



Fire Protection Engineering Design Evaluation (FPEDE) Guidelines



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Introduction

This document explains how the City of Rockville foresees how a designing Fire Protection Engineer (FPE) will administer all building, fire, and life safety codes in buildings with the currently adopted edition of the International Building Code. This document will help to ensure that fire safety goals are met for projects involving complex structures or fire protection systems. The evaluation aims to report observations and proposals of corrective action for all deficiencies a building or fire protection system may have. These deficiencies must comply with all applicable codes adopted by the City of Rockville and the State of Maryland. The FPEDE is designed to streamline the complex structure or fire protection system design review process. The plans for these complex projects shall address all issues and deficiencies observed in the FPEDE before submission.

This document intends to assist the designated Fire Protection Engineer (FPE) in meeting the City of Rockville's requirements regarding the details and information required to review the building and fire protection systems thoroughly. These guidelines are not intended to provide an all-inclusive set of requirements for the FPEDE.

The role of the FPE is as follows: First, the FPE should work closely with the design team during the design stage to ensure a code-compliant design. This includes, but is not limited to, attending Development Review meetings, building application meetings, and pre-construction meetings with the City of Rockville.

Second, the FPE shall oversee the Fire Protection Site Plan preparation for the Development Review Committee (DRC) and prepare a written report before the permit application submittal that provides the AHJ with the necessary details and information to review the building or fire protection systems thoroughly. The report must be uploaded along with the permit submittal package at the time of the permit application. The details of this report, referred to as the FPEDE, will be discussed in this document.

Lastly, the FPE must review the fire protection systems shop drawings the fire protection subcontractors developed. The FPE will review the drawings for code compliance and verify that the building systems are coordinated as written in the construction specifications. The fire protection subcontractor will have the FPE inspect all work before calling the City of Rockville for fire protection or life safety systems inspections. **Any deficiencies observed during the pre-inspection must be abated before an inspection with the City of Rockville is requested.**

Some projects have been predetermined to require an FPEDE per the Rockville City Code, Chapter 5, Article V. Special Inspection Program Manual. These requirements apply to new and existing structures. Any project with an estimated construction cost at or exceeding \$6,000,000 is required by Chapter 5 to have an FPEDE. Additional projects required to have an FPEDE are as follows:

- (1) Any assembly occupancy with an occupant load equal to or greater than 1,000 (the AHJ determines the occupant load)
- (2) All use group "E," Educational (To exclude daycare occupancies)
- (3) All high-hazard occupancies classified as use group "H."
- (4) Use groups I-2 and I-3, Institutional
- (5) M use groups, including strip malls or shopping centers
- (6) Other complex or unique structures

Qualifications

An FPE will only be accepted from a qualified professional. To be considered a qualified professional, the FPE must be recognized by the State of Maryland as a registered Professional Engineer. The FPE must also have a Bachelor of Science in Fire Protection Engineering from an Accreditation Board for Engineering and Technology (ABET) accredited university.

The person shall present their qualifications to the City of Rockville Fire Marshal for acceptance.

Report Format & Content

The evaluation must be typed and submitted electronically as described below:

- Cover Page—The document's cover page must include the name of the FPE and the architect, along with any professional licensures, the names of the affiliated firms, and contact information, including address, telephone number(s), and email address(es). The cover page must also include the project's name and site address.
- Introductory Statement – The introductory statement should briefly summarize the project's scope. This summary should incorporate any relevant history concerning the project and any foreseen obstacles with the proposed occupancy or construction.
- Analysis – The content of the FPEDE must incorporate sections of the various codes as highlighted in Chapter 5 of the Rockville City Code. The content of each subject area must be complete with all information requested. This section is the bulk of the FPEDE and must include the following:
 - Code Analysis – Documentation of the title and edition of all applicable state and local building and fire codes and standards and any amendments on which the design is based. The AHJ must be notified of which codes the building or fire protection system is being designed and evaluated under to evaluate the design properly.
 - Construction Type – The construction type(s) involved with the project must be identified for each building. All buildings must be identified and compared to the required materials for a given construction type. The building elements that carry a fire-resistance rating must be specified in this section. Also, any documentation regarding the fire endurance of a structural element must be included here.

