |
| Max Defl.             | 0.119"          | n/a                 | n/a               | 4    | 06-09-08 |
| Span / Depth          | 12.8            |                     |                   |      |          |

### Bearing Supports

|           | Dim. (LxW)  | Demand   | Demand/Resistance Support | Demand/Resistance Member | Material |
|-----------|-------------|----------|---------------------------|--------------------------|----------|
| B1 Hanger | 4" x 3-1/2" | 1402 lbs | n/a                       | 8.2%                     | HGUS410  |
| B2 Hanger | 4" x 3-1/2" | 3266 lbs | n/a                       | 19.1%                    | HGUS410  |

### Cautions

Header for the hanger HGUS410 is a Double 1-3/4" x 11-7/8" LVL Beam.  
Hanger model HGUS410 and seat length were input by the user. Hanger has not been analyzed for adequate capacity.

### 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

CONFORMS TO OBC 2012

AMENDED 2020



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Per: jocelyn



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

PASSED

## 2ND FLR FRAMING\Flush Beams\B13(i664) (Flush Beam)

Dry | 1 span | No cant.

July 27, 2020 08:27:40

BC CALC® Member Report

Build 7493

Job name:

Address:

City, Province, Postal Code: RICHMOND HILL

Customer:

Code reports: CCMC 12472-R

File name: UNIT 2010 EL A,B.mmdl

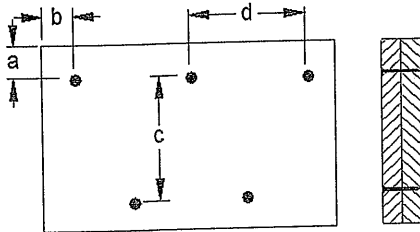
Description: 2ND FLR FRAMING\Flush Beams\B13(i664)

Specifier:

Designer: AJ

Company:

### Connection Diagram: Full Length of Member



a minimum = 2"

b minimum = 3"

c = 7-7/8"

d = 10' 8"

Calculated Side Load = 677.9 lb/ft

Connectors are: 16d 1 Nails

**3 1/2" ARDOX SPIRAL**



SWG NO. 4AM 9/26 -24  
STRUCTURAL  
COMPONENT ONLY

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Per: jocelyn.anguilar

BC CALC® Member Report

Build 7493

Job name:

File name: UNIT 2010 EL A,B.mmdl

Address:

Description: 2ND FLR FRAMING\Flush Beams\B14(i797)

City, Province, Postal Code: RICHMOND HILL

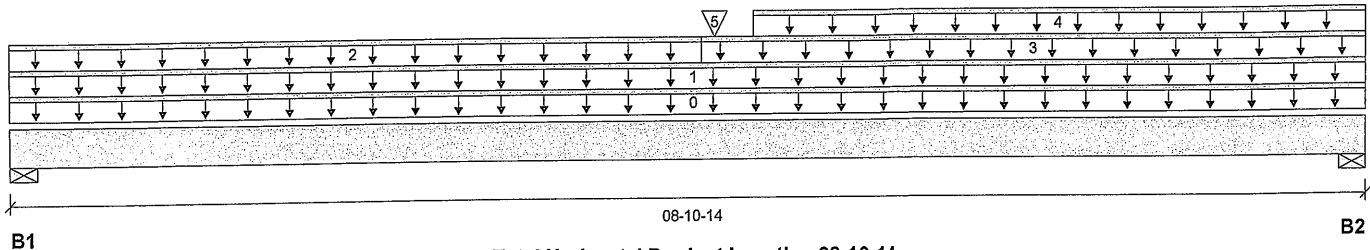
Specifier:

Customer:

Designer: AJ

Code reports: CCMC 12472-R

Company:



