
Modification or Upgrade of Existing Fire Alarm System / Automatic Emergency Recall of Elevators

The intent of this bulletin is:

- to clarify the application of the Vancouver Building By-law (VBBL) with respect to modification or upgrade of existing Fire Alarm System (FAS) in buildings;
- to clarify and establish the consistent requirements for the automatic emergency recall operation of elevators mandated by the VBBL;
- to explain the requirements and administrative processes for permit application submissions, plan reviews, electrical and building permits; and inspections for such regulated work; and
- to supersede Bulletin 2006-004-BU/EL and Bulletin 2008-002-BU/EL.

BACKGROUND

When a Fire Alarm System is required to be replaced, modified and / or installed in a building, all applicable provisions of the VBBL must be met. These provisions include the requirements of Subsection 3.2.4., Sentence 3.2.5.19.(1), Subsection 3.2.6., Article 3.2.7.10. and Subsection 9.10.18. of Division B of the VBBL. Devices and components of a fire alarm system must also be installed in conformance with the CAN/ULC S524 and the wiring methods must comply with Section 32 of the CSA C22.1 Canadian Electrical Code Part I (CEC). Article 3.2.6.4. of the VBBL mandates the automatic emergency recall for elevators and Article 3.2.4.12. mandates that certain smoke detectors shall upon actuation recall the elevators.

The ASME A17.1-2007/CSA B44-07, "Safety Code for Elevators and Escalators" is referenced by the VBBL. This "Elevator Code" contains Firefighters' Emergency Operation (FEO) requirements for emergency recall operation for automatic elevators. In accordance with the information provided by Technical Safety BC, clause 2.27.3 of the CAN/CSA B44-2007 requires FEO on new elevators, existing electric elevators where a controller is installed as part of an alteration and existing hydraulic elevators where a change on the type of motion control, type of operation control or emergency operation as part of an alteration. (Code reference CSA B44 Section 8.7.)

DEFINED CATEGORIES OF FAS WORK

When a replacement, modification or an upgrade of an existing fire alarm system is contemplated by a building owner, the following defined categories of work are required to be considered by an applicant. Work that is not included in these categories should be discussed with the Electrical Inspection staff.

1. **Voluntary upgrade of existing fire alarm system** - The replacement of a control unit, devices, and/or components when the existing FAS is still functioning according to the intent of its original design. A voluntary upgrade is usually initiated by the owner as a proactive measure in keeping a building safe for its occupants; by upgrading to meet the current requirements of the VBBL and CEC. This category does not apply when the work is required due to building alterations, additions, change of use, etc. (See applicable requirements of A, B, C.)

