

2021

Version 2

Buildings Engineering Steering Committee

Buildings

**Building Permit
Level of Design
Recommendations:**
Structural, Civil,
Mechanical, Electrical
Engineering



ACEC
BRITISH COLUMBIA

01 Structural Minimum Design Level Recommendations

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Introduction and Purpose

The Association of Consulting Engineering Companies - British Columbia (ACEC-BC) Building Engineering Committee developed this document to support consulting engineers in preparing building permit submissions. The document is complimentary to Engineers and Geoscientists (EGBC) [Guidelines and Advisories](#); EGBC reviewed the document to avoid conflicting recommendations and to support the ACEC-BC Building Engineering Committee in establishing local industry standards.

Note that permitting jurisdictions in BC may have different requirements, and in some cases the recommendations contained in this document may exceed local requirements. Consulting engineers should confirm the specific requirements for the jurisdiction in question prior to building permit application and submission.

Four engineering disciplines are covered in the document: structural, civil, mechanical, and electrical. Additional disciplines such as geotechnical and environmental must be considered during permitting. These disciplines may be added to this document in the future based on market feedback.

This document contains technical content, is not a representation of laws, rules, regulations, or policies of permitting jurisdictions, and should not be construed as professional advice. The Association of Consulting Engineering Companies - British Columbia (ACEC-BC) does not guarantee the accuracy of the content and will not be responsible for the practice decisions of consulting engineers in the submission of building permit applications to permitting jurisdictions.

Common Requirements all Disciplines

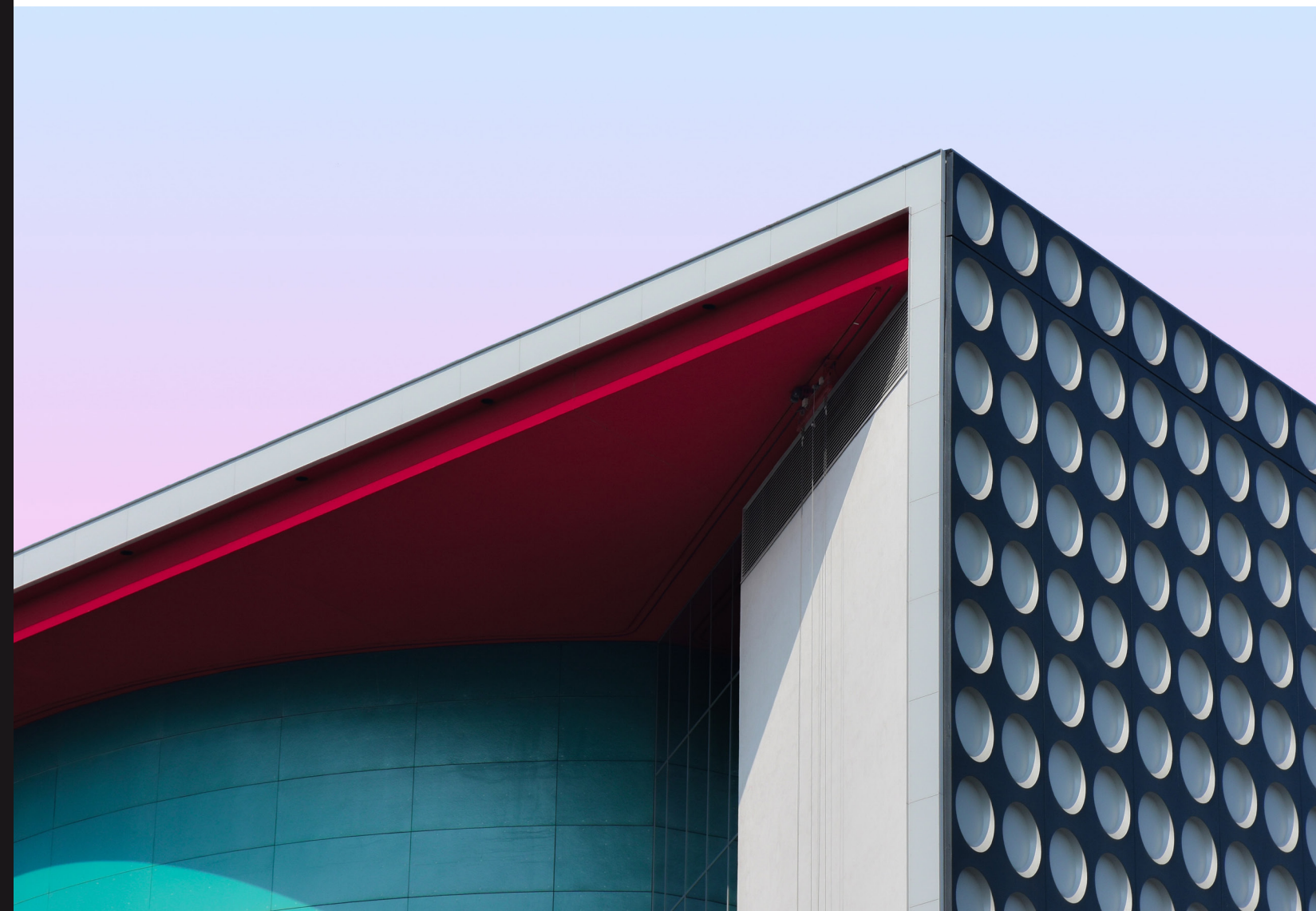
When a building permit is required, Letters of Assurance – for example, in the forms set out in [Schedule A and B of the British Columbia Building Code \(BCBC\)](#), municipal Codes (for example, Vancouver Building By-Law), or other relevant regulation – must be accompanied with signed and sealed drawings¹ and delivered to the Authority Having Jurisdiction (AHJ).