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

| Bearing    | Live    | Dead    | Snow    | Wind |
|------------|---------|---------|---------|------|
| B1, 5-1/2" | 169 / 0 | 493 / 0 | 182 / 0 |      |
| B2, 2-3/8" | 237 / 0 | 583 / 0 | 356 / 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 | 08-10-14 | Top  |              | 12           |              |              | 00-00-00  |
| 1   | FC2 Floor Material | Unf. Lin. (lb/ft) | L    | 00-00-00 | 08-10-14 | Top  | 20           | 10           |              |              | n/a       |
| 2   | E35(i415)          | Unf. Lin. (lb/ft) | L    | 00-00-00 | 04-06-00 | Top  |              | 61           |              |              | n/a       |
| 3   | E36(i430)          | Unf. Lin. (lb/ft) | L    | 04-06-00 | 08-10-14 | Top  |              | 81           |              |              | n/a       |
| 4   | E36(i430)          | Unf. Lin. (lb/ft) | L    | 04-10-00 | 08-10-14 | Top  | 33           | 30           | 78           |              | n/a       |
| 5   | E36(i430)          | Conc. Pt. (lbs)   | L    | 04-07-00 | 04-07-00 | Top  | 93           | 127          | 220          |              | n/a       |

### Controls Summary

|                       | Factored Demand | Factored Resistance | Demand/Resistance | Case | Location |
|-----------------------|-----------------|---------------------|-------------------|------|----------|
| Pos. Moment           | 3144 ft-lbs     | 35392 ft-lbs        | 8.9%              | 13   | 04-07-00 |
| End Shear             | 1100 lbs        | 14464 lbs           | 7.6%              | 13   | 07-08-10 |
| Total Load Deflection | L/999 (0.03")   | n/a                 | n/a               | 35   | 04-08-08 |
| Live Load Deflection  | L/999 (0.015")  | n/a                 | n/a               | 51   | 04-08-08 |
| Max Defl.             | 0.03"           | n/a                 | n/a               | 35   | 04-08-08 |
| Span / Depth          | 8.5             |                     |                   |      |          |

### Bearing Supports

|    | Dim. (LxW)                 | Demand   | Demand/Resistance Support | Demand/Resistance Member | Material        |
|----|----------------------------|----------|---------------------------|--------------------------|-----------------|
| B1 | Wall/Plate 5-1/2" x 3-1/2" | 690 lbs  | 9.0%                      | 4.5%                     | Spruce-Pine-Fir |
| B2 | Wall/Plate 2-3/8" x 3-1/2" | 1499 lbs | 29.3%                     | 14.8%                    | Spruce-Pine-Fir |

### 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.

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

CONFORMS TO OBC 2012

AMENDED 2020



CITY OF RICHMOND HILL  
BUILDING DIVISION

07/20/2021

OWN NO. YAM 9/27 -21

RECEIVED STRUCTURAL COMPONENT ONLY

Per: jocelyn.aguiar





**Double 1-3/4" x 11-7/8" VERSA-LAM® 2.0 3100 SP**  
**2ND FLR FRAMING\Flush Beams\B14(i797) (Flush Beam)**

**PASSED**

EC CALC® Member Report  
Build 7493

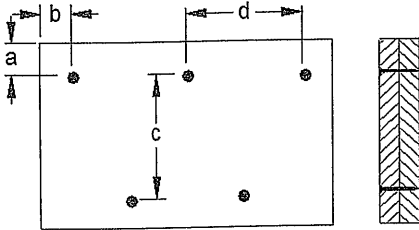
Dry | 1 span | No cant.

July 27, 2020 08:27:40

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

File name: UNIT 2010 EL A,B.mmdl  
Description: 2ND FLR FRAMING\Flush Beams\B14(i797)  
Specifier:  
Designer: AJ  
Company:

**Connection Diagram: Full Length of Member**



a minimum = 2"  
b minimum = 3"  
c = 7-7/8"  
d = 2 1/8"

Connectors are: Nails

**3 1/2" ARDOX SPIRAL**



OWG NO. TAM 9127 -21  
**STRUCTURAL  
COMPONENT ONLY**

**Disclosure**

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**CITY OF RICHMOND HILL  
BUILDING DIVISION**