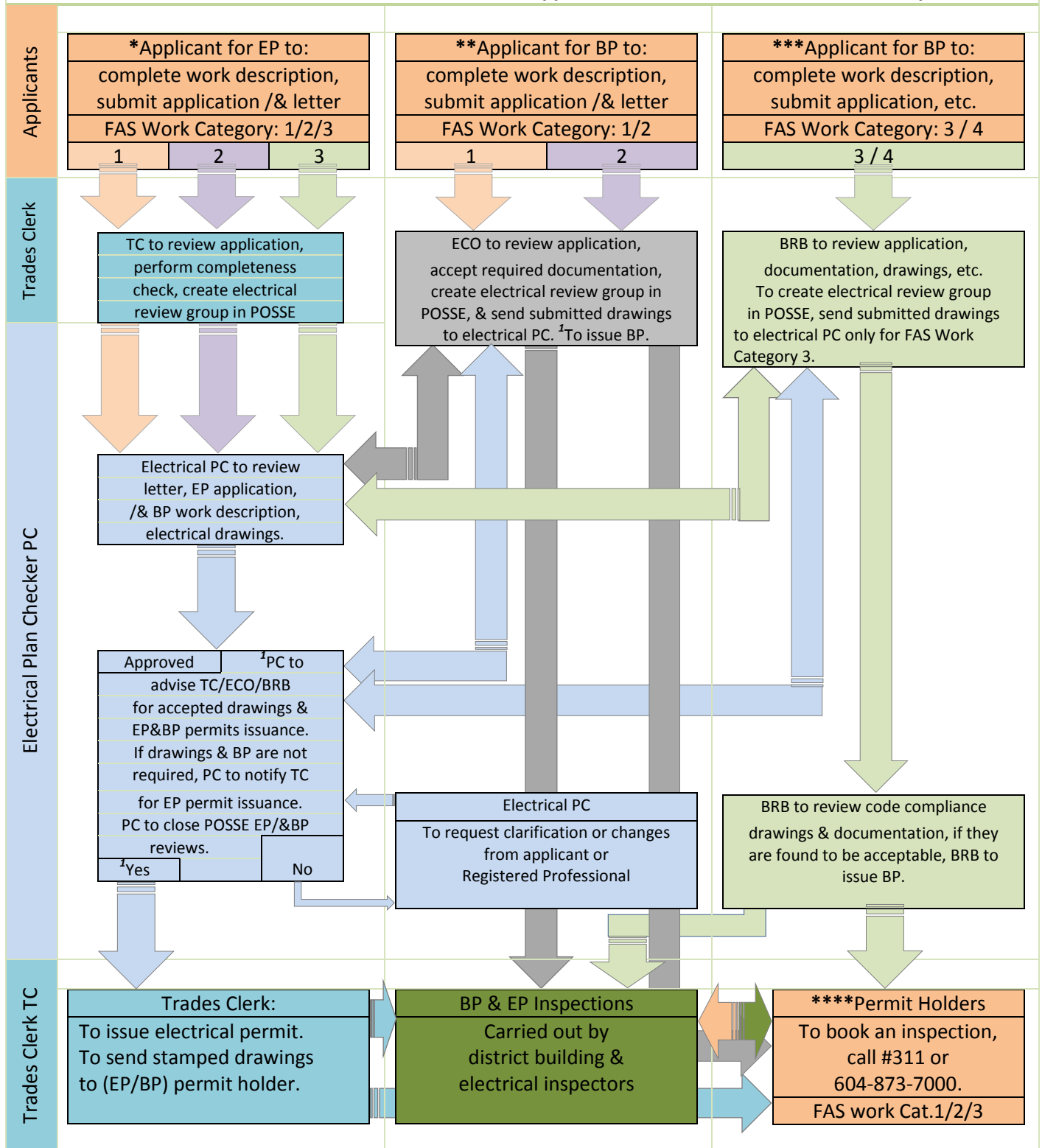
2. Modification of existing fire alarm system triggered by failure, routine maintenance and operation

- a) **Emergency Replacement of Control Unit** - The existing FAS installed in a building ceases to function due to the failure of the control unit. Either the non-functional control unit is to be replaced with an identical control unit with exactly the same model number that is available from the manufacturer or with a new control unit that is compatible with all the existing devices incorporated in the existing FAS. (See applicable requirements of A, B, C.)
- b) **FAS Modification for routine maintenance and operation** – The existing control units, modules, devices or components are defective, and the replacement is necessary to ensure FAS's fitness for service and to keep the system in safe and proper working condition and functioning according to the intent of its original design. (See applicable requirements of A, B, C.)

3. **Modification of existing fire alarm system triggered by elevator upgrade / modernization** – The FAS modification is performed to accommodate FEO requirements mandated by the Elevator Code CAN/CSA B44-2007 for the existing electric elevators where a controller is installed as part of an alteration; and existing hydraulic elevators where a change on the type of motion control, type of operation control or emergency operation as part of an alteration. (See BACKGROUND of this bulletin; and F & G requirements.)

4. **Modification or upgrade of existing fire alarm system triggered by building work** - When the required upgrade or modification of the existing FAS is triggered by the alteration, renovation, addition, reconstruction, tenant improvement or change of major occupancy classification within a building. The applicant for this category must follow the established process to obtain permits. Refer to Bulletin 2001-008-BU/EL. (See BACKGROUND of this bulletin.)

Attachment - Process Flowchart Overview for Permit Applications, Plan Reviews, Permits and Inspections



* Register for an online account - <http://vancouver.ca/home-property-development/electrical-permit-for-construction-or-renovation.aspx>
 ** **Appointments may be requested for intake at the Service Centre, or walk-in acceptable**
 *** Appointments are required for BP application submissions - <http://vancouver.ca/home-property-development/building-permit.aspx>
 **** To schedule your inspection - <http://vancouver.ca/home-property-development/inspections.aspx>

Acronyms: BRB - Building Review Branch, ECO – Enquiry Centre Officer, BP – Building permit, EP – Electrical permit.

