Ontario's 2024 Building Code

Introducing Part 2: Farm Buildings

August 2024
Building and Development Branch
Planning and Growth Division

Disclaimer

- The information contained within this slide deck is intended for general information purposes only. It only highlights key changes to the Building Code. It is not intended as legal or technical advice and it should not be relied on as such. Code users are strongly advised to consult the official records for specific legislative and regulatory requirements, including Ontario's 2024 Building Code, O. Reg. 163/24 as amended by O. Reg. 203/24, 2020 National Building Code and Ontario Amendment Document (May 15, 2024) for the full extent and the exact wording of the changes.

Purpose

- To ensure smooth transition to 2024 Building Code, this deck is intended to inform ministry partners and stakeholders about the new Part 2 (Farm Buildings) in Division B of Ontario's 2024 Building Code.
  - Design of large farm buildings
  - Design of small farm buildings based on 1995 National Farm Building Code and SB-11.

Content

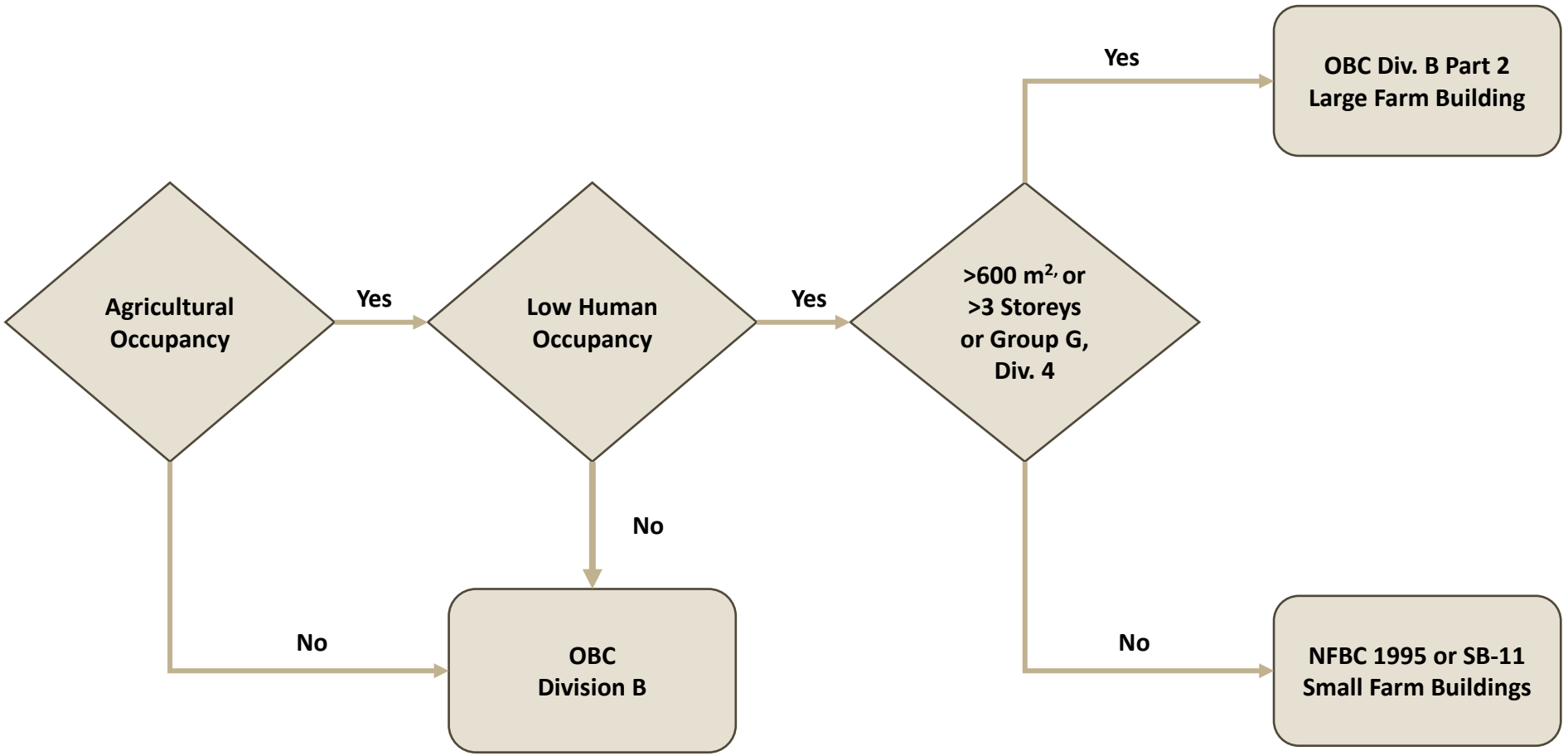
The following Items will be covered:

- ❑ Compliance Path
- ❑ Background
  - General
  - Rationale
  - New Definitions
- ❑ Large Farm Building Requirements
  - General Requirements
  - Fire Protection and Occupant Safety
  - Structural Design
  - Heating, Ventilation, and Air Conditioning (HVAC)
- ❑ Small Farm Buildings Requirements

Compliance Path

Ontario

Compliance Path



Ontario

Background

Ontario

Background - General

- National Farm Building Code of Canada (NFBC) was last updated in 1995
  - Referenced in Ontario's Building Code (OBC)
  - Regulates the design and construction of farm buildings of low human occupancy
- Issues with existing 1995 NFBC:
  - Existing Code provisions are outdated and fail to address growing complexity of current agricultural operations.
  - Lack of alternative solution pathway to compliance
  - Limitations to the prescribed floor area
  - Increased public interest in fire safety
  - Inconsistency in application of Code provisions - agricultural and non-agricultural occupancies in same building.

Background - General

Image courtesy of LHF Graphics

Traditional Barns

Ontario

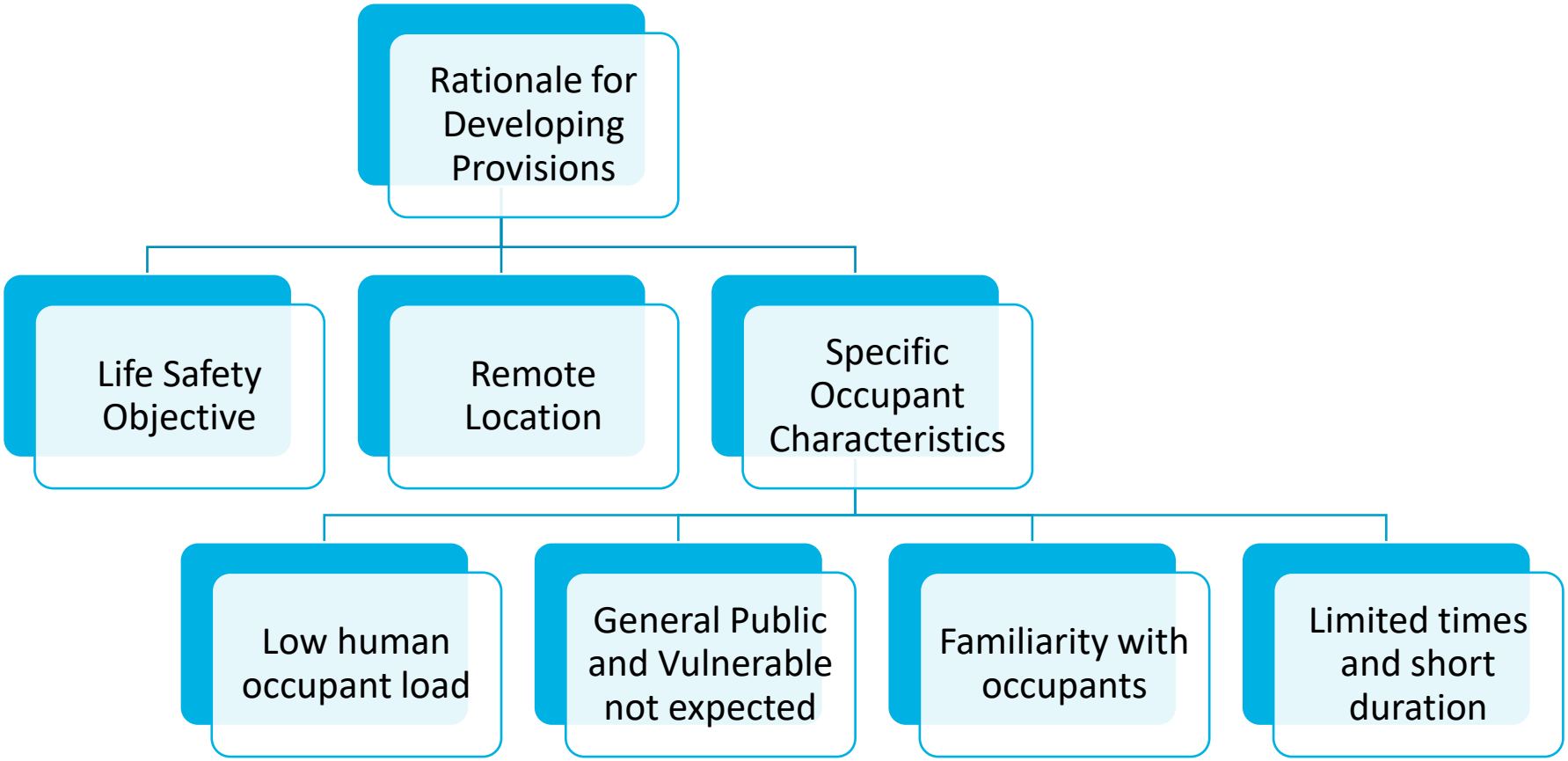
Background - General

Image courtesy of Agritecture

Large Scale Greenhouse

Ontario

Background - Rational



Ontario

Background - Rational

- Specific occupant characteristics:
  - low occupant load—the provisions for farm buildings are only applicable to buildings of agricultural occupancy meeting the requirement of having a low human occupant load (i.e. ≤ 1 person/40 m^2)
  - General public and vulnerable persons are not expected in farm buildings
  - Occupants are typically familiar with the building layout
  - Occupants tend to be only in the building for limited times and short durations

Background – New Definitions

- **Farm building** means a building or part thereof that contains an agricultural occupancy.
- **Agricultural occupancy (Group G)** means the occupancy of a building or part thereof that is located on land that is associated with and devoted to the practice of farming, and is used for the purpose of producing crops, raising farm animals, or preparing, marketing, storing or processing agricultural products.
- **4 Divisions of agricultural occupancies**
  - Group G, Division 1: High-hazard agricultural occupancy
  - Group G, Division 2: Not elsewhere classified in Group G
  - Group G, Division 3: Greenhouse agricultural occupancy
  - Group G, Division 4: Agricultural occupancy with no human occupants

Background – New Definitions

- **High-hazard agricultural occupancy (Group G, Division 1)** means an agricultural occupancy containing sufficient quantities of highly combustible and flammable or explosive materials which, because of their inherent characteristics, constitute a special fire hazard.