- Use Group Classifications/Height and Area Calculations – The FPE must identify all uses per current codes, including the main use group classification(s) and any incidental and/or accessory use(s) involved with the structure. Per the current building codes, multiple-use groups should be classified as separated or non-separated. The square footage of each use group classified must be indicated. The actual height and area of the building should be stated here, along with the calculated maximum allowable height and area per the applicable building code. The calculations used to derive the allowable height and area should include all increases due to open perimeter and sprinklers or any decreases due to the number of stories of the building. All calculations must be shown in a step-by-step format.
- Site Analysis – The FPE will evaluate the site for fire department vehicle access, fire hydrant location(s), and fire department connection location(s). An analysis of the fire hydrant coverage must be presented, verifying the distance(s) of the fire hydrant(s) from all portions of the building(s), as well as the coverage provided by the fire hydrant(s) on-site. The location of the fire department connection relative to the building and the nearest fire hydrant must be evaluated.
- Occupant Load/Egress Calculations – The total occupant load of the structure must be calculated per all building and fire codes – where in conflict, the most stringent (highest occupant load factor) must be used - in consideration of the uses of the spaces within the building. Any supporting calculations must also be provided. The occupant load of all building floor areas is essential in determining the required minimum width (egress capacity) of the means of egress components and the required number of exit components. The square footage of all usable spaces must be shown along with the area's occupant load factor (person per square foot). This section must also include an egress plan with calculations, verifying that adequate egress capacity is provided. Each means of egress component should indicate the maximum provided capacity and the required capacity based on the occupant load. The egress plan is vital for the building/floor, illustrating routes the occupants may travel to arrive at an exit. Travel distance, dead ends, and common paths of travel must be analyzed with the allowable and actual distances.
- Fire Resistant Materials – All materials with a fire-resistance rating must be identified here. This section must cover fire separation distance, firewalls, fire separation assemblies, fire-stopping systems, exit enclosures, shaft enclosures, horizontal exits, draft-stopping, fire-blocking, dampers, etc. Opening protectives and penetrations must be included in the analysis of the fire-rated assemblies. All design listings for fire-rated assemblies, such as UL, FM, or GA, must be included here.

- Fire Protection Systems – The structure's required fire protection systems must be identified. The FPE must determine the appropriate fire protection system for the intended application of the structure. The FPE must ensure that fire protection systems, sprinklers, fire alarms, smoke control systems, extinguishing systems, etc., follow the applicable code requirements.
- Emergency Lighting / Emergency Power – The FPE shall determine any area or component required to be provided with emergency lighting or emergency power. The FPE shall evaluate the capacity of the emergency systems operation for equipment such as means of egress lighting, exit signs, door locks, fire pumps, communication, elevators, and other emergency equipment as required by the applicable code.
- Emergency Communicating Systems – Any specialized communication systems, including two-way radio communication enhancement systems commonly referred to as a Bi-Directional Amplifier (BDA) for fire department operations or partial evacuations of occupants, must be discussed. Please note that the City of Rockville follows the Montgomery County Department of Permitting Services (DPS) in-building Radio Signal Amplification System Standard regarding these systems. All FCC regulations and requirements should be routed through the FCC/Montgomery County DPS.
- Interior Finishes – The FPE must evaluate all interior finishes including, but not limited to, fixed or movable walls and partitions, columns, ceilings, floor finishes, wainscoting paneling, or any other finish applied for acoustic treatment, insulation, fire resistance, decoration, or similar purposes.
- Special Use and Occupancy – The FPE must evaluate any special provisions of the use and occupancy of the building per the applicable building code, which may include atriums, high rises, etc. The FPE will provide the necessary calculations for evaluating mechanical smoke management systems. Additionally, a Computational Fluid Dynamic (CFD) model evaluation must be performed on the proposed smoke management system.
- Special Processes, Materials, or Hazards – In some cases, there are other requirements for special processes, materials, or hazards, such as elevators, special locking arrangements, laboratories, commercial cooking, etc. These requirements can be found in the applicable NFPA codes referenced by the Rockville City Code, Chapters 5 and 9, or the Maryland State Fire Prevention Code and must be evaluated by the FPE.
- Applicable provisions of Chapter 4 of the IBC, "Special Detailed Requirements Based on Occupancy and Use." If Chapter 4 of the IBC applies to the project, that information must be detailed in the FPEDE report.

- Deficiencies – If the FPE discovers any code deficiencies during a site visit to an existing building or fire protection system or during the review of the plans for a structure or fire protection system, those deficiencies must be identified in this section of the FPEDE.
- Recommendations – The FPE must analyze the design of the building or fire protection system. Considering all deficiencies, the FPE must make recommendations to remedy any non-code-compliant issues recognized upon analysis of the plans and building or fire protection system. These proposals must also be incorporated into the building or fire protection system design before submission to the City of Rockville.
- Statement of Compliance - To ensure the drawings submitted are of quality, the FPE and the architect of record must attest that the drawings submitted follow the applicable codes to the best of their knowledge. The statement must read: *"In my professional engineering opinion, these drawings and specifications are in compliance with the fire safety provisions of all adopted State and Local Building Codes, Fire Codes, Mechanical Codes, Local Amendments, and referenced codes and standards to the best of my knowledge and belief."* FPE and the architect of record must sign and seal this statement. The FPE and the architect of record cannot be the same individual. No general statements will be accepted, such as "...will comply with Section X of Code..." without any plans or details to verify compliance with the referenced code.