(Original signed by)

 W. White
 Deputy City Electrician
 Manager, Trades Inspection

(Original signed by)

 P. Ryan, M.Sc., P.Eng.
 Chief Building Official
 Director, Building Code and Policy

EXPLANATORY REQUIREMENTS / APPLICATION OF THE VBBL

- A. When a modification of an existing FAS is undertaken, all modified, added or replaced components or devices must be compatible with the existing FAS. These components or devices must be installed in conformance with the CAN/ULC-S524, CEC and the applicable provisions of the VBBL. **An electrical permit is required for such work.** When components or devices are added, or new or modified wiring is extended for the existing FAS, **a building permit is also required.** Upon completion of the installation, the FAS must be verified according to Bulletin 2000-021-BU/EL. (See requirements – D, E, & applicable requirements of G.)
- B. When an existing FAS is completely replaced by a new fire alarm system, the new FAS must meet provisions of the VBBL, CEC and CAN/ULC-S524. **Such work must be done under the respective building and electrical permits.** Upon completion of the installation, the entire FAS must be verified in conformance with the CAN/ULC-S537. Refer to Bulletin 2000-021-BU/EL. (See requirements – D, E, & applicable requirements of G.)
- C. If a FAS upgrade is limited only to the replacement of existing devices or components (i.e. detectors, audible/visible signal devices, manual stations, annunciators, transponders, control units, modules, etc.) without altering the existing wiring or outlet boxes, then such work is considered to be a straight replacement of the electrical equipment. **An electrical permit is required for such work (no building permit is required).** A complete verification of the FAS is required in conformance with CAN/ULC-S537. Refer to Bulletin 2000-021-BU/EL. (See requirements of D, & applicable requirements of G.)
- D. Where one of the above defined categories of work of 1, 2 and 3 is proposed for a FAS upgrade or modification, the permit application must be accompanied by a letter describing the full extent of the FAS work; the proponent of such proposal must spell out the scope of the project for the purpose of this bulletin. The proponent should also be aware that all existing VBBL equivalencies or Alternative Solutions accepted for the building which are related to the building FAS must not be compromised by the intended FAS upgrade or modification.
- E. Where a building permit is required under the above defined categories of work of 1 or 2, two sets of electrical drawings and corresponding Letter of Assurance (Schedule B), sealed and signed by a Registered Professional of Record will be required as part of the building permit application submission to the City. The building permit will be processed and issued through the “Development and Building Services Centre”. Upon completion of the electrical plan review for the electrical and building permits, one set of drawings stamped by the electrical plan examiner will be returned to the building permit holder; this set of drawings shall be kept on site and made available for review by the City’s building and

Modification or Upgrade of Existing Fire Alarm System / Automatic Emergency Recall of Elevators

electrical inspections staff. The second set of drawings to be used by the district electrical inspector shall be retained for City permanent records.

F. REGULATED WORK TRIGGERED BY ELEVATOR UPGRADE / UPDATING / MODERNIZATION

Every new elevator in a building; and every existing elevator that is undergoing an alteration as described in the category of work 3 must comply with both the requirements of CSA B44 and the VBBL. Therefore, an alteration to an existing elevator in a building shall require a building permit and an electrical permit. For all proposed regulated work, the following documents will be required at the time of application for building and electrical permits:

BUILDING AND ELECTRICAL PERMITS SUBMISSION

- 1) Architectural floor plans and electrical plans (5 sets) drawn to an indicated scale which shows the location of:
 - a) the elevators;
 - b) the FA devices that are used to initiate emergency recall of elevators;
 - c) the fire alarm annunciator and the fire alarm control unit panel, or the Dedicated Detection and Recall System panel and devices, whichever are applicable;
 - d) the recall level and the alternate recall level; and
 - e) the means of egress from the elevators at the recall and alternate recall levels to a public thorough-fare (see also Bulletin 2000-009-BU).
- 2) A statement that the design complies with the Vancouver's Building By-law and the latest edition of the Elevator Code CSA B44 adopted by Technical Safety BC shall be shown on the architectural and electrical drawings.
- 3) A letter to the Chief Building Official describing the full extent of the FAS upgrade or modification; please refer to Item D of this bulletin.
- 4) The electrical drawings for the intended FAS upgrade or modification must show and include a complete and detailed description of the following (where applicable):
 - a) sequence of operation;
 - b) installation instructions, design requirements to appropriate Standard;
 - c) location and description of the devices and components;
 - d) one or two stage system(s);
 - e) description of ancillary devices activated by FAS;
 - f) routing and method for electrical conductors protected in conformance with Article 3.2.7.10.;
 - g) signal to Fire Department provided in conformance with CAN/ULC-S561;
 - h) FA system zoning required in Sentence 3.2.4.9.(2) of Division B of the VBBL; and
 - i) a separate schematic & riser diagram showing the interconnection of devices & components.
- 5) The architectural and electrical drawings are to be sealed by the Registered Professionals responsible for the elevator and electrical design, complete with Letter of Assurance (Schedule B) for Architectural and Electrical disciplines.
- 6) Other application documentation as required by the City. See website below.
<http://vancouver.ca/home-property-development/building-permit.aspx>