  - Farm buildings housing livestock with a below-floor storage area for liquid manure
  - Feed mills
  - Grain elevators
  - Rooms for the bulk storage of flammable liquids or reactive materials

Background – New Definitions

- **Greenhouse agricultural occupancy (Group G, Division 3)** means an agricultural building or part thereof that is primarily constructed of roofs and walls designed to transmit natural light.
  - Greenhouses

Ontario

Background – New Definitions

- **Agricultural occupancy with no human occupants (Group G, Division 4)** means an agricultural occupancy that is not intended to be occupied by persons under normal use and is generally used for the storage of agricultural materials and by-products.

  - Biomass facilities
  - By-product facilities
  - Digesters
  - Grain bins
  - Vertical or Horizontal silos
  - Storage bins

Ontario

Background – New Definitions

- **Group G, Division 2** - not elsewhere classified in Group G
  - Animal exercise facilities
  - Animal training facilities
  - Facilities for the packaging and processing of agricultural products
  - Barns
  - Feed preparation centres
  - Feed storage facilities
  - Grain, forage and feed structures
  - Milking facilities
  - Viniculture facilities

Large Farm Buildings Requirements

General (Section 2.1.)

Ontario

Scope, Application and Classification (Section 2.1.)

- Section 2.1. specifies the scope, application and the classification of buildings containing agricultural occupancies for the purpose of applying the technical provisions.
- Group G, Division 4 major occupancies are exempt from complying with Subsections 2.2.6. (Safety within Farm Buildings), Subsection 2.2.7. (Exits) since no human occupants are expected these types of farm buildings.
- Article 2.1.2.3. provides a signpost to 1995 National Farm Building Code of Canada (NFBC) and SB-11 Construction of Farm Buildings for small farm buildings.

Fire Protection and Occupant Safety (Section 2.2.)

Ontario

General Fire Safety (Subsection 2.2.1.)

- Subsection 2.2.1. addresses general fire protection and occupant safety requirements including, but not limited to:
  - Fire Separation of Occupancies – between major occupancies (Group A to G)
  - Fire Separations and Closures – Subsection 3.1.8.
  - Penetrations in Fire Separations and Fire-Rated Assemblies – Subsection 3.1.9.
  - Firewalls – 3.1.10.
  - Fire Blocks – materials, concealed spaces in interior wall, ceiling, crawl spaces, floor assembly or roof assembly
  - Flame-Spread Ratings – Article 3.1.12.1., FSR 150 max
  - Foamed Plastics – Article 3.1.4.2.
  - Wire and Cables – Article 3.1.4.3.