Construction & Commissioning Responsibilities

After the building permit is issued, the FPE's responsibilities continue with the construction phase of the structure. The FPE will be responsible for four levels of performance for the project. These responsibilities will include:

- (1) Review plan reviewers' comments attached to the construction blueprints and the sub-contractor shop drawings to have the contractors implement the necessary changes.
- (2) Inspections of any firewall, fire barrier, fire partition, fire-stopping system, smoke barrier, and smoke partition penetration to guarantee adherence to installation requirements for the products used
- (3) Review of fire protection systems shop drawings, including revisions for system coordination before submittal to the City of Rockville for review
- (4) Inspect fire protection systems before requesting an inspection by the City of Rockville fire inspectors.

Conclusion

Once the FPEDE report is completed, the plans must be revised to incorporate any changes deemed necessary by the FPE before they are **submitted** to the City for review. Failure to do so will result in an immediate "hold" status from which the plans must be revised and

resubmitted. The FPEDE report must be included with the plans submitted to the City of Rockville's Inspection Services Division.

Appendix

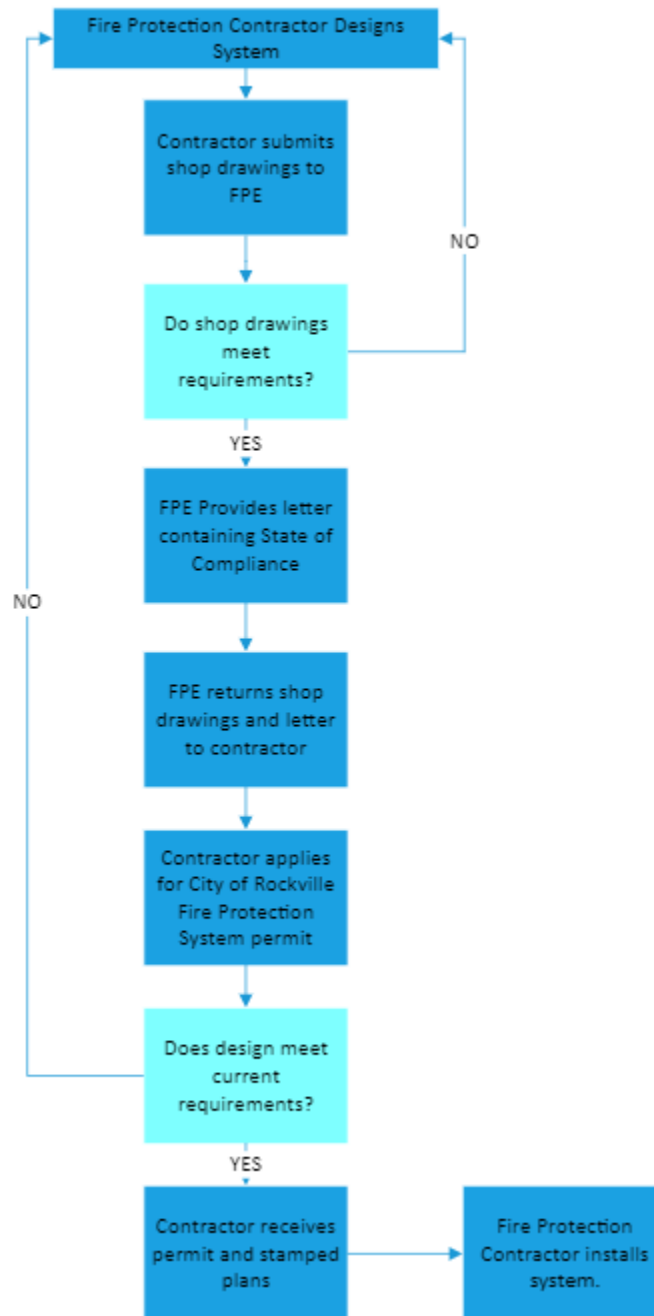
The following inspections and commissioning tests are conducted on fire protection systems. They will require the FPE first to complete the inspection and test and have any deficiencies corrected before calling for an inspection by the City of Rockville:

Commissioning Tests:

Underground Fire Protection Supply Piping
1. Hydrostatic Testing
2. Flushing
Sprinkler Systems
1. Hydrostatic Testing
2. Backflow Prevention Forward Flow Test
3. Dry Pipe Valve Trip Test
4. Final Installation
Standpipe Systems
1. Temporary Construction Standpipes
2. Hydrostatic Testing
3. Acceptance Flow Testing
4. Electrical Outlet (NEMA Connection) Testing
5. Pressure Reducing Valve Testing
Fire Pump
1. Acceptance Testing
Fire Alarm Systems
1. Acceptance Testing
Commercial Cooking Exhaust
1. Acceptance Testing
Two-Way Radio Communication Enhancement Systems
1. Acceptance Testing
Atrium Smoke Control, Stair Pressurization and Associated Doors
1. Acceptance Testing

Process Flowcharts:

FIRE PROTECTION SYSTEM PERMIT PROCESS



FIRE PROTECTION SYSTEM INSPECTION PROCESS