**07/20/2021**

**RECEIVED**

Per: jocelyn.aguilar

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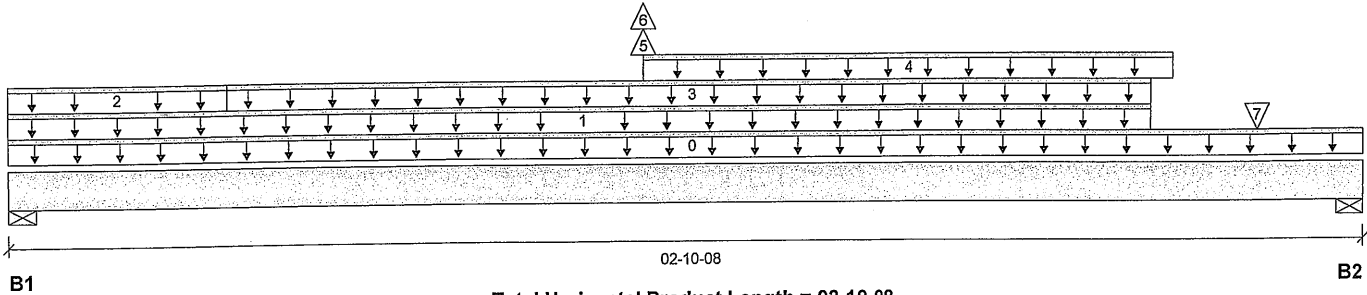
BC CALC® Member Report  
Build 7493

Dry | 1 span | No cant.

July 27, 2020 08:27:40

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

File name: UNIT 2010 EL A,B.mmdl  
Description: 2ND FLR FRAMING\Flush Beams\B15(i804)  
Specifier:  
Designer: AJ  
Company:



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

| Bearing    | Live      | Dead    | Snow    | Wind |
|------------|-----------|---------|---------|------|
| B1, 5-1/2" | 92 / 193  | 115 / 0 | 188 / 0 |      |
| B2, 5-1/2" | 116 / 159 | 137 / 0 | 224 / 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 | 02-10-08 | Top  |              | 12           |              |              | 00-00-00  |
| 1   | E32(i318)          | Unf. Lin. (lb/ft) | L    | 00-00-00 | 02-05-00 | Top  |              | 81           |              |              | n/a       |
| 2   | E32(i318)          | Unf. Lin. (lb/ft) | L    | 00-00-00 | 00-05-08 | Top  | 33           | 30           | 78           |              | n/a       |
| 3   | E32(i318)          | Unf. Lin. (lb/ft) | L    | 00-05-08 | 02-05-00 | Top  | 66           | 60           | 156          |              | n/a       |
| 4   | FC2 Floor Material | Unf. Lin. (lb/ft) | L    | 01-04-00 | 02-05-09 | Top  | 20           | 10           |              |              | n/a       |
| 5   | J3(i795)           | Conc. Pt. (lbs)   | L    | 01-04-00 | 01-04-00 | Top  | 11           | -171         |              |              | n/a       |
| 6   | J3(i795)           | Conc. Pt. (lbs)   | L    | 01-04-00 | 01-04-00 | Top  | -352         |              |              |              | n/a       |
| 7   | E31(i317)          | Conc. Pt. (lbs)   | L    | 02-07-12 | 02-07-12 | Top  | 30           | 51           | 71           |              | n/a       |

### Controls Summary

|                       | Factored Demand | Factored Resistance | Demand/Resistance | Case | Location |
|-----------------------|-----------------|---------------------|-------------------|------|----------|
| Pos. Moment           | 190 ft-lbs      | 35392 ft-lbs        | 0.5%              | 25   | 01-07-09 |
| Neg. Moment           | -276 ft-lbs     | -35392 ft-lbs       | 0.8%              | 22   | 01-04-00 |
| End Shear             | 340 lbs         | 14464 lbs           | 2.4%              | 2    | 01-05-02 |
| Total Load Deflection | L/999 (0")      | n/a                 | n/a               | 58   | 01-05-06 |
| Live Load Deflection  | L/999 (-0")     | n/a                 | n/a               | 84   | 01-04-13 |
| Total Neg. Defl.      | L/999 (-0")     | n/a                 | n/a               | 57   | 01-04-09 |
| Max Defl.             | 0"              | n/a                 | n/a               | 58   | 01-05-06 |
| Span / Depth          | 2.1             |                     |                   |      |          |