This document utilizes the term “Code” to collectively refer to applicable Codes, inclusive of, but not limited to the [British Columbia Building Code \(BCBC\)](#), the [Vancouver Building By-law \(VBBL\)](#), the [National Building Code \(NBC\)](#), and other applicable enactments respecting safety (except for construction safety aspects).

The following items are strongly recommended to be included on submissions for all disciplines:

- › Applicable Code for building design
- › Building code classification
- › Civic address
- › Drawing list
- › Issuance type and date
- › Legal description
- › North arrow
- › Number of Floors
- › Site plan
- › Symbol legend, key plan, and scale bar

¹ Signed and sealed drawings imply in the form required by the permitting authority and may be either hard copy or electronic files incorporating digital sign and seal.



01

Structural Minimum Design Level Recommendations

This section includes requirements for both structural drawings and structural foundation drawings. The full requirements for all structural drawings submitted for permitting are outlined in the relevant Code.

Structural Drawings

Note: refer to applicable [EGBC Professional Practice Guidelines](#) and [documentation of independent review](#).

The following summarizes the minimum level of information on structural drawings necessary to meet the intent of the relevant provisions in the Code:

1. Name and address of the person responsible for the design

Include in the information on [Schedule B](#) and the Engineer of Record's stamp and signature on the submitted building permit drawings.

2. Date of issue of the Code and Standards to which the design conforms

The drawing general notes must state the version (date) and name of the Code that the building or structure has been designed to. The applicable material design standards (CSA) should be referenced in the general notes for each material used in the design (i.e. concrete, steel, timber, etc.) including the date of the design standard version utilized in the design.

3. Dimensions, location, and size of all structural members in sufficient detail to enable the design to be checked

Drawings must include sufficient detail to enable the design to be checked in accordance with the [relevant EGBC Quality Management Guide](#)

[for Structural Engineers](#). Additionally, designers should reference the appropriate [EGBC Guide](#), which further defines what information should be on the structural drawings for permitting.

4. Sufficient detail to enable the dead loads to be determined

Drawings must define the structural framing systems including building dimensions and concrete thicknesses. General notes on the drawings should include a listing of the superimposed dead loads that were assumed for the design including partition allowances, suspended ceilings and mechanical/electrical equipment allowances, roofing material allowances, and any special items such as floor toppings, landscape materials, etc.

5. All effects and loads, other than dead loads, used for the design of the structural member and exterior cladding

General notes on the drawings must list all of the design live load assumptions including floor live loads, climatic criteria including ground snow and rain loads, wind load parameters, and seismic design parameters. Seismic design parameters should include S_a values, Site Class, lateral system type with related R_d and R_o , and M_v . Building Importance factor should also be noted.

