Technical Bulletin

No. 001-19
Issue Date: May 3, 2019
Category: Building Code, House
Topic: Wood framed exterior decks and platforms for private residential use

PURPOSE

This Practice Bulletin is intended to provide guidelines on the design and construction of wood framed exterior decks and platforms for private residential use that serve a house or an individual dwelling unit, including common associated components such as guards, stairs, foundations and footings.

WHERE A PERMIT IS REQUIRED [BCA, Sec. 1(1), and Sec. 8(1)]

- A building permit is required for all decks and platforms that are greater than 10 m² (107.6 ft²) in area, as well as decks and platforms that are less than or equal to 10 m² (107.6 ft²) that are attached to a building or serve an entrance to a building, as they are considered as part of that building.

EXCAVATION AND DEPTH OF FOUNDATIONS [OBC, Div.B 9.12.2.]

- Wood framed decks can classified as either a deck with full-depth foundations below the level of frost penetration, or a floating/on-grade deck.
- A deck with full-depth foundations, which is permitted to be attached to another building, requires the excavation and foundation to extend to a depth of not less than the depth of frost penetration, which in Mississippi Mills is accepted as being 1.2 m (3 ft 11 in) depth.
- If the foundation is bearing on sound bedrock that is not susceptible to frost, then the minimum depth does not apply.
- If a deck is classified as floating/on-grade, then the depth of excavation and foundation noted above does not apply and the deck is permitted to be constructed on-grade.
- In order for a deck to be classified as floating/on-grade, all of the following conditions (a) to (e) must be met:
  - (a) not more than 1 storey,
  - (b) not more than 55 m² (592 ft²) in area,
  - (c) the distance from grade to the underside of the floor joists is not more than 600 mm (23 5/8 in),
  - (d) not supporting a roof, and
  - (e) not attached to another structure, unless it can be demonstrated by a licenced Professional Engineer that differential movement will not adversely affect the performance of that structure.
- Prior to placement of foundations, all excavations are to be free of all organic matter and standing water, and shall extend to undisturbed soil. This includes floating/on-grade decks, which shall not be placed directly on top-soil or organic matter.

FOUNDATIONS [OBC, Div.B 9.15.]

- All decks and platforms require foundations and footings to transfer loads to supporting soil or rock.
- Footings must be adequately sized to support the loads from the deck, and can be sized according to **Figure 1** below, or alternatively, footings may be sized or omitted through a design provided by a licenced Professional Engineer.

Figure 1: Minimum Footing Sizes [OBC, Div.B 9.15.3.4., 9.15.3.7.]

Column Spacing	Minimum Footing Area, m² (ft²) (allowable soil bearing pressure 75 kPa)								
	Supported Joist Span, m (ft-in)								
m (ft-in)	1.5 (4'-11")	2.1 (6'-11")	2.4 (7'-10")	2.7 (8'-10")	3.0 (9'-10")	3.3 (10'-10")	3.6 (11'-10")	3.9 (12'-10")	4.2 (13'-9")
1.2 (3'-11")	0.05 (0.53)	0.07 (0.74)	0.08 (0.84)	0.09 (0.95)	0.10 (1.05)	0.11 (1.16)	0.12 (1.27)	0.13 (1.37)	0.14 (1.48)
1.5 (4'-11")	0.06 (0.66)	0.09 (0.92)	0.10 (1.05)	0.11 (1.19)	0.12 (1.32)	0.13 (1.45)	0.15 (1.58)	0.16 (1.71)	0.17 (1.85)
1.8 (5'-11")	0.07 (0.79)	0.10 (1.11)	0.12 (1.27)	0.13 (1.42)	0.15 (1.58)	0.16 (1.74)	0.18 (1.9)	0.19 (2.06)	0.21 (2.21)
2.1 (6'-11")	0.09 (0.92)	0.12 (1.29)	0.14 (1.48)	0.15 (1.66)	0.17 (1.85)	0.19 (2.03)	0.21 (2.21)	0.22 (2.4)	0.24 (2.58)
2.4 (7'-10")	0.10 (1.05)	0.14 (1.48)	0.16 (1.69)	0.18 (1.9)	0.20 (2.11)	0.22 (2.32)	0.24 (2.53)	0.25 (2.74)	0.27 (2.95)
2.7 (8'-10")	0.11 (1.19)	0.15 (1.66)	0.18 (1.9)	0.20 (2.14)	0.22 (2.37)	0.24 (2.61)	0.26 (2.85)	0.29 (3.08)	0.31 (3.32)
3.0 (9'-10")	0.12 (1.32)	0.17 (1.85)	0.20 (2.11)	0.22 (2.37)	0.24 (2.64)	0.27 (2.9)	0.29 (3.16)	0.32 (3.43)	0.34 (3.69)
3.3 (10'-10")	0.13 (1.45)	0.19 (2.03)	0.22 (2.32)	0.24 (2.61)	0.27 (2.9)	0.30 (3.19)	0.32 (3.48)	0.35 (3.77)	0.38 (4.06)
3.6 (11'-10")	0.15 (1.58)	0.21 (2.21)	0.24 (2.53)	0.26 (2.85)	0.29 (3.16)	0.32 (3.48)	0.35 (3.8)	0.38 (4.11)	0.41 (4.43)