| Bearing Supports | Dim. (LxW)      | Demand  | Demand/Resistance Support | Demand/Resistance Member | Material        |
|------------------|-----------------|---------|---------------------------|--------------------------|-----------------|
| B1 Wall/Plate    | 5-1/2" x 3-1/2" | 518 lbs | 4.4%                      | 2.2%                     | Spruce-Pine-Fir |
| B1 Uplift        |                 | 187 lbs |                           |                          |                 |
| B2 Wall/Plate    | 5-1/2" x 3-1/2" | 623 lbs | 5.3%                      | 2.7%                     | Spruce-Pine-Fir |
| B2 Uplift        |                 | 114 lbs |                           |                          |                 |

### Cautions

Uplift of 187 lbs found at bearing B1. (SIMPSON 2-HZ-SAE @ B1).



CITY OF RICHMOND HILL  
BUILDING DIVISION

07/20/2020  
STRUCTURAL  
COMPONENT ONLY

RECEIVED

Per: jocelyn.aguilar



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

## 2ND FLR FRAMING\Flush Beams\B15(i804) (Flush Beam)

PASSED

BC CALC® Member Report

Build 7493

Job name:

Address:

City, Province, Postal Code: RICHMOND HILL

Customer:

Code reports: CCMC 12472-R

Dry | 1 span | No cant.

July 27, 2020 08:27:40

File name: UNIT 2010 EL A,B.mmdl

Description: 2ND FLR FRAMING\Flush Beams\B15(i804)

Specifier:

Designer: AJ

Company:

### 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.

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

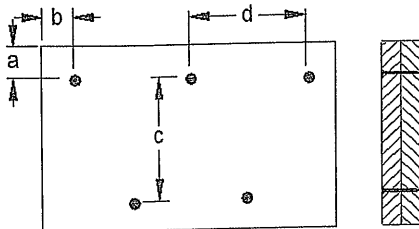
Design based on Dry Service Condition.

Importance Factor : Normal Part code : Part 9

CONFORMS TO OBC 2012

AMENDED 2020

### Connection Diagram: Full Length of Member



a minimum = 2"

b minimum = 3"

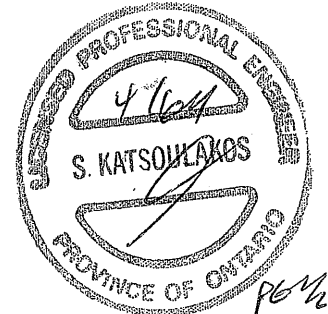
c = 7-7/8"

d = 8"

Calculated Side Load = 370.9 lb/ft

Connectors are: 16d Nails

3/4" ARDOX SPIRAL



ENGINEER NO. 9128-21  
STRUCTURAL  
COMPONENT ONLY

### Disclosure

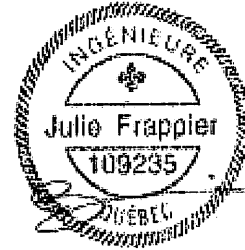
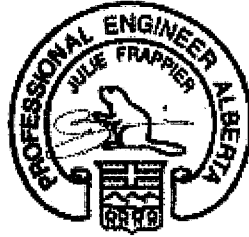
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Per: jocelyn.aguiar

## 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 |

1. 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.

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. 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.

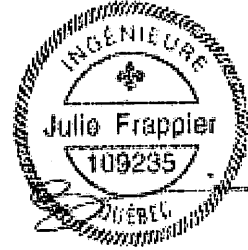
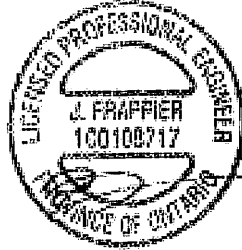
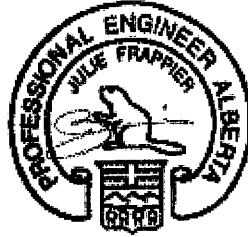
3. Minimum bearing length shall be 1-3/4 inches for the end bearings.