Construction Requirements (Subsection 2.2.2)

- Subsection 2.2.2. addresses the construction requirements relative to size and major occupancy for the large farm buildings.
- Based on the specific agricultural occupancy, building height, floor area size, and whether the building is sprinklered or not, the Code specifies the following:
  - type of construction (combustible construction or noncombustible construction or combination),
  - fire separation of floor assemblies
  - structural support rating requirements

Fire Alarm and Detection System (Subsection 2.2.3.)

- Subsection 2.2.3. addresses the fire alarm and detection system provisions for large farm buildings
- Fire alarm system is required in a farm building that is not sprinklered throughout and:
  - Group G1 (high-hazard) - occupant load more than 25 persons, or
  - Group G2 or G3 (Greenhouses)
    - occupant load more than 150,
    - building more than 1 storey in building height, or
    - building with a basement used for a purpose other than the housing of service equipment
- Specifies fire alarm installation and equipment requirements, based on the specific hazards and operational needs of agricultural occupancies

Provisions for Firefighting (Subsection 2.2.4.)

- Subsection 2.2.4. addresses the requirements for firefighting such as:
  - Fire Department Access to Buildings - access for fire department equipment by means of a street, private roadway or yard
  - Automatic Sprinkler Systems (where provided) – conform to Article 3.2.5.12.
  - Fire Pumps - conform to Article 3.2.5.18.
  - Portable Fire Extinguishers – provided and installed in accordance with Part 6 of the Fire Code

Emergency Lighting (Subsection 2.2.5.)

- Subsection 2.2.5. addresses the requirements for emergency lighting of the principal means of egress that incorporates certain similar Subsection 3.2.7. provisions such as average level and minimum value of illumination, emergency power supply duration.
- Emergency power:
  - Duration – minimum 30 min (upon failure of the regular power)
  - Power source – batteries or generator

Safety within Floor Areas (Section 2.2.6.)

- Subsection 2.2.6. addresses the requirements for safety within floor areas containing a Group G, Division 1, 2 or 3 major occupancy such as:
  - Egress requirements from roof-top enclosures and roof-top spaces intended to be occupied by persons
  - Minimum number of egress doorways from a room and maximum travel distances to egress doorways
  - Minimum headroom clearance
  - Minimum widths for paths of egress
  - Doors and door hardware (door swings, clear width, threshold, threshold heights, door release hardware)
  - Ramps and stairways – treads and risers, curved flight, headroom, surface finish, number of riser, etc.)

Exits (Subsection 2.2.7.)

- Subsection 2.2.7. addresses the requirements for exit facilities from farm buildings such as:
  - Types of exits – exterior doorway, open window, exit facility listed in Article 3.4.1.4.
  - Minimum number of exits – 2 exits, 1 exit permitted under certain conditions
  - Distance between exits - ½ maximum diagonal dimension of floor area
  - Travel distance – type of agricultural occupancy and whether the building is sprinklered or not
  - Minimum width of exterior doorway – minimum750 mm
  - Minimum width of exit stairs – 900 mm
  - Minimum headroom clearance - conform to Article 3.4.3.4.

Hazardous Processes and Equipment (Subsection 2.2.8.)

- Subsection 2.2.8. addresses requirements related to hazardous substances, processes and equipment in farm buildings such as:
  - Storage, handling and use of hazardous substances, equipment and processes
  - Production, handling, storage and utilization of biogas - ANSI/CSA-B149.6,
  - Exhaust ventilation and explosion venting - hazardous dust, fumes, gases, vapours or other contaminants
  - Ventilation, complete with a back-up power source for below-floor storage areas for liquid manure
  - Welding and cutting operations

Hazardous Processes and Equipment (Subsection 2.2.8.)

- Subsection 2.2.8. addresses requirements related to hazardous substances, processes and equipment in farm buildings such as (cont'd):
  - Liquid manure storage tanks and piping systems - protection of openings in liquid and manure storage tanks
  - Gas traps or valves – for liquids storage tanks capable of releasing hazardous gases or vapours
  - Storage of dangerous goods in packages or containers – comply with Fire Code (Part 3 and Part 4)
  - Pesticide storage areas – protection requirement based on a minimum quantity being present
  - Hazardous extraction operation involving cannabis – ventilation system, door locking, latching and other fastening devices

Structural Loads and Procedures (Section 2.3.)

Ontario

General Requirements and Loads for Large Farm Buildings (Subsections 2.3.1. & 2.3.2.)