Note: Common deck-block sizes tend to be 10 in x 10 in (~0.07 m² / 0.7 ft²) or 12 in x 12 in (~0.10 m² / 1.0 ft²)

- For floating/on-grade decks, foundations can be achieved using concrete footings poured on-grade or by use of a similar pre-manufactured product such as deck-blocks.

- If deck-blocks are used, additional support may be required under the deck-blocks, such as concrete patio stones, to meet the minimum footing area required.
- For full-depth foundations, where concrete piers are used, they shall have minimum dimensions of 230 mm (9 in) diameter for round piers ("sono-tube" or similar), and 200 mm x 200 mm (7 7/8 in x 7 7/8 in) for rectangular piers.
- Footings for full-depth foundations can be formed on-site or by using pre-manufactured footings forms ('Big-Foot' or similar), as per the minimum footing area requirement.
- Other types of foundations, such as helical piles, that are not covered in OBC Part 9 shall be designed by a licenced Professional Engineer.

ANCHORAGE [OBC, Div.B 9.23.6.2.]

- Columns or posts shall be anchored to the foundation to resist uplift and lateral movement, or alternatively where the distance from grade to the underside of the floor joists is not more than 600 mm (23 5/8 in) the columns or posts may be anchored directly to the ground to resist uplift.
- If a deck is classified as floating/on-grade, columns and posts need not be anchored to the foundation or the ground.

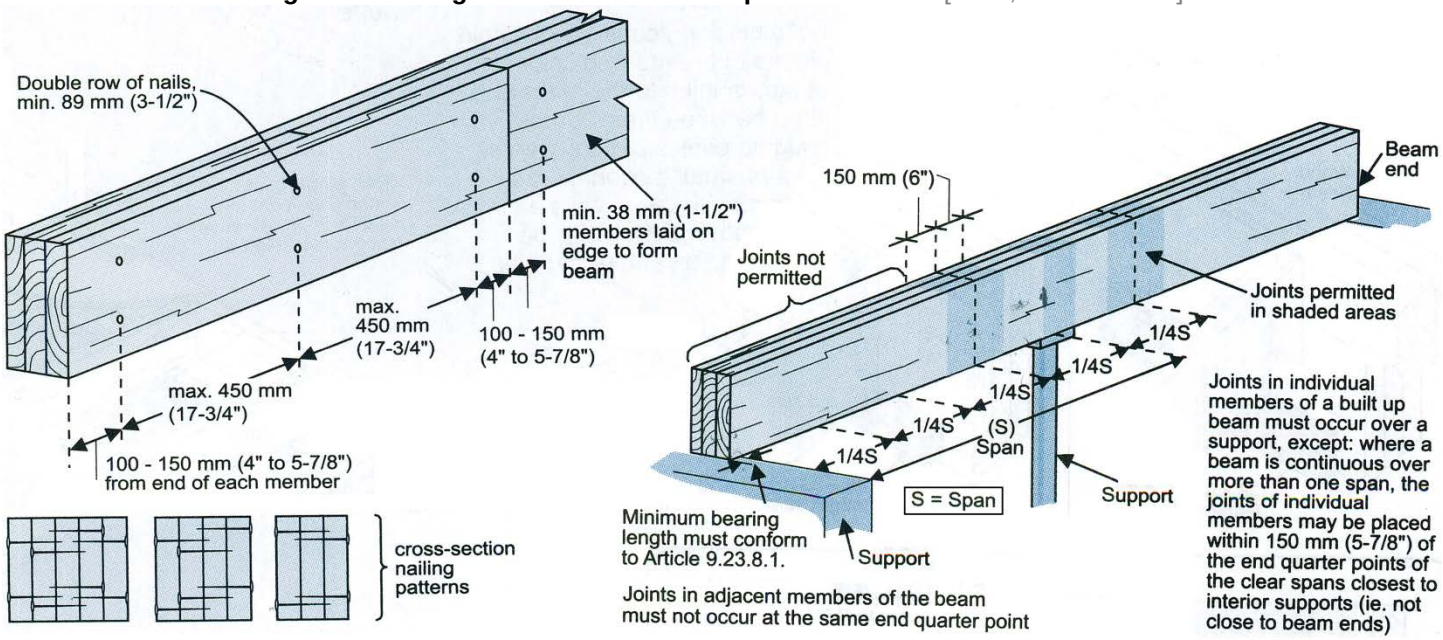
COLUMNS [OBC, Div.B 9.17.4.]