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 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.

6. 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-1274C.





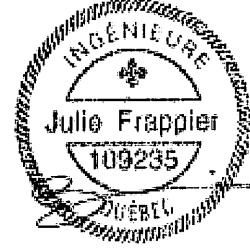
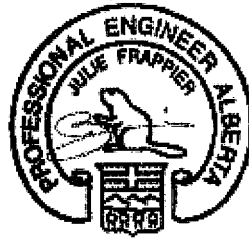
## Maximum Floor Spans

Live Load = 40 psf, Dead Load = 15 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'-10"           | 15'-0"  | 14'-5"  | 13'-5"  | 16'-4"              | 15'-5"  | 14'-6"  | 13'-5"  |
|         | NI-40x | 17'-0"            | 16'-0"  | 15'-5"  | 14'-9"  | 17'-5"              | 16'-5"  | 15'-10" | 15'-2"  |
|         | NI-60  | 17'-2"            | 16'-2"  | 15'-7"  | 14'-11" | 17'-6"              | 16'-7"  | 15'-11" | 15'-3"  |
|         | NI-70  | 18'-0"            | 16'-11" | 16'-3"  | 15'-7"  | 18'-5"              | 17'-3"  | 16'-7"  | 15'-11" |
|         | NI-80  | 18'-3"            | 17'-1"  | 16'-5"  | 15'-9"  | 18'-8"              | 17'-5"  | 16'-9"  | 16'-1"  |
| 11-7/8" | NI-20  | 17'-10"           | 16'-10" | 16'-2"  | 15'-6"  | 18'-6"              | 17'-4"  | 16'-9"  | 16'-1"  |
|         | NI-40x | 19'-4"            | 17'-11" | 17'-3"  | 16'-6"  | 19'-11"             | 18'-6"  | 17'-9"  | 17'-0"  |
|         | NI-60  | 19'-7"            | 18'-2"  | 17'-5"  | 16'-9"  | 20'-2"              | 18'-9"  | 17'-11" | 17'-2"  |
|         | 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'-11" | 22'-1"              | 20'-6"  | 19'-7"  | 18'-7"  |
|         | 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  | 16'-10"           | 15'-5"  | 14'-6"  | 13'-5"  | 16'-10"                                   | 15'-5"  | 14'-6"  | 13'-5"  |
|         | NI-40x | 18'-8"            | 17'-2"  | 16'-3"  | 15'-2"  | 18'-10"                                   | 17'-2"  | 16'-3"  | 15'-2"  |
|         | NI-60  | 18'-11"           | 17'-6"  | 16'-6"  | 15'-5"  | 19'-2"                                    | 17'-6"  | 16'-6"  | 15'-5"  |
|         | NI-70  | 20'-0"            | 18'-7"  | 17'-9"  | 16'-7"  | 20'-5"                                    | 18'-11" | 17'-10" | 16'-7"  |
|         | NI-80  | 20'-3"            | 18'-10" | 17'-11" | 16'-10" | 20'-8"                                    | 19'-3"  | 18'-2"  | 16'-10" |
| 11-7/8" | NI-20  | 20'-1"            | 18'-5"  | 17'-5"  | 16'-2"  | 20'-1"                                    | 18'-5"  | 17'-5"  | 16'-2"  |
|         | NI-40x | 21'-10"           | 20'-4"  | 19'-4"  | 17'-8"  | 22'-5"                                    | 20'-6"  | 19'-4"  | 17'-8"  |
|         | NI-60  | 22'-1"            | 20'-7"  | 19'-7"  | 18'-4"  | 22'-8"                                    | 20'-10" | 19'-8"  | 18'-4"  |
|         | NI-70  | 23'-4"            | 21'-8"  | 20'-8"  | 19'-7"  | 23'-10"                                   | 22'-3"  | 21'-2"  | 19'-9"  |
|         | NI-80  | 23'-7"            | 21'-11" | 20'-11" | 19'-9"  | 24'-1"                                    | 22'-6"  | 21'-5"  | 20'-0"  |
| 14"     | NI-90x | 24'-3"            | 22'-6"  | 21'-6"  | 20'-4"  | 24'-8"                                    | 23'-0"  | 22'-0"  | 20'-9"  |
|         | NI-40x | 24'-5"            | 22'-9"  | 21'-8"  | 19'-5"  | 25'-1"                                    | 23'-2"  | 21'-9"  | 19'-5"  |
|         | NI-60  | 24'-10"           | 23'-1"  | 22'-0"  | 20'-10" | 25'-6"                                    | 23'-8"  | 22'-4"  | 20'-10" |
|         | NI-70  | 26'-1"            | 24'-3"  | 23'-2"  | 21'-10" | 26'-8"                                    | 24'-11" | 23'-9"  | 22'-4"  |
|         | NI-80  | 26'-6"            | 24'-7"  | 23'-5"  | 22'-2"  | 27'-1"                                    | 25'-3"  | 24'-1"  | 22'-9"  |
| 16"     | NI-90x | 27'-3"            | 25'-4"  | 24'-1"  | 22'-9"  | 27'-9"                                    | 25'-11" | 24'-8"  | 23'-4"  |
|         | NI-60  | 27'-3"            | 25'-5"  | 24'-2"  | 22'-10" | 28'-0"                                    | 26'-2"  | 24'-9"  | 23'-1"  |
|         | NI-70  | 28'-8"            | 26'-8"  | 25'-4"  | 23'-11" | 29'-3"                                    | 27'-4"  | 26'-1"  | 24'-8"  |
|         | NI-80  | 29'-1"            | 27'-0"  | 25'-9"  | 24'-4"  | 29'-8"                                    | 27'-9"  | 26'-5"  | 25'-0"  |
|         | NI-90x | 29'-11"           | 27'-10" | 26'-6"  | 25'-0"  | 30'-6"                                    | 28'-5"  | 27'-2"  | 25'-8"  |