Loads Due to Use and Occupancy

- Subsection 2.3.1. addresses the structural design provisions for large farm buildings:
  - Conformance with Part 4 except as provided in Section 2.3. of the Code

- Subsection 2.3.2. addresses the structural design requirements based on specific loads for the use or occupancy of the farm building.
  - In comparison to NFBC 1995, there are minor differences

Large Farm Buildings
Snow Loads (Subsections 2.3.3. & 4.1.6.)

Large Farm Buildings

- **Snow Loads (4.1.6.)** (Deviations from previous requirements)
  - Snow loads in Supplementary Standard SB-1 of the 2024 OBC to be used (v. SB-1 of the 1997 OBC):
    - Increase by 7% on average (Canada-wide)
  - Snow loads on roofs of greenhouses - 2.3.3.2.(1):
    - Minimum roof snow load for greenhouses:
      - Increase from 0.7 kPa to 1.0 kPa

Large Farm Buildings
Wind Loads (Subsection 4.1.7.)

Large Farm Buildings

- **Wind Loads (4.1.7.)** (Deviations from previous requirements)
  - Part 2 mandates compliance with Part 4, with importance factor of 0.8.
    - Previously, wind loads in NFBC 1995 were based on a 10-year return period.
  - SB-1 of the 2024 OBC Climatic data has been updated
    - Wind Load increase by 22% on average (Canada-wide)

Large Farm Buildings
Seismic Design Requirements (Article 2.3.4.1.)

Large Farm Buildings

- **Seismic Requirements (2.3.4.1)**
  - For Part 2 OBC 2024, 2.3.4.1.(1):
    - Farm buildings in low seismic hazards areas, i.e., SC1 are exempted from complying with seismic design requirements in 4.1.8.
    - Farm buildings in SC2 are exempted, if the SFRS is ductile with R_dR_o value greater than 3.0, otherwise, they are required to comply with 4.1.8.
      - Previously, farm buildings were fully exempt from complying with seismic design requirements in NFBC 1995.

Liquid Manure Storage Tanks (Article 2.3.2.5.)

- The requirement for liquid manure storage tanks in the 2012 OBC (Subsection 4.4.5.) has been relocated to Part 2 and combined with the new 2020 NBC requirements.
  - Liquid manure tanks are of normal importance (2.3.1.1.(3)).
  - Top of liquid manure tanks subject to any occupancy or environmental loads shall be designed to the appropriate loads.
  - Walls and partitions of liquid manure tanks must be designed for internal pressure based on fluid density of 10 kN/m^3 or anticipated ice pressure.

Heating, Ventilating & Air-Conditioning (Section 2.4.)

Ontario

Heating, Ventilating & Air-Conditioning (Section 2.4.)

- Subsection 2.4.1. addresses the general HVAC provisions for farm buildings:
  - Conformance with Part 6 with some exceptions specified in Section 2.4. is required
- Subsection 2.4.2. addresses the requirements for ventilation based on use and occupancy of the farm building. Specific requirements include:
  - Greenhouses
  - Controlled-Atmosphere Storage Area
  - Silo and Grain Storage Bins
  - Below-Floor Storage of Liquid Manure
- Subsection 2.4.3. addresses the location and fire separation for fuel-fired heating appliances – conformance with Article 2.2.1.9.

Small Farm Buildings Requirements

General Requirements for Small Farm Buildings (Article 2.1.2.3.)

Small Farm Buildings

- In the new edition, current 1995 NFBC – only applicable to small farm buildings:
  - buildings not more than 3 storeys in building height and not more than 600 m² in building area used for major occupancies classified as Group G, Division 1, 2, or 3 agricultural occupancies
  - Compliance Path through Article 2.1.2.3.
- Climatic Loads, i.e., wind and snow loads: Climatic loads based on SB-1 of OBC 2024, not the OBC 1997.
- Maintained the permission to use MMAH Supplementary Standard SB-11 Construction of Farm Buildings to comply with structural requirements.

Small Farm Buildings
Snow Loads (Article 2.1.2.3. & SB-1)

Small Farm Buildings

- In essence, requirements for the design of the Small farm buildings did not change, except that the climatic data has been updated:
  - Snow load criteria must be obtained from SB-1 of 2024 Building Code for farm buildings designed to:
    - 1995 NFBC [2.1.2.3.(4)] or SB-11
  - OBC 1997 required a 1/30 snow load, however, by using the SB-1 of 2024 OBC, 1/50 year snow loads should be used for the design of new small farm buildings instead.
    - Approximate 10% increase in snow loads (across Ontario)

Questions?

Ontario