TECHNICAL INSTALLATION REQUIREMENTS

- 7) For a new building other than a high building as defined in VBBL Subsection 3.2.6., if a FAS is provided or is required by the VBBL, the FAS must be used in the automatic emergency recall operation of the elevators.
- 8) For a new or an existing high building, a FAS must be used in the automatic emergency recall operation of the elevators.
- 9) Notwithstanding Item 8, for an existing high building in which an existing FAS cannot be adapted for the emergency operation of the modernized elevators, it is recommended that the owner or agent should discuss the extent of application of the VBBL with the Chief Building Official with respect to the intended work. An application for Alternative Solution that includes a Dedicated Detection and Recall System (DDRS) may be made by the Registered Professional. For information on Alternative Solutions requirements, please refer to the following website:
<http://vancouver.ca/home-property-development/alternative-solutions.aspx>
- 10) For an existing building other than a high building in which an existing FAS cannot be adapted for the emergency operation of the modernized elevators, an application for Alternative Solution that includes a DDRS may be made by the Registered Professional as described in the foregoing Item 8 (except as stated and permitted in Subsection 9.10.18., if applicable).
- 11) For a new building other than a high building, if a FAS is neither required nor provided, a DDRS is permitted to be used in the automatic emergency recall operation of the elevators.
- 12) For an existing building other than a high building that is not installed with a FAS, a DDRS may be used in the automatic emergency recall operation of the elevators.
- 13) In a Dedicated Detection and Recall System, fire detectors installed for the purpose of the CSA B44 located in the elevator machine room(s), elevator hoistway(s) and in each floor area in front of the elevator(s) must be connected to a dedicated "Control Unit" that must be designated as an "Elevator Recall Control and Supervisory Panel"; and clearly identified as an "Elevator Recall Control and Supervisory Panel (This is not a fire alarm system)" in a permanent, conspicuous & legible manner. It is intended by this bulletin that in a DDRS, the smoke detectors comply with CAN/ULC-S529 "Smoke Detectors for Fire Alarm Systems", heat detectors comply with CAN/ULC-S530 "Heat Actuated Fire Detectors for Fire Alarm Systems", control unit complies with CAN/ULC-S527 "Control Units for Fire Alarm Systems" and audible signal devices comply with CAN/ULC-S525 "Audible Signal Devices for Fire Alarm Systems". It is also intended by this bulletin that the DDRS is comprised of the aforementioned FAS devices and components (although not considered a FAS) and is to be installed in conformance with the applicable requirements of the VBBL, CAN/ULC-S524 and C22.1 Canadian Electrical Code, Part I.
- 14) If a FAS is installed, smoke detectors must be installed in each floor area in front of the elevator(s) for automatic emergency recall for elevators that must initiate an alert signal in a two-stage system or an alarm signal in a single stage system; and indicate the actuation of each device separately on the FAS annunciator in conformance with Clauses 3.2.4.9.(2)(i) and 3.2.4.12.(1)(h) of the VBBL.

Modification or Upgrade of Existing Fire Alarm System / Automatic Emergency Recall of Elevators

- 15) Smoke detectors installed in the elevator machine rooms must, upon actuation, recall the elevators served by the elevator machine room in which the smoke detector is installed in conformance with Sentence 3.2.4.12.(4) of the VBBL.
- 16) The number of smoke detectors required to be installed in each floor area in front of the elevator(s) and in the elevator machine room is dependent on a maximum area protected by a spot type smoke detector as prescribed by CAN/ULC-S524.
- 17) Manual stations of a FAS are not permitted to initiate recall for the purpose of CSA B44. Elevator Code reference - Note (2.27.3.2.2): Smoke and heat detectors (fire alarm initiating devices) are referred to as fire detectors in the NBCC. Pull stations are not deemed to be fire detectors.
- 18) Where a DDRS is permitted to be installed, the DDRS must not interfere with operation of the FAS.
- 19) Where a DDRS is permitted to be installed, the smoke detector installed in each floor area in front of the elevator(s) and elevator machine room must sound an audible signal for localized alarm signaling utilizing either sounder bases that can operate as independent local alarm or separate audible signal devices.
- 20) SUMMARY OF AUTOMATIC EMERGENCY RECALL OPERATION OF ELEVATORS:

Description of building				Elevator recall	Emergency power supply for elevator	Electrical conductors protection
High building (per VBBL 3.2.6.)	New	FAS required		FAS to be used in emergency operation of elevators	Required	Required
	Existing	FAS required	Existing FAS adaptable	FAS to be used in emergency operation of elevators	Recommended	Required if installation is new
			Existing FAS not adaptable	DDRS requires an Alternative Solution accepted by CBO		
Non-high building	New	FAS required or installed		FAS to be used in emergency operation of elevators		
		FAS not installed		DDRS		
	Existing	FAS required or installed	Existing FAS adaptable	FAS to be used in emergency operation of elevators		
			Existing FAS not adaptable	DDRS requires an Alternative Solution accepted by CBO		
		FAS not installed		DDRS		

- 21) When the building is located in a flood hazard area, the alternate and designated levels should be above the base flood elevation (Elevator Code reference Section 8.12.). For buildings located on a designated flood plain or in a flood hazard area, provisions shall be made to prevent the elevator cab from descending into the floodwaters during a flood event.

**G. SAFETY PROTOCOL, INSPECTIONS, FUNCTIONAL TESTING AND VERIFICATION
(SEE ALSO BULLETIN 2003-004-BU)**

- 1) In accordance with the Fire By-law, interruption of normal operation of a fire protection system for any purpose constitutes a “temporary shutdown” and requires alternative measures to ensure that the level of safety intended by the Building and Fire By-laws is maintained. The alternative measures which include a Fire Watch that is acceptable to the Vancouver Fire and Rescue Services department (VFRS) and the Chief Building Official (CBO) must be provided in the building to ensure that all persons in the building can be promptly informed, and the fire department notified, should a fire occur while the alarm system is out of service.
- 2) If as the result of work under the building or electrical permit the existing FAS is temporarily shut down, alternative measures which include a Fire Watch acceptable to the VFRS and CBO must also be provided in the building.
- 3) A Construction Safety Plan shall be provided according to Subsection 8.1.3 of the VBBL.
- 4) Where site inspections under the above building and electrical permits reveal any unsafe or hazardous condition within the building, these unsafe or hazardous conditions shall be rectified before the permits are finalized.
- 5) After completion of the FAS work, the FAS must be fully functional without deficiencies. It is important to note, a ground fault indicated on the newly replaced control unit caused by a lack of bonding conductors in existing wiring is deemed to be deficiency which must be corrected.
- 6) Where applicable, electrical and building inspections are required for rough-in electrical, fire stopping and/or fire separation restitution, finals and coordinated life-safety. These demand type inspections are made through the City’s 311 Call Centre.
- 7) For the coordinated life-safety inspection, the “request for inspection” is also made through the City’s 311 Call Centre. The building inspector will work with the applicant to set up a specific time and date for the inspection. Generally, two business days’ notice is required from the City’s perspective. This inspection may include a functional testing of the fire and life safety systems; and the audibility of the FAS. The applicant shall provide the fire alarm verification report, the ULC Certificate for FAS monitoring and the Registered Professional’s Schedule C-B for this inspection.
- 8) A site inspection may reveal that a new Fire Safety Plan and posted instructions for the building may need to be prepared or that a lockbox may be required. If this is the case, review and acceptance of the Fire Safety Plan by VFRS, and a Fire Permit from VFRS for the lockbox may be required. (For Bulletin 2017-004-FI Fire Safety Plans, please refer to the following website: <http://vancouver.ca/home-property-development/fire-safety-plan.aspx>)
- 9) **FUNCTIONAL TESTING AND VERIFICATION FOR AUTOMATIC EMERGENCY RECALL OPERATION OF ELEVATORS** - For any newly installed elevator or any alteration to an existing elevator, confirmation of functional testing for automatic emergency recall operation of the elevator and verification of the FAS or the DDRS must be provided by the design professionals, and submitted to the City prior to the operation of the elevator. Approval by Technical Safety BC is also required.
- 10) See the attached flowchart for permitting process, this flowchart is primarily for staff use.