- 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 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 13032-R and APA Product Report PR-L274C.



## Maximum Floor Spans

Live Load = 40 psf, Dead Load = 30 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'-1"  | 13'-3"  | N/A | 15'-7"              | 14'-1"  | 13'-3"  | 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 |

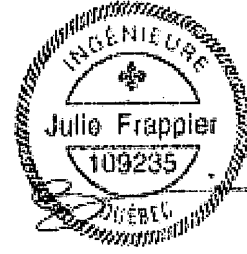
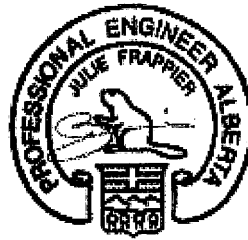
  

| Depth   | Series | Mid-Span Blocking |         |         |     | Mid-Span Blocking and 1/2" Gypsum Ceiling |         |        |     |
|---------|--------|-------------------|---------|---------|-----|-------------------------------------------|---------|--------|-----|
|         |        | On Centre Spacing |         |         |     | On Centre Spacing                         |         |        |     |
|         |        | 12"               | 16"     | 19.2"   | 24" | 12"                                       | 16"     | 19.2"  | 24" |
| 9-1/2"  | NI-20  | 15'-7"            | 14'-1"  | 13'-3"  | N/A | 15'-7"                                    | 14'-1"  | 13'-3" | N/A |
|         | NI-40x | 17'-9"            | 16'-1"  | 15'-1"  | N/A | 17'-9"                                    | 16'-1"  | 15'-1" | N/A |
|         | NI-60  | 18'-1"            | 15'-4"  | 14'-10" | N/A | 18'-1"                                    | 16'-4"  | 15'-4" | N/A |
|         | NI-70  | 19'-2"            | 17'-10" | 16'-9"  | N/A | 19'-7"                                    | 17'-10" | 16'-9" | N/A |
|         | NI-80  | 19'-5"            | 18'-0"  | 17'-1"  | N/A | 19'-10"                                   | 18'-3"  | 17'-1" | N/A |
| 11-7/8" | NI-20  | 18'-9"            | 17'-0"  | 16'-0"  | N/A | 18'-9"                                    | 17'-0"  | 16'-0" | N/A |