- The minimum size of square wood columns shall be 140 mm x 140 mm (5 1/2 in x 5 1/2 in), however the use of 89 mm x 89 mm (3 1/2 in x 3 1/2 in) wood columns will only be permitted on a deck that is considered to be floating/on-grade.
- Wood columns shall be at least the width of the beam or supported member above, and can either be a solid piece, or built-up with 38 mm (1 1/2 in) thick plies nailed together with 76 mm (3 in) nails @ 300 mm (11 7/8 in) o.c., or bolted together with 9.52 mm (3/8 in) diam. bolts @ 450 mm (17 3/4 in) o.c.
- Unless treated or decay resistant lumber is used, wood shall be separated from any concrete that is contact with the ground with 6 mil polyethylene or Type S roll roofing.

BEAMS [OBC, Div.B 9.23.8.]

- Built-up wood beams made up 38 mm (1 1/2 in) thick plies shall be either nailed together with 2 rows of 89 mm (3 1/2 in) nails @ 450 mm (17 3/4 in) o.c., or bolted with 12.7 mm (1/2 in) diam. bolts @ 1.2 m (3 ft 11 in) o.c.
- Joints in built-up wood beams shall be as per 9.23.8.3., as illustrated in **Figure 2** below.

Figure 2: Nailing and Joints for Built-up Wood Beams [OBC, Div.B 9.23.8.]



- The size of built-up beams, and their maximum spans shall be as per Table A-8, or be designed by a licenced Professional Engineer. **Figure 3** below lists beam sizes commonly used on wood framed residential decks, including the maximum spans as per Table A-8 from Part 9 of the OBC.

Figure 3: Maximum Spans for Built-up Wood Floor Beams [OBC, Div.B 9.23.4.2.(3), Table A-8]