Structural Foundation Drawings

Note: refer to the applicable [Code](#).

The following information required in the Code for structural foundation drawings:

- › The type and condition of the soil or rock as well as groundwater conditions, as determined by the subsurface investigation.
- › The factored bearing pressures on the soil or rock, the unfactored loads when applicable and the design loads applied to foundation units.
- › The earth pressures and other loads applied to the supporting structures of supported excavations.

By adding the following notes on the structural foundation drawings, the engineer will generally meet the intent of the relevant provisions of the Code:

- › Reference to the geotechnical engineer's site investigation report including firm name and report date

- › State the soil bearing assumptions (SLS and ULS) used for foundation design as provided by the geotechnical engineer
- › State the type of soil (a brief description of the bearing soil such as 'till') that the foundations are expected to bear on (see also EGBC [structural](#) and [geotechnical](#) guidelines)
- › Identify any special conditions or site preparations such as sub-excavation and engineered fill
- › State the design load assumptions for special foundations such as piles and anchors
- › State the seismic Site Class

Further, the structural foundation drawings should indicate where perimeter or under slab drainage is required to control groundwater as recommended by the geotechnical engineer.



02

Civil Minimum Design Level Recommendations

Drawings and reports shall contain all necessary details to demonstrate conformance with the applicable Code. In practical terms, this requires the preparation of technical reports and drawings. The following lists reference the main reports and drawings necessary for permitting; additional reports and drawings may be required.

Technical Reports

Some technical reports will be required for permitting. The most common reports are:

1. Stormwater Management Plan

Drawings

Several drawings are required for permitting; the engineer will generally meet the intent for building permit by providing the following:

1. Existing Conditions and Removals Site

This plan is only needed if removals are in scope. Otherwise the “existing conditions” information is the base plan information on the Proposed Site Plan.

2. Topographical Survey

Property lines, easements, rights-of-way, floodplain line, water courses and environmentally sensitive boundaries, water meters, fire hydrants, underground utilities, etc.

3. Proposed Site Plan

Include distance of all building setbacks perpendicular to property line. Coordinate with Architectural Site plan.

4. Site Grading and Drainage Plan

Include existing and proposed building corner grades, proposed grading, and drainage systems. Oil-water separators may be required.

5. Servicing Plans and Sections

Include sanitary, gas, electrical, water (domestic and fire lines, fire connection and distance to hydrant, new fire hydrant if any) and communications (as required)

6. Access Plans

7. Excavation

8. Sediment and Erosion Control Plan

A drawing may represent the entirety of the plan, although in some jurisdictions or for particular projects a technical report may also be necessary.

Offsite works plans and construction details for servicing, property frontage development and access requirements may be required and should be coordinated with AHJ.

Some projects may also require parking, loading, fire truck access, and bicycle plans, as well as retaining walls plan and profile (see EGBC [guideline](#)).



03

Mechanical Minimum Design Level Recommendations

Note: refer to applicable EGBC guidelines for **mechanical** and **fire protection**.

Drawings shall contain all necessary details to demonstrate conformance with the applicable Code. In practical terms, this requires the preparation of technical reports and drawings; reports are not typically issued for permitting. Three main drawings are typically required for permitting – heating, ventilation, and air conditioning (HVAC), plumbing, and fire protection. Additional drawings may be required; technical reports may also be necessary. Seismic restraint references must be included where appropriate.

HVAC

Drawings should include minimum design parameters related to pressure, alternatives, and energy performance. For example:

- › Code related pressurization measures – including specialty stair pressurization systems and any other specifics for high-buildings.
- › Ventilation to all spaces per Part 6 including, but not limited to, specialty exhaust systems that protect users or occupants.
- › Items related to project-specific alternative solutions as outlined in a Code-Compliance Report or alternative solutions prepared by the Code Consultant.
- › Energy Performance Statements, including version of Code and relevant energy compliance path/standard).
- › Any information about equipment that would be relevant to demonstrate compliance with Section 10 of the Code (energy performance).
- › Fire damper, smoke damper, combination of fire and smoke dampers.
- › Location of size of drains, (water and waste) traps, and vents.