|         | NI-40x | 21'-0"            | 19'-3"  | 17'-9"  | N/A | 21'-3"                                    | 19'-3"  | 17'-9" | N/A |
|         | NI-60  | 21'-4"            | 19'-8"  | 18'-5"  | N/A | 21'-8"                                    | 19'-8"  | 18'-5" | N/A |
|         | NI-70  | 22'-6"            | 20'-10" | 19'-11" | N/A | 23'-0"                                    | 21'-4"  | 20'-0" | N/A |
|         | NI-80  | 22'-9"            | 21'-1"  | 20'-1"  | N/A | 23'-3"                                    | 21'-7"  | 20'-5" | 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'-5"  | 19'-6"  | N/A | 24'-1"                                    | 21'-5"  | 19'-6" | N/A |
|         | NI-60  | 24'-0"            | 22'-3"  | 21'-0"  | N/A | 24'-8"                                    | 22'-5"  | 21'-0" | N/A |
|         | NI-70  | 25'-3"            | 23'-4"  | 22'-3"  | N/A | 25'-10"                                   | 24'-0"  | 22'-9" | 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"                                    | 24'-10" | 23'-4" | 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 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 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 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 13032-R and APA Product Report PR-L274C.

## 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'-1"  | 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" |

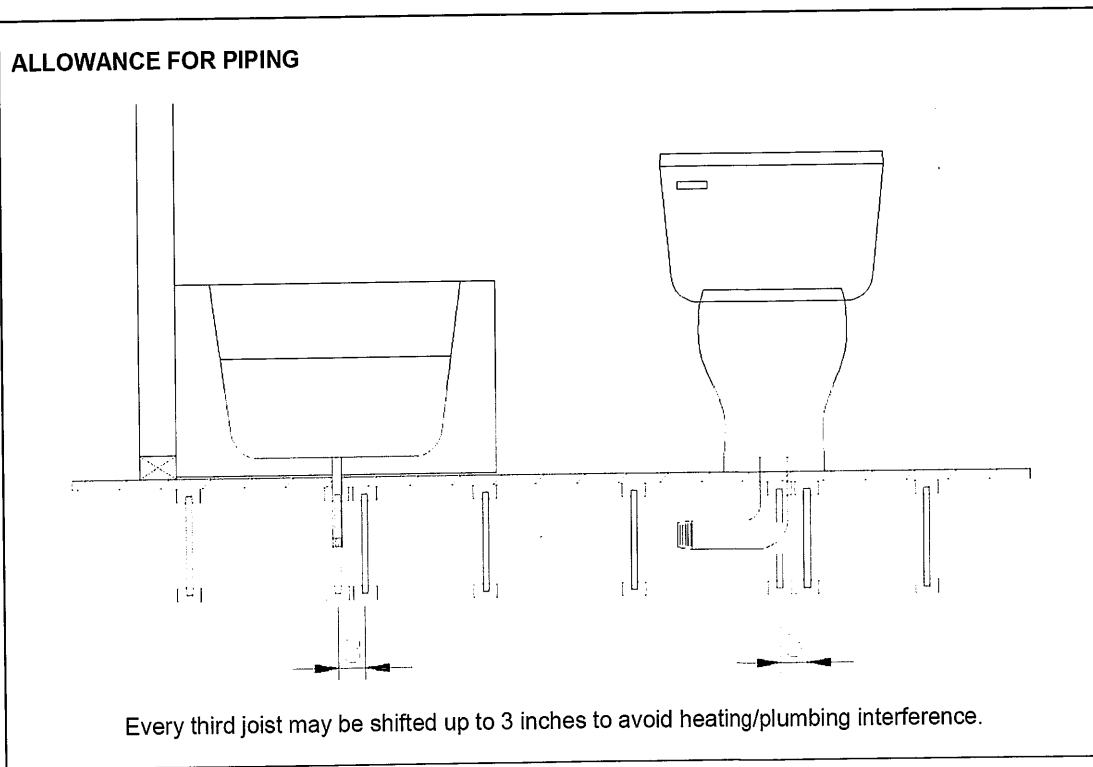
- Maximum clear span applicable to simple-span residential floor construction with a design live load of 40 psf and dead load of 30 psf. The ultimate limit states are based on the factored loads of 1.50L + 1.25D. The serviceability limit states include the consideration for floor vibration, a live load 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 13032-R and APA Product Report PR-L274C.