Wood Type or Commercial Designation	Grade	Size of Beam and Number of Plies, mm (inch, nominal size)	Maximum Span, m (ft-in) Supported Length, m (ft-in)				
			2.4 (7'-10")	3.0 (9'-10")	3.6 (11'-10")	4.2 (13'-9")	4.8 (15'-9")
Spruce-Pine-Fir (SPF)	No. 1 and No. 2	3 - 38 x 184 (3 - 2 x 8)	3.07 (10'-1")	2.85 (9'-4")	2.63 (8'-8")	2.44 (8'-0")	2.28 (7'-6")
		4 - 38 x 184 (4 - 2 x 8)	3.38 (11'-1")	3.14 (10'-4")	2.95 (9'-8")	2.80 (9'-2")	2.63 (8'-8")
		5 - 38 x 184 (5 - 2 x 8)	3.64 (11'-11")	3.38 (11'-1")	3.18 (10'-5")	3.02 (9'-11")	2.89 (9'-6")
		3 - 38 x 235 (3 - 2 x 10)	3.92 (12'-10")	3.52 (11'-7")	3.22 (10'-7")	2.98 (9'-9")	2.79 (9'-2")
		4 - 38 x 235 (4 - 2 x 10)	4.32 (14'-2")	4.01 (13'-2")	3.71 (12'-2")	3.44 (11'-3")	3.22 (10'-7")
		5 - 38 x 235 (5 - 2 x 10)	4.65 (15'-3")	4.32 (14'-2")	4.06 (13'-4")	3.84 (12'-7")	3.60 (11'-10")
		3 - 38 x 286 (3 - 2 x 12)	4.57 (14'-12")	4.09 (13'-5")	3.73 (12'-3")	3.46 (11'-4")	3.23 (10'-7")
		4 - 38 x 286 (4 - 2 x 12)	5.25 (17'-3")	4.72 (15'-6")	4.31 (14'-2")	3.99 (13'-1")	3.73 (12'-3")
		5 - 38 x 286 (5 - 2 x 12)	5.59 (18'-4")	5.25 (17'-3")	4.82 (15'-10")	4.46 (14'-8")	4.17 (13'-8")
Cedar and other species under NLGA grading rules	No. 1 and No. 2	3 - 38 x 184 (3 - 2 x 8)	2.59 (8'-6")	2.31 (7'-7")	2.11 (6'-11")	1.95 (6'-5")	1.83 (6'-0")
		4 - 38 x 184 (4 - 2 x 8)	2.99 (9'-10")	2.67 (8'-9")	2.44 (8'-0")	2.26 (7'-5")	2.11 (6'-11")
		5 - 38 x 184 (5 - 2 x 8)	3.29 (10'-10")	2.99 (9'-10")	2.73 (8'-11")	2.52 (8'-3")	2.36 (7'-9")
		3 - 38 x 235 (3 - 2 x 10)	3.16 (10'-4")	2.83 (9'-3")	2.58 (8'-6")	2.39 (7'-10")	2.24 (7'-4")
		4 - 38 x 235 (4 - 2 x 10)	3.65 (11'-12")	3.27 (10'-9")	2.98 (9'-9")	2.76 (9'-1")	2.58 (8'-6")
		5 - 38 x 235 (5 - 2 x 10)	4.08 (13'-5")	3.65 (11'-12")	3.33 (10'-11")	3.09 (10'-2")	2.89 (9'-6")
		3 - 38 x 286 (3 - 2 x 12)	3.67 (12'-0")	3.28 (10'-9")	3.00 (9'-10")	2.77 (9'-1")	2.59 (8'-6")
		4 - 38 x 286 (4 - 2 x 12)	4.24 (13'-11")	3.79 (12'-5")	3.46 (11'-4")	3.20 (10'-6")	3.00 (9'-10")
		5 - 38 x 286 (5 - 2 x 12)	4.74 (15'-7")	4.24 (13'-11")	3.87 (12'-8")	3.58 (11'-9")	3.35 (10'-12")

Note: Supported Length means half the sum of the joist spans on both sides of the beam.

FLOOR FRAMING [OBC, Div.B 9.23.4., 9.23.9., and 9.23.14.]

- Floor joist sizes, spacing, and spans shall be either designed in conformance with Tables A-1 and A-2, or be designed by a licenced Professional Engineer. **Figure 4** below lists joist types commonly used on wood framed residential decks, including the maximum spans as per Table A-1 from Part 9 of the OBC.

Figure 4: Maximum Spans for Floor Joists [OBC, Div.B 9.23.4.2.(1), Table A-1]

Wood Type or Commercial Designation	Grade	Maximum Span, m (ft-in)				
		Joist Spacing, mm (in)	Joists Size, mm (inch, nominal size)			
			38 x 140 (2 x 6)	38 x 184 (2 x 8)	38 x 235 (2 x 10)	38 x 286 (2 x 12)
Spruce-Pine-Fir (SPF)	No. 1 and No. 2	305 (12)	3.14 (10'-4")	3.81 (12'-6")	4.44 (14'-7")	5.01 (16'-5")
		406 (16)	2.85 (9'-4")	3.58 (11'-9")	4.17 (13'-8")	4.71 (15'-5")
		610 (24)	2.49 (8'-2")	3.27 (10'-9")	3.92 (12'-10")	4.42 (14'-6")
Cedar and other species under NLGA grading rules	No. 1 and No. 2	305 (12)	2.83 (9'-3")	3.44 (11'-3")	4.01 (13'-2")	4.53 (14'-10")
		406 (16)	2.57 (8'-5")	3.23 (10'-7")	3.77 (12'-4")	4.25 (13'-11")
		610 (24)	2.25 (7'-5")	2.96 (9'-9")	3.54 (11'-7")	4.00 (13'-1")

