Bulletin: Subdivision and Development Fire Flows

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This information is summarized for convenience only. Please refer to the applicable bylaw for the complete regulation.

Properties must satisfy all applicable Bylaws & Regulations of the City of Kelowna and conform to the B.C. Building Code.

Development Engineering
1435 Water Street
Kelowna, BC V1Y 1J4
TEL 250-469-8626
planninginfo@kelowna.ca

Purpose

To inform developers, consulting engineers, building contractors, and homeowners about an amendment to the Subdivision, Development and Servicing (SDS) Bylaw No. 7900 related to providing sufficient water supply for firefighting as a condition of Subdivision Approval or Building Permit issuance.

Background

Adequate water supply for fire protection is an inherent expectation of City of Kelowna residents. Water supply requirements for subdivision or development have been updated and are contained in SDS Bylaw 7900. The City's Fire and Life Safety Bylaw No. 10760 as well as the BC Building Code and BC Fire Code contain fire protection requirements for some buildings and buildings under construction. The requirements of the these standards have been integrated and incorporated into SDS Bylaw 7900, with greater clarity and consistent requirements around the technical assessment of adequate water supply to be provided as a condition of Subdivision Approval or Building Permit issuance.

Additionally, Council Policy 383: Water Supply Level of Service allocates available water on a priority basis. Water available for fire flow is prioritized first for public fire department use for exposure control and wildfire interfaces and secondly for private use for suppression systems installed and maintained in accordance with the BC Building Code.

Definitions

Available Fire Flow (AFF): the minimum flow able for firefighting purposes; provided by City water network model for the 20-yr growth maximum day demand scenario, at a minimum 20-psi residual and maximum 4 m/s water distribution velocity.

Required Fire Flow (RFF): the amount of water needed for fighfighting purposes for a given structure, as calculated by the Fire Underwriters Survey (FUS) Method outlined in the "Water Supply for Public Fire Protection."

Exposure Control: the action of protecting adjacent structures from a fire and containing that fire to a subject property. The FUS RFF calculation comprises of a base amount, which is used to extinguish a fully-involved structure fire, as well as an Exposure Adjustment Charge component, which is the additional flow that is added to the base amount for the purposes of Exposure Control.

Subdivision Requirements

An applicant must provide an FUS Calculation for the Required Fire Flow (RFF) of the highest-demand building type allowable under the Zoning Bylaw for the proposed lots. The Available Fire Flow (AFF) to the subject property, considering hydrant coverage, must be greater than the calculated anticipated RFF.

Building Permit Requirements

All new buildings in a public water supply area resulting in 3 or more units on a lot must be provided with sufficient water for firefighting purposes. This is assessed in two ways, depending on if the building is sprinklered or non-sprinklered. Larger buildings with less than 3 units may also trigger this requirement.

Non-Sprinklered Buildings

An applicant must provide an FUS Calculation for the Required Fire Flow (RFF) of the proposed building. The Available Fire Flow (AFF) to the subject property, considering hydrant coverage, must be greater than the calculated RFF.

Sprinklered Buildings

An applicant must provide:

- an NFPA 13 calculation for the sprinkler demand and hose stream allowance; the calculation must clearly delineate the sprinkler demand from the hose stream allowance; and
- an FUS Calculation for the Required Fire Flow (RFF) of the proposed building; the calculation must clearly delineate the Exposure Adjustment Charge component within the total RFF.

The AFF to a subject property is allocated on a priority basis first for public fire department use for exposure control and secondly for private use for on-site suppression systems. Therefore, the NFPA 13 Sprinkler Demand (excluding the hose stream allowance) must be lower than the Available Fire Flow (AFF) less the FUS Exposure Adjustment Charge. In other words:

$$AFF > Sprinkler\ Demand + FUS\ Exposure\ Charge$$

The flow required for Exposure Control must be available from nearby hydrants for public use prior to and independent of any hydrants being made available for private use in accordance with BC Building Code requirements.

Constrained Situations

Where an existing system is not able to provide the necessary water for the RFF and, in the opinion of the City Engineer, upgrading the existing network is not viable and the overall fire risk of the neighbourhood is low, the Subdivision may still be approved or a Building Permit issued, provided that:

- Building construction within 5.0 m of a property line meets the requirements for non-combustible cladding and unvented soffits under the BC Building Code, and
- At least the minimum AFF corresponding to the proposed building types outlined in Table 1.5.1 of Schedule 4, Bylaw 7900, is provided to proposed lots or the proposed development.

Fire Safety Plans for Buildings Under Construction

The highest probability of building fire spreading beyond the site is when a building is under construction, fully framed, and not yet finished with required fire-rated interior assemblies and exterior cladding.

New buildings may be required to submit a Fire Safety Plan as a condition of Building Permit issuance; this is typically required on larger buildings at the discretion of the Building Official and Fire Department.

Under the Fire & Life Safety Bylaw No. 10760, the BC Building Code, and the BC Fire Code, adjacent buildings must be protected from fire originating from a building under construction and water supplies for fire protection must be installed before construction commences.

Bylaw 7900 now aligns with these requirements and provides general direction for determining the amount of water supply required during construction. The methods vary depending on building type:

Buildings with Standpipes

Most buildings over 3 stories will require a standpipe to be installed and live during construction, along with adequate fire department access to each floor. Where a standpipe is live and provided in accordance with the BC Fire Code, Part 5, Div B, Section 5.6.1.6 and has water supply sufficient to meet the requirements of NFPA 14, Section 9.1, the City's requirement for sufficient water for firefighting during construction will be met if the AFF is greater than the lesser of the:

- Standpipe Demand + FUS Exposure Adjustment Charge, or
- FUS Required Fire Flow (RFF) for the under-construction condition

Note: the RFF for the under-construction condition should not including any reduction for a Sprinkler System if not active during construction, but may include the maximum reduction for Occupancy Hazard Charge, and any applicable reduction in Area or other factor deemed appropriate by the Professional of Record, as accepted by the City Engineer.