## 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.

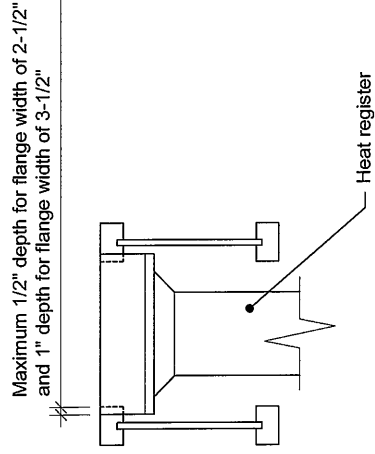
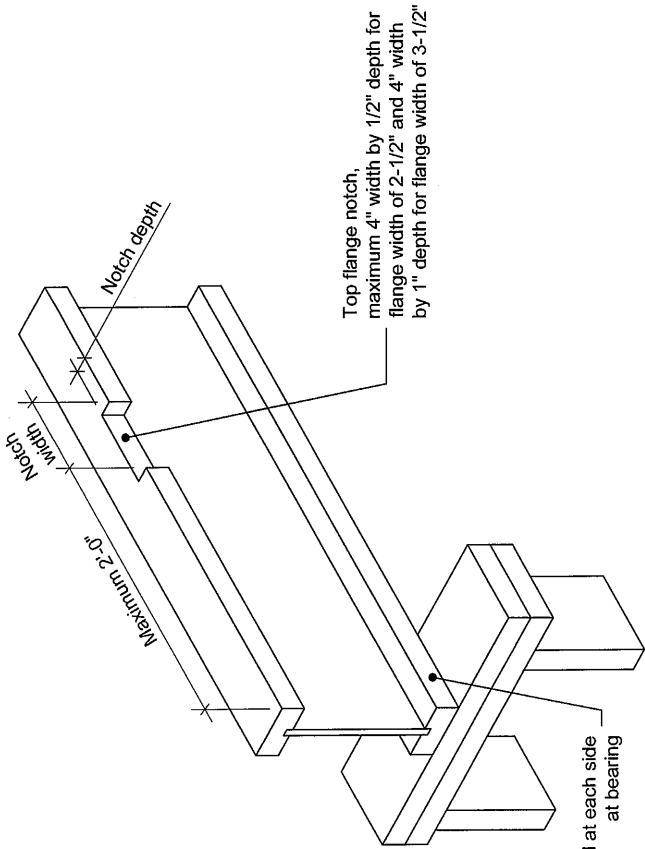
The detail below shows the 3-inch allowance for piping. Every third joist may be shifted up to 3 inches to avoid heating/plumbing interference. For other applications, please contact your distributor.





1W-1

CITY OF RICHMOND HILL  
BUILDING DIVISION  
07/20/2021  
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Per: jocelyn.aguilar



- 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.

|                                                          |                                  |                                    |          |
|----------------------------------------------------------|----------------------------------|------------------------------------|----------|
| <b>NORDIC</b>                                            | T 514-871-8526<br>1 866 817-3418 | Notch in I-joist for Heat Register | DOCUMENT |
| <b>STRUCTURES</b>                                        | nordic.ca                        | CATEGORY                           | -        |
|                                                          |                                  |                                    |          |
|                                                          |                                  |                                    |          |
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|                                                          |                                  |                                    |          |
| I-joist - Typical Floor Framing and Construction Details |                                  | DATE                               | NUMBER   |
|                                                          |                                  | 2018-04-10                         | 1W-1     |