- Floor joists require a minimum end bearing length of 38 mm (1 1/2 in), such as on top of a beam or a ledger board.
- The required floor joist bearing can alternatively be provided by the use of manufactured joist hangers or other engineered connectors, provided the hanger is installed as per the manufactures installation instructions using all required fasteners specified by the manufacturer.

- Where the span of the joists exceeds 2.1 m (6 ft 10 5/8 in), blocking or bridging shall be provided between the joists with consecutive rows of blocking/bridging located not more than 2.1 m (6 ft 10 5/8 in) apart. Alternatively, the use of min. 19 mm x 89 mm (1 x 4) strapping on the underside of joists can be used in lieu of blocking/bridging.
- Floor joists supporting roof loads shall not be cantilevered more than 400 mm (15 3/4 in) beyond their supports where 38 mm by 184 mm (2 x 8) joists are used and not more than 600 mm (23 5/8 in) beyond their supports where 38 mm by 235 mm (2 x 10) or larger joists are used, and shall not support floor loads from other storeys unless calculations are provided to show that the design resistances of the cantilevered joists are not exceeded.
- Wood lumber floor decking shall have a minimum thickness of 17 mm (5/8 in) for joist spacing up to maximum 406 mm (16 in), or 19 mm (3/4 in) where the joists spacing exceeds 406 m (16 in).
- Lumber decking shall be fully supported at the ends on solid bearing, and not more than 184 mm (7 1/4 in) wide.

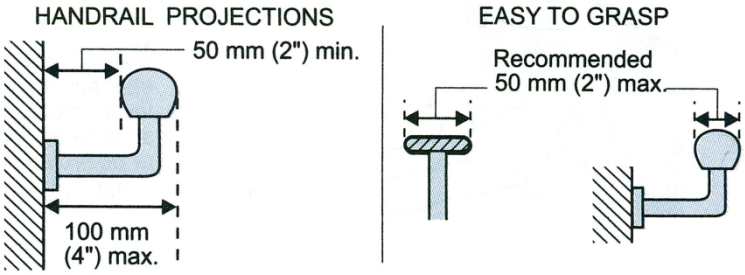
GUARDS [OBC, Div.B 9.8.8.]
- A guard is a protective barrier placed around openings, stairs, landings, raised walkways or other locations to prevent accidental falls from one level to another, and are required where the height from the walking surface of the deck is greater than 600 mm (23 5/8 in) to the adjacent surface or grade, or where the adjacent surface or grade within 1.2 m (3 ft 11 in) exceeds a slope of 1 in 2.
- Guards can either be constructed to resist the minimum specified loads set forth in Table 9.8.8.2. of the OBC, or constructed in accordance with the details, connections, and requirements in MMAH Supplementary Standard SB-7, “Guards for Housing and Small Buildings” (ask the Building Department for a copy of SB-7 details if needed).
- The minimum height of a guard shall be 900 mm (2 ft 11 1/2 in) where the height to grade is not more than 1.8 m (6 ft 10 7/8 in), and 1070 mm (3 ft 6 1/8 in) where the height to grade exceeds 1.8 m (6 ft 10 7/8 in).
- Guards shall be designed so that no member, attachment or opening located between 140 mm (5 1/2 in) and 900 mm (2 ft 11 1/2 in) above the floor or walking surface will facilitate climbing.
- Glass used in guards shall be either safety glass of the laminated or tempered type (CAN/CGSB-12.1-M, “Tempered or Laminated Safety Glass”), or wired glass (CAN/CGSB-12.11-M, “Wired Safety Glass”).