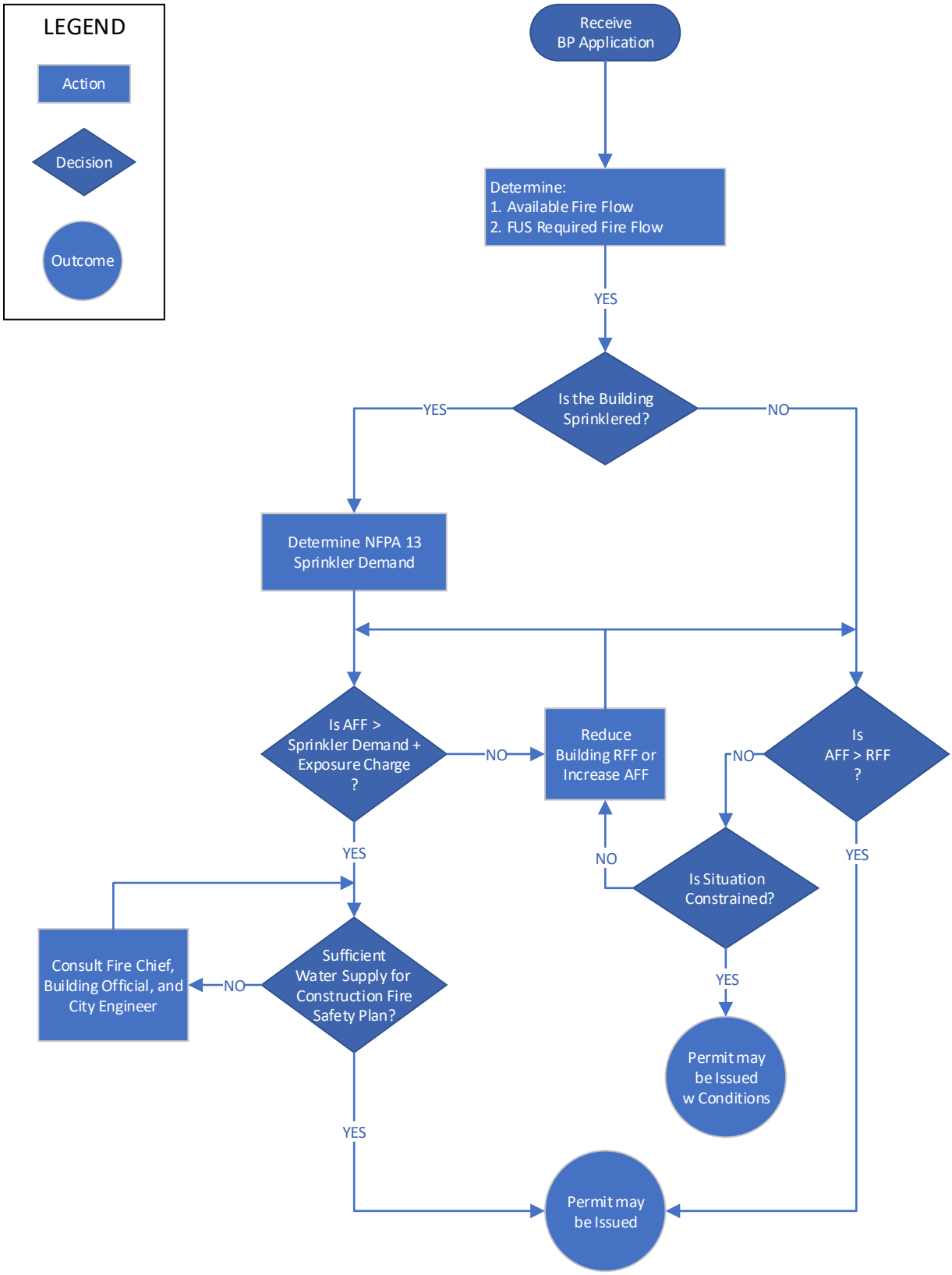
Buildings with No Standpipes

Buildings that are not provided with a standpipe during construction must have an AFF greater than the building's calculated RFF for the under-construction condition (see note related to the calculation of FUS RFF above). Where the calculated construction RFF is greater than the AFF, consult the City Engineer and Fire Department for alternative provisions that may be acceptable.

Conclusion

Subdivision, Development and Servicing Bylaw 7900 has been updated to bring greater alignment between the Fire and Life Safety Bylaw No. 10760, the BC Building Code, the BC Fire Code, and advancements in best practice. New buildings are now required to have sufficient water supply for firefighting and greater clarity and direction has been provided for developers and consulting engineers to quantify water supply requirements for firefighting both during and after construction.

A decision flow chart summarizing the Building Permit fire flow assessment process is included below.


LEGEND
Action
Decision
Outcome
Receive BP Application
Determine:
1. Available Fire Flow
2. FUS Required Fire Flow
YES
Is the Building Sprinklered?
YES
NO
Determine NFPA 13 Sprinkler Demand
Is AFF > Sprinkler Demand + Exposure Charge ?
NO
Reduce Building RFF or Increase AFF
Is AFF > RFF ?
NO
YES
YES
NO
Is Situation Constrained?
Consult Fire Chief, Building Official, and City Engineer
NO
Sufficient Water Supply for Construction Fire Safety Plan?
YES
Permit may be Issued w Conditions
YES
Permit may be Issued