Plumbing

- › Total loads for all systems (sanitary, storm, domestic hot water, domestic cold water, natural gas etc.).
- › Note: pipe loading should be indicated in all areas, but it is not necessary to show, on the drawings, detailed calculations of fixture count in tabular form.
- › Backflow Prevention Devices
- › Domestic Water Pipe Sizing Methodology per Plumbing Code
- › Life-safety measures related to plumbing systems, such as boiler room emergency shut down and gas PRV vents (coordinated with electrical).
- › Sump and sump pump sizing for life-safety systems such as elevator pit drainage and electrical pull pit drainage.
- › Energy performance statements, including version of Code and relevant energy compliance path/standard
- › Any information about equipment that would be relevant to demonstrate compliance with Section 10 of the Code (energy performance).
- › Typical firestopping requirements.

Fire Protection

Building permit requirements for fire protection drawings vary significantly between jurisdictions. It is recommended that the applicant contact the AHJ for information on level of detail required for the building permit submission.

04

Electrical Minimum Design Level Recommendations

Note: refer to applicable EGBC [guidelines](#).

Drawings shall contain all necessary details to demonstrate conformance with the applicable Code. In practical terms, this requires the preparation of technical reports and drawings; reports are not typically issued for permitting. Four main drawings are typically required for permitting – single line diagrams, life safety, service entrance, and general system items. Additional drawings may be required; technical reports may also be necessary. Seismic restraint references must be included where appropriate.

1. Single Line Diagrams

Single line diagrams must note a number of standard items from demarcation point (utility transformer on a new build, potentially just a meter or a panel in a tenant fit out), including all sub-distribution down to and including branch circuit panels. Fire rated feeders for power, fire alarm, and other life safety systems must be clearly indicated on single line diagrams and risers along with clarification as to method of maintaining rating (drywall enclosure, fire rated cables, concrete encasement etc.).

- › Address separate metering of mechanical loads, lighting loads, receptacle loads, etc. per Section 10.
- › Available Fault Level (from incoming utility service)
- › Conductor Sizes
- › Elevator Connections
- › Fire Pump Transfer Switch details (e.g. protection by circuit breaker (instantaneous trips) – no fuse)
- › Ground Fault Protection (Optional Ground fault to be indicated on drawings)
- › kA ratings for new equipment where applicable Load Calculation
- › Main Bus Sizes/Voltages

- › Motor Control Center (MCC)
- › Overcurrent Protection device ratings
- › Power quality components (capacitors, harmonic mitigation etc.)
- › Series rated protection
- › Transformer Sizes & Voltages
- › Meter Stack (as required)
- › As applicable: Generator (emergency power), etc.

2. Life Safety

- › Coordination of door hardware on exit path doors and related first alarm and security connections
- › Egress Signage
- › Emergency Generator Connections and Details
- › Emergency Lighting
- › Exit Signs Fire Alarm System and Devices Fire Alarm Sequence of Operations
- › Fire Alarm System Riser
- › Lightning protection
- › Patient/healthcare (any life-safety) grounding, as required.
- › Routing of fire pump and generator feeder on floor plan
- › Transfer switches and emergency distribution

3. Service Entrance

- › Duct Profile & Duct back sections
- › Ground Grid
- › Utility Pull Boxes – Note on Drawing
- › Location Overhead or Underground Requirements
- › Site Plan Showing Underground Service routing
- › Utility metering

4. General System Items

Any information about equipment that would be relevant to demonstrate compliance with energy performance as required by Code should be included in drawings. This includes energy performance statements, as well as version of the Code and relevant energy compliance path or standard.

- › Electrical Room layout Enlarged Plan
- › Fire-stopping details (as required)
- › Grounding details
- › Luminaire Schedule (as detailed as possible)
- › Power and Low-Tension Layout (Recommended completion to indicate intent) Compliance Checklist on first drawing
- › Lighting controls in compliance with Code
- › Electric vehicle charger power outlets/power distribution approach load management or non-load management system