STAIRS [OBC, Div.B 9.8.2. - 9.8.4., 9.8.9.]
- The minimum width of stairs shall be 860 mm (2 ft 10 in).
- The dimensions for stair rise, which is measured as the vertical distance between adjacent stair treads, shall be min. 125 mm (4 7/8 in), and max. 200 mm (7 7/8 in).
- The dimensions for stair run, which is measured as the horizontal distance from nosing to nosing of adjacent stair treads, shall be min. 210 mm (8 1/4 in), and max. 355 mm (14 in).
- The depth for stair treads shall be shall be min. 235 mm (9 1/4 in), and max. 355 mm (14 in), and shall not have a nosing greater than 25 mm (1 in).
- Stair stringers shall be supported and secured at both top and bottom, and spaced no greater than 900 mm (2 ft 11 in), except where the riser supports the front portion of the tread, the spacing shall be no greater than 1200 mm (3 ft 11 in).
- Stair stringers in contact with the ground shall be treated to prevent decay or shall be a decay resistant wood species.
- The min. thickness of treads shall be 25 mm (1 in) or equivalent 5/4 nominal lumber, except that if open risers are used and the stringer spacing exceeds 750 mm (29 1/2 in), the min. thickness shall be 38 mm (1 1/2 in).

RAMPS [OBC, Div.B 9.8.5.]
- The minimum width of ramps shall be 860 mm (2 ft 10 in).
- The maximum slope for exterior ramps shall be not more than 1 in 10.
- The max. rise of ramps between floors or landings shall be 1500 mm (4 ft 11 in) where the slope is greater than 1 in 12

HANDRAILS [OBC, Div.B 9.8.7.]
- Handrails are intended to provide guidance and support to stair and ramp users, by means of a graspable railing.
- Handrails are required on every set of exterior stairs with greater than 3 risers, and on every exterior ramp with a rise greater than 400 mm (15 3/4 in).
- Only one handrail is required on exterior stairs, however, exterior ramps require 2 handrails, one on each side.
- Handrails shall be continuous throughout the length of the stair or ramp, except where interrupted by landings or newel posts at changes in direction, and shall be terminated in a manner that will not create a hazard.

- They shall be constructed so as to be continually graspable along their entire length with no obstruction on or above them to break a handhold, and with a clearance of not less than 50 mm (2 in) shall be provided between the handrail and any surface behind it.
- The height of handrails, measured vertically from the top of the handrail to the edge of the stair nosing or ramp surface below, shall be between 865 mm (2 ft 10 in) and 965 mm (3 ft 2 in).



- Handrails and any building element that could be used as a handrail shall be designed and attached in such a manner as to resist a concentrated load at any point of not less than 0.9 kN (202.3 lbs), which can be achieved by meeting all of the following three requirements:
  (a) attachment points are spaced not more than 1.2 m (3 ft 11 in) apart,
  (b) attachment point at either end is located not more than 300 mm (11 3/4 in) from the end of the handrail, and
  (c) min. two wood screws at each attachment point, penetrating not less than 32 mm (1 1/4 in) into solid wood.

PERMIT APPLICATION REQUIREMENTS [BCA, Sec. 8(1.1); OBC, Div.C 1.3.1.3.(5)]

- Every Building permit application shall be submitted with the following documentation:
  (a) "Application for a Permit to Construct or Demolish" completed by the person applying for a permit, using the standard form prescribed by the Ministry of Municipal Affairs and Housing,
  (b) "Schedule 1: Designer Information Form" completed by the person who takes responsibility for the design of the project, or by the owner if they have provided the design and take responsibility (note, an owner is exempt from the requirement to have a registered BCIN #),
  (c) Letter of Authorization, required only if the permit is applied for by an authorized agent on behalf of the owner,
  (d) Site Plan, 2 copies, indicating the lot lines, locations of buildings/structures, setbacks to the lot lines, etc.,
  (e) Detailed construction drawings of the deck, 2 copies, with sufficient notes, and dimensions, including the size and height of the deck, type of foundations and framing proposed, location of guards, stairs, handrails, etc., and
  (f) Payment of the building permit fees, as set forth in the Fees By-law in effect on the day the fee is paid.
- Sufficient information shall be provided in every application for the Chief Building Official to determine that the proposed construction will comply with the Ontario Building Code and any applicable law.

BULLETIN ISSUED

Daniel Prest, BCIN 22926		May 3, 2019
Chief Building Official	Signature	Date

For more information on this bulletin or other topics, please contact the Building Department at 613-256-2064 ext. 260.